



pennsylvania

DEPARTMENT OF TRANSPORTATION

Equipment and Lift Thickness Optimization for Structure Backfill Compaction Operations

FINAL REPORT

February 29, 2024

By Tong Qiu and Xiaobai Hu
Pennsylvania State University

PENNSTATE



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

CONTRACT # 4400023298
WORK ORDER # PSU 011



1. Report No. FHWA-PA-2024-004-PSU WO 011		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Equipment and Lift Thickness Optimization for Structure Backfill Compaction Operations				5. Report Date February 29, 2024	
				6. Performing Organization Code	
7. Author(s) Tong Qiu and Xiaobai Hu				8. Performing Organization Report No. LTI 2024-6	
9. Performing Organization Name and Address The Thomas D. Larson Pennsylvania Transportation Institute The Pennsylvania State University 201 Transportation Research Building University Park, PA 16802				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. 4400023298/512101	
12. Sponsoring Agency Name and Address The Pennsylvania Department of Transportation Bureau of Planning and Research Commonwealth Keystone Building 400 North Street, 6 th Floor Harrisburg, PA 17120-0064				13. Type of Report and Period Covered Final Report (8/31/22-2/29/24)	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract The objective of this research project is to identify the most efficient compaction procedure for AASHTO #1, #57, and #8 aggregates by varying equipment type (both heavy and lightweight), moisture content, lift thickness, roller speed/operation duration, and number of passes needed to meet the non-movement condition through a literature review, survey of Department of Transportations and Contractors, and a field compaction test program. Five pieces of compaction equipment, four lift thicknesses, and two moisture conditions were used in the field compaction tests. Based on the results of this research, the recommended lift thickness, roller speed/operation duration, number of passes, and moisture condition for the aggregate types and equipment types tested to meet the non-movement criteria consistently are presented in a matrix format.					
17. Key Words Aggregates, compaction, compaction energy, hand impact rammer, lift thickness, non-movement condition, smooth single-drum roller, trench-type roller, vibratory plate compactor				18. Distribution Statement No restrictions. This document is available from the National Technical Information Service, Springfield, VA 22161	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified		21. No. of Pages 434	22. Price \$225,737.70	

DISCLAIMER

This work was sponsored by the Pennsylvania Department of Transportation. The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Commonwealth of Pennsylvania at the time of publication. This report does not constitute a standard, specification, or regulation.

TABLE OF CONTENTS

TABLE OF CONTENTS.....	i
1 INTRODUCTION.....	1
1.1 Research Objectives	1
1.2 Scope and Work.....	2
1.3 Organization of the Report	2
2 LITERATURE REVIEW	4
2.1 Nomenclatures of Aggregates	4
2.2 Aggregates to be Studied.....	4
2.3 Compaction Equipment.....	5
2.3.1 Working Theory of Typical Compaction Equipment	5
2.3.2 Compaction Equipment Types to be Used.....	6
2.4 Field Compaction Variables	10
2.4.1 Moisture Content	10
2.4.2 Weight, Number of Passes, and Speed/Operation Duration	11
2.4.3 Lift Thickness	12
2.5 Light Weight Deflectometer Testing.....	13
2.5.1 ASTM Standards.....	14
2.5.2 Formulas to Calculate Elastic Modulus	15
2.5.3 Factors Impacting LWD Testing	16
2.5.4 Influence Depth of LWD Testing	19
2.6 Compaction Quality Control	19
2.7 Summary and Implications to Current Research.....	21
3 SURVEY	28
3.1 DOT Specifications	28
3.2 Construction Practices	29
3.3 Field Compaction Test Program.....	30
4 FIELD COMPACTION TESTS	31
4.1 Field Test Site.....	31
4.2 Aggregates.....	31
4.3 Compaction Equipment.....	32

4.4	Light Weight Deflectometer.....	33
4.5	Test Layout, Procedure, and Schedule	34
4.5.1	Test Layout	34
4.5.2	Test Schedule	37
4.5.3	Test Procedure	39
4.6	Test Results	42
4.7	Analysis of Test Results	44
4.7.1	Effect of Compaction Equipment	44
4.7.2	Effects of Aggregate Type and Moisture Condition.....	52
4.7.3	Effect of Lift Thickness	63
4.7.4	Successive Compaction	73
5	CONCLUSIONS AND RECOMMENDATIONS.....	76
5.1	Limitations, Conclusions, and Recommendations	76
5.1.1	Limitations	76
5.1.2	Compaction Equipment	76
5.1.3	Aggregate Moisture Condition	77
5.1.4	Maximum Loose Lift Thickness.....	78
5.1.5	Roller Speed, Minimum Operation Duration, and Minimum Number of Passes..	79
5.1.6	Compaction Equipment and Specification Recommendations.....	80
5.2	Recommendations for Future Research	80
	APPENDIX A	A-1
	APPENDIX B	B-1
	APPENDIX C	C-1

CHAPTER 1

INTRODUCTION

Compaction is the densification of soils and aggregates by application of mechanical energy. Compaction improves the soil behavior and engineering properties, such as increasing shear strength, decreasing hydraulic conductivity (for fine-grained soils – most PA subgrades), reducing settlement, improving slope stability, improving bearing capacity, reducing volume changes, and improving frost resistance (PennDOT 2020). Per PennDOT Publication 408 Section 206.3(a), when placing and compacting materials as specified in Sections 206.3(b)1.a (soil) and 1.b (Type 1 Granular Material), a compaction quality control (QC) Plan is needed, where specific criteria regarding the compacted dry mass density must be satisfied; however, a QC Plan is not required when placing and compacting materials as specified in Sections 206.3(b)1.c (Type 2 Granular Material), 1.d (rock), 1.e (shale), and 1.f (random material), where compaction is accepted based on a condition of non-movement, as determined by the Representative. Non-movement under compaction equipment is defined as creating a stable condition of the compacted material. A stable condition occurs when there is no rutting, displacement, or shear wave under compaction equipment. A shear wave is bulging of the material surface in front of and behind the compaction equipment (PennDOT 2020). Hence, the evaluation of non-movement condition is subjective and may create inconsistencies in compaction QC.

1.1 Research Objectives

The objective of this research project is to identify the most efficient compaction procedure for three (3) different PennDOT-approved structure backfill aggregate types by varying equipment type (both heavy and lightweight), moisture content, lift thickness, roller speed/operation duration, and number of passes needed to meet the optimal compaction criteria. More specifically, AASHTO #1, #8, and #57 aggregate types are to be included as part of the research effort. Per PennDOT Publication 408, Section 206.3(b), "...compaction is accepted based on a condition of non-movement, as determined by the Representative," for the three (3) aggregate types to be studied in this project.

Per Publication 408, Section 108, the following four equipment types are to be included as part of the research effort: smooth single-drum vibratory roller (Section 108.05(c)3.i), self-propelled trench-type roller (Section 108.05(c)3.d), hand operated impact rammer (Section 108.05(c)4.a), and vibratory plate compactor (Section 108.05(c)4.b). For the smooth single-drum vibratory roller, two weight classes will be used to investigate the effect of equipment weight on field compaction; for the other three (3) equipment types, the typical equipment for each equipment type will be used due to the limited range of equipment classes for these equipment types. Hence, a total of five (5) pieces of equipment, covering four (4) equipment types, will be used. All compaction equipment to be used in this study will meet the equipment factor requirements of Publication 408, Section 108.05(c).

Four lift thickness (loose) values: 100 mm (4"), 200 mm (8"), 300 mm (12"), and 375 mm (15") will be considered. Note that 100 mm (4") lift will only be compacted by light-weight equipment.

Given that they are free-draining materials, AASHTO #57 and #8 aggregates will be tested in “surface-dry” and “surface-saturated” conditions to investigate the effect of moisture condition on compaction, where as AASHTO #1 aggregates will be tested in a typical moisture content representing field moisture condition from quarry.

1.2 Scope of Work

To accomplish the research objectives, this project consists of the following major tasks:

Literature review – This task involves a detailed literature review of all available research data and reports concerning the compaction of AASHTO #1, #8, and #57 aggregates for structural backfill, particularly when the four (4) equipment types are used. All factors affecting the compaction were taken into consideration, including variation in moisture condition, lift thickness, roller speed/operation duration, and number of passes. Relevant criteria for compaction quality control of these materials in the literature were compiled.

Survey – This task involves a survey on the compaction practice of AASHTO #1, #8, and #57 aggregates for structural backfill using the four (4) equipment types. The survey questions were electronically distributed to other State DOTs, relevant agencies, and contractors experienced in aggregate compaction. Topics addressed in the survey included moisture condition, lift thickness, roller speed/operation duration, and number of passes used in practice, as well as other topics revealed to be important from the literature review. This survey was designed and distributed by the Penn State team after review and approval by the PennDOT Technical Advisor.

Field Compaction Tests – Based on the results of the literature review and survey, a field compaction test program involving different combinations of moisture condition, lift thickness, roller speed/operation duration, and number of passes for these aggregate types using the four (4) equipment types was proposed by the Penn State team and approved by the PennDOT Technical Advisor. Twenty-five (25) days of field compaction tests on AASHTO #1, #8, and #57 aggregates were conducted.

Conclusions and Recommendations – This task involves compiling a final report that integrates all task reports and includes a matrix indicating the recommended lift thickness, roller speed/operation duration, number of passes, and moisture condition for the aggregate types and equipment types tested to meet the non-movement criteria consistently.

1.3 Organization of the Report

This report consists of five chapters. Chapter 1 presents background information, the scope of work and research objectives, and the organization of this report. Chapter 2 presents a summary of the literature review. Chapter 3 presents a summary of the survey responses; the survey questions and individual responses received are presented in Appendix A. Chapter 4 presents the field test site, the aggregates tested, the compaction equipment used, the test procedures, the test results, and their analyses. Detailed test results are presented in tabular format in Appendix B and graphic format (i.e., figures) in Appendix C. Chapter 5 presents analyses of the test results and a matrix with the recommended lift thickness, roller speed/operation duration, number of passes,

and moisture condition for the aggregate types and equipment types tested to meet the non-movement criteria consistently.

CHAPTER 2

LITERATURE REVIEW

This chapter presents a detailed literature review of all available research data and reports concerning the compaction of AASHTO #1, #57, and #8 aggregates for structural backfill, particularly when the following four (4) equipment types are used: smooth single-drum vibratory roller, self-propelled trench-type roller, hand operated impact rammer, and vibratory plate compactor according to PennDOT Publication 408, Section 108. All factors affecting the compaction are taken into consideration, including variation in moisture condition, lift thickness, roller speed/operation duration, and number of passes. Relevant criteria for compaction quality control of these materials in the literature are compiled.

2.1 Nomenclatures of Aggregates

According to ASTM D2487-17, gravels have particle sizes that pass the 76.2 mm (3") and are retained on the 4.75 mm (#4 sieve), sands have particle sizes that pass the 4.75 mm (#4 sieve) and are retained on the 0.075 mm (#200 sieve), and fines (silts and clays) have particle sizes that pass the 0.075 mm (#200 sieve). In AASHTO specifications, however, the cutoff size between gravel and sand is 2 mm (#10 sieve). Based on Pub 408 (2020) Sections 703.1 (Fine Aggregate) and 703.2 (Coarse Aggregate), PennDOT's definitions of fine aggregate and coarse aggregate are generally consistent with ASTM's definitions of sand and gravel, respectively; hence, nomenclatures of aggregates consistent with ASTM and PennDOT definitions are used in the following sections.

2.2 Aggregates to be Studied

The gradation requirements for AASHTO #1, #57, and #8 aggregates, per PennDOT Publication 408, Section 703.2(c), are shown in Table 2-1. These aggregates are open-graded aggregates (OGA) or poorly graded aggregates, and can be rounded or angular and classified as GP (poorly-graded gravel) according to the Unified Soil Classification System (USCS) in ASTM D2487-17. These aggregates are used in a variety of structure backfill applications, including retaining wall backfill and foundation support. They are selected primarily because of their strength, excellent drainage properties due to very low fine content, low frost heave potential, and speed of placement in the field.

Table 2-1. Gradation Requirements for Aggregates to be Studied

AASHTO #	Total Percent Passing												
	100 mm (4")	90 mm (3 1/2")	75 mm (3")	63 mm (2 1/2")	50 mm (2")	37.5 mm (1 1/2")	25 mm (1")	19.0 (mm) (3/4")	12.5 (mm) (1/2")	9.5 (mm) (3/8")	4.75 mm (No. 4)	2.36 mm (No. 8)	1.18 mm (No. 16)
1	100	90-100		25-60		0-15		0-5					
57						100	95-100		25-60		0-10	0-5	
8									100	85-100	10-30	0-10	0-5

2.3 Compaction Equipment

2.3.1 Working Theory of Typical Compaction Equipment

Compacting equipment densifies soil by applying one or a combination of the following types of compaction effort: static pressure, impact, vibration, and kneading. These different types of effort are found in the following two principal types of compaction forces: static and vibratory (Multiquip 2011).

Static force is often the deadweight of the machine, applying a downward force on the soil surface, compressing the soil. The effective compaction force can be changed by adding or reducing the weight of the machine. Static compaction is typically limited to soils/materials near the surface and is most effective for thin layers of non-granular materials and asphalt (Allied 2004). Kneading and static pressure are two examples of static compaction.

Vibratory force uses impact or vibration, usually engine-driven, to create a downward dynamic force in addition to the machine's static weight. The mechanism is usually a rotating eccentric weight or piston/spring combination (in rammers). Impact compaction equipment (e.g., rammers, tampers) generates a low-frequency, long-stroke motion, which can break soil "clumps" into smaller pieces and rearrange the pieces together. Impact compaction is effective for soils with less than 50% granular content (i.e., fine-grained soils). On the other hand, vibration compaction equipment generates a higher-frequency, shorter-stroke motion, resulting in stress waves propagating through the soil, setting particles in motion and rearranging them into a higher density. Vibration compaction is effective for soils with 50% or more granular content (i.e., coarse-grained soils) (Allied 2004).

A comparison of the relative performance of typical compaction equipment for different soil types is presented in Table 2-2, which indicates that vibration is effective in densifying granular soils (i.e., sand and gravel). Figure 2-1 shows an application chart of compaction equipment to different soil types as commonly used in practice. When vibration is added to a static component, compaction is significantly increased, as shown in Figure 2-2. For soils compacted on the dry side of optimum, adding the dynamic component results in increased density (Holtz and Kovacs 1981).

Table 2-2. Relative Performance of Typical Compaction Equipment for Different Soil Types (after Multiquip 2011)

Soil Types	Vibrating Sheepsfoot Rammer	Static Sheepsfoot Grid Roller Scraper	Vibrating Plate Compactor Vibrating Roller Vibrating Sheepsfoot	Scraper Rubber-tired Roller Loader Grid Roller
	Impact	Static Pressure with kneading	Vibration	Kneading with static pressure
Gravel	Poor	Not used	Good	Very good
Sand	Poor	Not used	Excellent	Good
Silt	Good	Good	Poor	Excellent
Clay	Excellent	Very Good	Not used	Good

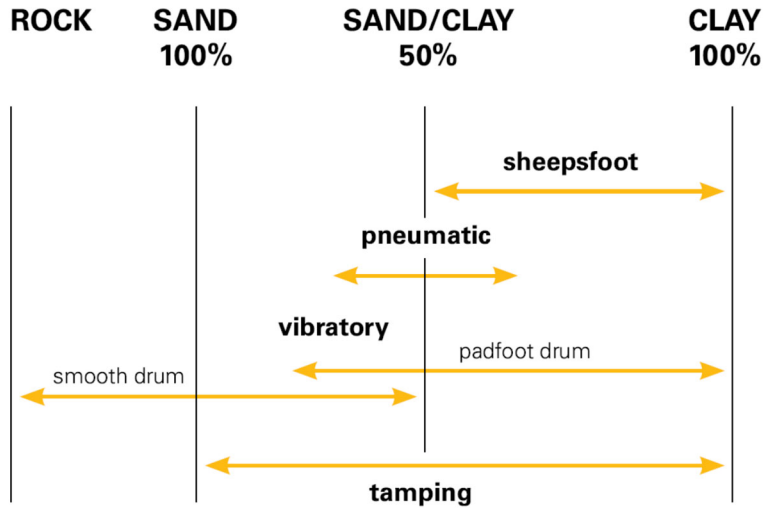


Figure 2-1. Application chart of compaction equipment to different soil types (from Caterpillar 2014).

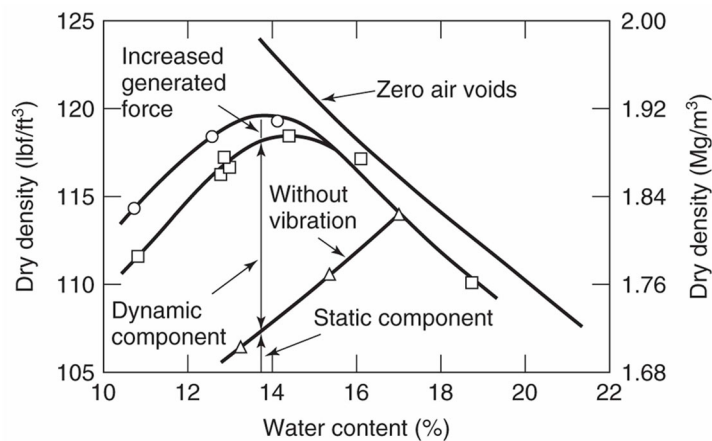


Figure 2-2. Compaction results on 300 mm (12") layers of silty sand, with and without vibration, using a 7700 kg (17000 lb) towed vibratory roller (after Parsons et al. 1962, as cited by Selig and Yoo 1977).

2.3.2 Compaction Equipment Types to be Used

Smooth Single-drum Vibratory Roller

Smooth drum rollers are used to compact soils and asphalt pavements. This type of equipment applies a uniform static load over the width of the drum and has the advantage of providing 100% coverage and a smooth finished surface. The static pressure applied by the smooth drum rollers is modest, typically about 300-380 kPa (45-55 psi), which may be adequate for compacting a thin lift of aggregate base course but inadequate for other aggregate types or greater lift thicknesses (Nicholson 2015). Vibratory rollers are similar in appearance to static roller compactors, with the addition of oscillating motors that apply eccentric loads, impact and vibrations to the soil. The vibratory action can result in more effective compaction of aggregates.

Compaction results are a function of the frequency and amplitude of the vibration of the vibrating drum, as well as the vibratory forces and the duration over which the forces are applied. Figure 2-3 shows the effect of vibration frequency, f , on compaction by smooth single-drum vibratory rollers for different soils. Figure 2-3 indicates that a peak in the density-frequency curve develops for most soils, including clays. The frequency at which a maximum density is achieved is called the optimum frequency (or resonant frequency, f_r), which is a function of the compactor-soil system, and it changes as the density increases during the process of compaction (Bernhard 1952; Converse 1952; Holtz and Kovacs 1981). Wersäll and Larsson (2013) discussed the history of soil compaction research with respect to f thoroughly. Granular soil particles (e.g., sand and gravel) respond to different vibration frequencies differently depending on particle size. The smaller the particle, the higher the frequency necessary to move/excite it. For compacting soils consisting of large particles, moving up to a larger compactor with a lower frequency and higher vibration force may be advantageous. Therefore, it is desirable for a compactor to have the capability to vary its operating frequency and have the frequency range required to obtain the maximum density. However, the peaks are gentle as shown in Figure 2-3 and a wide frequency range may not be important (Holtz and Kovacs 1981). Figure 2-3 suggests that vibrations provided by smooth single-drum vibratory rollers tend to be most effective at frequencies of 1000-3500 cycles per minute (approximately 17-60 Hz); for AASHTO #1, #57, and #8 aggregates, the effective vibration frequency tends to be lower than 1500 cycles per minute (approximately 25 Hz) due to their large particle sizes.

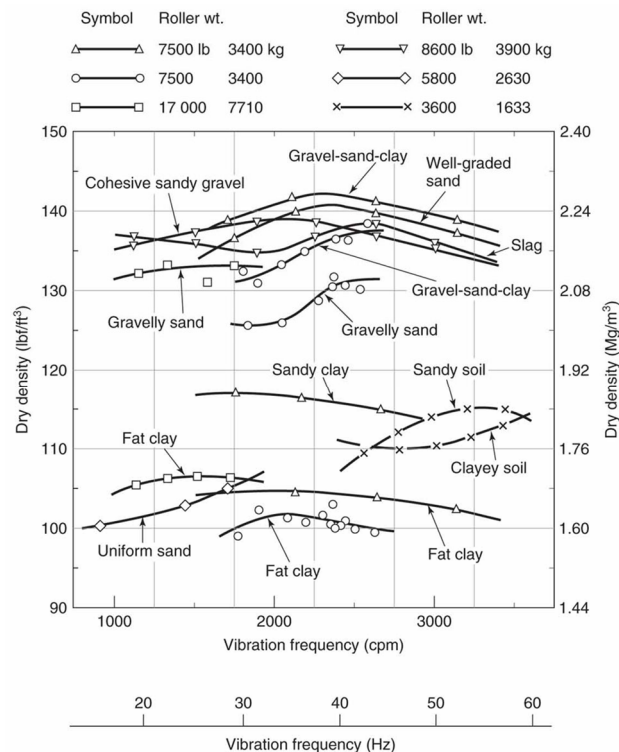


Figure 2-3. Effect of vibration frequency on compaction by smooth single-drum vibratory rollers (after several sources as cited by Selig and Yoo 1977).

Wersäll et al. (2017) conducted a major investigation on the effect of vibration frequency on soil compaction using a smooth single-drum vibratory roller (Dynapac CA3500D model) operated under variable frequency between 15 and 35 Hz. The aggregates tested were classified as GW (well-graded gravel) and had similar percentage of aggregates larger than 9.5 mm (3/8") as AASHTO #57 aggregate, but higher percentage of aggregates smaller than 4.75 mm (No. 4 sieve) than AASHTO #8 aggregate. A natural moisture content of 2% was used in their field compaction tests. They observed that for their site, f_r was approximately 18 Hz while the standard operating frequency of the roller was 31 Hz; hence, a decrease of operating frequency of about 10 Hz could lead to a considerable reduction in energy consumption, which in turn decreases fuel consumption, environmental impact and machine wear.

Per Publication 408, Section 108.05(c)3.i, smooth single-drum vibratory rollers of a self-propelled type should have a minimum drum width (W_d) of 48 in and a minimum vibratory roller factor (RF_v) of 2.0 using the following equation:

$$RF_v = (F_c \times (f \times A)^2) / (W_d \times 1000) \quad (2-1)$$

where RF_v = vibratory roller factor (dim); F_c = maximum centrifugal force (lb); f = minimum vibration frequency (Hz); A = maximum vibration amplitude (in); and W_d = drum width (in). The vibratory rollers must be capable of achieving the required density without objectionable undulations, material pickup, or other surface defects. Use a vibrator drive that automatically stops when the roller changes direction or stops.

Self-propelled Trench-type Roller

Self-propelled trench-type rollers are used in trenches, confined workspace, large area of compaction, and structure backfill applications. This type of rollers can be used for a wide range of soils due to their capability of being operated in both static and vibratory modes. Per Publication 408, Section 108.05(c)3.d, self-propelled trench-type rollers should have a minimum RF_t of 2.0 using the following equation:

$$RF_t = (F_c \times (f \times A)^2) / (W_d \times 650) \quad (2-2)$$

where the parameters are similarly defined as those in Equation (2-1). Trench-type rollers may be hand operated or remotely controlled. Use trench rollers capable of being operated in both static and vibratory modes. Roller drums must have alternating rows of raised pads across the entire drum width and be equipped with scraper bars at each drum to assist in removal of soil from between the pads. Smooth steel drums are prohibited. Supply manufacturer's technical data, measured data, and the serial number for the specific trench roller being used to the Representative before beginning compaction operations. Verify that the roller meets the minimum requirements. Equipment that does not meet the minimum requirements will be rejected. Operate equipment in accordance with manufacturer's recommendations and at a frequency and amplitude to provide the minimum required RF_t .

Hand-operated Impact Rammer

Hand-operated impact rammers (jumping jacks) are used for compaction of granular, mixed, and cohesive soils. Applications include compaction of backfill in difficult locations (e.g., corners, edges against walls and abutments and around foundations), subgrades underneath footings, base preparation for concrete work, and backfill compaction for pipeline and cable trenches (however note that the proposed research does not evaluate a trench condition). This type of rammer usually applies high impact force with a frequency range of around 500-750 blows per minute. Per Publication 408, Section 108.05(c)4.a, hand-operated impact rammer (jumping jack) should have a minimum required impact rammer factor (RF_i) of 2.0 using the following equation:

$$RF_i = (w_o \times (f \times A)^2) / (W_p \times L_p \times 400) \quad (2-3)$$

where RF_i = impact rammer factor (dim); w_o = operating weight (lb); f = percussion rate or frequency (Hz); A = rammer stroke or amplitude (in); W_p = rammer plate width (in); and L_p = rammer plate length (in). The rammer plate length and width must be reported as the actual dimensions of the plate. Verify that the plate dimensions reported on the manufacturer's technical data sheet are correct for the actual impact rammer being used. Use rammer plates constructed of steel. Plastic, rubber, or wood rammer plates are prohibited. Operate equipment in accordance with manufacturer's recommendations and at a percussion rate and stroke to provide the minimum required RF_i.

Hand-operated Vibratory Plate Compactor

Hand-operated vibratory plate compactors are mainly used for compaction of granular soils (e.g., sand and gravel) in narrow and restricted areas where it is not possible or economical to use large compaction equipment, such as areas adjacent to structures in structure backfill applications. This type of compactors have a heavy plate on the bottom, which moves rapidly up and down. In combination with rapid impacts, plate weight, and impact forces, the soil underneath is compacted. It generally takes two to four passes to achieve proper compaction, depending on the manufacturer's recommendations, lift thickness, and aggregate type. With a given contact stress between the plate and soil, an increase in plate dimensions results in a greater effective compaction depth due to the combination of an increase in the total vertical force and more confinement for the soils below the plate. Some field compaction tests have indicated that high compacted dry densities were obtained to depths of one and a half time of the width of plate (e.g., Converse 1952). Per Publication 408, Section 108.05(c)4.b, hand-operated vibratory plate compactors should have a minimum vibratory plate factor (PF_v) of 2.0 using the following equation:

$$PF_v = (F_c \times (f \times A)^2) / (A_p \times 100) \quad (2-4)$$

where PF_v = vibratory plate factor (dim); A_p = effective plate area (in²); and the rest of the parameters are similarly defined as those in Equation (1-1). The effective plate area must be reported as the actual area of the bottom surface of the plate in contact with the ground when placed on a firm surface. Verify the effective plate area in the presence of the Representative. Use vibratory plates constructed of steel. Plastic, rubber, or wood plates are prohibited. Operate equipment in accordance with the manufacturer's recommendations and at a frequency and amplitude to provide the minimum required PF_v.

2.4 Field Compaction Variables

The quality of field compaction may be affected by a number of factors, including material type, moisture (water) content during compaction, weight, number of passes and speed/operation duration of the compaction equipment, type of compactor and compaction method, and lift thickness. The type of compactor and compaction method and their applicability to different material types are discussed in Section 2.3 and, hence, not presented in the following sub-sections; the other variables are discussed below.

2.4.1 Moisture Content

Moisture (water) content has a profound effect on the compacted dry density, soil structure, and engineering properties of fine-grained soils. Figure 2-4 shows that as particle size increases, the optimal moisture content (OMC) decreases due to the decrease in surface area; for example, OMC is approximately 15% for the lean sandy silty clay (Soil 4) and decreases to approximately 7% for the well-graded loamy sand (Soil 1).

Qiu et al. (2014 and 2019) conducted a series of field compaction tests using a 50-50 blend of PennDOT 2A and 2RC materials so that the standard Proctor test (ASTM D698-12) could be performed on the mix and the nuclear density gauge tests could be performed to verify the compacted dry mass density. Figure 2-5 shows the grain size distribution of the mix, which can be classified as GW (well-graded gravel). Based on the standard Proctor test, the mix had an OMC of 7.7%. Figure 2-5 shows that the mix had similar percentage of aggregates larger than 9.5 mm (3/8") as AASHTO #57 aggregate, but higher percentage of aggregates smaller than 4.75 mm (No. 4 sieve) than AASHTO #8 aggregate. In a NCHRP report (Project 10-84), Nazarian et al. (2014) reported an OMC of 5.7% (standard Proctor test) for an El Paso base material (classified as poorly-graded gravel, GP) that has a gravel content of 66%, sand content of 30%, and fines content of 4%, which contains significantly more aggregates smaller than 2.36 mm (No. 8 sieve) than AASHTO #8 aggregate. Wiman (2006) reported an OMC of 3.7% (standard Proctor test) for a natural gravel material.

For AASHTO #1 aggregate, the standard Proctor test cannot be performed due to the large aggregate size; hence, there are no reported OMC values for this aggregate. For AASHTO #57 and #8 aggregates, the reported OMC values are generally at the lower end of the values reported in this section due to their larger particle sizes than those reported.

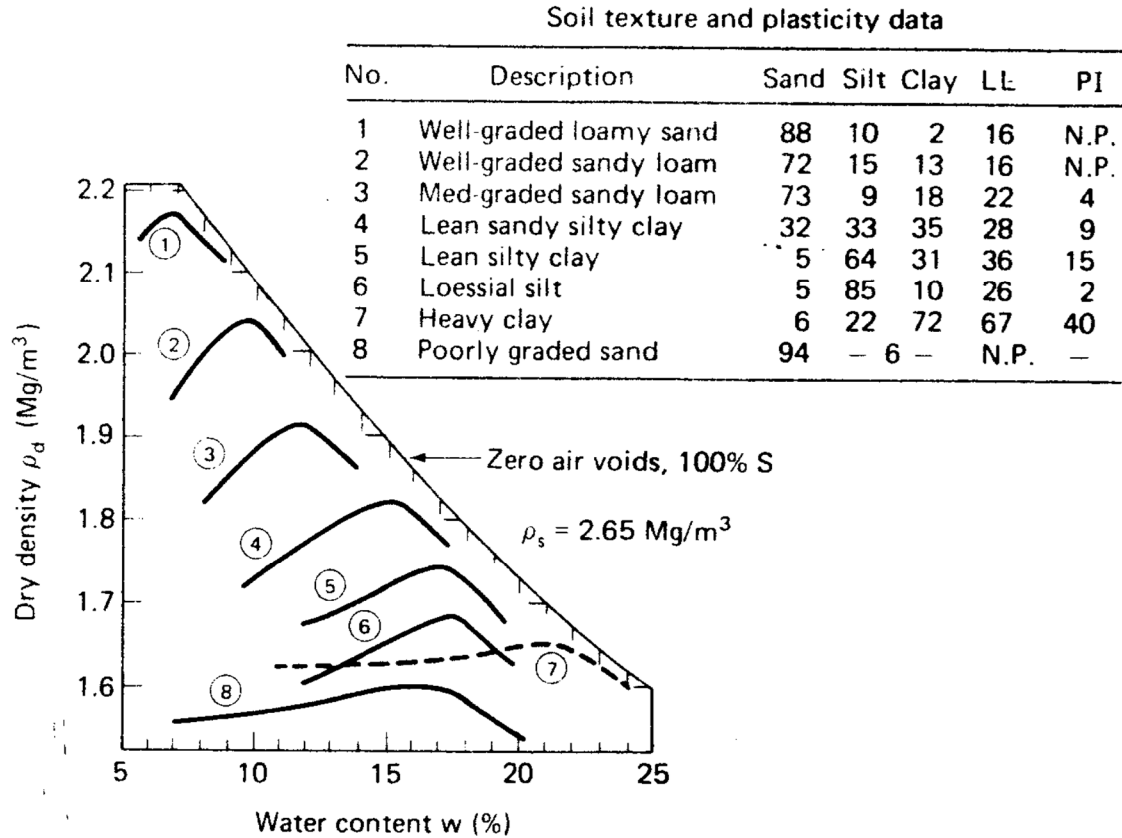


Figure 2-4. Water content vs. dry density for eight soils compacted according to the standard Proctor method (after Johnson and Sallberg 1960).

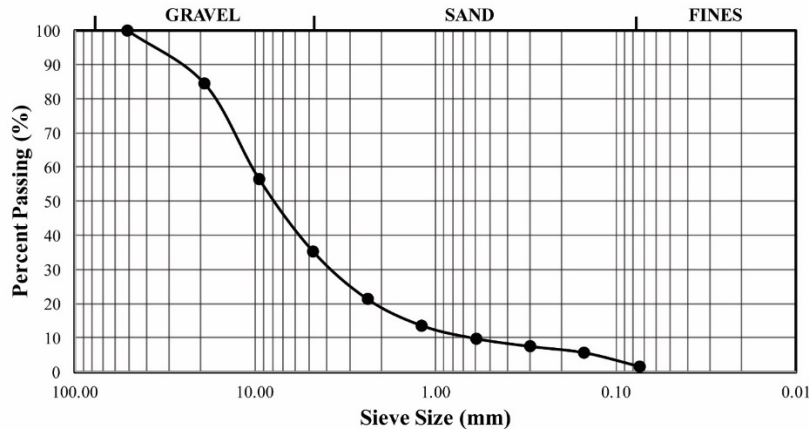


Figure 2-5. Grain size distribution of 2A aggregates used by Qiu et al. (2014 and 2019).

2.4.2 Weight, Number of Passes, and Speed/Operation Duration

The combination of compactor weight, dynamic forces, and number of passes in the field are analogous to the compactive effort delivered by a standardized laboratory test (Nicholson 2014). Generally, 4-8 passes are normally needed with a 10-ton vibratory compactor to economically achieve desired compaction results. Choi et al. (2018) conducted a series of field compaction using

a 10-ton smooth single-drum vibratory roller on five OGAs, which have gradations similar to two of the three aggregate types within this study, AASHTO #57 and #8 aggregates. They found that the modulus of the compacted aggregate steeply increased when advancing from one to four roller passes and up to two lift thicknesses (12" lift thickness), for most of the OGA materials considered; the modulus continued to increase as the number of passes increased beyond four passes, but with declined trends. Hence, the minimum of four roller passes recommended by Smith (2011) and Eisenberg et al. (2015) is efficient, but one can expect continuous stiffening of the compacted surface of OGAs for larger number of roller passes than four. The general requirement of 4-8 passes is also supported by discrete element method (DEM) simulations of field compaction of gravel-sized particles by Liu et al. (2020) and field compaction of rockfill materials as reported by Ye et al. (2022). For the construction of geosynthetic reinforced soil (GRS) integrated bridge system (IBS), FHWA recommended a procedural specification for compaction of OGA, where three to five passes with a walk-behind vibratory plate compactor near the wall face can be used and larger ride-on vibratory rollers with greater frequency and efficiency can be used in the core of the GRS mass with fewer passes 3' from the wall face (Adams et al. 2012). In PennDOT Publication 447, MS-0460-0011, a minimum of four vibratory passes per lift is specified for OGA backfills in abutments.

Faster compaction speeds will allow more area to be compacted for a given time. However, if compaction is conducted too quickly, there may not be enough time for the necessary deformations/densification to take place. In this case, additional passes would be required to complete the compaction process. Slower equipment traveling speeds are often necessary, especially when using vibratory equipment. Slower speeds of vibratory equipment allow more time for additional vibrations at a given point, resulting in better compaction. Compaction equipment usually has travel speeds between 5 and 15 mph. For vibratory compactors, a speed of 0.6-1.6 mph for rock and clay, and 1.2-3 mph for gravel and sand typically provides the best results (Caterpillar 2014).

2.4.3 Lift Thickness

Figure 2-6 shows the conceptual vertical stress distribution induced by the wheel of a moving compactor. The combination of both static and dynamic loads under the wheel contributes to the densification of soils (Kim et al. 2014). As the thickness of a lift increases, compaction efficiency decreases due to the compaction energy dissipation with depth. Hence, a thick lift may result in under-compacted regions at the bottom of the lift. It should be noted that granular soils may not be well compacted near the surface due to the lack of confinement and may be looser at the surface than prior to compacting (Nicholson 2014). Figure 2-7(a) shows the compacted density increases with depth to a point, corresponding to the maximum combined effect of confinement and compaction energy, and then decreases afterwards. For multiple lifts, Figure 2-7(b) shows that the minimum density in the compacted fill is at the juncture of the overlap between density curves for each successive lift. A balance must be made between compaction quality which favors thinner lifts and volume productivity which favors thicker lifts. Typical maximum allowed loose lift thicknesses range between 150-300 mm (6-12"), with higher thickness allowed for larger, heavier, and more dynamic equipment and for greater particle sizes (e.g., rockfill). Based on field tests, Tatsuoka (2015) indicated that a lift thicker than around 300 mm (12") may result in significant decrease in dry density with depth in a single soil layer, even when heavy compaction machinery

is used. The maximum loose lift thickness of 300 mm (12") for quality control is also supported by a series of field compaction investigation by Qiu et al. (2014 and 2019, see Section 2.4.1 for more details of the aggregates tested).

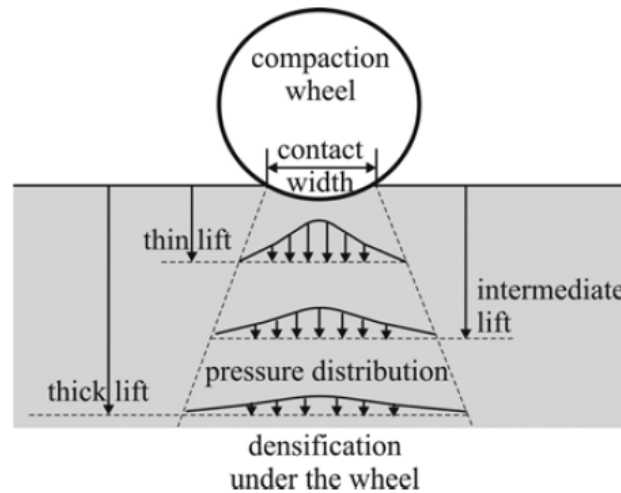


Figure 2-6. Conceptual stress distributions induced by compaction wheel for various lift thicknesses (from Kim et al. 2014).

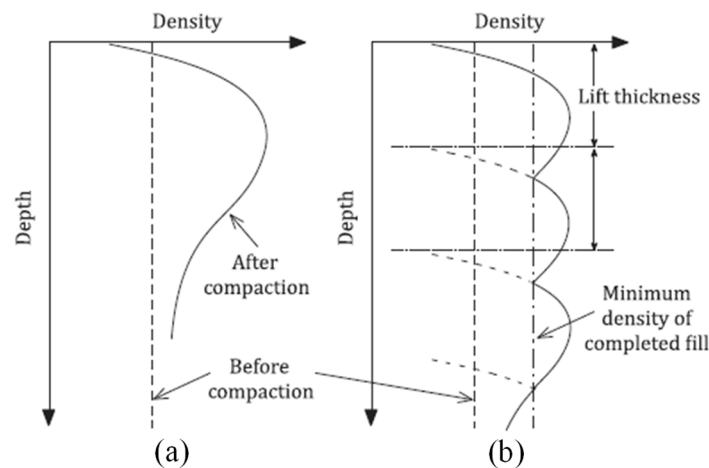


Figure 2-7. Example of density vs. depth for compacting lifts of sandy soil: (a) single lift; (b) multiple lifts (from Nicholson 2014).

2.5 Light Weight Deflectometer Testing

The most commonly used parameter to assess compaction quality is the maximum dry density; however, a target modulus is often directly used in backfill designs rather than dry density (Lin et al. 2006; Schwartz et al. 2017). A promising and relatively new technique is to use a light weight deflectometer (LWD) to measure the elastic modulus of a compacted surface directly in the field. LWD is portable, making it convenient to measure the stiffness of compacted surfaces even in small spaces and in a short amount of time. LWD is also safer than nuclear density gauges (NDG) due to the required radiation-safe operation of NDG (Schwartz et al. 2017).

2.5.1 ASTM Standards

LWD devices in the U.S. follow two American Society for Testing and Materials (ASTM) standards: ASTM E2583 *Standard Test Method for Measuring Deflections with a Light Weight Deflectometer (LWD)* and ASTM E2835 *Standard Test Method for Measuring Deflections using a Portable Impulse Plate Load Test Device*. Figure 2-8 shows typical schematic diagrams of LWD devices following these standards. Although devices following both standards theoretically perform the same tests, they produce different deflections under the same applied load. The differences in the LWD responses are partly attributed to the different load pulse shapes of the LWD devices, differences in deflection transducers and their location, and plate contact stress, among other factors that affect the calculation of the elastic modulus (Vennapusa and White 2009).

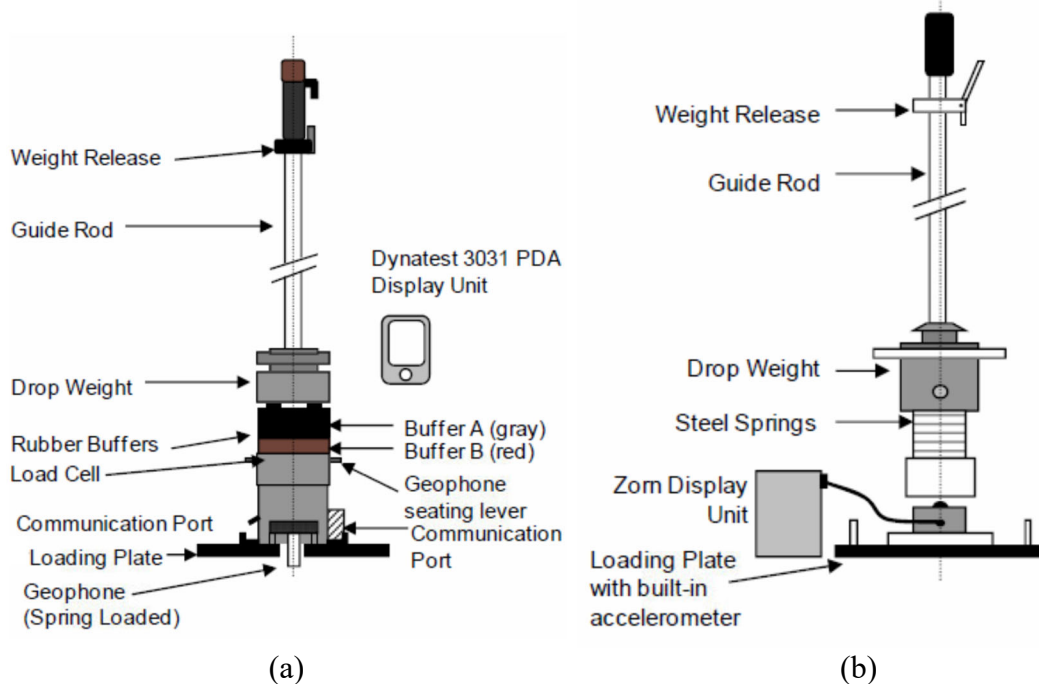


Figure 2-8. Schematic diagrams of LWD devices following different standards: (a) ASTM E2583; (b) ASTM E2835 (from Carrasco et al. 2014).

As can be seen in Figure 2-8 above, the main structures of LWD devices include:

Drop weight: A weight with known mass for the deflection test.

Weight release: Fixing the drop weight at a determined height. Some weight release mechanisms can adjust the release height of the drop weight along the guide rod for a desired impact force or deflection.

Guide rod: A smooth rod to guide the drop weight to impact the buffer from a desired height.

Buffer: A cushion to smooth the impact force, which is usually made of steel spring, rubber, or urethane.

Load cell: For determining the applied impact force to the tested surface through sensors such as geophone, accelerometer, etc.

Loading plate: To apply load from drop weight to the tested surface; the deflection of the loading plate is recorded by geophone, accelerometer, etc. LWD devices following ASTM E2583 have an annulus loading plate (see Figure 2-8(a)) and tend to measure soil deflection in the center hole of the loading plate; LWD devices following ASTM E2835 have a solid plate and tend to measure plate deflection.

Additional sensors: Some LWD devices have additional sensors to measure the surface deflection at several radial distances from the center of the loading plate.

2.5.2 Formulas to Calculate Elastic Modulus

The elastic modulus from LWD tests, E_{LWD} , is calculated using the following equation (Mooney and Miller 2009):

$$E_{LWD} = \frac{2F_{pk}(1-\nu^2)}{A_1rw_o} \quad (2-5)$$

where F_{pk} = maximum load applied by the LWD device; w_o = maximum deflection measured by the LWD device; A_1 = stress distribution factor; ν = Poisson's ratio of the tested geomaterial; and r = radius of the loading plate. Equation (2-5) is based on elastic half-space theory assuming homogeneous, isotropic, and linear elastic soil behavior (Mooney and Miller 2009). Theoretically, the stress distribution factor depends on the relative rigidity, K , of the loading plate to that of the tested geomaterial:

$$K = \frac{E_p(1-\nu_p^2)}{6E(1-\nu^2)} \left(\frac{t_p}{r}\right)^3 \quad (2-6)$$

where E_p and E are the elastic modulus of the loading plate and geomaterial, respectively; ν_p and ν are the Poisson's ratio of the loading plate and geomaterial, respectively; and t_p = thickness of the loading plate. For $K = 0$, the loading plate is considered flexible and the contact stress distribution is uniform; for $K = \infty$, the loading plate is considered perfectly rigid and the contact stress at the center of the loading plate is half of the applied stress (Suits et al. 2009; Duddu and Chennarapu 2022). Table 2-3 shows the typical stress distribution factors and stress distribution for different geomaterials in LWD calculations (Schwartz et al. 2017). From Equation (2-5), E_{LWD} values can vary 127 % to 170 % depending on the assumed stress distribution factor A_1 (see Table 2-3).

Table 2-3. Stress Distribution Factor and Stress Distribution

Geomaterial type	Stress Distribution Factor (A_1)	Stress Distribution
Mixed soil (uniform)	π	
Granular material (parabolic)	$3\pi/4$	
Cohesive (inverse-parabolic)	4	

2.5.3 Factors Impacting LWD Testing

Various factors influence the results of LWD testing, including ASTM standards, drop height, drop weight, and load plate size. The effects of these factors are discussed in this section.

Effect of ASTM Standards – It has been documented that LWD devices following the ASTM E2583 and ASTM E2835 standards provide different measurements of the deflection and E_{LWD} values for the same soil (Thom and Fleming 2002; Fleming et al. 2002; Hildebrand 2003; Vennapusa and White 2009). In LWD devices following the ASTM E2583 standard, the deflection of soil in the center hole of the loading plate is measured and used to calculate E_{LWD} (see Figure 2-8(a)); in LWD devices following the ASTM E2835 standard, the deflection of the loading plate is measured and used to calculate E_{LWD} (see Figure 2-8(b)).

Stamp and Mooney (2013) conducted LWD testing on 14 test beds at five test sites comprising granular subbase, granular base, lime-stabilized clay subgrade, and asphalt using different LWD devices. Figure 2-9 shows a comparison of w_o/F_{pk} (see Equation 2-5)) from LWD devices following ASTM E2583 and E2835 standards on these sites. Figure 2-9 shows that plate-measured (i.e., ASTM E2835) w_o/F_{pk} exceeded ground surface (i.e., ASTM E2583) w_o/F_{pk} by 40% to 200% on soil surfaces and by 20 % on asphalt surface. According to Stamp and Mooney (2013), the nature of the difference is due to a time delay in the plate and ground surface deflection response, and the physical cause is likely linked to particulate behavior in the annulus and plate–ground contact areas. LWDs built to ASTM E2835 and ASTM E2583 specifications will always produce different E_{LWD} values, and the relationship between these results is difficult to predict.

Effect of Drop Height and Drop Weight – Drop height and drop weight affect E_{LWD} since the plate contact stress increases as the drop height increases and/or the drop weight increases. Fleming et al. (2000) investigated the influence of plate contact stress using a Prima LWD (following ASTM E2583 standard) by altering the drop height on gravelly silty clay subgrade and granular capping layers. Results showed that the E_{LWD} values increased by approximately 1.15 to 1.3 times with increasing plate contact stress from 35 kPa to 120 kPa (5-17 psi). In contrast, Lin et al. (2006) concluded that the effect of drop height on E_{LWD} is insignificant based on tests on a natural sandy soil deposit using a Prima LWD (following ASTM E2583 standard). Camargo et al. (2006) showed that by increasing the drop height from 25 cm (1") to 75 cm (3"), the E_{LWD} values increased, on average, approximately 1.1 times on a compacted granular material (AASHTO classification: A-

1-b). Based on tests conducted on very stiff crushed aggregate and stabilized aggregate material (E_{LWD} values between 8.6 ksi and 11.9 ksi), van Gorp et al. (2000) reported that the E_{LWD} values did not vary significantly (<3% change) for a plate contact stress range of 140 kPa to 200 kPa (20-29 psi). Chaddock and Brown (1995) observed that E_{LWD} decreased with increasing plate contact stresses at locations of thin granular capping (6") over softer clay subgrade, and increased at locations of thicker granular layers. Based on the discussion above, it appears that for dense and compacted granular materials, E_{LWD} tends to increase with increasing contact stresses, except where the values are influenced by underlying softer subgrade materials. Some materials, however, may not be as sensitive to changes in contact stress (e.g., materials described in van Gorp et al. 2000).

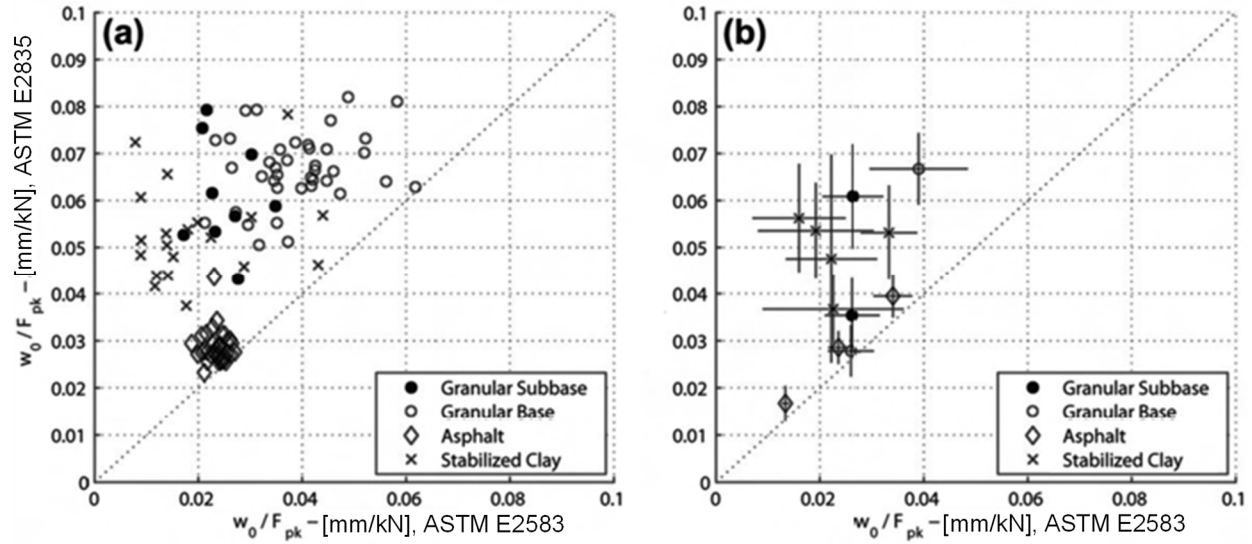


Figure 2-9. Comparison of w_o/F_{pk} from LWD devices following ASTM E2583 and E2835 standards: (a) on four typical test beds; (b) on all test beds. Data points reflect mean values, and scatter bars reflect standard deviation (from Stamp and Mooney 2013).

Effect of Load Plate Size – Terzaghi (1955) proposed the following equations to estimate the modulus of subgrade reaction, k_s (kPa/m), for different footing sizes from plate load tests:

$$k_s = k_1 \frac{B_1}{B} \quad [\text{for footings on clay}] \quad (2-7)$$

$$k_s = k_1 \left(\frac{B+B_1}{2B} \right)^2 \quad [\text{for footings on sand}] \quad (2-8)$$

where B_1 = side dimension of a square plate used in load test (mm); B = width of footing (m); and k_1 = stiffness estimated from a static plate load test (kPa/m). According to these equations, k_s determined from a 200-mm (8") plate is approximately 1.45 times (for sand) to 1.5 times (for clay) greater than that from a 300-mm (12") plate. Figure 2-10 shows the influence of plate diameter with comparisons to experimental data from several researchers (Stratton 1994; Chaddock and Brown 1995; Lin et al. 2006; Vennapusa and White 2009) using static plate load tests and LWDs; results are shown by plotting k_s or E_{LWD} normalized to that from a 300-mm (12") diameter plate load test. For example, Lin et al. (2006) conducted LWD tests on a natural sandy soil deposit

(AASHTO classification: A-1-b) and found that E_{LWD} from a 100-mm (4") plate was approximately 1.5 to 1.6 times higher than that from a 300-mm (12") plate at similar applied loads, as shown in Figure 2-10.

The manufacturer of Prima LWD suggests selecting plate sizes based on the material stiffness. For example, when E_{LWD} is less than 125 MPa (18 ksi), the recommended plate size is 300 mm (12"). For E_{LWD} between 125 MPa (18 ksi) and 170 MPa (25 ksi) and above 170 MPa (25 ksi), the 200-mm (8") and 100-mm (4") diameter plates, respectively, are recommended. By reducing the plate size with increasing modulus, it is possible to increase the plate contact stresses and, therefore, increase deflections to within a measurable range. In addition, by using a larger plate for lower-stiffness materials, the possibility of excessive deflection and bearing capacity failure can be avoided.

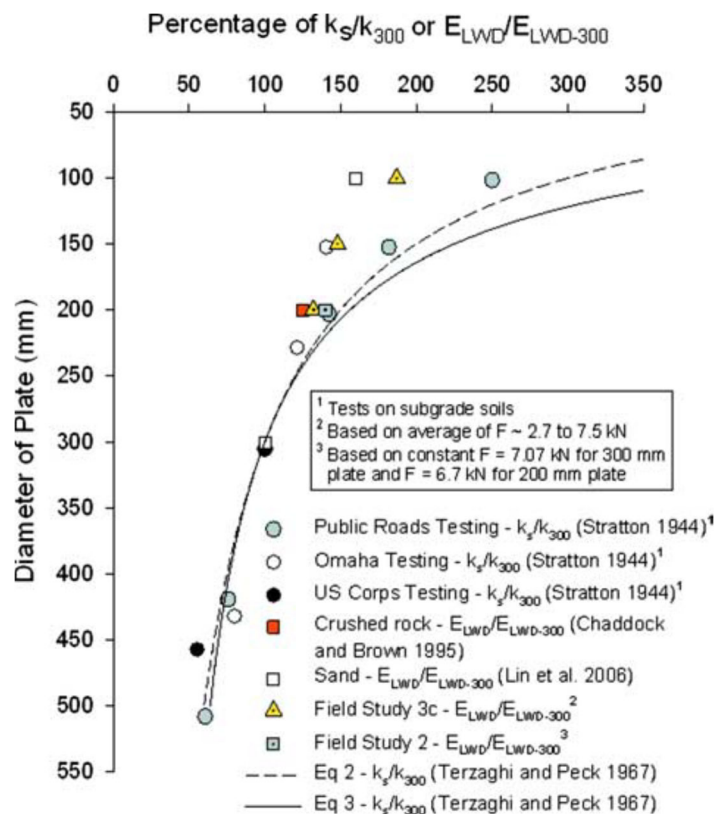


Figure 2-10. Relationship between material stiffness and diameter of load plate (from Vennapusa and White 2009).

As discussed previously, Equation (2-5) is based on continuum theory; hence, the load plate size should be at least six times larger than the aggregate size tested to render continuum behavior at plate-aggregate contact (Hoffman 2019). Neither ASTM E2583 nor ASTM E2835 has directly discussed the limit of particle size for LWD testing of aggregate materials; however, LWD devices following ASTM E2835 standard usually also follow German standards TP BF-StB part B 8.3 and ZTVE-StB 94, which limit the maximum particle size of tested aggregates to 63 mm (2.5"). Singh et al. (2010) conducted several hundred nuclear density gauge tests (ASTM D6938-17) and LWD tests using a device following the ASTM E2853 standard with a 300-mm (12") load plate on a

coarse sand and a well-graded sand-gravel mixture with a maximum particle size of 75 mm (3") in the field. Figure 2-11 shows the dry density from the nuclear density gauge tests vs. E_{LWD} from the LWD tests. It is evident from Figure 2-11 that LWD test results on large soil particles exhibit significantly larger scatter than the test results on smaller soil particles.

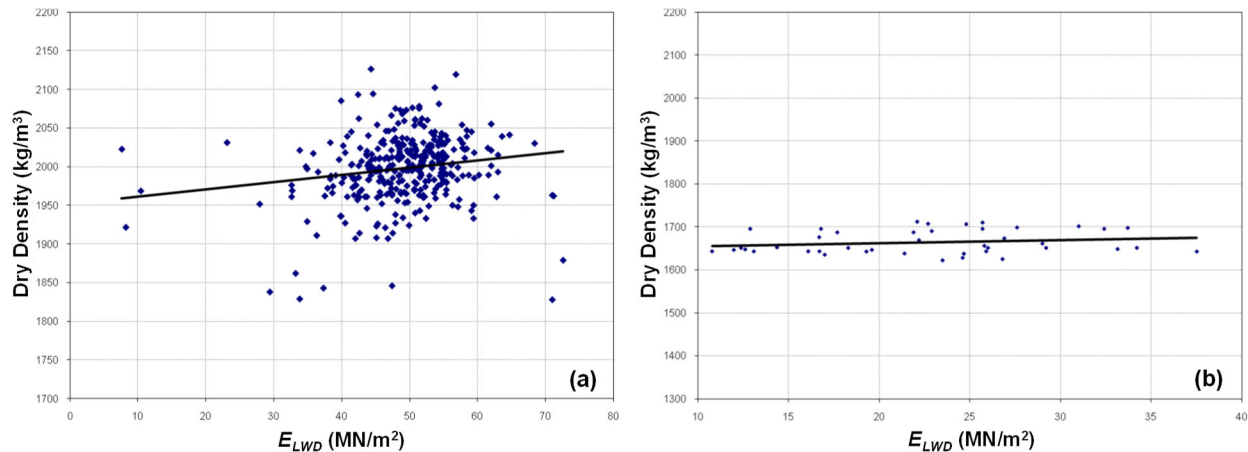


Figure 2-11. Dry density vs. E_{LWD} for: (a) a well-graded sand-gravel mixture with a maximum particle size of 75 mm (3"); (b) a coarse sand (from Singh et al. 2010).

2.5.4 Influence Depth of LWD Testing

In LWD testing, the measured deflection, which is used to calculate the elastic modulus (see Equation (2-5)), is affected not only by the stiffness of the top layer, but also properties of the underlying layers. As such, determining the influence depth of LWD testing is an important part of the quality acceptance plan. Fleming et al. (2000) and Siekmeier et al. (2000) reported the influence depth of LWD about the same as the diameter of the loading plate. Nazzal et al. (2004) reported the influence depth between 1.2 and 1.4 times the plate diameter. Mooney and Miller (2009) employed a stress-strain measurement approach to investigate the response of three different soil layers under LWD testing. They embedded earth pressure cells and displacement sensors at different depths of the layered soil system and tested a LWD device with variable load and plate size. They found the influence depth to be about 2 times the plate diameter based on stress distribution and between 0.5 and 1.1 times the plate diameter based on strain measurements. Using the results of a numerical investigation, Tirado et al. (2015) reported the influence depth between 2.0 and 2.5 times the plate diameter, and the influence depth decreases as the geomaterial becomes stiffer and more granular.

2.6 Compaction Quality Control

Most state departments of transportation (DOTs) currently use a density-based method for compaction quality control of aggregates in pavement layers, subgrade, and embankments by comparing their field density measurements to a target dry density value. The target density value typically is determined by conducting a specified laboratory standard compaction test, such as the standard (ASTM D698-12) and modified Proctor (ASTM D1557-12) tests, on the same material compacted in the field. Table 2-4 shows the compaction control specifications from various DOTs as compiled by Nazzal (2014). Table 2-4 shows that most DOTs specify that embankment backfill

be compacted to 95% of relative compaction as evaluated by the standard Proctor test, at moisture contents within $\pm 2\%$ of OMC, and with a loose lift thickness of 200 mm (8") or 300 mm (12"). Note that the compaction specifications for embankment fill and structure backfill are generally similar, except in areas adjacent to structures. Several DOTs also allow alternative methods for compaction quality control, such as the non-rutting condition of the compacted surface under the loaded hauling equipment (Akaska DOT), proof rolling and control strip. The nuclear density gauge (NDG, ASTM D6938-17) is the device used by most state DOTs for measuring the field density of compacted layers of aggregates (Tutumluer 2013). However, this device contains radioactive materials that can be an occupational hazard to the operators. Thus, its use entails extensive handling, storage, calibration, maintenance, and transportation regulations (Nazzal 2014).

The application of density-based compaction quality control on AASHTO #1, #57, and #8 aggregates has two main challenges. First, with regard to obtaining a target dry density value, the standard and modified Proctor tests have limitations because the particle sizes of these aggregates are too large to meet the specifications of these tests (Drnevich et al. 2007). Second, with regard to obtaining field density measurements through NDG testing, gravel and oversized particles or large voids in the source-detector path in these aggregates may cause higher or lower density measurements (ASTM D6938-17). Open-graded gravels are not conducive to NDG testing procedures as the direct transmission procedure is difficult to perform (the transmission hole will typically not stay open), and nuclear backscatter testing is not effective due to poor soil/gauge contact (Adams et al. 2012). In lieu of density testing, FHWA recommended a procedural specification (see Section 2.4.2 for details of the recommended procedure) for the construction of GRS-IBS using OGAs. FHWA specified that the compaction of OGAs should be observed to ensure non-movement of material under the compaction equipment; this observation is an indication of compaction or stiffness and is dictated by the number of passes (Adams et al. 2012). For the compaction of AASHTO #1, #57, and #8 aggregates, PennDOT specifies a condition of non-movement under the compaction equipment as determined by the Representative (Publication 408, Section 206.3(b)), which is generally consistent with the specification of Alaska DOT (see Table 2-4) and FHWA.

In recent years, the shift from empirical to mechanistic–empirical pavement design procedures has resulted in a growing interest in moving toward compaction control specifications that emphasize stiffness and strength to ensure the compacted materials' optimal performance and stability (Nazzal 2014). Various devices have been developed/used to measure the stiffness and strength of compacted materials in the field, such as the dynamic cone penetrometer (DCP) (ASTM D6951/D6951M-18), Clegg hammer (CH) (ASTM D5874-16), GeoGauge (ASTM D6758-18), and light weight deflectometer (LWD) (ASTM E2583-07). A comprehensive review of these tests including their principles of operation, repeatability, advantages and limitations, and a synthesis of past research activities is provided by Nazzal (2014). Comparing these tests, a significant advantage of LWD is the relatively short setup and test time (Sebesta et al. 2006; Siekmeier et al. 2009). Siekmeier et al. (2009) indicated that LWD could accurately test more material types, such as unbound materials with large aggregates, than could the standard density-based approach. In addition, LWD testing is safer because the field inspector is able to remain standing and visible during most of the testing process (Davich et al. 2006). LWD's main limitation has been reported to be its high variability. Hossain and Apeageyi (2010) reported high variability in measured LWD

modulus for the same material tested with different LWD devices; however, Nazarian et al. (2014) compared DCP, GeoGauge, and LWD tests for pavement applications through an integrated laboratory-scale (element tests), small-scale (3'-diameter specimens), and field-scale testing program, and found that the LWDs tested were more repeatable than the GeoGauges tested.

Choi et al. (2020) conducted a series of field compaction using a 10-ton smooth single-drum vibratory roller on five OGAs, which have gradations generally similar to AASHTO #57 and #8 aggregates. They used LWD and GeoGauge for compaction quality control. It was found that both the LWD and the GeoGauge captured changes in the modulus of OGAs with density increase adequately, and the variation of each device's measurements was not significant compared to the previous studies conducted on dense-graded soils. It is concluded that the LWD and GeoGauge are valid and fairly reliable devices for monitoring the modulus change of OGAs due to compaction.

2.7 Summary and Implications to Current Research

For the compaction quality control of AASHTO #1, #57, and #8 aggregates, PennDOT's specification of non-movement condition under the compaction equipment is consistent with at least one other state DOT and FHWA. This specification is due to: (1) a target dry density cannot be obtained from the standard or modified Proctor test, and (2) NDG tests cannot be performed on these aggregates. However, the judgement of non-movement condition based on a visual inspection is subjective and highly dependent on the inspector's experience. LWD tests provide a relatively fast, safe, and accurate means to quantitatively assess the stiffness of the compacted surface of these aggregates.

The research objectives in Section 1.1 can be accomplished through a comprehensive field compaction testing program. For example, the proposed four compaction equipment types, involving different coverage sizes and compaction energy, cover a variety of situations where different equipment types are needed in structure backfill applications. The proposed variation of four lift thicknesses (loose): 100 mm (4"), 200 mm (8"), 300 mm (12"), and 375 mm (15") covers the range of lift thicknesses of most DOT specifications. Note that 100 mm (4") lift will only be compacted by light-weight equipment. Given that they are free-draining materials, the testing of AASHTO #57 and #8 aggregates in "surface-dry" and "surface-saturated" conditions to investigate the effect of moisture condition on compaction appears to be reasonable, so is the testing of AASHTO #1 aggregate in a typical moisture content representing field moisture condition from quarry.

Table 2-4. Summary of Compaction Control Specifications of State DOTs (from Nazzal 2014)

State Earthwork Specification	Compaction Control Method	Type	Minimum Compaction Requirements	Loose Lift Thickness	Moisture Control Requirements	Alternative Methods
Alabama (2012)	Specified density	Embankment	95% RC (AASHTO T99: Method A for 10% passing or less; Method C for more than 10% retain on No. 4; Method D for 20% or more retained.)	8 in. (loose)	Strict moisture control will not be required.	N/A
		Modified or improved roadbed layer	100% RC (AASHTO T99: Method A for 10% passing or less; Method C for more than 10% retain on No. 4; Method D for 20% or more retained.)	—	OMC ± 2%	
		Base				
Alaska (2004)	Specified density	Embankment	95% RC (AASHTO T180 and AASHTO T224)	8 in. (loose)	OMC ± 2%	Compact until embankment does not rut under the loaded hauling equipment
		Subgrade				
		Base	98% RC (AASHTO T180 and AASHTO T224)			N/A
Arizona (2008)	Specified density	Embankment	100% of RC for top 6 in and beneath approach and anchor slabs, 95% RC for other (ADOT Material testing manual)	8 in. (loose)	At or near OMC	N/A
		Lime/cement treated subgrade	100% of RC (ADOT Material Testing Manual)	8 in. (loose)		
		Base				
Arkansas (2003)	Specified density	All type	95% Relative density (AASHTO T99: Method A for 10% passing or less; Method C for more than 11–30% retain on #4; and AASHTO T180 Method D for more than 30% or more retained)	10 in. (loose)	At OMC	N/A
		Subgrade		—		
		Cement treated base	95% of RC (AASHTO T134)	—	±5% of OMC	
California (2010)	Specified density	All types	95% RC (California Test 216 or 231)	8 in. (loose)	Suitable moisture content such that required density can be obtained and embankment stable	N/A
		Where 95% RC not required	90% RC (California Test 216 or 231)			
		Aggregate base/subbase	95% RC (California Test 216 or 231)			
Colorado (2011)	Specified density	Embankment	100% RC (AASHTO T99) or 95% RC (AASHTO T180)	8 in. (loose)	OMC 2% (dry side)	Proof rolling
		Lime treated subgrade	95% RC (AASHTO T99)		±2% of OMC	—
		Aggregate base	95% RC (AASHTO T180)	—	—	
Connecticut (2004)	Specified density	Embankment	95% RC (AASHTO T180 Method D)	12 in. (loose)	At OMC	N/A
		Subgrade				
		Processed aggregate base				
Delaware (2001)	Specified density	Embankment	95% RC (AASHTO T99 Method C, Modified)	8 in. (loose)	±2% of OMC	N/A
		Subgrade				
		Aggregate base	98% RC (AASHTO T99 Method C, Modified)			
District of Columbia (2009)	Specified density	Embankment	95% RC full depth and top 6 in. of subgrade (AASHTO T180 Method D)	6 in. (loose)	Not specified	N/A
		Subgrade	95% RC (AASHTO T180 Method D)			Control strip
		Aggregate base	95% RC (AASHTO T180 Method D)			
Florida (2013)	Specified density	Embankment	100% RC (AASHTO T99 Method C)	12 to 6 in. (compacted)	Suitable moisture content such that required density can be obtained	N/A
		Subgrade	98% RC (AASHTO T180 Method C)	12 in. (compacted)		
		Base		4 to 8 in. (compacted)		

State Earthwork Specification	Compaction Control Method	Type	Minimum Compaction Requirements		Loose Lift Thickness	Moisture Control Requirements	Alternative Methods	
Georgia (2010)	Specified density	Embankment	Full depth and 100 ft from bridge edge: 100 RC (GDT 7)		8 in.	At OMC	N/A	
			Full depth 95% RC; top 1 ft 100% (GDT 7)					
		Subgrade	95% RC (GDT 7)					
		Base						
Hawaii (2005)	Specified density	Embankment	95% RC (AASHTO T180 Method D and T224)		9 in. (loose)	±2% of OMC	N/A	
		Subgrade			N/A			
		Base						
Idaho (2012)	Specified density	Embankment	95% RC (AASHTO T99 Method A or C)		8 in. (loose)	+2/-4% of OMC	N/A	
		Subgrade						
		Granular base						
Illinois (2012)	Specified density	Embankment	Height < 1-1/2 ft	95% RC (AASHTO T99 Method C and T224)	8 in. (loose)	Top 2 ft not more than 120% OMC such that adequate compaction is achieved.	N/A	
			1-1/2 ft < height < 3 ft	First lift 90% RC; remainder 90% RC (AASHTO T99 Method C and T224)				
			Height > 3 ft	Lower 1/3 of the embankment to 90% RC; first lift above lower 1/3 to 93% with remainder to 95% RC (AASHTO T99 Method C and T224)				
		Specified density and DCP	Subgrade	95% RC (AASHTO T99 Method C and T224) with IBV based on DCP = 8 (Illinois Test Procedure 501)				N/A
	Specified density	Granular base	100% RC (AASHTO T99 Method C and T224)		8 in.		N/A	
Indiana (2012)	Specified density or stiffness/strength	Embankment	95% RC (AASHTO T99 Method C and T224) DCP or LWD target value		8 in. (loose)	-2% to +1% OMC	Proof rolling	
		Subgrade				100% RC (AASHTO T99 Method C and T224) or DCP target value		
		Aggregate base				100% RC (AASHTO T99 Method C and T224) or LWD target value		
Iowa (2012)	Specified density and DCP	Embankment	95% RC (AASHTO T99 Method C) and DCP stability and uniformity limits		Variable, such that adequate compaction is achieved	Variable such that adequate compaction is achieved	N/A	
	Roller walkout					Compacted a minimum of 1 pass per 1 in. of loose fill until the tamping feet penetrate 3 in. or less into an 8-in. lift		Variable
	Specified density	Natural subgrade	95% RC (test method Iowa No. 103)		—	—		
	Base							
Kansas (2007)	Specified density	Embankment	As specified within construction plans		8 in. (loose)	Specified on construction plans unless approved by engineer	N/A	
		Cement/fly ash treated subgrade	95% RC (AASHTO T99)			OMC ± 3%		
		Granular base	95% RC (AASHTO T99)			OMC ± 3%		
Kentucky	Specified density	Embankment	95% RC (KM 64-511)		12 in./3ft	OMC ± 2%	N/A	
		Subgrade						
	Control strip	Base	98% RC, single point 95% (KM 64-511)		8 in.	—		
Louisiana (2006)	Specified density	Embankment	95% RC (DOTD TR415 or TR418)		Nonplastic material 15 in.	±2% of OMC	N/A	
		Subgrade						
		Base			—			

State Earthwork Specification	Compaction Control Method	Type	Minimum Compaction Requirements		Loose Lift Thickness	Moisture Control Requirements	Alternative Methods	
Maine (2002)	Specified density	Embankment	90% of max density (AASHTO T180, Method C or D)		8 in. (loose)	Proper to maintain compaction and stability	N/A	
		Subgrade			—			
		Aggregate base and subbase	95% RC (AASHTO T180, Method C or D)		—			
Maryland (2008)	Specified density	Embankment	1 ft below top of subgrade 92%; top 1 ft 97% (AASHTO T180)		8 in. (loose)	±2% of OMC	N/A	
		Subgrade	97% RC (AASHTO T180)					
		Base	97% (AASHTO T180)					
Massachusetts (2012)	Specified density	Embankment	95% Relative density (other than rock) (AASHTO T99, Method C)		12 in. (loose)	at OMC	N/A	
		Subgrade	95% RC (AASHTO T99, Method C)					
		Gravel base						
Michigan (2012)	Specified density	Embankment	Cohesive material	95% RC (Michigan Density Testing and Inspection Manual)	9 in. (loose)	OMC to 4% OMC	Twelve-inch layer method	
			Granular material		15 in. (loose)	OMC to 5% OMC		
Minnesota (2005)	Specified density or stiffness/ strength	Embankment	Upper 3 ft of embankment or portions adjacent to structures	100% RC (Minnesota Grading and Base Manual) DCP or LWD target limit	8 in. (loose)	65%–102% OMC	Quality compaction method; DCP for granular material	
			Below upper 3 ft and not adjacent to structures	95% RC (Minnesota Grading and Base Manual) DCP or LWD target limit	12 in.	65%–115% OMC		
		Subgrade	100% RC (Minnesota Grading and Base Manual) DCP or LWD target limit					
		Base				65% of OMC to OMC		
Missouri (2013)	Specified density	Embankment	Embankments more than 50 ft below the top of finished subgrade, within 100 ft of structures, or within 18 in. of subgrade	95% Relative Compaction (AASHTO T99, Method C)	8 in. (loose)	Such that adequate compaction is achieved	DCP index for Type 7 base	
			All other embankments unless otherwise noted	90% Relative Compaction (AASHTO T99, Method C)		0% to +3% OMC for loessial soils		
		Subgrade	95% RC (AASHTO T99, Method C)			MC for adequate compaction is achieved		
		Aggregate Base	95% (AASHTO T99, Method C)					
Mississippi (2004)	Specified density	Embankment	95% to 98% of maximum density		8 in. (loose)	Such that adequate compaction is achieved	N/A	
		Base	Average of five at least 93% of maximum density, no single density below 89% of maximum density					
Montana (2006)	Specified density	Earth embankment B including all backfills	90% of maximum density (AASHTO T99)		8 in. (loose)	±2% of OMC	N/A	
		Subgrade	95% of maximum density (AASHTO T99)					
		Aggregate base	98% of maximum density (MT-230)					
Nebraska (2007)	Specified density	Embankment	95% RC (NDR T99)		8 in. (loose)		N/A	
		Stabilized subgrade	100% RC (NDR T99)					
		Base	—					
Nevada (2001)	Specified density	5 ft or less in height	90% RC (test method Nevada No. T101)		8 in. (loose)	Not specified	N/A	
		All other (including subgrade and aggregate base)	95% RC (test method Nev. No. T101)					

State Earthwork Specification	Compaction Control Method	Type	Minimum Compaction Requirements		Loose Lift Thickness	Moisture Control Requirements	Alternative Methods
New Hampshire (2010)	Specified density	Embankment	98% RC (beneath approach slab and 10 ft back of a structure); all other 95% (AASHTO T99)		12 in. (loose)	Not specified	N/A
		Subgrade	95% Relative density (AASHTO T99 or control strip)				
		Base			8 in.		
New Mexico (2007)	Specific density	Embankment	95% Relative density (AASHTO T99 Method C)		8 in. (loose)	OMC to OMC -5%; for soil with PI > 15 OMC to OMC +4%	N/A
		Subgrade	Top 6 in. 100%; soil with PI15: 95% (AASHTO T99, Method C)				
		Base	95% of maximum density (AASHTO T180)		6 in.		
New Jersey (2007)	Specified density	Embankment	95% Relative density (AASHTO T99, Method C)		12 in. (compacted)	Not specified	End dumping method, control fill method, direct method
		Subgrade					
	Control strip	Base	Q³ 0.36 (where Q = (Average lot density- 0.95 * Maximum Density)/Range of Lot Density)				Proof rolling for subgrade
New York (2008)	Specified density	Embankment	90% minimum; 95% minimum for subgrade of embankment (AASHTO T99)		Depends on compaction device	Not specified	N/A
		Subgrade					
		Soil cement base	95% of maximum density (AASHTO T99)				
North Carolina (2012)	Specified density	Embankment	95% RC [AASHTO T99 (state modified)]		10 in. (loose)	Not specified	Proof rolling
		Subgrade	100% RC [AASHTO T180 (state modified)]		8 in.		
		Base	Aggregate base	100% RC [AASHTO T99 (state modified)]			N/A
			Cement treated	97% RC [AASHTO T99 (state modified)]		+1.5% of OMC	
			Lime treated	97% RC [AASHTO T99 (state modified)]		+ 2% of OMC	
North Dakota (2008)	Specified density	Embankment	95% RC (AASHTO T99) / 90% (AASHTO T180)		12 in. (loose)	-4% of OMC to +5% of OMC (AASHTO T99) / OMC to +5% of OMC (AASHTO T180)	N/A
		Subgrade			—		
	Specification method	Base	—	—	—	—	
Ohio (2013)	Specified density	Embankment	$\gamma_{\max}$ (pcf)	% RC	8 in. (loose)	Suitable moisture content	N/A
			90 to 104.9	102			
			105 to 119.9	100			
			120 and more	98			
		Subgrade	AASHTO T99, T272 and supplemental specification 1015)				
Test strip	Aggregate base	98% RC of test section			±2% of OMC		
Oklahoma (2009)	Specified density	Embankment	95% RC (AASHTO T99 Methods C or D)		8 in. (loose)	±2% of OMC	N/A
		Subgrade					
		Aggregate base	98% (Type A); 95% for Types B, C, and D				
Oregon (2008)	Specified density or Deflection	Embankment	95% RC (AASHTO T99)		8 in. (loose)	-4% of OMC to OMC +2%	Proof rolling using ODOT TM 158
		Subgrade	—				
		Aggregate base	100% RC				
Rhode Island (2010)	Specified density	Top 3 ft of embankment	90% RC (AASHTO T180 and T224)		12 in. (loose)	Not specified	N/A
		Reminder up to subgrade and subgrade	95% RC (AASHTO T180 and T224)				
		Aggregate base	95% RC (AASHTO T180 and T224)				

State Earthwork Specification	Compaction Control Method	Type	Minimum Compaction Requirements		Loose Lift Thickness	Moisture Control Requirements	Alternative Methods
South Carolina (2007)	Specified density	Embankment	95% RC (SC-T-29)		8 in.	Suitable moisture content	N/A
		Subgrade					
		Base	100% RC (SC-T-29)			±2% of OMC	
South Dakota (2004)	Specified density	Embankment	95% or greater (AASHTO T99)		8 in. (loose)	For OMC 0–15% => OMC -4% to OMC +4%; for OMC > 15% => OMC -4% to OMC +6%	Ordinary compaction method
		Subbase and base	Base 97% RC; subbase 95% (D 104, Method 4 and SD 105 or SD 114)			Not specified	N/A
Tennessee (2006)	Specified density	Embankment	95% RC (AASHTO T99 and T224)		10 in. (loose)	± 3% of OMC	N/A
		Base	Aggregate base: 100% RC, 92 (single, minimum) (AASHTO T99 and T224)				
		Subgrade (lime treated)	Average per lot 96% (minimum), single determination 92% (minimum) (AASHTO T99 and T224)			±3% of OMC	
Texas (2004)	Specified density	Embankment	PI 15 => density 98%; 15 < PI 35 => density 98% and 102% ; W Wopt PI > 35 => density 95% Da and 100% Da; W Wopt. (Tex-114-E)		16 in. (loose)	15 < PI 35 => D W Wopt PI > 35 => W Wopt	N/A
		Subgrade	Lime treated or fly ash treated: 95% of maximum density (Tex-114-E);				
		Lime treated	98% of maximum density (Tex-114-E)				
Utah (2012)	Specified density	Embankment	Average per lot 96% (minimum), single determination 92% (minimum) (AASHTO T180 Method D for A-1 soils; AASHTO T99 Method D for all other soils)		12 in. (loose), may be reduced if unsatisfactory density	Appropriate moisture	N/A
		Untreated base course	Average 97% RC (minimum); single point 94% RC (AASHTO T180 Method D for A-1 soils; AASHTO T99 Method D for all other soils)			OMC ± 2%	
Vermont (2006)	Specified density	Embankment	Top 24 in. immediately above subgrade 95%; rest 90% relative density (AASHTO T99, Method C)		8 in. (loose)	OMC + 2%	N/A
		Subgrade	95% of maximum density (AASHTO T99, Method C)				
		Subbase and base	95% RC (AASHTO T180, Method D)			Not specified	
Virginia (2007)	Specified density	Embankment	95% RC		8 in. loose	±2% of OMC	N/A
		Subgrade	% Retained No. 4				
			RC				
Washington (2012)	Specified density	Embankment	Method A:	Not specified	8 in.	Method A: suitable moisture content Method B: +3% of OMC; Method C: ±3% of OMC	N/A
			Method B:	95% RC; height < 2 ft 90% RC			
			Method C:	95% RC			
		Subgrade	95% RC (% retained on No. 4: if 30 maximum (AASHTO T99 Method A); if more than 30% on # and 30% or less retained on 3/4 sieve (T180 Method D); if 30% or more on 3/4 sieve (WSDOT Method No. 606)		6 in.		
		Aggregate base					
West Virginia (2010)	Specified density	Embankment	95% RC (WV specifications: MP 717.04.21, MP 207.07.20, MP 700.004.2, etc.)		12 in. (loose) (40% or higher passing 3/4 in. sieve)	-4% of OMC to +3% of OMC (40% passing 3/4 in. sieve),	N/A
		Subgrade and base				OMC (elastic soils)	

State Earthwork Specification	Compaction Control Method	Type	Minimum Compaction Requirements		Loose Lift Thickness	Moisture Control Requirements	Alternative Methods
Wisconsin (2013)	Specified density	Embankment	Embankments less than or equal to 6 ft or within 200 ft of a bridge abutment	95% RC (AASHTO T99, Method C)	8 in. (loose)	Such that the material does not rut excessively and such that the material can be compacted properly	N/A
			Embankments higher than 6 ft	6 ft below subgrade: 90% RC; within 6 ft from top: 95% RC (AASHTO T99, Method C)			
		Subgrade	Final 6 in.	95% RC (AASHTO T99, Method C)			
Wyoming (2010)	Specified density	Embankment	95% RC (Materials Testing Manual WY DOT and AASHTO T180)		8 in. (loose)	-4% of OMC to +2% of OMC	N/A
		Subgrade					
		Base					

RC = relative compaction; OMC = optimum moisture content; N/A = not available.

CHAPTER 3

SURVEY

A survey on Department of Transportation (DOT) specifications and construction practices of AASHTO #1, #8, and #57 aggregates for structural backfill using the four (4) equipment types of interest in this study was conducted. The survey questions were electronically distributed to State DOTs and contractors experienced in aggregate compaction through Google Forms. Topics addressed in the survey included compaction acceptance criteria, moisture condition, lift thickness, roller speed/operation duration, and number of passes specified by State DOTs and used in construction practices. This chapter summarizes the research findings and survey responses, based on which a field compaction test program is proposed.

3.1 DOT Specifications

As of January 27, 2023, twenty-three (23) DOTs have responded to the survey and their responses are summarized in Appendix A. Regarding the compaction acceptance criteria (i.e., Question 1), 30.4% of responses indicated a non-movement condition under the compaction equipment through visual inspection, which is consistent with the current specification of Pennsylvania Department of Transportation (PennDOT). One DOT responded that both a specified density and at least one deflection test should be used, the latter of which supports the use of a lightweight deflectometer (LWD) as quality control in this study. It is noted that 34.8% of responses indicated a compaction control method that specified density after compaction (e.g., through nuclear gauge tests, sand cone tests, etc.). The validity of this response is considered questionable, given that the standard/modified Proctor tests, nuclear gauge tests, and sand cone tests cannot be conducted on the subject aggregates, due to their large particle size and voids.

Regarding equipment specification when non-movement condition is used as the compaction control method (i.e., Question 2), 70.6% of responses indicated that there is no equipment specification and it is up to the contractor to use appropriate equipment to meet the compaction acceptance criteria. Regarding moisture control requirements (i.e., Question 3), 34.8% of responses indicated that there is no specification; 26.1% of responses indicated that it is up to the contractor to use a suitable/appropriate moisture content (such that the material does not rut excessively and such that the material can be compacted properly); and 21.7% of responses indicated that the as-is moisture content in the field should be used.

Regarding the maximum allowed loose lift thickness (i.e., Question 4), the responses indicated a range of values from 6" to 12" are being specified, with 8" being the most common value; one DOT responded that a maximum of 4" is specified within 3' of the structure. These responses support the selection of 4", 8", 12", and 15" as the loose lift thicknesses in the field testing program to investigate the effect of loose lift thickness on the compaction of these aggregates, with the 15" being used to investigate if a higher loose lift thickness could be used when heavier equipment is used.

Regarding specifications related to the range of roller speed, minimum roller operation duration, or minimum number of passes for compacting these aggregates, 65.2% of responses indicated that there is no specification and it is up to the contractor to meet the compaction acceptance criteria; among the rest of responses (i.e., when there is a specification), a minimum of four (4) passes under 3 mph is most common.

3.2 Construction Practices

As of January 27, 2023, a total of seven (7) responses from six (6) construction companies were received (one company provided two responses) and their responses are summarized in Appendix A. Regarding the role of moisture content in compacting these aggregates (i.e., Question 1), 85.7% of responses indicated that moisture content does not play a significant role. In the follow-up question (i.e., Question 2), 75% of responses indicated that the as-is/delivered moisture content in the field should be used; an additional response indicated that these free-draining aggregates tend to be in a dry condition and applying moisture with a hose or water truck prior to compaction is effective.

Regarding the loose lift thickness for the five (5) different compaction equipment (i.e., Question 3), the responses indicated a range of values from 4" to 15", with 6" and 8" being the most common values for light to medium-weight equipment types (see Questions 3a, 3b, and 3c) and 8" and 12" being the most common values for heavy-weight equipment types (see Questions 3d and 3e). One response indicated that hand impact rammer (i.e., jumping jack) should not be recommended for compacting AASHTO #1 aggregate.

Regarding the duration/number of passes typically needed to achieve the non-movement condition when compacting these aggregates (i.e., Question 4), the responses indicated a range of values from 2 passes to 12 passes, with 4 passes being the most common value for typical vibratory plate compactor and self-propelled trench-type roller (see Questions 4a and 4b) and 2 passes being the most common value for the two smooth single-drum vibratory rollers (see Questions 4c and 4d). These responses will guide the initial field testing program; however, the number of passes needed to achieve the non-movement condition for different combinations of aggregate, compaction equipment, loose lift thickness, and moisture condition will be further studied in the field testing program.

Regarding the typical roller speed when compacting these aggregates (i.e., Question 5), the consensus response is that the roller be operated in a slow and steady manner with a speed of typically 2-3 miles per hour (mph). The responses to Question 6 indicated that lateral confinement plays a significant role in compacting these aggregates.

3.3 Field Compaction Test Program

Based on the survey responses, a field compaction test program involving different combinations of moisture condition, lift thickness, roller speed/operation duration, and number of passes for these aggregate types using the four (4) equipment types was proposed by the Penn State team and approved by the PennDOT Technical Advisor. The field compaction test program is discussed in the next chapter.

CHAPTER 4

FIELD COMPACTION TESTS

A comprehensive list of field compaction tests was conducted in two sessions: Session I between June 20, 2023 and June 30, 2023 and Session II between August 11, 2023 and September 1, 2023. The primary purpose of these tests was to investigate the effects of aggregates and their moisture conditions, lift thickness, number of passes, and compaction equipment on the elastic modulus of the compacted surface. This chapter describes the field test site, the aggregates tested, the compaction equipment used, the test procedures, the test results and their analyses.

4.1 Field Test Site

The test site is located in the test track facility at the Larson Transportation Institute, Pennsylvania State University, with a physical address of 164 Test Track Road, Bellefonte, PA, 16823. Figure 4-1 shows a map of the test site. The contractor utilized for the field tests was Ameron Construction Co., Inc., based in State College, PA.



Figure 4-1. Map of the test site.

4.2 Aggregates

AASHTO #1, #57, and #8 aggregates from Oak Hall Quarry (850 Boalsburg Road, Boalsburg, PA 16827) of Heidelberg Materials Northeast LLC, which is a PennDOT approved aggregate source listed in Publication 34 (Bulletin 14) under the supplier code HAP14B14, were used for the field testing. The size and gradation requirements for these aggregates, per PennDOT Publication 408 Section 703.2(c), are shown in Table 2-1. Figure 4-2 shows that these aggregates as-delivered were

in the surface-dry condition. AASHTO # 57, #8, and #1 aggregates were delivered to the test site on 6/20, 6/22, and 6/29, respectively.



Figure 4-2. Aggregates used in field tests: (a) AASHTO #1; (b) AASHTO #57; (c) AASHTO #8.

4.3 Compaction Equipment

The following four equipment types were used in the field tests: smooth single-drum vibratory roller, self-propelled trench-type roller, vibratory plate compactor, and hand-operated impact rammer. For the smooth single-drum vibratory roller, two weight classes were used to investigate the effect of equipment weight on field compaction; for the other three equipment types, a piece of typical equipment for each type was used due to the limited range of equipment classes for these types. Hence, five pieces of equipment covering four equipment types were used, as shown in Table 4-1 and Figure 4-3. All compaction equipment meets the equipment factor requirements of Publication 408, Section 108.05(c). The same five pieces of equipment were used in both field test sessions.

Table 4-1. Compaction Equipment Used in Field Tests

Compaction Equipment Type	Equipment Model	PennDOT Specification (Publication 408)	Calculated Equipment Factor
Smooth single-drum vibratory roller	Dynapac CA250D (15-ton equivalent)	Section 108.05(c)3.i	3.2
	Bomag BW 177 (7.5-ton equivalent)	Section 108.05(c)3.i	2.2
Self-propelled trench-type roller	BOMAG BMP 8500	Section 108.05(c)3.d	2.9
Vibratory plate compactor	BOMAG BPR 25/40	Section 108.05(c)4.b	3.6
Hand-operated impact rammer	BOMAG BT65/4	Section 108.05(c)4.a	2.1

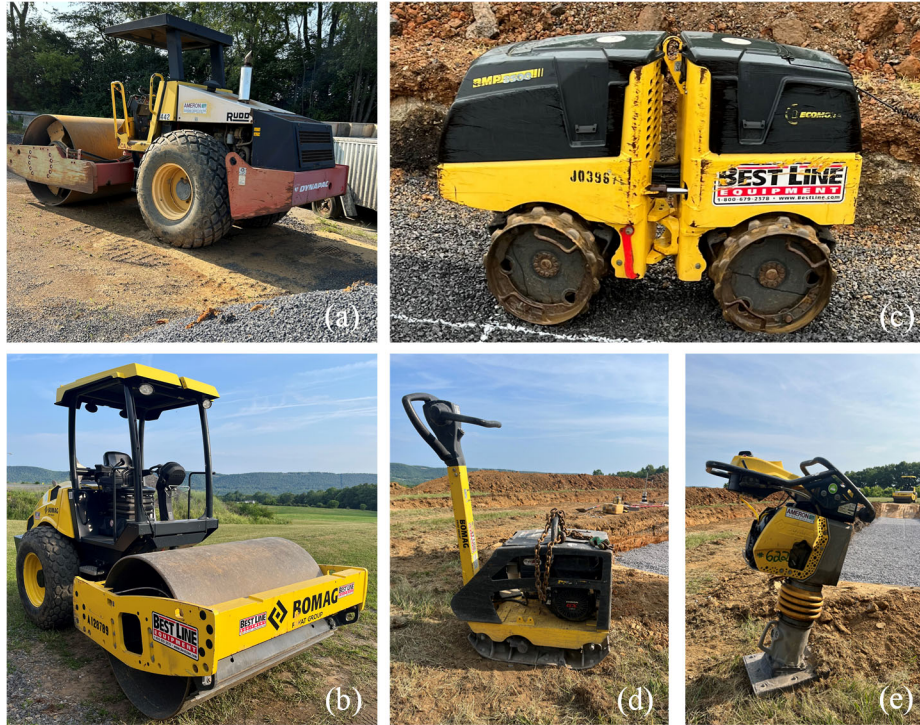


Figure 4-3. Compaction equipment used in field tests: (a) Dynapac CA250D; (b) Bomag BW 177; (c) BOMAG BMP 8500; (d) BOMAG BPR 25/40; (e) BOMAG BT65/4.

4.4 Light Weight Deflectometer

A Dynatest Model 3032 light weight deflectometer (LWD) was used in this study. The device is built to ASTM E2583 standard (see Section 2.5.1) and has a sensor-locking plug to lock the geophone to the plate by plugging the center hole of the plate (see Figure 2-8(a)). The sensor-locking plug was used in this study to avoid a potential situation in testing the aggregate materials where the protruding geophone rests on a large aggregate particle and, hence, measures the movement of the aggregate particle instead of the aggregate surface. With the sensor-locking plug, the surface deflection of the entire plate was measured by the geophone as a single unit in this study.

The device is equipped with a dual 150-mm-diameter (6"-diameter) and 300-mm-diameter (12"-diameter) plate, and the latter was used in this study for two reasons. First, it was suggested in the literature that the plate size should be selected based on the material stiffness and, when E_{LWD} is less than 125 MPa (18.1 ksi), the recommended plate size is 300 mm (12") (see Section 2.5.3). Given that most E_{LWD} values in this study were less than 125 MPa (18.1 ksi) (see Appendix B), the 300-mm-diameter (12"-diameter) plate was selected. Second, the aggregate particles tested in this study are relatively large, particularly the AASHTO #1 aggregate. The 300-mm-diameter (12"-diameter) plate was selected to have a continuum behavior at the plate-aggregate contact surface. The sizes of a portion of AASHTO #1 aggregate particles exceed the maximum particle size of 63 mm (2.5") specified by the German standards TP BF-StB part B 8.3 and ZTVE-StB 94 (see Section 2.5.3 and Table 2-1); when conducting LWD testing on AASHTO #1 aggregate surfaces, the test locations were selected where there was a high concentration of aggregates of smaller sizes and

a firm contact between the plate and at least six aggregate particles could be established (see Section 2.5.3). With a 300-mm-diameter plate (12"-diameter), the influence depth of the LWD measurements is equal to or slightly greater than the maximum lift thickness to be used in this study (i.e., 15") based on the discussions in Section 2.5.4.

A preliminary parametric study was conducted to investigate the sensitivity of E_{LWD} on the drop weight and drop height for the aggregate materials by conducting LWD tests using drop weights of 10 kg (22 lbs) and 15 kg (33 lbs) and drop heights of 81 cm (32") and 68 cm (27"). It was found that the E_{LWD} values were relatively insensitive (<5% change) to the drop weight and drop height for the aggregate materials tested, which is consistent with the findings of van Gurp et al. (2000) (see Section 2.5.3). Hence, a drop weight of 10 kg (22 lbs) and a drop height of 68 cm (27") were used in this study to reduce the physical burden on the LWD test operators from repetitive LWD testing (see Section 4.5).

For each LWD test, nine drops were conducted to establish a firm seating of the base plate on the aggregates, following the recommendations of Mondal et al. (2022). For each drop, the deflection of the base plate and the contact stress between the base plate and the aggregate surface were measured by the LWD, and an E_{LWD} value was calculated using Equation (2-5) where $A_1 = 3\pi/4$ for the aggregate materials (granular material, see Table 2-3) and π for the on-site soil (mixed material, see Table 2-3). A typical value of $\nu = 0.35$ is assumed for all materials tested (Maher and Bennert 2008). The exact value of ν is unknown for the tested aggregates and likely changes during compaction. The primary purpose of the LWD tests is to monitor the change in the stiffness of the compacted surface as a function of the number of passes, aggregate type, moisture content, and compaction equipment type, and to identify the most efficient compaction procedure to achieve the non-movement condition specified by PennDOT. Therefore, the trend of E_{LWD} change is more important than the exact value of E_{LWD} ; hence, the use of a constant value of ν is justified.

4.5 Test Layout, Procedure, and Schedule

Two types of compaction tests were conducted. In the first type (conventional compaction tests), each lift was compacted by the same piece of compaction equipment, where the aggregate and its moisture condition, compaction equipment, and lift thickness were varied to investigate the effects of these parameters on the stiffness of the compacted surface. In the second type (successive compaction tests), each lift was successively compacted by all five pieces of compaction equipment in the order of increasing compaction energy; for this type of tests, only AASHTO #8 aggregate and two lift thickness values were tested. The layout, procedure, and schedule of these tests are described in the following sections.

4.5.1 Test Layout

Three trenches were utilized for the conventional compaction tests. For the compaction tests of 8", 12", and 15" lifts, two large trenches with identical dimensions were used, as shown in Figure 4-4(a); each trench had a depth of 4', a width of 12', and a length of 60' at the bottom (all dimensions were measured and confirmed by a field survey). The horizontal dimensions of the trenches are designed to allow each piece of compaction equipment to have its own parcel/zone to compact in the continuously supported areas, and the size of the parcel/zone is consistent with the equipment's

use in practice. Figure 4-5 shows the parcels/zones for each piece of compaction equipment for the compaction tests of 8", 12", and 15" lifts in the trenches. Additionally, the horizontal dimensions reduce the lateral confinement of virgin ground and allow sufficient distance for each piece of compaction equipment to run. The trench width of 12' is deemed large enough to reduce the effect of confinement, mimicking open areas of structural backfill (e.g., behind walls and abutments). The trench depth of 4' is sufficient to accommodate three 15" lifts. All construction equipment can access the trenches through a ramp on each end.

For the compaction tests of 4" lifts, only the three pieces of compaction equipment with relatively lower compaction energy were used (i.e., self-propelled trench-type roller, vibratory plate compactor, and hand impact rammer) because the single-drum vibratory rollers are not typically used to compact 4" lifts in practice; hence, a smaller trench was used. Figure 4-4(b) shows that the smaller trench had a depth of 3', a width of 12', and a length of 20' at the bottom (all dimensions were measured and confirmed by a field survey). Figure 4-6 shows the parcels/zones for each piece of compaction equipment for the compaction tests of 4" lifts in the small trench, identical to the middle section of the large trenches (i.e., Figure 4-5).

Figures 4-7 and 4-8 show LWD test locations in each parcel/zone. In the parcels/zones for the smooth single-drum vibratory rollers and self-propelled trench-type roller, LWD testing was conducted at three locations equally distributed along the center line (see P1, P2, and P3 in Figures 4-7 and 4-8); in the parcels/zones for the vibratory plate compactor and hand impact rammer, LWD testing was conducted at two locations equally distributed along the center line (see P1 and P2 in Figures 4-7 and 4-8) due to their relatively small parcel/zone size. LWD testing was conducted multiple times during field tests according to the field test procedure discussed in Section 4.4.3; each time LWD testing was conducted, all 13 locations in Figure 4-7 and seven locations in Figure 4-8 were tested to record the stiffness values at these locations at the time of measurement.

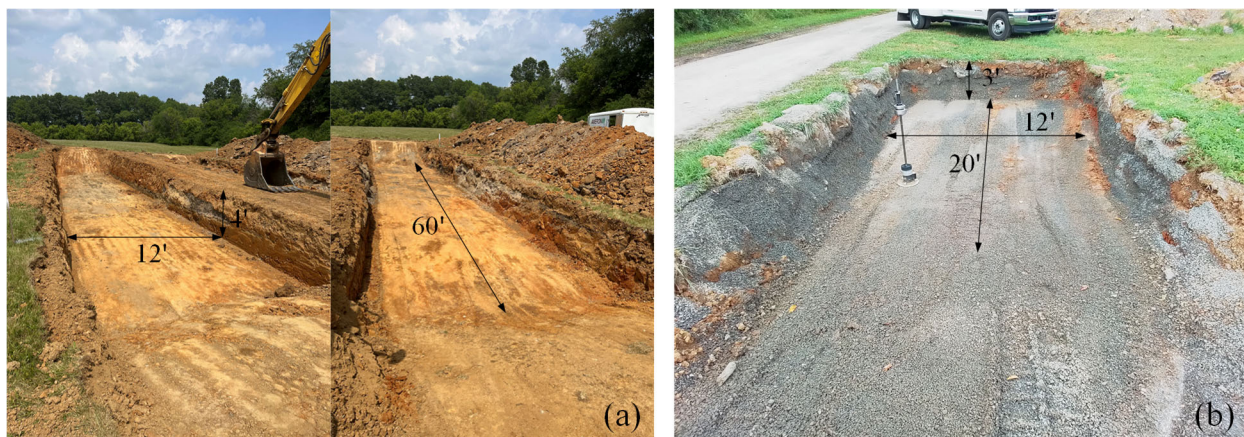


Figure 4-4. Three trenches were utilized for compaction tests: (a) two large trenches with identical dimensions; (b) a small trench.

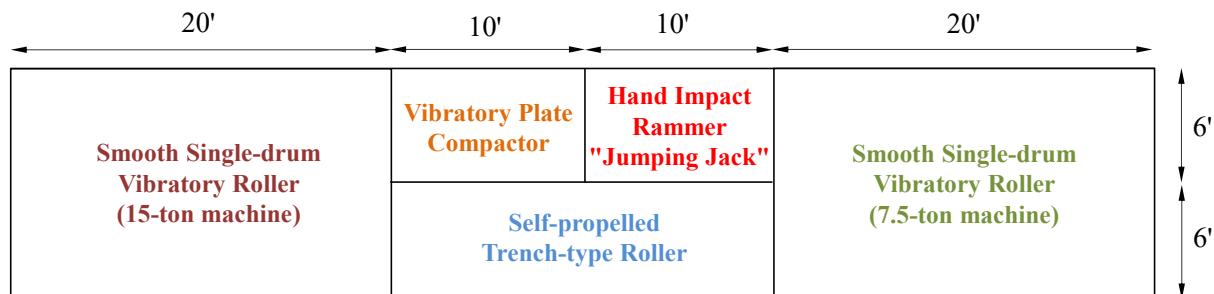


Figure 4-5. Compaction parcel/zone for each piece of equipment for 8", 12", and 15" lifts in two large trenches.

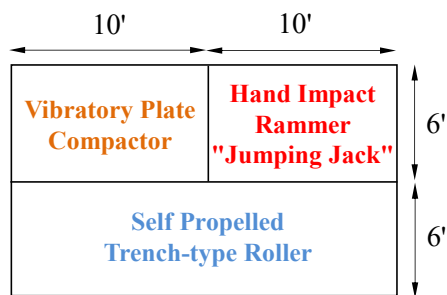


Figure 4-6. Compaction parcel/zone for each piece of equipment for 4" lifts in the small trench.

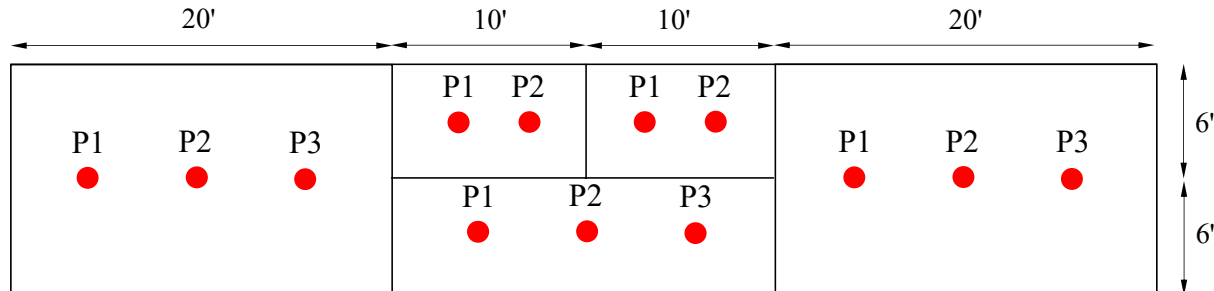


Figure 4-7. LWD test locations in parcels/zones corresponding to different compaction equipment for 8", 12", and 15" lifts in two large trenches.

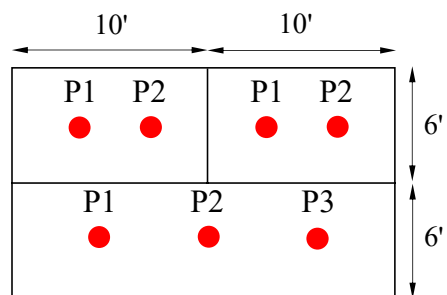


Figure 4-8. LWD test locations in parcels/zones corresponding to different compaction equipment for 4" lifts in the small trench.

The small trench was also utilized for the successive compaction tests. Aggregates in the entire trench were compacted by all five pieces of equipment successively in the order of increasing compaction energy (i.e., no separate parcel/zone for each compaction equipment), as shown in Figure 4-9. Figure 4-10 shows the three LWD test locations equally distributed along the center line of the small trench for the successive compaction tests. A detailed test procedure is described in Section 4.4.3.

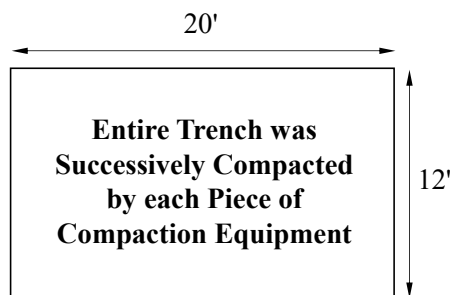


Figure 4-9. Successive compaction by each piece of equipment over the entire small trench.

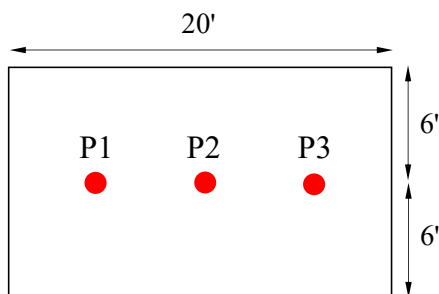


Figure 4-10. LWD test locations for successive compaction tests in the small trench.

4.5.2 Test Schedule

Table 4-2 lists the field tests conducted and their test dates in chronological order. The aggregates were delivered in the surface-dry (SD) condition (see Figure 4-2); however, storms and overnight precipitation, which are challenging to predict, could bring the aggregates to their surface-saturated (SS) condition. Compaction tests in SD and SS conditions were conducted in groups to take advantage of the weather: tests in SD conditions were conducted when the aggregates were SD and no precipitation was forecasted, whereas tests in SS conditions were conducted when the aggregates were SS and precipitation was forecasted. To protect aggregates in SD condition from incoming storms and overnight precipitation, water-proof sheets were used to cover the aggregates, as shown in Figure 4-11. When switching from SS tests to SD tests, aggregates were spread out in thin layers to expedite the drying process (over sunny/windy weekends), as shown in Figure 4-12.

Table 4-2 shows that the three lifts for most tests were conducted under the same moisture conditions. For the tests with AASHTO #57 at 8" lift thickness and AASHTO #57 at 15" lift thickness, the first lift was compacted in the SD condition on 6/21 and 8/24, respectively; however, unexpected overnight thunderstorms brought the aggregates to the SS condition, and the subsequent two lifts in these two tests were compacted in the SS condition.

Table 4-2. Field Tests Conducted and Test Schedule in Chronological Order

Aggregate	Lift Thickness (in)	Date Test Conducted		
		1 st Lift	2 nd Lift	3 rd Lift
AASHTO #57 (SS)	8	6/21 (SD)	6/22 (SS)	6/23 (SS)
AASHTO #8 (SS)	8	6/22 (SS)	6/23 (SS)	6/26 (SS)
AASHTO #57 (SS)	12	6/26 (SS)	6/27 (SS)	6/28 (SS)
AASHTO #8 (SS)	12	6/27 (SS)	6/28 (SS)	6/29 (SS)
AASHTO #1 (SD)	8	6/29 (SD)	6/29 (SD)	6/30 (SD)
AASHTO #57 (SS)	4	8/11 (SS)	8/11 (SS)	8/11 (SS)
AASHTO #8 (SS)	4	8/14 (SS)	8/14 (SS)	8/14 (SS)
AASHTO #1 (SD)	4	8/15 (SD)	8/16 (SD)	8/16 (SD)
AASHTO #1 (SD)	12	8/15 (SD)	8/15 (SD)	8/16 (SD)
AASHTO #8 (SS)	15	8/16 (SS)	8/17 (SS)	8/18 (SS)
AASHTO #1 (SD)	15	8/17 (SD)	8/18 (SD)	8/18 (SD)
AASHTO #57 (SD)	4	8/21 (SD)	8/21 (SD)	8/21 (SD)
AASHTO #57 (SD)	8	8/22 (SD)	8/22 (SD)	8/23 (SD)
AASHTO #8 (SD)	8	8/22 (SD)	8/22 (SD)	8/23 (SD)
AASHTO #8 successive compaction (SS)	8	8/23 (SS)	8/24 (SS)	8/24 (SS)
AASHTO #57 (SS)	15	8/24 (SD)	8/25 (SS)	8/28 (SS)
AASHTO #8 successive compaction (SS)	12	8/25 (SS)	8/28 (SS)	8/28 (SS)
AASHTO #57 (SD)	12	8/29 (SD)	8/30 (SD)	8/30 (SD)
AASHTO #8 (SD)	4	8/29 (SD)	8/29 (SD)	8/29 (SD)
AASHTO #8 (SD)	12	8/30 (SD)	8/30 (SD)	8/31 (SD)
AASHTO #8 successive compaction (SD)	8	8/31 (SD)	9/1 (SD)	9/1 (SD)

SD: surface-dry condition; SS: surface-saturated condition.



Figure 4-11. Water-proof plastic sheets protecting aggregates in SD condition from incoming storms or overnight precipitation.



Figure 4-12. Aggregates in SS condition were spread out to expedite drying.

4.5.3 Test Procedure

Conventional Compaction Tests

The test procedure for the conventional compaction tests is generally consistent and is summarized below. Figure 4-13 shows photos taken during various stages of the tests.

- A. LWD testing of trench bottom before placement of aggregates. The test locations are the same as those shown in Figures 4-7 and 4-8.
This step was added at the beginning of Session II. The purpose of this step is to investigate the effect of the stiffness of the virgin ground on the stiffness of the compacted surface, particularly for the 1st lift. Figure 4-13(a) shows a photo taken during this step. On-site soil is a mixed soil with a high clay content.
- B. Lay 1st lift of aggregates
 1. At the half of lift thickness, mark LWD test locations using white markers, as shown in Figure 4-13(b)
 2. Place a small piece of geotextile fabric on each LWD test location, as shown in Figure 4-13(c)
 3. Continue with aggregate placement for the lift until lift thickness is confirmed by the field survey
- C. Compaction and LWD testing of 1st lift
 1. LWD testing of uncompacted surface, as shown in Figure 4-13(d)
 2. Compact the aggregate surface with 2 passes, as shown in Figures 4-13(e) and 4-13(f)
 3. LWD testing of compacted surface, as shown in Figure 4-13(g)
 4. Compact the aggregate surface with 2 additional passes (4 passes in total)
 5. LWD testing of compacted surface
 6. Compact the aggregate surface with 2 additional passes (6 passes in total)
 7. LWD testing of compacted surface
 8. Compact the aggregate surface with the final 2 additional passes (8 passes in total)
 9. LWD testing of compacted surface

10. Excavate the compacted aggregates down to previously-placed geotextile fabrics at mid-depth of lift at LWD test locations
11. Conduct LWD testing on exposed geotextile fabric surfaces at mid-depth of lift, as shown in Figure 4-13(h).

D. Repeat Steps B and C for 2nd lift of aggregates

E. Repeat Steps B and C for 3rd lift of aggregates

F. Excavate all aggregates from the trench to conclude the test

Note:

- 1) For Step B, geotextile fabrics were not placed at mid-depth for tests on AASHTO #1 aggregates due to the large aggregate size and the difficulty in excavating these aggregates to mid-depth (i.e., Steps B1 and B2 were skipped).
- 2) For Step B, geotextile fabrics were not placed at mid-depth for all tests on 4" lifts (i.e., Steps B1 and B2 were skipped).
- 3) For Step C, the Ameron construction crew defined a pass as the compaction equipment going across a lift in a round trip; if a pass is defined as the compaction equipment going across a lift in one direction, the number of passes in this report will need to be doubled.
- 4) The hand impact rammers and vibratory plate compactors are specified in terms of “duration”, not “passes”, per Section 206.3(b)1 for equipment meeting Section 108.05(c)4 according to PennDOT Publication 408. For Step C, a pass is equivalent to approximately 6 seconds of continuous compaction for the hand impact rammer and the vibratory plate compactor.
- 5) For the trench-type roller and the two smooth single-drum rollers, the roller speed was set at a maximum of 3 miles per hour for all tests.
- 6) The trench bottom was proof rolled by the 15-ton smooth single-drum roller with one pass before fill placement. For each lift of fill placement, the aggregates were dropped into the trench by an excavator’s bucket and spreaded manually by hand with shovels and heavy-duty metal rakes.



Figure 4-13. Photos taken during field tests: (a) LWD testing of trench bottom; (b) placement of aggregate to half of lift thickness and mark LWD test locations; (c) placement of geotextile fabric at LWD test locations at half of lift thickness; (d) LWD testing of uncompacted surface after placing 1st lift; (e) aggregate compaction using the smooth single-drum vibratory roller (7.5 ton); (f) aggregate compaction using the hand impact rammer; (g) LWD testing of compacted surface; (h) LWD testing of mid-depth of lift on exposed geotextile fabric surfaces.

Successive Compaction Tests

The test procedure for the successive compaction tests is generally consistent and is summarized below.

- A. LWD testing of trench bottom before placement of aggregates. The test locations are the same as those shown in Figure 4-10.
- B. Lay 1st lift of aggregates
- C. Compaction and LWD testing of 1st lift
 1. LWD testing of uncompacted surface
 2. Compact the aggregate surface with 8 passes of the self-propelled trench-type roller; conduct LWD testing after every 2 passes
 3. Compact the aggregate surface with 8 passes of the hand impact rammer; conduct LWD testing after every 2 passes
 4. Compact the aggregate surface with 8 passes of the vibratory plate compactor; conduct LWD testing after every 2 passes

5. Compact the aggregate surface with 8 passes of the smooth single-drum vibratory roller (7.5 ton); conduct LWD testing after every 2 passes
6. Compact the aggregate surface with 8 passes of the smooth single-drum vibratory roller (15 ton); conduct LWD testing after every 2 passes

D. Repeat Steps B and C for 2nd lift of aggregates

E. Repeat Steps B and C for 3rd lift of aggregates

F. Excavate all aggregates from the trench to conclude the test

Note:

1) For the first successive compaction test conducted (AASHTO #8, SS, 8" lifts, on 8/23, see Table 4-2), the first lift was compacted using a different sequence, which started with the hand impact rammer first, the vibratory plate compactor next, and the self-propelled trench-type roller next, before proceeding with the smooth single-drum vibratory rollers. A preliminary analysis of the LWD test data on-site suggested that, among all five pieces of the compaction equipment, the self-propelled trench-type roller generally yielded the smallest stiffness values of the compacted surface. In the subsequent successive compact tests, the sequence of compaction equipment was adjusted to what is shown in Step C so that the stiffness of the compacted surface was expected to increase as each lift was successively compacted by different equipment.

Overall, approximately 250 tons of each aggregate were used for the field testing. This quantity is based on approximately 180 tons of aggregate needed for filling the large trench with a depth of 4', a width of 12', and a length of 60' at the bottom (see Figure 4-4(a)) plus approximately 70 tons (40%) of extra needed to replace contaminated aggregate in the removal and replacement of aggregate during the repeated field testing with different lift thickness, moisture content, and equipment. Each time after the aggregates were excavated from a trench, any heavily contaminated aggregates (from on-site clayey soil) were removed off site and clean aggregates from a separate stockpile were added for the next compaction test.

4.6 Test Results

Table 4-3 lists all compaction tests conducted in the order of decreasing aggregate size and increasing lift thickness. Appendix B presents All LWD test data in a tabular format as a reference. Appendix C presents the LWD test data in a series of figures in terms of elastic modulus vs. number of passes. Each reported elastic modulus value in these figures is the average value of E_{LWD} from the last three drops (i.e., 7th, 8th, and 9th drops); if one of these three E_{LWD} values is significantly different than the other two, the value is discarded, and the average of the other two is used to plot all figures. For example, for AASHTO #1 aggregates in the SD condition at the 1st 4" lift in the parcel/zone for the self-propelled trench-type roller (see Table B-2), the E_{LWD} values of the uncompacted surface at P3 are 23.3 MPa, 662.1 MPa, and 22.6 MPa from the 7th, 8th, and 9th drop, respectively. Given that 662.1 MPa is significantly different than the other two values, the average of 23.3 MPa and 22.6 MPa (i.e., 22.95 MPa) is used to represent the elastic modulus value of the uncompacted surface at this location and plot Figure C-1. The significant deviance of a few E_{LWD} values in Table B-2 could be associated with abnormal test conditions. For example, a non-

vertical or loosened guide rod (see Figure 2-8) and an improper contact (e.g., slippage) between the base plate and aggregate surface could result in erroneous LWD readings and E_{LWD} values; these situations were corrected immediately after their occurrence.

Table 4-3. List of All Field Tests Conducted

Aggregate	Lift Thickness (in)
AASHTO #1 (SD)	4
AASHTO #1 (SD)	8
AASHTO #1 (SD)	12
AASHTO #1 (SD)	15
AASHTO #57 (SD)	4
AASHTO #57 (SS)	4
AASHTO #57 (SD)	8
AASHTO #57 (SS)	8
AASHTO #57 (SD)	12
AASHTO #57 (SS)	12
AASHTO #57 (SS)	15
AASHTO #8 (SD)	4
AASHTO #8 (SS)	4
AASHTO #8 (SD)	8
AASHTO #8 (SS)	8
AASHTO #8 (SD)	12
AASHTO #8 (SS)	12
AASHTO #8 (SS)	15
AASHTO #8 successive compaction (SD)	8
AASHTO #8 successive compaction (SS)	8
AASHTO #8 successive compaction (SS)	12

SD: surface-dry condition; SS: surface-saturated condition.

In the figures in Appendix C, the elastic modulus values at zero pass correspond to the LWD test results on the uncompacted surface after the placement of each lift (see Figure C-1 as an example). LWD tests were conducted at the trench bottom (TB) for all compaction tests in Session II, and the results are shown as filled markers in grey (see Figure C-1 as an example). For the figures for successive compaction tests in Appendix C, IR, VP, TR, R7.5T, and R15T stand for the hand impact rammer, vibratory plate compactor, trench-type roller, 7.5-ton smooth single-drum roller, and 15-ton smooth single-drum roller, respectively.

4.7 Analysis of Test Results

In this section, LWD test results from different compaction tests are compared to show the effects of compaction equipment, aggregate type and moisture condition, and lift thickness on the field compaction of the aggregates tested.

4.7.1 Effect of Compaction Equipment

Figure 4-14 shows the effect of compaction equipment on AASHTO #1 aggregates in the SD condition and 4" lifts. Figure 4-14(a) shows the measured elastic modulus of the uncompacted surface and the compacted surface after 2 passes, 4 passes, 6 passes, and 8 passes. The graphed elastic modulus values represent the average of the LWD test points within the parcel, as shown in Figure 4-8. As the results of the compaction of the 1st lift will experience the greatest influence from the trench bottom, it was determined to be most appropriate to use the results of the 3rd lift to highlight the effect of compaction equipment while minimizing the effect of the trench bottom's non-uniform stiffness. Figure 4-14(b) shows the ratio of the elastic modulus of the compacted surface E over that of the uncompacted condition E_{un} ; hence, the ratio represents the increase in elastic modulus due to compaction and normalizes the difference in the initial elastic modulus of the uncompacted surfaces in different parcels/zones. The combination of E and E/E_{un} presents a more meaningful indicator of the effect of compaction on the aggregates than each of the parameter alone.

Figures 4-15, 4-16, and 4-17 show the corresponding plots for 8" lifts, 12" lifts, and 15" lifts, respectively, all for AASHTO #1 aggregates in the SD condition. Figures 4-18, 4-19, and 4-20 show the corresponding plots for AASHTO #57 aggregates in the SD condition for 4" lifts, 8" lifts, and 12" lifts, respectively; Figures 4-21, 4-22, and 4-23 show the corresponding plots for AASHTO #8 aggregates. Note that for AASHTO #57 and #8 aggregates, compaction tests with 15" lifts in the SD condition were not conducted (see Table 4-3).

A cross-comparison of Figures 4-14 through 4-23 shows the following trends for the effect of compaction equipment:

- For 4" lifts in the SD condition, regardless of the aggregate type and compaction equipment, compaction did not result in significant increases in the elastic modulus of the compacted surface as the values of E/E_{un} are generally around 1.0 even after 8 passes. This observation is consistent with the reasoning why lightweight compaction equipment is used for thin lifts. Thin lifts are only specified in areas of influence behind structural elements, such as walls and abutments, to avoid imparting lateral loading.
- For these aggregates, the elastic modulus of the aggregate surface is highly dependent on the local microstructure formed during aggregate placement. In isolated cases, an uncompacted surface may exhibit a high elastic modulus (e.g., the parcel/zone for the hand impact rammer in Figures 4-15(a), 4-18(a), and 4-21(a)); subsequent compaction may alter the microstructure and result in lower elastic modulus values, as manifested by E/E_{un} values being smaller than 1 (e.g., Figures 4-15(b), 4-18(b), and 4-21(b)). These isolated cases are typically observed when using the hand impact rammer to compact AASHTO #1 and #57

aggregates in 4" lifts, suggesting that hand impact rammers may not be the best type of compaction equipment in these situations.

- The hand impact rammer was ineffective for compacting AASHTO #1 aggregates; its effectiveness increased as the particle size decreased, and it was most effective for compacting AASHTO #8 aggregates. This is due to a combination of two reasons. First, the hand impact rammer has a relatively small rammer plate dimension, which is more effective in compacting smaller aggregates (e.g., AASHTO #8 aggregates) than large aggregates (e.g., AASHTO #1 aggregates). Second, granular soil particles (e.g., sand and gravel) respond to different vibration frequencies differently depending on particle size. The smaller the particle, the higher the frequency necessary to move/excite it (see Section 2.3.2). Larger aggregate particles require higher energy and larger vibration forces to excite them; hence, moving up to a larger compactor with a lower frequency and higher vibration force may be advantageous for compacting AASHTO #1 and #57 aggregates.
- The vibratory plate compactor, self-propelled trench-type roller, and smooth single-drum vibratory rollers were effective in compacting these aggregates at 8" lifts, 12" lifts, and 15" lifts, as manifested by E/E_{un} values generally in the range of 1.4-1.5 and, in some cases, greater than 2 (e.g., Figures 4-20(b) and 4-23(b)).
- Compaction meaningfully increased the elastic modulus of the compacted surface by 1.4-1.5 times for AASHTO #1 aggregates (except for 4" lifts), and the increase was more pronounced for AASHTO #57 and #8 aggregates. This suggests that AASHTO #57 and #8 aggregates are more "compactable" than AASHTO #1 aggregates for the testing equipment used in this study.
- While 8 passes may have resulted in the highest elastic modulus increase in isolated cases, the optimal number of passes was 4 to 6 in most cases due to over-compaction beyond this number of passes. Over-compaction did not improve the packing condition; on the contrary, the aggregate matrix could be "destabilized" under excessive compaction. This phenomenon was also observed in a series of laboratory compaction tests of coarse aggregates by Mondal et al. (2022).

AASHTO #1, SD, 4" Lifts

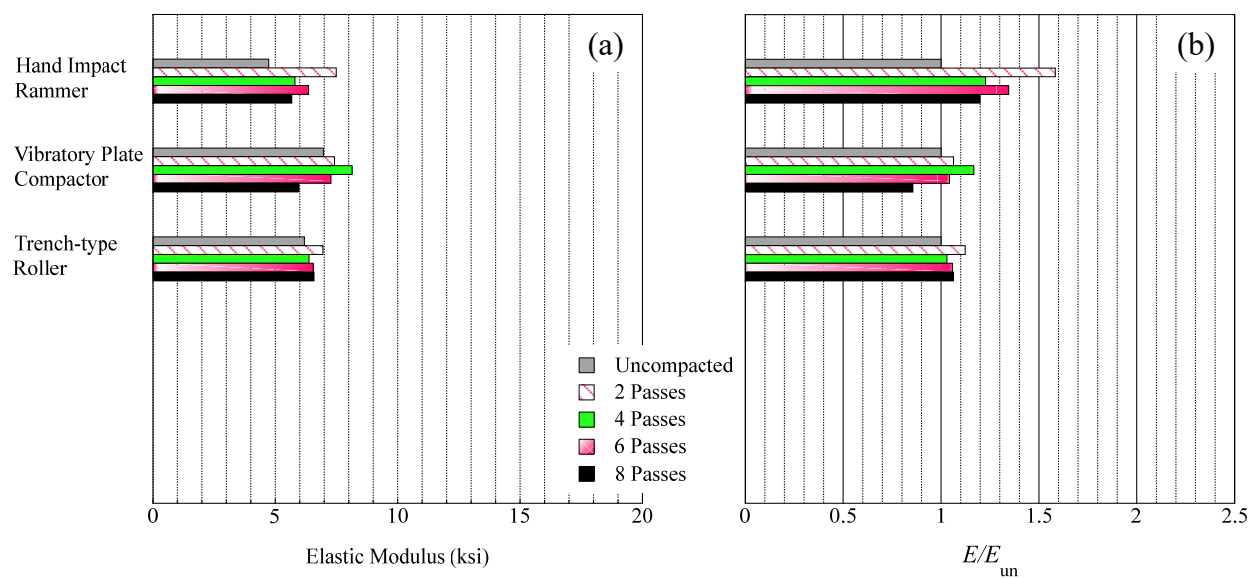


Figure 4-14. Effect of compaction equipment on AASHTO #1 aggregates, SD, 4" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #1, SD, 8" Lifts

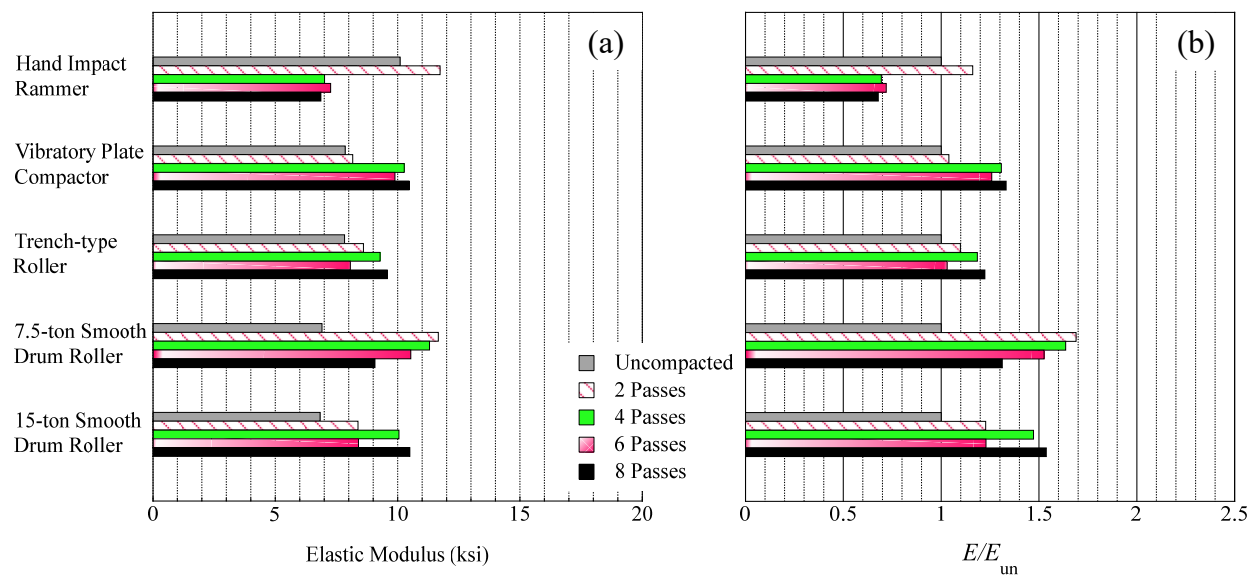


Figure 4-15. Effect of compaction equipment on AASHTO #1 aggregates, SD, 8" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #1, SD, 12" Lifts

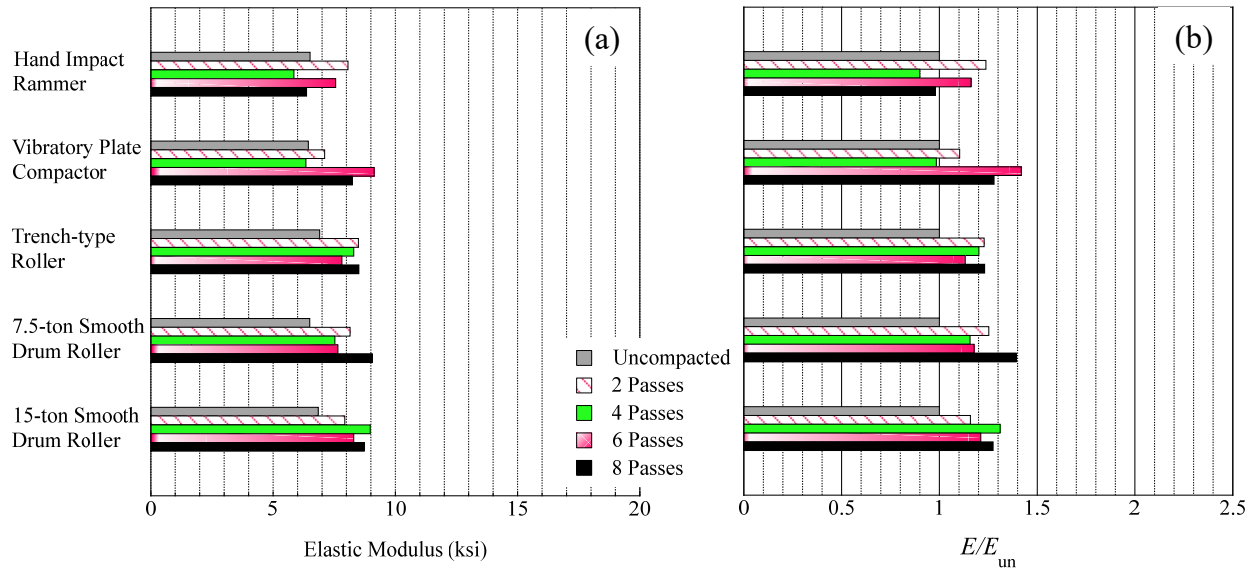


Figure 4-16. Effect of compaction equipment on AASHTO #1 aggregates, SD, 12" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #1, SD, 15" Lifts

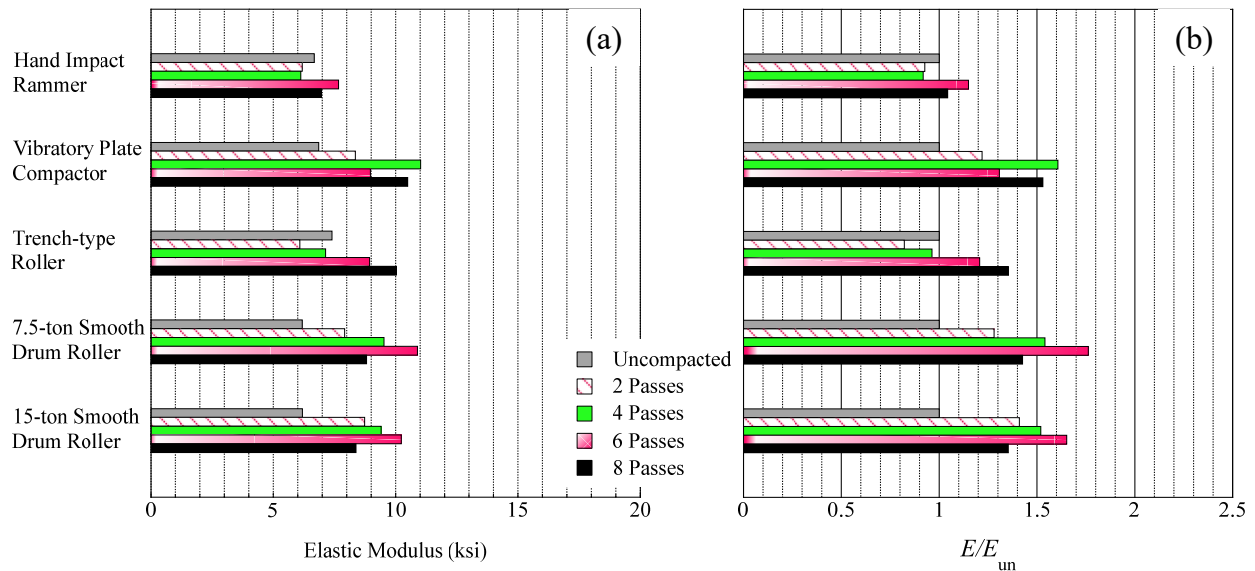


Figure 4-17. Effect of compaction equipment on AASHTO #1 aggregates, SD, 15" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #57, SD, 4" Lifts

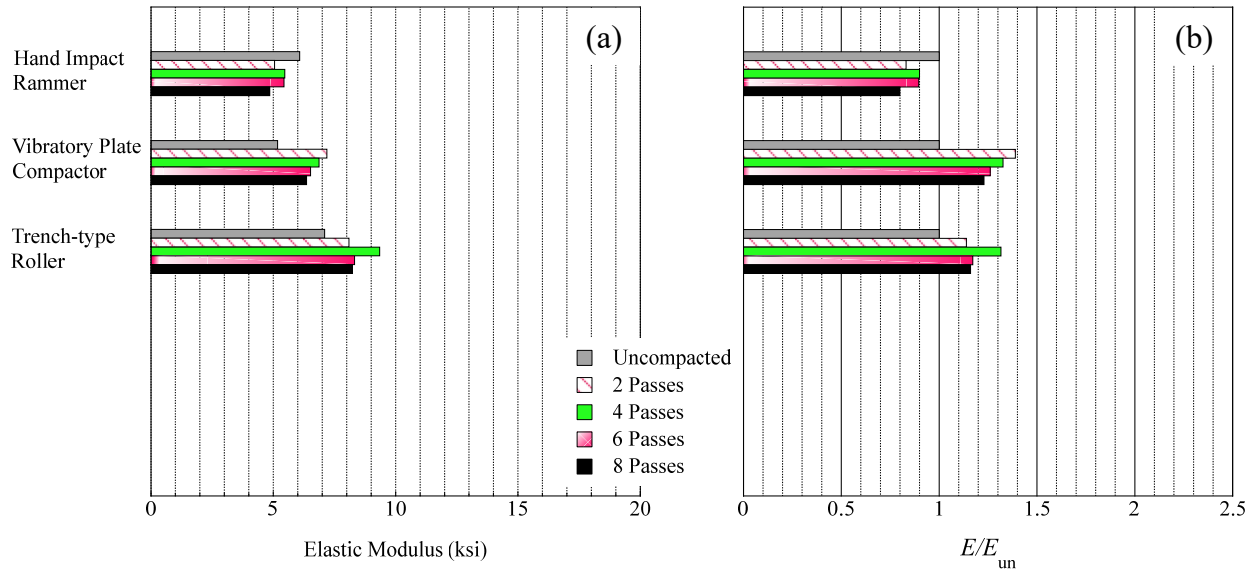


Figure 4-18. Effect of compaction equipment on AASHTO #57 aggregates, SD, 4" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #57, SD, 8" Lifts

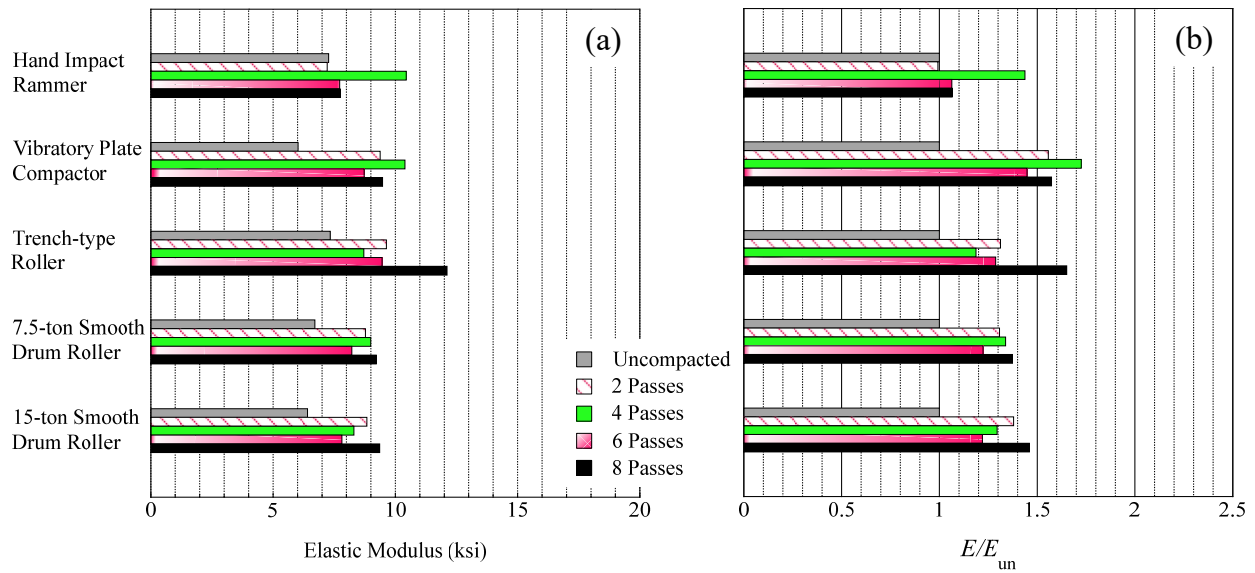


Figure 4-19. Effect of compaction equipment on AASHTO #57 aggregates, SD, 8" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #57, SD, 12" Lifts

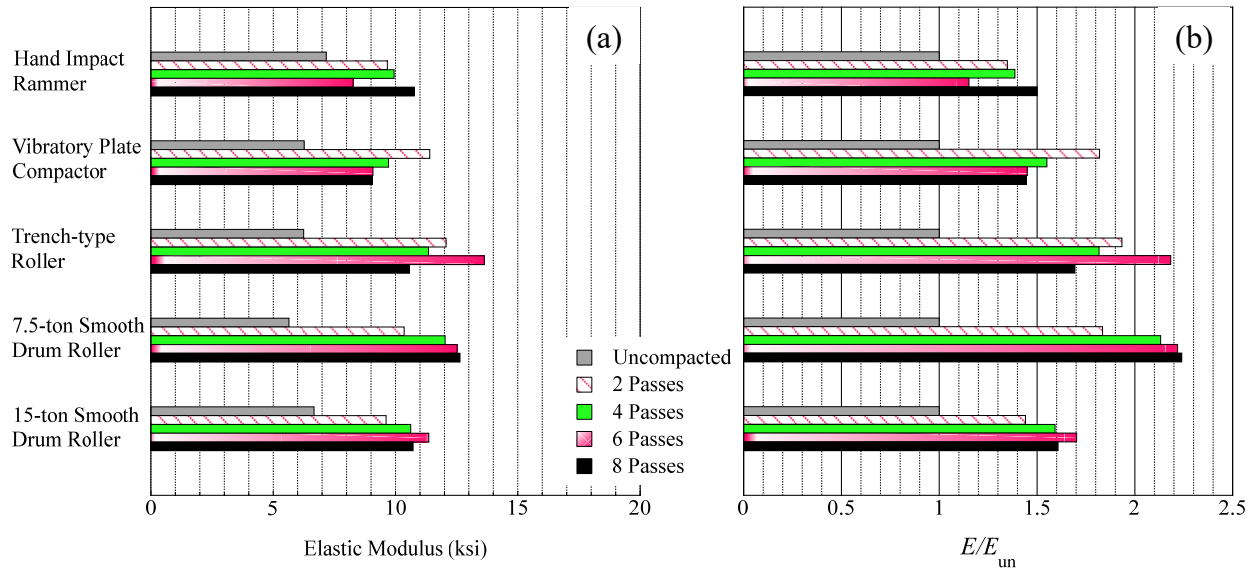


Figure 4-20. Effect of compaction equipment on AASHTO #57 aggregates, SD, 12" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #8, SD, 4" Lifts

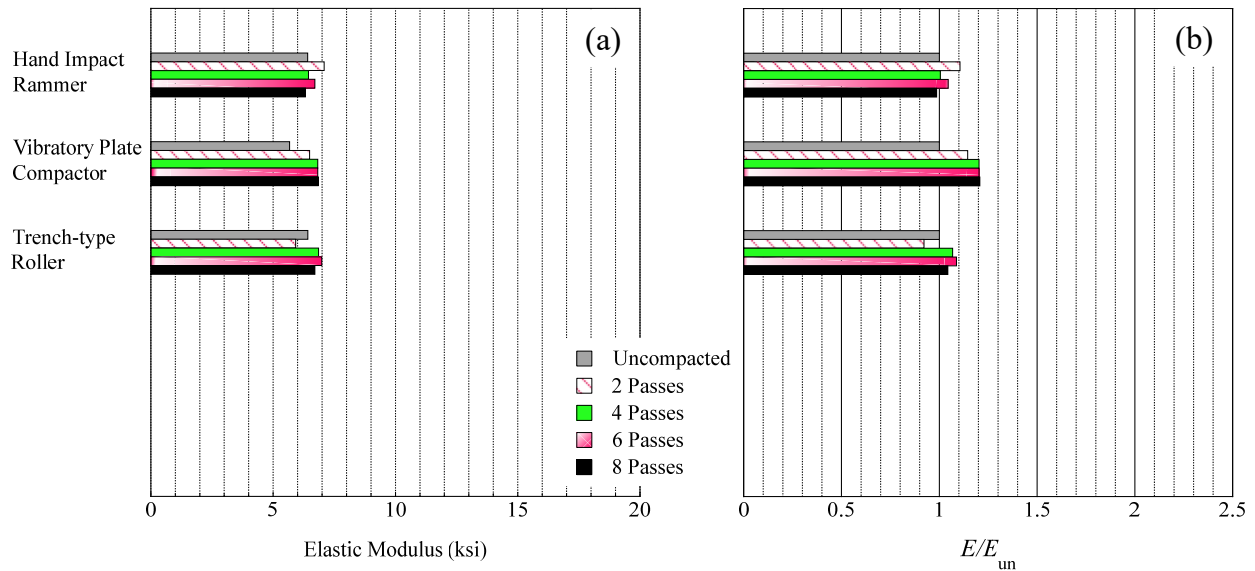


Figure 4-21. Effect of compaction equipment on AASHTO #8 aggregates, SD, 4" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #8, SD, 8" Lifts

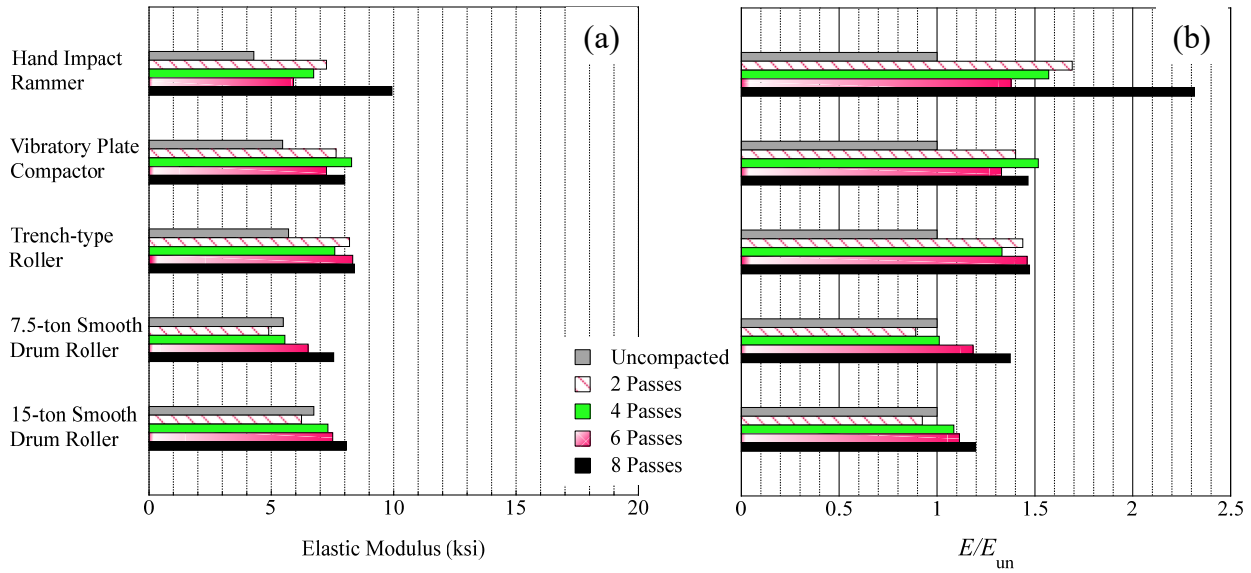


Figure 4-22. Effect of compaction equipment on AASHTO #8 aggregates, SD, 8" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #8, SD, 12" Lifts

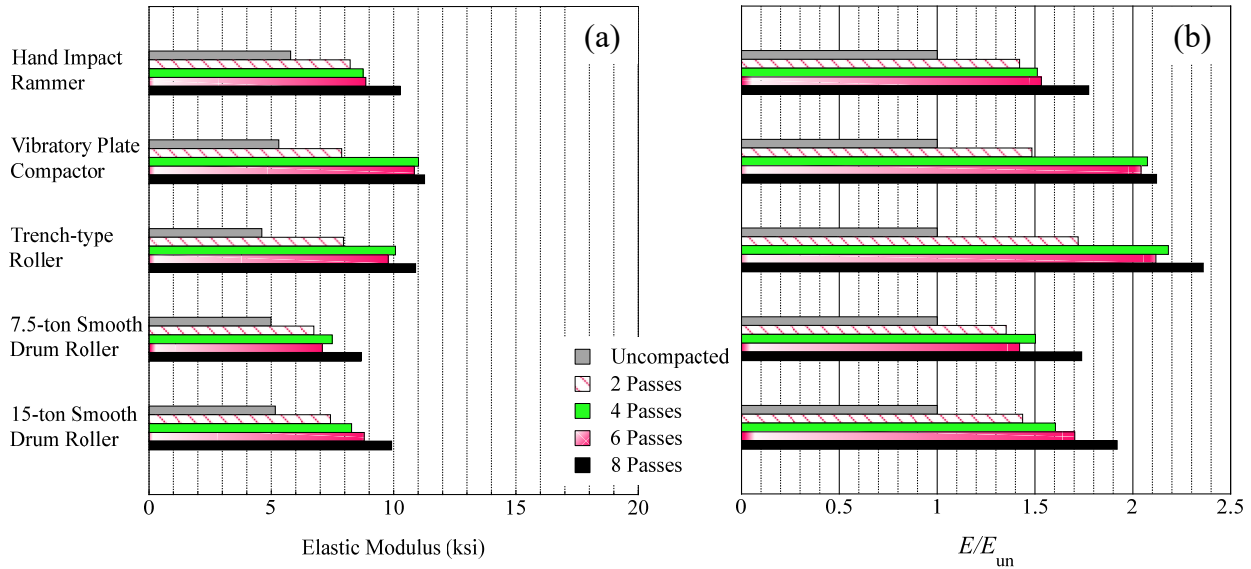


Figure 4-23. Effect of compaction equipment on AASHTO #8 aggregates, SD, 12" lifts:
(a) elastic modulus; (b) E/E_{un} .

Figures 4-24 through 4-27 show the effect of equipment for AASHTO #57 and #8 aggregates for 8" and 12" lifts in the SS condition. Similar to the trends observed for these aggregates in the SD condition, Figures 4-24 through 4-27 show that for these aggregates in the SS condition, compaction significantly increased the elastic modulus of the compacted surface, particularly for AASHTO #57 aggregates at 12" lifts and for AASHTO #8 aggregates at both 8" and 12" lifts. For AASHTO #57 and #8 aggregates, compaction in the SS condition resulted in more pronounced

increases in elastic modulus than compaction in the SD condition did for a given lift thickness. Note that the scale of the horizontal axis for elastic modulus is 0-140 MPa in Figures 4-24 through 4-27, which is different than 0-100 MPa in Figures 4-14 through 4-23; the scale of the horizontal axis for E/E_{un} is 0-3 in Figure 4-27, which is different than 0-2.5 in the other figures. The effects of aggregate type and moisture condition on aggregate compaction are discussed in the following subsection.

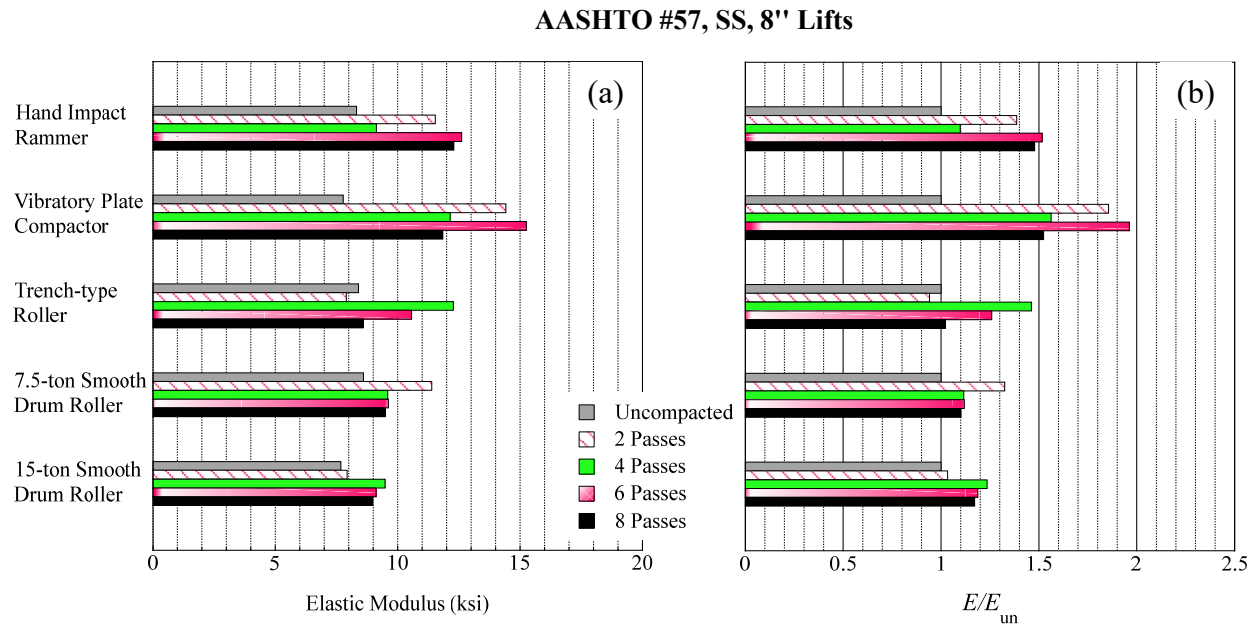


Figure 4-24. Effect of compaction equipment on AASHTO #57 aggregates, SS, 8" lifts:
(a) elastic modulus; (b) E/E_{un} .

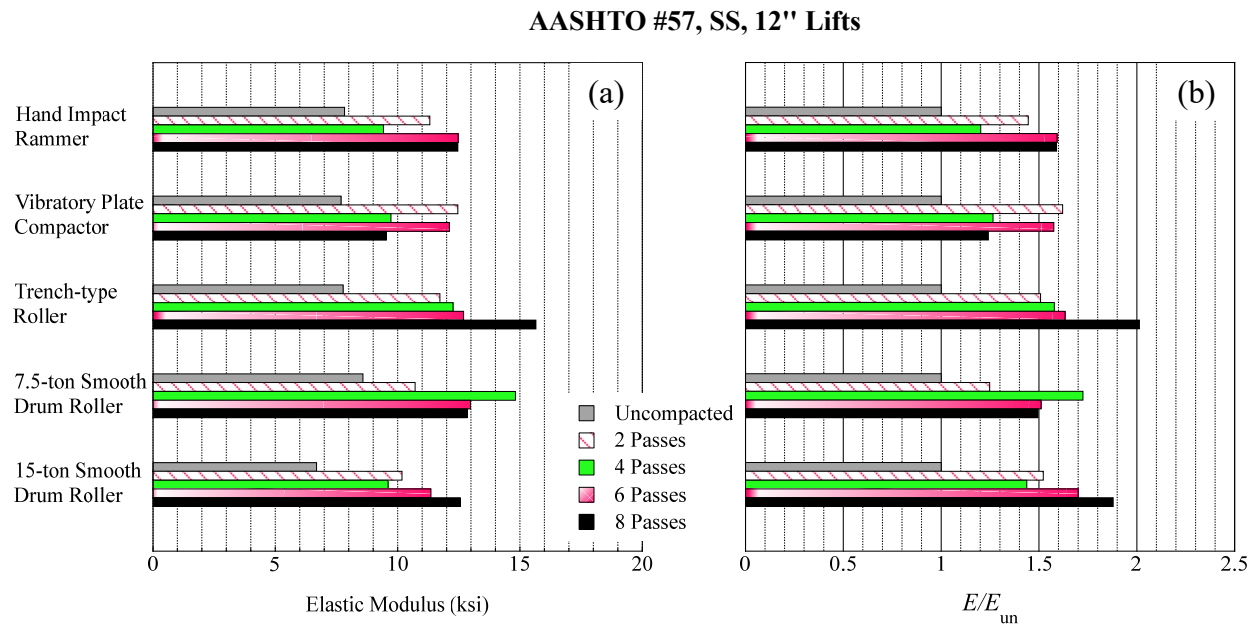


Figure 4-25. Effect of compaction equipment on AASHTO #57 aggregates, SS, 12" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #8, SS, 8" Lifts

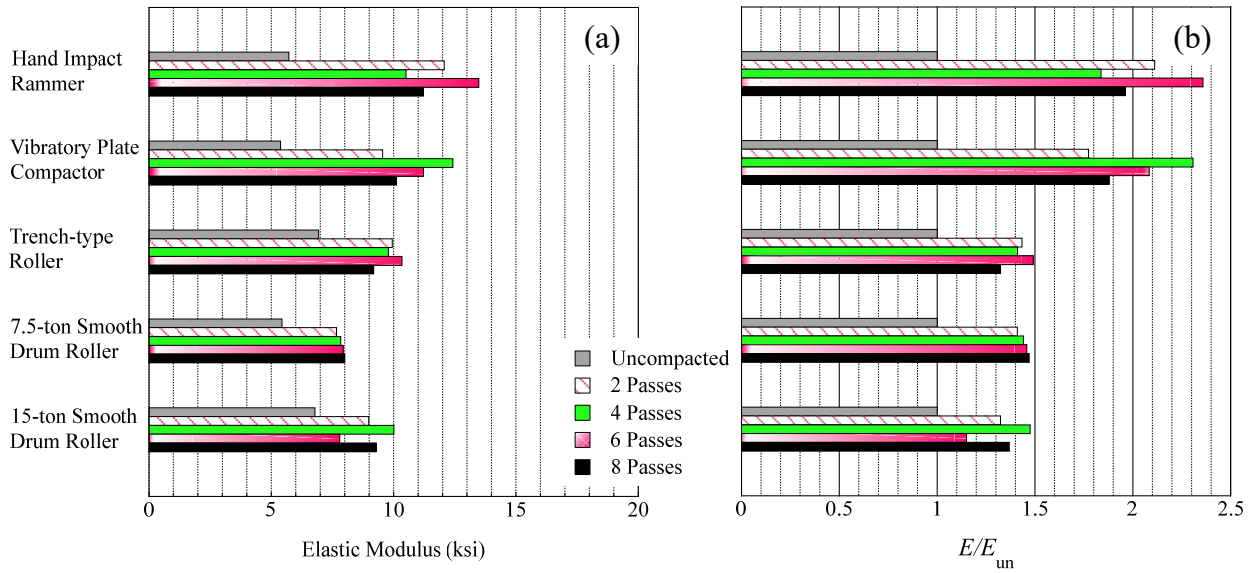


Figure 4-26. Effect of compaction equipment on AASHTO #8 aggregates, SS, 8" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #8, SS, 12" Lifts

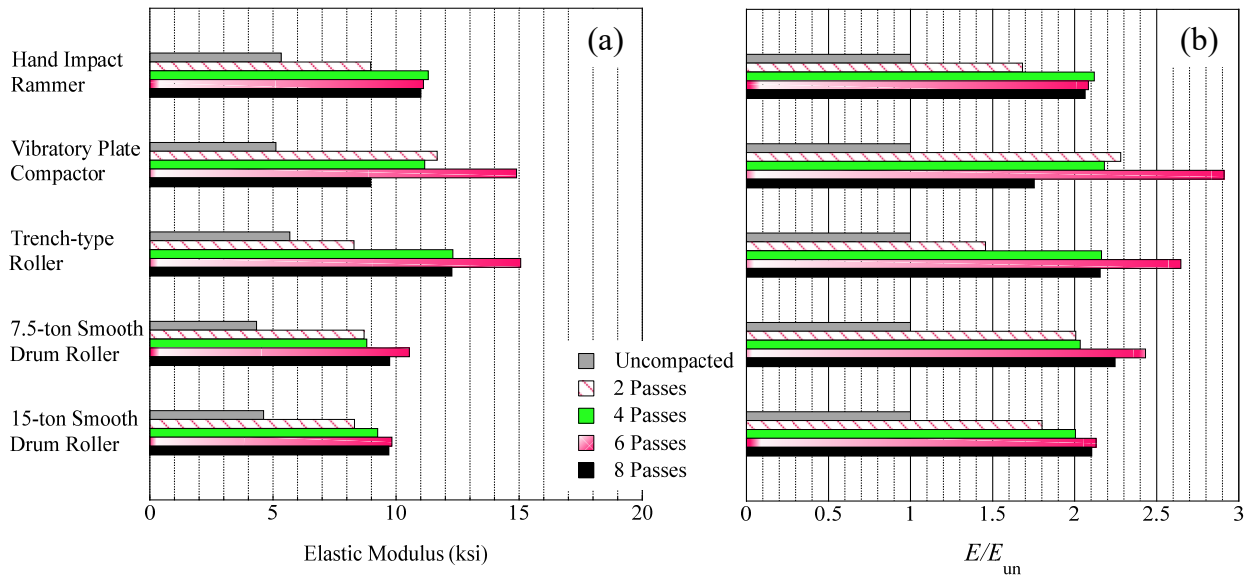


Figure 4-27. Effect of compaction equipment on AASHTO #8 aggregates, SS, 12" lifts:
(a) elastic modulus; (b) E/E_{un} .

4.7.2 Effects of Aggregate Type and Moisture Condition

Figures 4-28, 4-29, and 4-30 show the effects of aggregate type and moisture condition on the field compaction with 4" lifts using the hand impact rammer, vibratory plate compactor, and trench-type roller, respectively. Figures 4-31, 4-32, 4-33, 4-34, and 4-35 show the corresponding effects with

8" lifts using the hand impact rammer, vibratory plate compactor, trench-type roller, 7.5-ton smooth single-drum roller, and 15-ton smooth single-drum roller, respectively. Figures 4-36 through 4-40 show the corresponding plots for 12" lifts, and Figures 4-41 through 4-45 for 15" lifts. Similar to Section 4.6.1, the average elastic modulus from the multiple LWD test locations (see Figures 4-7 and 4-8) in the 3rd lift is used to represent the modulus of the individual parcel/zone compacted by a particular equipment. Note that the scale of the horizontal axis for elastic modulus is 0-100 MPa for most figures but 0-140 MPa for few figures (e.g., Figures 4-32 and 4-37 through 4-39); the scale of the horizontal axis for E/E_{un} is 0-2.5 for most figures but 0-3 for few figures (e.g., Figures 4-37 and 4-38).

A cross-comparison of Figures 4-28 through 4-45 shows the following trends for the effects of aggregate type and moisture condition:

- For 4" lifts in the SD condition, regardless of the aggregate type and compaction equipment, compaction did not result in significant increases in the elastic modulus of the compacted surface as the values of E/E_{un} are generally around 1.0 even after 8 passes. For 4" lifts in the SS condition, the hand impact rammer and vibratory plate compactor can effectively compact AASHTO #57 and #8 aggregates, as manifested by E/E_{un} values much higher than 1.0 after compaction due to the lubrication effect in the SS condition. For example, after 8 passes, the E/E_{un} value for AASHTO #57 and AASHTO #8 in the SS condition reached approximately 1.25 and 1.52, respectively; in contrast, the corresponding values in the SD condition were about 0.8 and 0.98 (see Figure 4-28(b)).
- The moisture condition appears to have a negligible effect on compaction of the aggregates evaluated when using the trench-type roller.
- For 8" lifts (Figures 4-31 through 4-35), the effectiveness of compaction for the hand impact rammer and vibratory plate compactor increased as the particle size decreased from AASHTO #1 aggregates to AASHTO #8 aggregates and as the moisture condition changed from SD condition to SS condition for the aggregate types evaluated under both conditions, as manifested by the reported E/E_{un} values. However, the effectiveness of compaction for the other three pieces of compaction equipment was less sensitive to the aggregate type and moisture condition, as manifested by E/E_{un} values in a similar range after compaction. For example, Figure 4-31 shows that after 8 passes, the hand impact rammer resulted in an E/E_{un} value of about 0.68 for AASHTO #1 aggregates in SD condition, 1.06 for AASHTO #57 in SD condition, 1.48 for AASHTO #57 in SS condition, 2.31 for AASHTO #8 in SD condition, and 1.97 for AASHTO #8 in SS condition. This observation is likely due to the difference in soil-equipment interaction among the five pieces of compaction equipment. For the hand impact rammer and vibratory plate compactor, the compaction relies on the dynamic interaction between aggregates and a relatively small plate excited by a high-frequency, short-stroke motion, generating stress waves propagating through the aggregates, setting particles in motion and rearranging them into a higher density. The dynamic interaction is more effective if the plate surface can interact with more aggregate particles; hence, the compaction effectiveness increases as the aggregate size decreases for these two pieces of equipment. On the other hand, the soil-equipment interaction surface has a much larger contact area in the other three pieces of equipment, resulting in the compaction effectiveness being less sensitive to aggregate size.

- For 12" lifts (Figures 4-36 through 4-40), the effectiveness of compaction for all five pieces of compaction equipment generally increased as the particle size decreased and as the moisture condition changed from SD condition to SS condition for a given aggregate type. For the hand impact rammer and vibratory plate compactor, this trend is similar to that observed for 8" lifts, and the mechanism is discussed previously. For the other three pieces of compaction equipment, this trend is different than that observed for 8" lifts.
- For 15" lifts (Figures 4-41 through 4-45), only three combinations of aggregate and moisture conditions were tested due to time constraint. It is generally observed that for 15" lifts, the hand impact rammer, vibratory plate compactor, and trench-type roller were able to more effectively compact AASHTO #57 and #8 in SS condition than AASHTO #1 in SD condition. However, the two smooth single-drum rollers were able to effectively compact all three combinations of aggregate and moisture conditions.
- While 8 passes may have resulted in the highest elastic modulus increase in some cases, the optimal number of passes was 4 to 6 in most cases due to over-compaction beyond this number of passes.

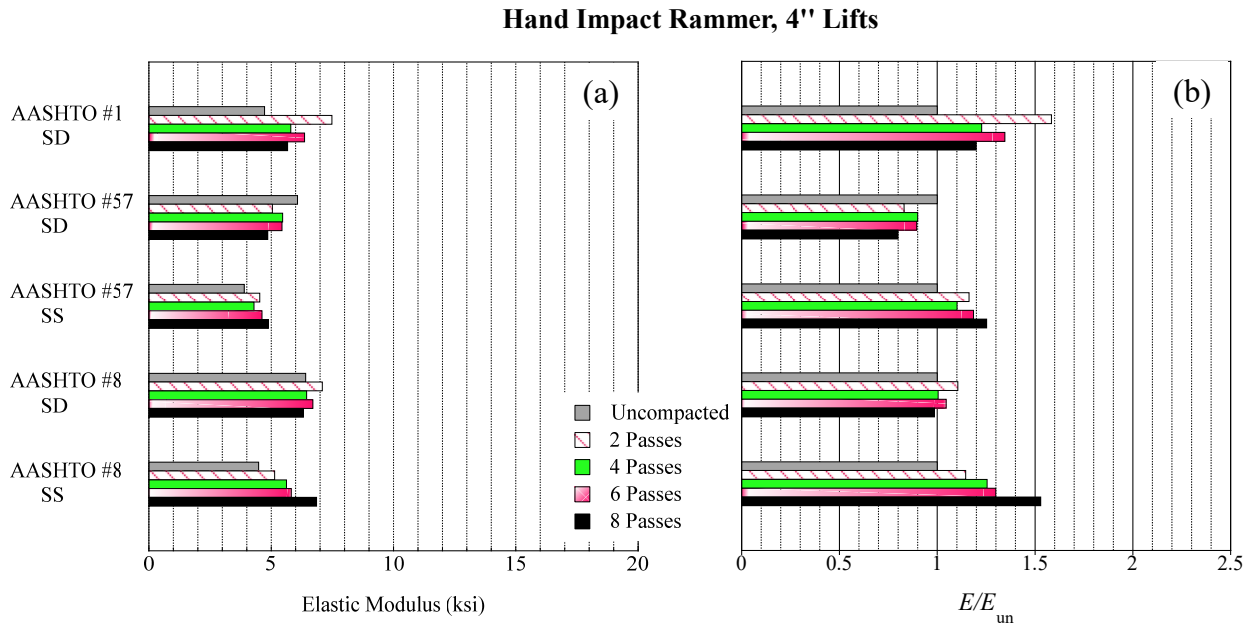


Figure 4-28. Effects of aggregate type and moisture condition on compaction using hand impact rammer and 4" lifts: (a) elastic modulus; (b) E/E_{un} .

Vibratory Plate Compactor, 4" Lifts

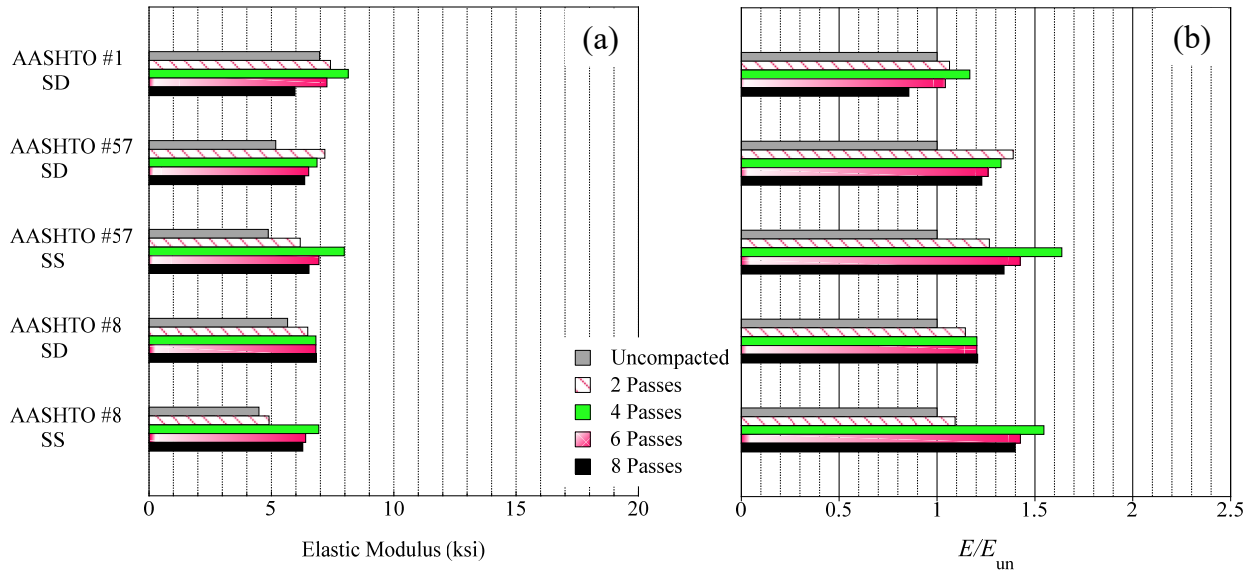


Figure 4-29. Effects of aggregate type and moisture condition on compaction using vibratory plate compactor and 4" lifts: (a) elastic modulus; (b) E/E_{un} .

Trench-type Roller, 4" Lifts

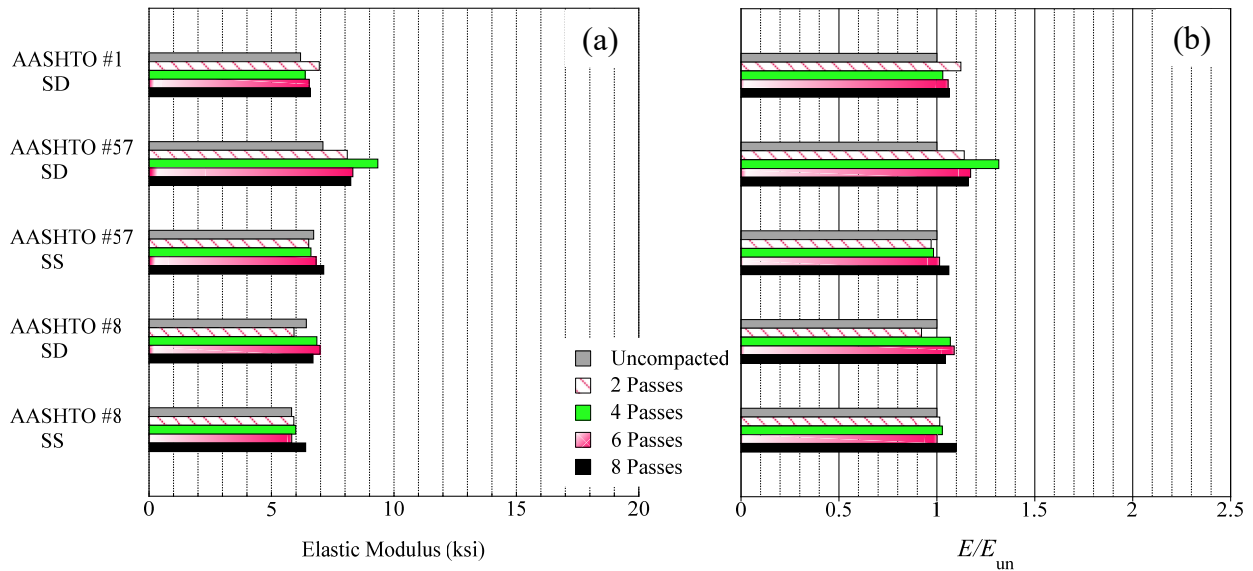


Figure 4-30. Effects of aggregate type and moisture condition on compaction using trench-type roller and 4" lifts: (a) elastic modulus; (b) E/E_{un} .

Hand Impact Rammer, 8" Lifts

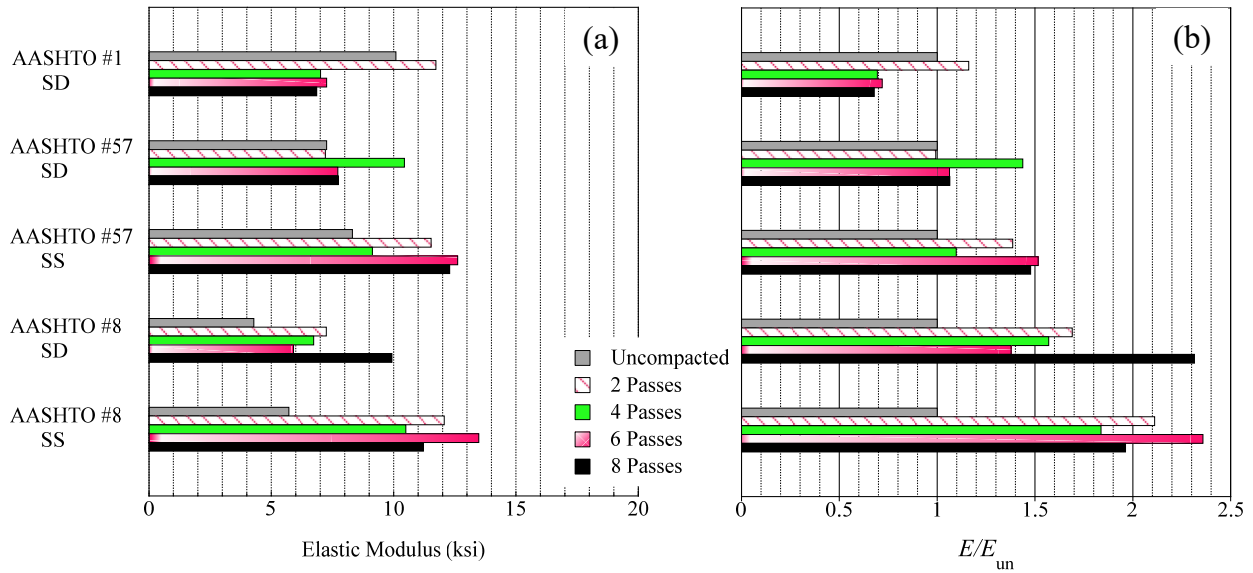


Figure 4-31. Effects of aggregate type and moisture condition on compaction using hand impact rammer and 8" lifts: (a) elastic modulus; (b) E/E_{un} .

Vibratory Plate Compactor, 8" Lifts

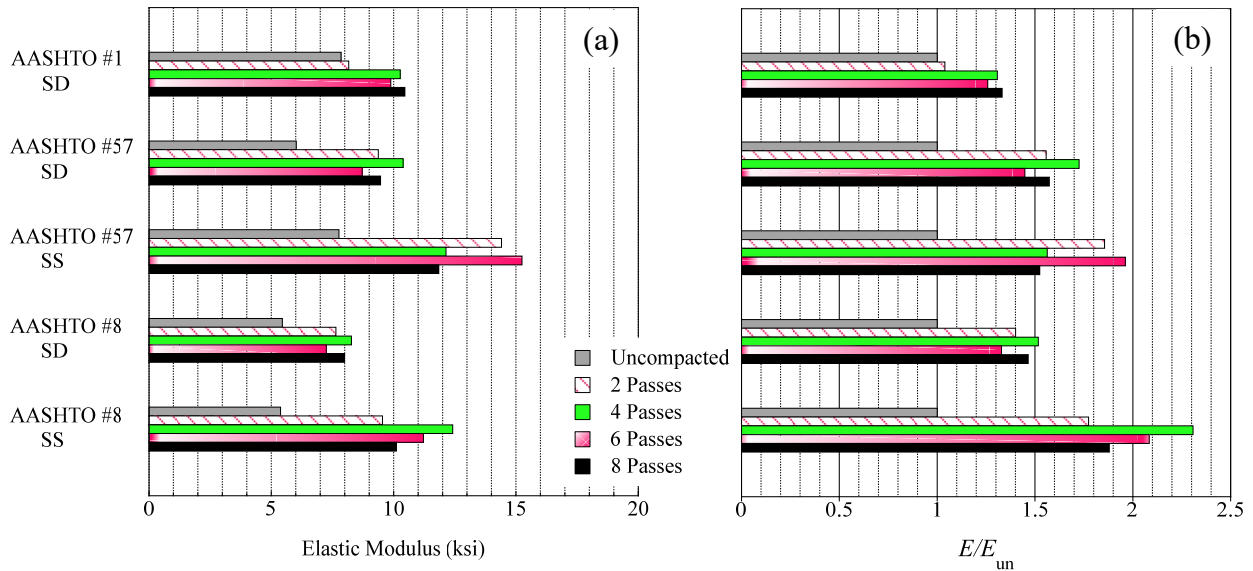


Figure 4-32. Effects of aggregate type and moisture condition on compaction using vibratory plate compactor and 8" lifts: (a) elastic modulus; (b) E/E_{un} .

Trench-type Roller, 8" Lifts

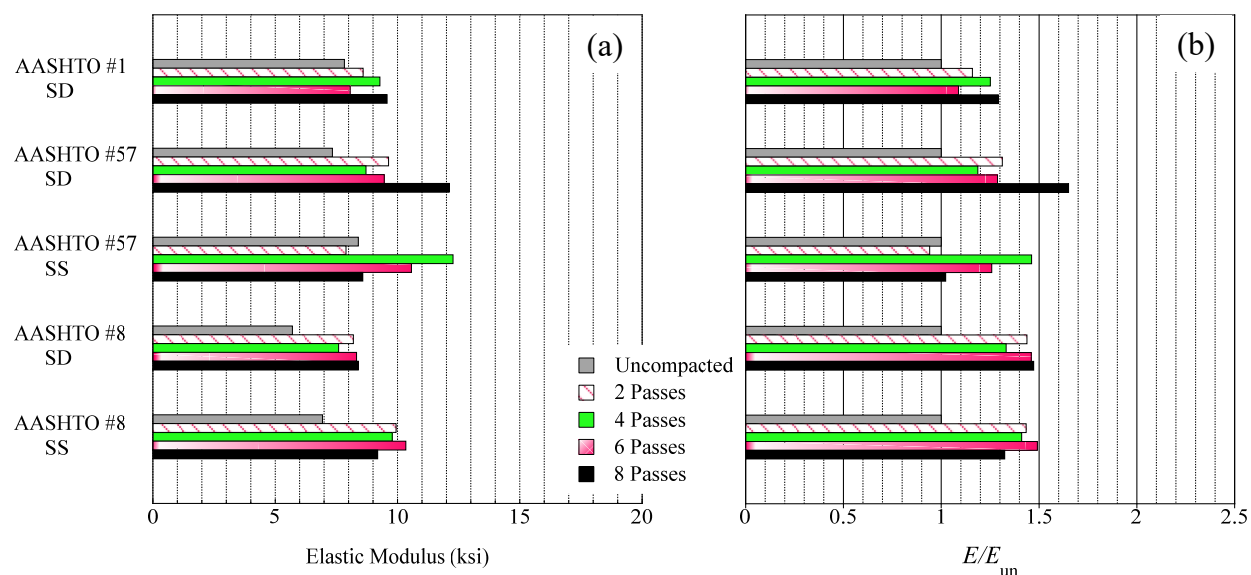


Figure 4-33. Effects of aggregate type and moisture condition on compaction using trench-type roller and 8" lifts: (a) elastic modulus; (b) E/E_{un} .

7.5-ton Smooth Single-drum Roller, 8" Lifts

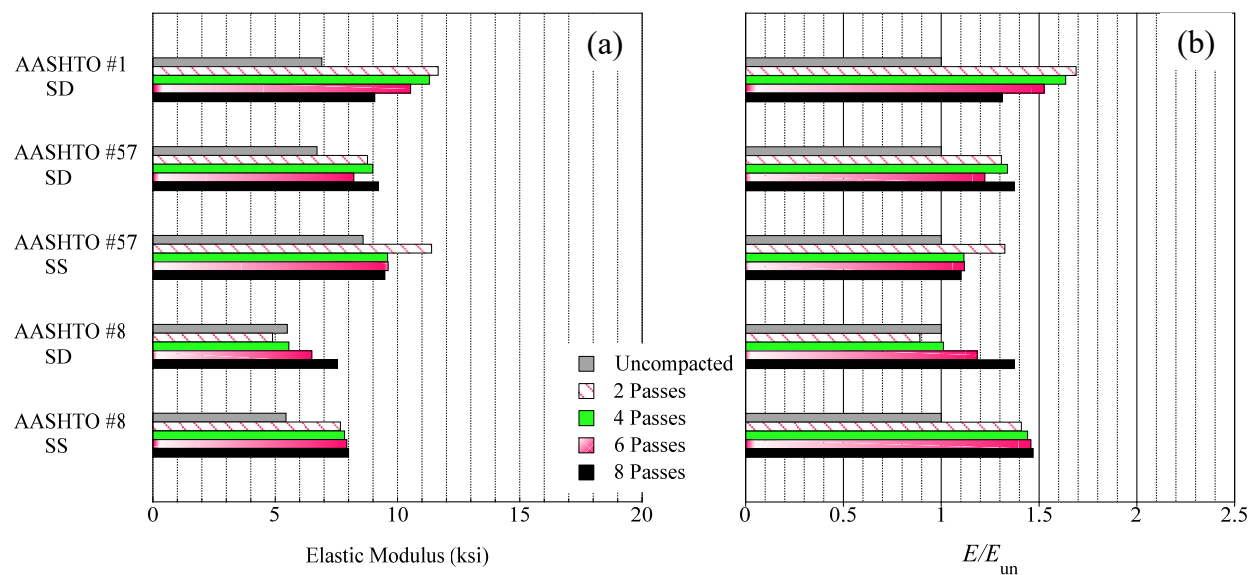


Figure 4-34. Effects of aggregate type and moisture condition on compaction using 7.5-ton smooth single-drum roller and 8" lifts: (a) elastic modulus; (b) E/E_{un} .

15-ton Smooth Single-drum Roller, 8" Lifts

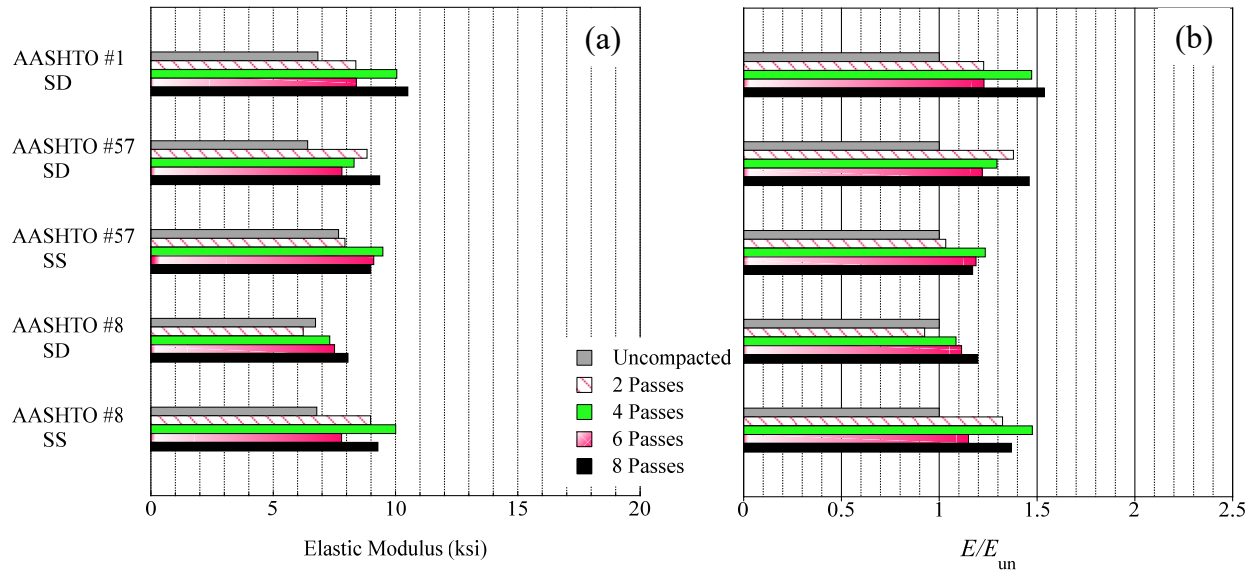


Figure 4-35. Effects of aggregate type and moisture condition on compaction using 15-ton smooth single-drum roller and 8" lifts: (a) elastic modulus; (b) E/E_{un} .

Hand Impact Rammer, 12" Lifts

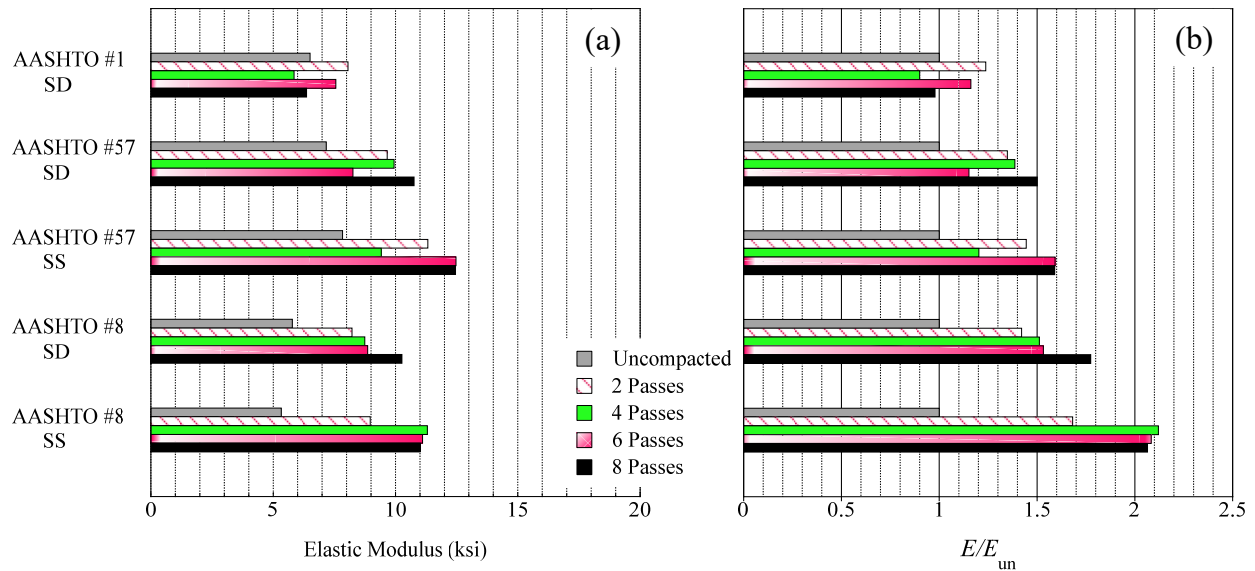


Figure 4-36. Effects of aggregate type and moisture condition on compaction using hand impact rammer and 12" lifts: (a) elastic modulus; (b) E/E_{un} .

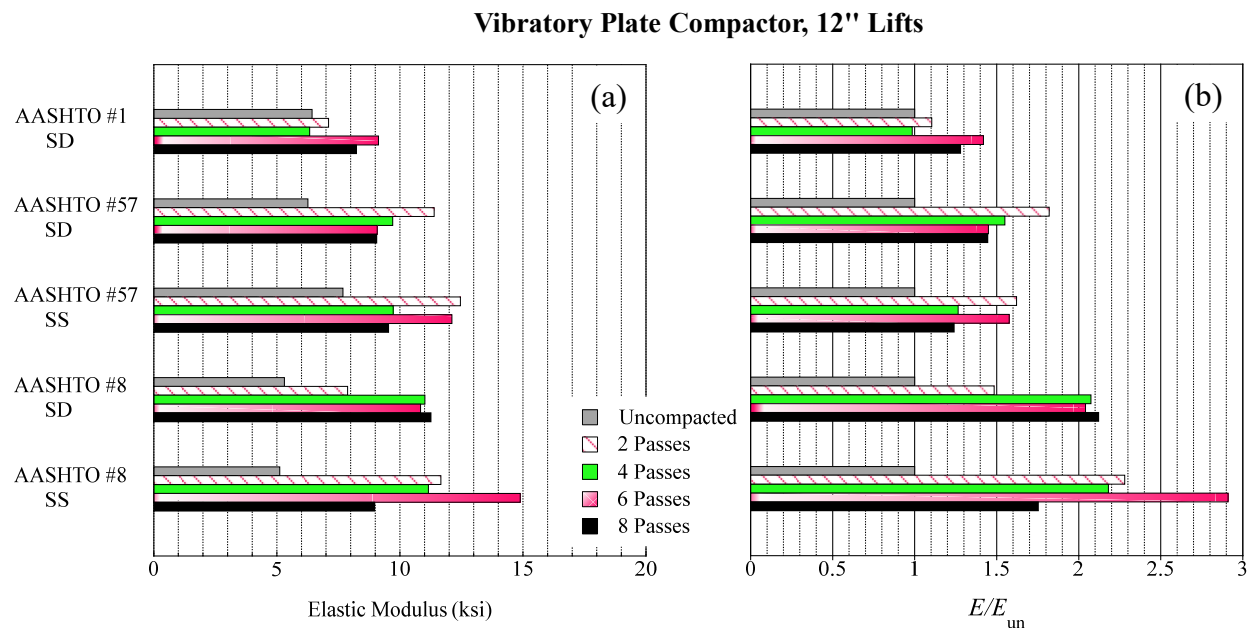


Figure 4-37. Effects of aggregate type and moisture condition on compaction using vibratory plate compactor and 12" lifts: (a) elastic modulus; (b) E/E_{un} .

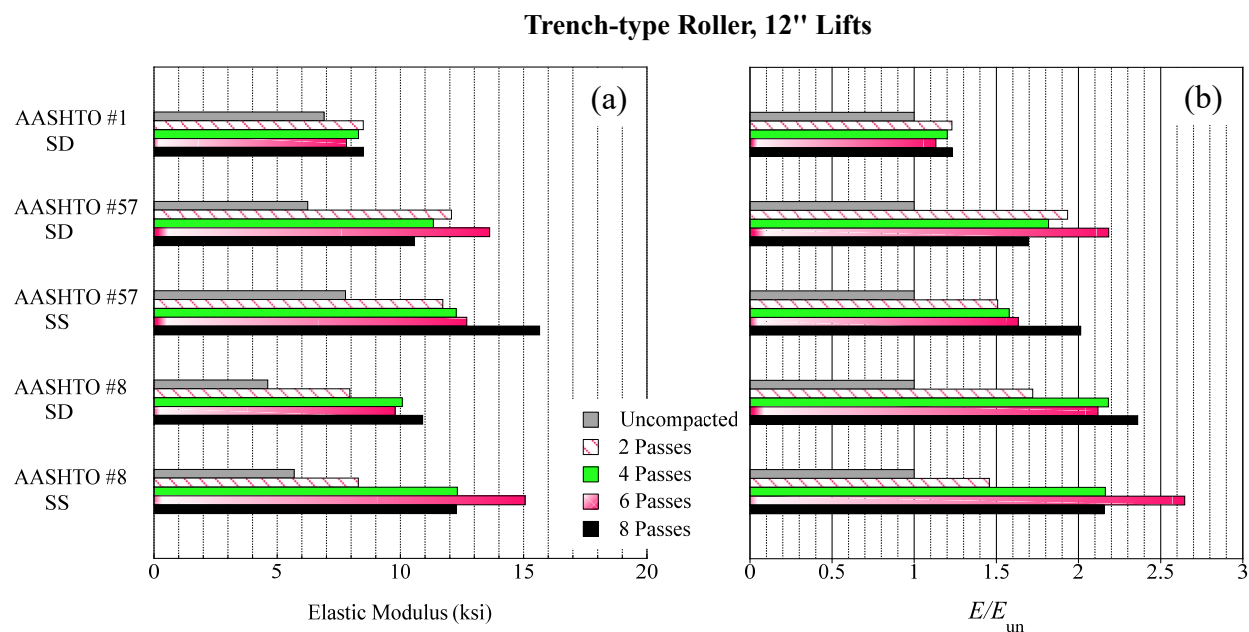


Figure 4-38. Effects of aggregate type and moisture condition on compaction using trench-type roller and 12" lifts: (a) elastic modulus; (b) E/E_{un} .

7.5-ton Smooth Single-drum Roller, 12" Lifts

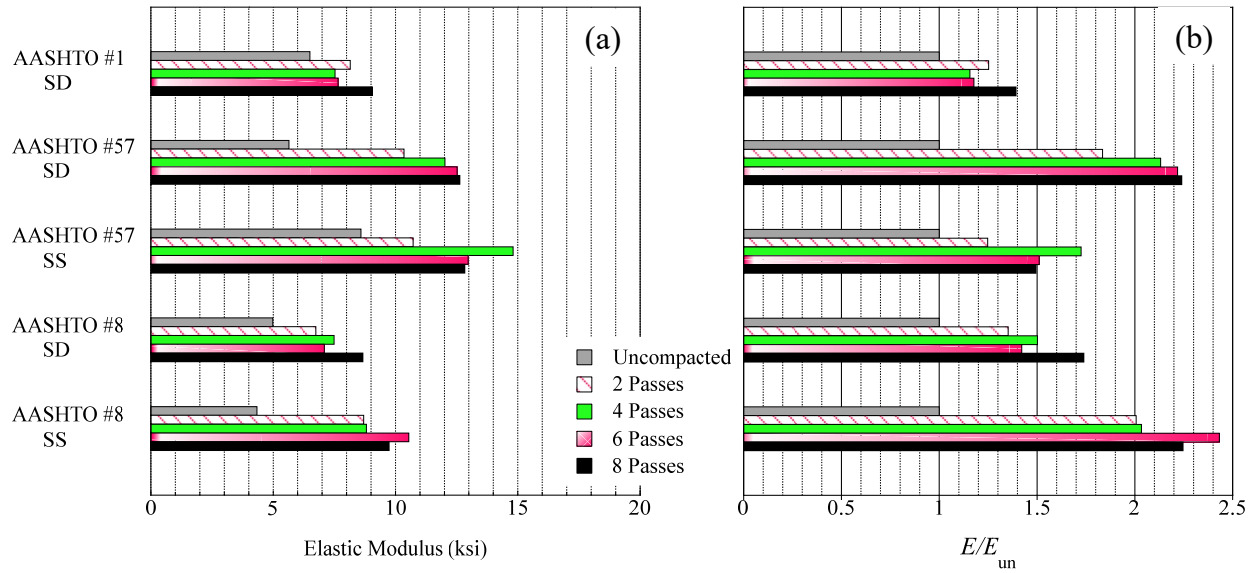


Figure 4-39. Effects of aggregate type and moisture condition on compaction using 7.5-ton smooth single-drum roller and 12" lifts: (a) elastic modulus; (b) E/E_{un} .

15-ton Smooth Single-drum Roller, 12" Lifts

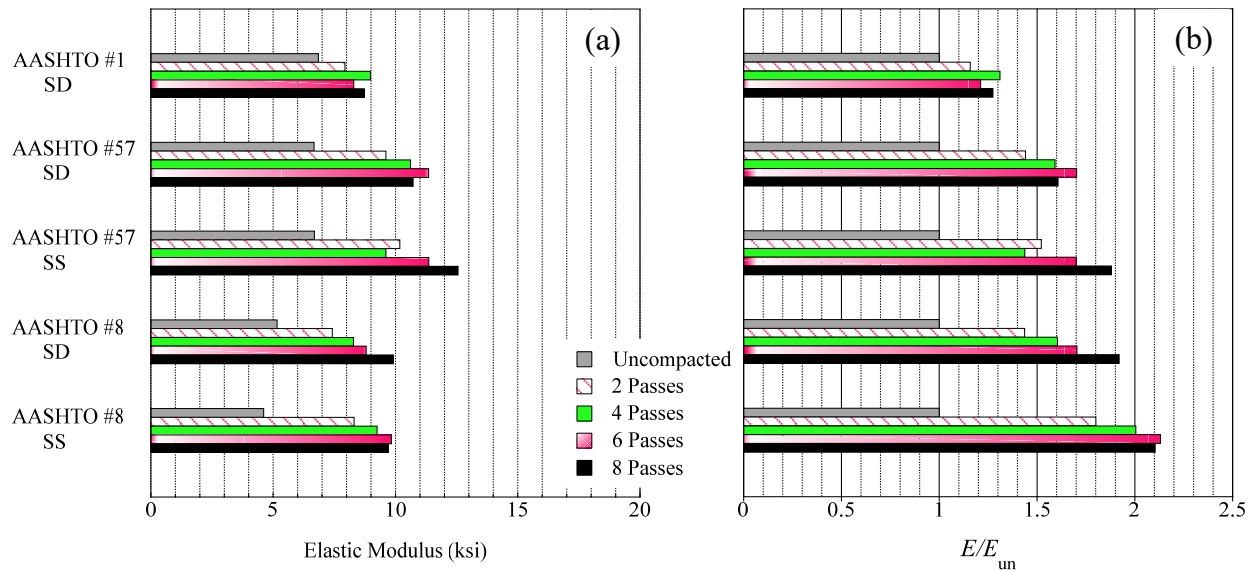


Figure 4-40. Effects of aggregate type and moisture condition on compaction using 15-ton smooth single-drum roller and 12" lifts: (a) elastic modulus; (b) E/E_{un} .

Hand Impact Rammer, 15" Lifts

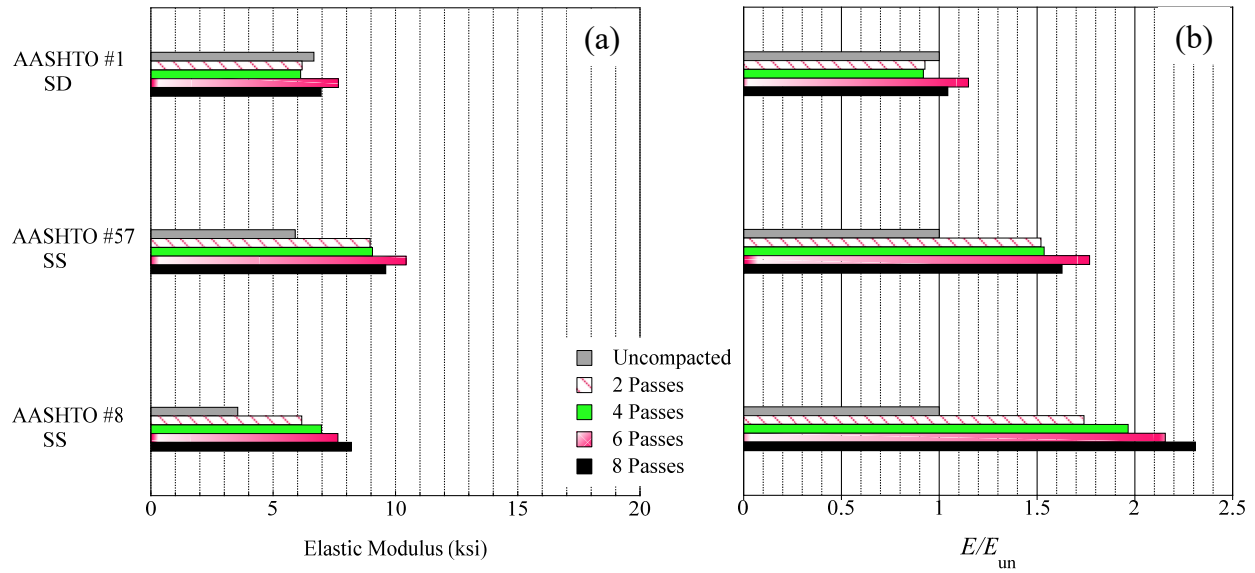


Figure 4-41. Effects of aggregate type and moisture condition on compaction using hand impact rammer and 15" lifts: (a) elastic modulus; (b) E/E_{un} .

Vibratory Plate Compactor, 15" Lifts

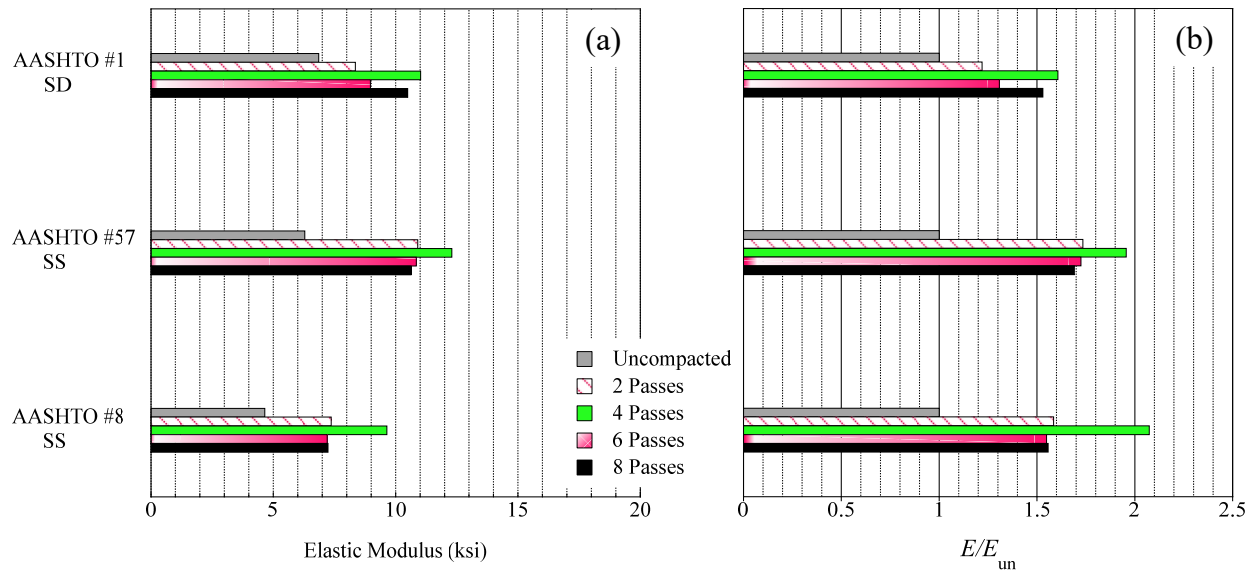


Figure 4-42. Effects of aggregate type and moisture condition on compaction using vibratory plate compactor and 15" lifts: (a) elastic modulus; (b) E/E_{un} .

Trench-type Roller, 15" Lifts

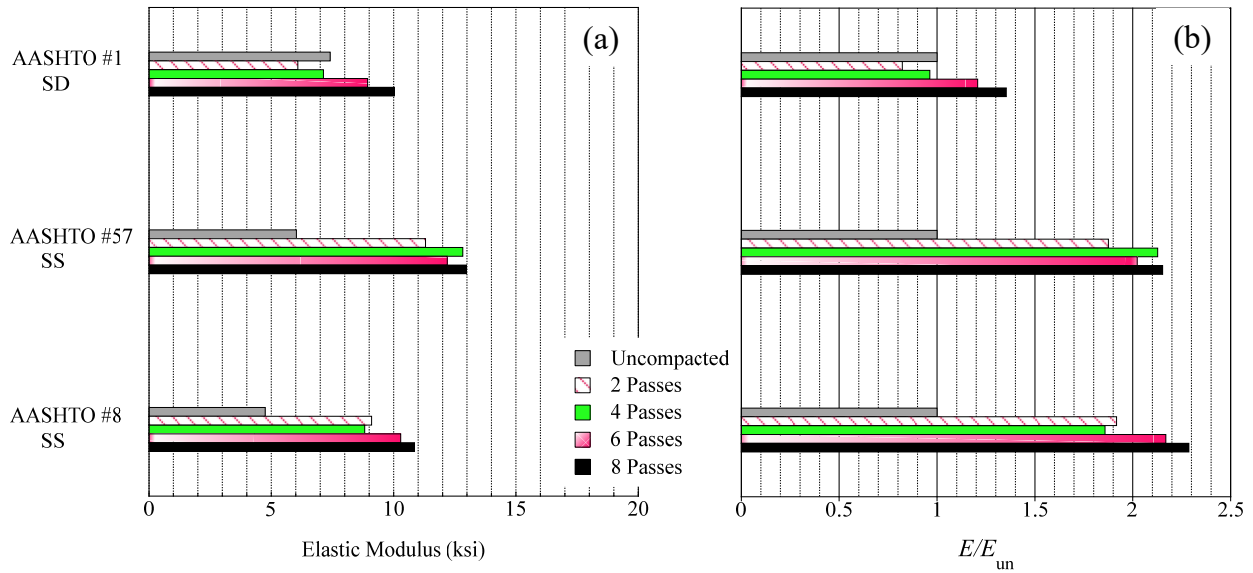


Figure 4-43. Effects of aggregate type and moisture condition on compaction using trench-type roller and 15" lifts: (a) elastic modulus; (b) E/E_{un} .

7.5-ton Smooth Single-drum Roller, 15" Lifts

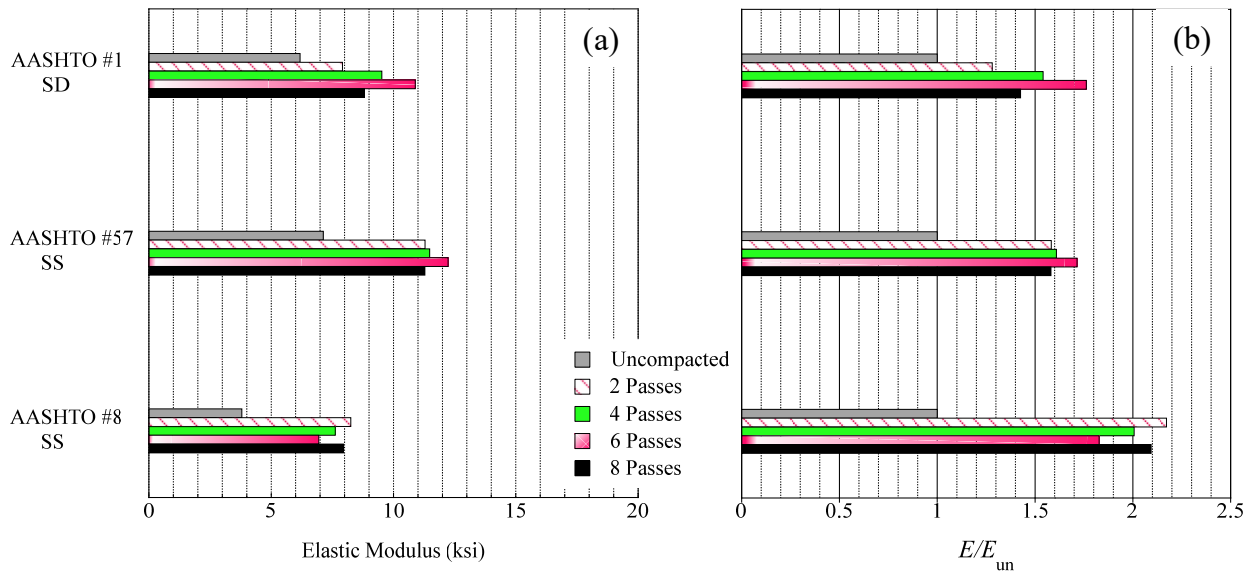


Figure 4-44. Effects of aggregate type and moisture condition on compaction using 7.5-ton smooth single-drum roller and 15" lifts: (a) elastic modulus; (b) E/E_{un} .

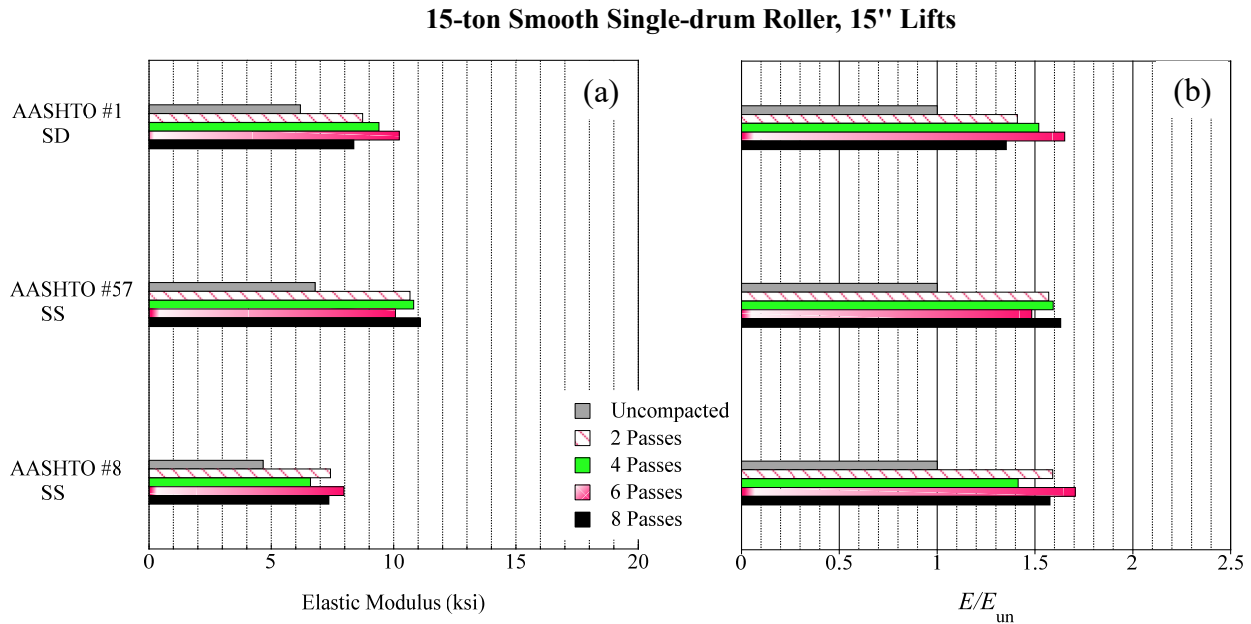


Figure 4-45. Effects of aggregate type and moisture condition on compaction using 15-ton smooth single-drum roller and 15" lifts: (a) elastic modulus; (b) E/E_{un} .

4.7.3 Effect of Lift Thickness

Figures 4-46, 4-47, 4-48, 4-49, and 4-50 show the effects of lift thickness on the compaction of AASHTO #1 aggregates using the hand impact rammer, vibratory plate compactor, trench-type roller, 7.5-ton smooth single-drum roller, and 15-ton smooth single-drum roller, respectively. Figures 4-51 through 4-60 show the corresponding plots for AASHTO #57 aggregates and #8 aggregates. A cross-comparison of Figures 4-46 through 4-60 shows the following trends for the effect of lift thickness:

- For compacting AASHTO #1 aggregates, the hand impact rammer was least effective (except for 4" lifts, where the equipment was moderately effective), the vibratory plate compactor and the trench-type roller were moderately effective, and the two smooth single-drum rollers were most effective among the five equipment types; the effectiveness of these equipment types was not sensitive to the lift thickness.
- As the aggregate size decreased from AASHTO #1 aggregates to AASHTO #8 aggregates, the effectiveness of all five compaction equipment types increased for the same lift thickness, with the hand impact rammer, the vibratory plate compactor, and the trench-type roller seeing significant increases whereas the smooth single-drum rollers being less sensitive to aggregate type/size. This observation corroborates the discussions in Sections 4.7.1 and 4.7.2.
- For the same aggregate type and compaction equipment type, the compaction effectiveness generally increased as the lift thickness increased from 4" to 12" and, in most cases, there was a drop in effectiveness for 15" lifts. The increase in effectiveness of compaction is more pronounced as the aggregate size decreases and appears most pronounced in AASHTO #8 aggregates, less in AASHTO #57 aggregates, and not observed in AASHTO #1 aggregates

(see Figures 4-46 through 4-60). Granular soils may not be well compacted near the surface due to the lack of confinement and may be looser at the surface than prior to compacting (see Section 2.4.3). The compacted density increases with depth to a point, corresponding to the maximum combined effect of confinement and compaction energy, and then decreases afterward (see Section 2.4.3 and Figure 2-7). Figures 4-46 through 4-60 suggest that the optimal lift thickness for the best combination of high elastic modulus of the compacted aggregate surface and high E/E_{un} value is 8" and/or 12".

- For AASHTO #57 and #8 aggregates, the surface saturated condition generally resulted in a higher compaction effectiveness than the surface dry condition regardless of the lift thickness and equipment type.

Figure 4-61 shows E_{mid}/E and E_{mid}/E_{un} for AASHTO #57 aggregates with varying lift thickness, moisture condition, and compaction equipment type. Figure 4-62 shows the corresponding plots for AASHTO #8 aggregates. Parameter E_{mid}/E stands for the ratio of the elastic modulus of the mid-depth to the elastic modulus of the compacted surface for the 3rd lift after 8 passes and can be used to infer if compaction is uniform along depth; parameter E_{mid}/E_{un} stands for the ratio of the elastic modulus of the mid-depth to the elastic modulus of the uncompacted surface for the 3rd lift and can be used to infer if compaction has meaningfully increased the elastic modulus of the lower half of the lift. Please refer to Figures 4-46 through 4-60 for values of E and E_{un} . Note that LWD testing of mid-depth was conducted after each lift was compacted with 8 passes (see Section 4.5.3). In Figures 4-61 and 4-62, IR, VP, TR, R7.5T, and R15T stand for the hand impact rammer, vibratory plate compactor, trench-type roller, 7.5-ton smooth single-drum roller, and 15-ton smooth single-drum roller, respectively. Figures 4-61 and 4-62 show the following general trends:

- E_{mid}/E values generally decreased as the lift thickness increased from 8" to 15" for AASHTO #57 aggregates, indicating progressively more non-uniform compaction with depth within the lift; on the other hand, E_{mid}/E values were less sensitive to the lift thickness for AASHTO #8 aggregates.
- E_{mid}/E_{un} values were generally smaller than 1.0 for AASHTO #57 aggregates (except in one isolated case), indicating that the lower half of the lift was not compacted. Figure 4-61 suggests that for AASHTO #57 aggregates, a small lift thickness (e.g., 8" maximum) is preferable for a more uniform compaction along the depth.
- E_{mid}/E_{un} values were generally larger than 1.0 for AASHTO #8 aggregates with 12" and 15" lifts under the surface saturated condition, indicating that the lower half of the lift was compacted. Figure 4-62 suggests that for AASHTO #8 aggregates, the surface saturated condition is preferable for 12" and 15" lifts.

AASHTO #1, Hand Impact Rammer

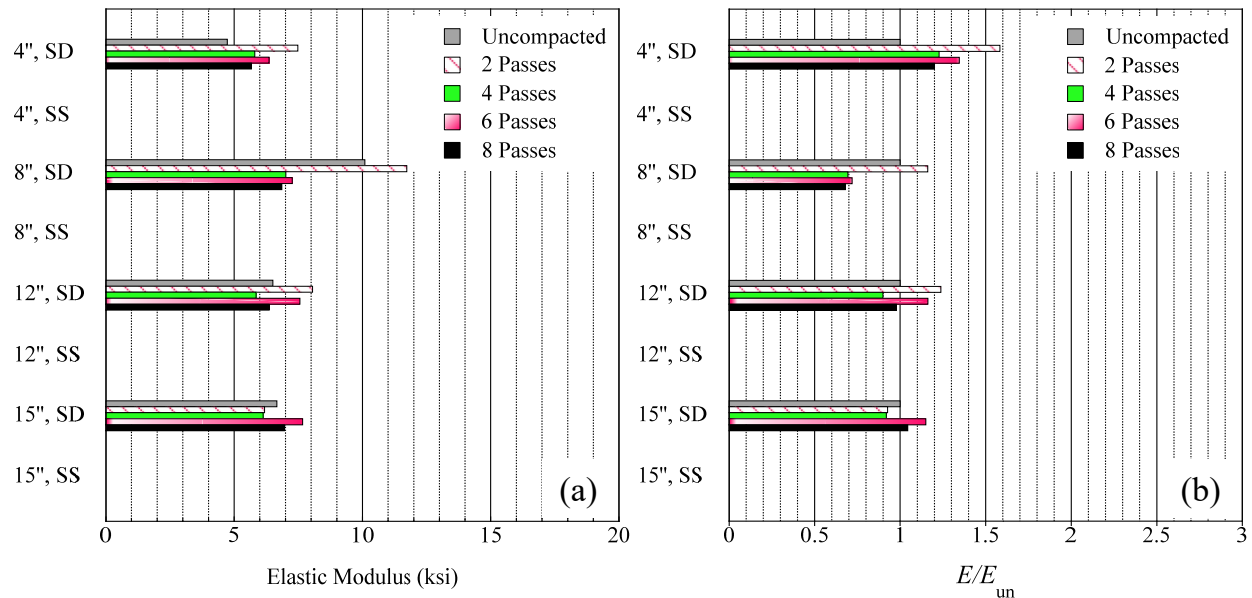


Figure 4-46. Effects of lift thickness on compaction of AASHTO #1 aggregates using hand impact rammer: (a) elastic modulus; (b) E/E_{un} .

AASHTO #1, Vibratory Plate Compactor

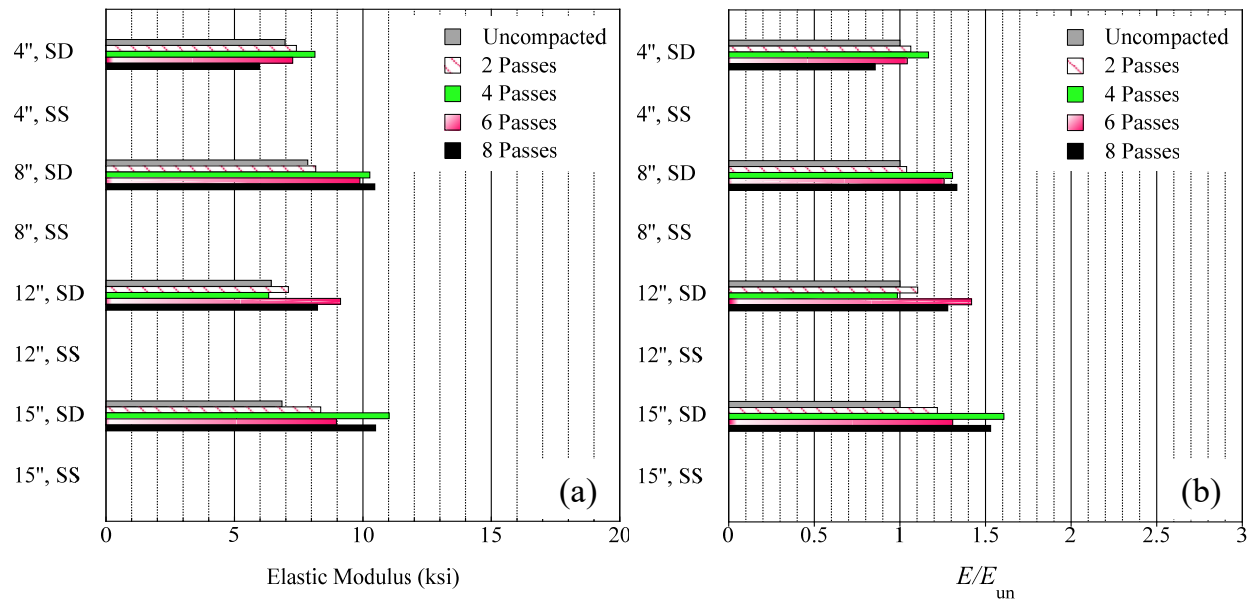


Figure 4-47. Effects of lift thickness on compaction of AASHTO #1 aggregates using vibratory plate compactor: (a) elastic modulus; (b) E/E_{un} .

AASHTO #1, Trench-type Roller

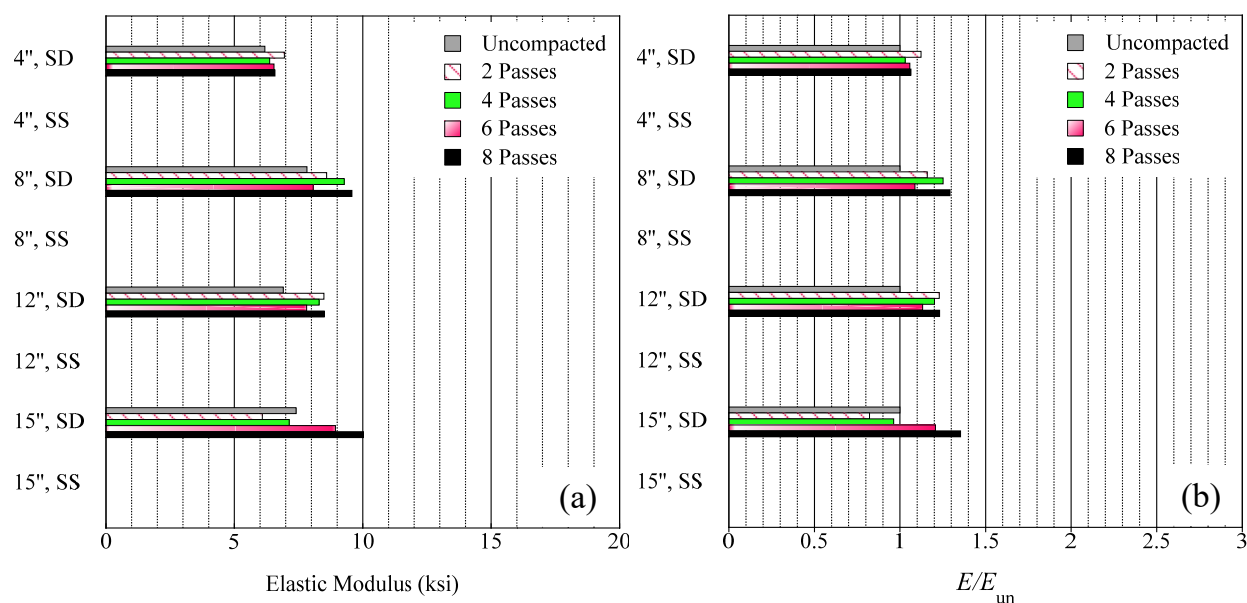


Figure 4-48. Effects of lift thickness on compaction of AASHTO #1 aggregates using trench-type roller: (a) elastic modulus; (b) E/E_{un} .

AASHTO #1, 7.5-ton Smooth Single-drum Roller

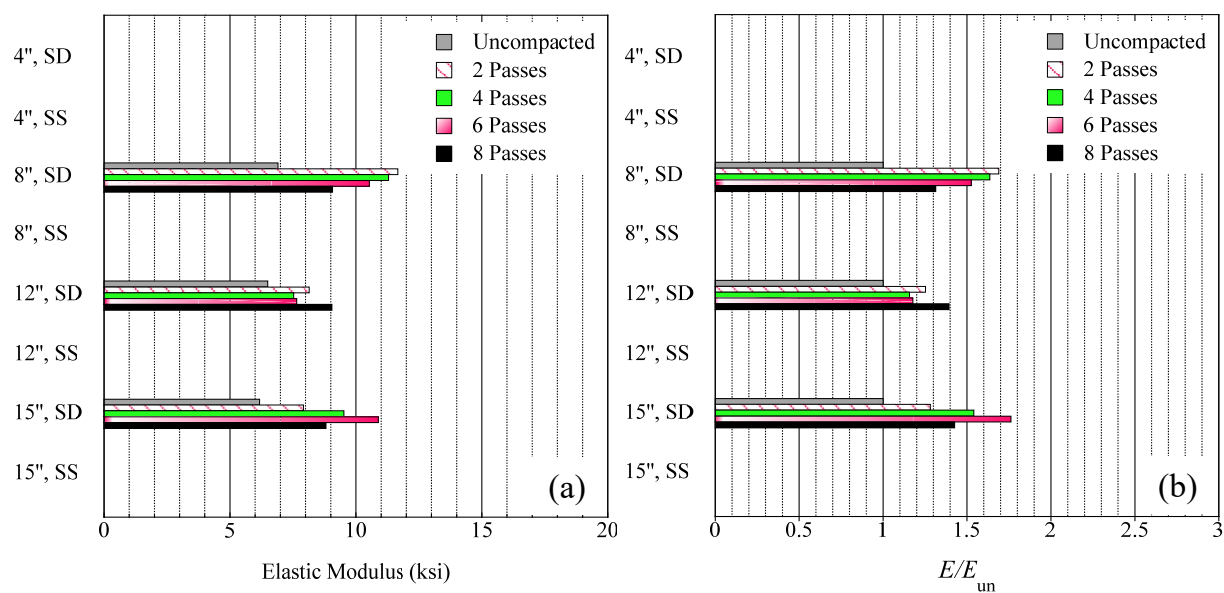


Figure 4-49. Effects of lift thickness on compaction of AASHTO #1 aggregates using 7.5-ton smooth single-drum roller: (a) elastic modulus; (b) E/E_{un} .

AASHTO #1, 15-ton Smooth Single-drum Roller

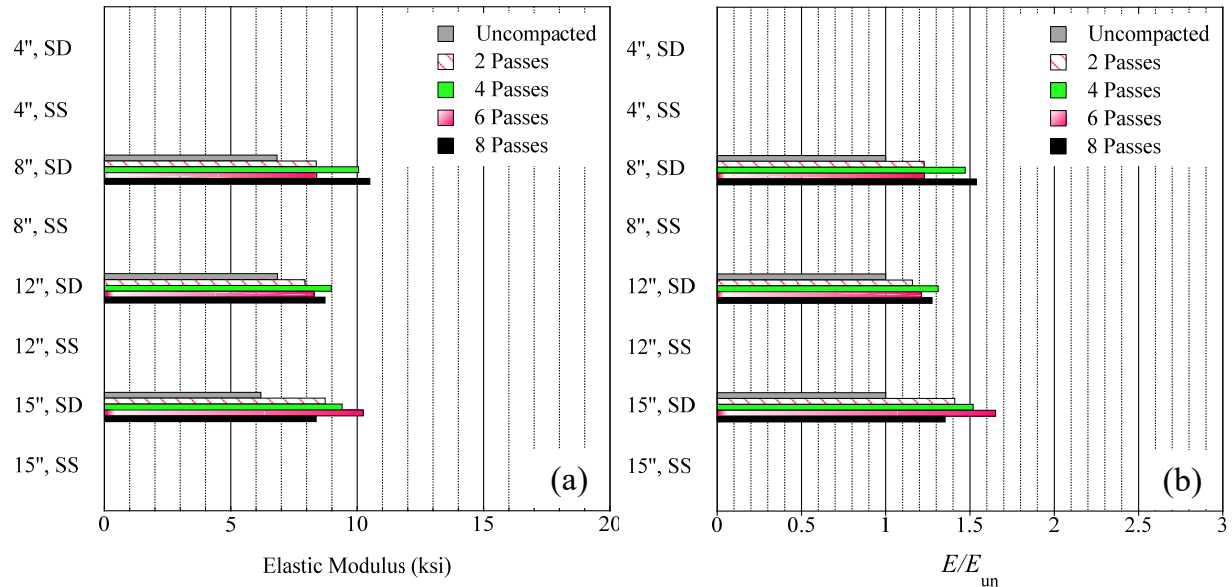


Figure 4-50. Effects of lift thickness on compaction of AASHTO #1 aggregates using 15-ton smooth single-drum roller: (a) elastic modulus; (b) E/E_{un} .

AASHTO #57, Hand Impact Rammer

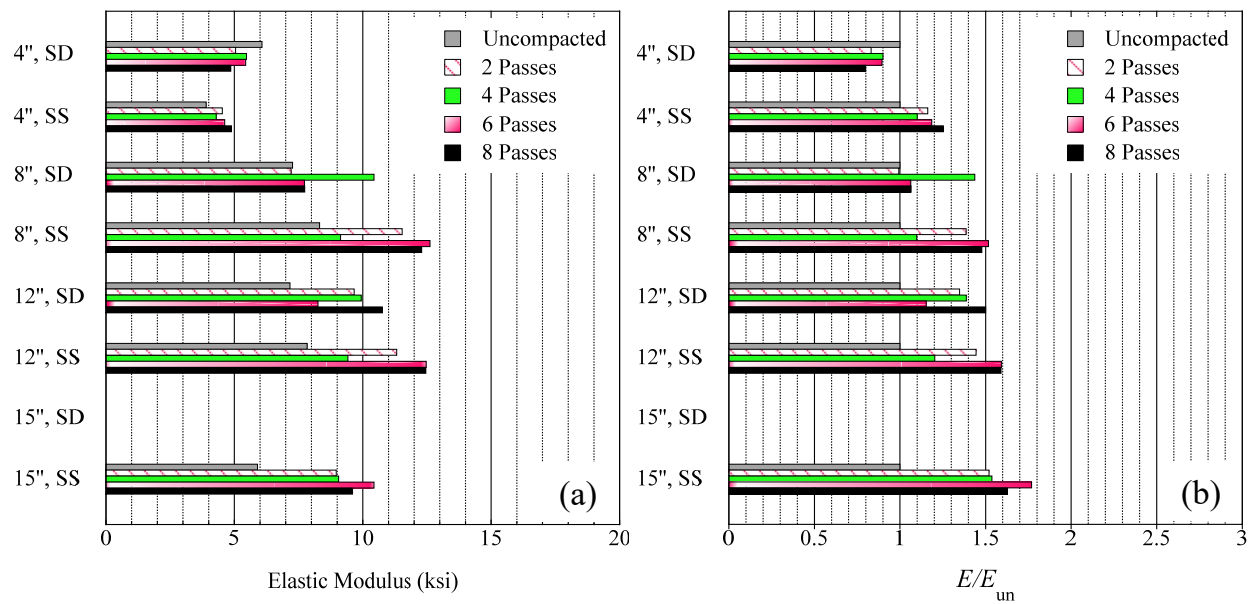


Figure 4-51. Effects of lift thickness on compaction of AASHTO #57 aggregates using hand impact rammer: (a) elastic modulus; (b) E/E_{un} .

AASHTO #57, Vibratory Plate Compactor

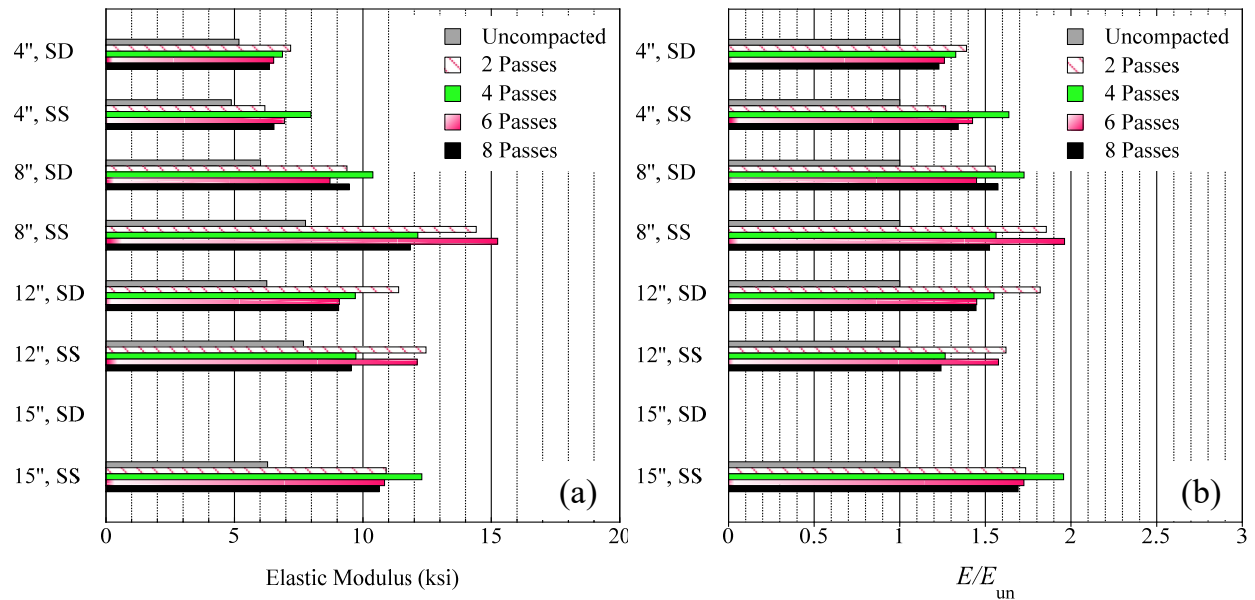


Figure 4-52. Effects of lift thickness on compaction of AASHTO #57 aggregates using vibratory plate compactor: (a) elastic modulus; (b) E/E_{un} .

AASHTO #57, Trench-type Roller

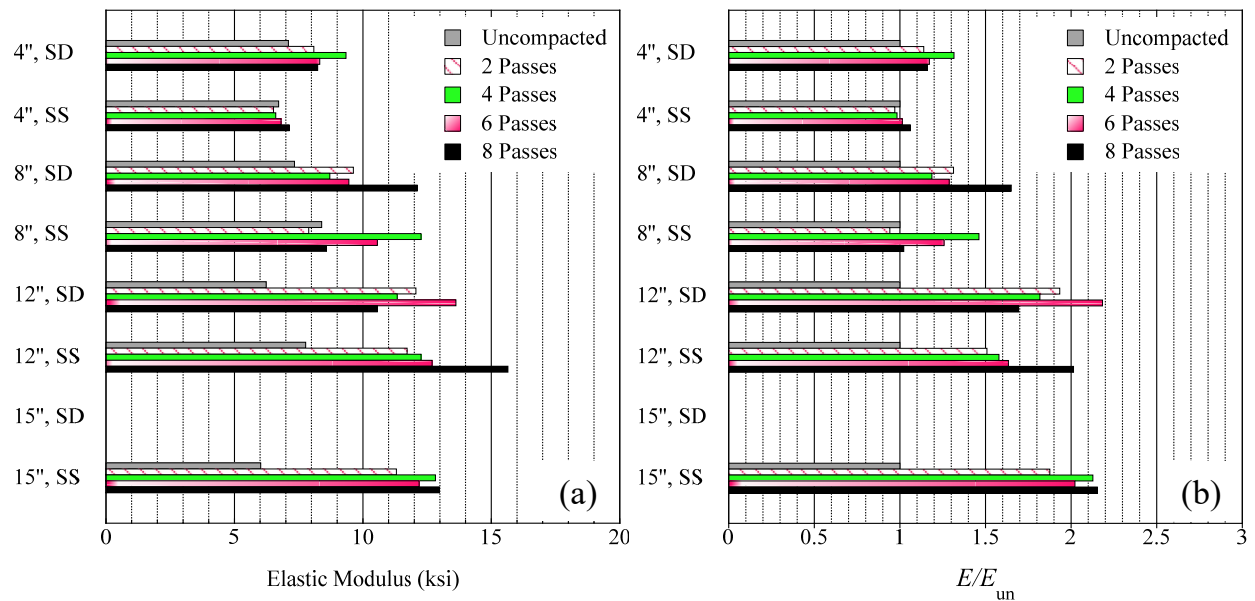


Figure 4-53. Effects of lift thickness on compaction of AASHTO #57 aggregates using trench-type roller: (a) elastic modulus; (b) E/E_{un} .

AASHTO #57, 7.5-ton Smooth Single-drum Roller

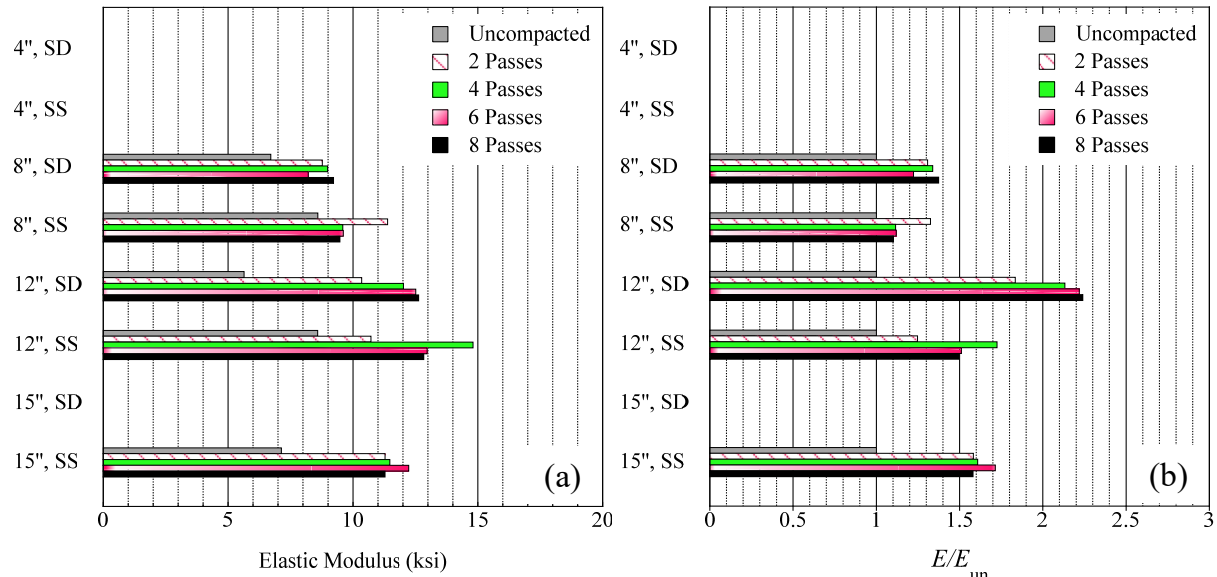


Figure 4-54. Effects of lift thickness on compaction of AASHTO #57 aggregates using 7.5-ton smooth single-drum roller: (a) elastic modulus; (b) E/E_{un} .

AASHTO #57, 15-ton Smooth Single-drum Roller

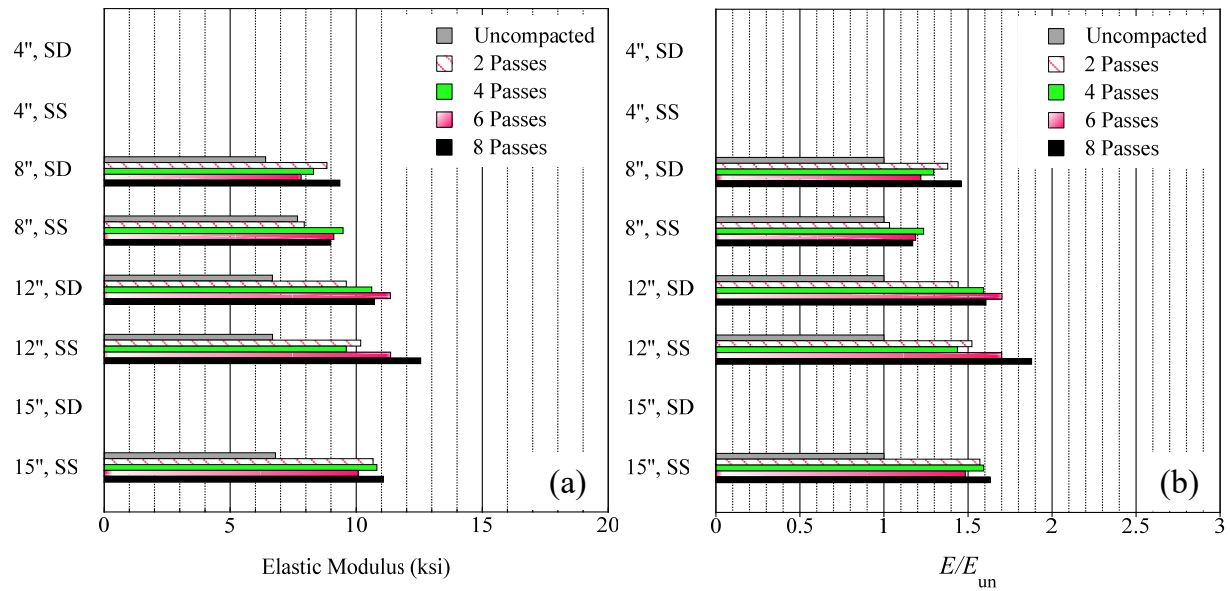


Figure 4-55. Effects of lift thickness on compaction of AASHTO #57 aggregates using 15-ton smooth single-drum roller: (a) elastic modulus; (b) E/E_{un} .

AASHTO #8, Hand Impact Rammer

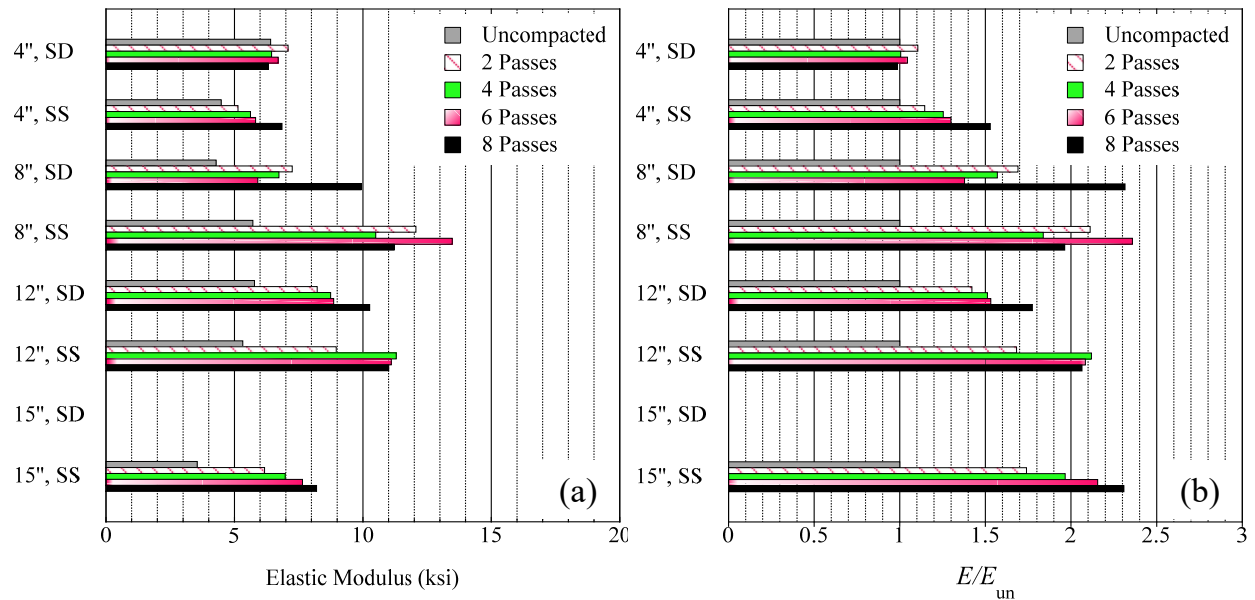


Figure 4-56. Effects of lift thickness on compaction of AASHTO #8 aggregates using hand impact rammer: (a) elastic modulus; (b) E/E_{un} .

AASHTO #8, Vibratory Plate Compactor

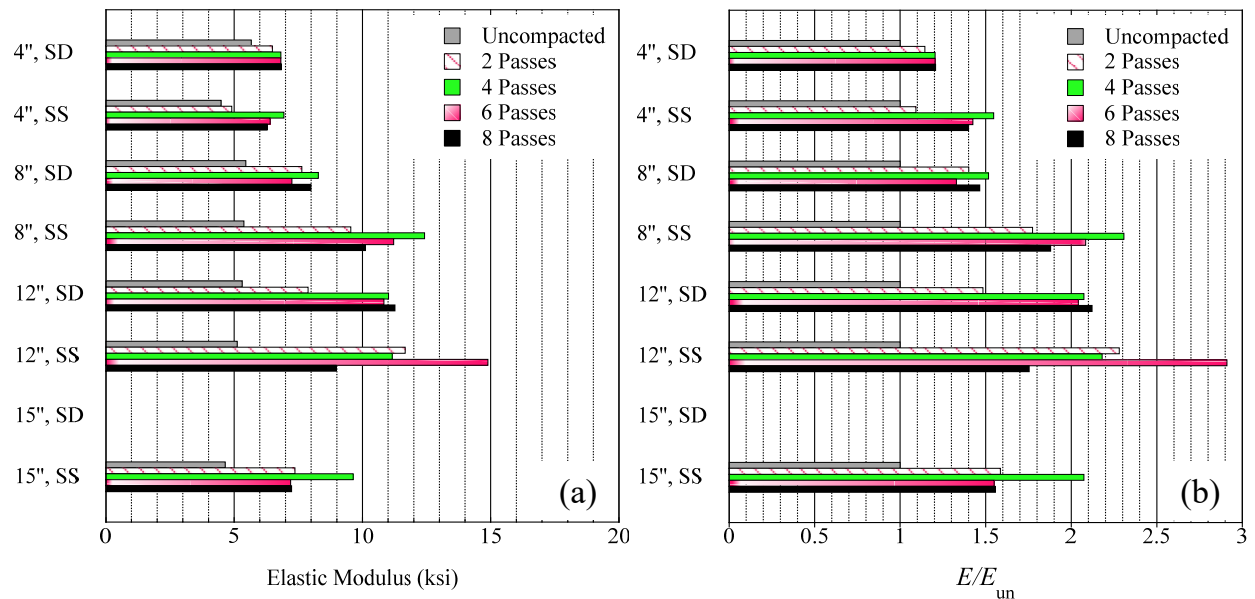


Figure 4-57. Effects of lift thickness on compaction of AASHTO #8 aggregates using vibratory plate compactor: (a) elastic modulus; (b) E/E_{un} .

AASHTO #8, Trench-type Roller

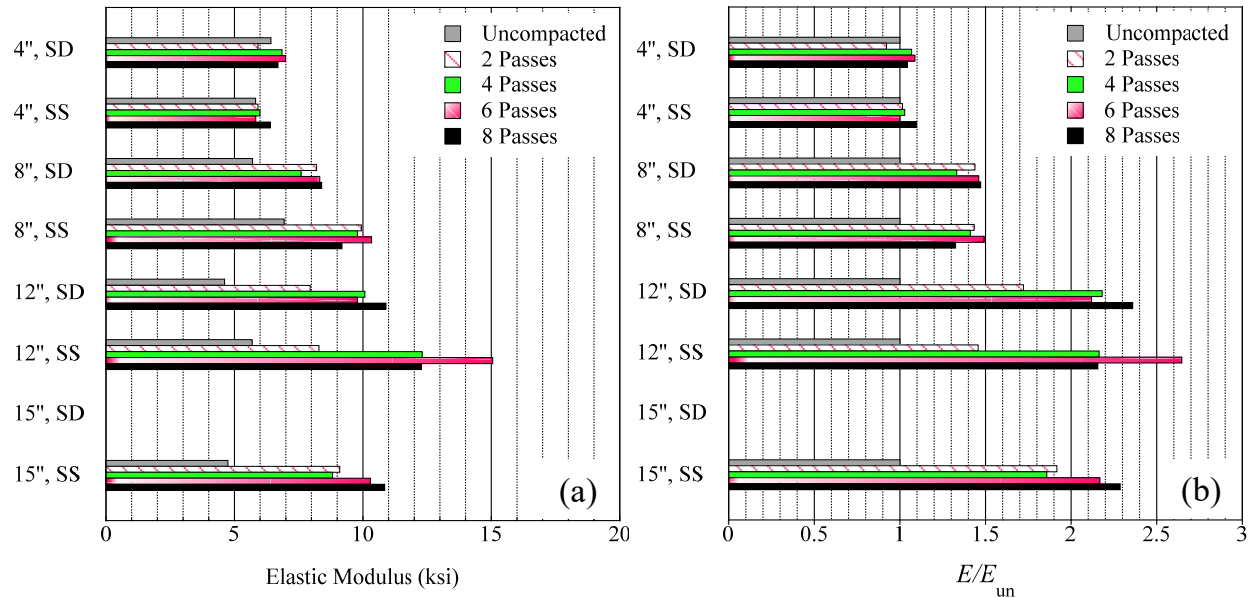


Figure 4-58. Effects of lift thickness on compaction of AASHTO #8 aggregates using trench-type roller: (a) elastic modulus; (b) E/E_{un} .

AASHTO #8, 7.5-ton Smooth Single-drum Roller

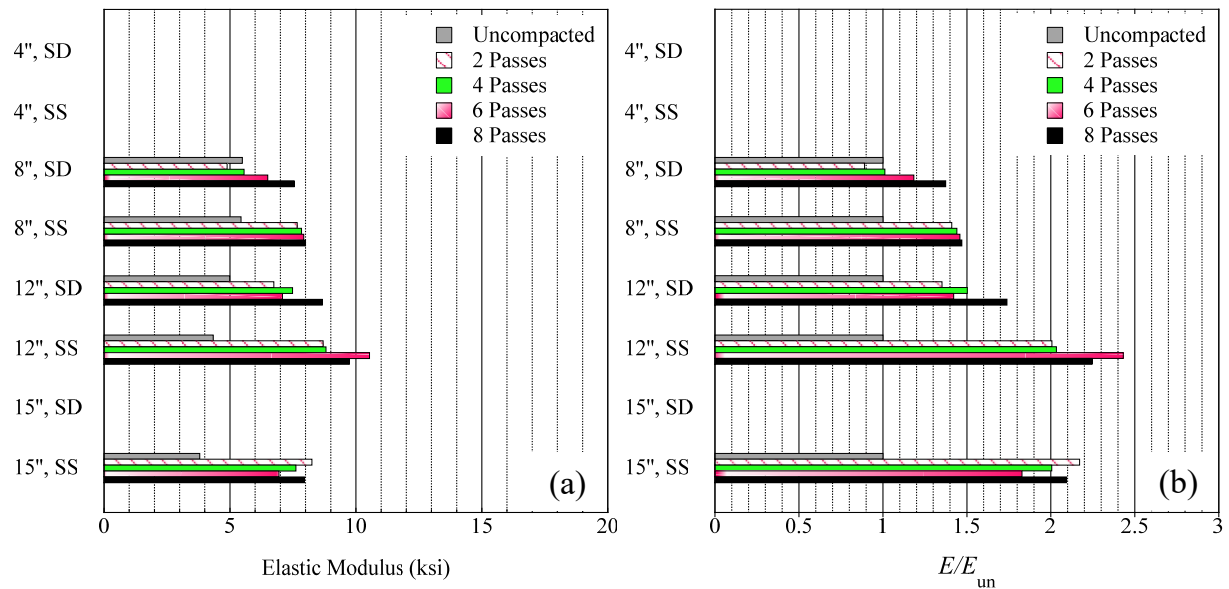


Figure 4-59. Effects of lift thickness on compaction of AASHTO #8 aggregates using 7.5-ton smooth single-drum roller: (a) elastic modulus; (b) E/E_{un} .

AASHTO #8, 15-ton Smooth Single-drum Roller

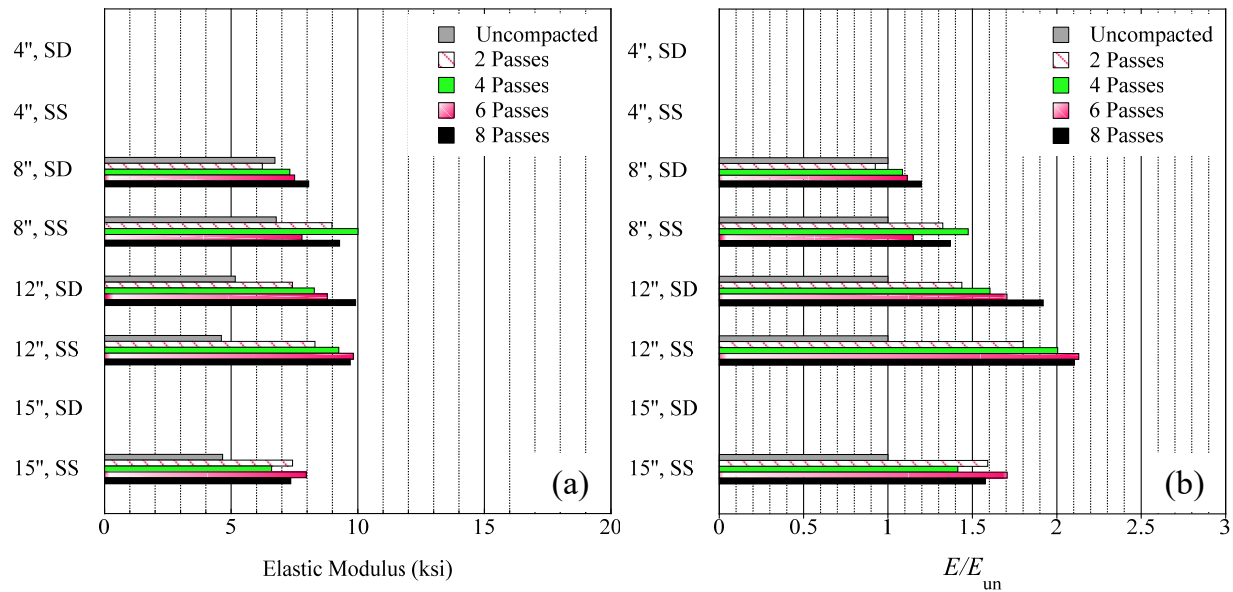


Figure 4-60. Effects of lift thickness on compaction of AASHTO #8 aggregates using 15-ton smooth single-drum roller: (a) elastic modulus; (b) E/E_{un} .

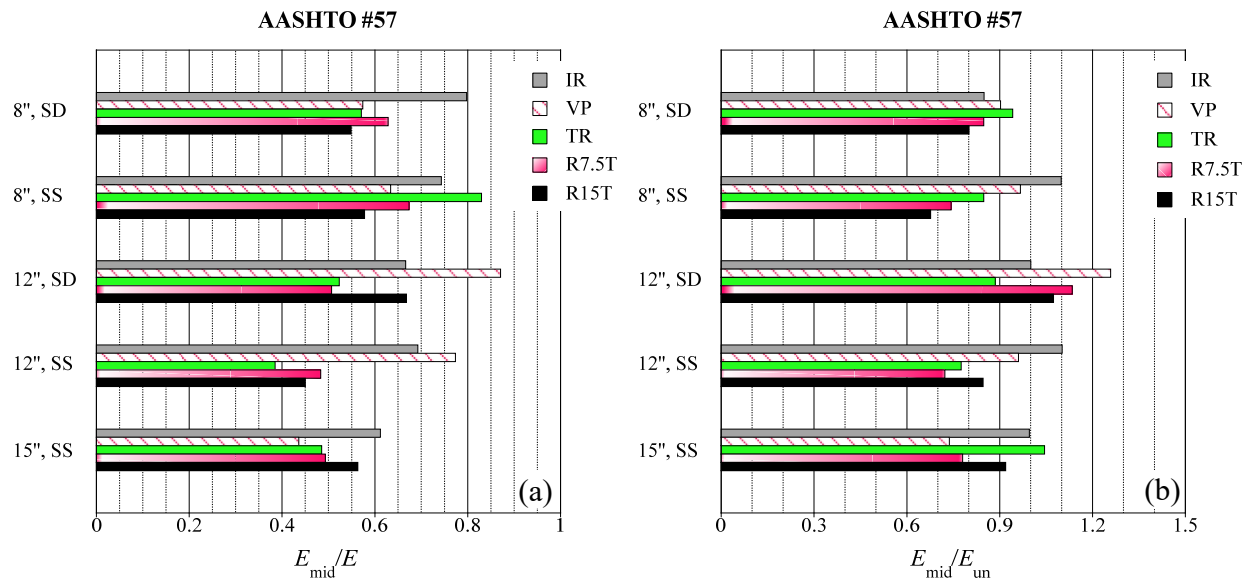


Figure 4-61. Effect of lift thickness on compaction of AASHTO #57 aggregates for different compaction equipment types: (a) E_{mid}/E ; (b) E_{mid}/E_{un} .

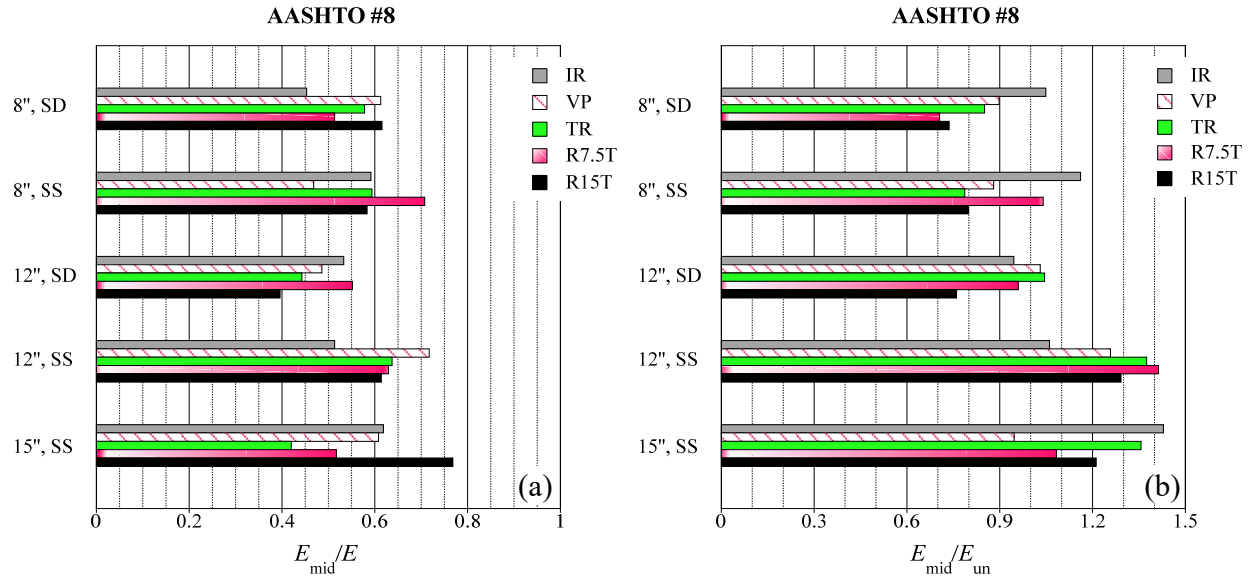


Figure 4-62. Effect of lift thickness on compaction of AASHTO #8 aggregates for different compaction equipment types: (a) E_{mid}/E ; (b) E_{mid}/E_{un} .

4.7.4 Successive Compaction

Figures 4-63, 4-64, and 4-65 show the results of successive compaction tests for AASHTO #8 aggregates with 8" lifts in SD condition, 8" lifts in SS condition, and 12" lifts in SS condition, respectively. Similar to the previous sections, the average elastic modulus from the three LWD test locations (see Figures 4-9 and 4-10) in the 3rd lift is used to represent the modulus of the lift compacted by a particular equipment. The entire zone (see Figure 4-9) was successively compacted by all five pieces of equipment in the order of trench-type roller, hand impact rammer, vibratory plate compactor, 7.5-ton smooth single-drum roller, and 15-ton smooth single-drum roller. Figure 4-22 (AASHTO #8 aggregates with 8" lifts in SD condition) and Figure 4-26 (AASHTO #8 aggregates with 8" lifts in SS condition) show that the trench-type roller resulted in lower elastic modulus than the hand impact rammer and the vibratory plate compactor; hence, the trench-type roller was used first in the sequence. The uncompacted surface for the trench-type roller was after lift placement as the trench-type roller was the first equipment used; after 8 passes of compaction using the trench-type roller, the surface became the "uncompacted" surface for the next equipment (i.e., hand impact rammer), and the process repeated. Hence, in Figures 4-63(a), 4-64(a), and 4-65(a), the elastic modulus after 8 passes for a piece of equipment is the same as the elastic modulus of the uncompacted surface for the next piece of equipment. Figures 4-63 through 4-65 show the following general trends:

- For all three successive compaction tests, the trench-type roller resulted in the lowest elastic modulus (as expected); the elastic modulus generally increased as the equipment progressed to the vibratory plate compactor, particularly in the tests with 8" lifts (in both moisture conditions); however, the use of the 7.5-ton smooth single-drum roller decreased the elastic modulus; and subsequent use of the 15-ton smooth single-drum roller did not reduce the elastic modulus further. The decrease in elastic modulus by the 7.5-ton smooth single-drum roller is likely attributed to over-compaction after the aggregates were successively

compacted by three pieces of equipment with 8 passes each, similar to the over-compaction discussed in Section 4.7.1, sixth bullet, and Section 4.7.2, sixth bullet.

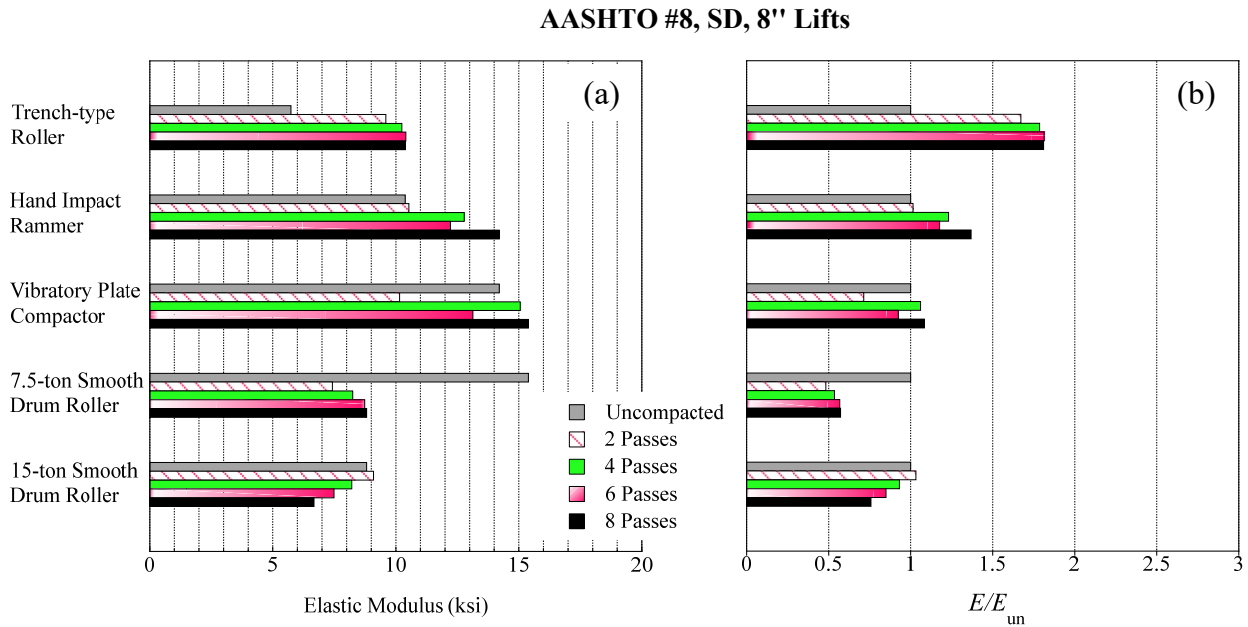


Figure 4-63. Successive compaction tests on AASHTO #8 aggregates, SD, 8" lifts:
(a) elastic modulus; (b) E/E_{un} .

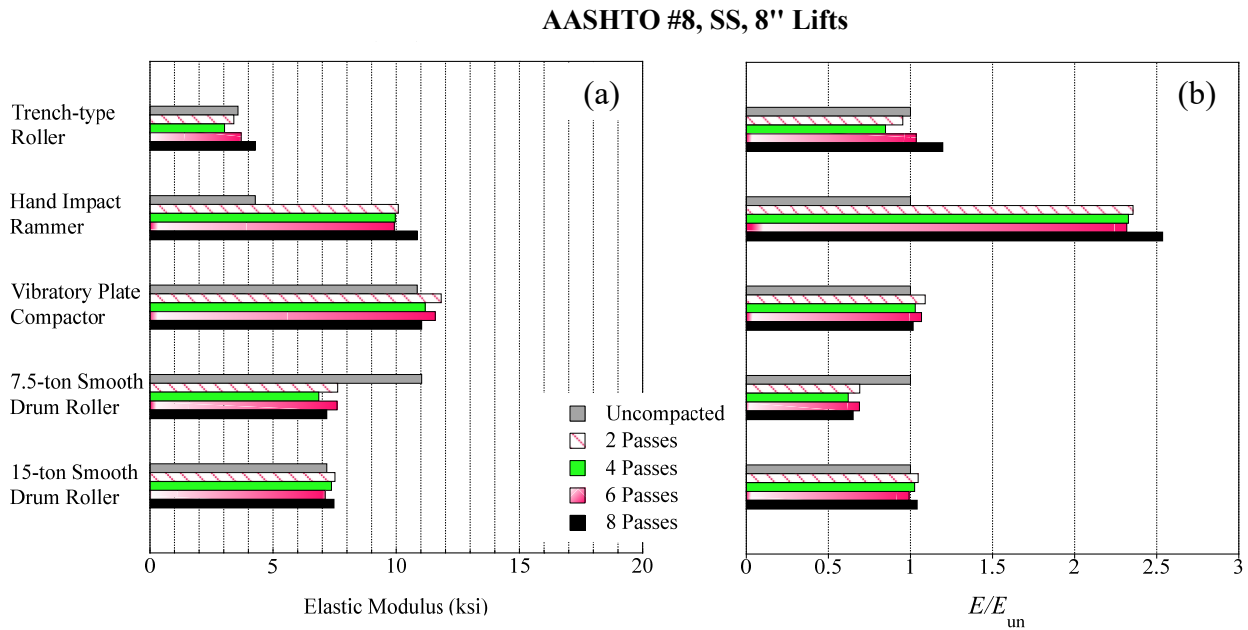


Figure 4-64. Successive compaction tests on AASHTO #8 aggregates, SS, 8" lifts:
(a) elastic modulus; (b) E/E_{un} .

AASHTO #8, SS, 12" Lifts

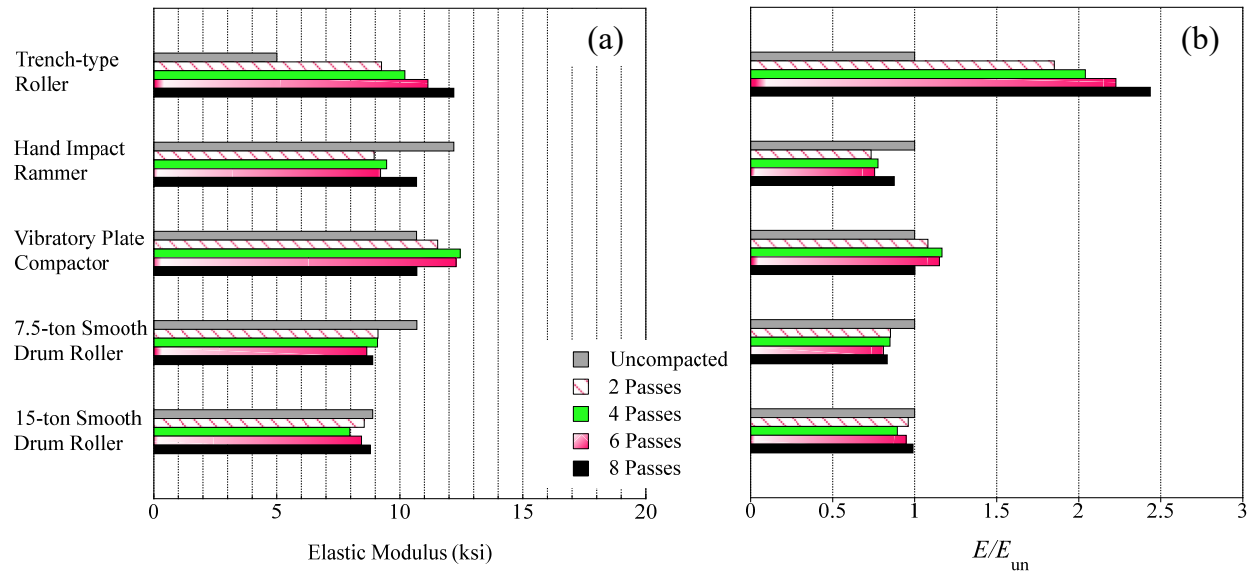


Figure 4-65. Successive compaction tests on AASHTO #8 aggregates, SS, 12" lifts:
(a) elastic modulus; (b) E/E_{un} .

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the information gained from the literature review, the survey (both DOT Specifications and Contractor common practices), and the results of the field compaction testing. Conclusions and recommendations for compaction practices and future research are also provided.

5.1 Limitations, Conclusions, and Recommendations

5.1.1 Limitations

The field compaction tests were limited to one compaction test per condition (e.g., equipment type, lift thickness, and moisture condition); however, multiple tests of each condition are required to provide statistical validity. The field compaction tests were based on one model of compaction equipment for each equipment type for a total of five pieces of equipment; hence, the results and conclusions may be specific to the compaction equipment used.

Additionally, the three materials tested (AASHTO #1, #57, and #8) classify as “Gravel”, per the Unified Soil Classification System (USCS); therefore, it is important to reiterate the limitations associated with the LWD testing equipment relative to aggregate size. Sources indicate that the maximum aggregate size to “...render continuum behavior at plate-aggregate contact...” should be in the range of 2.0" to 2.5", for a 12"-diameter plate used, as discussed in Section 2.5.3 and illustrated in Figure 2-11. The LWD loading plate used in the field testing was 12" in diameter.

Regarding quality acceptance for LWD testing, Section 2.5.4 includes references stating that influence depths range from 1.2 to 1.4 times the plate diameter. Since the testing equipment included a 12"-diameter plate, the depth of influence is estimated to range between 14" and 16", which covers the lift thicknesses evaluated as part of this study.

Additionally, this research effort defined a pass of compaction equipment as crossing the lift, roundtrip, i.e., forward across the lift and back equates to 1 pass. It is important to note this when reviewing all graphed data through the report and appendices.

5.1.2 Compaction Equipment

As the surveys revealed (Section 3.0 and Appendix A), most DOTs do not have equipment specifications. Instead, the Contractor selects the appropriate equipment to meet compaction acceptance criteria, for both material compacted to non-movement and materials whose gradation meets proctor requirements and can be tested with a nuclear gauge. Contractor survey responses indicated that hand-operated equipment is not recommended for AASHTO #1 aggregate and that the proposed lift thickness of the tested aggregates “...depends a great deal on the size and weight of the plate compactor”.

Per Section 5.1.1, the types of aggregate tested classify as “Gravel”, per USCS. Referencing the literature review, Table 2-2 (after Multiquip 2011) is independent of lift thickness but indicates the

following rated performance for compacting “Gravel” using the following different equipment types: “Poor” for Rammers/Vibrating Sheepsfoot (Impact), “Not Used” for Static Sheepsfoot/Grid Roller/Scraper (Static Pressure with Kneading), “Good” for Vibrating Plate Compactor (Vibration), and “Very Good” for Scraper/Rubber-tired Roller/Loader/Grid Roller (Kneading with Static Pressure).

Current PennDOT Specifications limit the lift thickness to 4" using lightweight equipment (Impact Rammers, Vibratory Plates, and Trench Rollers) for material placed within a 3' distance behind a structural element. Referencing Section 4.7.1 and comparing Figures 4-14, 4-18, and 4-21, the field compaction tests, in general, indicate that the use of the lightweight equipment results in only a marginal increase in strength/stiffness, relative to uncompacted state for all three aggregate types tested with 4" lifts. These results could be due to the thin lift relative to aggregate size and the contact area of the compaction equipment, as well as the limitations associated with the testing equipment. Overall, the use of Impact Rammers should be considered with caution when larger aggregate sizes are proposed for thinner lifts.

While Figures 4-14 through 4-23 show a relative increase from uncompacted state for thicker lifts using lightweight equipment, there is not adequate information (Section 2.3, Section 2.4.3, Section 2.5.3, and Section 5.1.1) to recommend any change to the current PennDOT practice regarding the use of lightweight equipment to compact lifts in excess of 4". The trends observed in Figures 4-14 through 4-23 support current PennDOT practice regarding the use of full-size equipment (7.5T and 15T Smooth Single-drum Rollers) to compact 8" lifts of the three aggregate types tested.

It is worth noting that when comparing Figure 4-15, Figure 4-19, and Figure 4-22 (8" lifts and SD condition), it appears the greatest gains in strength/stiffness were observed when full-size compaction equipment was used on AASHTO #1 (largest aggregate type tested) and when the lightweight compaction equipment was used on AASHTO #8 (smallest aggregate type tested) whereas modest gains were observed on AASHTO #57 aggregates across all equipment types tested. These observations highlight the dependency of the effectiveness of compaction equipment on aggregate size.

5.1.3 Aggregate Moisture Condition

As the surveys revealed (Section 3.0 and Appendix A), most DOTs do not specify moisture control for these aggregates tested and instead use the as-is/delivered moisture content or the Contractor uses a suitable/appropriate moisture content that avoids excessive rutting. Contractor survey responses indicated that the as-is/delivered moisture content in the field should be used; an additional response indicated that these free-draining aggregates tend to be in a dry condition and applying moisture with a hose or water truck prior to compaction is effective.

The aggregates tested (“Gravel” per USCS), in general, are considered to be moisture insensitive due to their large particle size. Section 2.4.1 of the literature review references a prior research study that ran proctors on a 50/50 blend of PennDOT 2A and 2RC aggregates that had a similar percentage greater than the 3/8" sieve as AASHTO #57, but a higher percentage smaller than the No. 4 sieve, as compared to AASHTO #8. The OMC of the 50/50 blend was 7.7%. Given the size

of the three aggregate types tested, it is anticipated that the OMCs would be on the low end of the range of reported OMC values, if the materials could be tested.

Referencing Section 4.7.2 and Figures 4-28 through 4-45, overall, the field compaction tests showed that for AASHTO #57 and #8 aggregates, the surface saturated condition generally resulted in higher compaction effectiveness than the surface dry condition regardless of the lift thickness and equipment type. AASHTO #1 aggregate was only evaluated in the surface dry condition; it is not anticipated that surface moisture would increase the compaction effectiveness for this large aggregate type.

Similar to observations concluded in Section 5.1.2, for lightweight equipment, the compaction effectiveness appeared to increase as the particle size decreased and moved from the surface dry to surface saturated condition, while the compaction effectiveness appeared less sensitive to moisture condition when full-size equipment was used. Overall, consideration should be given to surface saturating smaller aggregate sizes when using lightweight equipment to compact thinner lifts.

5.1.4 Maximum Loose Lift Thickness

Referencing the surveys (Section 3.0 and Appendix A), the maximum allowable loose lift thickness ranged from 6" to 12", with 8" being the most common value, as specified by the surveyed DOTs. One DOT limited the loose lift thickness to a maximum of 4" when compacting materials within 3' of a structure. Contractor survey responses indicated acceptable loose lift thicknesses ranging from 4" to 15" for lightweight equipment, with 6" and 8" being the most common values, and acceptable loose lift thicknesses ranging from 6" to 18" for full-size equipment, with 8" and 12" being the most common values.

As discussed in Section 2.4.3, the literature review indicates that the compaction efficiency decreases due to the compaction energy dissipation with depth. Figure 2.7(a) illustrates how the compaction effectiveness varies with depth, stating that the density achieved is a combination of compaction energy and confinement, i.e., granular materials may not be as well compacted at the surface due to lack of confinement. Typical maximum allowable lift thicknesses range from 6" to 12", with larger thicknesses permitted for larger aggregate or rock sizes, provided larger, heavier, and more dynamic equipment is used.

Referencing Section 4.7.3 and Figures 4-46 through 4-60, it is observed that as the aggregate size decreased from AASHTO #1 to AASHTO #8, the compaction effectiveness generally increased for all five types of compaction equipment, with the most pronounced increase observed for the lightweight equipment; this trend is consistent with the conclusions drawn in Sections 5.1.2 and 5.1.3.

Referencing Section 4.7.3 and Figures 4-61 to 4-62, the compaction effectiveness at the top of the final lift is discussed and compared to mid-depth compaction effectiveness of the final lift placed (refer to Section 4.5.3 for a detailed explanation of the test procedure) for both AASHTO #57 and #8 aggregates. The field compaction tests showed that for AASHTO #57 aggregates, as the lift thickness increased from 8" to 15", the compaction effectiveness generally decreased,

indicating a progressively more non-uniform condition with depth. This observation supports current PennDOT practice that for AASHTO #57 aggregates, a maximum lift thickness of 8" is preferable to achieve greater compaction effectiveness. For AASHTO #8 aggregates, the field compaction tests showed less sensitivity as the lift thickness increased.

5.1.5 Roller Speed, Minimum Operation Duration, and Minimum Number of Passes

As the surveys revealed (Section 3.0 and Appendix A), most DOTs do not have specifications on the roller speed, minimum operation duration, and minimum number of passes for compacting these aggregates, and it is instead the Contractor's responsibility to meet the compaction acceptance criteria. Among the DOTs with specifications, a minimum of 3 to 4 passes under 3 mph is most common. The Contractors' surveys indicated that the roller should be operated in a "slow and steady" manner with a speed of typically 2 mph to 3 mph, a "slow walk". Regarding the duration/number of passes typically needed to achieve the non-movement condition when compacting these aggregates, the contractors indicated a range of values from 2 passes to 12 passes, with 4 passes being the most common value for typical vibratory plate compactor and self-propelled trench-type roller and 2 passes being the most common value for the two smooth single-drum vibratory rollers.

Section 2.4.2 of the literature review indicates that a range of 4 passes to 8 passes is common, based on a number of prior studies on materials with similar gradations to that of AASHTO #57 and #8. FHWA recommends 3 passes to 5 passes for the compaction of OGA placed near the wall face for GRS-IBS and PennDOT Publication 447, MS-0460-0011, requires a minimum of 4 vibratory passes per lift for open-graded backfill in GRS-IBS.

As discussed throughout Sections 4.5 and 4.7, for the field compaction tests, the operation speed was set at 3 mph for full-size equipment. The compaction effort is specified using the number of passes for full-size equipment and using the continuous duration for the impact rammer and vibratory plate compactor. To enable a direct comparison of compaction effort between the equipment types, a pass of full-size equipment was made equivalent to approximately 6 seconds of continuous compaction for the hand impact rammer and the vibratory plate compactor, by the contractor in the field tests. The field compaction test results in Sections 4.7.1 and 4.7.2 showed that the "optimal number of passes" (defined as achieving the highest elastic modulus of the compacted surface) ranged from 4 passes to 6 passes in most cases. Typically DOTs and most Contractors define a pass as moving forward across the lift, in one direction. Therefore, referencing Section 5.1.1, the "optimal number of passes" detailed herein should be doubled to 8 passes to 12 passes, to directly compare the results of this study against survey and literature results. A potential contributing factor that may be skewing the "optimal number of passes" to the higher end of the range of published literature and the survey results, is likely based on its definition herein. This research bases the "optimal number of passes" in terms of measured data (i.e., elastic modulus) versus typical practice for a gravel material classification, which instead requires a visual non-movement assessment, as determined by the Representative, according to PennDOT Publication 408 Section 206.3(a).

Regarding the number of passes, consideration should also be given to limiting an excessive number of passes as over-compaction can occur, which may have a destabilizing effect on the

compacted material. A limit on the number of passes cannot be determined from the current study, but potential effects of destabilization can be observed in Figures throughout Section 4.7, when 8 passes (corrected to 16 passes) were made.

5.1.6 Compaction Equipment and Specification Recommendations

Table 5-1 summarizes the discussion in Sections 5.1.1 through 5.1.5 for the three aggregate types tested and includes compaction equipment recommendations, based on lift thickness, aggregate type, and moisture condition, for the specified number of passes or operation duration. These recommendations are a culmination of observations in data trends, numerical results, survey responses, and published literature.

Specification Recommendations:

- Do not use hand impact rammers when compacting AASHTO #1 aggregate.
- Surface saturate 4" lifts for better compaction of thin lifts. Hand impact rammers or vibratory plate compactors are recommended to compact thin lifts, without destabilizing the material. Thin lifts are only to be specified for confined areas and locations adjacent to structures to mitigate imposing lateral loads on structures.
- AASHTO #57 and AASHTO #8 may be easier to compact overall. Consider specifying materials for fast track or critical projects to minimize time or risk related to potential variability for compaction.
- An 8" loose lift is recommended for most efficient compaction. A 15" lift did not exhibit adequate compaction throughout the depth of the layer. A 12" lift exhibited better compaction with depth than the 15" lift. However, an 8" lift exhibited the most consistent compaction throughout the lift.
- Maintain equipment speed of 3 mph or less, 2-3 mph is recommended.
- Additional time for smaller equipment such vibratory plate compactors or hand impact rammers can result in better penetration of compactive energy into the lift. A minimum of 30 seconds at each individual footprint of the compaction equipment is recommended to achieve penetration of the energy into the lift. The 30-second duration is based on equating a 6-second duration as equal to 1 pass, with 5 passes considered to be the average "optimal number of passes".

5.2 Recommendations for Future Research

As detailed in 5.1.1, this research was limited to gravel, a 12"-diameter LWD plate, one piece of compaction equipment (from one specific manufacturer) of each equipment type, and no redundancy in testing. Future research could include different models of compaction equipment of the same type to further investigate the effect of equipment specifications (e.g., base plate dimensions for hand impact rammer and vibratory plate compactor, and centrifugal forces for rollers) on field compaction, and include multiple tests of each condition to provide statistical validity of the test results.

Future research could potentially assess the effects of the backfill specific compaction requirements at bridge approaches, commonly referred to as "the bump at the end of the bridge",

and the associated lateral pressures imposed when compaction equipment runs directly adjacent to the structural elements. In such investigations, the surface of the structural elements can be instrumented with earth pressure cells to monitor the lateral earth pressures induced by different compaction equipment and aggregate types.

Table 5-1. Summary of Compaction Equipment Recommendations ^{1,2}							
Aggregate	Moisture Condition ³	Lift Thickness ^{4,5}	Hand Impact Rammer	Vibratory Plate Compactor	Trench Roller	Single-Drum Vibratory Rollers (7.5T and 15T)	Commentary
AASHTO #1 ⁶	Surface Dry	8"	NG	Adequate	Better	Best	For AASHTO #1, the equipment weight dictates the overall recommendation, as this aggregate type is insensitive to moisture condition and the aggregate size is large relative to both compaction equipment surface area and testing equipment plate diameter.
		12"	NG	Adequate	Better	Best	
AASHTO #57	Surface Dry	8"	Adequate	Adequate	Better	Better	For AASHTO #57, the moisture condition contributes to compaction, and the medium-sized aggregate (relative to this study) works for both a vibratory plate compactor and rollers. Equipment weight is more critical for thicker lifts.
		12"	Adequate	Adequate	Better	Better	
	Surface Saturated	4"	Adequate	Better	NG	NE	
		8"	Better	Better	Better	Better	
		12"	Better	Better	Best	Best	
AASHTO #8	Surface Dry	8"	Better	Better	Adequate	Adequate	For AASHTO #8, the moisture condition contributes to compaction, and the smaller aggregate size works best with lightweight equipment, though will also work for rollers, particularly where the equipment weight is more critical for thicker lifts.
		12"	Adequate	Adequate	Adequate	Better	
	Surface Saturated	4"	Better	Best	Adequate	NE	
		8"	Better	Better	Better	Better	
		12"	Adequate	Adequate	Better	Best	

NG = Not Good, NE = Not Evaluated

Notes:

- The "Compaction Equipment Performance" is a reflection of the following duration or number of passes, as applicable:
 Hand Impact Rammer/Vibratory Plate Compactor: 30 second duration (equivalent to 5 passes)
 Trench Roller: 4 to 6 passes, operating at a speed of 3 mph
 Single-Drum Roller (both 7.5T and 15T): 8 passes, operating at a speed of 3 mph
- In this study, a pass of compaction equipment is defined as crossing the lift, roundtrip, i.e. forward across the lift and back, equates to 1 pass.
- Surface Saturated defined as applying water to placed aggregates, prior to compaction, via hose or water truck.
- Loose lift thickness.
- For 4" lifts in the surface dry condition, regardless of the aggregate type and compaction equipment, significant increases in the elastic modulus of the compacted surface were not observed.
- AASHTO #1 was only evaluated in the "Surface Dry" Condition. It is not anticipated that application of water would increase compaction effectiveness given the aggregate size.

REFERENCES

Adams, M., Nicks, J., Stabile, T., Wu, J. T., Schlatter, W., and Hartmann, J. (2012). "Geosynthetic reinforced soil integrated bridge system interim implementation guide." *Rep. No. FHWA-HRT-11-026*, Federal Highway Administration, Washington, DC.

American Society for Testing and Materials (ASTM), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³, 2,700 kN-m/m³), ASTM D1557-12, ASTM, West Conshohocken, PA., 2012.

American Society for Testing and Materials (ASTM), Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System), Annual Book of ASTM Standards, ASTM D2487-17, ASTM, West Conshohocken, PA., 2017.

American Society for Testing and Materials (ASTM), Standard Test Method for Measuring Deflections with a Light Weight Deflectometer (LWD), Annual Book of ASTM Standards, ASTM E2583-07, ASTM, West Conshohocken, PA., 2020.

American Society for Testing and Materials (ASTM), Standard Test Method for Measuring Deflections using a Portable Impulse Plate Load Test Device, Annual Book of ASTM Standards, ASTM E2835-21, ASTM, West Conshohocken, PA., 2021.

American Society for Testing and Materials (ASTM), Standard Test Method for Determination of the Impact Value (IV) of a Soil, Annual Book of ASTM Standards, ASTM D5874-16, ASTM, West Conshohocken, PA., 2016.

American Society for Testing and Materials (ASTM), Standard Test Method for Measuring Stiffness and Apparent Modulus of Soil and Soil-Aggregate In-Place by Electro-Mechanical Method, Annual Book of ASTM Standards, ASTM D6758-18, ASTM, West Conshohocken, PA., 2021.

American Society for Testing and Materials (ASTM), Standard Test Method for Laboratory Compaction Characteristics of Soils Using Standard Effort, Annual Book of ASTM Standards, ASTM D698-12, ASTM, West Conshohocken, PA., 2012.

American Society for Testing and Materials (ASTM), Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods, Annual Book of ASTM Standards, ASTM D6938-17, ASTM, West Conshohocken, PA., 2017.

American Society for Testing and Materials (ASTM), Standard Test Method for Use of the Dynamic Cone Penetrometer in Shallow Pavement Applications, Annual Book of ASTM Standards, ASTM D6951/D6951M-18, ASTM, West Conshohocken, PA., 2018.

Allied (2004). *Compaction Handbook*. pp. 24.

Bernhard, R.K. (1952). “Static and dynamic soil compaction.” *Proceedings of the 31st annual meeting of the Highway Research Board*, Washington, DC, USA, pp. 563–592.

Camargo, F., Larsen, B., Chadbourn, B., Roberson, R., and Siekmeier, J. (2006). “Intelligent Compaction: A Minnesota Case History.” *Proc., 54th Annual University of Minnesota Geotechnical Conf.*, St. Paul, MN.

Carrasco, C., Tirado, C., and Wang, H. (2014). “Numerical Simulation of Intelligent Compaction Technology for Construction Quality Control.” *Report CAIT-UTC-029*, U.S Department of Transportation/Research and Innovative Technology Administration, 30 pp.

Caterpillar (2014). “Soil Compaction – Drum Selection”: <https://s7d2.scene7.com/is/content/Caterpillar/CM20160919-42450-18058>, last accessed on 10/31/2022.

Chaddock, B.C.J. and Brown, A. (1995). “In-situ tests for road foundation assessment.” *Proc., UnboundAggregates in Roads—UNBAR 4*. A. Dawson, and B. Jones, Eds., Nottingham, U.K.

Choi, Y., Ahn, D., Nguyen, T.H., and Ahn, J. (2018). “Assessment of field compaction of aggregate base materials for permeable pavements based on plate load tests.” *Sustainability*, 10, 3817, doi:10.3390/su10103817.

Choi, Y., Ahn, D., Lee, Y., and Ahn, J. (2020). “Compaction Quality Monitoring of Open-Graded Aggregates by Light Weight Deflectometer and Soil Stiffness Gauge.” *Sustainability*, 12, 2521, doi:10.3390/su12062521.

Converse, F.J. (1952). “Soil Compaction by Vibration.” *Engineering and Science*, 15(4), 12-14.

Davich, P., Camargo, F., Larsen, B., Roberson, R., and Siekmeier, J. (2006). *Validation of DCP and LWD Moisture Specifications for Granular Materials*, Report No. MN/RC-2006-20, Minnesota Department of Transportation, St. Paul.

Drnevich, V., Evans, A., and Prochaska, A. (2007). *A Study of Effective Soil Compaction Control of Granular Soils*, FHWA/IN/JTRP-2007/12, Indiana Department of Transportation: Indianapolis, IN, USA.

Duddu, S.R. and Chennarapu, H. (2022). “Quality control of compaction with lightweight deflectometer (LWD) device: a state-of-art.” *Geo-Engineering*, 13(1), 6. <https://doi.org/10.1186/s40703-021-00171-2>.

Eisenberg, B.E., Lindow, K.C., Smith, D.R. (2015). *Permeable Pavements*, 1st ed., American Society of Civil Engineers, Reston, VA, USA, ISBN 978-0-7844-7867-7.

Fleming, P.R., Frost, M.W., and Rogers, C. (2000). “A Comparison of Devices for Measuring Stiffness In-situ.” *Proceedings of the Unbound Aggregates in Road Construction—UNBAR 5*, CRC Press (Taylor & Francis Group), New York, NY, pp. 193–200.

Fleming, P.R., Lambert, J.P., Frost, M.W., and Rogers, C. (2002). "In-situ Assessment of Stiffness Modulus for Highway Foundations during Construction." *Proceedings of the 9th International Conference on Asphalt Pavements*, August 17–22, 2002, Copenhagen, Denmark, International Society for Asphalt Pavements, Lino Lakes, MN.

Hildebrand, G. (2003). "Comparison of Various Types of Bearing Capacity Equipment." *Nordic Road and Transport Research*, 15(3), 12–14.

Hoffman, P. (2019). "Triaxial testing's 1/6 th rule: particle-continuum analysis of granular stability during compression." *E3S Web Conf.*, (A. Tarantino and E. Ibraim, eds.), 92, 15009. <https://doi.org/10.1051/e3sconf/20199215009>.

Holtz, R.D. and Kovacs, W.D. (1981). *An Introduction to Geotechnical Engineering*. 2nd Edition, Prentice-Hall, pp. 733.

Hossain, M.S. and Apeagyei, A.K. (2010). *Evaluation of the Lightweight Deflectometer for In situ Determination of Pavement Layer Moduli*, Final Report FHWA/VTTC 10-R6, Virginia Transportation Research Council, Richmond.

Johnson, A.W. and Sallberg, J.R. (1960). "Factors that influence field compaction of soils." Bulletin 272, Highway Research Board, pp. 206.

Kim, K.S., Fratta, D., and Wen, H.F. (2014). "Field Measurements for the Effectiveness of Compaction of Coarse-grained Soils," *KSCE Journal of Civil Engineering*, 18(2), 497-504.

Lin, D.F., Liao, C.C., and Lin, J.D. (2006). "Factors affecting portable falling weight deflectometer measurements." *Journal of Geotechnical and Geoenvironmental Engineering*, 132(6), 804–808.

Liu, D., Sun, L., Ma, H., and Cui, W. (2020). "Process Simulation and Mesoscopic Analysis of Rockfill Dam Compaction Using Discrete Element Method." *International Journal of Geomechanics*, ASCE, 20(6): 04020047.

Maher, A. and Bennert, T. (2008). "Evaluation of Poisson's Ratio for Use in the Mechanistic Empirical Pavement Design Guide (MEPDG)," FHWA-NJ-2008-004, pp. 60.

Mondal, R., Rabbi, M.F., Smith, D., and Mishra, D. (2022). "Compaction studies on open-graded aggregates using portable impulse plate load test devices." *Construction and Building Materials*, 327: 126876. <https://doi.org/10.1016/j.conbuildmat.2022.126876>

Mooney, M.A., Nocks, C.S., Selden, K.L., Bee, G.T., and Senseney, C.T. (2008). "Improving quality assurance of mse wall and bridge approach earthwork compaction."

Mooney, M.A. and Miller, P.K. (2009). "Analysis of lightweight deflectometer test based on in situ stress and strain response." *Journal of Geotechnical and Geoenvironmental Engineering*, 135(2), 199–208.

Multiquip Inc. (2011). *Soil Compaction Handbook*. pp. 20.

Nazarian, S., Mazari, M., Abdallah, I., Puppala, A.J., Mohammad, L.N., and Abu-Farsakh, M. (2014). *NCHRP Project 10-84: Modulus-Based Construction Specification for Compaction of Earthwork and Unbound Aggregate*, National Cooperative Research Program.

Nazzal, M., Abu-Farsakh, M., Alshibli, K., and Mohammad, L. (2004). “Evaluating the Potential Use of a Portable LFWD for Characterizing Pavement Layers and Subgrades.” *Geotechnical Engineering for Transportation Projects*, GeoTrans 2004, GSP 126, July 27-31, 2004, M.K. Yegian and E. Kavazanjian, eds., American Society of Civil Engineers, Los Angeles, CA, 915–924.

Nazzal, M. (2014). *NCHRP Synthesis 456: Non-Nuclear Methods for Compaction Control of Unbound Materials*, Washington, DC: The National Academies Press. <https://doi.org/10.17226/22431>, pp. 157.

Nicholson, P.G. (2015). *Soil Improvement and Ground Modification Methods*, Elsevier Inc. pp. 455.

Parsons, A.W., Krawczyk, J., and Cross, J.E. (1962). “An Investigation of the Performance on an 8.5-Ton Vibrating Roller for the Compaction of Soil.” Road Research Laboratory, Laboratory Note No. LN/64/AWP. JK. JEC.

PennDOT (Pennsylvania Department of Transportation). (2020). “Specifications.” Publication 408/2020, Commonwealth of Pennsylvania Dept. of Transportation, Pennsylvania.

PennDOT (Pennsylvania Department of Transportation). (2022). “Approved Products for Lower Volume Local Roads.” Publication 447/2022, Commonwealth of Pennsylvania Dept. of Transportation, Pennsylvania.

Qiu, T., Xiao, M., and Wang, C. (2014). *Evaluation of hydraulic plate compactor*. Rep. No. FHWA-PA-2014-008-PSU WO 12A. State College, PA: Pennsylvania State Univ.

Qiu, T., Xiao, M., Prabhu, S., and Liew, M. (2019). *Evaluation of aggregate compaction using excavator-mounted hydraulic plate compactors*. Rep. No. FHWA-PA-002-PSU WO 002. State College, PA: Pennsylvania State Univ.

Schwartz, C., Afsharikia, Z., and Khosravifar, S., (2017). “Standardizing lightweight deflectometer modulus measurements for compaction quality assurance.” *Report MD-17-SHA-UM-3-20*, Maryland Department of Transportation, 147 pp.

Sebesta, S., Estakhri, C., Scullion, T., and Liu, W. (2006). *New Technologies for Evaluating Flexible Pavement Construction: Year 1 Report*, Report No. FHWA/TX-06/0-4774-1, Texas Department of Transportation, College Station.

Selig, E.T. and Yoo, T.-S. (1977). “Fundamentals of Vibratory Roller Behavior.” *Proceedings of the Ninth International Conference on Soil Mechanics and Foundation Engineering*, Tokyo, 2, 375-380.

Siekmeier, J. A., Young, D., and Beberg, D. (2000). “Comparison of the Dynamic Cone Penetrometer with Other Tests During Subgrade and Granular Base Characterization in Minnesota.” Symp. Nondestructive Testing of Pavements and Backcalculation of Moduli: Third Volume, ASTM STP 1375, S.D. Tayabji and E.O. Lukanen, eds., American Society for Testing and Materials, Seattle, WA, 175–188.

Siekmeier, J., Pinta, C., Merth, S., Jensen, J., Davich, P., Camargo, F., and Beyer, M. (2009). *Using the Dynamic Cone Penetrometer and the Light Weight Deflectometer for Construction Quality Assurance*, Final Report MN/RC 2009-12, Minnesota Department of Transportation, St. Paul.

Singh, N.K., Mejia, C., Martison, T., Shah, F., Fleming, C., and Fitzpatrick, J. (2010). “Use of the light weight deflectometer (LWD) at highland valley copper mine.” *Proceedings from the 63rd Canadian Geotechnical Conference*, Calgary, Alberta, Canada, 265-272.

Smith, D.R. (2011). *Permeable Interlocking Concrete Pavements*, 4th ed., Interlocking Concrete Pavement Institute, Herndon, VA, USA, ISBN 978-1-4507-8440-5.

Stamp, D.H. and Mooney, M.A. (2013). “Influence of Lightweight Deflectometer Characteristics on Deflection Measurement.” *Geotechnical Testing Journal*, 36(2), 216–226.

Stratton, J.H. (1944). “Military airfields—Construction and design problems” *Proc. Am. Soc. Civ. Eng.*, 70(1), 28–54.

Suits, L.D., Sheahan, T.C., Vennapusa, P.K.R., and White, D.J. (2009). “Comparison of light weight deflectometer measurements for pavement foundation materials.” *Geotechnical Testing Journal*, 32(3), 101704, <https://doi.org/10.1520/GTJ101704>.

Tatsuoka F. (2015). “Compaction characteristics and physical properties of compacted soil controlled by the degree of saturation.” In: Keynote lecture, deformation characteristics of geomaterials, *Proc. of the 6th international conference on deformation characteristics of geomaterials*, Buenos Aires, pp. 40–78.

Terzaghi, K. (1955). “Evaluation of Coefficient of Subgrade Reaction.” *Geotechnique*, 5(4), 297–326.

Thom, N.H. and Fleming, P.R. (2002). “Experimental and Theoretical Comparison of Dynamic Plate Testing Methods.” *Proceedings of the 6th International Conference on Bearing Capacity of Roads, Railways, and Airfields*, June 24–26, 2002, CRC Press (Taylor & Francis Group), New York, NY, pp. 731–740.

Tirado, C., Mazari, M., Carrasco, C., and Nazarian, S. (2015). “Evaluating Influence Depth of Light Weight Deflectometer through Finite Element Modeling,” *Proceedings of Airfield and Highway Pavements 2015*, <https://doi.org/10.1061/9780784479216.070>.

Tutumluer, E. (2013). *NCHRP Synthesis 445: Practices for Unbound Aggregate Pavement Layers*, Transportation Research Board of the National Academies, Washington, D.C., 180 pp.

van Gurp, C., Groenendijk, J., and Beuving, E. (2000). “Experience with Various Types of Foundation Tests.” *Proc., Unbound Aggregates in Road Construction—UNBAR5*, A. Dawson, Ed., Balkema, Rotterdam, 239–246.

Vennapusa, P.P.K. and White, D.J. (2009). “Comparison of Light Weight Deflectometer Measurements for Pavement Foundation Materials.” *Geotechnical Testing Journal*, 32(3), 1–13.

Wersäll, C. and Larsson, S. (2013). “Small-scale testing of frequency-dependent compaction of sand using a vertically vibrating plate.” *Geotech. Testing J.*, 36(3), 394–403.

Wersäll, C., Nordfelt, I., and Larsson, S. (2017). “Soil compaction by vibratory roller with variable frequency.” *Geotechnique*, 67(3), 272–278.

Wiman, L.G. (2006). “Accelerated Load Testing of Pavements: HVS-NORDIC Tests at VTI Sweden 2003–2004.” VTI rapport 544A, Swedish National Road and Transport Research Institute: Linköping, Sweden.

Ye, H., Zhu, S., Feng, S., Xu, J., Yang, Y., and Zhu, J. (2022). “Research into compaction characteristics of large-size coarse-grained soil and application.” *European Journal of Environmental and Civil Engineering*, <https://doi.org/10.1080/19648189.2022.2114945>

APPENDIX A

1. Survey Responses from DOT Agencies

The following twenty-three (23) DOTs have responded to the survey and their responses are summarized in this section.

DOTs Responded to Survey (as of January 27, 2023)
Minnesota DOT
Oklahoma DOT
Colorado DOT
Indiana DOT
Montana DOT
Utah DOT
Ohio DOT
Connecticut DOT
Mississippi Department of Transportation
South Dakota DOT
North Dakota DOT
Wyoming DOT
Virginia DOT
Arizona DOT
Michigan DOT
Iowa DOT
Arkansas DOT
Vermont Agency of Transportation
Maine DOT
Florida DOT
Kansas DOT
Oregon DOT
Delaware DOT

Question 1: What is the compaction control method specified by your agency for compacting AASHTO #1, #57, and #8 aggregates in structure backfill applications? Note that the standard/modified Proctor tests cannot be conducted on these aggregates due to their large particle size. Please check all that apply.

Responses		No. of Responses (%)
(A): A specified density after compaction (e.g., through nuclear gauge tests, sand cone tests, etc.)		8 (34.8%)
(B): A specified stiffness/strength (e.g., through dynamic cone penetrometer (DCP), LWD, etc.)		1 (4.3%)
(C): Control strip		7 (30.4%)
(D): A non-movement condition under the compaction equipment through visual inspection by a representative of your agency		7 (30.4%)
(E): Other (please provide details)	A method specification is generally used for #8 aggregate, e.g. provide a maximum lift thickness of 6" and compact with a vibratory roller using a minimum of 4 passes.	1 (4.3%)
	we do not have a compaction control method for this type of aggregate, we also rarely use large aggregates.	1 (4.3%)
	No test is performed.	1 (4.3%)
	No compaction control methods are available. Inspectors make the call.	1 (4.3%)
	ADOT only has control specifications for fills that are within 3 feet of the pavement surface.	1 (4.3%)
	We don't use these gradations.	1 (4.3%)
	Both a specified density and at least one deflection test.	1 (4.3%)

Question 2: If you clicked choice D in Question (1), please respond to this question; otherwise, please proceed to Question 3.

Does your agency specify any acceptable equipment type/class when non-movement condition is used as the compaction control method?

Responses		No. of Responses (%)
(A): No, it is up to the contractor to meet the compaction acceptance criteria.		12 (70.6%)
(B): Yes (please provide details)	Specific weights per axel, tire size, and tire pressure.	1 (5.9%)
	Project by project determination.	1 (5.9%)
	For #8 aggregate, 4 vibratory and 1 static roller pass are performed.	1 (5.9%)
	Rule of thumb is to use loaded dump truck or motor grader for proof rolling subgrade but it is not specified in writing.	1 (5.9%)
	Minimum number of passes based on compactor weight.	1 (5.9%)

Question 3: What is the moisture control requirement specified by your agency for compacting AASHTO #1, #57, and #8 aggregates in structure backfill applications? Note that: (1) the standard/modified Proctor tests cannot be conducted on these aggregates due to their large particle size; hence, the optimal moisture content (OMC) may not be available; and (2) these aggregates are free-draining materials.

Responses		No. of Responses (%)
(A): Suitable/appropriate moisture content (such that the material does not rut excessively and such that the material can be compacted properly)		6 (26.1%)
(B): As-is moisture content in the field		5 (21.7%)
(C): Surface dry condition		0 (0%)
(D): Surface wet condition		0 (0%)
(E): Not specified		8 (34.8%)
(F): Other (Please provide details)	Control strip constructed at moisture content near OMC from T-99.	1 (4.3%)
	0.25 gal/ft ² of surface area per lift.	1 (4.3%)
	Compact material when moisture content is within plus 2 percent to minus 4 percent of optimum.	1 (4.3%)
	We don't use these gradations.	1 (4.3%)

Question 4: What is the maximum allowed loose lift thickness for compacting AASHTO #1, #57, and #8 aggregates in structure backfill applications?

Responses	No. of Responses (%)
6 inches	3 (13.0%)
6 inches compacted. 4 inches within 3 ft of wall.	1 (4.3%)
6 – 12 inches	1 (4.3%)
6 – 8 inches	2 (8.7%)
8 inches	7 (30.4%)
8 inches unless otherwise approved. With approval, the Contractor may place layers in excess of 8 inches and less than 24 inches provided the Contractor demonstrates that the compaction requirements are being obtained.	1 (4.3%)
9 inches	1 (4.3%)
10 inches	1 (4.3%)
12 inches	2 (8.7%)
We don't use these gradations, but require max. 8 inches loose lifts.	1 (4.3%)
It is not specified	1 (4.3%)

Question 5: Does your agency specify a range of roller speed, a minimum roller operation duration, or a minimum number of passes for compacting AASHTO #1, #57, and #8 aggregates in structure backfill applications?

Responses		No. of Responses (%)
(A): No, it is up to the contractor to meet the compaction acceptance criteria.		15 (65.2%)
(B): Yes (Please provide details)	Rollers of 20 tons complete 4 passes under 3 mph; min. dynamic force of 30,000 lbs per vibration and 1,000 vibrations per minute.	1 (4.3%)
	1000 vibrations/ min.	1 (4.3%)
	Minimum effective roller weight and minimum number of passes are specified.	1 (4.3%)
	Generally 4 passes is specified.	1 (4.3%)
	By at least four passes with a heavy vibratory roller.	1 (4.3%)
	Not used for structure backfill.	1 (4.3%)
	At least 4 passes of a roller	1 (4.3%)
	It is up to the contractors but they are still required to do 3 passes.	1 (4.3%)

Question 6: Do you have other comments or input?

Responses
Specification can be found at https://www.codot.gov/business/designsupport/cdot-construction-specifications/2022-construction-specifications/2022-specs-book/2022-division-200
Suggest performing vibratory table test in laboratory and get the maximum unit weight with 3% of moisture.
It is rare for us to use these specific AASHTO aggregates. We do use free draining aggregate and control compaction with a test strip.
Where coarse aggregate lightweight materials are used in embankments, we require a test box be used within the compacted area where the Contractor's actual equipment is used. Then the compacted material is weighed and the corresponding density is determined.
These types of aggregates are typically used for drainage applications, box culvert bedding and undercut backfill.
Structural backfill in AR is typically embankment material, not granular material.
Embankment construction and compaction requirements are specified in MaineDOT Standard Specification sections 203.10, 203.11, 203.12, and 203.13. The Specifications are available on the MaineDOT website.
Coarse aggregate must be comprised of natural stones meeting the requirements of Section 901 with a size distribution of any of the listed aggregate gradations from Size No 57 through Size No 89, inclusive, except as noted on the Plans.

2. Survey Responses from Contractors

A total of seven responses from the following six companies were received and the responses are summarized in this section.

Companies Responded to Survey (as of January 27, 2023)
Allison Park Contractors
Ameron Construction (2 responses)
Centre Concrete
Cottle's Asphalt Maintenance, Inc.
Croda, Inc.
Glenn O. Hawbaker, Inc.

Question 1: For compacting AASHTO #1, #57, and #8 aggregates in structure backfill applications, does moisture content play a significant role based on your experience?

Responses	No. of Responses (%)
(A): Yes. Then, please respond to Question 2.	1 (14.3%)
(B): No. Then, please skip Question 2 and proceed to Question 3.	6 (85.7%)

Question 2: What is the most suitable/appropriate moisture content for compacting AASHTO #1, #57, and #8 aggregates in structure backfill applications (e.g., surface dry condition, surface saturated condition, as-is moisture condition in the field, etc.)? Note that: (1) the standard/modified Proctor tests cannot be conducted on these aggregates due to their large particle size; hence, the optimal moisture content (OMC) may not be available; and (2) these aggregates are free-draining materials.

Responses	No. of Responses (%)
As-is/delivered condition in the field	3 (75%)
Typically, these aggregates arrive at job site in a relatively dry condition. Stockpiled, free-draining aggregates as well tend to be in a dry condition. Addition of water is typically advantageous to lubricate the individual particles and to facilitate consolidation. My experience is that the best method is to place a layer of aggregate, then apply moisture (just with a hose or water truck), then apply compactive effort.	1 (25%)

Question 3: What is the maximum loose lift thickness (e.g., 4", 8", 12", 15", etc.) in the field when each of the following equipment is used to compact AASHTO #1, #57, and #8 aggregates in structure backfill applications while meeting the non-movement condition based on your experience?

3(a) Hand impact rammer (i.e., jumping jack)

Responses	No. of Responses (%)
12"	1 (14.3%)
8"	1 (14.3%)
8" for #8 and #57. I do not recommend hand operated equipment for consolidation of #1 stone.	1 (14.3%)
6"	3 (42.9%)
5"-6"	1 (14.3%)

3(b) Typical vibratory plate compactor

Responses	No. of Responses (%)
8"	2 (28.6%)
6"	2 (28.6%)
4-5"	1 (14.3%)
4"	1 (14.3%)
This depends a great deal on the size and weight of the plate compactor. Light equipment, such as plate compactors used to compact asphalt around curblines, can actually be less effective than jumping jacks. Heavy, walk-behind plate compactors work very well. I recommend maximum lifts of 8" for #57 and #8, and 12" for #1, provided that a heavier plate compactor is used.	1 (14.3%)

3(c) Typical self-propelled trench-type roller

Responses	No. of Responses (%)
15"	1 (14.3%)
8" (#8), 12" (#57 and #1)	1 (14.3%)
8"	3 (42.9%)
6"	2 (28.6%)

3(d) 7.5-Ton Smooth single-drum vibratory roller

Responses	No. of Responses (%)
15"	1 (14.3%)
12"	2 (28.6%)
8"	2 (28.6%)
6"-8"	1 (14.3%)
6"	1 (14.3%)

3(e) 15-Ton Smooth single-drum vibratory roller

Responses	No. of Responses (%)
15"	1 (14.3%)
12" (#8 and #57), 18" (#1)	1 (14.3%)
12"	2 (28.6%)
8"	2 (28.6%)
6"-8"	1 (14.3%)

Question 4: What is the duration/number of passes typically needed to achieve the non-movement condition when compacting AASHTO #1, #57, and #8 aggregates in structure backfill applications? In your response(s), please note associated lift thickness(es) and whether it is “loose” or “compacted”.

4(a) Typical vibratory plate compactor

Responses	No. of Responses (%)
This all depends upon whether or not there is adequate lateral confinement of the material. As a very general baseline, 12 passes for an 8" loose lift.	1 (14.3%)
4	3 (42.9%)
Typically, 4 passes at 6" loose lift on stable subgrade	1 (14.3%)
3-4	1 (14.3%)
2	1 (14.3%)

4(b) Typical self-propelled trench-type roller

Responses	No. of Responses (%)
10 passes for an 8" loose lift	1 (14.3%)
Typically, 4 passes at 8" loose lift on stable subgrade	1 (14.3%)
4	1 (14.3%)
2-3	1 (14.3%)
2	3 (42.9%)

4(c) 7.5-Ton Smooth single-drum vibratory roller

Responses	No. of Responses (%)
8 passes for an 8" loose lift	1 (14.3%)
4 to 6 passes at 12" loose lift	1 (14.3%)
4	1 (14.3%)
2	4 (57.1%)

4(d) 15-Ton Smooth single-drum vibratory roller

Responses	No. of Responses (%)
6 passes for an 8" loose lift	1 (14.3%)

4 passes at 12" loose lift	1 (14.3%)
4	1 (14.3%)
2	4 (57.1%)

Question 5: What is the typical roller speed you would use when compacting AASHTO #1, #57, and #8 aggregates in structure backfill applications?

Responses
2-3 mph
1-2 mph
2 mph or 150 LF/min
slow and steady
slow walk
medium speed
I am unsure but would estimate 2-4 mph.

Question 6: Do you have other comments or input?

Responses
Lateral confinement has a lot to do with getting non-movement in an open grade stone such as #8, #57, and #1.
Width of material bed and lateral confinement have a lot to do with how much effort is needed for non-movement. Even 1 pass could work in narrow <3' wide, side wall confined trenches.
Field conditions and common sense should help decide.

APPENDIX B

FIELD TEST RESULTS IN TABULAR FORMAT

Table B-1. Tables for All Tests

Tests	Tables
AASHTO #1 Aggregate, Surface Dry, 4" Lifts	B2-B10
AASHTO #1 Aggregate, Surface Dry, 8" Lifts	B11-B25
AASHTO #1 Aggregate, Surface Dry, 12" Lifts	B26-B40
AASHTO #1 Aggregate, Surface Dry, 15" Lifts	B41-B55
AASHTO #57 Aggregate, Surface Dry, 4" Lifts	B56-B64
AASHTO #57 Aggregate, Surface Dry, 8" Lifts	B65-B79
AASHTO #57 Aggregate, Surface Dry, 12" Lifts	B80-B94
AASHTO #57 Aggregate, Surface Saturated, 4" Lifts	B95-B103
AASHTO #57 Aggregate, Surface Saturated, 8" Lifts	B104-B118
AASHTO #57 Aggregate, Surface Saturated, 12" Lifts	B119-B133
AASHTO #57 Aggregate, Surface Saturated, 15" Lifts	B134-B148
AASHTO #8 Aggregate, Surface Dry, 4" Lifts	B149-B157
AASHTO #8 Aggregate, Surface Dry, 8" Lifts	B158-B172
AASHTO #8 Aggregate, Surface Dry, 12" Lifts	B173-B187
AASHTO #8 Aggregate, Surface Saturated, 4" Lifts	B188-B196
AASHTO #8 Aggregate, Surface Saturated, 8" Lifts	B197-B211
AASHTO #8 Aggregate, Surface Saturated, 12" Lifts	B212-B226
AASHTO #8 Aggregate, Surface Saturated, 15" Lifts	B227-B241
AASHTO #8 Aggregate, Surface Dry, 8" Lifts, Successive Compaction	B242-B256
AASHTO #8 Aggregate, Surface Saturated, 8" Lifts, Successive Compaction	B257-B271
AASHTO #8 Aggregate, Surface Saturated, 12" Lifts, Successive Compaction	B271-B286

Table B-2. 1st 4" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	38	1.3	11	66	2.3	11	104	1.5	12	43	4.0	11	115	1.4	12	59	2.9
	2	7	49	1.5	11	51	3.1	8	24	4.8	12	37	4.5	7	33	2.8	13	52	3.4
	3	5	32	1.6	4	30	1.9	8	22	4.9	12	33	5.1	8	28	3.8	13	48	3.6
	4	8	45	1.7	7	29	3.4	8	21	5.3	12	33	4.9	8	26	4.2	13	47	3.8
	5	5	31	1.7	10	1	101.8	12	20	8.4	12	32	5.2	8	25	4.2	13	33	5.4
	6	5	31	1.8	12	40	4.1	8	21	5.5	12	31	5.5	8	27	4.1	8	32	3.6
	7	6	30	1.9	6	25	3.1	8	21	5.4	12	30	5.6	12	37	4.6	13	44	4.0
	8	3	22	1.6	8	26	4.1	5	1	65.2	12	31	5.6	12	35	4.9	8	29	3.8
	9	3	20	1.8	8	26	4.1	8	18	6.0	12	31	5.4	8	25	4.3	8	30	3.7
	Avg.			1.8			3.8			5.7			5.5			4.6			3.8
P2	1	12	97	1.3	11	153	1.0	11	115	1.4	11	59	2.7	11	113	1.3	12	116	1.4
	2	3	26	1.3	11	74	2.1	12	62	2.7	5	19	3.5	5	18	3.5	5	18	4.0
	3	4	24	1.5	3	18	2.4	6	22	3.7	3	11	4.0	8	1	72.9	3	10	4.5
	4	12	67	1.9	12	56	2.9	6	4	24.9	5	18	3.8	3	11	4.4	13	40	4.4
	5	6	33	1.8	3	19	2.5	12	40	4.1	2	6	4.2	12	39	4.4	8	27	4.2
	6	2	13	2.0	2	9	3.4	12	37	4.5	3	10	4.7	5	18	4.0	6	16	4.7
	7	0	3	1.5	12	50	3.3	6	19	4.2	12	39	4.2	2	5	4.9	3	10	4.4
	8	13	61	2.2	4	1	45.8	3	7	5.3	12	40	4.1	14	36	5.3	3	6	6.9
	9	6	31	1.9	2	9	3.7	4	12	4.3	8	27	4.0	5	16	4.4	13	37	5.0
	Avg.			1.9			3.5			4.6			4.1			4.9			5.4
P3	1	12	83	1.6	7	55	1.8	12	72	2.3	11	806	0.2	10	681	0.2	12	53	3.2
	2	8	42	2.1	7	50	2.0	12	53	3.1	11	62	2.6	7	32	3.2	12	44	3.8
	3	6	31	2.0	11	494	0.3	12	46	3.6	12	50	3.3	12	47	3.5	13	41	4.3
	4	6	29	2.2	8	43	2.5	12	43	3.9	4	27	2.2	12	44	3.7	12	39	4.4
	5	6	29	2.2	8	41	2.6	12	40	4.1	12	41	4.0	7	29	3.6	8	28	4.0
	6	6	29	2.2	12	66	2.5	12	38	4.3	12	40	4.2	8	28	3.8	8	26	4.2
	7	6	29	2.2	12	50	3.4	8	27	4.3	12	40	4.2	7	28	3.6	8	25	4.5
	8	6	28	2.2	12	2	96.0	8	26	4.4	12	39	4.2	7	27	3.8	8	26	4.5
	9	6	28	2.2	8	32	3.3	8	25	4.4	12	39	4.2	8	26	4.0	8	25	4.4
	Avg.			2.2			3.3			4.3			4.2			3.8			4.5

Table B-3. 1st 4" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	82	1.4	4	38	1.3	11	127	1.2	5	16	4.2	12	86	2.0	12	37	4.3
	2	6	20	2.8	12	56	2.8	12	40	4.0	5	15	4.9	8	31	3.6	8	22	4.9
	3	5	26	2.0	5	23	2.8	6	16	5.0	8	1	130.9	5	21	3.5	3	9	4.9
	4	4	18	2.1	13	55	3.2	4	10	5.5	2	9	3.8	3	12	3.8	2	5	5.9
	5	2	11	2.4	4	3	17.2	4	10	5.7	3	7	6.1	2	5	5.8	12	28	5.8
	6	12	50	2.5	3	13	3.5	4	10	5.6	12	32	5.0	13	34	5.4	6	15	5.1
	7	8	34	2.4	12	46	3.5	3	6	6.4	5	15	4.7	5	15	4.7	3	9	5.1
	8	3	17	2.2	8	32	3.2	4	1	49.0	3	8	5.3	3	9	4.5	3	5	7.8
	9	1	6	2.3	12	39	4.2	4	9	5.8	3	9	4.8	3	9	5.1	3	5	8.8
	Avg.			2.3			3.6			6.1			4.9			4.8			7.3
P2	1	12	108	1.1	11	100	1.6	10	132	1.1	12	120	1.4	11	163	1.0	11	126	1.2
	2	8	34	2.3	11	68	2.3	7	42	2.4	12	53	3.1	12	55	3.2	8	29	3.6
	3	8	35	2.2	7	30	3.4	7	40	2.6	12	47	3.5	13	47	3.7	8	28	4.0
	4	12	46	2.6	5	19	3.7	7	36	2.8	12	45	3.6	12	44	3.8	8	26	4.1
	5	8	27	3.0	7	29	3.5	12	52	3.2	12	44	3.7	13	42	4.2	5	18	4.1
	6	5	18	3.0	10	19	7.6	12	50	3.3	12	43	3.7	12	40	4.3	8	24	4.7
	7	6	18	3.1	5	11	5.9	12	50	3.3	12	40	4.2	13	41	4.3	8	24	4.6
	8	5	18	2.9	5	18	4.0	8	35	3.0	12	42	3.9	12	40	4.3	8	24	4.4
	9	3	12	3.1	7	27	3.8	12	48	3.5	12	40	4.2	13	39	4.6	8	24	4.7
	Avg.			3.1			4.6			3.2			4.1			4.4			4.6

Table B-4. 1st 4" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	60	1.2	11	339	0.4	11	115	1.3	11	101	1.5	11	80	2.0	12	102	1.7
	2	3	23	1.5	3	16	2.3	8	41	2.6	3	13	3.2	8	29	3.9	8	42	2.6
	3	2	11	1.6	2	8	3.0	5	26	2.8	12	41	4.1	3	11	3.2	4	16	3.4
	4	13	64	2.1	13	56	3.2	4	17	3.0	4	17	3.2	12	37	4.5	3	15	2.4
	5	5	34	1.4	12	79	2.2	3	10	3.7	4	1	62.0	5	17	4.5	2	7	3.5
	6	2	11	1.9	12	63	2.7	11	46	3.3	12	38	4.5	2	5	6.2	2	5	5.6
	7	12	57	2.2	8	39	2.8	12	46	3.7	5	16	4.4	1	2	5.5	2	4	7.8
	8	5	29	1.8	3	16	2.8	8	32	3.3	12	34	4.9	1	1	7.5	3	14	3.2
	9	3	19	1.6	2	6	3.8	6	22	3.5	5	15	4.6	13	39	4.6	3	14	3.3
	Avg.			1.9			3.1			3.5			4.6			5.9			4.8
P2	1	11	117	1.0	7	70	1.3	11	119	1.3	11	94	1.7	12	69	2.4	13	69	2.6
	2	8	43	1.9	5	21	3.3	12	64	2.5	12	48	3.5	12	60	2.8	13	71	2.5
	3	5	27	2.1	7	36	2.8	12	59	2.8	8	30	3.5	12	57	3.0	8	43	2.5
	4	3	19	1.8	8	33	3.2	12	54	2.9	8	30	3.6	12	55	3.0	5	23	3.1
	5	5	27	2.0	8	32	3.5	12	52	3.2	12	42	3.9	12	52	3.2	8	38	3.1
	6	5	26	2.2	8	33	3.3	8	37	2.9	12	39	4.2	13	50	3.5	8	34	3.2
	7	5	26	2.1	8	35	3.1	8	37	2.9	12	39	4.1	13	52	3.3	8	41	2.8
	8	6	25	2.3	6	22	3.5	8	36	2.9	12	39	4.2	12	50	3.4	8	33	3.3
	9	5	25	2.2	8	31	3.6	8	36	3.1	12	39	4.3	12	49	3.5	8	45	2.4
	Avg.			2.2			3.4			3.0			4.2			3.4			2.9

Table B-5. 2nd 4" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	141	1.0	12	64	2.5	12	39	4.4	11	101	1.6	11	86	1.8
	2	12	72	2.2	12	38	4.5	46	20	32.2	12	41	4.1	12	33	5.0
	3	12	0	814.5	12	28	6.0	9	18	6.7	12	41	4.1	12	29	5.8
	4	8	29	3.7	12	24	6.8	9	18	6.6	12	35	4.7	12	26	6.3
	5	12	42	3.9	12	22	7.5	13	27	6.5	12	32	5.2	12	25	6.7
	6	12	37	4.5	12	24	7.0	12	27	6.4	13	31	5.6	12	25	6.6
	7	12	35	4.6	8	15	7.5	8	17	6.6	13	30	5.7	8	17	6.4
	8	12	34	4.9	8	14	7.8	12	26	6.6	9	20	5.9	8	16	6.7
	9	12	33	5.0	7	14	7.2	12	25	6.9	9	20	6.0	8	15	7.4
	Avg.			4.8			7.5			6.7			5.9			6.8
P2	1	12	85	1.9	2	7	4.6	12	160	1.1	11	98	1.6	12	78	2.1
	2	12	58	2.8	12	49	3.4	5	19	3.8	3	14	3.4	8	25	4.3
	3	12	53	3.1	12	43	4.0	4	12	4.4	4	2	38.5	12	36	4.6
	4	12	47	3.5	7	26	3.8	4	12	4.8	4	14	3.7	12	34	4.8
	5	12	46	3.6	2	4	7.5	13	38	4.6	2	5	4.2	12	33	5.1
	6	12	43	3.7	3	5	7.1	12	36	4.8	4	13	3.8	12	32	5.3
	7	12	41	4.1	1	1	8.3	12	34	5.0	4	12	4.3	12	31	5.2
	8	6	28	3.0	12	26	6.6	6	16	4.9	2	5	5.8	12	31	5.5
	9	8	28	3.9	12	24	6.9	2	5	6.6	3	13	3.8	12	29	5.7
	Avg.			3.6			7.3			5.5			4.6			5.5
P3	1	5	20	3.5	11	121	1.3	12	119	1.4	11	60	2.6	12	199	0.8
	2	12	50	3.3	13	48	3.7	12	52	3.3	12	36	4.5	12	45	3.8
	3	12	49	3.4	12	44	3.8	8	27	4.0	12	36	4.7	12	40	4.2
	4	12	46	3.5	12	40	4.2	8	27	4.2	12	34	4.9	8	25	4.5
	5	12	43	3.8	12	38	4.5	8	26	4.2	12	33	5.0	8	1	127.3
	6	12	43	3.9	12	38	4.5	5	19	3.7	12	33	5.1	6	16	4.7
	7	12	42	3.9	13	35	5.0	8	29	3.7	12	30	5.4	13	32	5.5
	8	12	40	4.1	8	26	4.0	9	27	4.4	12	29	5.7	13	32	5.5
	9	8	26	4.2	12	36	4.7	12	39	4.4	12	32	5.2	13	31	5.7
	Avg.			4.1			4.6			4.2			5.5			5.5

Table B-6. 2nd 4" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	135	1.1	12	69	2.4	12	47	3.5	12	28	6.0	12	148	1.1
	2	7	37	2.7	3	6	7.0	8	18	6.3	8	17	6.9	7	36	2.8
	3	8	29	3.6	2	3	10.3	8	20	5.7	8	18	6.3	12	38	4.6
	4	12	47	3.6	12	25	7.0	3	7	6.5	6	12	6.7	8	22	4.8
	5	12	42	4.1	5	10	7.2	13	29	6.2	4	9	6.2	3	9	4.7
	6	8	27	3.9	4	5	9.5	8	16	7.1	6	12	6.8	5	12	6.0
	7	7	26	4.0	2	3	11.6	9	16	7.5	4	9	7.0	8	19	6.0
	8	2	9	3.6	3	6	7.4	8	16	7.1	3	9	4.8	8	18	6.3
	9	5	17	3.7	3	1	58.5	9	17	7.2	4	7	6.9	6	10	7.5
	Avg.			3.8			7.4			7.3			6.2			6.6
P2	1	10	912	0.1	12	102	1.6	12	62	2.7	12	126	1.3	12	152	1.1
	2	7	27	3.4	12	42	3.9	13	28	6.2	8	18	6.3	12	27	6.2
	3	7	26	3.7	11	522	0.3	8	17	6.3	8	17	7.0	8	17	6.6
	4	12	32	5.2	9	26	4.5	7	16	6.3	8	16	7.3	12	25	6.9
	5	12	39	4.4	8	25	4.6	8	17	6.5	13	24	7.2	12	23	7.5
	6	7	25	3.9	8	24	4.7	8	16	7.0	12	24	7.2	13	25	7.2
	7	12	34	4.9	13	34	5.2	8	16	6.9	12	23	7.3	8	16	6.9
	8	7	19	5.3	8	20	5.5	12	23	7.2	13	23	7.7	8	15	7.4
	9	12	33	5.2	9	3	46.9	8	14	7.6	8	15	7.7	8	15	7.3
	Avg.			5.1			5.4			7.3			7.6			7.2

Table B-7. 2nd 4" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	574	115	1.3	5	20	3.4	12	97	1.7	11	75	2.1	11	110	1.4
	2	6	51	1.6	1	4	4.8	5	19	3.9	12	41	4.0	3	12	3.6
	3	2	7	4.9	2	6	4.2	6	19	4.0	4	28	2.2	3	11	4.2
	4	5	15	4.4	12	41	4.2	4	14	3.9	12	38	4.3	4	12	4.3
	5	2	4	7.1	7	1	86.0	4	13	4.4	12	36	4.7	3	7	5.4
	6	12	41	3.9	3	10	4.8	9	1	91.6	8	24	4.4	2	6	5.8
	7	12	44	3.7	3	11	4.5	5	13	5.1	8	25	4.5	4	11	4.8
	8	12	41	4.0	2	5	6.1	6	18	4.3	6	17	4.7	6	17	4.7
	9	5	16	4.5	3	9	5.0	13	36	4.9	6	17	4.6	6	15	5.1
	Avg.			4.1			5.2			4.7			4.6			4.9
P2	1	6	42	2.0	7	35	2.8	12	53	3.2	12	84	2.0	12	70	2.4
	2	7	39	2.5	12	57	2.9	12	41	4.1	8	36	3.0	12	45	3.8
	3	12	29	5.7	12	55	2.9	12	38	4.4	8	35	3.1	12	42	4.1
	4	12	51	3.2	12	42	4.0	9	28	4.2	8	34	3.1	13	40	4.4
	5	8	31	3.7	12	36	4.8	9	26	4.5	12	48	3.5	12	39	4.3
	6	8	29	3.9	13	34	5.1	9	25	4.9	12	45	3.8	12	39	4.3
	7	8	27	3.9	12	32	5.3	8	25	4.7	8	33	3.3	12	38	4.6
	8	8	27	4.2	12	31	5.4	8	24	4.9	8	31	3.5	13	39	4.5
	9	8	24	4.7	12	31	5.5	7	24	3.7	8	30	3.7	13	10	18.4
	Avg.			4.3			5.4			4.4			3.5			4.5

Table B-8. 3rd 4" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	213	0.7	11	777	0.2	11	66	2.4	12	49	3.3	12	62	2.7
	2	12	49	3.3	9	19	6.4	8	18	5.8	12	28	6.0	8	19	6.0
	3	12	45	3.7	13	30	5.9	8	17	6.2	12	25	6.6	13	27	6.5
	4	12	36	4.5	12	26	6.6	8	17	6.1	12	23	7.3	13	26	6.6
	5	8	19	5.8	12	26	6.5	8	18	6.1	12	24	7.2	12	24	7.0
	6	8	17	6.5	12	26	6.5	5	11	6.4	12	23	7.1	12	23	7.3
	7	5	11	6.5	12	23	7.4	8	17	6.4	12	22	7.3	11	16	9.7
	8	8	14	8.2	12	22	7.8	8	16	6.4	4	14	4.2	8	15	7.4
	9	8	14	7.9	13	23	7.7	12	26	6.4	12	28	6.1	4	10	5.5
	Avg.			7.5			7.7			6.4			5.9			7.5
P2	1	11	722	0.2	12	99	1.6	10	134	1.0	10	186	0.8	10	976	0.1
	2	6	88	0.9	8	34	3.0	12	36	4.6	8	19	5.7	4	11	5.0
	3	2	6	4.2	13	52	3.5	12	39	4.2	8	16	7.0	1	3	6.6
	4	4	15	4.1	12	35	4.9	9	2	69.4	8	15	7.6	1	2	8.1
	5	3	7	5.3	9	20	5.9	4	7	7.2	6	10	8.1	12	28	5.9
	6	2	4	6.3	7	9	10.9	4	7	7.3	6	9	8.7	7	21	4.7
	7	3	10	4.4	6	13	6.3	6	11	7.3	6	9	8.5	6	14	5.7
	8	1	2	6.4	14	13	14.4	8	18	6.0	3	6	8.0	4	10	5.4
	9	3	7	5.4	9	20	6.2	6	11	7.2	3	5	9.4	6	13	6.0
	Avg.			5.4			6.3			6.8			8.6			5.7
P3	1	12	120	1.4	13	34	5.2	11	120	1.3	11	259	0.6	12	113	1.4
	2	10	333	0.4	13	30	6.0	12	35	4.7	12	45	3.6	12	46	3.7
	3	12	45	3.7	13	29	6.2	12	29	5.8	12	34	4.8	12	28	5.9
	4	12	34	5.0	13	28	6.5	12	3	47.9	7	23	4.5	12	29	6.0
	5	12	33	5.2	13	28	6.4	8	21	5.4	12	29	5.5	12	28	6.1
	6	12	31	5.4	13	28	6.4	8	20	5.6	12	29	5.5	12	27	6.2
	7	12	30	5.7	13	27	6.6	8	20	5.5	12	44	3.6	12	26	6.3
	8	12	29	5.7	13	26	7.1	8	18	6.2	12	28	5.8	12	25	6.6
	9	12	31	5.5	13	26	7.0	8	18	6.0	11	27	5.9	12	26	6.6
	Avg.			5.6			6.9			5.9			5.1			6.5

Table B-9. 3rd 4" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	222	0.6	6	17	4.5	11	119	1.2	12	40	4.2	12	64	2.7
	2	6	54	1.6	5	10	7.5	7	30	3.0	8	16	7.0	12	27	6.1
	3	5	13	5.3	6	9	8.9	2	4	7.2	8	24	4.4	8	13	7.9
	4	3	6	6.2	6	9	8.9	3	8	5.2	6	11	7.1	4	6	8.6
	5	12	28	5.9	6	5	16.2	4	10	5.2	5	5	12.3	2	3	11.2
	6	5	11	6.3	9	14	8.7	4	10	5.6	2	3	8.0	2	2	10.5
	7	3	6	7.5	8	13	8.7	12	27	6.2	12	24	6.9	12	43	3.8
	8	2	3	11.1	12	18	9.2	8	17	6.4	12	27	6.2	4	10	6.2
	9	4	14	4.4	8	12	9.2	4	11	4.9	8	16	7.1	3	9	5.7
	Avg.			6.0			9.1			5.8			6.7			5.2
P2	1	6	11	6.8	12	142	1.1	12	43	3.8	11	141	1.1	12	108	1.5
	2	8	18	6.0	8	24	4.7	6	10	7.5	7	20	5.1	6	13	6.0
	3	8	17	6.9	8	24	4.6	4	9	6.8	9	18	6.6	8	19	6.1
	4	8	17	6.7	6	6	15.6	0	0	21.8	9	17	7.2	8	18	6.3
	5	8	16	7.1	8	23	4.7	0	0	21.8	9	16	7.2	8	17	6.6
	6	11	0	1306.6	6	16	5.0	2	3	8.7	9	15	8.3	8	17	6.5
	7	13	22	8.1	5	15	4.9	1	1	10.2	6	11	7.6	8	17	7.0
	8	9	15	7.9	5	13	5.6	1	1	10.7	8	15	7.7	6	12	6.4
	9	8	15	7.9	6	11	6.9	3	8	4.6	12	21	8.0	6	11	6.7
	Avg.			8.0			5.8			10.4			7.8			6.7

Table B-10. 2nd 4" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	686	0.2	11	746	0.2	12	90	1.8	12	58	2.9	11	123	1.2
	2	7	34	2.9	6	13	6.0	12	47	3.5	12	32	5.0	12	57	3.0
	3	5	22	3.0	4	9	5.5	8	22	4.7	12	28	5.9	3	12	4.0
	4	3	10	4.0	6	14	6.0	4	1	55.3	12	27	6.0	2	5	6.2
	5	5	19	3.6	6	13	6.2	3	9	5.4	12	28	5.7	8	31	3.6
	6	2	5	5.1	4	8	6.9	4	8	6.2	12	30	5.6	8	29	3.7
	7	2	10	3.1	3	4	9.1	6	13	5.8	12	32	5.2	5	10	6.4
	8	5	17	4.0	3	4	9.0	4	8	6.6	12	26	6.2	1	2	6.6
	9	12	39	4.1	4	8	7.1	6	15	5.6	12	31	5.4	3	10	4.4
	Avg.			3.7			8.4			6.0			5.6			5.8
P2	1	11	63	2.5	6	12	6.5	11	117	1.3	12	109	1.5	12	132	1.3
	2	12	41	4.2	9	19	6.3	7	33	3.0	8	19	5.7	8	21	5.1
	3	12	43	3.8	12	31	5.6	8	27	4.1	8	17	6.3	8	21	5.2
	4	12	37	4.5	12	28	6.2	8	22	5.1	8	17	6.3	8	20	5.4
	5	12	33	5.0	13	27	6.4	8	21	5.4	8	17	6.5	8	20	5.5
	6	12	31	5.4	13	28	6.2	8	21	5.6	12	24	6.9	8	20	5.4
	7	12	28	5.9	12	26	6.6	6	15	5.2	12	25	6.6	8	21	5.4
	8	12	30	5.6	12	26	6.6	8	20	5.5	12	22	7.7	6	14	6.1
	9	12	29	5.6	12	26	6.6	13	28	6.1	8	16	6.9	5	14	5.1
	Avg.			5.7			6.6			5.6			7.1			5.5

Table B-11. 1st 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	73	1.5	10	81	1.6	10	118	1.1	10	105	1.3	10	90	1.6
	2	8	35	3.1	2	3	8.1	10	38	3.6	2	4	6.0	7	19	5.3
	3	8	26	4.2	2	4	7.7	10	33	4.3	1	2	8.0	7	18	5.4
	4	8	22	5.0	7	17	5.6	10	31	4.5	10	27	5.1	7	18	5.7
	5	8	20	5.5	10	24	6.0	10	29	4.7	4	12	5.2	11	25	6.1
	6	8	24	4.7	7	16	6.1	10	29	4.9	5	12	5.4	11	25	6.0
	7	8	19	5.6	10	24	6.1	10	27	5.2	7	17	5.7	7	17	6.1
	8	8	21	5.4	7	16	6.0	10	28	5.1	7	18	5.5	5	12	5.8
	9	8	22	5.0	7	15	6.4	10	26	5.3	10	22	6.4	5	12	6.4
	Avg.			5.3			6.1			5.2			5.9			6.1
P2	1	9	99	1.3	10	60	2.3	10	88	1.6	10	58	2.4	10	67	2.0
	2	9	49	2.6	4	19	3.3	10	22	6.3	10	26	5.4	7	14	6.5
	3	10	167	0.8	7	2	48.1	7	12	8.2	10	23	5.9	7	14	7.1
	4	10	39	3.4	5	11	6.5	5	8	9.2	10	21	6.7	10	18	8.0
	5	10	32	4.1	5	12	5.5	10	16	8.5	11	20	7.2	10	1	124.6
	6	6	23	3.7	2	2	9.5	7	11	9.0	7	12	7.3	10	3	48.8
	7	6	35	2.4	2	4	8.2	3	6	6.9	10	18	7.9	5	7	9.4
	8	4	12	4.3	7	14	7.5	5	8	9.0	7	12	7.6	7	11	9.5
	9	7	22	4.1	10	28	5.0	7	11	8.8	10	14	10.2	10	15	9.5
	Avg.			3.6			6.9			8.3			7.7			9.4
P3	1	10	60	2.3	10	79	1.7	10	82	1.7	10	27	5.1	10	74	1.9
	2	10	28	5.1	10	28	5.2	10	27	5.1	10	20	6.9	5	10	6.9
	3	7	14	6.9	10	24	6.1	10	22	6.2	10	20	6.8	3	7	7.0
	4	5	1	84.8	10	21	6.9	7	15	6.0	10	19	7.3	1	3	7.7
	5	5	9	7.3	10	20	7.2	10	20	6.9	10	19	7.5	5	9	7.7
	6	7	13	7.5	10	18	7.6	7	15	6.6	10	24	5.8	2	3	9.3
	7	7	13	7.4	10	18	7.9	7	15	6.2	10	20	6.7	10	18	8.0
	8	10	17	8.0	10	18	8.0	3	7	7.2	8	9	12.5	7	12	7.9
	9	7	15	6.5	10	18	7.9	1	1	11.1	10	19	7.5	7	13	7.9
	Avg.			7.3			7.9			6.7			7.1			7.9

Table B-12. 1st 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	42	3.27	10	68	2.12	10	82	1.61	10	113	1.19	10	114	1.17
	2	3	4	8.48	5	11	6.73	4	11	4.96	10	31	4.38	5	15	4.77
	3	1	1	9.70	7	14	7.21	2	3	7.61	10	24	5.76	2	5	6.61
	4	10	32	4.45	3	6	7.88	2	3	10.44	10	22	6.18	4	10	4.84
	5	4	10	5.19	2	3	13.31	4	6	8.21	10	21	6.49	5	14	5.05
	6	2	3	8.85	11	20	7.17	2	3	10.95	10	21	6.88	1	2	6.06
	7	10	27	5.27	7	12	8.20	5	9	7.37	10	19	7.18	2	4	7.35
	8	2	3	7.93	5	1	65.45	5	10	7.48	7	14	7.27	3	9	5.00
	9	10	23	5.93	2	2	12.47	3	3	15.77	5	10	6.44	5	15	4.60
	Avg.			6.38			8.20			7.43			6.96			5.66
P2	1	10	112	1.22	11	93	1.60	10	68	2.07	10	85	1.60	10	54	2.62
	2	11	54	2.76	5	9	7.58	7	16	6.11	7	17	5.67	10	24	5.86
	3	7	25	3.95	4	6	8.60	5	10	7.13	10	24	5.76	10	21	6.81
	4	5	17	3.92	2	3	10.58	4	7	7.64	7	15	6.66	10	20	7.12
	5	8	25	4.14	11	17	8.54	7	13	7.61	5	11	5.95	10	19	7.52
	6	5	23	2.90	8	11	9.35	11	17	8.50	2	3	10.18	10	18	8.20
	7	2	4	6.76	4	6	8.88	7	13	7.38	7	14	7.31	10	18	7.97
	8	5	1	98.99	8	11	9.63	5	9	8.48	5	10	6.94	10	19	7.40
	9	11	35	4.52	8	11	9.85	2	3	11.40	11	18	8.35	11	1	218.61
	Avg.			5.64			9.46			7.93			7.54			7.69
P3	1	10	116	1.18	10	66	2.02	10	41	3.37	10	120	1.10	10	66	2.12
	2	10	54	2.63	7	25	3.59	5	14	5.09	9	15	8.05	2	4	8.30
	3	10	46	3.13	3	7	5.75	7	20	4.78	10	30	4.71	3	8	5.97
	4	11	30	5.09	7	29	3.25	10	42	3.33	7	17	5.29	2	3	9.26
	5	7	25	3.92	10	26	5.34	3	10	5.01	7	16	5.61	3	8	5.66
	6	5	19	3.54	7	18	5.48	10	31	4.56	10	25	5.77	5	10	6.59
	7	6	29	3.00	7	17	5.71	5	15	4.69	3	11	3.51	11	16	9.93
	8	7	15	6.66	5	12	5.51	3	9	5.20	2	4	7.13	7	15	6.62
	9	7	15	6.67	3	7	6.86	3	8	5.22	5	10	6.29	7	7	14.80
	Avg.			6.66			6.03			5.03			6.72			10.44

Table B-13. 1st 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	120	1.07	9	116	1.10	10	86	1.54	9	122	1.03	9	157	0.82
	2	7	27	3.34	10	59	2.25	10	49	2.79	3	15	2.89	10	53	2.49
	3	3	10	4.74	10	51	2.62	10	43	3.23	3	16	2.71	10	43	3.09
	4	2	5	5.40	7	8	11.99	10	43	3.29	5	14	4.85	6	33	2.57
	5	1	3	5.45	7	31	3.04	5	22	2.86	2	10	3.17	6	34	2.60
	6	1	56	0.32	6	28	3.06	2	8	3.33	3	16	2.71	9	2	63.13
	7	2	7	4.53	10	39	3.63	7	32	3.17	4	18	2.82	10	40	3.45
	8	1	4	3.99	6	28	3.13	2	9	3.24	5	25	2.78	10	42	3.21
	9	3	13	3.48	3	11	3.54	10	40	3.44	5	24	2.81	10	43	3.28
	Avg.			4.00			3.44			3.28			2.80			3.32
P2	1	9	607	0.21	10	95	1.42	10	108	1.30	10	74	1.84	10	64	2.18
	2	9	79	1.64	7	29	3.10	10	34	4.18	5	0	432.72	7	18	5.64
	3	10	71	1.89	10	41	3.39	7	21	4.32	4	9	6.28	10	27	5.23
	4	10	85	1.61	10	41	3.44	10	2	64.11	4	8	6.61	3	9	5.31
	5	10	65	2.08	10	67	2.09	10	32	4.30	4	9	6.13	4	8	6.51
	6	10	61	2.17	11	63	2.32	10	32	4.39	3	6	6.55	11	24	6.05
	7	10	43	3.19	11	33	4.39	10	40	3.49	6	14	5.64	7	17	6.11
	8	10	40	3.42	10	35	4.13	7	18	5.00	8	19	5.66	7	17	5.93
	9	10	35	4.04	11	31	4.75	6	17	5.26	11	24	6.24	3	9	5.43
	Avg.			3.55			4.42			4.58			5.85			5.83
P3	1	10	442	0.31	10	44	3.18	10	84	1.57	10	116	1.17	10	102	1.35
	2	10	67	2.15	10	35	4.17	10	35	3.88	5	19	3.42	7	24	3.97
	3	7	27	3.54	7	21	4.57	9	29	4.56	2	6	5.16	8	15	7.62
	4	5	21	3.14	7	20	4.91	10	25	5.53	3	11	4.35	4	10	4.93
	5	4	16	3.80	10	30	4.71	10	23	5.76	3	10	4.55	1	3	6.21
	6	7	9	10.73	10	29	4.86	10	23	6.08	5	14	4.96	2	5	6.46
	7	4	15	4.14	7	19	5.11	7	16	5.75	7	19	5.21	10	25	5.52
	8	7	18	5.33	3	9	5.09	10	22	6.22	7	19	5.22	5	12	5.46
	9	7	18	5.41	3	9	4.96	10	23	6.14	5	12	5.51	10	28	5.05
	Avg.			4.96			5.05			6.04			5.31			5.34

Table B-14. 1st 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	54	2.48	10	106	1.34	10	71	1.97	11	92	1.59	10	113	1.22
	2	3	7	5.81	11	2	89.09	7	23	3.96	10	34	4.09	5	13	5.22
	3	10	28	5.12	10	37	3.66	3	11	4.37	10	30	4.57	7	18	5.53
	4	3	12	3.48	10	32	4.42	3	10	4.61	10	28	5.00	3	8	5.58
	5	10	25	5.49	4	1	42.70	3	10	4.61	10	26	5.41	2	4	7.07
	6	3	7	6.44	10	32	4.32	2	4	6.43	10	13	10.66	10	24	5.87
	7	10	23	5.97	10	35	4.01	11	32	4.53	10	26	5.45	7	17	5.79
	8	3	6	6.45	10	34	4.10	7	21	4.86	10	29	4.99	3	8	5.63
	9	11	23	6.68	10	35	4.07	5	15	4.90	10	32	4.29	10	23	6.12
	Avg.			6.37			4.06			4.76			4.92			5.85
P2	1	10	121	1.17	10	60	2.19	10	78	1.80	10	40	3.36	11	54	2.73
	2	10	116	1.21	6	21	3.81	11	31	4.71	10	28	4.82	2	10	3.42
	3	11	790	0.19	10	32	4.29	5	9	7.30	10	26	5.13	3	9	4.93
	4	7	26	3.67	10	29	4.69	7	12	8.18	7	16	5.80	2	4	6.30
	5	7	20	5.13	9	31	4.20	7	12	8.29	7	16	5.79	2	5	5.86
	6	10	25	5.59	6	21	4.09	7	12	8.51	10	24	5.58	3	10	4.68
	7	7	19	5.06	6	23	3.82	7	12	7.92	6	16	5.37	5	14	5.15
	8	7	17	5.66	4	16	3.43	7	12	8.46	5	5	13.71	4	10	5.01
	9	2	7	4.57	6	25	3.29	7	12	8.29	2	3	9.31	6	14	5.57
	Avg.			5.09			3.51			8.22			5.37			5.40

Table B-15. 1st 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	113	1.24	10	70	1.91	9	118	1.09	10	102	1.36	10	32	4.53
	2	7	30	3.19	10	38	3.57	10	50	2.72	4	17	3.62	3	9	4.91
	3	7	28	3.48	5	16	4.29	4	15	3.76	3	11	4.32	2	5	6.96
	4	11	35	4.22	5	16	4.23	3	7	4.87	2	6	5.06	2	0	116.36
	5	7	47	1.99	10	26	5.40	3	14	2.90	5	17	4.10	10	26	5.63
	6	11	46	3.23	7	18	5.01	10	34	3.90	2	0	356.36	5	14	5.43
	7	7	27	3.73	10	24	5.82	4	20	2.93	11	46	3.28	3	2	25.45
	8	7	30	3.25	5	13	5.08	4	19	3.24	5	26	2.62	2	5	6.11
	9	10	44	3.31	5	12	5.66	3	14	2.82	11	35	4.19	5	14	4.79
	Avg.			3.42			5.51			3.00			3.36			5.45
P2	1	8	323	0.35	9	115	1.14	10	107	1.32	9	111	1.17	10	76	1.78
	2	9	95	1.24	3	21	1.84	6	51	1.52	1	6	2.85	4	35	1.72
	3	9	94	1.38	7	50	1.83	7	49	1.85	10	60	2.33	1	7	1.95
	4	3	28	1.53	10	61	2.17	5	7	9.26	5	33	1.99	10	65	2.08
	5	10	67	2.00	4	47	1.23	3	21	2.10	5	34	1.90	10	65	2.11
	6	6	43	1.96	9	58	2.26	10	59	2.46	4	33	1.86	10	63	2.18
	7	6	36	2.12	10	56	2.40	10	57	2.49	5	33	2.02	6	47	1.86
	8	10	62	2.17	6	46	1.92	10	56	2.52	3	23	1.86	6	48	1.84
	9	10	86	1.57	5	31	2.08	10	54	2.58	7	49	2.01	3	21	1.90
	Avg.			1.96			2.13			2.52			1.96			1.87

Table B-16. 2nd 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	115	1.12	9	113	1.15	10	126	1.13	10	68	2.02	10	112	1.18
	2	3	4	13.16	9	24	5.32	7	15	6.48	7	15	6.10	2	3	11.70
	3	10	27	4.99	2	2	13.88	3	6	8.25	7	14	6.63	2	3	10.06
	4	4	10	6.07	10	18	7.75	3	5	8.74	7	14	7.34	10	17	8.54
	5	10	27	5.11	7	11	9.27	5	9	7.53	3	5	9.57	8	0	290.18
	6	10	23	5.98	5	7	9.26	3	5	9.08	3	5	9.52	10	15	9.74
	7	4	9	6.34	3	5	9.49	3	5	8.48	10	17	8.21	10	14	10.12
	8	5	9	7.34	10	17	8.15	1	1	11.64	3	5	7.39	10	13	10.99
	9	2	3	9.93	3	4	10.47	10	17	8.67	11	17	8.94	7	9	10.67
	Avg.			7.87			9.37			8.57			8.18			10.59
P2	1	6	28	2.91	9	112	1.11	10	99	1.39	10	79	1.70	10	71	1.92
	2	2	6	5.48	2	3	10.76	2	3	10.91	2	2	9.82	3	3	14.02
	3	11	30	4.98	10	19	7.20	3	4	9.90	10	20	6.88	10	20	6.99
	4	4	10	6.00	2	3	11.40	10	30	4.68	11	19	7.51	10	18	7.69
	5	10	36	3.64	1	1	17.71	2	3	10.58	3	0	241.81	5	7	9.75
	6	3	1	29.56	10	16	9.21	10	22	6.26	10	17	8.25	2	3	11.14
	7	10	24	5.69	3	4	10.64	3	6	6.91	10	17	8.37	1	1	15.27
	8	10	23	6.40	11	18	8.33	11	22	7.04	10	14	9.71	3	0	124.44
	9	2	3	9.50	3	4	11.09	2	3	10.31	10	18	7.64	10	16	8.55
	Avg.			6.05			10.02			6.98			8.57			8.55
P3	1	9	127	1.03	10	107	1.28	9	91	1.43	10	26	5.43	10	49	2.81
	2	3	5	7.89	1	2	8.10	5	8	8.32	10	21	6.66	5	2	36.36
	3	10	21	6.67	10	22	6.56	10	18	7.74	10	20	7.13	5	0	188.36
	4	7	12	7.83	5	9	7.27	3	5	8.30	7	15	6.45	10	20	6.85
	5	2	4	7.80	1	2	9.26	10	17	8.37	10	21	6.90	7	14	6.67
	6	10	17	8.57	10	19	7.38	4	6	9.03	8	10	10.30	2	4	6.64
	7	5	7	9.41	5	9	8.03	2	3	9.67	3	6	7.53	10	17	8.21
	8	3	4	10.08	3	4	9.81	2	0	237.57	5	1	62.66	7	12	8.48
	9	3	4	12.22	1	2	10.18	10	17	8.17	5	10	6.56	5	11	6.06
	Avg.			10.57			9.34			8.92			7.05			7.59

Table B-17. 2nd 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	89	1.55	10	114	1.22	10	59	2.31	10	81	1.67	2	23	1.39
	2	2	6	5.22	5	12	6.23	2	4	8.57	5	10	7.51	10	28	4.79
	3	10	25	5.83	3	1	45.82	10	24	5.82	4	9	6.39	2	3	8.36
	4	4	5	10.94	10	22	6.33	3	6	6.83	5	8	8.09	2	3	8.94
	5	2	3	7.47	3	0	244.36	10	23	6.11	3	5	9.12	10	18	7.80
	6	11	29	4.99	3	7	7.32	12	23	7.12	7	1	195.80	4	6	8.81
	7	4	13	4.61	2	3	9.90	1	1	14.04	5	8	8.69	10	15	9.80
	8	4	12	5.18	9	18	7.32	10	20	7.23	3	5	9.92	4	6	9.38
	9	3	6	6.49	5	9	7.59	2	5	5.52	1	2	12.42	10	14	9.88
	Avg.			5.42			8.27			6.37			10.34			9.69
P2	1	10	119	1.18	9	89	1.44	4	7	7.53	10	70	1.92	10	60	2.33
	2	5	13	4.94	1	1	7.07	11	16	8.98	10	17	8.62	10	20	7.17
	3	11	33	4.56	10	20	6.85	4	6	9.13	10	14	9.76	10	18	7.55
	4	11	23	6.65	3	5	7.80	4	5	9.87	1	1	14.25	7	12	8.32
	5	2	3	9.55	10	20	7.19	4	6	9.07	10	13	10.39	10	16	8.53
	6	11	20	7.58	10	17	7.80	2	3	12.54	10	13	10.34	10	16	9.06
	7	2	2	10.57	1	1	11.57	3	5	9.55	10	15	9.40	10	16	8.65
	8	11	20	7.43	10	17	8.62	3	3	13.09	1	1	9.63	8	11	9.39
	9	3	5	9.26	2	2	11.50	2	2	13.74	10	11	12.20	5	8	8.40
	Avg.			9.08			10.56			13.42			10.41			8.82
P3	1	10	662	0.21	10	347	0.38	9	126	1.00	10	84	1.67	10	92	1.50
	2	6	17	5.16	1	1	10.72	10	31	4.64	10	50	2.86	3	4	10.75
	3	7	18	5.13	10	20	6.97	10	22	6.52	10	19	7.53	6	9	8.37
	4	3	8	4.79	4	10	6.26	7	13	7.34	7	10	9.56	3	3	11.65
	5	1	1	8.26	2	3	11.54	4	7	7.00	7	10	10.06	1	2	11.75
	6	11	26	5.77	10	17	8.31	5	9	7.90	7	10	9.59	1	2	7.83
	7	4	12	5.07	5	9	7.59	3	5	9.26	4	8	7.91	1	1	11.01
	8	2	3	9.02	2	3	10.32	4	7	7.39	5	7	9.60	6	8	9.82
	9	11	26	5.80	10	16	8.75	7	12	8.31	7	9	11.19	2	2	14.55
	Avg.			5.44			8.89			8.33			9.57			10.41

Table B-18. 2nd 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	104	1.23	9	88	1.46	0	1	8.04	9	114	1.13	10	65	2.04
	2	11	57	2.55	7	19	4.89	9	60	2.17	3	8	4.93	3	4	9.55
	3	10	45	3.10	3	7	5.99	10	39	3.47	3	1	29.56	1	1	11.31
	4	7	16	5.60	11	28	5.24	10	29	4.49	3	1	76.36	10	22	5.99
	5	10	34	4.19	2	4	7.42	5	12	5.45	10	35	4.07	5	10	7.09
	6	3	3	14.11	11	35	4.21	10	23	5.87	8	3	36.46	3	4	10.75
	7	11	29	5.04	3	7	5.69	5	11	5.75	5	11	5.70	10	20	6.50
	8	4	1	45.98	2	3	9.40	10	21	6.53	5	11	5.97	5	9	8.02
	9	11	25	6.24	10	20	6.99	2	3	11.57	5	1	75.34	1	1	9.43
	Avg.			5.64			7.35			6.15			5.83			7.98
P2	1	10	145	0.94	9	427	0.29	10	90	1.53	9	128	1.00	11	114	1.32
	2	11	34	4.25	3	5	8.85	2	3	10.33	3	5	7.97	10	22	6.27
	3	7	14	6.83	1	1	10.18	10	22	6.61	10	21	6.64	10	20	6.85
	4	4	8	7.70	1	2	9.70	3	7	7.23	11	17	9.41	10	19	7.49
	5	3	6	6.79	3	5	8.04	10	21	6.45	10	17	8.06	10	18	7.68
	6	1	1	14.85	2	3	9.02	4	7	7.39	10	17	8.33	10	18	8.09
	7	2	2	12.94	11	20	7.20	3	9	4.53	1	1	12.73	10	19	7.21
	8	3	4	9.91	5	9	7.37	3	8	6.07	10	15	9.23	10	19	7.47
	9	5	7	8.67	5	9	7.40	5	12	6.10	3	7	6.58	4	5	10.79
	Avg.			9.28			7.32			5.57			7.90			7.25
P3	1	9	117	1.08	9	173	0.73	10	88	1.56	10	116	1.16	10	50	2.82
	2	10	110	1.22	3	5	6.79	10	26	5.20	5	8	7.87	3	6	7.60
	3	10	44	3.22	10	18	7.34	10	25	5.45	4	9	6.88	2	5	6.22
	4	7	21	4.44	1	1	12.73	10	26	5.26	4	8	7.61	6	18	4.69
	5	3	6	6.49	10	21	6.75	7	17	5.35	4	7	8.62	9	91	1.44
	6	6	20	4.42	3	3	16.97	4	11	5.11	2	2	12.08	5	11	5.92
	7	7	15	5.86	10	15	8.55	3	5	7.71	2	2	10.18	5	11	6.00
	8	2	3	10.96	3	2	15.02	4	1	41.53	1	0	25.45	5	10	7.04
	9	10	23	6.36	10	17	8.25	10	21	6.74	3	3	11.98	7	14	6.95
	Avg.			6.11			8.40			7.22			11.08			6.53

Table B-19. 2nd 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	1	1	9.79	7	17	5.91	9	173	0.73	10	43	3.10	10	71	1.99
	2	10	29	4.64	3	7	6.58	2	2	12.03	10	20	6.76	10	27	5.28
	3	5	11	6.06	0	0	-	10	14	10.18	2	3	11.86	5	11	6.54
	4	1	1	8.78	4	0	274.91	7	10	9.89	10	18	7.51	2	3	6.91
	5	10	25	5.68	0	0	25.45	2	2	10.72	2	0	-	10	17	8.14
	6	7	17	5.68	11	21	7.31	3	4	10.77	9	18	7.39	7	13	7.10
	7	3	5	7.06	11	21	7.31	3	3	11.65	4	5	12.10	2	3	9.70
	8	10	24	5.77	11	21	7.00	10	13	10.48	2	3	11.93	10	17	8.50
	9	4	11	5.70	7	14	7.40	3	4	10.45	10	15	9.24	3	7	7.10
	Avg.			6.18			7.24			10.86			11.10			8.44
P2	1	10	39	3.45	10	57	2.44	7	11	8.61	10	42	3.36	10	82	1.67
	2	10	42	3.15	7	14	6.49	10	22	6.09	5	9	7.95	10	21	6.55
	3	1	1	9.70	10	19	7.38	2	2	13.40	3	5	8.04	10	17	8.33
	4	10	30	4.63	4	6	9.03	10	15	9.39	3	5	8.96	10	17	8.58
	5	2	3	7.93	2	3	10.03	2	2	17.31	3	0	93.33	10	17	8.57
	6	10	41	3.24	10	17	8.48	10	14	9.56	2	3	11.80	10	16	8.59
	7	2	3	8.71	2	2	11.75	3	4	10.80	3	5	8.42	10	15	9.01
	8	10	23	5.91	11	15	9.55	10	12	11.31	3	7	6.86	10	16	8.63
	9	10	23	6.24	3	3	12.55	3	3	11.57	3	5	9.92	10	15	9.20
	Avg.			6.95			11.28			11.23			8.40			8.95

Table B-20. 2nd 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	117	1.06	5	10	6.77	10	41	3.38	9	106	1.22	10	35	4.06
	2	2	3	8.07	4	8	6.19	2	1	21.44	9	37	3.47	7	11	8.40
	3	2	3	8.29	2	4	6.48	11	59	2.55	1	2	8.10	3	4	9.98
	4	1	3	6.64	10	25	5.88	2	5	6.57	10	21	6.57	5	8	8.53
	5	0	0	76.36	5	13	4.92	10	26	5.50	10	23	5.88	6	10	8.92
	6	2	0	190.91	5	12	6.22	2	2	9.66	2	4	6.07	7	11	8.30
	7	3	4	9.58	4	8	6.46	10	26	5.48	3	4	9.13	7	10	8.94
	8	2	4	8.92	2	4	8.67	2	3	7.45	9	18	7.21	5	9	7.73
	9	0	0	25.45	11	20	7.15	10	22	6.40	5	10	6.44	3	4	9.07
	Avg.			9.25			7.43			6.44			7.59			8.59
P2	1	10	50	2.84	10	68	2.12	9	133	0.89	10	53	2.48	10	82	1.61
	2	6	17	4.87	3	8	5.12	7	24	4.03	11	32	4.58	3	10	4.02
	3	10	29	4.73	11	31	4.79	7	24	4.07	10	27	5.10	2	5	6.57
	4	1	1	9.70	4	3	15.62	7	23	4.25	10	27	5.28	2	5	6.62
	5	10	25	5.38	11	33	4.46	5	15	4.29	5	12	5.49	10	33	4.14
	6	2	3	9.19	6	0	241.81	7	14	6.42	3	8	5.30	4	15	4.10
	7	10	57	2.30	10	31	4.59	4	14	4.51	8	1	189.09	4	3	16.53
	8	2	3	8.26	3	4	9.77	4	13	4.81	7	19	5.25	1	2	6.46
	9	10	26	5.37	11	26	5.68	5	13	5.17	5	11	5.77	10	31	4.52
	Avg.			6.82			5.13			4.83			5.51			5.50

Table B-21. 3rd 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	59	2.30	9	126	1.02	9	69	1.88	11	152	1.03	12	96	1.74
	2	10	32	4.22	3	7	6.12	5	10	6.89	12	54	3.18	13	24	7.32
	3	4	1	90.91	4	7	7.67	2	3	10.05	12	28	6.07	12	20	8.64
	4	6	18	4.81	7	12	7.73	3	6	6.45	12	25	7.03	12	22	8.00
	5	7	16	5.51	2	11	3.03	3	5	8.76	12	58	2.94	12	18	9.59
	6	10	43	3.23	10	26	5.29	3	5	8.12	12	24	7.09	13	22	8.12
	7	10	26	5.45	3	6	6.28	3	6	7.47	12	22	7.66	13	20	8.75
	8	10	24	5.82	1	1	11.31	2	3	10.46	12	21	8.20	43	13	46.84
	9	7	20	4.46	2	3	9.07	1	2	10.83	13	19	9.28	13	18	10.07
	Avg.			5.25			8.89			10.65			8.38			9.41
P2	1	0	0	12.73	7	11	9.08	10	51	2.61	12	93	1.77	12	139	1.18
	2	1	1	14.14	2	3	10.18	2	3	7.57	8	14	7.62	8	16	6.97
	3	3	6	5.93	4	7	7.93	10	20	6.97	9	1	100.12	6	8	9.32
	4	10	23	5.99	10	16	8.61	2	3	9.67	6	10	7.47	4	6	8.33
	5	5	2	40.25	10	16	8.57	10	17	8.69	2	2	11.68	2	2	12.22
	6	4	8	6.69	4	9	5.87	1	2	8.33	1	2	9.61	0	0	50.91
	7	1	3	6.70	5	11	6.27	10	16	9.23	12	20	8.64	1	0	28.28
	8	2	5	7.21	10	17	7.80	2	3	11.70	8	13	8.26	1	1	18.18
	9	4	8	7.10	3	8	6.04	2	26	1.24	5	10	7.56	1	0	22.63
	Avg.			7.01			6.70			10.46			8.15			18.18
P3	1	9	152	0.84	10	29	4.96	9	76	1.72	12	164	1.03	12	84	2.01
	2	2	3	12.73	7	13	8.14	10	20	6.67	12	42	4.05	13	36	4.89
	3	10	20	6.98	7	12	7.89	6	11	8.15	8	16	6.58	13	26	6.61
	4	2	3	11.14	5	8	8.84	6	11	7.65	13	29	5.94	8	15	7.39
	5	11	21	6.94	5	9	8.45	3	8	5.54	13	24	7.37	8	16	7.22
	6	4	5	9.73	5	8	7.89	7	12	7.94	11	26	5.90	8	19	5.89
	7	10	18	7.87	11	16	9.41	5	7	8.57	13	1	161.82	8	20	5.69
	8	3	5	8.04	7	11	9.27	7	10	9.02	13	21	8.29	4	23	2.31
	9	11	17	8.81	8	10	9.99	4	6	9.62	13	19	9.04	7	24	3.95
	Avg.			8.24			9.56			9.06			8.67			3.91

Table B-22. 3rd 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	110	1.19	10	164	0.84	10	83	1.63	12	138	1.20	8	14	7.79
	2	7	24	3.99	11	24	6.20	10	14	10.15	12	27	6.38	12	25	6.55
	3	5	12	5.60	6	14	6.47	9	12	10.41	13	23	7.53	13	25	6.86
	4	3	7	5.66	11	20	7.37	2	2	17.33	13	18	9.68	8	11	10.00
	5	1	3	7.05	8	13	8.25	10	11	12.38	13	19	9.20	6	8	10.23
	6	11	28	5.58	8	13	8.12	1	1	21.82	13	18	9.86	6	8	9.94
	7	5	17	3.82	8	0	725.44	10	9	15.00	13	17	10.69	4	6	9.41
	8	6	8	10.64	8	12	9.02	3	1	62.22	13	16	10.94	4	6	9.75
	9	7	19	4.64	11	15	10.45	10	10	14.46	12	17	9.88	8	11	10.51
	Avg.			6.37			9.74			14.73			10.50			9.89
P2	1	10	141	0.95	10	75	1.92	10	32	4.32	13	85	2.18	6	11	7.82
	2	1	3	7.83	5	6	11.80	10	14	10.30	8	14	8.34	6	11	7.16
	3	10	23	6.11	0	0	33.94	5	7	10.97	5	8	8.95	6	12	6.80
	4	5	10	6.95	12	12	12.97	3	4	10.00	3	6	6.99	3	0	322.42
	5	1	2	7.77	5	6	12.91	4	4	11.82	2	2	13.17	12	21	8.03
	6	2	3	10.05	3	2	18.33	2	2	16.29	1	2	11.57	13	21	8.30
	7	2	4	8.67	11	11	13.92	3	4	10.94	2	2	15.27	9	15	7.88
	8	10	20	6.57	5	5	13.60	4	7	7.56	2	4	7.73	3	9	4.73
	9	5	10	6.64	3	3	14.28	5	6	10.37	13	14	12.55	4	4	13.58
	Avg.			7.29			13.93			9.63			12.55			7.88
P3	1	9	114	1.09	8	11	9.22	10	57	2.48	12	110	1.53	11	110	1.38
	2	3	6	6.01	4	5	10.88	4	7	7.97	13	31	5.94	5	10	7.16
	3	10	20	6.57	2	2	12.98	2	2	13.74	13	26	6.77	8	15	7.31
	4	3	7	6.26	3	2	19.09	2	2	10.35	13	26	6.91	8	13	8.26
	5	11	19	7.98	6	7	11.18	3	5	8.79	13	22	7.86	8	15	6.91
	6	5	9	6.84	4	7	8.23	3	6	8.48	13	37	4.77	6	8	9.00
	7	5	8	8.44	3	3	14.90	5	7	9.38	13	21	8.27	6	8	9.08
	8	2	4	6.79	5	7	11.15	4	5	9.96	13	21	8.48	8	11	9.90
	9	3	7	5.95	6	7	11.51	5	8	9.33	13	20	8.95	8	12	9.33
	Avg.			7.06			11.33			9.56			8.57			9.44

Table B-23. 3rd 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	80	1.68	10	73	1.86	9	66	1.98	12	111	1.48	12	42	3.89
	2	9	60	2.16	10	33	4.34	3	9	4.45	8	21	5.24	12	24	6.80
	3	10	31	4.28	2	5	6.31	1	2	9.26	5	12	5.91	6	10	8.35
	4	7	15	6.14	5	14	4.64	1	2	8.10	5	13	5.75	4	6	8.85
	5	7	14	6.77	3	9	4.79	10	21	6.60	3	8	6.17	4	5	9.66
	6	7	13	7.14	10	35	4.04	3	6	6.72	2	4	7.59	2	2	11.98
	7	5	1	98.82	7	23	4.07	1	1	11.01	3	2	24.35	12	17	10.04
	8	1	2	9.70	3	13	3.29	10	20	6.90	6	2	52.21	8	11	10.22
	9	5	4	16.47	2	152	0.17	2	3	8.68	5	13	5.81	8	12	9.87
	Avg.			9.70			3.68			8.86			5.81			10.04
P2	1	10	246	0.56	11	56	2.63	10	47	3.04	11	121	1.31	12	80	2.06
	2	2	7	5.18	5	10	7.16	7	14	7.03	13	30	5.87	8	16	6.95
	3	1	1	9.90	4	8	7.46	4	6	8.78	13	25	6.92	8	12	9.45
	4	10	25	5.72	2	3	11.07	4	6	9.32	13	21	8.48	5	9	8.17
	5	10	23	6.12	1	1	9.38	4	6	10.45	13	20	9.00	8	12	9.29
	6	10	21	6.78	2	3	9.38	2	2	9.33	13	20	8.80	8	11	10.32
	7	7	17	5.67	1	1	14.25	1	0	18.51	13	24	7.68	8	11	10.25
	8	4	7	7.49	3	2	19.35	2	2	10.72	13	21	8.55	9	11	10.76
	9	7	14	6.76	2	2	12.52	10	17	7.96	13	19	9.31	6	8	9.79
	Avg.			6.64			13.39			9.34			8.51			10.27
P3	1	9	116	1.11	10	149	0.91	9	91	1.44	11	119	1.31	11	92	1.72
	2	4	13	4.09	3	6	7.67	3	5	8.62	8	19	5.70	12	55	2.94
	3	9	41	3.06	4	6	7.86	1	2	8.81	5	7	9.72	8	16	7.17
	4	2	3	9.43	10	20	6.97	3	5	8.96	3	7	6.15	8	12	9.31
	5	10	21	6.46	3	5	6.94	2	3	11.31	2	3	9.76	4	8	7.57
	6	2	3	10.72	10	21	6.64	3	4	9.01	3	1	62.89	6	10	8.32
	7	10	19	7.41	5	8	8.53	3	5	8.21	4	5	9.50	6	9	8.71
	8	3	8	5.46	5	8	9.28	2	3	10.91	6	5	15.93	4	7	8.16
	9	10	17	8.58	4	6	8.38	3	4	9.82	5	7	10.59	2	2	16.97
	Avg.			7.15			8.73			9.65			10.05			8.43

Table B-24. 3rd 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	150	0.85	9	116	1.10	10	17	7.95	13	33	5.41	12	46	3.65
	2	2	3	8.82	10	23	5.91	5	7	11.02	13	17	10.60	8	17	7.03
	3	10	19	7.21	6	12	7.52	4	2	34.71	8	11	10.22	8	14	8.18
	4	5	8	8.82	7	12	7.53	2	2	10.35	13	16	11.41	8	14	8.44
	5	3	5	8.30	5	9	6.90	3	3	12.56	13	16	11.87	9	13	8.89
	6	1	2	11.57	2	3	9.93	4	116	0.50	14	16	11.73	12	18	9.52
	7	10	14	9.99	10	19	7.21	3	3	13.43	13	15	12.36	12	18	9.21
	8	3	5	8.82	7	11	8.01	4	5	10.70	14	15	12.40	13	18	9.71
	9	1	2	10.83	7	11	8.33	7	9	10.62	13	14	13.11	12	18	9.23
	Avg.			9.88			7.85			11.59			12.62			9.38
P2	1	10	104	1.38	7	17	5.79	10	23	5.75	13	30	5.99	11	70	2.27
	2	7	16	5.79	7	16	5.92	5	9	8.01	13	23	7.85	12	23	7.11
	3	7	15	6.85	3	2	26.61	5	9	7.49	13	20	8.83	12	18	9.61
	4	7	14	7.40	2	1	46.99	2	3	11.93	13	20	8.89	12	16	10.83
	5	5	4	15.63	7	12	8.10	11	16	9.21	13	25	7.15	12	17	10.01
	6	4	11	5.28	10	16	8.51	7	11	8.82	13	26	6.68	12	14	12.54
	7	7	16	6.11	1	1	11.98	4	5	9.29	13	27	6.45	12	13	13.07
	8	4	11	4.76	10	17	8.29	0	0	-	12	55	3.08	12	15	11.09
	9	7	15	6.63	2	3	8.68	10	16	8.63	13	23	7.86	12	16	10.51
	Avg.			5.83			8.48			8.96			7.15			11.56

Table B-25. 3rd 8" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	123	1.13	10	59	2.29	10	41	3.29	12	112	1.45	12	37	4.71
	2	7	17	5.84	5	11	6.41	2	4	6.49	13	46	4.05	8	20	5.34
	3	5	11	6.52	1	3	6.36	2	39	0.82	13	58	3.10	8	18	5.98
	4	5	9	7.99	7	15	6.36	7	15	6.72	14	29	6.41	8	16	7.08
	5	11	17	8.78	3	6	7.02	3	5	7.95	6	17	4.90	8	17	6.68
	6	8	11	9.22	2	3	9.38	1	2	6.79	13	26	7.16	8	16	6.98
	7	5	8	9.23	2	3	10.18	3	6	6.72	13	23	8.03	6	12	7.42
	8	3	10	4.89	2	3	11.23	3	5	8.13	14	23	8.12	8	15	7.62
	9	8	10	10.22	1	2	11.45	1	2	6.25	13	22	8.41	6	11	7.73
	Avg.			9.73			10.96			7.00			8.19			7.59
P2	1	11	126	1.19	9	124	1.00	10	53	2.67	13	162	1.13	11	85	1.82
	2	10	104	1.31	10	27	5.16	11	30	4.95	8	19	5.53	12	35	4.54
	3	6	11	7.16	10	20	6.87	7	15	6.67	4	9	5.51	12	28	5.94
	4	3	3	12.24	5	10	6.60	10	22	6.49	13	27	6.91	12	30	5.51
	5	11	21	7.04	3	6	7.64	4	9	6.66	13	28	6.56	7	14	7.13
	6	4	7	7.92	11	16	9.23	5	11	6.09	13	20	9.01	5	10	7.18
	7	3	3	12.42	2	0	84.85	5	10	6.29	8	18	6.10	3	7	5.56
	8	11	17	8.52	3	5	9.55	2	4	7.66	5	12	5.73	0	0	38.18
	9	3	1	30.81	3	3	15.47	5	10	7.05	5	10	7.19	7	15	6.71
	Avg.			10.47			12.51			7.03			6.34			6.14

Table B-26. 1st 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	194	0.63	11	115	1.32	12	58	2.92	11	113	1.36	11	127	1.25	11	108	1.41
	2	12	38	3.13	11	73	2.18	12	46	3.72	12	42	4.03	12	44	3.82	8	20	5.53
	3	8	22	3.64	7	57	1.81	12	32	5.41	7	19	5.40	8	21	5.05	4	12	4.81
	4	8	22	3.58	8	37	2.91	12	1	114.20	7	17	5.50	8	19	5.56	6	12	6.75
	5	5	15	3.78	8	31	3.54	12	28	6.21	12	29	5.76	8	18	6.36	6	11	6.72
	6	6	14	4.02	6	17	4.61	8	17	6.83	7	17	5.80	12	27	6.21	5	12	5.64
	7	5	14	3.99	12	44	3.76	9	17	6.89	7	17	5.71	12	28	6.09	6	12	6.58
	8	5	14	3.95	12	38	4.38	8	17	6.70	7	16	6.13	13	26	6.71	3	8	5.41
	9	6	12	5.11	9	25	4.74	6	11	6.99	12	24	7.09	8	18	6.19	6	11	6.99
	Avg.			4.35			4.29			6.86			6.31			6.33			6.33
P2	1	12	101	1.22	12	58	2.85	12	29	5.94	11	123	1.19	12	71	2.34	11	113	1.35
	2	5	27	1.83	12	36	4.60	12	24	7.12	2	4	6.97	12	48	3.43	6	9	8.38
	3	5	28	2.01	12	30	5.57	8	14	7.83	12	28	5.89	12	27	6.11	11	19	8.23
	4	8	36	2.35	12	27	6.14	8	14	8.27	7	17	5.75	2	4	7.83	6	9	8.83
	5	8	29	2.76	12	25	6.54	8	13	8.54	12	26	6.48	12	22	7.26	6	9	9.02
	6	6	25	2.38	12	27	6.11	8	14	8.11	7	16	6.54	8	14	7.56	6	9	8.94
	7	10	33	3.25	8	17	6.76	3	6	6.87	7	14	6.92	6	0	1018.17	4	7	9.28
	8	4	18	2.42	6	12	7.04	2	2	12.12	7	15	6.90	1	3	7.16	6	8	9.55
	9	6	25	2.41	12	25	6.78	0	1	8.04	5	10	6.92	3	6	7.18	6	8	9.59
	Avg.			2.69			6.86			7.45			6.91			7.17			9.47
P3	1	12	179	0.67	8	26	4.16	8	15	7.58	12	216	0.78	11	189	0.78	12	41	3.97
	2	8	24	3.44	8	23	4.92	6	11	7.40	13	33	5.28	8	17	6.14	7	22	4.65
	3	8	23	3.67	12	37	4.39	8	15	7.89	13	27	6.52	8	16	6.85	5	15	4.63
	4	6	15	3.93	12	29	5.58	6	11	7.73	8	14	7.52	8	15	6.82	5	15	4.79
	5	7	11	6.34	8	18	6.15	3	8	5.93	8	14	7.89	8	2	49.02	5	15	4.71
	6	6	14	3.96	8	17	6.62	6	10	7.92	8	14	7.73	12	23	7.26	8	19	5.47
	7	6	14	4.17	6	11	6.88	4	8	6.98	8	13	7.88	12	22	7.76	8	19	5.67
	8	4	10	4.08	6	11	6.79	4	8	6.65	8	13	8.59	8	14	7.62	5	14	5.19
	9	4	10	4.06	6	11	6.93	2	3	9.79	12	20	8.79	8	15	7.17	6	14	5.53
	Avg.			4.11			6.87			7.81			8.42			7.52			5.46

Table B-27. 1st 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	391	0.30	11	77	2.00	11	1002	0.15	11	143	1.08	12	90	1.83	7	23	4.19
	2	12	105	1.18	8	23	4.57	6	12	6.38	8	15	7.29	12	43	3.91	6	10	7.27
	3	12	72	1.73	8	21	5.11	8	16	6.93	5	11	7.00	13	32	5.53	3	1	50.91
	4	12	67	1.94	8	1	75.67	6	10	7.95	12	22	7.64	8	17	6.22	4	8	6.21
	5	12	62	2.08	8	20	5.50	4	9	6.57	12	22	7.71	8	18	6.22	6	10	7.92
	6	12	60	2.12	8	20	5.55	6	11	7.15	12	20	8.19	8	16	6.95	6	10	7.47
	7	12	54	2.35	8	20	5.78	6	10	8.35	12	21	8.15	8	16	6.49	6	10	8.07
	8	12	58	2.18	3	9	4.38	6	10	8.55	12	19	8.57	8	16	6.96	8	14	7.97
	9	12	55	2.34	8	19	6.18	6	10	8.48	12	20	8.53	8	16	6.76	6	9	8.20
	Avg.			2.29			5.44			8.46			8.42			6.74			8.08
P2	1	12	57	2.15	10	210	0.65	12	132	1.21	12	1145	0.15	12	34	4.90	11	111	1.33
	2	12	47	2.54	12	172	0.97	8	16	6.73	12	41	3.99	8	18	6.29	2	3	8.88
	3	7	26	2.80	12	43	3.75	6	11	7.15	7	23	4.41	8	17	6.51	12	24	6.82
	4	8	25	3.12	12	35	4.64	3	3	11.31	5	15	4.75	8	17	6.57	4	8	6.79
	5	4	16	2.49	5	16	4.76	1	1	13.58	12	26	6.38	8	17	6.59	6	11	7.38
	6	8	26	3.10	4	9	5.42	3	4	8.73	12	24	7.01	6	12	6.32	4	10	5.23
	7	12	40	3.07	6	14	5.42	4	5	10.52	8	17	6.33	6	12	6.54	11	18	9.00
	8	12	39	3.13	8	21	5.12	2	3	8.94	8	17	6.47	4	9	5.99	5	9	8.23
	9	8	25	3.24	6	14	5.58	6	11	7.43	4	10	5.26	4	9	6.50	4	7	7.44
	Avg.			3.15			5.37			8.96			6.02			6.34			8.22
P3	1	11	87	1.35	3	10	4.91	12	117	1.42	12	155	1.03	12	42	3.97	11	185	0.86
	2	8	61	1.28	8	24	4.31	12	36	4.71	8	21	5.33	8	17	6.10	8	17	6.24
	3	5	41	1.35	6	15	5.22	12	33	5.29	12	32	5.07	6	13	5.88	8	14	7.42
	4	6	43	1.33	6	15	5.22	12	30	5.51	8	20	5.61	7	12	8.37	8	15	7.14
	5	5	42	1.33	6	15	5.50	12	28	6.03	6	14	6.40	5	11	6.85	12	23	7.47
	6	5	40	1.38	6	13	6.02	12	26	6.58	9	19	6.13	6	12	6.90	8	15	7.49
	7	12	69	1.76	6	14	5.64	12	24	7.05	8	19	5.96	5	11	6.73	8	14	8.22
	8	8	55	1.46	6	13	5.95	12	24	6.89	8	19	5.83	8	15	7.31	8	14	8.19
	9	12	68	1.84	6	14	5.72	12	24	7.20	6	13	5.89	8	14	7.95	5	10	7.27
	Avg.			1.68			5.77			7.05			5.89			7.33			7.89

Table B-28. 1st 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	399	0.29	10	206	0.65	11	53	3.01	11	112	1.38	5	18	4.07	7	47	2.04
	2	8	39	2.19	7	36	2.81	12	32	5.10	5	15	4.75	6	1	71.65	12	43	3.94
	3	6	25	2.45	7	1	73.37	12	39	4.08	5	12	5.84	5	19	3.93	6	15	5.58
	4	4	16	2.31	8	30	3.51	12	29	5.83	5	13	5.25	4	12	4.04	4	9	6.31
	5	2	10	2.59	35	27	17.73	12	30	5.44	3	7	6.26	3	5	9.01	6	5	17.82
	6	8	35	2.51	6	16	4.72	12	28	6.01	8	18	5.72	12	32	5.22	2	2	9.85
	7	6	24	2.61	2	4	5.82	8	21	5.44	6	12	6.16	8	2	69.09	0	0	9.26
	8	4	16	2.50	4	11	5.02	6	13	6.08	12	26	6.22	4	8	5.98	13	28	6.54
	9	8	33	2.68	8	23	5.05	5	12	6.12	8	16	6.44	2	3	7.18	8	19	6.19
	Avg.			2.60			5.29			5.88			6.27			6.58			7.33
P2	1	11	598	0.19	12	35	4.81	12	75	2.16	7	26	3.50	5	9	7.73	8	25	4.09
	2	8	30	2.62	12	29	5.74	6	10	8.10	7	21	4.33	8	14	7.83	3	13	3.79
	3	8	28	2.87	8	15	7.47	4	7	7.43	5	11	5.98	8	14	7.87	5	12	6.04
	4	8	27	2.90	8	15	7.42	4	7	8.04	3	6	7.02	8	14	8.01	5	13	5.66
	5	12	37	3.42	6	10	7.38	4	7	8.10	7	15	6.67	8	13	8.48	8	15	7.04
	6	12	36	3.45	3	4	9.35	2	3	9.31	12	38	4.38	12	19	8.76	6	11	6.65
	7	8	26	3.14	8	14	8.05	6	9	9.63	7	15	7.02	8	13	8.33	5	12	6.41
	8	8	25	3.37	6	10	7.89	12	18	9.32	8	15	7.21	4	9	6.28	4	11	4.68
	9	8	21	3.98	4	7	7.61	12	17	9.52	8	14	7.27	8	13	8.56	5	11	6.66
	Avg.			3.50			7.85			9.49			7.17			7.72			5.92
P3	1	12	116	1.05	12	148	1.10	8	17	6.57	7	24	4.25	12	86	1.85	12	39	4.26
	2	12	45	2.83	12	89	1.83	12	24	6.75	12	36	4.50	5	14	5.03	4	19	3.16
	3	5	17	3.33	12	30	5.38	12	22	7.51	5	13	5.06	7	23	4.43	8	19	5.57
	4	5	16	3.30	8	21	5.33	12	25	6.48	3	7	5.26	8	22	4.96	6	14	5.89
	5	6	8	7.45	8	20	5.65	12	31	5.32	2	4	7.83	7	17	5.58	6	1	125.77
	6	4	11	3.57	8	18	6.34	6	14	5.81	5	12	6.07	6	14	5.26	2	8	3.62
	7	6	1	120.42	12	49	3.46	8	13	8.56	8	17	6.33	8	21	5.21	0	1	8.04
	8	12	28	4.56	12	42	3.88	8	13	8.89	5	12	6.36	6	14	5.64	4	8	6.36
	9	12	28	4.55	8	18	6.02	6	11	7.70	4	7	7.68	6	14	5.83	2	4	8.65
	Avg.			4.55			4.45			8.39			6.79			5.56			7.69

Table B-29. 1st 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	110	1.08	11	67	2.32	12	92	1.76	12	34	4.91	12	84	1.95	12	43	3.99
	2	12	51	2.43	10	19	7.40	8	17	6.53	12	24	6.99	12	22	7.31	6	12	6.44
	3	8	29	2.82	8	18	6.25	8	16	6.68	12	22	7.54	8	12	8.65	9	15	7.80
	4	8	27	3.12	12	12	13.67	8	16	6.69	12	22	7.82	8	11	9.60	8	14	7.96
	5	8	27	3.10	6	12	6.68	8	15	7.40	6	13	6.59	8	11	9.74	8	14	7.85
	6	9	26	3.35	6	11	7.30	8	15	7.20	8	13	8.28	12	16	10.41	8	13	8.31
	7	8	26	3.15	6	11	7.02	8	15	7.41	8	13	8.18	8	10	10.70	10	14	9.83
	8	6	17	3.28	4	9	6.64	8	15	7.10	8	13	8.28	8	10	10.81	8	14	7.94
	9	8	24	3.44	3	5	7.71	8	15	7.27	12	19	8.84	8	10	10.38	8	15	7.64
	Avg.			3.29			7.13			7.26			8.44			10.63			8.47
P2	1	11	107	1.06	11	111	1.34	12	25	6.66	11	155	1.02	12	53	3.05	12	49	3.41
	2	12	43	2.89	12	39	4.21	12	23	7.29	11	72	2.11	3	9	5.19	5	13	5.54
	3	8	28	2.79	12	31	5.17	8	13	8.43	11	106	1.50	3	8	6.23	3	7	6.81
	4	6	9	6.80	8	17	6.32	3	6	7.64	5	11	6.25	2	3	8.24	1	2	9.09
	5	6	16	3.49	12	34	4.82	5	1	110.80	2	1	20.96	12	20	8.54	12	21	7.89
	6	3	6	4.58	12	27	6.05	2	3	12.92	12	19	8.89	8	14	8.02	5	10	7.19
	7	12	32	3.90	8	15	7.25	5	8	8.53	5	1	125.57	6	10	7.33	3	7	7.36
	8	6	15	3.85	5	11	6.95	3	7	6.90	7	14	7.38	4	9	5.75	3	7	6.98
	9	2	5	4.74	12	22	7.49	2	3	10.18	5	1	57.27	1	0	33.94	12	19	9.10
	Avg.			4.16			7.23			8.54			7.38			6.54			7.18

Table B-30. 1st 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	2	8	2.45	11	278	0.53	8	17	6.58	12	44	3.82	12	66	2.41	12	200	0.80
	2	5	21	2.45	7	38	2.59	8	15	7.39	12	37	4.57	8	21	5.26	12	30	5.65
	3	2	8	2.77	5	19	3.81	6	10	8.18	12	31	5.29	8	20	5.34	8	16	7.13
	4	5	20	2.52	5	19	3.89	4	8	7.13	12	28	6.16	8	19	5.53	8	16	7.35
	5	3	13	2.42	3	12	3.94	4	8	7.31	12	27	6.24	7	19	5.44	13	25	7.09
	6	5	19	2.68	2	6	5.74	3	3	10.66	12	25	6.62	8	19	5.76	13	21	8.37
	7	3	14	2.43	4	11	4.53	2	3	9.14	12	23	7.21	8	19	6.01	12	21	8.18
	8	3	7	3.86	4	11	4.69	9	0	776.35	8	15	7.27	8	18	5.95	12	23	7.51
	9	13	39	3.39	6	16	4.85	12	22	7.68	12	23	7.44	8	19	5.78	13	20	8.58
	Avg.			3.23			4.69			8.41			7.31			5.91			8.09
P2	1	8	65	1.20	12	73	2.20	11	104	1.48	11	106	1.45	11	86	1.69	12	96	1.67
	2	5	45	1.24	8	37	2.90	4	15	3.52	2	12	2.40	12	41	3.95	6	18	4.38
	3	5	42	1.30	12	46	3.60	4	14	3.54	11	41	3.69	3	7	4.87	2	3	6.59
	4	8	58	1.42	8	31	3.44	3	14	3.36	5	20	3.37	8	22	4.64	2	3	6.51
	5	8	58	1.43	12	42	4.05	4	14	3.73	5	18	3.80	3	9	4.36	4	10	4.80
	6	12	76	1.67	12	37	4.44	2	8	4.51	0	1	4.93	2	1	28.77	2	3	8.10
	7	5	41	1.36	12	37	4.44	3	2	21.31	12	33	5.15	11	29	5.30	2	3	7.27
	8	4	29	1.29	8	29	3.79	12	38	4.41	5	18	4.05	5	16	4.17	13	31	5.61
	9	1	11	1.34	12	37	4.61	8	31	3.58	6	1	78.32	2	3	10.33	8	24	4.52
	Avg.			1.33			4.28			3.99			4.60			4.74			5.80

Table B-31. 2nd 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	112	1.29	12	33	4.95	11	118	1.29	11	106	1.45	11	113	1.37
	2	11	100	1.57	12	32	5.17	12	55	2.96	8	21	5.05	12	26	6.43
	3	11	84	1.86	12	26	6.44	7	26	3.84	8	17	6.39	12	21	8.06
	4	12	70	2.32	12	23	7.30	8	24	4.40	13	30	5.99	8	13	8.61
	5	11	77	2.06	12	23	7.21	8	21	5.13	13	26	6.59	8	13	8.70
	6	12	36	4.69	12	24	6.98	12	27	6.11	8	14	8.22	5	13	5.49
	7	12	38	4.44	12	21	7.55	8	19	5.55	8	15	7.68	8	13	8.59
	8	12	34	4.79	12	20	8.25	8	18	6.00	13	22	8.18	8	13	8.74
	9	12	29	5.86	5	14	4.69	12	22	7.59	8	14	8.41	8	13	8.74
	Avg.			5.03			6.83			6.38			8.09			8.69
P2	1	12	124	1.39	12	71	2.25	12	1163	0.14	11	716	0.20	11	120	1.30
	2	11	116	1.32	4	0	315.63	5	12	6.13	2	3	9.83	8	18	6.06
	3	13	67	2.62	12	22	7.56	12	29	5.56	12	20	8.42	12	29	5.66
	4	13	38	4.68	6	11	7.49	3	6	7.22	6	10	8.55	4	8	6.03
	5	8	22	5.00	6	10	7.52	12	24	7.01	4	7	7.88	4	7	6.73
	6	6	0	2036.33	6	10	7.97	6	14	5.46	2	3	7.93	13	23	7.53
	7	2	4	6.76	4	10	5.26	2	3	9.95	3	3	10.78	8	16	6.86
	8	2	5	5.57	3	6	8.02	1	1	10.72	2	4	9.15	6	11	7.54
	9	4	0	246.06	2	3	11.10	2	1	47.73	12	18	9.33	3	8	6.33
	Avg.			6.17			6.64			10.33			9.75			6.91
P3	1	3	8	6.11	12	916	0.18	11	178	0.84	8	17	6.47	12	25	6.72
	2	12	31	5.47	8	17	5.96	7	14	7.48	12	26	6.60	8	14	7.91
	3	12	28	6.08	8	15	7.50	7	16	6.46	12	26	6.71	8	13	8.28
	4	13	25	7.08	8	14	8.29	7	13	7.64	12	22	7.99	8	13	8.51
	5	12	21	8.05	8	13	8.51	12	27	6.08	12	20	8.48	8	14	8.24
	6	12	22	7.67	8	15	7.50	12	29	5.64	12	20	8.58	8	13	8.61
	7	12	22	7.80	8	10	11.36	12	19	8.35	13	20	8.82	12	17	9.65
	8	12	21	8.08	12	14	11.89	8	11	9.24	13	18	9.83	8	12	8.95
	9	8	14	7.93	12	14	12.26	7	13	8.11	13	19	9.15	8	12	8.73
	Avg.			7.93			11.84			8.57			9.27			9.11

Table B-32. 2nd 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	120	1.45	12	139	1.16	11	84	1.87	12	249	0.66	12	59	2.88
	2	13	59	3.05	12	33	5.07	12	54	3.02	8	16	6.86	12	31	5.62
	3	13	38	4.68	8	15	7.12	8	17	6.41	12	22	7.80	8	16	7.25
	4	13	40	4.37	8	15	7.00	8	15	7.25	12	19	8.97	6	11	7.72
	5	13	36	4.95	12	23	7.28	12	31	5.42	13	18	9.66	4	8	7.24
	6	13	35	5.24	12	22	7.66	8	15	7.27	13	18	9.73	4	7	7.48
	7	13	31	5.74	12	22	7.63	6	10	7.97	12	17	9.76	4	4	14.23
	8	13	31	5.71	13	22	8.05	5	10	7.51	12	16	10.72	4	8	7.31
	9	13	30	6.22	12	20	8.27	8	13	8.33	8	11	10.00	3	3	11.04
	Avg.			5.89			7.98			7.94			10.16			9.17
P2	1	6	52	1.71	5	13	5.08	11	403	0.38	8	15	7.31	12	168	0.97
	2	8	31	3.31	12	31	5.39	12	47	3.43	8	13	8.46	9	0	1001.20
	3	6	13	5.99	12	31	5.46	4	9	5.54	4	6	8.22	6	11	7.98
	4	12	31	5.28	8	16	6.52	1	0	40.73	4	6	8.06	4	8	7.06
	5	12	30	5.48	5	11	6.14	1	2	6.57	3	5	8.80	4	8	7.89
	6	12	24	7.03	6	7	11.45	2	4	8.09	2	3	10.18	3	4	8.93
	7	12	25	6.76	4	7	7.94	1	4	4.20	1	2	9.98	1	1	7.27
	8	8	14	7.49	8	14	7.76	2	3	10.55	4	6	8.54	2	3	8.12
	9	6	9	8.31	8	14	7.85	3	5	7.77	6	8	9.30	4	8	7.35
	Avg.			7.52			7.85			9.16			9.27			7.58
P3	1	11	629	0.24	11	138	1.10	11	103	1.52	8	17	6.19	12	112	1.44
	2	7	52	1.83	12	53	3.27	12	34	4.88	13	26	6.67	8	22	4.90
	3	11	109	1.41	12	43	3.97	12	31	5.25	8	16	6.95	5	8	8.84
	4	12	97	1.67	12	37	4.65	12	26	6.30	8	15	7.51	3	8	6.17
	5	12	38	4.18	13	29	6.09	12	24	6.72	30	14	28.93	9	12	10.08
	6	12	33	4.91	13	28	6.35	12	23	7.44	13	20	8.93	6	12	6.66
	7	12	31	5.18	12	25	6.87	12	22	7.54	12	20	8.65	6	11	7.30
	8	12	23	6.96	12	27	6.47	12	21	8.09	8	12	9.11	6	11	7.38
	9	12	23	6.90	13	22	8.06	12	21	7.89	13	20	8.82	4	9	5.90
	Avg.			6.35			7.13			7.84			8.86			6.86

Table B-33. 2nd 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	318	0.49	11	166	0.92	11	186	0.84	12	89	1.84	11	798	0.19
	2	5	9	8.11	3	7	6.85	5	11	6.43	6	12	6.46	3	8	5.71
	3	7	47	2.17	12	25	6.71	2	2	13.02	3	4	9.16	14	23	8.51
	4	5	17	4.14	2	6	5.41	12	19	8.96	6	11	7.15	8	15	7.42
	5	5	14	5.22	5	10	7.48	12	20	8.27	4	7	7.23	6	5	16.45
	6	4	8	6.55	3	6	7.18	3	6	7.86	13	22	7.85	2	3	13.11
	7	6	13	5.95	6	10	7.99	1	2	11.18	6	11	7.07	2	3	8.00
	8	3	6	6.54	2	3	11.07	2	3	10.86	12	18	9.06	14	20	9.66
	9	4	9	6.71	2	2	12.32	2	2	13.02	12	20	8.02	14	11	17.97
	Avg.			6.40			11.69			11.69			8.05			8.83
P2	1	7	52	1.82	11	108	1.47	10	409	0.34	12	112	1.45	12	152	1.07
	2	11	119	1.33	12	58	2.78	11	50	3.19	12	33	5.03	8	16	6.97
	3	12	98	1.70	12	32	5.26	8	14	7.87	12	20	8.15	8	14	7.99
	4	12	58	2.95	12	27	6.18	8	15	7.12	12	19	8.87	8	14	8.39
	5	13	45	3.85	12	26	6.38	12	28	5.74	12	17	9.55	7	13	6.91
	6	13	40	4.36	12	25	6.83	12	28	5.96	13	18	9.86	8	13	9.04
	7	13	37	4.87	13	0	453.08	8	15	7.08	12	16	10.21	12	18	9.35
	8	8	18	6.52	8	16	6.61	7	17	5.87	12	17	10.06	12	18	9.70
	9	8	20	5.73	8	15	6.94	8	14	7.23	8	12	8.92	9	12	9.78
	Avg.			5.71			6.77			6.73			9.73			9.61
P3	1	11	142	1.08	11	151	0.99	12	173	0.94	8	14	7.25	12	107	1.54
	2	13	55	3.17	3	7	4.85	6	10	7.30	3	0	1119.98	8	14	8.12
	3	13	41	4.23	12	33	5.18	3	4	9.55	12	20	8.40	12	25	6.86
	4	6	13	6.01	8	17	6.33	8	13	8.84	8	12	8.67	4	12	4.82
	5	8	24	4.55	5	11	6.82	8	12	9.68	6	8	10.08	5	7	9.13
	6	8	21	5.30	4	6	7.76	8	12	9.44	6	8	9.53	4	6	9.98
	7	8	19	6.13	2	2	11.68	4	6	9.08	2	2	15.27	4	6	8.59
	8	4	12	4.35	2	3	11.23	6	8	9.93	12	16	10.33	6	8	9.77
	9	4	13	3.97	3	6	7.75	6	9	9.30	8	0	475.14	4	6	8.59
	Avg.			4.82			11.46			9.44			10.33			8.99

Table B-34. 2nd 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	21	5.30	12	40	4.06	12	87	1.85	12	37	4.57	12	47	3.52
	2	8	15	7.50	7	13	7.17	12	63	2.66	8	14	7.77	12	19	8.90
	3	8	14	8.27	11	34	4.59	12	47	3.53	8	11	10.04	12	16	10.87
	4	9	14	8.53	11	27	5.77	12	35	4.58	8	12	9.08	12	15	11.42
	5	8	14	8.53	12	22	7.38	12	40	4.20	8	10	11.45	8	11	10.94
	6	9	13	8.78	12	25	6.43	12	44	3.85	13	12	14.38	2	3	12.54
	7	4	10	5.32	12	20	8.15	12	37	4.50	12	14	12.09	4	6	9.75
	8	6	10	8.59	6	13	6.77	12	33	5.08	8	10	11.95	2	3	12.54
	9	9	13	9.21	12	18	9.01	8	22	5.24	8	10	12.10	4	6	10.40
	Avg.			8.90			7.97			4.94			12.05			10.90
P2	1	11	109	1.38	12	104	1.55	11	61	2.60	12	74	2.23	11	86	1.85
	2	11	1221	0.12	11	47	3.34	8	12	9.27	12	28	6.02	8	13	8.70
	3	7	20	5.01	5	17	3.78	4	7	7.15	5	12	5.93	12	24	6.80
	4	7	18	5.72	3	9	4.18	2	1	15.56	2	0	288.48	12	22	7.66
	5	5	11	6.66	12	41	3.89	2	2	14.36	1	2	7.39	8	12	9.49
	6	4	10	5.92	5	15	4.33	4	8	6.59	12	24	6.69	6	8	9.04
	7	12	31	5.44	3	10	4.07	4	0	381.81	5	11	6.66	6	2	43.16
	8	8	13	8.33	0	1	6.79	2	2	10.91	2	3	10.31	4	6	8.78
	9	10	10	14.49	0	0	7.27	0	0	16.97	1	3	7.27	8	11	10.45
	Avg.			6.89			6.04			10.91			6.97			9.61

Table B-35. 2nd 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	41	3.98	11	412	0.36	11	257	0.62	11	112	1.40	12	76	2.12
	2	8	16	6.81	13	31	5.65	12	37	4.45	12	31	5.32	12	30	5.52
	3	8	15	7.29	12	25	6.89	12	28	6.05	12	21	7.65	12	25	6.66
	4	8	14	7.78	13	23	7.55	12	27	6.36	12	19	9.13	12	22	7.88
	5	8	14	7.62	12	20	8.35	12	25	6.72	12	27	6.07	8	13	8.26
	6	8	13	8.26	8	14	7.78	12	25	6.80	13	21	8.22	12	20	8.62
	7	8	13	8.18	8	13	8.69	12	3	59.16	12	18	9.44	8	14	8.09
	8	6	10	7.93	8	13	8.64	12	23	7.38	12	19	9.06	8	14	7.71
	9	6	9	8.45	8	12	9.04	12	23	7.40	12	19	9.17	8	25	4.32
	Avg.			8.19			8.79			7.39			9.22			7.90
P2	1	12	111	1.48	11	104	1.43	12	126	1.27	12	110	1.53	11	112	1.40
	2	12	68	2.43	2	3	7.00	4	8	5.92	12	25	6.51	12	39	4.30
	3	7	33	3.07	12	30	5.39	12	22	7.89	8	21	5.10	6	13	5.87
	4	12	52	3.20	4	13	4.77	6	11	7.73	12	29	5.87	4	7	7.50
	5	8	23	4.84	4	14	4.52	6	10	8.05	5	17	4.22	3	3	11.18
	6	8	25	4.28	7	22	4.57	8	14	8.29	12	26	6.34	2	3	9.59
	7	8	24	4.35	3	7	5.42	13	20	8.88	12	22	7.41	6	11	7.65
	8	5	16	4.64	5	0	186.66	12	21	8.32	8	15	7.22	6	10	7.52
	9	5	16	4.29	7	18	5.60	8	13	8.77	8	17	6.28	6	11	7.43
	Avg.			4.43			5.51			8.66			6.97			7.53

Table B-36. 3rd 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	48	3.32	11	90	1.69	12	70	2.36	11	78	2.03	11	103	1.53
	2	8	15	7.56	12	35	4.66	12	26	6.27	12	23	7.35	12	34	4.78
	3	8	16	7.31	12	0	#DIV/0!	9	13	9.16	8	11	9.59	12	25	6.47
	4	8	19	6.00	12	26	6.36	8	13	9.23	8	12	9.12	12	24	6.89
	5	8	16	7.25	12	22	7.59	8	9	12.23	12	16	10.38	12	19	8.62
	6	12	26	6.44	12	19	8.73	8	12	9.52	12	16	10.67	12	17	9.64
	7	8	17	6.65	8	13	8.59	8	13	8.88	12	15	11.21	12	17	9.55
	8	8	18	6.27	8	12	8.92	9	12	10.08	12	16	10.23	8	10	11.29
	9	8	16	6.85	8	12	9.02	8	12	9.74	8	11	9.68	8	10	11.59
	Avg.			6.59			8.84			9.57			10.37			10.81
P2	1	11	241	0.62	11	131	1.14	12	29	5.71	11	113	1.37	12	77	2.10
	2	12	64	2.62	7	6	18.03	12	22	7.63	8	18	5.96	8	19	5.71
	3	5	9	7.09	6	9	8.67	9	2	65.30	6	0	339.39	4	10	5.79
	4	3	5	8.42	3	3	15.11	4	6	9.20	1	1	10.48	2	4	7.27
	5	6	9	8.06	4	6	8.21	2	2	13.40	12	19	9.05	1	1	13.58
	6	2	3	11.39	6	9	8.56	2	3	10.33	8	13	8.62	6	12	6.59
	7	12	20	8.52	6	2	32.32	4	6	9.78	6	8	9.39	6	12	6.49
	8	26	14	25.31	4	7	7.31	6	9	10.00	2	2	10.18	6	13	6.40
	9	8	13	8.13	3	3	12.38	12	15	11.23	2	2	13.97	13	23	7.53
	Avg.			8.33			7.31			10.33			9.79			6.81
P3	1	10	181	0.80	13	110	1.61	12	67	2.47	11	207	0.75	11	79	1.94
	2	8	26	3.94	8	18	5.98	8	19	5.84	12	34	4.77	12	42	3.80
	3	8	19	5.56	8	17	6.35	13	1	320.00	8	16	6.90	4	9	5.86
	4	12	35	4.69	8	17	6.53	12	27	6.25	8	16	7.13	4	9	5.87
	5	12	31	5.20	8	15	7.39	12	26	6.56	8	15	7.39	4	9	6.12
	6	12	29	5.94	8	14	7.47	12	26	6.48	8	15	7.31	2	4	6.89
	7	12	30	5.76	8	14	8.00	12	25	6.86	6	16	5.04	12	19	8.54
	8	12	30	5.60	6	10	7.38	13	25	7.11	8	20	5.30	12	19	8.57
	9	12	29	5.54	6	10	7.58	9	17	7.12	4	16	3.88	12	20	8.62
	Avg.			5.63			7.65			7.03			4.74			8.58

Table B-37. 3rd 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	55	2.99	12	109	1.50	12	107	1.54	12	66	2.50	12	59	2.77
	2	12	41	4.07	8	14	7.83	8	18	6.61	10	17	8.03	6	12	6.40
	3	12	37	4.60	8	13	8.69	12	24	6.90	8	17	6.96	3	4	8.81
	4	12	35	4.93	8	12	9.15	8	14	8.04	12	19	9.16	2	4	8.40
	5	12	36	4.63	8	12	9.29	8	14	7.76	12	24	7.07	13	20	9.28
	6	13	32	5.67	12	19	8.80	12	19	8.74	12	23	7.53	6	11	7.17
	7	12	29	5.67	12	18	9.07	11	0	979.99	12	23	7.47	4	7	7.75
	8	8	18	6.29	8	12	9.27	8	13	8.82	13	22	7.94	4	7	7.96
	9	8	18	6.38	8	12	8.95	8	14	8.07	12	22	7.65	1	1	11.07
	Avg.			6.11			9.09			8.44			7.68			7.86
P2	1	10	287	0.46	11	121	1.28	11	108	1.39	11	92	1.67	12	107	1.56
	2	11	172	0.89	6	14	5.59	8	18	6.28	8	20	5.75	6	10	8.35
	3	11	68	2.31	3	7	6.71	6	14	5.48	4	11	5.53	4	7	8.38
	4	7	17	5.86	3	4	8.73	4	9	5.73	4	0	1578.16	2	3	9.43
	5	7	32	3.08	6	12	6.66	4	8	6.39	4	9	6.51	12	16	10.57
	6	8	17	6.08	6	13	6.54	4	10	5.63	5	10	6.54	8	11	10.18
	7	8	17	6.30	6	14	5.94	2	4	7.73	4	9	6.80	6	9	9.82
	8	7	22	4.68	6	13	6.48	4	8	6.58	3	5	8.63	3	4	9.85
	9	5	12	6.43	6	11	7.66	3	7	6.57	4	9	5.82	4	1	34.40
	Avg.			5.80			6.69			6.96			7.09			9.83
P3	1	12	33	4.95	11	138	1.09	11	117	1.36	11	93	1.71	12	655	0.25
	2	12	30	5.63	5	13	5.74	8	21	5.33	8	14	7.77	8	14	7.84
	3	12	27	6.15	6	10	7.38	8	19	5.69	8	13	8.41	5	7	9.53
	4	8	15	7.12	5	11	6.66	8	9	12.30	8	13	8.80	1	1	13.28
	5	8	16	7.16	8	14	7.83	5	12	5.82	12	19	8.52	12	17	9.97
	6	8	15	7.33	6	10	8.19	6	12	6.28	12	21	7.77	8	12	9.91
	7	9	16	7.55	6	10	8.38	8	16	7.13	12	18	8.96	6	9	9.32
	8	8	15	7.44	8	13	8.53	8	17	6.88	12	18	9.11	6	9	9.53
	9	8	14	7.78	6	9	9.04	9	16	7.50	6	14	6.51	4	6	9.57
	Avg.			7.59			8.65			7.17			8.19			9.47

Table B-38. 3rd 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	13	5.44	10	243	0.59	11	129	1.23	12	95	1.76	12	64	2.49
	2	5	11	6.52	11	41	3.90	12	37	4.43	8	21	5.09	8	22	5.02
	3	12	39	4.23	6	10	7.96	6	9	8.64	3	3	11.04	12	28	6.12
	4	5	14	5.13	3	3	11.38	8	13	8.72	2	3	10.18	8	21	5.52
	5	5	0	1832.70	1	2	9.61	6	8	9.73	2	3	8.98	8	19	6.16
	6	3	7	6.43	3	5	9.05	4	7	7.85	4	3	15.71	6	14	5.85
	7	4	7	7.15	6	8	9.47	4	6	9.97	2	3	7.67	4	10	5.66
	8	3	1	38.62	4	6	9.02	4	5	10.11	4	8	6.76	5	11	6.03
	9	5	10	7.42	5	8	9.47	8	11	10.41	4	9	6.39	4	11	5.46
	Avg.			7.28			9.32			10.16			6.94			5.72
P2	1	12	117	1.38	11	372	0.39	11	694	0.21	12	78	2.05	12	94	1.70
	2	12	31	5.39	7	16	6.36	8	16	6.81	12	32	5.18	8	15	7.04
	3	12	27	6.31	8	15	6.86	6	11	7.17	8	16	6.75	5	8	9.30
	4	12	26	6.53	12	25	6.50	8	14	7.70	12	27	6.48	2	3	11.10
	5	12	24	6.93	12	22	7.25	8	14	7.73	5	16	4.41	12	29	5.69
	6	12	24	6.72	8	13	8.25	8	14	7.79	13	22	7.81	5	7	10.89
	7	12	23	7.29	6	10	7.99	8	14	7.79	8	14	7.88	8	11	9.78
	8	12	23	7.51	5	9	7.98	8	13	8.51	4	10	4.93	8	12	8.85
	9	12	22	7.87	3	6	5.87	6	10	7.85	9	14	8.48	8	14	7.59
	Avg.			7.56			7.28			8.05			7.10			8.74
P3	1	11	65	2.39	11	126	1.18	11	75	2.12	12	109	1.51	8	11	9.83
	2	5	12	6.08	11	35	4.36	6	14	5.58	8	14	8.39	8	12	9.77
	3	3	7	6.44	7	13	7.56	6	14	5.67	8	13	8.69	8	11	10.82
	4	3	7	6.30	5	9	7.02	4	10	5.61	3	6	7.83	12	18	9.48
	5	2	3	11.86	7	12	8.24	8	18	6.12	13	18	9.93	12	19	8.80
	6	6	12	6.62	3	6	7.50	6	13	6.03	12	18	9.69	12	15	11.37
	7	12	30	5.58	3	6	8.48	4	9	6.16	6	8	9.75	12	15	11.58
	8	12	30	5.36	7	11	9.03	13	27	6.79	9	1	143.47	8	11	10.86
	9	5	11	6.69	7	11	9.09	9	18	7.11	4	6	9.07	12	16	10.74
	Avg.			5.88			8.87			6.69			9.41			11.06

Table B-39. 3rd 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	55	3.01	11	116	1.33	12	131	1.22	12	54	3.13	11	77	2.07
	2	8	14	7.46	7	25	4.07	8	26	4.20	13	32	5.40	12	32	5.37
	3	12	27	6.11	8	22	4.95	8	24	4.60	8	16	7.01	13	28	6.19
	4	12	28	6.01	8	18	6.38	8	21	5.01	9	16	7.36	12	27	6.20
	5	12	25	6.59	8	20	5.73	8	20	5.61	12	21	7.93	11	0	753.44
	6	12	23	7.16	8	19	5.87	8	19	5.93	12	21	8.36	8	17	6.54
	7	12	25	6.70	8	19	6.08	8	19	5.69	8	19	5.79	5	17	3.67
	8	12	23	7.27	8	16	6.95	8	18	5.95	8	15	7.54	8	17	6.57
	9	12	23	7.20	8	17	6.79	8	18	6.21	6	12	6.70	8	17	6.62
	Avg.			7.06			6.61			5.95			6.68			5.62
P2	1	12	111	1.45	12	79	2.18	12	45	3.76	12	34	4.85	12	96	1.76
	2	6	12	6.22	6	11	7.57	4	7	6.88	6	12	7.02	8	24	4.73
	3	8	23	4.53	8	15	7.42	3	8	4.58	3	5	8.28	8	13	8.41
	4	12	30	5.43	6	10	7.49	6	10	7.74	12	18	9.51	12	21	7.81
	5	11	14	11.10	4	8	7.03	6	10	7.49	8	13	8.81	8	10	10.94
	6	5	13	5.33	2	4	7.40	4	7	6.73	6	10	8.10	8	10	10.57
	7	6	13	5.97	2	4	6.82	4	8	6.43	3	4	9.75	12	14	11.64
	8	6	13	5.71	1	2	6.72	4	8	6.58	3	3	12.73	12	25	6.58
	9	12	28	5.78	1	2	9.26	4	7	7.19	1	1	12.29	8	11	10.07
	Avg.			5.82			7.60			6.73			11.59			10.85

Table B-40. 3rd 12" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	14	4.74	12	107	1.58	11	185	0.84	12	56	3.03	12	38	4.32
	2	8	22	4.78	12	26	6.53	8	20	5.84	8	15	7.57	12	24	7.07
	3	8	20	5.10	12	21	7.93	8	19	5.80	8	14	7.99	12	23	7.26
	4	8	20	5.31	12	19	9.02	8	18	6.48	8	14	8.20	16	15	15.05
	5	12	28	5.72	12	21	8.21	9	18	6.70	8	13	8.38	6	10	7.85
	6	12	26	6.38	12	20	8.50	8	16	6.90	9	14	8.51	4	8	6.90
	7	12	25	6.50	12	17	9.81	5	13	5.76	8	13	8.64	4	10	5.92
	8	12	24	7.20	5	12	5.44	8	17	6.52	8	13	8.21	12	25	6.66
	9	12	23	7.21	8	12	9.12	8	17	6.76	8	13	8.87	12	16	10.87
	Avg.			6.97			9.47			6.35			8.57			6.29
P2	1	11	625	0.25	12	715	0.24	12	107	1.50	12	93	1.72	11	244	0.62
	2	5	19	3.30	4	23	2.38	12	53	3.07	4	9	6.17	12	45	3.67
	3	5	20	3.31	7	33	2.87	12	41	4.08	12	22	7.66	3	9	4.67
	4	12	65	2.53	11	38	4.11	12	40	4.07	6	9	8.27	12	25	6.74
	5	5	16	4.69	12	31	5.23	3	11	4.27	4	7	8.29	9	19	6.36
	6	5	15	4.76	7	18	5.71	3	11	4.27	6	0	208.72	4	10	5.59
	7	3	10	4.54	8	16	6.80	4	10	5.36	5	2	33.60	2	4	6.75
	8	2	4	6.19	12	24	6.64	6	17	4.62	12	30	5.75	3	5	7.11
	9	2	4	7.41	8	16	6.52	2	5	6.11	8	15	7.35	4	11	5.47
	Avg.			6.05			6.65			5.36			6.55			6.44

Table B-41. 1st 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	147	0.82	8	26	4.11	11	111	1.33	12	36	4.71	5	19	3.81	12	35	4.65
	2	8	20	3.96	12	37	4.35	8	20	5.29	8	14	7.77	8	25	4.36	12	27	6.34
	3	8	19	4.22	11	111	1.41	12	31	5.19	8	14	8.09	13	33	5.30	12	25	6.95
	4	12	25	5.19	11	71	2.22	12	27	5.91	8	15	7.80	12	29	5.87	12	23	7.35
	5	8	15	5.27	11	49	3.16	12	24	6.69	8	15	7.73	12	28	6.13	12	23	7.47
	6	8	16	5.14	11	84	1.87	12	23	7.27	8	15	7.89	13	28	6.40	12	21	8.08
	7	8	16	5.19	11	51	3.07	12	22	7.63	6	11	7.40	12	26	6.57	12	20	8.62
	8	13	23	5.67	7	55	1.64	12	22	7.51	6	3	31.27	12	25	6.71	13	21	8.65
	Avg.			5.40			2.44			7.38			7.41			6.70			8.56
P2	1	12	147	0.82	12	84	1.90	11	72	2.21	8	22	5.11	11	113	1.33	8	15	7.68
	2	5	15	3.53	11	67	2.32	8	21	4.97	5	1	84.85	6	18	4.30	6	11	7.40
	3	3	6	5.85	11	65	2.33	5	14	5.31	3	5	7.32	12	33	4.96	3	4	9.77
	4	12	28	4.51	11	121	1.23	3	3	12.90	2	4	7.07	6	13	5.71	8	13	8.59
	5	5	21	2.51	3	20	2.02	12	21	7.87	1	2	6.14	2	4	7.47	6	9	8.48
	6	6	1	89.09	5	17	4.16	8	14	7.85	3	0	120.91	12	25	6.92	4	7	8.19
	7	4	10	3.91	3	10	4.39	7	2	47.85	6	12	6.12	6	13	6.22	12	17	10.25
	8	4	11	3.62	12	42	4.13	4	8	7.09	4	11	5.47	3	10	4.16	8	12	9.15
	9	4	10	3.99	4	14	3.74	3	3	11.38	4	10	5.40	12	31	5.45	8	13	8.77
	Avg.			3.84			4.09			7.09			5.67			5.28			9.39
P3	1	12	76	1.65	5	17	4.17	5	12	6.25	8	18	6.10	11	117	1.29	12	104	1.57
	2	8	24	3.41	5	20	3.64	4	8	6.06	8	16	6.93	12	51	3.20	12	28	5.88
	3	5	15	3.41	8	0	483.63	6	1	142.54	8	17	6.77	12	28	5.87	12	28	6.11
	4	5	14	3.92	6	18	4.13	6	11	7.06	8	16	6.89	12	28	6.01	12	24	6.98
	5	8	19	4.30	8	26	4.31	5	10	6.75	12	22	7.75	12	25	6.74	12	21	7.83
	6	6	13	4.63	8	26	4.10	6	11	7.35	12	23	7.45	12	24	6.84	12	21	8.02
	7	6	13	4.56	8	25	4.50	6	10	7.94	12	21	7.93	12	23	7.37	12	20	8.52
	8	6	12	4.95	8	23	4.79	4	10	5.33	12	22	7.60	8	17	6.61	12	19	8.94
	9	6	12	5.12	8	23	4.85	6	9	8.09	12	11	16.21	8	16	6.73	12	18	9.30
	Avg.			4.88			4.72			7.12			7.76			6.90			8.92

Table B-42. 1st 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	36	2.19	5	12	5.80	11	121	1.31	8	15	7.58	13	31	5.55	12	105	1.59
	2	8	29	2.83	8	18	6.24	8	15	7.57	8	14	8.20	13	26	7.04	12	25	6.80
	3	8	29	2.95	8	19	6.22	8	14	8.31	8	13	8.38	13	25	7.24	12	22	7.80
	4	12	43	3.00	8	17	6.44	8	14	8.36	8	13	8.64	13	23	7.95	12	22	7.60
	5	8	26	3.12	8	18	6.46	8	13	8.61	8	13	8.74	13	23	8.17	12	20	8.29
	6	8	26	3.23	8	18	6.58	8	13	8.93	7	10	8.91	13	23	7.91	12	19	8.84
	7	8	17	4.63	8	18	6.52	8	12	9.29	6	9	9.08	13	22	7.95	12	19	8.69
	8	6	17	3.30	8	17	6.54	8	13	8.96	12	18	9.24	13	22	8.25	12	19	8.89
	9	6	18	3.33	12	11	14.04	8	12	9.15	8	12	9.63	13	21	8.47	12	18	9.40
	Avg.			3.75			6.53			9.14			9.32			8.22			8.99
P2	1	7	50	1.50	12	81	2.01	12	128	1.33	12	84	1.95	12	94	1.75	8	14	7.99
	2	8	41	1.96	8	25	4.16	13	27	6.91	8	18	6.34	4	10	5.27	8	14	8.58
	3	4	22	1.80	12	37	4.51	13	24	7.73	12	25	6.61	4	9	6.07	8	13	9.03
	4	5	23	2.39	5	14	5.25	13	22	8.39	6	11	7.20	12	26	6.55	12	19	8.90
	5	2	9	2.46	3	8	4.92	13	20	8.87	12	25	6.53	6	11	7.83	12	18	9.55
	6	12	51	2.51	3	8	5.29	8	13	8.19	8	14	7.81	4	8	6.67	12	18	9.72
	7	5	22	2.56	4	16	3.49	9	16	7.54	4	9	5.88	14	22	8.73	12	16	10.38
	8	3	9	3.08	8	21	5.18	13	20	9.01	4	8	7.79	9	14	8.46	9	11	10.50
	9	1	5	2.66	8	20	5.62	13	20	9.22	3	5	8.55	4	11	5.51	9	12	9.82
	Avg.			2.77			4.77			8.59			7.41			8.60			10.23
P3	1	8	29	2.87	12	99	1.64	11	1121	0.14	11	619	0.26	12	195	0.82	12	115	1.43
	2	8	29	2.96	8	26	4.39	6	13	6.19	5	13	5.66	12	34	4.94	8	16	6.62
	3	6	17	3.36	9	26	4.55	6	13	6.01	5	11	6.52	12	28	6.03	12	23	7.16
	4	5	1	87.27	6	16	5.05	3	8	5.79	5	10	7.33	13	26	6.90	12	22	7.58
	5	12	39	3.20	6	16	5.23	6	12	6.71	8	16	7.15	8	15	7.76	12	21	7.69
	6	6	18	3.21	5	15	4.75	6	12	6.78	8	15	7.20	6	10	7.97	12	22	7.52
	7	4	12	3.26	6	15	5.43	8	16	7.34	8	14	7.97	9	14	8.16	12	22	7.91
	8	4	13	3.34	6	14	5.89	8	16	7.08	8	15	7.76	9	14	8.63	12	21	8.12
	9	6	16	3.50	8	21	5.67	6	11	7.32	8	14	8.12	9	13	8.83	12	19	8.89
	Avg.			3.36			5.66			7.25			7.95			8.54			8.31

Table B-43. 1st 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	35	2.2	11	95	1.66	4	11	4.80	8	24	4.31	12	176	0.94	11	106	1.50
	2	5	21	2.5	11	73	2.17	3	3	12.55	11	27	5.58	8	22	5.10	8	20	5.67
	3	3	13	2.8	7	31	3.21	1	4	4.29	5	13	5.71	4	0	#DIV/0!	6	13	5.88
	4	5	20	2.7	5	19	3.86	2	6	5.38	3	5	7.62	1	2	8.21	6	13	6.03
	5	6	1	111.8	5	20	3.66	6	10	8.83	1	1	11.31	2	4	8.83	4	10	5.61
	6	4	14	2.7	3	8	5.09	4	12	4.58	1	1	10.18	0	0	101.82	4	9	5.96
	7	4	13	2.9	12	44	3.69	3	4	9.07	2	3	7.78	6	10	7.52	4	9	6.51
	8	3	14	2.5	12	36	4.44	1	3	6.13	2	2	10.72	4	9	5.88	4	10	6.13
	9	4	14	2.7	8	2	52.79	4	11	4.78	4	9	6.14	6	11	8.11	4	9	6.47
	Avg.			2.7			4.06			5.46			6.96			7.17			6.37
P2	1	11	441	0.3	11	391	0.38	12	30	5.76	12	34	5.00	11	114	1.39	8	18	5.84
	2	12	52	2.4	8	24	4.62	6	10	7.27	8	17	6.61	8	19	5.57	8	15	7.25
	3	5	21	2.6	8	2	73.10	6	1	61.39	4	13	4.64	12	26	6.75	8	15	7.45
	4	8	29	2.7	8	21	5.47	6	9	9.16	6	13	6.21	13	23	7.78	8	14	7.66
	5	12	41	3.1	8	19	5.79	6	10	8.62	6	13	6.12	13	22	7.83	8	14	7.68
	6	8	28	2.9	8	20	5.72	5	10	6.57	6	13	6.23	13	21	8.50	8	14	8.36
	7	8	28	2.8	8	19	5.76	7	9	10.58	6	13	6.06	13	21	8.44	8	14	7.59
	8	4	28	1.5	8	19	6.00	9	13	9.01	13	25	7.12	12	20	8.48	8	15	7.55
	9	8	28	2.7	12	37	4.38	9	12	10.12	8	18	5.92	13	19	9.13	4	14	4.17
	Avg.			2.4			5.38			9.90			6.37			8.68			7.57
P3	1	12	100	1.2	11	78	1.96	3	7	4.90	11	356	0.43	10	129	1.06	12	61	2.72
	2	3	14	2.6	2	7	3.78	12	30	5.55	4	8	6.12	4	9	5.87	8	18	6.05
	3	2	11	2.4	10	79	1.81	8	4	25.01	6	1	130.45	4	7	7.03	12	27	5.98
	4	4	16	2.5	7	53	1.82	6	2	35.99	6	11	6.97	1	1	15.66	6	11	6.65
	5	4	9	4.0	2	5	5.83	4	9	5.96	4	8	6.19	4	7	7.62	8	15	7.48
	6	4	1	76.4	0	0	13.88	4	9	5.58	3	4	10.40	4	7	7.70	12	22	7.48
	7	3	9	3.3	2	4	8.31	6	11	7.43	3	4	10.08	4	7	7.74	12	22	7.81
	8	8	22	3.8	3	8	5.09	3	8	6.30	2	3	7.27	4	7	7.88	12	20	8.22
	9	12	35	3.6	2	4	7.01	1	2	10.91	2	3	8.88	4	7	7.75	12	21	7.85
	Avg.			3.6			6.80			6.86			8.74			7.79			7.96

Table B-44. 1st 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	36	2.2	11	93	1.65	12	30	5.62	11	107	1.44	12	85	2.02	12	27	6.24
	2	8	29	2.8	7	34	2.96	18	22	11.10	8	18	6.32	12	28	6.05	8	17	6.66
	3	8	29	2.9	7	35	2.94	8	20	5.33	8	17	6.84	12	23	7.37	9	17	7.31
	4	12	43	3.0	7	35	2.89	8	17	6.63	10	16	8.94	12	24	7.24	8	16	7.08
	5	8	26	3.1	8	34	3.04	8	15	7.98	8	16	7.46	12	21	8.20	8	17	6.96
	6	8	26	3.2	7	29	3.29	8	14	8.18	9	15	7.70	13	20	8.52	12	22	7.50
	7	8	17	4.6	7	35	2.78	8	14	8.39	9	15	7.82	8	14	8.08	12	22	7.57
	8	6	17	3.3	12	51	3.16	9	14	8.56	9	15	8.07	13	20	8.75	12	22	7.78
	9	6	18	3.3	7	29	3.47	9	14	8.71	8	15	7.81	12	19	9.21	12	22	7.76
	Avg.			3.8			3.14			8.55			7.90			8.68			7.70
P2	1	7	50	1.5	11	80	1.98	12	191	0.89	12	101	1.60	13	151	1.19	11	391	0.40
	2	8	41	2.0	5	16	4.35	6	14	5.64	6	15	5.16	4	14	3.90	5	15	4.91
	3	4	22	1.8	3	10	3.44	4	12	4.99	3	4	9.82	6	11	7.14	6	14	5.67
	4	5	23	2.4	3	7	6.77	4	11	5.32	3	1	78.32	4	9	5.52	4	9	6.13
	5	2	9	2.5	3	1	30.55	6	17	4.71	11	27	5.85	2	4	7.94	6	13	6.52
	6	12	51	2.5	3	9	5.35	4	12	5.21	7	14	6.76	1	2	8.81	6	11	6.89
	7	5	22	2.6	2	4	7.21	3	5	6.96	6	15	5.35	1	2	9.61	4	8	6.79
	8	3	9	3.1	3	9	5.24	4	12	4.99	4	9	5.35	6	11	7.93	6	11	7.75
	9	1	5	2.7	4	10	5.17	3	5	8.35	3	5	7.27	4	8	6.99	4	8	6.77
	Avg.			2.8			5.88			6.77			5.99			8.17			7.10

Table B-45. 1st 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	39	1.91	2	5	4.52	12	33	5.01	10	182	0.77	13	51	3.45	11	54	2.91
	2	7	34	2.25	8	3	37.20	9	16	7.49	5	9	7.33	13	30	5.76	8	17	6.26
	3	8	33	2.39	8	26	4.51	7	12	7.39	8	18	6.46	8	26	4.34	8	17	6.56
	4	3	19	1.68	8	23	4.87	6	12	7.27	7	17	5.91	13	25	7.16	12	23	6.86
	5	12	50	2.44	8	22	5.10	6	11	7.80	9	16	7.45	9	18	6.83	12	22	7.47
	6	12	45	2.80	8	22	5.21	7	11	7.87	9	15	8.20	6	11	7.22	7	15	6.46
	7	12	50	2.61	12	41	4.24	6	11	7.57	9	15	8.24	8	16	7.08	6	11	6.82
	8	8	28	2.78	7	21	4.54	6	11	7.32	9	15	8.04	9	14	8.21	8	15	7.08
	9	8	28	2.86	8	21	5.26	6	11	7.45	6	11	7.49	2	3	10.82	8	14	7.69
	Avg.			2.75			4.68			7.45			7.92			8.70			7.20
P2	1	3	26	1.10	1	7	2.93	12	87	1.86	12	113	1.42	12	73	2.29	12	85	1.93
	2	2	14	1.31	11	112	1.37	5	20	3.70	8	26	4.40	6	15	5.40	12	40	4.23
	3	5	40	1.31	2	8	3.99	6	18	4.41	5	16	4.56	12	31	5.63	8	28	4.04
	4	5	40	1.36	6	39	2.20	4	13	3.75	4	12	4.33	8	19	5.98	6	17	4.96
	5	4	26	1.43	2	10	2.49	6	20	3.95	1	1	8.15	9	20	6.00	6	17	4.80
	6	4	2	23.76	11	64	2.49	4	14	3.76	2	5	5.71	8	19	6.00	6	16	5.08
	7	3	27	1.22	12	40	4.21	6	19	4.22	2	5	4.71	9	18	6.42	4	11	5.22
	8	3	25	1.42	8	25	4.35	4	13	4.32	4	14	4.07	8	19	6.19	4	12	4.86
	9	3	26	1.41	7	25	3.78	5	18	3.70	6	16	5.35	5	1	46.89	4	12	4.81
	Avg.			1.35			4.11			4.08			4.71			6.30			4.96

Table B-46. 2nd 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	138	1.19	9	13	9.16	12	1227	0.14	12	158	1.05	12	31	5.50
	2	12	87	1.91	9	13	9.53	5	10	6.93	6	10	7.62	12	25	6.88
	3	12	67	2.53	9	13	9.04	5	10	7.13	6	10	8.01	3	6	6.05
	4	6	4	20.05	12	18	9.47	8	13	8.80	3	6	7.14	3	6	6.76
	5	4	6	10.55	6	9	9.05	65	12	72.87	4	8	6.93	3	6	6.49
	6	11	32	4.71	3	6	6.32	5	10	7.33	3	6	7.09	3	6	6.76
	7	6	13	6.24	4	5	11.95	5	10	7.42	3	6	7.40	2	3	10.86
	8	4	9	6.45	4	71	0.81	8	12	9.08	5	6	12.06	3	7	6.33
	9	3	5	8.06	6	8	10.04	13	16	11.05	3	6	7.93	5	11	6.41
	Avg.			6.92			11.00			9.18			7.67			6.37
P2	1	12	59	2.73	11	138	1.14	11	110	1.37	12	58	2.93	12	24	7.10
	2	8	21	5.49	8	98	1.09	12	26	6.40	5	10	7.75	8	14	8.02
	3	8	17	6.41	4	11	5.80	5	11	6.79	3	6	7.50	5	9	7.52
	4	8	17	6.73	3	5	6.74	5	11	6.95	2	3	7.79	6	9	8.45
	5	9	17	7.27	1	2	5.66	5	11	6.53	12	21	8.02	3	6	7.17
	6	8	18	6.43	3	4	8.73	5	11	6.90	6	13	6.57	3	6	6.28
	7	6	13	6.53	2	4	7.42	3	7	6.59	5	10	7.13	5	9	7.85
	8	6	13	6.66	3	5	8.76	2	4	7.71	5	9	7.46	3	6	6.85
	9	6	12	7.05	13	22	8.19	3	4	10.63	3	6	6.68	2	3	9.19
	Avg.			6.75			8.13			7.15			7.09			7.96
P3	1	2	4	9.15	11	109	1.37	8	15	7.12	12	112	1.43	12	135	1.25
	2	12	33	4.95	11	131	1.17	5	9	7.55	5	10	6.92	12	24	7.27
	3	5	11	6.82	5	13	5.60	8	14	7.44	3	5	8.80	8	13	7.93
	4	3	4	9.58	4	9	5.39	8	14	7.83	5	9	7.95	5	8	8.52
	5	3	4	10.07	2	4	8.31	8	1	184.54	3	5	9.15	5	8	9.35
	6	4	3	15.57	4	9	6.07	8	13	8.64	2	3	10.64	4	0	-
	7	3	0	76.36	4	8	6.91	8	13	8.41	6	9	9.15	2	2	13.40
	8	12	20	8.20	4	8	7.13	5	9	8.48	3	5	9.08	3	5	9.26
	9	8	17	6.47	4	8	6.93	5	8	8.77	3	5	9.44	3	5	8.82
	Avg.			7.33			6.99			8.55			9.22			9.04

Table B-47. 2nd 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	6	12	6.54	12	29	5.89	11	78	2.02	12	190	0.86	12	129	1.32
	2	6	12	6.18	8	16	6.84	8	13	8.20	6	9	8.71	4	9	5.84
	3	9	56	2.12	4	10	5.84	5	8	8.88	4	8	6.43	3	5	9.70
	4	8	16	7.11	3	6	7.12	6	9	8.71	6	12	6.80	5	9	8.45
	5	6	12	6.69	1	2	6.11	6	8	9.23	6	11	7.27	5	7	10.61
	6	9	20	6.07	2	0	203.63	6	9	8.98	6	10	7.46	6	8	10.29
	7	8	17	7.01	2	4	8.04	5	7	9.70	4	7	7.08	8	11	10.04
	8	6	13	6.64	2	4	7.41	5	8	9.03	4	8	6.93	8	11	10.74
	9	4	8	7.24	3	5	8.41	6	8	10.08	6	10	7.50	13	16	10.91
	Avg.			6.96			7.96			9.60			7.17			10.56
P2	1	11	102	1.51	12	58	2.82	11	130	1.19	12	169	0.96	9	17	7.38
	2	5	17	4.11	8	20	5.55	12	33	5.10	6	12	6.87	5	11	6.76
	3	2	5	6.98	8	14	8.58	12	26	6.71	4	8	6.94	2	4	9.21
	4	3	10	4.68	12	18	9.41	5	11	6.87	8	14	8.25	12	21	8.14
	5	12	34	4.92	6	7	10.50	4	8	6.33	4	6	8.22	8	12	8.90
	6	8	19	5.66	6	7	11.13	3	7	6.69	3	2	30.02	8	12	9.19
	7	6	12	6.36	4	6	10.40	3	7	6.26	3	1	82.24	4	7	7.93
	8	4	9	6.08	4	5	12.32	2	3	7.93	8	12	9.39	1	1	10.72
	9	3	5	7.38	6	7	11.60	3	6	6.65	12	18	9.69	12	18	9.30
	Avg.			6.61			11.44			6.95			9.54			9.31
P3	1	11	189	0.80	12	116	1.45	11	362	0.43	12	126	1.31	12	99	1.64
	2	4	13	4.10	6	10	8.55	8	17	6.19	6	11	7.25	4	11	5.51
	3	4	34	1.59	4	7	8.29	8	17	6.58	4	8	7.12	6	10	7.33
	4	11	37	4.30	5	7	10.01	5	11	6.45	6	11	7.14	6	9	8.56
	5	5	13	5.62	4	7	7.72	5	11	6.87	4	7	7.39	8	12	9.05
	6	6	13	5.95	4	7	8.53	6	11	7.22	6	10	8.32	8	12	9.24
	7	2	4	8.32	7	7	14.14	8	14	7.81	6	10	8.01	12	20	8.74
	8	0	0	50.91	4	2	39.45	8	14	7.79	6	10	8.14	12	18	9.58
	9	1	1	9.26	6	10	8.59	8	15	7.55	6	9	8.67	8	11	9.59
	Avg.			8.79			8.59			7.72			8.27			9.30

Table B-48. 2nd 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	98	1.60	11	135	1.18	11	109	1.43	6	30	2.91	5	10	7.42
	2	12	97	1.68	4	7	7.31	2	4	8.01	3	8	5.14	6	10	8.18
	3	11	127	1.24	6	11	7.57	12	28	6.06	4	7	7.19	3	5	8.98
	4	5	18	3.83	4	7	7.98	5	9	7.52	2	3	7.67	6	10	8.82
	5	2	5	6.56	12	23	7.34	2	4	9.62	12	20	8.57	5	9	7.65
	6	4	13	4.61	9	14	8.48	1	2	9.70	8	14	8.00	8	13	8.33
	7	3	7	5.45	4	9	6.50	1	2	9.05	6	9	8.38	5	9	7.90
	8	3	6	6.23	6	9	8.85	13	17	10.16	3	7	6.89	5	10	7.33
	9	5	11	5.74	12	21	7.93	8	10	10.77	4	7	8.18	8	13	8.43
	Avg.			5.81			7.76			9.99			7.82			7.89
P2	1	6	13	5.72	12	1100	0.15	11	156	0.99	12	129	1.26	11	109	1.38
	2	6	13	6.01	6	13	6.21	7	15	6.66	4	6	8.78	13	37	4.73
	3	6	13	6.24	4	10	6.03	8	15	7.14	5	7	10.07	8	19	6.00
	4	6	12	6.22	3	5	7.70	8	14	7.60	5	7	10.64	5	11	6.41
	5	6	14	5.27	3	5	8.63	7	13	8.14	6	7	10.87	1	3	5.90
	6	9	18	6.49	3	5	7.95	8	12	9.23	5	7	10.58	1	0	18.51
	7	6	13	6.32	8	15	7.50	8	12	9.15	5	7	10.95	4	7	7.39
	8	6	13	6.05	8	15	7.72	7	12	8.77	5	7	10.58	6	11	7.72
	9	6	12	6.69	5	16	4.35	8	11	9.32	5	7	10.70	6	11	6.97
	Avg.			6.36			7.61			9.08			10.75			7.36
P3	1	3	6	7.08	3	4	10.58	11	104	1.48	12	72	2.29	11	462	0.33
	2	3	11	4.43	12	22	7.97	12	33	5.16	5	9	7.37	12	22	7.82
	3	3	4	9.01	6	10	8.66	8	14	7.67	1	1	12.73	8	14	7.47
	4	8	18	5.89	4	7	8.13	5	9	8.15	12	18	9.66	4	8	7.09
	5	3	7	6.85	6	9	8.85	2	3	10.95	6	3	23.92	3	3	12.73
	6	2	3	10.82	4	7	7.97	4	6	7.71	3	5	9.85	3	3	11.60
	7	12	22	7.90	4	7	8.48	11	17	9.05	2	2	14.19	3	6	8.73
	8	8	13	8.18	6	9	9.40	8	12	8.78	12	24	7.07	2	3	10.55
	9	12	33	4.81	6	9	9.05	4	6	8.54	6	8	9.00	12	16	10.85
	Avg.			8.04			8.98			8.79			8.03			10.04

Table B-49. 2nd 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	3	10	3.68	12	35	4.58	13	150	1.16	12	37	4.62	13	76	2.33
	2	7	33	2.88	8	20	5.50	5	10	7.42	8	12	8.51	12	23	7.43
	3	2	4	6.60	4	10	5.66	5	9	8.00	3	7	5.44	8	15	7.43
	4	11	133	1.19	4	9	5.73	5	9	8.17	3	6	7.27	8	14	7.65
	5	5	11	6.53	4	11	5.76	3	5	8.91	5	9	8.60	8	14	7.89
	6	3	4	10.63	4	10	5.61	3	4	9.17	2	7	4.95	8	14	7.77
	7	2	3	9.14	3	6	6.07	5	8	8.90	5	9	7.81	8	14	7.85
	8	2	1	22.01	12	23	7.50	5	8	9.66	3	6	5.80	5	9	7.82
	9	3	4	10.29	12	22	7.87	3	1	45.25	4	0	197.27	8	13	8.62
	Avg.			9.71			7.14			9.28			6.81			8.10
P2	1	11	77	2.05	2	6	5.09	11	105	1.43	13	73	2.39	11	110	1.39
	2	7	46	2.06	12	58	2.89	5	10	6.89	5	9	8.56	8	16	6.39
	3	8	25	4.24	12	36	4.67	12	24	6.73	12	18	9.82	13	22	7.97
	4	12	41	3.95	8	24	4.54	3	4	8.04	8	11	10.45	6	10	7.52
	5	12	31	5.28	6	17	5.10	2	1	42.87	8	12	9.60	6	11	7.09
	6	12	28	5.94	4	12	4.90	13	14	12.07	4	6	7.91	2	3	12.02
	7	12	31	5.61	3	6	6.32	5	7	9.84	3	3	10.91	4	6	9.19
	8	12	28	6.18	2	4	6.36	3	3	12.27	4	6	9.82	2	3	11.39
	9	12	11	14.70	3	5	7.01	2	2	12.73	6	8	10.23	2	3	8.24
	Avg.			5.90			6.56			11.61			10.32			9.60

Table B-50. 2nd 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	3	9	4.26	11	113	1.37	13	27	6.39	12	61	2.74	12	121	1.34
	2	4	0	134.21	5	15	4.79	4	12	4.18	8	19	5.45	8	26	4.17
	3	5	13	5.78	6	14	5.40	5	11	6.17	5	12	5.88	8	17	6.02
	4	5	11	6.47	6	14	5.55	8	15	7.04	6	1	138.18	8	17	6.47
	5	5	12	5.86	4	9	5.53	6	12	6.54	2	6	4.77	5	14	5.03
	6	3	7	6.05	3	8	5.00	8	8	14.62	5	10	6.61	6	12	6.56
	7	5	11	6.45	2	6	5.06	5	11	6.46	3	5	7.99	7	17	5.86
	8	5	1	50.91	3	6	7.57	5	11	6.66	3	5	7.89	8	16	6.63
	9	12	23	7.31	6	12	6.49	8	15	7.31	5	11	6.62	8	14	7.25
	Avg.			6.88			6.37			6.81			7.50			6.58
P2	1	11	572	0.27	8	15	7.39	11	125	1.25	12	60	2.89	11	126	1.24
	2	12	35	4.75	4	6	8.70	4	10	6.21	3	6	7.54	2	6	5.62
	3	12	28	5.81	4	6	9.00	0	0	14.55	13	19	9.30	12	48	3.54
	4	4	12	4.94	2	3	11.39	12	25	6.85	6	8	9.37	3	6	6.94
	5	2	5	5.66	13	17	10.69	8	2	48.28	2	3	11.75	4	9	5.49
	6	5	14	5.15	6	9	9.15	3	5	8.70	13	21	8.27	12	24	7.04
	7	5	12	6.28	4	6	8.75	12	19	8.74	8	13	8.56	6	12	6.16
	8	5	11	6.15	3	3	12.09	5	9	7.69	6	9	8.66	3	8	5.41
	9	3	6	6.79	4	6	8.82	5	9	7.99	2	3	10.72	13	30	5.79
	Avg.			6.41			8.79			8.14			9.31			5.79

Table B-51. 3rd 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	661	0.25	12	109	1.53	12	81	2.09	12	45	3.78	12	110	1.47
	2	7	32	3.09	6	10	8.42	8	14	8.39	12	23	7.45	8	12	9.10
	3	5	15	4.79	12	23	7.29	4	9	5.42	12	20	8.52	6	8	9.92
	4	6	15	5.08	8	9	11.80	12	21	8.16	8	12	9.32	5	7	10.18
	5	3	8	5.55	4	6	8.84	13	20	8.78	8	12	8.97	6	8	9.72
	6	6	15	5.00	4	6	8.88	8	12	9.23	8	12	9.71	8	11	9.59
	7	5	14	5.02	6	8	9.61	13	17	10.28	8	11	9.83	8	11	9.85
	8	6	16	4.73	6	8	9.48	13	17	10.09	13	14	12.45	8	11	9.96
	9	6	16	4.62	6	9	9.34	8	13	8.95	5	12	6.03	8	10	11.78
	Avg.			4.79			9.48			9.77			11.14			10.53
P2	1	12	221	0.73	13	479	0.36	12	66	2.62	11	47	3.34	11	83	1.89
	2	2	5	6.03	9	16	7.38	8	18	6.46	5	12	6.08	5	11	6.41
	3	2	3	8.27	6	10	8.15	12	21	8.02	8	1	142.01	4	7	7.49
	4	0	0	25.45	12	20	8.47	5	9	8.45	5	14	5.31	3	5	7.56
	5	12	33	5.21	8	12	9.67	3	6	7.54	6	0	386.90	1	2	7.51
	6	8	17	6.41	4	7	8.84	3	6	8.43	2	8	4.51	1	1	11.57
	7	4	7	6.97	3	1	37.71	3	6	8.26	3	4	9.52	12	19	9.00
	8	3	4	8.26	12	15	11.15	2	3	10.44	6	10	7.83	5	9	7.81
	9	3	5	7.51	12	16	10.66	1	2	8.98	4	5	12.03	8	13	8.41
	Avg.			7.58			10.91			9.23			9.79			8.41
P3	1	12	74	2.23	7	20	5.23	11	188	0.84	12	1205	0.14	12	169	1.01
	2	8	23	4.86	5	13	5.59	5	10	6.88	8	12	8.70	8	20	5.75
	3	6	14	5.59	5	12	5.95	6	10	7.68	8	13	8.64	8	20	5.68
	4	6	12	6.28	5	13	5.69	6	10	8.38	8	11	9.07	8	19	5.49
	5	8	18	6.35	6	11	6.80	5	9	8.15	6	8	9.55	8	0	407.27
	6	8	17	6.71	6	12	6.36	6	9	8.27	6	9	8.13	8	18	5.87
	7	12	31	5.46	5	12	5.62	6	9	8.97	6	1	65.23	8	17	6.22
	8	12	24	7.08	5	12	5.78	6	8	9.74	8	12	9.29	6	14	6.07
	9	12	28	6.10	6	13	6.05	6	9	8.96	13	17	10.25	8	17	6.35
	Avg.			6.21			5.82			9.22			9.77			6.21

Table B-52. 3rd 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	2	8	3.92	12	153	1.09	12	116	1.44	12	570	0.28	11	109	1.39
	2	5	12	5.54	12	27	6.25	3	8	6.33	8	13	8.13	8	16	6.95
	3	5	12	5.38	8	15	7.14	6	11	7.14	8	12	9.21	8	15	7.33
	4	5	12	5.80	8	15	7.27	6	10	7.93	8	12	9.46	8	15	7.84
	5	5	12	5.90	6	11	6.85	5	9	8.52	8	11	10.33	12	21	8.15
	6	5	11	6.01	6	4	17.43	6	8	9.52	8	10	10.61	13	21	8.21
	7	8	3	33.53	6	11	6.67	8	12	9.78	13	15	11.95	12	19	8.55
	8	12	26	6.57	5	11	7.05	8	11	10.25	13	14	12.13	8	14	8.36
	9	8	17	6.08	5	11	6.79	6	8	10.87	4	11	5.72	5	10	6.97
	Avg.			6.32			6.84			10.30			12.04			7.96
P2	1	9	199	0.65	11	107	1.46	11	103	1.51	11	147	1.08	12	55	3.04
	2	11	185	0.79	5	10	7.16	8	0	699.99	12	27	6.22	8	14	8.26
	3	11	67	2.35	5	11	6.66	3	5	8.92	8	14	8.08	8	13	8.64
	4	12	37	4.46	3	8	5.87	2	3	11.80	4	6	8.87	4	6	10.46
	5	8	18	6.07	2	3	9.26	4	7	8.44	4	5	10.18	2	2	11.75
	6	8	16	6.75	12	21	7.68	12	19	8.98	3	4	8.11	13	19	9.49
	7	3	6	7.64	8	14	7.87	6	9	8.94	1	1	7.83	13	19	9.71
	8	3	6	7.59	5	8	9.10	3	6	8.67	5	6	11.49	5	9	8.64
	9	3	6	7.14	2	7	3.47	3	3	15.01	5	7	10.47	2	3	10.32
	Avg.			7.45			8.48			8.80			9.93			9.56
P3	1	10	706	0.20	11	104	1.49	8	13	7.98	8	14	7.67	5	10	7.48
	2	3	7	5.89	12	33	5.09	8	13	8.36	4	9	5.68	13	24	7.43
	3	3	6	5.66	5	10	7.01	8	12	9.10	8	12	8.86	8	13	8.43
	4	4	12	4.60	6	2	32.79	8	14	7.97	12	18	9.54	8	12	9.18
	5	7	20	4.79	4	6	8.54	8	12	9.29	13	19	9.60	8	11	9.80
	6	7	19	4.74	3	5	8.48	8	11	9.89	13	18	10.05	5	8	9.10
	7	12	40	4.13	3	6	8.37	8	11	9.48	13	17	10.28	2	5	6.81
	8	12	29	5.80	3	6	8.48	8	11	9.37	6	8	10.38	2	3	10.30
	9	12	38	4.37	12	9	19.12	8	11	9.55	13	15	11.44	5	7	9.65
	Avg.			4.77			8.43			9.46			10.70			8.92

Table B-53. 3rd 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	3	11	4.00	12	69	2.40	10	678	0.21	12	114	1.42	11	136	1.15
	2	12	41	4.03	8	15	6.82	3	11	4.21	8	0	712.72	5	9	7.90
	3	5	12	6.12	3	7	7.10	2	6	4.90	2	4	6.79	8	13	8.33
	4	4	9	5.75	12	27	6.20	3	1	38.18	8	16	6.56	13	21	8.48
	5	3	4	9.26	12	25	6.68	13	34	5.10	5	11	6.90	8	11	9.97
	6	12	29	5.96	12	23	7.30	8	21	5.31	3	6	6.72	6	8	9.78
	7	6	10	8.41	12	26	6.44	4	10	5.01	6	9	9.26	6	8	9.53
	8	2	3	11.10	12	31	5.51	2	9	3.51	6	10	7.27	6	8	9.26
	9	13	23	7.57	12	24	7.10	2	5	6.71	6	10	7.65	6	8	10.61
	Avg.			9.03			6.35			5.08			8.06			9.80
P2	1	5	14	4.64	3	6	6.97	12	156	1.04	12	141	1.19	3	11	4.53
	2	7	28	3.38	12	49	3.43	5	3	21.90	8	13	8.41	6	9	8.34
	3	5	16	4.32	8	19	5.42	6	7	11.35	6	8	9.98	8	12	9.36
	4	5	15	4.93	5	12	5.62	4	8	5.92	6	9	9.77	8	13	9.07
	5	8	22	4.76	7	18	5.61	4	7	8.83	6	7	10.75	8	12	8.85
	6	8	21	4.94	12	30	5.81	6	11	6.87	8	10	11.22	12	19	9.07
	7	8	20	5.44	12	31	5.52	8	1	164.04	8	10	10.61	12	18	9.79
	8	6	12	6.43	8	18	6.39	6	11	7.12	8	9	11.86	12	18	9.60
	9	6	12	6.73	4	18	3.31	6	10	8.28	8	9	12.28	12	17	9.88
	Avg.			6.20			5.07			7.70			11.58			9.76
P3	1	11	116	1.31	13	42	4.29	11	265	0.56	6	8	9.80	12	39	4.26
	2	3	4	9.26	5	19	3.76	4	16	3.82	2	3	12.19	12	20	8.34
	3	12	28	6.12	12	30	5.59	5	15	4.93	3	1	50.91	8	12	9.50
	4	4	8	6.33	12	29	5.90	3	5	7.50	13	16	11.23	4	6	9.03
	5	5	10	6.73	8	17	6.44	2	3	10.46	6	7	11.16	4	1	52.61
	6	5	13	5.48	6	11	6.80	1	1	11.31	4	5	11.22	4	6	8.72
	7	2	3	9.09	4	8	6.74	14	22	8.80	3	8	5.85	4	6	8.94
	8	12	27	6.04	4	9	6.70	6	11	7.90	6	7	11.75	2	3	12.34
	9	5	12	5.83	4	7	7.08	9	13	9.19	4	6	8.48	6	8	10.29
	Avg.			6.99			6.84			8.63			7.17			10.52

Table B-54. 3rd 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	3	6	5.99	8	15	7.09	12	69	2.47	11	105	1.48	11	100	1.53
	2	5	17	4.39	6	10	8.06	4	6	9.83	5	11	6.06	13	28	6.13
	3	5	12	6.28	6	10	8.29	3	3	14.88	4	10	6.31	8	12	9.14
	4	5	17	4.18	6	10	8.26	11	16	9.60	4	9	7.01	9	3	42.42
	5	6	15	5.12	6	10	8.07	6	8	10.95	2	5	6.41	6	8	9.39
	6	10	11	11.83	6	10	7.85	6	8	10.33	3	5	8.41	5	4	16.64
	7	8	15	7.06	6	1	62.04	3	3	13.76	3	4	9.21	7	0	763.63
	8	12	26	6.61	6	10	7.68	3	3	12.91	5	8	8.31	8	11	10.63
	9	8	14	7.45	6	10	7.79	4	6	9.78	5	8	8.53	8	10	10.84
	Avg.			7.04			7.73			13.33			8.68			10.73
P2	1	11	52	2.83	11	107	1.47	12	99	1.63	12	20	8.52	12	59	2.90
	2	3	8	5.22	5	11	6.70	8	13	8.48	6	9	8.31	3	7	6.57
	3	12	35	4.60	12	26	6.63	6	9	9.07	2	2	13.96	12	15	11.01
	4	4	3	15.98	13	22	7.99	3	4	10.87	2	3	8.60	9	2	55.54
	5	12	32	5.21	5	9	8.60	6	9	9.32	2	4	6.97	4	13	4.66
	6	5	13	5.67	2	3	11.93	2	5	6.79	2	3	8.04	2	2	13.88
	7	3	8	5.57	2	3	10.18	1	0	50.91	12	16	10.48	12	18	9.60
	8	2	4	7.66	3	6	8.13	4	6	9.23	5	8	9.14	5	6	10.93
	9	2	4	6.79	8	13	8.66	6	9	8.20	5	9	8.15	5	7	10.24
	Avg.			6.67			8.99			8.71			9.26			10.26

Table B-55. 3rd 15" Lift of Surface Dry AASHTO #1 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	3	9	4.82	12	72	2.32	11	102	1.48	8	18	5.98	12	145	1.19
	2	3	9	5.16	8	20	5.34	5	14	5.18	6	11	7.09	8	18	6.06
	3	3	10	4.61	8	19	5.49	2	4	7.73	6	11	7.09	8	19	6.12
	4	6	15	5.23	5	14	5.22	2	4	8.48	6	11	7.41	8	18	6.46
	5	5	13	5.36	3	10	4.65	2	4	6.15	6	10	8.07	8	17	6.80
	6	5	14	5.05	4	11	4.51	1	3	6.13	6	10	7.33	8	17	6.65
	7	5	13	5.57	6	16	4.67	12	23	7.21	8	13	8.74	13	23	7.63
	8	5	13	5.71	5	16	4.58	5	12	6.13	13	20	9.13	8	15	7.58
	9	8	17	6.19	3	9	5.16	2	4	6.72	13	20	8.94	8	16	7.27
	Avg.			5.82			4.80			6.69			8.94			7.49
P2	1	4	16	3.97	12	69	2.34	12	101	1.62	12	143	1.15	12	50	3.34
	2	12	46	3.53	12	29	5.73	8	18	6.41	7	22	4.21	13	29	5.99
	3	4	8	6.03	5	13	5.38	6	13	6.31	3	10	4.31	8	18	5.88
	4	13	34	5.34	3	5	7.64	6	13	6.44	2	4	5.81	11	12	11.95
	5	5	8	7.91	3	2	29.09	12	26	6.51	0	1	6.94	3	7	6.26
	6	12	35	4.69	1	1	9.26	8	1	105.59	2	4	5.82	3	7	6.40
	7	5	11	5.93	1	1	9.63	4	13	4.04	2	4	6.85	3	7	6.19
	8	1	2	9.35	0	0	15.27	8	18	6.18	2	4	6.89	5	12	5.97
	9	1	2	7.27	12	30	5.48	6	13	6.48	3	8	5.45	12	24	7.13
	Avg.			7.52			7.56			5.57			6.40			6.43

Table B-56. 1st 4" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	37	2.14	12	71	2.25	11	154	0.98	8	28	3.92	5	20	3.63	11	548	0.28
	2	3	14	1.98	5	19	3.64	8	36	3.02	5	18	4.05	8	27	4.15	8	27	3.92
	3	3	12	2.56	5	18	3.90	6	23	3.45	4	12	4.49	8	27	4.30	5	18	4.19
	4	5	21	2.44	3	12	3.96	4	15	3.58	3	7	5.92	9	25	4.71	4	11	4.43
	5	5	21	2.42	3	11	4.18	4	15	3.68	3	6	6.01	8	23	4.98	3	11	4.30
	6	3	12	2.41	6	17	4.49	7	15	6.31	6	17	4.92	8	23	4.97	6	40	1.90
	7	5	4	12.97	8	23	4.95	4	14	3.76	4	10	5.07	8	22	5.20	5	16	4.62
	8	3	13	2.62	12	32	5.20	4	15	4.00	4	10	5.11	4	16	3.57	6	3	30.85
	9	5	18	2.94	12	33	5.03	6	20	3.84	4	11	4.75	5	15	4.76	3	10	4.49
	Avg.			2.78			5.06			3.87			4.98			4.51			4.55
P2	1	12	417	0.29	11	74	2.12	12	71	2.29	5	23	3.29	7	32	3.06	11	702	0.22
	2	13	55	2.40	8	74	2.78	8	32	3.36	6	23	3.30	5	19	3.98	12	46	3.64
	3	8	31	2.78	5	74	3.46	8	31	3.50	6	30	2.64	6	1	59.89	12	40	4.08
	4	8	31	2.70	2	74	3.98	11	30	4.88	5	20	3.63	12	44	3.70	12	41	4.08
	5	3	15	2.04	12	74	3.53	8	30	3.67	5	19	3.72	12	42	3.95	8	26	4.14
	6	13	45	2.99	5	74	3.63	6	20	3.78	12	43	3.86	8	27	3.82	5	17	4.04
	7	13	44	3.02	12	74	4.00	8	28	3.88	8	27	4.00	8	25	4.15	2	6	5.09
	8	13	41	3.23	8	74	3.52	12	38	4.48	8	27	4.01	8	26	4.32	3	11	4.32
	9	6	20	2.92	5	74	3.86	12	37	4.55	8	26	4.24	12	35	4.91	3	11	4.15
	Avg.			3.05			3.79			4.31			4.08			4.46			4.52
P3	1	7	35	2.11	11	74	1.14	11	321	0.48	11	342	0.45	8	21	5.16	2	5	6.04
	2	7	31	2.46	8	37	2.25	8	31	3.38	4	10	5.07	7	19	5.20	5	18	4.16
	3	8	30	2.70	5	21	3.25	5	19	3.69	3	10	4.52	6	13	6.19	4	10	5.09
	4	12	52	2.48	2	8	3.00	2	7	4.97	4	9	5.90	4	9	6.25	4	10	4.95
	5	12	50	2.55	12	46	3.13	5	19	3.79	6	14	5.64	6	12	6.34	5	15	4.98
	6	8	29	2.82	5	20	3.42	8	26	4.17	6	14	5.81	6	12	6.72	4	10	4.97
	7	8	30	2.83	12	41	3.53	5	18	3.82	4	9	5.63	6	12	6.49	5	14	5.28
	8	5	20	2.71	8	30	3.66	5	17	4.06	4	9	5.96	3	8	5.79	8	20	5.19
	9	3	14	2.58	5	19	4.03	6	1	99.39	4	10	6.08	8	15	7.18	8	19	5.68
	Avg.			2.71			3.74			3.94			5.89			6.49			5.38

Table B-57. 1st 4" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	43	1.69	11	606	0.24	5	33	2.13	12	98	1.66	7	58	1.73	7	81	1.18
	2	5	26	2.07	3	9	4.07	5	31	2.28	12	63	2.59	5	34	1.94	3	22	1.83
	3	7	36	2.00	3	9	4.34	5	31	2.41	12	53	3.09	7	50	2.01	3	22	2.09
	4	7	37	2.09	3	8	4.97	12	57	2.96	12	61	2.63	5	32	2.14	8	9	12.04
	5	12	48	2.58	3	7	5.12	8	42	2.69	7	37	2.68	8	50	2.10	8	5	23.53
	6	12	44	2.71	8	26	4.17	5	29	2.55	5	25	2.81	7	45	2.27	5	31	2.15
	7	7	37	2.03	5	17	4.13	12	28	5.73	4	16	3.05	5	28	2.44	12	66	2.61
	8	5	23	2.30	4	12	4.57	6	30	2.58	5	23	3.16	5	28	2.48	8	39	2.87
	9	5	24	2.23	4	12	4.34	4	20	2.54	5	23	2.97	8	43	2.43	8	40	2.88
	Avg.			2.19			4.35			3.61			3.06			2.45			2.79
P2	1	6	103	0.57	10	511	0.26	4	40	1.54	10	151	0.93	7	56	1.75	7	72	1.39
	2	0	2	1.39	4	32	1.91	2	22	1.55	2	15	1.99	5	34	2.03	5	41	1.73
	3	12	76	1.58	3	21	2.03	3	21	2.07	2	15	2.20	3	20	2.09	8	56	1.86
	4	7	42	1.83	5	21	3.11	3	23	2.05	3	16	2.26	3	19	2.09	8	54	1.93
	5	7	43	1.72	5	31	2.41	5	36	2.08	3	16	2.33	5	31	2.20	5	36	2.00
	6	5	31	1.57	12	57	2.94	6	36	2.20	3	16	2.31	5	30	2.44	3	22	2.07
	7	3	19	1.64	8	38	2.83	4	22	2.32	3	12	3.93	3	19	2.24	4	23	2.22
	8	1	4	2.03	12	62	2.67	6	35	2.20	4	24	2.07	3	18	2.35	6	34	2.27
	9	1	5	2.39	12	66	2.51	4	21	2.42	8	48	2.22	6	10	7.58	6	33	2.38
	Avg.			2.02			2.67			2.31			2.74			2.30			2.29

Table B-58. 1st 4" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	228	0.51	7	40	2.45	11	89	1.79	5	31	2.20	10	136	1.00	11	169	0.88
	2	5	32	1.59	12	60	2.76	5	32	2.05	4	6	9.20	7	49	1.95	3	24	1.70
	3	2	12	1.87	12	60	2.78	12	64	2.69	3	20	2.34	5	28	2.31	1	4	2.45
	4	1	6	1.91	4	22	2.31	12	62	2.68	5	29	2.39	5	27	2.47	12	82	2.02
	5	2	12	1.79	3	10	4.24	12	55	3.04	5	29	2.55	3	15	3.07	12	79	2.07
	6	5	35	1.52	3	12	3.97	12	55	3.08	8	40	2.67	5	26	2.65	7	64	1.60
	7	8	48	1.69	2	6	4.86	8	40	2.60	12	52	3.29	3	14	2.99	7	63	1.55
	8	5	33	1.66	6	17	4.58	8	40	2.64	8	40	2.74	5	25	2.66	8	67	1.56
	9	8	46	1.74	5	20	3.67	5	27	2.70	8	38	2.93	12	47	3.46	8	63	1.68
	Avg.			1.70			4.37			2.65			2.99			3.04			1.60
P2	1	4	39	1.12	5	15	4.55	5	30	2.34	8	39	2.69	7	38	2.71	8	51	2.07
	2	8	35	2.26	5	15	4.42	5	30	2.42	5	26	2.62	5	24	3.10	8	45	2.32
	3	6	26	2.41	4	14	3.82	3	18	2.66	3	17	2.75	5	24	3.13	3	2	22.21
	4	4	17	2.55	8	33	3.33	12	61	2.62	4	16	3.09	3	13	3.50	5	28	2.52
	5	3	9	3.15	8	31	3.42	5	28	2.58	4	17	3.14	3	14	3.37	8	40	2.63
	6	2	9	2.55	8	30	3.71	2	9	3.50	3	16	2.81	5	23	3.20	8	39	2.83
	7	3	9	3.47	8	29	3.79	3	16	2.84	3	16	2.84	4	15	3.58	5	27	2.76
	8	3	9	3.03	8	29	3.75	4	17	3.00	6	6	14.18	3	14	3.20	5	26	2.82
	9	3	10	3.14	12	40	4.25	3	16	2.93	5	24	2.97	3	14	3.09	5	25	2.94
	Avg.			3.21			3.93			2.92			2.91			3.29			2.84

Table B-59. 2nd 4" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	211	0.70	11	617	0.25	6	13	1.3	12	148	1.08	12	425	0.38
	2	5	14	5.03	8	21	5.14	4	9	3.7	5	15	4.75	6	14	5.56
	3	3	9	5.16	6	13	5.98	3	8	3.7	3	8	5.46	3	5	8.70
	4	6	13	5.74	6	12	6.30	5	13	5.6	3	9	5.40	2	3	7.57
	5	6	13	6.11	4	12	4.85	6	12	4.1	5	12	6.41	12	26	6.27
	6	8	17	6.25	5	11	6.80	8	17	4.6	14	24	7.78	12	25	6.56
	7	8	12	9.38	6	11	7.07	6	12	3.9	8	15	7.73	6	12	6.51
	8	5	11	6.54	3	7	6.97	4	8	61.1	5	7	10.41	4	2	32.49
	9	8	16	6.86	6	10	7.55	2	3	5.0	4	7	7.88	2	3	8.62
	Avg.			7.59			7.19			4.4			7.80			7.56
P2	1	11	785	0.19	12	45	3.65	11	132	3.8	11	472	0.33	12	38	4.53
	2	12	46	3.45	12	34	4.71	8	23	4.6	3	9	5.00	6	14	5.90
	3	11	15	9.86	4	16	3.17	12	33	4.9	3	8	5.68	6	5	18.15
	4	3	8	5.71	5	14	5.31	12	30	5.8	13	27	6.48	6	12	6.36
	5	2	5	7.21	4	9	5.68	12	28	5.7	7	19	5.52	6	12	6.45
	6	4	9	6.28	2	5	6.79	12	27	6.8	2	4	6.86	2	4	8.65
	7	6	13	5.97	3	4	8.56	12	27	33.9	3	7	6.62	4	8	7.03
	8	6	12	6.53	4	9	6.03	12	25	6.7	1	2	8.15	3	4	9.48
	9	8	17	6.72	4	9	5.84	12	25	7.1	12	24	6.95	2	2	8.89
	Avg.			6.41			6.81			6.9			7.24			8.47
P3	1	10	440	0.31	11	658	0.23	6	13	4.1	11	123	1.27	12	123	1.32
	2	12	88	1.89	8	20	5.09	6	13	3.6	12	35	4.79	12	36	4.76
	3	12	40	4.21	8	18	6.03	5	12	4.0	5	13	5.60	12	32	5.38
	4	8	23	4.71	6	12	6.26	5	11	4.3	4	8	6.52	6	12	6.34
	5	8	22	4.93	6	12	6.32	6	11	4.6	4	8	6.59	8	17	6.63
	6	8	20	5.60	6	8	9.83	8	17	4.7	1	2	8.04	3	5	8.85
	7	8	19	5.92	8	16	7.09	6	11	4.8	1	2	8.08	4	4	13.75
	8	8	20	5.67	6	12	6.71	4	7	4.6	2	4	8.48	12	23	7.38
	9	5	2	33.29	12	24	6.89	4	7	5.0	3	7	5.94	8	16	7.11
	Avg.			5.79			6.90			4.8			7.50			7.25

Table B-60. 2nd 4" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	55	2.87	11	450	0.35	12	85	1.92	11	114	1.38	12	182	0.90
	2	8	28	3.90	5	25	2.83	12	43	3.74	4	15	3.49	3	9	3.98
	3	3	11	4.14	5	22	3.05	12	38	4.31	12	45	3.69	4	15	3.26
	4	12	38	4.28	4	15	3.37	12	38	4.33	6	23	3.30	6	23	3.43
	5	12	35	4.65	3	12	3.27	12	36	4.56	8	36	3.09	6	16	5.17
	6	7	23	4.17	5	21	3.46	6	89	0.99	5	22	3.30	2	7	4.60
	7	12	34	4.82	8	15	7.16	12	34	4.82	3	15	2.66	12	40	4.25
	8	12	30	5.45	3	12	3.47	12	34	4.82	2	7	3.81	12	38	4.57
	9	12	31	5.31	8	32	3.26	12	35	4.80	4	2	35.15	12	37	4.46
	Avg.			5.19			3.37			4.81			3.23			4.43
P2	1	10	891	0.16	11	119	1.23	11	125	1.25	11	117	1.30	12	118	1.38
	2	5	24	2.97	3	17	2.56	6	25	3.09	4	18	3.36	5	18	3.61
	3	3	16	3.09	3	19	2.46	2	7	4.45	1	7	2.80	3	17	2.87
	4	4	15	3.27	3	17	2.65	3	13	3.35	3	1	61.63	1	6	3.23
	5	5	22	3.30	3	17	2.69	3	1	48.23	3	19	2.45	14	48	4.05
	6	6	22	3.46	3	16	2.81	1	4	4.16	2	12	2.42	6	26	2.99
	7	5	22	3.41	3	17	2.89	12	41	4.03	2	12	2.43	4	17	2.91
	8	6	21	3.62	2	8	3.81	12	41	4.00	1	3	2.37	3	10	3.88
	9	4	15	3.81	4	16	3.12	8	31	3.48	3	12	3.43	2	8	4.04
	Avg.			3.61			3.27			3.84			2.74			3.61

Table B-61. 2nd 4" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	34	3.02	11	125	1.19	11	166	0.94	11	524	0.29	2	9	3.44
	2	12	46	3.59	5	26	2.59	5	23	3.23	1	2	4.31	12	56	2.88
	3	8	30	3.66	5	29	2.48	3	14	3.38	1	3	4.24	5	29	2.59
	4	8	30	3.65	8	38	2.94	4	14	3.70	11	43	3.54	5	17	4.24
	5	5	18	4.02	8	38	2.95	6	22	3.47	5	21	3.60	1	5	3.06
	6	6	18	4.44	4	23	2.74	3	13	3.46	2	6	4.90	2	9	3.62
	7	5	17	4.27	5	23	3.18	3	12	3.59	12	41	4.08	2	9	3.97
	8	8	26	4.02	6	23	3.53	3	13	3.81	6	19	4.05	2	9	3.50
	9	12	35	4.70	8	35	3.25	5	1	59.39	3	11	4.24	2	8	3.84
	Avg.			4.33			3.32			4.81			4.13			3.77
P2	1	5	21	3.48	8	39	2.76	12	61	2.66	12	113	1.45	12	136	1.19
	2	4	14	3.85	5	23	3.21	12	50	3.40	4	14	3.74	4	15	3.25
	3	4	13	4.03	6	23	3.26	12	47	3.54	14	43	4.51	4	17	3.55
	4	6	19	3.96	8	33	3.18	12	48	3.48	5	21	3.45	3	9	4.28
	5	6	19	3.97	6	23	3.28	12	47	3.66	1	4	4.71	3	9	5.34
	6	6	19	3.95	4	15	3.65	12	45	3.70	1	2	3.39	4	7	7.23
	7	6	18	4.33	4	15	3.66	12	43	3.90	3	8	5.30	3	9	3.97
	8	6	18	4.44	4	14	3.77	12	42	4.05	3	7	5.45	4	15	3.40
	9	4	12	4.60	6	23	3.54	8	35	3.12	2	5	4.85	4	16	3.48
	Avg.			4.45			3.66			3.70			5.20			3.62

Table B-62. 3rd 4" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	25	4.21	12	89	1.85	12	94	1.74	12	90	1.87	13	30	5.80
	2	6	14	5.53	6	12	6.44	6	11	7.59	6	14	5.82	8	16	7.22
	3	4	0	124.96	4	8	6.67	4	7	8.21	6	13	6.17	6	10	7.97
	4	3	5	8.91	3	4	9.35	4	7	8.18	6	12	7.40	5	1	67.20
	5	4	9	6.50	2	3	9.95	4	6	8.54	6	12	6.89	6	10	7.99
	6	4	9	7.08	4	7	7.50	4	6	8.74	13	21	8.56	4	6	8.07
	7	4	9	6.65	4	7	6.99	4	6	8.74	12	19	8.71	4	7	7.88
	8	4	9	6.62	4	7	7.54	4	6	8.81	4	6	8.07	4	6	8.64
	9	3	8	5.37	4	8	7.39	4	6	8.70	2	3	8.00	6	9	8.63
	Avg.			6.21			7.31			8.75			8.26			8.39
P2	1	8	25	4.28	11	118	1.31	11	123	1.25	12	126	1.32	12	102	1.61
	2	5	22	3.02	6	14	5.85	6	14	6.23	6	0	509.08	12	33	5.13
	3	8	19	5.73	4	8	6.87	3	8	5.58	3	7	6.40	12	29	5.96
	4	4	11	4.64	2	4	9.15	4	7	7.15	4	7	7.43	12	24	6.96
	5	5	11	6.69	2	3	9.83	3	4	9.30	1	2	9.09	12	23	7.54
	6	6	11	7.09	3	1	56.56	5	9	7.54	2	3	9.70	2	30	0.93
	7	11	3	45.12	4	6	7.81	3	4	9.16	3	6	7.86	12	22	7.71
	8	12	21	8.04	6	11	7.65	2	3	9.63	6	2	52.15	12	20	8.55
	9	8	15	7.29	6	10	8.02	12	20	8.22	3	4	10.51	13	0	1107.26
	Avg.			7.67			7.82			9.01			9.19			8.13
P3	1	11	840	0.19	11	155	1.01	11	400	0.38	12	122	1.33	11	426	0.35
	2	6	14	5.96	13	13	14.03	6	13	6.44	6	13	5.91	12	36	4.76
	3	6	12	6.89	4	8	6.36	6	12	7.01	6	13	6.05	6	11	7.11
	4	6	12	6.91	3	4	9.30	4	8	7.24	3	4	9.16	2	3	10.55
	5	3	4	9.45	2	36	0.94	12	24	6.99	4	8	7.20	3	3	10.78
	6	4	8	6.85	2	3	10.04	6	10	7.86	5	7	10.18	4	7	7.44
	7	6	11	7.50	2	3	8.73	5	7	9.82	2	4	7.27	6	10	8.26
	8	6	11	7.35	2	2	8.89	5	5	11.72	4	6	8.16	6	10	8.15
	9	4	8	7.42	2	3	9.83	3	4	9.30	4	7	7.15	6	5	18.59
	Avg.			7.42			9.15			10.28			7.53			8.20

Table B-63. 3rd 4" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	48	3.34	12	105	1.55	12	407	0.42	12	183	0.93	12	62	2.74
	2	12	35	4.54	6	12	6.86	6	13	5.84	4	10	5.29	12	30	5.69
	3	12	38	4.31	4	8	6.87	4	9	6.08	4	10	5.68	12	28	6.04
	4	8	21	5.27	4	8	6.53	4	1	46.28	4	10	5.61	12	26	6.54
	5	8	19	5.47	6	11	7.30	4	8	6.39	6	13	6.36	6	13	5.94
	6	12	30	5.42	6	11	7.05	6	12	6.71	4	9	5.96	4	8	6.48
	7	12	34	4.79	6	11	7.49	6	12	6.71	4	4	16.42	4	8	6.63
	8	8	18	5.84	6	11	7.44	6	12	6.69	3	5	8.63	8	17	6.45
	9	12	32	5.02	6	11	7.41	6	12	6.64	4	10	6.16	12	24	7.24
	Avg.			5.22			7.44			6.68			7.39			6.77
P2	1	8	21	5.07	13	52	3.35	12	236	0.70	12	134	1.20	12	238	0.72
	2	4	12	4.07	6	14	5.90	5	16	4.77	8	28	3.87	12	38	4.53
	3	2	7	4.65	4	8	6.72	5	10	6.17	8	27	4.34	6	17	4.61
	4	2	4	5.50	3	4	8.33	3	9	5.34	8	25	4.69	4	10	5.09
	5	2	5	6.04	3	4	8.33	4	10	5.33	8	25	4.56	4	10	5.19
	6	1	2	5.87	3	4	8.56	3	1	68.88	8	24	4.76	4	10	5.54
	7	3	8	5.17	4	8	6.71	2	4	7.47	4	11	4.98	2	4	6.75
	8	3	7	5.50	4	8	7.17	3	6	6.49	6	16	5.27	4	10	6.04
	9	4	12	4.73	6	8	10.47	3	5	7.22	2	5	6.73	8	23	5.06
	Avg.			5.13			6.94			7.06			5.66			5.95

Table B-64. 3rd 4" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	123	1.24	8	31	3.60	12	34	4.88	11	72	2.20	12	139	1.24
	2	12	48	3.44	6	20	3.94	8	24	4.77	4	11	5.22	6	21	3.86
	3	12	40	4.25	6	19	4.03	6	1	83.49	4	10	5.01	9	28	4.19
	4	12	34	4.79	6	6	12.97	4	10	6.03	2	6	5.30	4	12	4.68
	5	12	35	4.69	4	12	4.67	3	5	7.89	4	10	5.55	2	5	7.27
	6	12	32	5.33	4	13	4.40	2	4	8.24	2	4	6.79	13	35	5.07
	7	16	25	8.54	3	12	3.58	2	4	7.44	4	9	5.37	6	18	4.66
	8	8	22	4.99	4	11	4.88	6	13	5.86	2	5	6.61	3	3	14.28
	9	8	22	5.00	4	12	5.07	2	4	7.34	4	9	5.88	13	30	6.22
	Avg.			4.99			4.51			6.88			5.95			5.44
P2	1	3	11	4.18	12	110	1.53	12	116	1.43	8	30	3.71	11	785	0.19
	2	1	3	6.36	6	16	4.89	8	35	3.09	6	19	4.22	4	14	4.02
	3	1	3	5.80	4	10	5.40	5	20	3.76	3	6	5.93	1	2	5.76
	4	1	2	5.53	3	4	8.26	6	19	4.04	4	12	4.39	4	12	4.51
	5	1	3	6.79	4	9	6.07	5	19	3.92	3	10	4.95	8	28	4.14
	6	4	10	5.15	4	9	6.36	6	19	4.06	4	11	4.91	13	33	5.26
	7	3	5	6.94	4	9	6.00	6	19	4.06	6	17	4.68	13	33	5.30
	8	3	5	7.44	3	9	4.59	6	19	4.10	4	11	4.88	14	42	4.52
	9	3	5	7.10	6	13	6.17	5	18	4.02	4	11	5.22	6	26	3.01
	Avg.			7.16			5.59			4.06			4.93			4.28

Table B-65. 1st 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	112	1.06	11	118	1.29	11	78	2.02	12	122	1.37	11	98	1.60	13	32	5.52	5	26	2.75
	2	13	42	3.11	8	18	6.25	8	16	6.41	13	34	5.13	4	0	441.21	5	13	5.71	4	10	4.86
	3	5	14	3.84	5	10	7.60	5	11	6.76	13	28	6.24	8	18	6.20	3	8	5.57	3	9	4.75
	4	4	14	2.91	3	6	7.83	3	7	5.12	13	25	7.10	8	17	6.19	3	8	5.35	8	20	5.59
	5	5	14	4.12	3	6	8.19	3	5	9.08	13	24	7.31	12	25	6.83	3	7	6.07	6	13	6.10
	6	6	14	4.36	3	0	107.47	3	7	6.68	13	23	7.69	12	24	6.90	5	12	6.28	5	13	5.61
	7	6	14	4.34	2	2	12.32	3	6	7.40	13	22	7.81	12	24	7.10	6	12	6.34	8	18	6.14
	8	6	14	4.36	2	3	11.64	3	6	7.64	13	22	8.09	12	23	7.51	6	12	6.32	9	1	108.60
	Avg.			4.31			11.98			7.44			7.97			7.42			6.36			6.29
P2	1	12	34	3.67	11	145	1.08	12	135	1.21	12	109	1.47	12	99	1.67	13	28	6.63	6	18	4.18
	2	6	14	4.13	5	12	6.09	13	23	7.47	6	11	7.38	8	16	6.70	8	13	8.59	6	4	20.76
	3	3	8	4.35	3	6	6.91	12	20	8.37	1	2	9.79	12	22	7.70	6	10	7.52	2	4	8.01
	4	2	5	5.55	3	8	5.90	11	2	73.43	1	2	9.61	12	19	8.87	6	11	7.86	1	3	7.05
	5	1	2	4.77	6	10	7.62	8	13	8.72	3	3	11.65	9	4	33.75	2	2	13.58	3	8	5.82
	6	0	1	6.74	3	8	4.70	12	15	11.17	1	1	11.64	5	8	9.42	1	2	9.79	6	15	5.02
	7	2	5	4.37	2	5	7.15	12	55	3.04	1	1	12.06	3	6	7.86	1	2	9.43	5	12	6.25
	8	3	7	4.69	3	4	11.05	12	15	10.94	1	2	8.21	5	7	10.07	3	3	13.28	6	19	4.09
	9	2	5	5.01	12	19	9.09	8	11	9.83	1	2	10.66	2	3	10.91	1	2	9.61	6	12	6.56
	Avg.			4.69			9.10			10.38			10.31			9.61			10.77			5.64
P3	1	10	160	0.65	11	268	0.58	12	94	1.72	11	115	1.37	11	120	1.32	12	121	1.38	8	29	3.74
	2	5	14	3.64	7	23	4.19	12	24	6.88	6	11	7.22	8	15	7.37	6	10	7.56	6	17	4.47
	3	3	8	4.20	5	12	5.66	4	9	5.80	5	10	7.45	9	8	16.27	6	10	7.85	6	17	4.61
	4	5	12	4.34	12	29	5.79	5	8	8.84	5	9	8.22	6	9	8.56	6	9	8.87	8	22	5.17
	5	12	27	4.75	12	26	6.47	8	12	9.74	5	9	8.33	6	8	9.71	3	6	7.36	8	21	5.20
	6	12	27	4.79	7	15	6.98	8	8	12.43	5	8	8.60	6	7	10.45	3	6	5.76	8	8	14.62
	7	13	24	5.40	4	10	5.24	8	12	9.07	5	8	8.76	6	8	9.87	3	4	10.27	8	22	4.96
	8	5	10	5.50	5	9	7.37	6	8	9.52	5	8	8.94	8	10	10.99	6	9	9.72	8	19	5.45
	9	8	15	5.61	6	9	8.27	8	11	10.29	6	8	9.58	8	11	10.36	6	9	9.86	8	19	5.72
	Avg.			5.50			6.96			9.63			9.09			10.41			9.95			5.37

Table B-66. 1st 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	43	2.90	12	36	4.66	12	108	1.50	12	137	1.26	12	87	1.87	12	71	2.32	12	206	0.81
	2	12	44	2.78	5	11	6.30	8	13	8.21	8	14	7.91	8	13	8.77	8	13	8.62	8	0	407.27
	3	4	15	2.68	6	4	20.26	8	13	8.51	6	9	8.67	8	12	9.88	6	12	6.80	5	14	5.29
	4	9	14	6.49	3	6	7.32	5	9	7.37	3	5	8.55	12	18	9.23	4	6	9.48	2	4	6.75
	5	5	15	3.43	2	6	5.54	5	8	9.10	3	5	9.15	12	16	10.61	6	2	50.91	3	8	5.37
	6	8	1	88.58	3	4	10.09	5	8	9.06	3	5	9.29	12	0	1043.62	6	8	10.61	4	9	5.79
	7	8	22	3.60	3	5	8.24	8	11	9.76	2	3	11.07	8	10	11.03	4	5	10.41	4	10	5.09
	8	8	22	3.83	3	5	8.06	8	4	30.87	2	2	12.52	6	8	10.81	6	8	10.73	6	14	5.75
	9	8	22	3.85	3	6	8.08	8	10	10.85	6	8	10.08	3	5	8.41	6	8	10.58	6	13	5.97
	Avg.			3.76			8.12			10.31			11.22			10.09			10.57			5.61
P2	1	5	17	3.06	12	49	3.27	12	72	2.35	12	118	1.42	12	66	2.42	12	73	2.27	12	154	1.07
	2	7	25	3.04	7	20	5.02	13	27	6.55	9	0	436.36	8	13	8.03	12	23	7.11	11	1	200.95
	3	7	25	3.05	8	18	6.02	9	14	8.80	3	6	7.94	8	12	9.14	8	12	8.78	20	28	10.01
	4	12	37	3.37	5	11	6.46	8	13	8.83	8	13	8.36	6	9	8.91	6	8	9.39	8	21	5.37
	5	12	36	3.50	5	10	6.96	6	9	9.53	6	9	8.09	6	8	9.45	4	6	9.50	12	1	234.74
	6	12	35	3.62	6	7	11.01	13	17	10.00	12	4	46.53	6	8	9.45	4	6	9.04	12	33	5.13
	7	12	34	3.65	4	7	8.23	13	17	10.25	8	12	9.30	8	11	10.03	6	8	9.92	8	21	5.32
	8	8	23	3.40	3	6	8.09	9	11	10.43	13	16	11.10	6	8	10.87	5	8	9.32	8	20	5.77
	9	8	23	3.46	3	3	12.22	6	8	10.44	12	17	10.13	5	8	9.56	6	1	89.09	9	20	5.87
	Avg.			3.50			8.16			10.37			10.18			10.16			9.62			5.65
P3	1	11	679	0.17	11	933	0.16	12	66	2.53	12	140	1.16	12	96	1.76	8	14	8.07	12	41	4.16
	2	3	15	2.17	5	13	5.36	6	11	6.89	6	9	8.09	6	10	8.28	8	13	8.31	8	22	4.80
	3	5	21	2.45	5	12	5.60	4	9	6.74	6	9	8.88	4	6	8.00	4	6	8.98	6	14	5.58
	4	5	21	2.55	3	6	6.52	6	11	7.40	6	8	9.28	1	2	10.91	4	6	7.81	4	3	18.72
	5	8	6	13.56	2	4	8.39	4	9	6.88	6	8	9.65	3	6	7.91	2	3	11.86	8	19	6.03
	6	12	48	2.61	2	3	8.69	6	10	7.74	6	8	9.98	6	9	9.15	2	3	11.98	8	19	5.91
	7	12	44	2.89	2	3	8.80	6	10	7.83	6	9	9.43	6	9	9.11	4	6	8.77	5	12	6.13
	8	8	31	2.55	3	7	7.15	6	10	7.83	6	8	9.98	6	9	8.82	6	9	9.30	6	13	6.06
	9	8	28	2.80	5	10	7.22	6	10	8.01	6	8	9.88	3	6	7.94	6	8	9.99	6	12	6.28
	Avg.			2.75			7.72			7.89			9.76			8.62			9.35			6.16

Table B-67. 1st 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	117	1.08	11	369	0.41	12	111	1.46	12	112	1.49	12	172	0.93	11	104	1.51	8	30	3.94
	2	5	24	2.08	12	35	4.70	12	34	5.00	12	31	5.37	8	25	4.40	12	38	4.47	6	19	4.16
	3	1	7	2.17	12	29	5.99	8	19	5.73	8	18	6.11	12	31	5.45	12	32	5.31	6	18	4.40
	4	12	40	3.04	12	25	6.88	12	27	6.39	4	9	5.87	8	21	5.34	8	21	5.17	4	13	4.09
	5	8	26	3.03	13	23	7.80	12	26	6.50	2	4	8.57	8	20	5.78	7	23	4.44	2	5	6.12
	6	8	30	2.59	8	14	8.29	8	18	6.24	2	4	8.09	6	14	5.64	8	19	5.75	2	4	5.82
	7	4	4	10.11	12	22	7.71	8	17	6.51	4	8	6.21	5	8	8.60	12	27	6.10	2	6	5.93
	8	2	10	2.45	7	12	8.22	6	12	6.30	4	8	6.18	2	4	7.68	12	26	6.69	3	13	3.17
	9	1	6	2.42	12	19	8.78	3	7	6.57	4	7	7.07	1	3	6.03	8	17	6.31	12	32	5.35
	Avg.			2.43			8.24			6.46			6.49			7.44			6.37			4.82
P2	1	12	176	0.71	12	43	3.91	12	80	2.05	12	88	1.85	12	133	1.27	11	147	1.02	12	81	2.09
	2	5	12	4.79	6	13	5.86	6	10	8.29	8	15	6.79	8	15	7.27	5	10	7.13	12	33	5.10
	3	6	12	4.98	3	8	5.83	6	9	8.48	5	9	7.85	6	10	8.24	4	7	7.19	12	29	5.92
	4	3	7	4.03	5	12	6.28	6	9	8.94	5	9	7.78	6	10	7.83	4	1	98.18	8	16	6.61
	5	5	11	5.11	3	8	4.80	6	9	8.87	5	9	7.95	6	9	8.64	4	7	8.34	8	17	6.45
	6	3	7	5.49	6	1	71.27	11	8	19.71	3	6	7.68	6	9	8.63	4	6	7.95	8	16	6.83
	7	4	6	5.82	6	11	6.84	6	8	9.70	2	2	11.22	5	9	8.48	4	6	8.54	8	16	6.91
	8	4	7	5.42	3	7	6.15	6	9	9.34	2	3	11.23	8	13	9.09	4	6	8.54	5	1	57.70
	9	4	8	5.51	5	8	8.85	6	8	9.53	6	9	8.60	8	10	11.01	4	6	8.72	8	15	7.00
	Avg.			5.58			7.28			9.52			10.35			9.53			8.60			6.95
P3	1	7	42	1.72	7	20	5.12	12	122	1.32	12	123	1.32	12	29	5.69	12	107	1.49	8	27	4.01
	2	12	52	2.38	8	17	6.15	6	11	6.65	8	17	6.46	8	14	7.57	8	18	6.10	6	18	4.58
	3	5	20	2.44	12	26	6.66	8	15	7.07	7	11	9.39	8	11	10.68	12	27	6.34	4	13	4.13
	4	2	6	3.26	8	15	7.08	12	21	8.00	3	6	7.14	4	7	7.62	8	16	7.08	6	16	5.43
	5	3	10	3.30	8	15	7.45	12	21	8.39	3	6	7.18	2	3	9.09	6	10	7.47	3	10	4.44
	6	3	11	3.02	8	14	7.91	13	19	9.06	6	10	7.56	4	5	10.18	6	11	7.95	4	12	4.52
	7	5	0	118.01	6	9	8.37	12	19	9.15	3	6	8.20	6	9	8.91	6	10	8.14	12	33	4.98
	8	3	10	3.11	8	13	8.28	13	19	9.43	5	9	7.88	4	6	9.00	8	16	7.27	6	14	5.52
	9	2	6	3.89	8	13	8.66	12	18	9.66	5	10	7.27	4	5	9.52	6	10	7.83	5	14	5.38
	Avg.			3.50			8.44			9.41			7.78			9.15			7.75			5.29

Table B-68. 1st 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	753	0.16	12	120	1.36	6	13	6.01	12	112	1.45	12	100	1.64	12	176	0.95	10	195	0.72
	2	5	16	3.25	5	14	4.88	4	9	5.76	8	19	5.54	5	9	8.72	6	11	7.07	2	5	5.36
	3	3	2	19.09	2	3	7.19	4	8	6.55	5	12	5.88	4	5	9.50	5	1	67.27	3	9	5.07
	4	3	9	3.75	2	3	7.36	3	8	5.97	6	0	220.60	6	7	10.18	4	7	8.38	2	5	5.13
	5	3	9	3.68	8	16	6.55	3	8	5.19	6	12	6.49	5	7	10.24	4	6	8.48	2	6	4.74
	6	3	9	3.62	5	12	5.79	3	7	6.79	5	11	6.73	5	6	11.10	3	5	8.42	3	9	4.49
	7	3	9	3.90	6	11	6.63	3	8	5.99	6	11	7.22	5	6	10.63	4	6	9.35	3	11	4.26
	8	2	4	5.40	5	12	6.24	4	8	5.92	6	10	7.65	5	6	10.49	5	8	9.61	3	10	4.74
	9	5	14	3.94	8	15	6.99	6	11	7.01	6	11	7.38	6	6	12.18	9	12	9.78	3	9	5.09
	Avg.			4.36			6.62			6.31			7.41			11.10			9.58			4.69
P2	1	8	25	3.11	11	126	1.16	12	40	4.10	12	22	7.59	12	63	2.69	12	54	3.14	11	116	1.30
	2	7	2	40.57	5	16	4.50	12	20	8.58	12	19	8.89	5	9	7.73	8	14	8.27	4	19	3.10
	3	5	14	3.75	3	7	6.43	12	17	9.99	12	16	10.60	3	5	8.30	8	12	9.30	3	11	3.90
	4	8	21	3.80	6	12	6.45	8	12	9.13	12	15	11.21	2	3	11.75	8	12	9.63	12	34	4.91
	5	7	22	3.41	3	7	6.62	8	11	9.97	12	15	10.99	1	1	16.97	8	11	10.67	8	25	4.22
	6	8	22	3.51	3	6	6.79	6	8	9.59	12	14	11.93	12	16	10.78	8	11	9.65	5	15	4.32
	7	7	19	4.14	3	6	7.18	3	6	7.89	13	14	12.55	8	11	9.66	6	8	9.85	5	14	4.83
	8	5	13	4.44	4	6	7.91	8	10	11.44	12	13	12.88	6	4	18.64	8	11	9.86	3	7	5.95
	9	6	13	4.49	12	20	8.16	9	10	11.46	12	13	13.72	5	7	9.75	9	12	10.18	3	9	5.14
	Avg.			4.41			7.75			10.27			13.05			9.70			9.96			5.31

Table B-69. 1st 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	16	3.16	11	112	1.39	12	73	2.36	8	17	6.44	12	114	1.44	11	114	1.38	5	17	4.46
	2	2	6	3.38	5	14	5.15	5	12	6.10	8	16	6.73	8	19	5.72	8	21	4.96	3	10	4.70
	3	4	18	2.55	5	14	5.01	6	3	25.45	12	15	11.73	6	13	6.36	5	13	5.39	3	11	3.17
	4	7	26	2.87	5	12	5.86	8	15	7.35	8	15	7.14	6	11	7.20	3	9	5.09	3	7	6.29
	5	8	24	3.21	2	3	9.14	8	18	6.39	8	16	6.96	6	12	6.93	5	13	5.44	8	19	5.66
	6	5	17	2.98	5	13	5.49	6	10	7.58	8	14	8.10	6	11	7.38	5	12	5.82	8	19	5.96
	7	5	15	3.44	3	7	5.18	4	7	6.99	6	11	7.95	4	8	6.55	5	13	5.73	8	19	6.03
	8	3	10	2.88	3	5	8.22	3	6	7.99	5	0	152.73	6	4	19.09	3	9	5.60	6	13	5.66
	9	5	15	3.37	3	7	6.43	4	7	7.11	12	20	8.48	5	10	6.64	5	12	5.94	3	10	4.65
	Avg.			3.23			6.61			7.36			8.22			6.59			5.76			5.44
P2	1	1	12	1.23	12	174	0.92	12	110	1.45	8	40	2.60	11	98	1.61	11	112	1.40	12	115	1.41
	2	11	68	1.74	8	22	4.69	5	18	4.19	8	36	2.89	4	22	2.77	5	24	2.97	8	39	2.76
	3	12	64	1.94	12	34	4.82	4	5	11.31	8	35	3.01	2	7	4.19	5	25	2.76	5	24	2.90
	4	5	34	1.65	8	19	5.48	2	5	6.79	8	33	3.25	4	13	3.75	3	13	2.77	3	17	2.72
	5	8	48	1.62	8	19	5.84	3	10	4.82	6	21	3.60	4	14	3.64	2	7	4.76	4	4	15.44
	6	5	34	1.47	12	28	5.94	3	10	4.76	8	32	3.41	2	7	5.06	1	3	5.16	12	47	3.55
	7	3	18	1.58	8	18	5.91	3	9	4.98	12	39	4.25	4	13	3.79	1	4	4.68	12	49	3.49
	8	2	11	1.57	3	7	6.15	6	16	4.85	11	41	3.89	4	14	3.76	5	21	3.47	13	49	3.56
	9	5	32	1.71	3	1	35.11	6	16	5.26	12	1	273.63	6	12	6.75	4	13	4.19	13	49	3.57
	Avg.			1.62			6.03			5.03			4.07			4.77			4.11			3.54

Table B-70. 2nd 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	405	0.38	12	85	1.96	12	171	0.96	12	27	6.35	8	16	6.76	12	175	0.92
	2	12	64	2.66	4	9	6.09	13	37	4.66	9	14	8.53	8	14	7.55	7	27	3.46
	3	8	19	5.98	8	12	8.79	13	28	6.31	2	3	11.16	5	9	7.77	7	22	4.55
	4	5	12	5.37	8	11	10.03	13	26	6.93	3	3	11.75	5	9	7.60	12	37	4.49
	5	5	13	5.89	5	8	9.32	13	23	7.58	6	10	8.14	8	13	8.10	5	21	3.60
	6	6	12	6.64	4	6	9.39	13	22	7.86	3	6	7.75	8	12	9.15	3	13	3.33
	7	5	11	6.90	3	3	11.51	13	21	8.48	2	3	9.92	8	12	8.59	8	18	5.83
	8	5	9	7.64	6	6	14.83	13	21	8.31	2	3	10.82	8	12	9.66	12	31	5.31
	9	5	11	7.05	8	10	10.53	13	21	8.33	1	2	8.48	5	8	8.91	13	36	5.08
	Avg.			7.20			12.29			8.37			9.74			9.06			5.41
P2	1	11	596	0.26	12	94	1.72	12	94	1.78	12	112	1.46	12	99	1.65	5	16	4.29
	2	12	58	2.87	12	31	5.35	12	29	5.65	4	0	369.09	5	10	6.61	1	5	3.54
	3	12	44	3.76	12	24	6.79	8	14	7.99	6	3	24.80	3	6	6.81	3	9	5.20
	4	12	35	4.77	7	15	7.04	6	10	7.99	2	3	10.72	0	0	19.09	1	3	5.16
	5	8	17	6.17	12	21	8.09	8	8	13.86	6	10	8.07	1	1	10.18	13	26	6.79
	6	5	13	5.21	12	20	8.29	6	9	8.66	6	10	8.02	1	1	7.83	9	18	6.45
	7	4	19	2.92	12	1	257.54	5	9	8.26	6	10	8.02	13	20	8.98	8	19	6.26
	8	7	25	4.07	8	13	8.34	4	9	5.61	4	7	7.70	8	13	8.46	3	4	10.08
	9	8	19	5.39	8	13	8.67	8	13	8.24	3	6	7.59	5	8	8.05	5	13	5.69
	Avg.			4.13			8.50			7.37			7.77			8.50			5.97
P3	1	12	124	1.29	11	104	1.53	12	79	2.03	12	118	1.41	12	87	1.91	7	23	4.24
	2	5	14	4.67	12	25	6.92	8	14	7.64	6	12	6.88	13	26	6.95	12	36	4.63
	3	12	34	4.95	12	20	8.62	8	13	8.18	6	10	7.73	7	0	458.18	12	33	5.17
	4	8	18	6.22	12	18	9.11	8	13	8.54	3	3	13.95	5	9	8.25	12	32	5.31
	5	8	17	6.29	12	18	9.62	5	9	8.18	3	7	6.98	5	8	8.29	12	31	5.53
	6	12	24	7.05	12	17	10.11	5	9	8.30	2	3	10.06	13	17	10.02	12	30	5.66
	7	8	16	7.11	12	16	10.13	12	2	106.91	1	2	6.79	13	17	10.25	13	29	6.02
	8	8	15	7.20	12	16	10.43	12	18	9.47	0	0	50.91	13	17	10.93	12	28	6.12
	9	4	12	4.46	12	16	10.77	12	17	9.90	3	5	8.06	8	11	9.68	12	25	6.83
	Avg.			6.25			10.44			9.68			7.42			10.29			6.32

Table B-71. 2nd 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	146	1.02	12	94	1.74	12	146	1.15	12	152	1.13	11	83	1.91	12	41	4.18
	2	8	21	5.04	8	16	6.80	6	11	7.49	9	0	631.26	5	9	7.76	12	33	5.14
	3	8	18	6.06	6	11	7.27	8	16	6.98	4	7	7.50	2	3	10.46	8	20	5.27
	4	8	16	6.80	8	14	7.82	8	15	7.74	3	3	10.91	5	7	10.18	8	20	5.43
	5	6	10	7.30	8	14	8.07	5	10	6.34	4	6	8.33	5	9	8.45	7	20	5.11
	6	6	11	7.38	8	13	8.18	6	10	7.89	4	6	8.54	8	12	9.70	16	21	10.65
	7	8	14	7.78	8	13	8.31	8	13	8.11	9	12	10.08	8	11	9.27	8	20	5.10
	8	8	14	8.44	12	18	9.26	8	13	9.07	13	17	10.64	2	3	10.33	5	16	4.51
	9	8	14	7.91	8	13	9.00	4	9	5.56	13	16	10.65	3	6	8.43	3	7	5.63
	Avg.			8.04			8.86			7.58			10.46			9.34			5.08
P2	1	11	432	0.35	12	131	1.28	12	66	2.52	12	112	1.52	12	67	2.38	12	49	3.43
	2	8	19	5.58	6	11	7.22	8	15	7.29	13	27	6.37	8	13	8.41	8	21	5.06
	3	10	13	11.19	6	10	8.22	13	21	8.45	13	22	8.02	12	20	8.44	3	9	4.71
	4	3	8	5.09	4	8	6.16	8	14	7.84	13	20	8.87	8	12	8.89	0	0	12.73
	5	4	6	8.22	2	3	12.19	6	9	8.67	13	19	9.43	6	8	9.00	13	27	6.72
	6	4	8	6.80	3	0	114.54	6	9	8.45	9	12	10.11	3	7	7.19	5	13	5.48
	7	9	14	8.48	1	0	30.55	5	9	8.64	8	12	9.45	3	6	7.58	3	7	5.75
	8	12	22	7.82	4	9	6.60	6	8	9.47	6	9	9.11	1	1	17.62	3	8	4.78
	9	9	14	8.75	6	0	746.66	13	15	11.44	6	9	9.38	3	3	13.20	0	0	33.94
	Avg.			8.35			6.60			9.85			9.32			12.80			5.26
P3	1	8	20	5.10	8	19	5.40	12	122	1.33	12	368	0.45	11	187	0.85	7	31	3.10
	2	8	17	6.53	13	17	10.04	6	10	7.62	8	18	6.32	5	10	6.77	8	3	38.72
	3	4	13	4.48	8	16	6.84	6	3	24.21	9	15	8.07	7	13	7.82	4	17	3.63
	4	8	15	7.37	12	12	13.91	6	10	8.52	13	23	8.08	8	14	7.63	3	10	4.19
	5	8	14	7.87	12	23	7.53	5	6	10.95	13	22	8.25	8	12	8.48	2	4	6.82
	6	8	13	8.90	5	14	5.12	2	3	9.20	9	14	8.75	12	18	9.13	1	2	4.93
	7	6	9	8.45	8	14	7.75	2	3	11.98	13	19	9.48	11	1	108.70	13	30	5.74
	8	6	10	8.11	6	0	231.92	6	1	101.82	9	14	8.76	12	18	9.32	7	22	4.74
	9	6	10	8.18	8	14	8.17	6	8	10.28	13	23	8.13	12	18	9.09	8	19	5.47
	Avg.			8.25			7.96			11.13			8.79			9.20			5.32

Table B-72. 2nd 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	24	4.01	11	138	1.14	12	83	1.96	12	155	1.09	12	152	1.08	8	24	4.54
	2	5	14	4.99	8	17	6.39	8	18	6.11	3	8	5.12	5	11	6.79	5	13	5.47
	3	5	13	5.47	13	26	6.95	6	11	7.03	2	3	7.93	3	6	8.08	12	32	5.31
	4	5	13	5.43	13	25	7.44	8	15	7.29	2	3	8.48	1	1	12.12	13	27	6.35
	5	6	13	6.08	9	15	7.74	12	22	7.70	2	3	10.91	1	0	20.36	13	29	5.96
	6	6	12	6.51	5	10	7.53	12	21	8.36	13	20	9.09	13	18	10.27	12	25	6.84
	7	3	8	6.33	8	14	7.79	12	20	8.47	8	13	8.68	8	1	87.93	13	23	7.58
	8	3	8	6.08	6	9	9.44	12	19	9.06	6	10	7.83	3	5	8.48	13	24	7.25
	9	6	12	7.05	8	13	8.98	12	19	8.87	13	19	9.18	2	2	15.16	13	27	6.53
	Avg.			6.49			8.74			8.80			8.57			8.48			7.12
P2	1	7	22	4.62	12	95	1.72	12	102	1.57	13	28	6.35	12	106	1.63	12	271	0.64
	2	5	11	6.12	12	25	6.82	8	12	8.78	8	13	8.66	8	12	9.15	8	19	5.95
	3	5	11	6.59	13	21	8.66	4	9	6.14	4	6	8.32	8	11	10.14	6	14	5.48
	4	8	15	6.99	12	17	9.86	8	11	10.07	6	9	9.11	6	8	9.92	12	14	12.00
	5	12	22	7.48	12	18	9.53	6	8	9.87	6	10	8.19	5	7	9.91	6	0	173.94
	6	12	22	7.60	12	16	10.33	4	6	8.21	2	3	9.55	6	8	10.28	6	13	5.74
	7	12	21	8.15	8	12	9.38	5	8	9.50	12	16	10.44	8	10	11.43	6	13	6.01
	8	12	19	8.67	8	12	9.84	8	12	9.00	12	14	11.99	6	8	9.70	13	23	7.72
	9	12	19	8.52	8	12	9.60	12	15	11.20	9	12	10.49	6	8	10.34	13	24	7.69
	Avg.			8.45			9.61			9.90			10.98			10.49			7.14
P3	1	12	51	3.28	8	18	6.13	11	114	1.39	12	139	1.16	12	153	1.05	11	472	0.33
	2	8	20	5.43	6	11	7.06	12	33	5.01	6	11	7.35	12	21	7.90	5	14	5.05
	3	8	18	6.14	3	6	7.36	12	28	5.90	12	22	7.87	12	21	7.85	12	29	5.66
	4	8	17	6.39	3	6	7.48	12	24	7.07	12	22	7.87	5	9	7.85	8	18	6.00
	5	8	16	6.59	3	6	7.52	12	22	7.56	13	20	8.72	5	8	7.85	3	7	6.59
	6	6	12	6.32	1	1	11.98	8	15	7.37	13	19	9.22	5	7	8.84	2	3	9.76
	7	8	15	7.07	12	18	9.64	8	14	8.29	12	19	9.30	3	5	9.08	11	23	6.52
	8	12	24	7.07	5	9	8.08	13	19	9.04	8	12	9.20	1	1	12.73	8	9	13.43
	9	12	24	7.09	4	6	8.11	13	18	9.85	6	9	8.74	13	17	10.21	3	11	4.24
	Avg.			7.08			8.61			9.06			9.08			11.02			5.38

Table B-73. 2nd 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	407	0.38	12	183	0.88	12	89	1.88	13	16	10.72	12	50	3.40	8	21	5.04
	2	8	19	5.85	8	23	4.91	8	13	8.28	6	8	9.77	7	13	7.86	5	14	5.16
	3	8	16	7.24	8	21	5.45	8	12	9.57	3	5	9.37	5	8	8.53	5	14	5.25
	4	8	17	7.03	8	20	5.85	8	11	9.58	3	5	8.98	5	8	8.95	6	14	5.79
	5	8	15	7.64	8	19	6.07	8	11	9.86	4	6	9.03	3	4	9.61	8	18	6.09
	6	9	15	8.23	8	18	6.24	8	11	9.75	4	5	9.87	5	8	8.97	5	14	5.34
	7	8	13	8.61	8	18	6.36	6	8	10.13	4	5	9.87	8	10	9.99	4	9	6.03
	8	8	14	8.56	8	17	6.90	8	11	10.52	6	13	5.97	8	11	9.70	12	26	6.45
	9	8	13	8.64	8	17	6.64	8	10	11.02	5	7	10.35	8	11	10.26	8	18	5.91
	Avg.			8.60			6.63			10.56			10.11			9.98			6.13
P2	1	8	22	4.75	12	53	3.01	13	22	8.08	13	21	8.58	12	55	3.15	8	25	4.22
	2	4	9	5.84	12	20	8.59	12	18	9.62	13	18	10.05	5	9	7.44	3	22	1.92
	3	2	3	9.26	8	12	9.21	8	10	10.53	13	17	10.69	2	4	7.95	11	54	2.90
	4	4	9	5.84	6	9	8.48	6	9	9.81	8	12	9.02	6	2	49.64	5	16	4.45
	5	4	8	7.17	8	11	10.43	4	6	9.82	6	8	9.21	3	6	6.25	6	16	4.98
	6	3	5	8.48	12	14	11.65	4	6	8.12	2	2	14.97	3	5	9.06	6	14	5.27
	7	2	4	8.39	12	15	11.73	9	12	10.52	3	0	203.63	1	1	6.57	4	13	4.02
	8	2	4	8.85	12	14	11.79	12	34	4.83	13	13	14.01	9	9	14.05	4	9	5.44
	9	4	7	7.11	12	15	11.42	8	11	10.26	8	10	11.23	13	15	11.30	6	15	5.17
	Avg.			8.12			11.65			10.39			12.62			11.30			4.88

Table B-74. 2nd 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	10	9.82	12	217	0.77	12	198	0.85	12	112	1.45	12	155	1.09	5	14	5.05
	2	5	15	4.69	12	22	7.71	8	15	7.58	12	31	5.43	13	26	6.79	3	9	5.48
	3	8	20	5.82	8	14	8.25	6	11	7.46	8	17	6.15	8	16	7.09	3	6	5.91
	4	8	19	5.81	8	13	8.66	3	7	6.46	8	16	6.70	8	14	7.98	3	8	5.48
	5	5	13	5.59	9	13	9.52	6	10	8.25	8	17	6.31	8	13	8.23	6	9	8.41
	6	8	22	5.16	6	9	8.63	6	10	8.42	4	11	4.81	8	13	8.18	5	14	5.17
	7	8	17	6.86	6	9	8.59	6	10	8.15	8	15	7.61	5	9	8.41	8	15	7.03
	8	8	17	6.89	6	9	9.00	6	10	8.62	5	11	6.90	5	8	9.81	12	30	5.76
	9	13	23	7.46	9	12	10.05	9	12	9.69	12	21	7.88	3	5	9.01	12	29	5.85
	Avg.			7.07			9.21			8.82			7.46			9.07			6.21
P2	1	12	72	2.30	12	90	1.87	12	146	1.13	12	69	2.39	12	135	1.23	8	22	5.03
	2	8	35	3.19	12	33	5.22	12	48	3.46	12	42	3.89	7	18	5.62	8	21	5.43
	3	6	21	3.62	13	27	6.70	9	26	4.66	12	28	6.04	5	11	6.27	4	8	6.03
	4	3	6	7.67	13	25	7.09	4	16	3.04	12	26	6.36	8	15	7.35	2	3	8.69
	5	2	6	5.29	13	23	7.74	5	1	89.70	8	17	6.22	8	15	6.97	2	3	10.05
	6	2	6	5.47	13	22	7.84	4	11	4.81	12	26	6.59	5	10	6.66	4	10	4.88
	7	3	6	5.66	8	15	7.37	3	14	3.54	12	24	6.96	8	16	6.85	6	12	6.53
	8	3	15	2.94	12	20	8.42	4	13	3.94	12	24	7.08	8	15	7.20	12	31	5.44
	9	3	10	3.76	13	21	8.58	6	18	4.34	12	25	6.70	3	5	7.43	13	26	6.70
	Avg.			4.12			8.12			3.94			6.91			7.16			6.22

Table B-75. 3rd 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Locatin	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	37	2.66	12	83	1.99	12	83	1.98	11	571	0.26	12	146	1.13	12	112	1.52
	2	7	30	3.31	5	9	7.43	13	33	5.49	5	10	6.85	8	15	7.43	8	19	5.53
	3	4	18	2.98	8	13	8.03	8	13	8.41	2	3	10.64	8	13	8.46	5	12	6.01
	4	7	27	3.81	12	19	8.83	5	9	8.37	12	20	8.27	12	19	8.94	5	0	305.45
	5	8	24	4.35	12	20	8.55	5	8	8.44	8	11	9.71	13	17	9.98	3	7	6.15
	6	7	25	3.90	13	18	9.69	6	1	127.27	6	9	8.94	8	12	9.33	3	8	5.55
	7	7	33	3.03	12	17	9.97	6	9	8.56	3	5	8.80	8	11	9.78	3	8	5.97
	8	5	16	4.06	13	17	10.35	6	9	8.93	4	1	98.63	8	11	9.61	5	10	6.92
	9	7	28	3.57	7	11	9.39	8	11	10.25	3	5	9.92	8	11	10.30	4	10	5.25
	Avg.			3.55			9.90			9.25			9.36			9.90			6.05
P2	1	8	23	4.58	8	17	6.28	12	87	1.87	12	117	1.44	12	96	1.68	13	965	0.18
	2	5	12	5.96	8	15	6.91	5	13	5.27	6	15	5.23	8	14	8.32	8	22	4.84
	3	2	3	8.27	3	6	7.10	12	23	7.16	1	2	7.51	2	3	10.03	3	8	5.23
	4	2	3	9.73	2	4	8.95	5	10	6.92	13	24	7.39	13	18	9.68	1	3	5.90
	5	3	7	5.91	6	10	7.58	5	11	6.50	9	17	6.97	8	13	8.56	2	4	7.42
	6	2	3	11.07	6	10	7.77	6	11	7.12	8	16	7.24	3	5	8.35	3	10	4.61
	7	13	22	7.96	4	10	5.74	3	8	5.06	4	13	3.95	3	3	12.22	2	4	8.30
	8	13	23	8.01	5	9	7.88	2	3	7.73	1	3	6.45	1	1	11.75	5	15	4.81
	9	8	14	7.78	12	18	9.64	4	8	6.93	2	3	11.10	5	10	7.72	2	9	3.45
	Avg.			7.92			7.76			6.58			5.20			11.98			4.13
P3	1	3	7	6.30	12	146	1.11	11	136	1.16	12	114	1.44	12	116	1.38	3	7	6.81
	2	2	3	10.06	5	9	7.37	5	11	6.27	9	16	7.97	5	13	5.39	5	16	4.29
	3	3	3	11.25	3	5	8.06	3	7	6.89	3	6	7.59	5	14	5.33	5	15	4.43
	4	3	7	6.85	3	6	7.23	1	2	8.10	3	6	6.93	12	40	4.22	5	3	23.50
	5	5	10	6.72	1	3	7.71	1	2	8.48	9	10	12.63	13	24	7.31	5	15	4.48
	6	5	10	6.92	3	4	10.08	2	1	58.18	5	9	7.98	8	17	6.84	8	21	5.29
	7	8	14	7.58	8	0	343.63	1	2	8.48	6	9	8.82	8	16	7.24	5	13	5.09
	8	8	15	7.57	7	11	8.78	3	0	120.91	8	12	9.04	8	16	6.83	5	13	5.21
	9	8	13	8.13	7	11	8.94	1	2	9.70	6	10	8.79	7	17	5.55	5	13	5.38
	Avg.			7.76			8.86			9.09			8.88			6.19			5.23

Table B-76. 3rd 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	110	1.39	12	160	1.00	12	26	6.63	12	150	1.11	12	133	1.24	13	112	1.56
	2	5	11	6.29	8	14	7.59	8	14	7.53	5	11	6.29	55	14	54.68	6	19	4.06
	3	5	1	67.27	3	5	8.10	5	9	7.68	5	11	6.29	13	23	7.69	2	4	6.42
	4	3	6	7.72	3	4	8.64	3	5	8.55	3	4	10.47	8	13	8.80	14	33	5.95
	5	3	7	6.93	2	2	11.88	3	5	7.98	5	9	7.81	8	13	8.93	9	23	5.11
	6	2	3	7.79	2	3	9.63	8	12	9.30	4	9	5.76	8	12	9.74	9	22	5.35
	7	12	24	7.06	13	16	10.72	8	4	28.95	6	3	23.59	4	8	7.27	5	16	4.50
	8	5	9	7.43	8	11	10.07	8	11	9.72	8	12	8.85	8	12	9.64	2	4	7.95
	9	3	6	7.27	8	10	10.84	13	16	10.93	8	12	8.94	8	11	10.40	9	20	5.89
	Avg.			7.25			10.54			10.32			8.89			9.14			6.11
P2	1	12	116	1.41	12	116	1.43	12	89	1.89	12	144	1.19	12	75	2.24	12	518	0.32
	2	7	22	4.66	8	0	1425.43	5	12	5.78	5	14	5.09	12	27	6.34	4	14	3.79
	3	5	14	5.11	5	25	2.78	3	9	5.55	2	3	8.07	5	11	6.75	5	13	5.39
	4	8	20	5.41	2	3	10.80	5	12	6.43	1	1	8.73	3	7	6.20	6	13	5.92
	5	5	13	5.47	8	14	7.67	6	13	5.99	3	11	4.30	2	3	10.05	6	14	6.05
	6	2	3	9.31	8	13	8.30	3	8	6.07	8	15	7.27	5	11	6.86	6	14	5.87
	7	5	0	152.73	6	0	254.54	3	7	5.93	8	16	7.27	2	3	10.33	6	13	5.89
	8	5	12	6.25	3	6	7.04	2	3	10.03	5	10	6.89	1	2	7.75	6	14	6.04
	9	5	13	5.74	12	19	9.08	13	19	9.35	3	7	6.69	12	18	9.50	8	16	6.84
	Avg.			6.00			8.06			8.44			7.15			9.19			6.26
P3	1	5	14	4.92	12	18	9.57	13	34	5.26	11	994	0.16	11	90	1.75	7	31	3.29
	2	5	13	5.57	11	107	1.48	7	10	8.64	3	7	6.54	8	16	7.04	8	25	4.18
	3	6	12	6.18	12	33	5.05	6	10	7.44	3	7	7.27	5	10	7.22	3	11	4.12
	4	6	12	6.47	5	11	6.04	3	6	7.67	2	3	10.91	6	9	8.16	3	11	4.23
	5	3	7	6.62	5	10	6.71	2	3	10.72	2	3	10.76	5	8	8.69	3	11	4.18
	6	2	3	8.17	7	15	6.53	3	6	6.28	4	6	8.22	8	13	8.19	2	3	9.31
	7	2	3	8.29	13	22	8.16	13	21	8.53	6	9	8.77	12	19	8.84	5	16	4.69
	8	4	0	159.09	8	15	7.10	8	14	7.82	6	9	8.48	12	19	9.18	2	3	8.48
	9	3	7	6.97	8	15	7.84	8	13	8.26	6	9	8.56	12	17	10.02	3	10	4.75
	Avg.			6.89			7.73			8.20			8.60			9.34			4.72

Table B-77. 3rd 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	529	0.28	12	67	2.48	12	82	2.02	12	85	1.95	12	85	1.95	12	710	0.24
	2	3	7	5.79	7	14	7.44	6	10	7.80	13	24	7.23	3	5	8.62	8	25	4.41
	3	0	0	10.18	5	10	6.64	4	8	6.72	8	15	7.20	3	3	12.55	3	9	4.31
	4	3	6	6.52	4	9	6.63	2	3	9.95	6	10	8.03	13	15	11.27	5	17	4.21
	5	5	11	6.50	4	9	6.58	2	3	10.32	6	10	8.05	8	10	10.98	3	8	4.65
	6	12	23	7.60	3	4	8.71	5	10	7.50	4	10	5.05	5	7	9.96	3	9	4.34
	7	8	14	7.33	4	11	5.46	4	6	8.33	4	9	5.66	5	7	10.64	4	3	17.19
	8	12	29	5.78	12	16	10.68	6	10	8.15	4	8	6.59	5	7	10.66	2	4	6.64
	9	8	13	7.83	12	16	10.45	4	8	6.21	3	7	6.79	5	7	11.15	8	20	5.67
	Avg.			6.98			10.57			7.57			6.35			10.81			6.15
P2	1	11	119	1.28	12	121	1.34	11	1054	0.15	12	156	1.05	12	104	1.58	13	138	1.26
	2	6	21	3.58	12	28	6.12	8	14	7.19	6	0	#DIV/0!	8	11	9.84	6	14	5.63
	3	4	9	6.53	12	22	7.80	8	12	9.02	2	3	11.10	8	10	10.26	9	18	6.63
	4	5	2	39.24	12	18	9.29	7	11	9.21	4	5	10.10	12	17	9.63	3	9	5.32
	5	8	13	8.28	5	9	8.25	5	7	10.36	3	4	10.80	8	10	10.72	2	4	7.68
	6	8	13	8.25	3	4	10.00	5	8	8.74	2	2	13.20	6	7	10.40	2	4	7.71
	7	5	9	8.64	12	16	10.60	5	7	10.18	12	14	12.69	5	7	11.28	13	23	8.13
	8	3	5	7.74	8	11	9.49	5	7	9.85	6	0	2138.15	8	9	12.11	13	22	8.31
	9	3	5	9.22	3	4	10.87	5	7	9.68	6	7	10.51	8	9	11.62	6	12	6.78
	Avg.			8.53			10.32			9.91			11.60			11.67			7.74
P3	1	11	130	1.15	12	112	1.47	12	894	0.18	12	125	1.28	12	156	1.05	13	272	0.66
	2	4	16	3.77	3	7	6.85	3	7	5.44	5	11	6.20	8	13	8.10	3	9	4.82
	3	4	13	4.80	2	3	9.90	2	2	11.61	0	0	25.45	3	5	8.92	13	46	3.88
	4	5	13	4.76	1	2	7.58	13	20	9.23	12	17	9.99	4	6	9.20	3	7	5.63
	5	3	8	4.99	5	10	6.72	5	12	5.96	5	8	8.77	2	2	14.92	6	12	6.34
	6	3	5	6.74	3	7	6.89	8	12	9.15	3	4	8.93	1	1	13.09	2	3	9.76
	7	3	5	7.06	3	6	7.37	5	9	8.06	2	2	10.91	0	0	#DIV/0!	5	11	6.52
	8	2	6	4.51	1	2	9.14	8	11	9.60	5	8	8.73	2	3	13.31	3	7	7.19
	9	2	4	7.95	3	6	7.55	5	8	8.33	2	2	11.61	2	2	14.42	2	3	10.76
	Avg.			6.51			8.02			8.66			10.42			13.87			6.85

Table B-78. 3rd 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	25	4.05	12	138	1.19	12	66	2.63	8	17	6.14	12	202	0.84	11	251	0.60
	2	8	21	4.86	8	14	7.67	5	7	10.24	3	7	6.75	9	14	8.48	4	6	10.45
	3	8	19	5.67	8	12	8.73	8	9	12.56	1	2	7.90	8	13	8.94	3	9	4.61
	4	13	28	6.24	6	4	17.91	7	1	97.74	1	1	19.09	4	9	5.88	5	16	4.22
	5	12	27	6.50	8	10	10.30	5	7	11.28	2	3	9.81	5	8	8.73	4	18	3.04
	6	8	16	6.82	12	14	12.16	6	6	13.29	1	2	8.48	8	12	9.84	7	17	5.91
	7	8	15	7.18	8	10	10.63	8	8	13.08	3	4	9.82	8	11	10.18	8	1	149.90
	8	8	16	6.70	8	10	11.00	8	8	13.02	3	6	7.59	8	11	10.47	5	13	5.47
	9	8	15	7.18	8	10	11.34	13	13	13.63	4	1	76.36	8	11	10.86	5	13	5.12
	Avg.			7.02			10.99			13.24			8.71			10.50			5.29
P2	1	12	109	1.56	12	38	4.47	12	159	1.06	12	140	1.19	12	86	1.93	8	21	4.97
	2	13	44	3.99	8	14	8.17	13	25	7.10	9	20	5.90	3	5	7.01	2	4	6.94
	3	8	22	4.66	3	8	4.54	6	10	7.96	4	9	5.68	12	23	7.12	3	10	4.36
	4	5	16	4.43	13	23	7.57	6	17	4.83	1	3	6.27	5	9	7.15	2	5	6.47
	5	8	21	4.97	12	22	7.87	6	9	8.09	12	20	8.24	4	8	6.92	2	5	5.90
	6	8	20	5.40	13	22	7.88	6	11	7.43	8	16	7.11	8	13	8.48	1	4	5.42
	7	8	20	5.32	13	22	8.16	4	7	7.79	8	15	7.50	8	13	8.67	12	26	6.51
	8	5	15	4.76	13	20	9.08	4	10	5.84	6	8	9.97	5	9	8.23	8	19	5.49
	9	3	8	5.00	12	28	6.07	6	8	9.00	3	12	3.90	8	3	37.38	5	14	4.74
	Avg.			5.03			7.77			7.54			8.74			8.45			5.58

Table B-79. 3rd 8" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	165	0.95	11	775	0.20	12	98	1.72	12	150	1.11	13	113	1.55	8	19	5.54
	2	3	9	5.43	3	9	5.31	5	10	7.53	9	14	8.30	6	14	5.59	6	13	5.91
	3	1	3	5.82	12	25	6.58	4	7	7.11	5	10	7.19	8	17	6.09	3	8	5.68
	4	12	23	7.09	8	15	7.35	3	6	7.32	6	10	7.46	8	17	6.39	6	12	6.38
	5	12	23	7.42	5	11	6.85	3	2	25.45	4	7	8.84	8	16	6.65	13	24	7.39
	6	8	13	8.51	3	7	6.40	2	3	12.73	3	6	8.00	12	21	8.26	8	1	171.82
	7	8	13	8.18	4	8	6.82	2	2	13.17	3	6	7.62	8	15	7.12	8	16	6.82
	8	5	10	7.30	6	11	7.22	2	2	13.64	3	6	8.02	8	15	7.25	6	12	6.68
	9	12	20	8.64	6	10	8.15	3	1	70.00	6	9	8.48	12	20	8.65	6	11	6.80
	Avg.			8.04			7.40			13.40			8.04			7.68			6.77
P2	1	11	247	0.64	12	285	0.56	12	29	5.74	12	219	0.76	12	70	2.47	12	188	0.90
	2	12	35	4.69	12	34	4.71	5	12	5.80	6	11	6.84	5	12	6.13	2	4	5.49
	3	8	18	5.95	4	12	4.49	5	12	6.03	3	8	6.36	4	2	38.49	13	31	5.56
	4	7	16	6.27	8	15	7.08	2	4	8.76	2	3	9.95	1	3	7.38	12	32	5.38
	5	12	25	6.81	5	10	6.88	3	8	5.68	2	3	7.57	12	20	8.72	13	29	6.12
	6	12	26	6.63	2	2	11.61	3	4	8.48	4	8	6.52	12	19	9.02	7	20	5.12
	7	7	15	6.73	11	20	7.89	2	3	7.00	4	7	7.00	5	10	7.69	3	7	5.20
	8	3	7	6.29	9	1	113.13	0	0	101.82	6	11	7.15	4	7	7.93	13	24	7.28
	9	5	11	6.46	4	10	6.16	2	3	7.97	8	14	8.08	4	6	7.81	5	16	4.25
	Avg.			6.49			7.03			7.49			7.41			7.81			5.58

Table B-80. 1st 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	112	1.24	12	74	2.28	12	111	1.55	12	106	1.63	13	103	1.69	13	147	1.21	11	24	6.65
	2	13	52	2.68	12	55	3.03	8	16	6.58	13	31	5.94	8	17	6.59	14	54	3.59	4	1	60.16
	3	13	42	3.35	13	50	3.50	5	10	6.51	13	28	6.52	8	16	7.05	10	18	8.07	5	0	181.01
	4	14	38	3.68	9	43	3.06	6	12	7.32	13	23	8.16	7	12	7.75	10	18	7.89	7	20	4.98
	5	10	29	3.68	9	42	3.10	12	68	2.47	10	19	7.51	5	10	7.48	8	14	8.34	7	20	5.13
	6	5	28	1.96	7	29	3.56	12	23	7.37	7	12	7.94	4	7	7.81	7	11	8.88	10	24	5.41
	7	11	30	3.69	6	23	3.56	13	12	15.10	5	10	7.66	4	7	7.47	7	10	8.97	7	19	5.29
	8	10	30	3.63	5	11	5.76	8	14	7.54	7	11	8.73	6	2	35.82	7	10	9.59	4	12	5.06
	9	10	30	3.60	3	11	3.99	6	11	7.82	7	12	8.17	4	9	6.42	7	10	9.43	4	12	5.01
	Avg.			3.64			4.43			7.68			8.18			6.95			9.33			5.12
P2	1	14	94	1.51	11	274	0.54	12	29	5.75	13	673	0.26	13	648	0.27	10	18	7.96	12	619	0.26
	2	8	19	4.24	12	68	2.50	13	27	6.85	10	19	7.06	13	30	5.99	7	10	8.80	12	96	1.79
	3	6	15	4.37	6	19	4.31	13	24	7.53	8	13	8.70	13	24	7.65	7	10	8.98	7	26	3.56
	4	5	14	3.96	4	13	4.35	13	24	7.72	4	9	6.50	10	16	8.85	5	8	9.32	9	33	3.71
	5	5	12	4.37	3	10	4.29	13	22	8.42	5	7	9.89	13	20	9.01	7	10	9.85	13	35	5.23
	6	5	11	4.53	4	15	3.95	13	21	8.88	5	7	10.29	10	14	10.41	5	8	9.28	5	25	2.61
	7	10	20	5.24	6	18	4.58	14	20	9.37	13	17	10.94	10	13	10.49	6	7	10.40	13	36	5.14
	8	8	15	5.64	12	27	6.02	13	19	9.70	13	17	11.14	8	11	11.06	5	7	10.29	13	39	4.63
	9	6	14	4.79	13	32	5.66	10	17	8.60	10	12	11.75	7	9	10.00	7	9	10.14	13	38	4.75
	Avg.			5.22			5.42			9.23			11.28			10.52			10.28			4.84
P3	1	13	424	0.31	11	739	0.21	13	36	4.95	8	16	6.66	8	12	8.62	12	104	1.65	6	19	4.49
	2	10	29	3.57	9	38	3.36	8	14	7.71	10	20	6.78	4	7	6.81	13	28	6.39	10	30	4.75
	3	10	27	3.90	8	25	4.13	13	22	7.94	6	11	7.86	3	4	8.41	8	12	9.02	10	27	5.15
	4	13	32	4.43	6	17	4.82	13	21	8.52	10	15	8.94	3	4	11.64	7	10	9.47	8	21	5.29
	5	11	24	4.63	6	17	4.72	8	13	8.83	7	9	10.18	4	5	10.10	7	9	10.23	8	21	5.33
	6	10	23	4.69	6	16	5.12	8	13	8.90	5	8	9.35	4	5	10.18	7	9	10.84	8	21	5.45
	7	8	18	4.79	6	16	5.47	7	9	10.76	3	8	6.20	6	1	75.42	6	7	10.56	7	18	5.31
	8	8	17	5.01	3	12	3.98	8	12	9.21	3	4	11.05	5	7	10.73	5	7	10.83	5	14	4.86
	9	14	27	5.30	6	14	5.92	7	10	9.60	8	11	10.00	5	6	11.07	4	6	9.65	7	18	5.26
	Avg.			5.04			5.13			9.86			10.52			10.90			10.35			5.14

Table B-81. 1st 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	47	2.91	7	26	3.89	12	106	1.62	13	104	1.71	13	163	1.08	13	114	1.54	12	124	1.34
	2	10	37	2.80	8	26	4.04	6	14	6.22	13	29	6.14	7	11	8.36	10	19	7.24	13	44	4.04
	3	8	30	2.83	6	19	4.46	4	7	7.48	13	25	7.41	5	8	8.29	7	11	8.67	13	34	5.23
	4	8	30	2.83	6	18	4.50	3	4	9.65	10	18	7.86	5	8	8.69	10	15	9.30	13	31	5.78
	5	8	30	2.87	6	18	4.51	6	12	7.32	10	17	8.08	5	8	8.94	7	11	9.15	10	26	4.99
	6	8	30	2.81	6	17	4.97	5	9	7.39	8	13	8.28	5	8	8.92	7	1	195.80	12	37	4.72
	7	7	24	2.89	6	18	4.75	5	9	7.66	8	13	8.48	6	10	9.26	8	12	9.65	13	28	6.39
	8	7	16	4.41	8	22	4.80	6	0	386.90	8	12	8.51	5	8	8.97	10	13	10.63	13	28	6.25
	9	7	23	2.91	8	21	5.08	13	20	8.79	8	13	8.38	5	7	9.53	8	11	10.22	10	23	6.23
	Avg.			3.40			4.88			8.22			8.46			9.25			10.17			6.29
P2	1	13	96	1.41	11	136	1.11	12	116	1.40	13	146	1.22	13	141	1.25	13	113	1.59	10	216	0.66
	2	10	24	4.24	7	31	3.22	13	29	6.01	10	18	7.83	8	15	7.40	13	24	7.50	7	23	3.99
	3	7	23	3.23	6	21	3.73	8	15	7.14	8	13	9.03	8	13	8.51	13	18	9.99	6	18	4.93
	4	8	17	5.07	3	11	4.48	5	8	7.89	13	20	9.32	11	13	11.36	13	18	10.64	6	18	4.86
	5	8	17	4.98	5	14	4.77	5	9	7.78	13	19	9.72	13	20	9.18	14	17	10.83	6	17	4.99
	6	7	13	5.36	3	11	4.37	3	6	7.88	13	18	9.83	14	19	10.14	13	16	11.74	5	14	4.96
	7	7	14	5.05	13	30	6.02	5	8	8.35	13	17	11.06	8	14	8.15	13	15	12.23	5	14	4.90
	8	7	14	5.34	13	31	5.73	5	8	8.75	13	17	11.15	13	17	10.98	11	13	11.36	5	13	5.26
	9	8	15	5.69	13	29	6.23	13	19	8.98	13	17	10.86	14	15	12.21	11	13	11.58	5	13	5.36
	Avg.			5.36			5.99			8.70			11.02			10.45			11.72			5.17
P3	1	12	678	0.18	10	36	3.69	13	42	4.20	13	500	0.35	12	741	0.23	13	119	1.47	13	86	2.06
	2	6	28	2.10	10	32	4.38	13	28	6.31	8	17	6.72	10	22	6.31	13	30	6.10	13	77	2.27
	3	4	19	2.18	10	29	4.73	13	24	7.42	7	12	7.55	8	13	8.46	13	25	7.40	6	20	3.84
	4	4	20	2.13	8	21	5.24	13	22	8.08	7	11	8.34	7	10	8.88	13	24	7.81	6	20	4.21
	5	4	22	2.07	8	20	5.47	13	20	8.87	7	11	8.76	7	10	9.06	10	17	8.48	13	40	4.51
	6	6	25	2.51	8	20	5.72	10	16	8.48	8	13	8.59	7	10	9.29	10	16	9.08	13	33	5.40
	7	6	26	2.41	10	24	5.92	12	18	9.69	10	16	9.05	7	10	9.15	10	16	9.08	10	28	4.65
	8	8	31	2.54	10	23	6.21	13	18	9.91	8	13	9.01	8	12	9.84	7	10	9.66	13	32	5.55
	9	8	31	2.60	10	23	6.14	10	15	9.01	13	19	9.31	22	12	26.22	7	10	9.22	10	29	4.60
	Avg.			2.52			6.09			9.54			9.12			9.49			9.32			4.93

Table B-82. 1st 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	119	1.09	7	30	3.29	13	39	4.60	12	111	1.48	3	7	6.83	6	10	8.11	7	31	3.34
	2	10	30	3.48	6	21	3.96	13	29	6.13	9	19	6.71	8	16	6.81	10	18	7.70	12	59	2.89
	3	10	24	4.30	4	15	4.24	13	26	7.07	8	14	7.87	8	15	7.29	13	23	8.16	12	41	4.11
	4	15	16	10.10	6	19	4.55	12	1	239.57	5	10	6.71	8	15	7.71	13	20	9.07	9	31	4.13
	5	6	13	5.20	4	0	178.18	10	19	7.47	8	13	8.43	8	15	7.71	13	17	10.51	9	29	4.35
	6	7	12	5.87	3	10	4.52	8	15	7.60	8	12	8.75	8	14	8.20	13	17	10.75	10	29	4.50
	7	8	15	5.58	3	6	6.15	8	15	7.47	13	10	18.04	10	17	8.41	13	18	10.36	5	23	3.18
	8	7	11	5.88	5	13	5.01	8	14	7.96	8	12	9.04	13	21	9.02	13	18	10.07	10	27	4.95
	9	7	11	6.29	8	13	8.13	6	1	93.33	8	12	9.18	10	17	8.08	8	14	7.37	7	21	4.95
	Avg.			5.92			6.43			7.71			9.11			8.50			9.27			4.36
P2	1	13	135	1.03	10	153	0.94	8	17	6.30	8	14	7.64	13	176	1.00	8	15	7.29	10	12	11.77
	2	10	32	3.17	6	25	3.20	13	28	6.62	5	8	8.82	8	15	7.46	5	9	7.88	10	25	5.86
	3	10	34	2.97	4	17	3.63	7	12	7.46	2	4	8.85	8	15	7.57	5	9	8.25	10	21	6.68
	4	10	33	3.07	5	17	4.17	7	11	8.22	2	2	11.22	7	12	7.54	7	10	8.87	8	17	6.59
	5	10	44	2.25	5	16	3.99	8	14	8.12	3	3	12.09	8	14	8.10	8	13	8.72	10	20	7.08
	6	13	63	2.07	3	11	4.32	7	9	10.27	3	3	15.27	8	14	8.02	7	10	9.11	10	20	7.04
	7	13	40	3.33	5	15	4.80	7	11	8.64	9	14	9.34	5	0	1679.9 ₈	5	8	8.69	13	10	18.21
	8	13	33	4.03	5	14	4.88	6	9	8.48	13	22	8.44	8	13	8.53	5	8	8.77	10	20	7.03
	9	13	36	3.81	8	19	5.77	5	9	8.19	19	11	23.19	10	16	8.93	8	12	9.47	12	23	7.13
	Avg.			3.72			5.15			8.44			8.89			8.73			8.98			7.08
P3	1	13	56	2.44	12	58	2.92	12	138	1.17	13	129	1.40	13	136	1.33	13	167	1.07	9	31	3.80
	2	8	24	3.37	8	25	4.23	8	18	5.78	13	25	7.19	13	29	6.42	13	24	7.64	9	23	5.31
	3	7	17	3.98	6	17	4.65	5	16	4.42	13	20	9.04	13	23	8.13	13	21	8.82	7	17	5.53
	4	5	13	4.05	3	9	4.89	5	12	5.26	13	19	9.45	13	22	8.38	13	20	9.53	5	13	5.69
	5	5	13	4.10	4	9	6.25	6	12	7.13	13	18	9.94	10	17	8.57	14	19	10.16	5	13	5.78
	6	7	16	4.28	3	10	4.84	6	12	7.32	13	17	10.79	8	13	8.77	13	18	10.64	7	17	5.68
	7	7	15	4.64	2	5	4.94	6	11	7.57	13	16	10.84	8	13	9.14	9	11	10.36	6	12	6.60
	8	7	15	4.69	3	8	5.63	8	1	223.21	13	17	10.37	7	10	9.24	8	11	10.40	4	9	5.86
	9	5	13	4.28	4	13	4.95	8	14	8.07	13	17	10.40	10	15	9.67	8	11	10.78	3	10	4.97
	Avg.			4.53			5.17			7.82			10.54			9.35			10.51			5.81

Table B-83. 1st 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	440	0.31	10	37	3.78	13	28	6.43	14	92	2.10	6	13	6.64	13	207	0.86	11	127	1.25
	2	7	23	3.06	8	24	4.46	13	22	8.07	11	16	9.31	6	12	6.85	13	32	5.77	13	80	2.27
	3	7	16	4.16	7	18	5.26	12	20	8.64	8	13	9.06	6	0	330.90	75	22	47.41	13	60	2.99
	4	7	16	4.35	7	16	5.64	13	18	9.52	7	11	8.86	8	14	7.90	8	15	7.16	10	34	3.88
	5	7	15	4.63	7	17	5.39	13	18	9.76	7	10	9.53	7	12	7.56	6	12	7.37	7	28	3.69
	6	7	15	4.63	4	16	3.78	13	17	10.42	8	12	9.45	6	11	7.89	8	15	7.35	4	15	3.56
	7	8	18	4.80	7	16	5.74	13	17	10.11	8	12	9.74	7	10	8.87	8	14	8.01	2	9	3.73
	8	8	18	4.88	7	15	6.28	12	18	9.47	8	12	9.21	10	9	16.20	13	22	8.41	14	43	4.39
	9	8	17	5.05	7	15	6.15	13	17	10.23	7	10	9.64	7	10	9.11	8	14	7.95	6	17	5.19
	Avg.			4.91			6.06			9.94			9.53			8.99			8.13			4.44
P2	1	13	125	1.08	11	405	0.38	8	14	7.75	10	17	8.18	13	168	1.11	13	27	6.93	5	19	3.83
	2	10	28	3.71	9	34	3.84	5	9	7.18	8	12	8.97	10	21	6.59	13	23	7.75	6	19	4.31
	3	8	19	4.28	13	44	4.17	5	8	8.20	8	0	421.81	69	19	50.49	13	21	8.73	6	20	4.44
	4	7	15	4.58	10	26	5.13	6	9	9.29	8	11	10.37	10	18	8.01	13	20	9.28	8	22	4.79
	5	7	14	4.89	6	15	5.92	6	9	9.44	8	11	10.22	11	17	8.50	13	18	9.96	8	21	5.19
	6	7	15	4.90	6	14	5.95	13	17	10.09	8	10	10.74	8	14	8.44	13	17	10.63	8	21	5.27
	7	8	18	4.95	5	11	6.29	8	11	9.85	8	11	10.26	7	10	8.94	10	13	10.97	8	20	5.50
	8	11	21	5.27	13	28	6.53	6	9	9.56	10	13	11.00	8	13	9.23	8	11	10.56	8	19	5.58
	9	13	27	5.21	8	16	6.59	6	9	9.91	10	13	10.78	8	13	8.98	8	11	10.64	13	30	6.04
	Avg.			5.14			6.47			9.77			10.68			9.05			10.72			5.71

Table B-84. 1st 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	18	4.52	7	26	3.99	12	440	0.38	14	100	1.89	12	107	1.61	13	61	2.93	8	22	4.74
	2	8	18	4.79	9	23	5.32	13	30	5.82	8	16	7.29	8	23	4.68	13	26	6.99	6	17	5.00
	3	8	17	5.03	6	16	5.40	12	26	6.63	8	15	7.58	8	22	5.05	8	14	7.61	6	17	5.08
	4	8	17	5.26	6	15	5.96	10	18	7.16	8	15	7.73	8	21	4.99	8	14	7.94	7	22	4.44
	5	8	16	5.28	7	15	6.11	13	21	8.11	7	13	7.30	8	20	5.58	7	12	7.69	6	17	4.92
	6	7	13	5.34	6	14	6.22	12	22	7.75	8	15	7.37	8	20	5.52	8	13	8.41	7	14	7.23
	7	7	13	5.40	5	11	6.23	12	20	8.65	5	12	5.91	10	0	-	7	11	8.42	6	16	5.24
	8	13	31	4.37	6	14	6.24	9	16	7.95	5	10	7.10	10	22	6.42	6	13	6.40	5	14	4.63
	9	13	24	5.71	8	16	6.72	7	13	8.06	5	11	6.79	13	27	6.72	8	12	9.41	12	30	5.68
	Avg.			5.16			6.40			8.22			6.60			6.57			8.08			5.18
P2	1	13	170	0.79	3	13	3.33	8	27	3.91	8	27	4.05	13	113	1.58	13	129	1.35	13	80	2.27
	2	13	41	3.33	3	21	2.02	6	19	4.39	6	19	4.28	10	36	3.81	13	44	4.11	13	62	2.96
	3	10	25	4.08	5	39	1.69	6	19	4.48	7	19	4.70	10	34	4.08	13	43	4.18	10	50	2.67
	4	8	19	4.50	6	26	3.26	6	19	4.57	5	14	4.64	10	33	4.22	13	41	4.32	8	38	2.99
	5	7	15	4.58	6	24	3.44	6	1	115.21	4	10	5.03	11	0	309.69	13	39	4.72	8	37	2.98
	6	7	15	4.69	6	24	3.56	7	18	5.09	5	15	4.74	14	19	10.57	13	39	4.68	6	28	3.18
	7	7	15	4.63	8	31	3.36	5	14	4.90	5	14	4.74	13	34	5.40	13	36	4.86	5	21	3.38
	8	7	14	4.71	4	17	3.58	6	17	5.15	5	14	5.08	13	35	5.34	13	36	4.94	5	22	3.41
	9	8	16	5.13	3	13	3.73	6	17	4.99	5	14	5.05	13	33	5.54	10	33	4.25	5	20	3.45
	Avg.			4.82			3.56			5.01			4.95			5.42			4.69			3.41

Table B-85. 2nd 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	171	0.78	13	118	1.49	13	109	1.62	12	141	1.22	13	537	0.33	13	558	0.32
	2	12	94	1.75	13	27	6.94	18	16	15.96	8	13	8.43	7	5	19.09	10	28	4.90
	3	4	10	5.61	13	21	8.74	7	12	7.43	6	9	9.02	4	10	4.99	10	27	5.18
	4	3	6	6.52	8	13	8.71	5	4	19.03	4	6	9.19	11	21	7.09	8	20	5.50
	5	2	2	10.00	7	10	9.97	5	9	7.97	7	9	10.55	10	20	7.30	4	16	3.49
	6	6	13	6.46	6	8	10.39	4	7	7.74	5	8	9.50	8	15	7.72	6	16	5.30
	7	3	4	10.72	4	6	9.57	8	14	8.53	3	5	6.74	7	12	7.82	14	28	6.66
	8	5	9	7.21	4	4	15.63	7	11	8.61	3	4	11.05	9	14	8.21	8	18	5.86
	9	3	7	6.89	4	6	9.83	7	10	8.95	8	10	10.87	8	14	8.13	8	18	6.00
	Avg.			7.05			9.70			8.70			10.96			8.05			6.17
P2	1	2	4	6.23	13	107	1.69	13	135	1.35	13	27	6.81	13	273	0.65	13	50	3.68
	2	3	8	5.04	7	12	7.99	10	21	7.00	8	13	8.64	8	12	8.70	8	21	5.37
	3	6	16	5.15	5	9	7.98	10	18	7.95	8	12	9.57	8	11	9.86	10	27	5.24
	4	13	39	4.56	6	9	8.37	10	17	8.50	6	10	8.89	5	1	140.98	10	26	5.34
	5	8	18	5.80	5	9	8.48	8	13	8.59	6	9	9.10	7	9	10.84	8	20	5.58
	6	4	11	5.70	7	11	8.96	8	12	9.27	5	8	9.37	5	7	11.28	6	15	5.08
	7	3	8	6.20	7	10	9.20	8	12	9.43	7	9	10.14	7	8	11.50	7	13	7.18
	8	3	8	6.33	7	10	9.52	8	12	9.52	8	11	10.15	6	7	11.50	6	16	5.41
	9	4	7	7.44	6	8	9.55	8	12	9.61	8	11	10.18	5	7	10.24	13	26	7.10
	Avg.			6.66			9.42			9.52			10.16			11.08			6.56
P3	1	9	704	0.18	13	109	1.65	7	13	7.36	12	99	1.75	10	19	7.33	13	95	1.96
	2	2	6	5.69	8	13	8.87	5	9	7.85	8	15	7.20	8	13	8.53	13	55	3.37
	3	3	6	6.05	8	12	9.84	5	9	8.30	7	10	9.18	13	10	17.82	13	33	5.72
	4	7	22	4.34	6	7	10.29	7	10	8.64	4	6	9.26	6	10	9.07	14	32	5.91
	5	4	11	4.68	8	11	10.75	5	9	8.15	2	3	9.81	7	10	9.57	13	31	5.83
	6	3	7	5.72	7	8	11.82	7	10	9.26	3	5	9.12	7	10	9.35	10	24	5.74
	7	3	6	6.60	6	7	11.58	5	8	8.57	5	0	232.72	7	10	9.56	8	19	5.81
	8	3	6	6.36	11	7	21.78	5	8	9.37	5	8	9.81	8	10	11.99	6	15	5.39
	9	3	7	6.07	6	6	12.18	9	9	14.48	8	11	10.67	8	11	10.67	6	16	5.54
	Avg.			6.35			12.29			8.97			10.24			10.74			5.58

Table B-86. 2nd 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	4	13	3.77	13	102	1.78	13	356	0.51	14	25	7.64	12	116	1.46	7	20	4.58
	2	5	17	3.82	14	29	6.54	7	12	7.56	8	13	8.59	8	14	7.82	7	19	4.74
	3	13	42	4.25	8	14	8.32	5	9	8.37	16	10	21.73	6	11	7.78	6	18	4.88
	4	10	30	4.51	8	14	8.46	6	8	9.08	5	8	8.93	5	8	8.33	7	20	4.60
	5	8	21	5.07	8	13	8.92	5	9	8.64	5	8	9.06	5	8	8.81	6	18	4.81
	6	6	18	4.72	7	9	10.18	6	8	9.04	7	1	184.05	5	8	8.73	7	19	4.67
	7	5	7	10.89	6	7	10.24	6	9	8.64	7	9	9.80	7	10	9.11	7	19	4.96
	8	3	9	5.04	7	8	11.23	6	8	9.45	9	11	10.50	8	12	9.38	8	22	5.33
	9	3	9	5.30	4	7	7.98	7	9	9.67	11	13	11.03	8	12	8.92	6	14	6.42
	Avg.			5.17			9.82			9.25			10.44			9.14			5.57
P2	1	7	21	4.85	13	84	2.19	13	26	7.08	11	19	7.88	13	75	2.34	13	50	3.58
	2	4	11	5.70	8	15	7.72	10	17	8.16	9	13	9.16	8	12	9.21	10	25	5.56
	3	2	4	8.09	8	7	17.07	8	13	8.82	8	13	9.23	6	9	9.20	8	19	5.53
	4	8	16	6.81	7	11	8.83	8	12	9.42	9	12	9.89	3	3	13.09	10	22	6.42
	5	5	9	6.87	5	8	8.76	7	10	9.40	9	11	10.36	3	3	11.60	10	22	6.34
	6	4	5	11.57	5	9	8.41	7	10	9.43	14	18	10.23	4	5	9.94	10	21	6.63
	7	4	9	7.31	4	6	9.02	7	10	9.55	11	0	330.90	13	14	12.69	11	21	7.04
	8	5	8	8.05	7	10	9.46	8	12	9.78	14	0	537.37	8	9	11.70	8	18	6.43
	9	3	7	7.15	6	8	9.13	8	12	9.74	14	16	12.06	14	12	15.19	8	17	6.61
	Avg.			7.50			9.20			9.69			12.06			13.19			6.70
P3	1	10	178	0.80	2	3	7.67	12	119	1.45	6	14	6.35	13	103	1.73	13	170	1.04
	2	7	57	1.59	5	11	6.57	8	17	6.66	6	13	6.67	16	16	13.67	13	77	2.29
	3	3	8	5.28	7	14	7.10	7	12	7.65	5	10	7.07	9	15	7.74	8	23	4.77
	4	3	7	6.30	7	13	7.32	7	12	7.79	5	9	7.60	5	14	4.79	7	24	3.98
	5	3	7	6.59	6	10	7.38	5	10	7.57	5	10	6.75	7	11	8.19	6	16	4.87
	6	3	8	6.27	5	10	7.72	5	9	7.98	5	9	7.65	6	9	8.48	6	15	5.21
	7	3	7	6.62	6	10	7.93	7	11	8.48	5	9	7.46	6	9	8.87	5	14	4.72
	8	3	7	6.40	6	10	7.83	7	1	174.54	10	19	7.35	6	9	8.75	3	10	4.68
	9	3	7	6.60	6	10	7.47	7	11	8.58	13	22	8.45	7	11	8.93	3	14	3.02
	Avg.			6.54			7.74			8.69			7.75			8.85			4.14

Table B-87. 2nd 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	4	11	4.63	13	570	0.31	13	614	0.29	13	107	1.63	13	57	3.18	7	20	4.60
	2	3	6	6.32	7	12	7.82	8	14	8.01	8	13	8.46	6	7	11.91	3	12	3.93
	3	3	7	5.99	4	6	8.17	5	8	8.16	8	12	8.54	5	6	11.75	4	14	3.87
	4	4	2	26.40	7	10	8.81	5	9	7.94	8	12	9.26	6	9	10.04	3	7	4.82
	5	3	7	6.06	7	10	9.11	3	6	8.31	6	10	8.89	8	7	16.47	4	13	4.32
	6	3	6	7.22	5	8	8.98	3	5	9.84	8	7	15.94	6	6	13.35	9	28	4.28
	7	2	4	9.41	5	8	9.01	5	8	8.88	9	8	16.26	4	5	11.52	6	17	4.60
	8	3	7	6.44	7	2	54.46	5	8	8.57	3	5	9.68	4	4	12.99	6	17	4.53
	9	2	4	7.59	7	9	9.72	14	17	11.26	3	5	10.01	2	2	16.64	4	12	4.63
	Avg.			7.81			9.36			9.57			9.85			12.25			4.59
P2	1	10	142	0.94	13	96	1.92	10	17	8.35	13	68	2.66	13	65	2.68	13	364	0.48
	2	3	9	4.35	10	19	7.66	10	17	8.41	10	16	8.98	10	0	865.44	7	30	3.37
	3	4	16	3.96	8	13	8.82	9	13	9.27	7	9	10.32	7	9	10.41	6	20	4.32
	4	3	11	4.26	8	13	8.77	21	12	23.67	8	8	13.17	5	8	9.55	7	20	4.69
	5	4	1	78.91	7	10	9.26	8	12	9.88	5	8	8.65	4	6	9.65	8	25	4.70
	6	4	10	5.03	5	8	9.42	8	12	9.52	8	11	10.15	6	8	9.78	7	20	4.78
	7	3	10	4.70	6	8	9.77	9	11	10.63	8	12	9.26	5	8	9.03	8	24	4.80
	8	3	9	5.16	7	10	10.06	8	11	10.11	8	10	11.08	6	8	9.82	6	19	4.62
	9	3	10	4.99	6	8	9.44	8	10	11.10	10	13	11.33	8	11	10.26	7	20	4.70
	Avg.			4.95			9.75			10.62			10.55			9.70			4.71
P3	1	5	14	5.17	13	110	1.60	13	25	7.47	13	25	7.53	12	117	1.48	9	25	5.13
	2	4	10	5.74	4	9	5.54	10	14	10.01	10	14	9.85	6	9	9.86	4	12	4.69
	3	3	6	6.52	7	11	8.83	8	10	11.53	8	10	11.03	5	7	9.18	13	24	7.46
	4	2	3	8.68	7	10	9.52	8	10	11.99	8	10	11.18	5	7	10.67	13	28	6.55
	5	3	6	5.95	7	10	9.33	8	9	12.14	7	8	11.92	4	5	10.52	10	21	6.67
	6	4	9	6.74	5	8	8.84	8	9	12.35	6	7	11.22	5	7	11.35	10	1	123.63
	7	4	8	6.96	6	8	9.08	7	8	12.53	5	7	10.58	5	6	12.04	8	16	6.55
	8	9	17	7.70	5	9	8.56	7	7	12.93	6	7	11.58	5	6	11.63	6	13	6.15
	9	7	12	8.37	4	6	8.59	8	8	13.93	6	7	11.96	5	7	10.24	6	0	213.82
	Avg.			7.68			8.74			13.13			11.38			11.30			6.35

Table B-88. 2nd 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	4	16	3.53	13	55	3.35	13	1463	0.12	14	60	3.13	13	648	0.28	12	584	0.28
	2	4	15	3.91	10	20	7.29	8	16	6.98	8	14	8.04	8	13	8.67	15	474	0.44
	3	2	6	6.01	5	8	8.44	8	14	7.83	7	12	8.14	5	8	8.32	8	24	4.56
	4	3	5	7.00	6	7	11.25	5	11	6.25	5	9	7.77	4	5	11.05	8	25	4.27
	5	2	6	5.50	5	9	7.76	7	11	8.33	9	13	9.16	4	3	18.13	8	27	3.93
	6	3	9	4.67	7	11	8.12	8	14	8.61	7	10	9.29	5	8	9.00	8	16	6.83
	7	4	14	4.51	5	9	7.71	6	11	8.08	7	9	9.72	5	8	8.61	10	19	7.42
	8	5	1	79.68	6	10	8.42	6	11	8.33	4	1	52.79	5	7	9.53	10	17	8.67
	9	2	5	6.98	7	11	8.45	6	10	8.72	7	9	9.97	7	8	11.79	10	17	7.91
	Avg.			5.74			8.20			8.37			9.84			9.98			8.00
P2	1	11	262	0.57	13	53	3.30	13	21	8.86	13	110	1.68	13	43	4.23	8	27	3.97
	2	7	20	4.88	8	10	11.48	8	13	8.26	13	26	7.11	10	15	9.48	10	33	4.28
	3	6	14	5.36	8	9	12.29	6	11	8.20	11	15	9.55	6	9	9.14	10	29	4.70
	4	3	4	9.07	6	7	13.02	6	11	8.36	8	12	9.47	5	8	7.83	8	24	4.78
	5	3	5	7.99	5	5	12.26	8	12	8.68	7	10	9.47	8	10	10.77	8	24	4.73
	6	4	10	5.68	5	5	12.54	6	10	8.39	8	11	10.08	7	10	10.30	6	19	4.53
	7	2	5	6.27	5	5	13.38	6	10	8.39	10	14	10.66	13	14	13.08	7	19	4.87
	8	3	4	9.30	4	4	13.65	6	9	9.37	10	13	10.89	13	14	13.11	4	12	4.43
	9	5	16	4.18	3	0	292.72	8	10	10.54	10	12	11.66	13	13	13.97	6	19	4.76
	Avg.			6.58			13.51			9.43			11.07			13.39			4.69

Table B-89. 2nd 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	278	0.47	6	15	5.55	12	106	1.62	8	16	6.99	14	33	5.83	10	36	3.70
	2	4	15	3.46	6	14	6.11	6	14	6.22	7	12	7.64	14	24	7.98	13	44	4.08
	3	3	10	4.16	6	14	6.31	4	7	7.48	7	11	8.16	14	22	8.79	8	22	5.20
	4	2	6	5.74	6	14	6.44	3	4	9.65	7	12	7.95	14	21	9.12	8	21	5.14
	5	3	10	4.44	7	14	6.66	6	12	7.32	7	12	8.23	13	22	8.47	8	20	5.32
	6	4	14	4.23	7	14	6.47	5	9	7.39	7	11	8.19	13	24	7.81	13	31	6.04
	7	5	14	4.49	7	14	6.64	5	9	7.66	7	11	8.28	14	19	9.85	10	31	4.31
	8	3	10	4.85	7	13	7.05	6	0	386.90	8	13	8.71	14	18	10.58	10	26	5.53
	9	4	14	4.57	6	13	6.85	13	20	8.79	11	16	9.49	14	18	10.47	8	22	4.93
	Avg.			4.64			6.85			8.22			8.83			10.30			4.92
P2	1	3	7	5.09	12	112	1.52	12	116	1.40	7	18	5.13	13	71	2.62	13	46	3.95
	2	4	13	4.54	5	11	6.08	13	29	6.01	7	17	5.71	14	27	6.97	10	30	4.70
	3	3	8	5.21	6	12	6.56	8	15	7.14	5	14	5.44	14	24	7.95	8	23	4.71
	4	6	16	5.14	5	10	6.70	5	8	7.89	7	17	5.72	14	21	8.91	6	20	4.41
	5	4	11	5.54	4	11	5.07	5	9	7.78	5	16	3.99	14	21	9.26	6	23	3.70
	6	6	15	5.63	5	8	8.44	3	6	7.88	7	16	6.14	14	21	9.01	5	14	4.68
	7	4	14	4.12	5	8	8.97	5	8	8.35	11	22	6.72	14	21	9.01	6	20	3.82
	8	6	15	5.38	7	10	9.31	5	8	8.75	14	27	7.39	14	19	9.99	4	28	2.00
	9	6	15	5.49	7	9	10.31	13	19	8.98	14	25	7.93	14	18	10.47	13	579	0.32
	Avg.			5.00			9.53			8.70			7.34			9.82			2.91

Table B-90. 3rd 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	398	0.35	12	114	1.48	13	92	1.89	12	463	0.36	12	99	1.74	8	21	5.21
	2	12	116	1.45	6	12	6.95	13	23	7.55	4	12	5.19	7	8	11.62	10	23	6.33
	3	10	39	3.48	4	8	7.48	9	0	3156.32	8	11	9.57	13	24	7.59	10	21	6.82
	4	8	24	4.67	5	1	125.57	5	8	9.51	10	13	10.21	13	16	10.99	11	21	6.93
	5	7	17	5.46	5	8	7.76	4	5	11.57	10	14	9.42	13	15	11.99	11	21	6.99
	6	8	20	5.65	8	13	8.48	1	7	2.96	10	13	10.30	13	15	12.12	10	20	7.23
	7	8	0	249.91	8	13	8.54	3	2	16.36	10	13	10.82	13	15	12.06	10	20	7.39
	8	9	18	6.52	8	12	8.62	4	5	12.20	10	12	10.60	10	10	12.82	8	16	7.04
	9	7	14	6.58	8	8	14.25	6	7	11.61	7	9	10.75	8	8	12.55	10	19	7.78
	Avg.			6.55			8.58			11.91			10.72			12.48			7.41
P2	1	10	440	0.32	13	95	1.88	13	111	1.61	13	78	2.29	13	97	1.84	4	13	4.75
	2	9	41	3.09	8	0	738.17	13	26	7.16	14	21	8.94	13	23	8.13	6	24	3.55
	3	8	24	4.64	8	12	8.79	7	12	8.35	13	17	10.93	10	14	10.15	2	5	4.76
	4	7	16	5.53	5	8	8.53	5	7	8.89	6	10	7.99	14	16	12.05	7	0	2545.42
	5	8	20	5.68	6	12	7.20	3	3	12.42	8	10	11.38	10	12	11.72	5	14	5.29
	6	7	15	5.97	6	9	10.32	2	2	12.73	7	8	11.93	10	12	11.31	4	11	5.24
	7	7	11	8.30	5	7	9.82	1	1	9.90	5	6	11.98	12	8	19.73	3	0	193.45
	8	5	11	6.10	6	9	9.24	14	14	13.35	4	4	11.47	10	12	11.61	3	1	62.22
	9	5	11	6.55	4	6	10.18	13	15	12.26	4	5	10.88	8	10	11.06	3	7	6.13
	Avg.			6.98			9.75			11.84			11.44			11.33			6.13
P3	1	8	26	4.26	12	130	1.28	12	108	1.59	13	93	1.92	8	18	6.17	8	18	5.77
	2	6	19	3.92	8	15	6.92	13	27	6.65	8	15	7.49	6	13	6.63	10	23	5.87
	3	9	19	6.25	4	7	8.48	8	14	7.68	7	11	8.36	8	16	6.87	8	19	5.89
	4	9	21	5.51	5	8	8.31	6	10	8.19	6	8	10.28	8	15	7.25	8	16	7.09
	5	8	20	5.78	5	7	8.90	5	9	7.71	7	8	11.07	8	14	7.73	8	16	6.58
	6	7	17	5.64	5	8	9.06	3	6	8.48	10	12	11.46	8	14	7.59	10	21	6.92
	7	9	19	6.31	6	9	9.90	3	6	8.20	10	12	11.48	10	17	8.54	10	20	7.17
	8	9	19	6.38	8	10	10.73	3	6	8.04	10	11	13.01	10	17	8.17	14	23	8.26
	9	10	21	6.77	10	13	10.89	4	6	8.11	9	11	11.25	10	0	445.45	13	22	8.42
	Avg.			6.49			10.50			8.11			11.91			8.36			7.95

Table B-91. 3rd 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	26	3.90	13	79	2.28	13	76	2.39	13	79	2.35	13	75	2.42	8	17	6.31
	2	6	17	5.10	4	8	7.09	8	11	9.78	10	15	9.33	10	15	9.27	7	14	6.56
	3	6	16	5.30	4	6	10.11	7	9	10.41	12	0	475.14	5	10	6.62	7	14	6.86
	4	6	15	5.77	8	9	11.63	6	8	10.87	11	13	11.40	8	5	23.90	8	15	7.60
	5	4	12	4.23	6	8	11.34	6	0	447.99	10	13	11.07	10	12	11.79	10	18	7.82
	6	6	15	5.90	6	7	11.43	6	8	11.03	13	15	12.49	10	11	13.01	13	23	8.09
	7	6	15	5.96	8	9	11.71	5	6	10.43	14	14	13.62	10	11	13.44	13	577	0.32
	8	7	14	6.56	8	9	11.89	6	7	12.51	14	14	14.12	10	10	13.41	10	18	7.99
	9	5	11	6.39	8	9	11.77	7	7	12.38	14	13	13.99	14	13	14.63	10	17	8.25
	Avg.			6.30			11.79			11.78			13.91			13.83			8.12
P2	1	10	240	0.55	13	104	1.76	13	64	2.87	13	67	2.71	13	28	6.58	12	219	0.74
	2	9	48	2.49	13	26	7.07	13	21	8.53	13	23	7.85	8	11	9.47	6	15	5.75
	3	13	49	3.65	8	13	7.83	10	13	10.75	10	13	10.51	6	8	10.62	4	14	4.48
	4	10	32	4.38	6	15	5.85	6	8	10.64	8	10	11.11	6	9	9.82	3	10	4.82
	5	10	29	4.84	7	12	7.60	5	6	10.62	8	10	11.29	6	8	11.49	2	5	6.98
	6	13	31	5.61	6	9	8.91	3	0	135.76	8	10	11.61	6	7	11.56	2	3	7.27
	7	13	32	5.65	4	8	7.93	3	5	9.84	6	9	9.87	6	7	11.58	1	1	9.79
	8	13	31	5.74	3	5	8.55	3	3	14.34	7	8	12.01	10	11	13.63	6	14	5.59
	9	13	29	6.21	2	3	11.24	2	2	12.26	5	6	10.80	8	9	12.39	6	16	5.33
	Avg.			5.87			9.24			12.15			10.89			12.53			5.46
P3	1	11	168	0.93	12	678	0.25	6	10	8.80	7	19	5.42	13	100	1.83	14	633	0.30
	2	8	33	3.23	8	14	7.35	3	5	9.33	10	17	8.37	10	17	8.10	9	597	0.22
	3	10	39	3.41	5	8	8.02	4	3	17.85	13	18	10.54	8	13	8.59	8	24	4.48
	4	6	29	2.95	6	9	9.12	5	7	9.23	13	16	11.89	11	15	9.63	8	22	5.05
	5	8	29	3.85	5	7	9.03	3	5	9.44	14	16	12.02	10	14	9.82	8	22	5.04
	6	8	27	4.11	6	8	10.23	5	7	10.30	14	16	11.50	10	13	10.61	13	30	6.12
	7	10	30	4.71	6	9	9.96	6	5	15.11	13	15	12.08	10	13	10.85	10	25	5.62
	8	10	29	4.69	6	9	10.18	3	4	10.81	14	14	13.22	10	13	10.80	13	15	11.79
	9	10	28	4.87	6	9	9.95	3	5	10.53	13	14	12.94	14	15	13.00	14	0	2418.15
	Avg.			4.76			10.03			12.15			12.74			11.55			5.62

Table B-92. 3rd 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	434	0.34	12	490	0.35	6	12	7.64	8	12	9.13	14	832	0.23	13	112	1.60
	2	10	26	5.01	8	13	8.32	5	10	6.73	10	14	9.85	10	16	8.26	8	51	2.20
	3	8	16	7.06	10	16	8.28	5	9	7.71	6	9	10.18	8	12	9.40	3	11	4.06
	4	7	11	8.45	6	9	9.24	3	12	3.09	7	8	10.66	8	11	10.11	10	28	4.80
	5	7	11	8.67	6	8	10.58	2	3	10.95	10	12	11.65	6	9	9.07	8	29	3.96
	6	7	11	8.95	5	6	9.99	1	1	11.50	14	15	12.90	7	10	8.87	13	851	0.21
	7	5	10	7.72	4	0	134.21	12	17	10.35	14	14	14.17	6	9	9.91	8	23	4.46
	8	7	11	8.74	2	2	13.33	6	11	8.18	13	14	13.68	5	7	9.62	3	10	4.50
	9	7	10	8.80	1	2	12.12	5	7	9.11	13	18	10.41	2	5	6.71	13	95	1.83
	Avg.			8.42			12.73			9.21			13.92			9.76			4.48
P2	1	8	0	264.72	13	103	1.69	8	14	7.54	8	8	14.44	10	18	7.81	13	72	2.51
	2	8	31	3.45	6	9	9.57	5	10	7.04	8	10	10.84	8	13	8.51	9	21	5.85
	3	6	24	3.56	6	9	9.34	3	7	7.36	8	10	11.44	6	10	8.89	7	15	6.04
	4	5	19	3.50	13	16	11.42	4	5	10.43	8	10	11.59	8	12	9.91	8	18	6.38
	5	5	18	3.56	10	13	10.61	3	4	9.67	8	10	11.94	8	11	9.94	7	14	6.50
	6	7	22	4.12	8	10	11.00	5	8	8.13	8	9	12.24	11	14	10.13	7	15	6.55
	7	10	29	4.80	8	10	10.78	9	10	13.35	8	9	11.93	10	13	10.94	10	21	6.75
	8	21	25	11.85	10	12	11.79	5	8	8.36	11	11	13.75	14	15	12.53	9	17	6.92
	9	6	23	3.84	8	9	11.62	7	10	9.20	14	13	14.59	10	13	11.05	8	16	6.94
	Avg.			4.32			11.40			9.66			13.42			11.51			6.87
P3	1	7	29	3.35	12	678	0.25	13	70	2.63	12	71	2.34	13	71	2.58	13	522	0.33
	2	13	55	3.18	13	28	6.39	8	10	10.57	6	9	9.57	4	11	5.41	13	50	3.56
	3	13	41	4.37	8	13	8.28	6	8	10.95	3	5	9.29	3	3	13.09	12	45	3.83
	4	13	35	5.21	6	10	8.55	3	134	0.36	2	2	17.31	2	2	13.58	10	27	5.02
	5	10	25	5.43	5	7	8.76	2	2	11.43	13	15	12.69	2	2	12.98	6	16	5.14
	6	10	25	5.58	5	8	7.89	2	2	12.73	14	14	13.32	2	3	13.52	6	16	5.53
	7	6	14	6.12	9	11	11.73	1	1	16.20	13	14	13.37	4	6	9.70	6	15	5.44
	8	5	12	5.67	13	14	13.38	13	12	15.98	13	14	13.76	2	2	16.62	5	13	5.15
	9	8	18	6.16	10	13	11.12	10	10	13.28	13	14	13.45	10	13	10.42	5	13	5.11
	Avg.			5.99			12.08			15.15			13.53			10.06			5.23

Table B-93. 3rd 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	691	0.21	13	95	1.92	14	92	2.06	13	78	2.34	13	145	1.29	10	29	4.68
	2	8	32	3.29	13	23	8.16	4	11	5.78	8	17	6.38	8	16	6.78	8	20	5.66
	3	8	28	3.81	7	15	6.70	2	4	9.62	13	343	0.54	8	16	7.09	8	19	5.97
	4	7	21	4.27	9	19	6.42	2	4	9.15	12	44	3.88	8	16	7.16	10	22	6.48
	5	7	20	4.53	10	14	9.95	2	4	7.79	13	43	4.09	8	15	7.56	11	22	6.66
	6	7	16	5.53	13	16	11.37	3	5	8.98	10	19	7.14	8	15	7.80	10	21	6.81
	7	4	12	4.61	9	12	10.85	4	9	7.08	8	13	8.41	8	13	8.34	11	19	7.74
	8	4	13	4.61	13	13	14.43	7	8	11.60	8	13	8.54	8	14	7.83	13	22	8.22
	9	6	16	4.90	10	12	11.99	7	11	7.98	6	10	8.65	10	17	8.46	13	23	7.94
	Avg.			4.71			12.42			7.53			8.53			8.21			7.97
P2	1	6	15	5.34	10	14	9.84	13	56	3.24	13	81	2.25	14	338	0.56	13	32	5.75
	2	8	18	5.80	8	11	9.52	6	9	10.18	10	19	7.45	8	13	8.30	12	27	6.34
	3	6	12	6.87	7	9	10.41	5	6	10.43	8	15	7.49	7	0	585.45	6	0	#DIV/0!
	4	6	12	7.12	8	10	10.61	4	6	10.68	13	18	10.34	5	8	8.97	13	889	0.21
	5	6	11	7.48	8	10	10.89	4	5	10.70	13	17	10.83	6	10	8.45	10	17	8.17
	6	7	0	585.45	8	10	10.87	3	2	16.42	10	14	9.68	6	9	9.56	8	15	7.52
	7	5	9	7.98	5	7	10.12	3	3	16.70	8	12	9.73	6	9	9.24	8	14	7.81
	8	5	9	7.71	5	7	10.12	3	2	15.02	7	10	9.64	5	7	8.98	7	13	7.45
	9	5	9	7.78	6	8	10.87	4	4	11.89	8	12	9.52	10	13	11.49	7	11	8.16
	Avg.			7.82			10.37			11.89			9.63			9.90			7.81

Table B-94. 3rd 12" Lift of Surface Dry AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	32	4.13	8	14	7.77	5	15	5.08	12	100	1.71	6	11	7.45	13	27	7.00
	2	13	34	5.35	13	24	7.65	6	14	6.14	13	30	6.09	7	11	8.42	11	22	6.89
	3	10	21	6.76	8	14	7.73	6	12	7.09	10	16	8.44	7	10	9.01	11	21	7.12
	4	8	16	7.40	7	11	8.72	6	12	7.20	10	16	8.68	8	12	9.23	11	21	7.03
	5	8	15	8.00	6	14	5.69	6	12	7.45	10	16	8.24	8	12	9.10	11	21	7.09
	6	8	14	8.04	8	10	10.81	5	9	7.37	10	11	12.20	10	15	9.77	8	16	7.11
	7	7	11	7.90	5	8	7.81	6	11	8.20	5	9	7.66	10	14	10.36	8	16	7.29
	8	7	12	8.17	4	7	9.02	10	14	10.10	10	14	9.64	10	13	10.95	11	20	7.47
	9	5	11	6.25	5	0	313.93	10	14	9.81	13	3	59.50	14	15	12.63	14	21	9.15
	Avg.			7.44			8.42			9.37			8.65			11.31			7.97
P2	1	10	36	3.68	14	85	2.21	13	853	0.21	8	17	6.65	14	189	1.01	14	960	0.20
	2	8	23	4.84	8	14	7.67	3	7	6.40	6	14	6.53	8	13	8.15	9	28	4.58
	3	7	17	5.64	6	10	8.29	1	2	9.05	5	11	6.32	6	11	8.01	10	30	4.61
	4	6	12	6.18	6	10	8.86	13	21	8.78	8	1	158.38	3	4	9.98	10	27	5.22
	5	5	13	5.87	5	9	7.18	7	12	8.15	7	13	6.86	6	10	8.38	8	21	5.38
	6	5	12	6.34	6	9	10.32	5	0	140.00	5	11	6.46	3	2	16.97	7	15	6.13
	7	6	11	6.81	8	10	11.29	5	8	7.89	6	7	12.65	4	7	8.44	13	904	0.21
	8	7	14	7.00	8	10	11.00	2	2	12.94	10	17	7.80	14	17	11.27	8	16	7.13
	9	7	14	6.88	8	10	10.46	1	1	10.72	10	17	7.95	13	17	10.92	5	13	5.61
	Avg.			6.90			10.92			10.52			7.87			10.21			6.37

Table B-95. 1st 4" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	56	2.30	10	134	1.08	11	219	0.72	11	128	1.20	12	52	3.28	8	34	3.24
	2	8	19	4.37	6	25	3.16	6	27	3.14	6	21	3.96	6	19	4.18	6	22	3.88
	3	6	13	4.55	6	13	5.66	3	8	4.87	6	20	4.26	2	5	5.61	2	10	3.37
	4	12	32	3.90	4	12	4.66	2	4	6.60	6	19	4.31	1	3	5.40	4	15	3.79
	5	4	9	4.41	6	17	4.48	3	0	138.18	6	19	4.26	1	2	5.66	1	3	5.52
	6	2	4	5.22	6	17	4.75	4	12	5.17	6	19	4.42	1	3	6.11	13	38	4.74
	7	2	4	5.03	3	11	4.01	4	63	0.98	6	18	4.52	13	32	5.54	8	27	4.23
	8	13	28	4.79	4	11	5.05	6	17	4.89	4	13	4.74	6	17	5.14	11	20	7.96
	9	6	12	4.87	4	16	3.64	4	11	5.24	6	18	4.84	5	1	84.85	9	27	4.33
	Avg.			4.90			4.24			5.06			4.70			5.34			4.28
P2	1	45	75	6.21	8	43	2.40	12	113	1.43	11	117	1.35	11	141	1.08	11	421	0.36
	2	11	54	2.18	12	63	2.56	8	44	2.48	3	18	2.64	4	17	3.12	8	41	2.72
	3	12	49	2.46	8	37	2.96	3	12	3.27	12	57	2.85	12	54	3.10	8	5	24.18
	4	12	43	2.83	2	10	3.31	12	56	3.07	6	28	2.75	8	37	2.96	8	38	2.98
	5	12	40	3.03	4	16	3.39	12	60	2.84	1	7	2.76	12	50	3.43	8	38	3.01
	6	12	36	3.43	1	6	3.54	12	59	2.86	12	53	3.16	8	35	3.33	6	27	3.16
	7	7	19	3.88	3	0	111.07	8	38	2.89	4	19	2.88	4	25	2.06	6	26	3.28
	8	12	32	3.79	3	10	3.52	6	28	2.83	12	51	3.30	3	120	0.35	6	26	3.28
	9	12	31	4.07	3	10	3.57	4	20	2.85	4	20	2.58	2	6	5.39	6	25	3.28
	Avg.			3.91			3.54			2.86			2.92			3.73			3.28
P3	1	43	111	4.02	5	27	2.79	11	163	0.97	11	113	1.31	11	157	0.94	12	76	2.15
	2	45	81	5.77	9	1	125.15	8	41	2.77	5	43	1.69	12	81	1.99	5	38	1.95
	3	44	131	3.51	8	33	3.32	12	52	3.29	3	29	1.23	7	61	1.67	2	9	2.35
	4	27	40	7.07	6	24	3.30	9	27	4.81	6	21	3.56	2	15	2.08	2	9	2.72
	5	15	18	8.61	6	22	3.71	4	19	2.91	3	29	1.64	12	66	2.47	12	69	2.32
	6	19	25	7.77	6	23	3.53	4	19	3.10	1	10	1.82	5	40	1.79	4	27	1.93
	7	20	25	8.07	6	22	3.62	4	18	3.28	4	31	1.66	1	7	2.33	3	16	2.96
	8	20	23	9.07	4	16	3.48	8	35	3.35	6	45	1.80	12	72	2.22	1	4	1.87
	9	9	10	8.87	12	38	4.43	6	25	3.31	4	32	1.57	8	2	52.76	2	3	9.12
	Avg.			8.67			3.84			3.31			1.68			2.27			2.41

Table B-96. 1st 4" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	3	13	2.57	5	26	2.67	2	19	1.18	5	39	1.63	7	62	1.64	10	749	0.18
	2	3	13	2.62	4	17	2.95	5	56	1.18	12	73	2.24	3	27	1.65	3	22	1.83
	3	3	12	2.89	2	10	3.45	12	102	1.67	37	56	9.28	3	27	1.68	1	7	2.06
	4	3	12	2.77	2	10	3.33	11	101	1.57	2	14	2.02	3	24	1.80	1	8	2.40
	5	5	18	3.17	3	1	74.40	5	47	1.42	2	14	2.08	3	25	1.80	5	32	2.10
	6	8	24	3.34	2	11	2.98	12	83	1.95	12	64	2.54	4	24	2.15	5	32	2.18
	7	12	43	2.93	2	7	3.99	5	44	1.45	3	23	1.84	3	24	1.91	3	22	2.01
	8	5	17	3.35	2	6	3.87	1	8	1.67	2	13	2.31	2	15	2.15	3	13	2.93
	9	3	12	3.08	2	7	3.66	1	7	1.40	2	14	2.15	3	24	1.92	3	22	2.04
	Avg.			3.12			3.84			1.50			2.10			2.00			2.33
P2	1	5	20	2.46	2	9	2.55	3	30	1.32	10	153	0.86	12	92	1.83	12	87	1.94
	2	13	60	2.27	3	18	2.41	4	17	2.93	5	32	2.22	12	79	2.13	6	39	2.05
	3	3	13	2.57	4	20	2.51	4	12	4.58	4	22	2.51	9	3	35.76	4	28	2.00
	4	5	18	2.95	12	61	2.74	5	43	1.67	3	1	48.59	8	51	2.06	6	36	2.25
	5	4	13	2.96	6	28	2.78	3	29	1.52	4	20	2.68	2	14	2.06	4	26	2.05
	6	3	13	2.82	5	19	3.61	1	10	2.09	4	21	2.61	2	13	2.16	4	18	3.17
	7	2	6	4.33	3	12	3.09	5	40	1.80	4	19	2.68	13	66	2.77	3	17	2.19
	8	12	41	3.15	3	12	3.95	3	27	1.55	12	47	3.52	4	24	2.27	6	35	2.30
	9	6	17	3.36	4	20	2.96	3	28	1.72	8	36	3.17	3	22	1.82	4	26	2.30
	Avg.			3.62			3.34			1.69			3.13			2.29			2.26

Table B-97. 1st 4" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	225	0.42	7	60	1.67	8	60	1.76	10	398	0.35	2	10	2.43	12	90	1.80
	2	8	39	2.02	5	38	1.96	4	27	1.96	12	92	1.74	3	20	1.86	5	35	1.98
	3	8	35	2.21	4	25	2.09	4	27	1.90	3	26	1.76	5	36	1.79	5	36	1.95
	4	8	32	2.48	4	24	2.08	12	79	2.04	2	14	2.24	3	23	1.87	4	1	44.74
	5	5	21	2.54	1	4	2.36	6	37	2.16	2	14	2.21	2	12	2.27	5	38	1.84
	6	5	21	2.59	12	63	2.62	2	9	2.53	1	6	2.86	2	13	1.87	5	37	2.00
	7	6	21	2.76	5	20	3.26	12	75	2.28	1	6	2.17	2	13	1.64	4	27	1.85
	8	8	27	2.93	3	13	3.42	6	39	2.03	1	6	2.16	3	24	1.72	2	15	2.04
	9	5	20	2.72	2	8	3.08	2	10	2.28	1	6	1.98	5	39	1.82	2	14	2.08
	Avg.			2.81			3.25			2.20			2.11			1.73			1.99
P2	1	11	85	1.40	10	479	0.30	8	55	2.05	10	178	0.75	7	38	2.63	7	85	1.06
	2	5	14	3.85	6	31	2.53	6	38	2.15	3	28	1.69	2	12	2.39	11	444	0.34
	3	4	10	3.82	6	31	2.48	6	37	2.15	8	60	1.78	1	6	2.53	5	50	1.40
	4	4	10	4.71	6	31	2.61	4	26	2.26	8	57	1.92	12	432	0.39	1	11	1.45
	5	5	13	4.27	8	41	2.71	4	26	2.05	7	1	82.11	8	54	1.94	12	102	1.62
	6	4	9	4.28	8	39	3.01	4	26	2.42	8	55	1.98	12	127	1.28	5	49	1.36
	7	8	19	4.55	6	28	2.76	6	33	2.52	6	40	1.90	4	24	2.10	12	98	1.70
	8	2	4	4.96	8	37	3.08	6	34	2.45	4	26	1.93	12	98	1.67	4	48	1.16
	9	3	8	4.34	6	27	2.98	6	33	2.49	4	25	2.02	5	36	2.07	1	18	1.10
	Avg.			4.62			2.94			2.49			1.95			1.95			1.32

Table B-98. 2nd 4" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	275	0.55	11	112	1.40	11	101	1.54	12	42	3.95	11	109	1.38
	2	6	17	4.56	6	18	4.70	6	15	5.38	9	22	5.29	12	41	4.08
	3	2	3	7.10	4	11	5.15	12	35	4.87	12	31	5.30	12	33	5.26
	4	1	2	7.10	3	7	5.50	12	33	5.21	12	30	5.68	12	30	5.84
	5	1	2	6.23	3	7	6.33	8	20	5.66	12	28	5.93	12	27	6.21
	6	2	3	7.70	3	7	5.92	4	9	6.04	12	28	6.17	12	27	6.34
	7	3	2	22.96	3	7	6.14	3	5	7.44	12	25	6.70	12	25	6.68
	8	6	14	5.66	6	13	6.12	2	3	8.59	13	27	6.56	12	26	6.68
	9	12	34	4.90	4	9	6.31	4	9	6.36	12	25	6.79	12	25	6.96
	Avg.			5.28			6.19			7.47			6.68			6.78
P2	1	8	32	3.50	11	213	0.75	11	113	1.31	11	120	1.30	11	114	1.37
	2	12	41	3.98	3	32	1.50	3	12	4.09	4	12	4.70	4	12	4.17
	3	8	25	4.33	3	7	5.31	6	19	4.03	13	39	4.72	12	36	4.65
	4	12	36	4.62	12	37	4.37	3	8	5.06	3	11	4.43	12	35	4.91
	5	8	23	4.75	8	26	4.46	1	2	6.25	4	10	5.13	6	15	5.18
	6	12	33	5.20	4	7	7.03	12	34	4.87	1	2	6.68	4	10	5.22
	7	8	0	229.09	1	2	6.72	6	16	4.88	3	6	6.24	2	3	8.68
	8	6	15	5.66	1	2	6.14	6	16	5.00	3	7	5.83	1	2	6.36
	9	4	10	5.95	2	4	7.42	3	7	5.79	2	4	7.50	12	29	6.01
	Avg.			5.80			6.76			5.22			6.52			7.02
P3	1	0	2	1.00	10	343	0.42	11	533	0.28	11	113	1.32	11	118	1.29
	2	12	62	2.62	12	68	2.34	8	52	2.13	8	47	2.30	12	64	2.50
	3	8	28	3.82	8	46	2.25	4	20	2.67	4	17	3.12	8	47	2.30
	4	3	12	3.23	5	29	2.59	2	11	2.98	3	11	3.48	12	53	3.16
	5	1	2	5.53	2	9	3.76	2	7	3.87	3	10	3.47	12	51	3.24
	6	1	2	5.99	2	9	3.99	3	11	3.19	4	17	3.22	12	50	3.24
	7	2	4	6.43	4	16	3.10	2	7	4.07	4	17	3.24	12	50	3.37
	8	1	2	6.48	4	16	3.18	3	12	3.27	4	17	3.39	12	49	3.34
	9	3	6	7.08	3	15	3.17	3	12	3.28	4	17	3.35	12	49	3.44
	Avg.			6.66			3.15			3.54			3.36			3.38

Table B-99. 2nd 4" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	3	20	2.44	12	79	2.09	12	112	1.47	10	167	0.86	12	85	1.99
	2	4	19	2.82	12	55	3.01	6	25	3.27	8	52	2.07	7	49	2.07
	3	4	19	2.89	2	17	1.62	12	43	3.95	4	21	2.52	12	53	3.10
	4	4	20	2.89	12	47	3.47	3	16	2.47	1	4	3.25	8	46	2.29
	5	4	11	4.55	4	19	2.72	8	36	3.27	4	20	2.59	8	47	2.22
	6	4	18	2.98	2	6	3.77	4	1	42.42	3	12	3.02	3	20	2.00
	7	6	28	3.05	3	12	3.01	1	3	4.75	1	4	3.22	3	20	2.31
	8	6	27	3.08	1	3	2.99	1	3	4.19	4	19	2.72	1	6	3.35
	9	7	2	54.54	13	44	4.08	12	36	4.72	4	19	2.89	12	48	3.54
	Avg.			3.07			3.36			4.56			2.94			3.07
P2	1	12	99	1.64	11	104	1.48	12	50	3.36	11	116	1.26	5	35	2.08
	2	11	84	1.87	3	28	1.71	6	27	3.09	8	56	1.94	8	49	2.15
	3	2	16	2.07	2	16	2.01	12	44	3.94	8	49	2.35	8	50	2.17
	4	11	68	2.32	2	15	2.10	9	2	70.83	8	62	1.71	8	51	2.21
	5	3	14	3.19	2	16	2.09	5	17	4.14	8	45	2.51	12	53	3.20
	6	3	27	1.76	3	28	1.71	3	10	3.58	6	31	2.52	8	47	2.21
	7	2	16	2.11	3	17	2.42	5	16	4.02	8	44	2.50	5	34	2.15
	8	1	4	2.14	4	26	1.92	3	10	3.95	8	43	2.46	8	49	2.13
	9	1	4	2.29	3	27	1.73	6	23	3.64	6	31	2.62	6	47	1.67
	Avg.			2.18			2.03			3.87			2.53			1.98

Table B-100. 2nd 4" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	4	14	3.66	4	90	0.66	11	113	1.34	11	118	1.34	7	55	1.85
	2	8	43	2.58	3	23	1.97	7	67	1.51	4	26	1.98	5	32	2.07
	3	12	55	3.01	1	7	2.45	1	7	2.93	11	63	2.48	5	31	2.13
	4	12	53	3.17	5	39	1.73	12	68	2.54	6	22	3.60	2	8	3.62
	5	4	36	1.67	2	7	3.11	5	43	1.71	1	4	2.21	11	55	2.90
	6	8	34	3.33	11	58	2.65	2	14	2.34	0	2	2.26	8	47	2.21
	7	6	22	3.73	3	23	1.57	2	13	2.40	0	3	2.35	7	46	2.23
	8	6	21	3.71	2	13	2.34	1	3	2.55	2	8	3.05	7	47	2.15
	9	6	21	3.82	2	7	3.11	12	62	2.63	11	61	2.48	5	29	2.28
	Avg.			3.75			2.34			2.53			2.63			2.22
P2	1	11	215	0.68	5	49	1.42	10	270	0.50	10	154	0.94	7	43	2.35
	2	4	14	3.70	2	16	2.06	2	14	1.95	7	47	2.07	12	57	2.79
	3	1	4	4.09	3	1	71.27	4	7	7.79	12	63	2.56	12	56	2.85
	4	12	56	3.03	2	17	2.04	3	31	1.43	11	60	2.65	12	57	2.83
	5	8	32	3.54	2	16	1.96	5	50	1.33	12	61	2.64	12	56	2.88
	6	4	14	4.08	3	1	43.08	5	50	1.38	11	58	2.75	7	43	2.39
	7	3	8	4.43	2	17	2.04	3	30	1.40	5	30	2.20	12	55	2.95
	8	6	20	4.11	2	17	2.01	3	29	1.44	6	3	29.20	12	53	3.12
	9	3	8	4.56	8	63	1.71	3	30	1.40	2	18	1.91	12	54	3.07
	Avg.			4.36			1.92			1.41			2.05			3.04

Table B-101. 3rd 4" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	125	1.23	12	110	1.46	12	127	1.28	11	111	1.43	12	138	1.17
	2	12	32	5.39	12	42	4.11	12	34	4.91	12	36	4.51	12	31	5.43
	3	8	19	5.77	13	31	5.60	13	30	5.80	12	29	5.92	12	25	6.72
	4	7	1	152.73	13	28	6.28	12	27	6.35	12	26	6.22	7	22	4.53
	5	8	18	6.32	13	27	6.54	13	25	7.09	12	25	6.55	12	23	7.40
	6	8	18	6.64	13	25	6.96	12	24	7.07	12	24	6.85	13	22	7.83
	7	4	17	3.47	13	24	7.21	12	23	7.55	6	12	7.18	13	22	8.19
	8	13	23	7.73	13	23	7.73	12	22	7.69	12	23	7.27	12	21	8.20
	9	8	17	6.83	13	24	7.53	13	21	8.40	12	23	7.33	12	20	8.50
	Avg.			7.28			7.49			7.88			7.26			8.30
P2	1	5	17	4.17	12	114	1.43	12	126	1.29	6	16	5.03	9	22	5.37
	2	6	15	4.96	13	42	4.13	4	10	5.82	6	14	5.83	13	31	5.65
	3	8	1	158.38	4	10	5.09	3	5	9.33	4	10	5.98	12	28	6.24
	4	3	5	9.44	6	4	20.57	2	3	7.47	6	14	6.02	12	26	6.69
	5	3	9	5.55	12	29	5.92	1	3	7.17	2	3	8.94	12	24	7.10
	6	2	4	7.83	6	13	6.00	3	1	43.97	12	25	6.73	12	24	7.14
	7	2	0	76.36	9	0	330.90	4	8	6.79	8	18	6.29	6	11	7.60
	8	0	1	7.83	6	13	6.36	4	8	6.61	12	25	6.88	3	5	7.89
	9	0	1	7.64	2	4	8.16	1	1	7.49	12	24	7.24	2	5	6.62
	Avg.			7.73			7.26			6.96			6.80			7.37
P3	1	11	115	1.27	11	154	0.99	12	52	3.23	11	159	0.96	11	133	1.17
	2	7	37	2.68	12	53	3.08	12	44	3.81	12	43	3.89	12	45	3.81
	3	12	42	3.89	12	44	3.72	12	38	4.27	12	33	5.10	12	38	4.49
	4	8	31	3.42	12	41	4.10	12	38	4.34	12	42	3.88	12	35	4.80
	5	8	29	3.66	12	39	4.38	12	36	4.62	12	29	5.81	12	33	5.06
	6	12	31	5.17	12	38	4.37	12	36	4.61	12	32	5.41	12	32	5.32
	7	11	34	4.73	12	36	4.62	12	35	4.73	12	27	6.44	12	31	5.40
	8	12	33	4.97	12	36	4.78	12	33	4.95	12	28	6.15	12	29	5.87
	9	12	28	5.78	13	35	5.04	12	32	5.29	12	26	6.59	12	29	5.93
	Avg.			5.16			4.81			4.99			6.39			5.74

Table B-102. 3rd 4" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	140	1.05	12	51	3.18	12	94	1.77	12	51	3.24	12	55	2.93
	2	8	40	2.64	6	15	5.31	12	28	6.11	6	12	6.80	6	15	5.39
	3	12	44	3.88	4	10	5.45	8	20	5.91	3	6	7.03	2	5	6.41
	4	6	22	3.64	2	3	7.27	8	18	6.39	9	17	7.07	4	5	10.18
	5	3	12	4.07	12	27	6.34	6	13	6.25	9	18	6.86	8	21	5.52
	6	1	1	5.66	6	15	5.64	4	1	66.18	6	12	6.94	4	9	6.20
	7	12	37	4.52	4	9	5.91	2	3	9.67	6	11	7.17	2	3	6.67
	8	4	14	4.12	4	9	6.12	3	5	7.66	6	11	7.40	12	25	6.68
	9	1	2	5.84	2	5	6.46	7	1	137.75	3	6	6.83	8	20	5.68
	Avg.			4.83			6.16			8.66			7.13			6.34
P2	1	11	122	1.30	11	136	1.17	12	31	5.30	12	140	1.15	12	64	2.55
	2	12	51	3.37	12	36	4.56	12	28	6.10	12	35	4.82	12	31	5.30
	3	12	42	3.94	12	31	5.40	12	27	6.16	12	30	5.72	12	29	5.83
	4	12	41	4.19	12	30	5.53	12	25	6.73	13	27	6.56	12	28	6.02
	5	13	38	4.69	12	29	5.88	12	24	6.94	13	27	6.51	12	27	6.31
	6	12	37	4.57	13	29	6.19	12	24	7.00	12	27	6.50	12	26	6.39
	7	12	36	4.80	12	28	5.98	12	23	7.05	13	24	7.37	12	25	6.68
	8	13	35	5.03	12	27	6.31	12	23	7.30	13	26	6.81	12	24	6.89
	9	12	34	4.94	12	27	6.31	13	23	7.57	9	20	6.10	12	25	6.66
	Avg.			4.92			6.20			7.31			6.76			6.74

Table B-103. 3rd 4" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	79	2.04	12	95	1.71	12	235	0.70	12	91	1.79	12	87	1.87
	2	3	14	3.35	2	0	381.81	8	36	3.04	6	19	4.25	8	28	4.05
	3	12	47	3.45	12	40	4.18	6	23	3.25	8	29	4.03	13	2	108.03
	4	2	6	5.02	4	14	3.71	6	24	3.38	4	15	3.81	8	26	4.45
	5	1	3	4.97	2	6	5.32	8	33	3.43	4	11	4.95	12	34	5.03
	6	3	13	3.63	2	3	6.59	6	22	3.69	6	17	4.62	12	30	5.77
	7	14	51	3.77	11	36	4.29	6	24	3.41	3	7	5.92	5	25	2.89
	8	5	20	3.45	6	19	3.97	4	2	32.81	4	11	5.45	8	25	4.64
	9	2	6	5.39	6	2	54.82	5	0	152.73	4	12	5.19	8	24	4.92
	Avg.			4.20			4.13			3.41			5.52			4.15
P2	1	10	187	0.77	11	109	1.44	12	48	3.59	12	108	1.52	12	76	2.13
	2	5	21	3.39	8	32	3.31	13	43	4.05	12	65	2.52	12	35	4.89
	3	8	32	3.36	12	40	4.20	13	41	4.30	12	36	4.51	12	33	5.23
	4	12	40	4.15	12	38	4.36	13	39	4.45	12	48	3.42	12	30	5.55
	5	8	28	3.74	12	35	4.69	13	37	4.77	12	49	3.34	12	31	5.58
	6	8	28	3.85	12	35	4.76	13	36	4.81	12	33	5.04	13	32	5.52
	7	8	38	2.81	12	34	4.83	13	35	5.18	8	28	4.00	13	31	5.68
	8	5	2	30.91	12	33	4.97	13	33	5.25	12	44	3.79	12	31	5.54
	9	5	16	4.38	12	33	4.99	13	35	5.10	12	49	3.36	13	31	5.63
	Avg.			3.59			4.93			5.18			3.72			5.62

Table B-104. 1st 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	111	2.11	19	87	2.99	19	97	2.70	17	120	2.00	19	95	2.73
	2	19	52	4.96	20	38	7.20	20	42	6.68	19	40	6.48	19	52	5.16
	3	19	43	6.08	20	32	8.64	20	35	8.05	19	34	7.73	20	45	6.26
	4	19	39	6.81	20	30	9.15	20	32	8.81	19	30	8.77	20	41	6.53
	5	19	39	6.75	20	29	9.49	20	31	9.25	18	30	8.15	19	39	6.85
	6	19	36	7.31	20	28	9.87	21	30	9.59	19	28	9.39	20	39	6.97
	7	19	34	7.57	20	26	10.95	20	28	9.91	19	29	8.96	20	38	7.14
	8	19	33	8.08	20	26	10.80	20	26	10.75	19	28	9.29	20	38	7.10
	9	19	32	8.04	20	26	10.82	21	27	10.62	19	26	10.03	20	38	7.23
	Avg.			7.90			10.86			10.42			9.43			7.16
P2	1	18	105	2.39	19	97	2.70	19	104	2.50	18	105	2.35	18	90	2.81
	2	19	45	5.94	20	42	6.49	20	43	6.48	19	42	6.19	19	56	4.77
	3	19	38	6.95	20	36	7.74	20	36	7.88	19	35	7.52	19	55	4.81
	4	19	34	7.69	20	33	8.31	20	33	8.40	19	33	8.00	19	50	5.37
	5	19	33	8.13	20	32	8.66	20	32	8.96	19	29	8.96	20	47	5.72
	6	19	32	8.37	20	31	9.15	20	30	9.22	19	29	9.19	20	44	6.21
	7	19	31	8.59	20	30	9.44	20	28	9.99	14	21	9.08	20	45	6.08
	8	19	30	8.96	20	28	9.91	20	29	9.78	19	25	10.39	20	45	6.11
	9	19	29	9.08	20	29	9.71	20	29	9.81	19	25	10.36	20	44	6.15
	Avg.			8.87			9.69			9.86			9.94			6.11
P3	1	18	105	2.41	19	96	2.76	18	245	1.02	18	119	2.06	18	153	1.67
	2	19	39	6.66	20	42	6.54	20	60	4.50	19	53	4.89	19	56	4.72
	3	19	33	8.02	20	37	7.54	20	50	5.53	19	41	6.26	19	53	5.05
	4	19	30	8.83	20	33	8.27	20	47	5.93	19	45	5.81	20	51	5.31
	5	19	28	9.40	20	31	8.85	20	45	6.25	19	41	6.50	20	49	5.51
	6	19	27	9.76	20	30	9.44	20	43	6.36	19	39	6.75	20	46	5.97
	7	19	26	10.06	20	29	9.61	20	42	6.63	19	36	7.21	20	44	6.13
	8	20	26	10.90	20	28	9.96	20	41	6.85	19	35	7.59	20	44	6.13
	9	19	25	10.58	20	30	9.19	20	40	6.93	20	34	8.05	19	44	6.11
	Avg.			10.51			9.58			6.80			7.62			6.12

Table B-105. 1st 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	116	2.12	19	98	2.70	18	76	3.26	19	36	7.35	18	96	2.61
	2	19	41	6.52	20	39	7.21	18	39	6.49	19	31	8.40	19	59	4.44
	3	19	34	7.87	20	34	8.40	19	35	7.35	19	30	8.69	19	56	4.66
	4	19	31	8.73	20	31	9.06	14	24	8.02	19	26	10.14	19	53	4.97
	5	19	29	9.13	21	29	9.77	13	23	8.05	19	27	9.93	19	48	5.49
	6	19	29	9.30	20	29	9.83	13	22	8.34	19	26	10.53	19	52	5.09
	7	20	28	9.76	20	27	10.53	13	22	8.44	19	26	10.40	19	49	5.43
	8	20	27	9.99	20	27	10.45	10	16	8.95	19	25	10.73	19	48	5.59
	9	20	26	10.40	20	27	10.45	10	15	9.27	19	25	10.91	19	47	5.57
	Avg.			10.05			10.48			8.89			10.68			5.53
P2	1	19	103	2.50	18	116	2.19	18	93	2.68	18	123	1.98	19	88	2.90
	2	20	41	6.53	20	47	6.06	19	39	6.84	19	39	6.86	19	39	6.76
	3	20	35	7.68	21	39	7.36	19	33	8.07	19	33	8.18	19	36	7.51
	4	19	32	8.35	21	34	8.34	19	34	7.64	19	27	9.86	19	31	8.53
	5	19	31	8.68	20	32	8.71	19	30	8.84	19	26	10.06	19	32	8.30
	6	21	29	9.89	20	30	9.49	19	29	9.22	19	26	10.37	20	30	8.91
	7	19	29	9.19	20	30	9.33	19	30	8.96	19	25	10.82	19	30	8.86
	8	19	29	9.38	21	29	9.80	19	28	9.20	20	24	11.35	19	30	8.92
	9	20	28	9.67	20	29	9.72	19	29	8.99	19	23	11.68	19	28	9.43
	Avg.			9.42			9.62			9.05			11.28			9.07
P3	1	19	53	5.01	19	124	2.07	-	-	-	18	103	2.42	17	128	1.86
	2	19	39	6.77	20	46	6.00	-	-	-	19	44	5.99	19	60	4.32
	3	19	34	7.92	20	36	7.75	-	-	-	19	42	6.23	19	51	5.14
	4	19	32	8.35	20	33	8.49	-	-	-	19	105	2.51	19	45	5.78
	5	20	31	8.86	20	31	9.11	-	-	-	19	40	6.69	19	43	6.15
	6	20	29	9.46	21	29	9.94	-	-	-	21	32	8.89	19	42	6.29
	7	20	28	9.71	21	28	10.34	-	-	-	19	32	8.45	19	41	6.41
	8	20	28	9.96	21	28	10.18	-	-	-	19	31	8.59	19	40	6.58
	9	20	27	10.29	20	26	10.88	-	-	-	19	29	9.33	19	39	6.61
	Avg.			9.99			10.47			-			8.79			6.53

Table B-106. 1st 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	115	2.10	19	95	2.73	19	114	2.26	17	137	1.67	18	126	1.98
	2	19	64	4.01	20	51	5.45	20	55	4.93	18	81	3.08	19	92	2.84
	3	19	52	4.99	20	45	6.06	20	47	5.98	18	71	3.60	19	79	3.30
	4	10	91	1.45	20	41	6.79	20	43	6.46	13	55	3.26	19	75	3.50
	5	19	47	5.73	20	40	6.85	20	41	6.78	13	51	3.58	19	72	3.68
	6	19	46	5.85	20	39	7.26	20	40	7.06	19	62	4.13	20	70	3.85
	7	19	45	5.88	20	37	7.55	20	38	7.25	19	60	4.32	20	69	3.92
	8	19	43	6.14	20	38	7.42	20	39	7.14	19	60	4.31	20	68	3.97
	9	19	42	6.27	20	37	7.66	20	37	7.56	19	57	4.55	19	67	3.98
	Avg.			6.10			7.54			7.32			4.39			3.96
P2	1	18	117	2.10	19	120	2.14	19	118	2.18	17	125	1.91	19	88	3.00
	2	19	56	4.65	20	56	4.90	20	50	5.51	18	70	3.61	19	75	3.48
	3	19	46	5.76	20	47	5.84	20	41	6.91	19	57	4.52	19	64	4.11
	4	19	42	6.27	20	43	6.49	20	38	7.36	19	50	5.24	19	65	4.08
	5	19	39	6.85	20	41	6.79	20	36	7.64	19	49	5.33	19	64	4.16
	6	19	38	7.04	20	40	6.96	20	36	7.73	19	44	5.91	19	62	4.21
	7	19	36	7.28	20	39	7.27	15	25	8.17	18	46	5.33	20	62	4.39
	8	19	36	7.39	20	39	7.27	15	25	8.32	19	41	6.31	19	60	4.43
	9	19	35	7.58	20	38	7.31	15	24	8.31	19	42	6.10	19	57	4.72
	Avg.			7.42			7.29			8.27			5.91			4.51
P3	1	17	131	1.80	18	140	1.76	19	101	2.55	17	123	1.94	17	120	2.01
	2	18	93	2.71	19	86	3.09	19	94	2.86	18	112	2.16	18	121	2.01
	3	18	86	2.93	19	77	3.46	18	77	3.24	18	101	2.40	17	121	1.99
	4	18	83	3.07	19	73	3.70	18	81	3.06	18	102	2.42	17	122	1.98
	5	6	85	0.89	19	71	3.77	18	75	3.34	18	101	2.41	17	124	1.94
	6	12	84	2.06	8	73	1.52	18	79	3.21	12	106	1.51	17	122	1.95
	7	12	83	2.06	10	43	3.29	18	77	3.21	12	105	1.56	17	124	1.92
	8	12	81	2.09	10	48	2.84	18	76	3.34	18	99	2.54	18	124	1.95
	9	12	79	2.14	10	47	2.93	18	75	3.39	18	99	2.50	17	123	1.95
	Avg.			2.10			3.02			3.32			2.20			1.94

Table B-107. 1st 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	19	40	6.67	19	137	1.91	18	126	1.93	19	55	4.70	18	70	3.63
	2	20	31	8.67	20	36	7.83	19	34	7.59	19	33	7.99	19	43	6.25
	3	20	27	10.06	20	30	9.38	13	20	9.45	19	29	9.17	19	37	7.28
	4	20	28	9.72	20	28	10.17	19	27	9.69	14	21	9.48	19	36	7.40
	5	20	27	10.39	21	26	10.88	19	25	10.60	14	20	9.60	19	35	7.69
	6	20	25	10.95	20	26	11.08	19	25	10.68	14	20	9.79	19	34	7.94
	7	20	26	10.59	21	25	11.54	19	23	11.63	14	20	9.70	19	33	7.97
	8	21	25	11.31	21	24	12.14	23	17	19.19	19	26	10.04	19	32	8.31
	9	20	25	11.14	20	24	11.80	11	13	11.06	19	26	10.41	19	32	8.33
	Avg.			11.01			11.82			11.34			10.05			8.20
P2	1	19	116	2.20	20	91	2.97	18	84	2.99	19	54	4.79	19	121	2.17
	2	19	40	6.66	15	25	8.10	19	37	7.00	19	36	7.31	19	46	5.76
	3	19	34	7.83	15	25	8.34	19	54	4.79	19	34	7.87	19	38	6.94
	4	20	32	8.37	15	24	8.51	19	33	7.80	19	32	8.40	19	38	6.99
	5	20	31	8.81	15	23	9.06	18	29	8.55	19	31	8.69	19	37	7.01
	6	19	30	9.08	15	23	9.24	19	29	9.19	19	29	9.08	19	34	7.89
	7	20	29	9.29	15	23	9.07	19	28	9.46	19	29	9.28	19	34	7.72
	8	20	29	9.56	15	22	9.34	19	27	9.79	19	28	9.66	19	34	7.87
	9	20	29	9.59	20	27	10.49	19	29	9.26	20	27	9.93	19	138	1.86
	Avg.			9.48			9.64			9.50			9.63			7.80

Table B-108. 1st 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	19	128	2.01	19	108	2.41	18	81	3.11	18	83	3.04	19	76	3.45
	2	20	58	4.66	20	57	4.78	19	44	5.99	19	53	4.89	19	68	3.81
	3	20	49	5.53	20	50	5.53	19	39	6.72	14	35	5.37	19	61	4.39
	4	20	46	5.93	20	46	6.02	20	39	7.14	14	35	5.32	19	56	4.62
	5	20	42	6.39	20	45	6.26	19	39	6.71	10	26	5.22	19	52	5.04
	6	20	42	6.54	20	43	6.50	19	35	7.69	14	33	5.81	19	50	5.27
	7	20	41	6.76	20	42	6.60	19	34	7.73	14	33	5.76	19	51	5.16
	8	20	40	6.91	20	40	6.90	19	33	8.23	14	33	5.74	19	53	4.96
	9	20	39	6.91	20	39	7.03	19	32	8.45	14	33	5.84	19	51	5.20
	Avg.			6.86			6.84			8.14			5.78			5.11
P2	1	19	66	3.94	19	110	2.37	19	57	4.53	19	101	2.55	18	122	2.00
	2	20	46	5.82	20	64	4.23	19	51	5.08	19	69	3.72	19	89	2.89
	3	19	42	6.46	20	59	4.59	19	49	5.24	19	66	3.88	19	80	3.23
	4	19	40	6.72	20	57	4.83	19	48	5.44	19	60	4.34	18	81	3.13
	5	19	40	6.72	20	56	4.91	10	40	3.65	19	64	4.16	19	79	3.28
	6	19	39	6.81	20	54	5.03	19	43	6.06	19	60	4.35	19	77	3.35
	7	14	29	6.65	20	52	5.25	19	44	5.94	19	59	4.47	18	80	3.18
	8	10	22	6.32	20	53	5.17	19	43	6.08	19	60	4.31	19	81	3.21
	9	11	21	7.12	20	53	5.11	19	44	5.95	19	58	4.56	19	78	3.33
	Avg.			6.69			5.18			5.99			4.45			3.24

Table B-109. 2nd 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	63	4.04	17	164	1.44	17	116	2.05	2	15	2.20	19	55	4.85	19	73	3.52
	2	19	44	5.95	19	50	5.16	19	53	4.90	19	40	6.64	20	44	6.12	19	61	4.31
	3	19	40	6.51	19	39	6.63	12	25	6.70	19	35	7.40	19	38	7.00	19	57	4.60
	4	19	39	6.56	19	35	7.44	19	39	6.75	19	32	8.24	19	35	7.64	19	54	4.96
	5	19	33	7.96	19	32	8.10	19	36	7.37	19	32	8.21	19	20	12.87	19	52	4.99
	6	19	34	7.57	19	31	8.47	20	33	8.09	19	31	8.51	19	31	8.40	19	59	4.45
	7	19	32	8.18	19	29	9.00	19	32	8.39	19	28	9.25	19	30	8.88	19	46	5.79
	8	19	29	9.25	19	29	9.17	20	34	8.04	19	28	9.26	19	29	9.21	19	49	5.31
	9	19	30	8.68	19	28	9.41	20	34	8.11	19	28	9.41	13	19	9.23	19	52	5.09
	Avg.			8.70			9.19			8.18			9.30			9.11			5.40
P2	1	18	77	3.31	18	106	2.32	18	122	2.02	19	55	4.83	19	63	4.08	19	80	3.20
	2	18	56	4.50	19	44	5.99	20	53	5.08	19	44	5.98	19	44	5.97	19	47	5.55
	3	19	47	5.47	19	36	7.36	20	44	6.14	19	40	6.53	19	38	6.86	19	39	6.67
	4	19	42	6.22	19	34	7.91	20	40	6.81	19	38	6.79	19	34	7.75	19	41	6.44
	5	19	39	6.73	19	33	8.06	20	38	7.27	13	26	6.63	19	32	8.17	19	34	7.77
	6	19	37	7.06	19	30	8.71	20	34	7.96	19	35	7.41	19	32	8.28	19	35	7.72
	7	19	36	7.30	19	28	9.48	14	26	7.31	19	33	8.07	19	29	9.20	19	33	8.15
	8	19	35	7.44	19	29	9.24	20	34	8.19	19	33	8.06	19	27	9.48	19	31	8.58
	9	19	34	7.66	19	28	9.59	20	34	8.11	19	32	8.37	19	27	9.81	19	31	8.47
	Avg.			7.47			9.43			7.87			8.16			9.50			8.40
P3	1	17	139	1.69	18	120	2.03	18	120	2.12	19	49	5.28	18	60	4.21	18	112	2.21
	2	18	70	3.62	19	50	5.22	7	27	3.67	19	40	6.50	19	47	5.48	19	56	4.59
	3	19	55	4.75	18	42	5.99	20	40	6.77	13	23	7.84	12	29	5.79	19	48	5.43
	4	19	48	5.51	19	38	7.08	13	23	8.21	13	22	8.24	8	20	5.63	18	45	5.61
	5	19	45	5.76	19	35	7.62	20	33	8.40	13	22	8.18	9	19	6.58	19	44	5.82
	6	19	43	6.09	19	35	7.54	19	51	5.23	13	21	8.58	9	19	6.75	19	43	6.07
	7	19	41	6.29	19	33	8.14	20	31	8.74	13	21	8.68	9	19	6.83	19	40	6.53
	8	19	40	6.53	19	31	8.56	20	31	9.02	19	30	9.03	13	25	7.12	13	27	6.40
	9	19	39	6.61	19	31	8.65	20	30	9.02	6	21	4.29	13	25	7.15	13	28	6.48
	Avg.			6.48			8.45			8.92			7.33			7.03			6.47

Table B-110. 2nd 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	96	2.56	18	98	2.57	18	162	1.56	18	115	2.18	18	130	1.87	18	211	1.17
	2	19	41	6.41	19	44	6.04	19	52	5.20	19	48	5.59	19	51	5.09	19	57	4.53
	3	19	33	8.15	19	38	7.05	20	39	7.11	20	35	7.67	19	37	7.23	13	32	5.49
	4	19	30	8.98	19	35	7.57	20	33	8.43	20	32	8.52	19	33	8.14	13	31	5.64
	5	19	27	9.78	19	34	7.85	13	24	7.86	20	30	8.96	19	33	8.21	12	568	0.29
	6	19	27	9.94	20	32	8.38	20	31	9.06	19	28	9.47	19	29	9.08	19	38	6.87
	7	19	26	10.37	20	32	8.58	20	29	9.75	19	28	9.70	19	30	8.91	19	40	6.78
	8	19	25	10.68	14	23	8.10	20	30	9.35	20	27	10.00	19	26	10.15	19	37	7.15
	9	19	24	10.94	19	29	9.13	20	28	9.86	20	26	10.32	19	27	10.11	19	36	7.51
	Avg.			10.66			8.60			9.65			10.01			9.72			7.15
P2	1	18	121	2.01	18	515	0.47	19	95	2.69	18	105	2.40	19	39	6.78	18	729	0.34
	2	19	46	5.87	19	52	5.08	20	36	7.77	19	37	7.26	19	32	8.29	19	58	4.62
	3	19	35	7.59	19	41	6.38	19	29	9.17	19	29	9.28	19	29	9.41	19	53	5.04
	4	19	31	8.78	19	39	6.90	9	17	7.26	19	26	10.21	20	26	10.35	19	46	5.75
	5	20	28	9.63	19	35	7.64	19	24	11.05	19	24	11.02	19	25	10.74	19	44	6.16
	6	20	26	10.40	20	33	8.22	19	22	11.96	19	24	11.26	20	24	11.30	19	42	6.36
	7	20	25	11.04	20	32	8.39	19	23	11.59	19	22	11.90	19	23	11.57	19	47	5.65
	8	19	25	10.91	19	32	8.45	19	21	12.66	19	22	12.03	19	25	10.85	20	39	7.13
	9	19	23	11.58	19	30	8.98	19	21	12.97	19	22	12.13	19	22	12.00	19	40	6.72
	Avg.			11.18			8.61			12.41			12.02			11.48			6.50
P3	1	19	39	6.70	17	116	2.08	19	48	5.39	17	113	2.06	18	109	2.28	19	54	5.02
	2	19	34	7.89	19	44	5.98	19	39	6.52	19	53	4.82	19	37	7.11	19	43	6.14
	3	19	29	9.01	19	35	7.59	16	35	6.46	18	62	4.09	13	18	9.70	19	41	6.47
	4	19	27	9.86	19	31	8.61	19	31	8.48	19	45	5.69	10	12	10.84	19	41	6.45
	5	19	26	10.42	19	29	9.19	19	29	8.98	19	31	8.51	10	12	11.09	19	35	7.62
	6	19	24	11.07	19	28	9.44	19	27	9.66	18	30	8.36	13	16	11.27	19	34	7.49
	7	19	25	10.82	19	26	10.08	19	25	10.42	19	29	8.93	10	11	11.79	19	33	8.09
	8	19	25	10.83	20	25	10.74	19	26	10.06	19	26	9.94	10	11	11.83	19	32	8.38
	9	19	23	11.48	19	23	11.67	19	26	10.42	19	29	9.03	13	15	12.35	19	32	8.21
	Avg.			11.04			10.83			10.30			9.30			11.99			8.22

Table B-111. 2nd 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	111	2.18	18	88	2.90	20	62	4.33	12	44	3.90	18	72	3.50	19	62	4.12
	2	18	58	4.41	19	51	5.16	19	52	5.16	13	36	4.93	19	38	6.88	19	52	5.00
	3	19	48	5.44	19	46	5.75	20	48	5.73	19	46	5.71	19	32	8.26	19	51	5.03
	4	19	44	5.98	19	43	6.26	20	44	6.10	19	43	6.12	13	20	9.00	18	50	5.07
	5	19	40	6.49	19	40	6.66	8	33	3.23	19	41	6.51	19	27	9.42	19	49	5.19
	6	19	39	6.86	19	40	6.68	20	41	6.58	19	40	6.73	19	10	27.23	13	36	4.95
	7	19	37	7.06	20	39	6.96	20	38	7.23	19	38	7.02	19	25	10.24	9	25	5.07
	8	19	37	7.06	19	38	7.03	20	39	7.00	19	39	6.86	19	24	10.83	19	43	5.90
	9	19	35	7.39	19	38	6.98	20	38	7.15	19	36	7.44	13	17	10.68	13	33	5.37
	Avg.			7.17			6.99			7.13			7.11			10.58			5.45
P2	1	19	43	6.14	18	91	2.73	18	97	2.61	18	90	2.83	18	120	2.02	18	88	2.84
	2	19	42	6.32	19	39	6.71	20	41	6.68	19	42	6.33	19	49	5.39	20	54	4.98
	3	19	37	7.13	19	32	8.29	19	50	5.33	19	36	7.46	13	26	6.98	19	48	5.47
	4	19	37	7.20	19	28	9.54	20	34	7.96	19	31	8.53	19	31	8.41	19	42	6.14
	5	19	35	7.59	19	29	9.19	13	23	8.17	19	31	8.45	19	31	8.28	19	41	6.33
	6	19	34	7.93	19	27	9.92	20	31	8.76	19	29	9.23	19	31	8.43	19	45	5.79
	7	19	33	8.03	19	26	10.06	20	31	8.68	19	28	9.63	20	28	9.59	19	38	6.88
	8	19	33	8.07	19	26	10.17	20	28	9.85	19	27	9.99	19	28	9.49	19	39	6.68
	9	19	33	7.96	19	25	10.40	20	27	10.23	19	29	9.21	19	26	10.21	18	40	6.43
	Avg.			8.02			10.21			9.58			9.61			9.76			6.66
P3	1	18	123	1.98	18	444	0.55	18	102	2.47	18	113	2.22	18	109	2.27	17	102	2.36
	2	19	55	4.68	19	49	5.20	13	30	5.87	12	38	4.58	19	43	6.03	18	51	5.02
	3	19	45	5.69	19	41	6.54	13	27	6.43	19	46	5.69	19	39	6.56	18	43	5.72
	4	19	41	6.38	20	36	7.54	13	26	6.62	13	32	5.68	12	30	5.63	18	46	5.45
	5	19	39	6.76	19	33	8.24	13	25	7.19	10	19	7.00	19	37	7.06	18	44	5.66
	6	19	38	7.01	19	31	8.65	13	24	7.19	10	18	7.21	19	34	7.69	18	43	5.85
	7	19	35	7.35	19	31	8.65	13	24	7.48	15	669	0.31	19	35	7.50	18	43	5.90
	8	19	33	7.92	19	29	9.11	13	23	7.52	19	34	7.91	19	34	7.67	18	43	5.84
	9	19	34	7.86	19	29	9.19	20	30	8.98	19	34	8.01	19	34	7.84	12	31	5.61
	Avg.			7.71			8.98			7.99			7.96			7.67			5.78

Table B-112. 2nd 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	120	2.08	18	71	3.56	19	70	3.70	20	31	8.62	19	113	2.28	30	39	10.61
	2	19	52	5.04	19	32	8.16	19	35	7.62	19	25	10.83	19	36	7.41	27	2	211.73
	3	19	43	6.14	19	30	8.82	19	31	8.58	19	21	12.40	19	30	9.02	20	40	7.05
	4	20	41	6.54	19	29	9.26	19	29	9.14	19	22	12.01	13	21	8.50	14	29	6.59
	5	19	38	7.10	19	28	9.37	19	29	9.15	19	20	13.14	20	27	10.17	14	28	6.88
	6	20	38	7.14	19	29	9.16	19	26	10.01	19	20	13.28	19	24	11.41	20	42	6.47
	7	20	37	7.37	19	26	10.29	19	27	9.77	19	20	13.55	20	22	12.08	14	29	6.63
	8	20	36	7.49	19	25	10.63	19	26	10.21	19	18	14.48	20	23	11.93	9	23	5.48
	9	20	35	7.74	19	25	10.59	19	26	10.38	19	17	15.86	19	21	12.28	20	35	7.82
	Avg.			7.53			10.50			10.12			14.63			12.10			6.64
P2	1	19	54	4.87	18	111	2.23	19	36	7.41	18	112	2.22	19	51	5.20	20	45	5.95
	2	19	42	6.27	19	34	7.88	20	29	9.33	19	42	6.27	19	34	7.67	20	39	7.04
	3	19	37	7.21	20	30	9.05	20	28	9.53	19	35	7.51	20	31	8.64	20	39	7.04
	4	19	36	7.43	19	28	9.56	19	27	9.91	19	30	8.68	19	33	8.13	20	34	7.86
	5	19	34	7.66	20	26	10.29	20	26	10.59	19	29	8.99	20	28	9.64	20	35	7.95
	6	19	33	7.92	20	26	10.48	13	20	9.24	19	28	9.33	20	29	9.55	19	32	8.36
	7	19	32	8.13	14	19	9.85	14	20	9.63	19	24	11.11	20	26	10.41	20	32	8.73
	8	19	32	8.47	20	25	10.86	13	19	9.64	19	23	11.63	19	27	10.03	20	32	8.63
	9	19	32	8.29	14	19	10.01	20	24	11.41	19	22	11.98	20	26	10.33	20	33	8.34
	Avg.			8.30			10.24			10.22			11.58			10.26			8.57

Table B-113. 2nd 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	115	2.20	19	51	5.10	18	405	0.62	20	45	6.09	18	111	2.25	18	422	0.59
	2	19	57	4.71	19	32	8.30	19	36	7.12	20	37	7.33	19	32	8.43	13	36	4.84
	3	20	48	5.65	19	28	9.40	19	30	8.69	20	32	8.59	19	28	9.76	19	44	5.97
	4	19	41	6.53	19	26	10.45	19	28	9.69	20	30	9.02	20	24	11.17	18	41	6.12
	5	19	38	7.13	20	28	9.55	19	26	10.18	20	30	9.34	19	25	10.56	18	51	4.98
	6	20	37	7.37	19	26	10.27	13	20	9.55	20	31	8.93	20	24	11.33	19	39	6.74
	7	20	37	7.38	19	24	11.06	13	19	9.78	20	29	9.43	20	23	11.81	19	34	7.77
	8	19	35	7.69	19	26	10.37	19	24	10.97	20	27	10.23	19	24	11.29	19	33	8.03
	9	20	35	7.84	19	22	11.98	20	24	11.36	20	28	9.81	20	21	12.73	19	35	7.66
	Avg.			7.64			11.14			10.70			9.82			11.94			7.82
P2	1	18	127	1.94	19	45	5.94	18	66	3.83	18	167	1.48	17	85	2.83	19	59	4.43
	2	19	64	4.18	20	36	7.62	19	40	6.52	19	39	6.92	19	39	6.87	20	52	5.22
	3	19	52	5.14	20	33	8.30	19	33	8.08	19	34	7.90	19	32	8.30	20	48	5.69
	4	20	48	5.63	20	30	9.07	19	32	8.18	19	33	8.04	19	29	9.18	20	42	6.43
	5	20	45	5.99	19	30	9.07	19	31	8.52	19	32	8.24	19	29	9.16	20	41	6.55
	6	20	44	6.20	19	27	9.99	19	28	9.23	19	30	8.96	19	26	10.23	20	41	6.63
	7	20	41	6.71	19	27	9.94	19	30	9.02	19	29	9.40	19	29	9.22	19	56	4.76
	8	20	40	6.69	20	29	9.35	19	29	9.09	19	28	9.33	19	26	10.12	19	54	4.73
	9	20	39	6.98	20	27	10.28	19	28	9.30	19	29	9.27	19	27	9.58	19	74	3.47
	Avg.			6.79			9.86			9.13			9.33			9.64			4.32

Table B-114. 3rd 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	122	1.93	17	130	1.84	17	184	1.28	17	190	1.23	17	1051	0.22	1	0	39.60
	2	19	54	4.81	13	26	6.75	18	57	4.35	19	50	5.15	18	60	4.27	18	81	3.13
	3	18	45	5.56	12	28	6.14	19	44	5.97	19	39	6.75	19	40	6.49	19	62	4.20
	4	19	36	7.32	19	80	3.23	19	38	6.97	19	33	8.00	19	35	7.41	12	40	4.18
	5	19	36	7.26	20	40	6.78	19	33	8.05	19	28	9.28	19	32	8.22	9	29	4.35
	6	19	34	7.63	19	37	7.33	20	32	8.46	19	32	8.27	19	33	8.21	13	36	4.79
	7	12	21	8.12	20	35	7.81	19	30	8.92	19	29	9.21	19	40	6.63	13	35	5.18
	8	12	21	8.19	20	32	8.40	19	28	9.76	19	27	9.86	19	31	8.61	13	33	5.57
	9	19	30	8.80	19	32	8.28	19	28	9.32	19	27	9.74	19	37	7.09	19	41	6.39
	Avg.			8.37			8.16			9.33			9.60			7.44			5.72
P2	1	17	353	0.66	18	93	2.73	17	584	0.41	19	56	4.71	17	315	0.74	18	82	3.10
	2	18	63	4.07	19	47	5.68	19	45	5.90	13	25	7.44	19	58	4.62	19	66	3.98
	3	18	50	5.06	20	41	6.53	20	34	7.97	19	37	7.23	19	47	5.75	19	63	4.15
	4	19	42	6.16	19	38	6.85	20	29	9.70	19	34	7.92	20	39	7.13	19	65	4.01
	5	19	38	6.86	20	33	8.27	3	4	11.98	19	30	8.86	20	38	7.23	19	60	4.34
	6	19	36	7.37	19	37	7.26	20	27	10.18	19	29	9.12	19	34	7.84	19	54	4.91
	7	19	34	7.78	19	36	7.39	20	26	10.44	19	28	9.51	19	34	7.98	19	53	4.90
	8	19	32	8.11	20	32	8.51	20	24	11.44	20	27	10.15	19	31	8.60	19	47	5.61
	9	19	30	8.60	20	30	8.98	20	24	11.29	20	25	10.84	20	27	10.14	19	73	3.53
	Avg.			8.16			8.29			11.06			10.17			8.91			4.68
P3	1	17	186	1.25	18	119	2.13	19	65	4.00	18	59	4.25	19	66	3.97	12	58	2.77
	2	18	72	3.46	20	57	4.71	19	50	5.25	19	34	7.83	20	42	6.51	19	59	4.51
	3	18	56	4.51	20	50	5.44	19	43	6.17	19	35	7.57	19	31	8.65	19	51	5.14
	4	19	49	5.22	20	44	6.26	19	39	6.77	19	28	9.52	20	31	8.86	11	55	2.71
	5	18	46	5.44	20	39	6.86	19	38	7.01	19	33	8.00	20	26	10.41	8	29	3.58
	6	19	42	6.20	20	40	6.96	20	35	7.64	19	25	10.63	14	17	11.08	5	44	1.68
	7	19	41	6.33	20	38	7.27	20	36	7.50	19	49	5.20	20	28	9.80	19	48	5.48
	8	19	40	6.49	20	35	7.86	20	32	8.43	19	30	8.73	20	25	11.30	12	35	4.90
	9	18	38	6.67	13	27	6.91	19	32	8.25	19	30	8.80	20	25	10.73	13	34	5.16
	Avg.			6.49			7.35			8.06			7.58			10.61			5.18

Table B-115. 3rd 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	117	1.95	19	118	2.21	19	56	4.71	20	51	5.28	18	134	1.80	13	39	4.56
	2	12	34	4.89	20	50	5.43	19	41	6.38	20	40	7.00	19	57	4.53	13	35	5.16
	3	9	23	5.67	20	37	7.61	19	36	7.47	20	33	8.43	19	43	6.14	13	32	5.66
	4	12	29	5.88	20	38	7.26	19	37	7.25	20	30	9.34	19	41	6.50	20	42	6.45
	5	12	27	6.36	20	32	8.83	19	32	8.26	20	28	10.04	19	36	7.44	13	31	6.04
	6	13	25	7.04	20	30	9.38	19	29	8.87	20	25	11.07	20	34	8.04	13	29	6.39
	7	13	26	6.98	20	29	9.60	19	41	6.37	20	25	11.17	20	39	6.93	14	29	6.45
	8	13	24	7.55	20	30	9.57	19	31	8.46	19	35	7.66	19	42	6.33	10	22	6.13
	9	19	31	8.33	20	29	9.58	19	28	9.27	19	26	10.35	20	29	9.39	13	29	6.41
	Avg.			7.62			9.58			8.03			9.73			7.55			6.33
P2	1	18	121	2.00	18	89	2.87	17	118	2.02	19	63	4.13	19	54	4.75	18	327	0.75
	2	19	44	5.96	13	19	9.31	19	39	6.71	19	38	7.05	19	45	5.69	18	61	4.18
	3	19	33	7.97	10	12	11.68	19	32	8.25	20	37	7.44	19	35	7.70	19	53	4.88
	4	19	29	8.85	13	16	11.75	19	30	8.99	20	27	10.33	20	31	8.60	19	42	6.13
	5	19	29	8.93	19	22	12.34	19	26	10.21	19	26	10.17	20	30	9.02	19	44	5.97
	6	19	27	9.57	20	20	13.47	19	26	10.15	19	26	10.20	19	24	11.13	19	40	6.69
	7	19	26	10.07	14	14	13.55	19	23	11.61	20	24	11.42	20	29	9.30	19	44	6.00
	8	19	26	10.06	20	19	14.33	19	24	11.17	19	23	11.66	20	24	11.35	20	44	6.19
	9	20	25	10.82	20	18	14.91	19	22	11.97	20	26	10.43	19	23	11.70	19	44	6.05
	Avg.			10.32			14.26			11.58			11.17			10.78			6.08
P3	1	18	107	2.30	19	59	4.43	19	55	4.79	19	62	4.17	18	54	4.67	9	32	4.10
	2	18	49	5.04	19	39	6.73	19	40	6.38	19	46	5.79	19	41	6.43	7	21	4.41
	3	19	42	6.18	19	41	6.52	19	36	7.50	19	37	7.27	19	36	7.08	13	34	5.31
	4	19	36	7.30	19	36	7.30	19	35	7.71	19	38	7.02	19	33	8.00	13	33	5.60
	5	19	41	6.29	20	26	10.51	20	33	8.30	20	35	7.81	19	30	8.61	13	34	5.50
	6	13	31	5.67	19	24	11.28	19	32	8.50	20	30	9.02	19	28	9.10	13	37	4.72
	7	19	34	7.62	20	27	10.00	20	31	8.80	20	44	6.15	19	27	9.54	14	32	5.87
	8	19	32	8.11	19	27	9.96	20	31	8.82	20	31	9.21	19	26	10.29	19	35	7.66
	9	19	34	7.84	19	24	11.03	19	27	9.89	19	32	8.52	19	25	10.50	19	40	6.72
	Avg.			7.86			10.33			9.17			7.96			10.11			6.75

Table B-116. 3rd 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	99	2.38	19	99	2.64	19	46	5.71	19	47	5.59	19	66	3.94	19	50	5.27
	2	18	44	5.85	13	29	6.15	20	30	8.95	19	44	6.04	19	49	5.40	19	42	6.08
	3	18	36	7.09	13	24	7.77	19	26	10.08	19	33	8.04	19	44	6.04	19	40	6.67
	4	18	32	7.96	14	23	8.34	20	22	12.19	19	32	8.37	19	40	6.59	19	41	6.47
	5	18	30	8.40	14	21	8.76	20	25	11.10	13	17	10.57	19	31	8.46	19	39	6.97
	6	18	28	9.16	13	20	9.22	20	24	11.35	13	17	10.99	19	30	8.72	19	38	6.83
	7	18	28	9.09	13	22	8.10	19	23	11.63	13	17	10.93	19	34	7.55	19	37	7.26
	8	18	24	10.60	20	30	9.22	20	21	12.80	13	16	11.57	19	32	8.24	19	34	7.72
	9	19	25	10.33	20	36	7.82	20	19	14.59	13	16	11.29	13	21	8.63	19	34	7.64
	Avg.			10.01			8.38			13.01			11.26			8.14			7.54
P2	1	18	55	4.57	19	94	2.78	19	46	5.83	20	44	6.15	20	56	4.84	6	33	2.58
	2	18	48	5.24	20	49	5.59	19	30	8.84	20	31	8.85	19	40	6.69	20	48	5.61
	3	18	41	6.25	20	44	6.11	20	28	9.83	20	27	10.29	20	38	7.25	19	37	7.17
	4	18	38	6.53	20	45	5.99	19	23	11.25	20	23	11.83	20	35	7.65	19	43	6.07
	5	18	36	6.93	20	40	6.79	20	26	10.43	20	24	11.57	20	34	8.13	1	2	8.35
	6	18	36	6.93	20	34	8.00	20	22	12.37	20	26	10.99	20	33	8.31	20	36	7.55
	7	18	34	7.54	20	38	7.26	20	22	12.80	20	23	11.89	20	38	7.21	20	36	7.48
	8	18	33	7.63	20	33	8.27	20	20	13.27	20	36	7.60	20	30	9.10	14	26	7.34
	9	18	34	7.53	20	31	8.79	20	21	12.89	20	32	8.62	20	30	9.44	13	25	7.60
	Avg.			7.57			8.11			12.99			8.11			8.58			7.47
P3	1	17	111	2.15	18	115	2.17	18	329	0.74	20	41	6.78	18	771	0.32	19	72	3.68
	2	18	55	4.59	19	62	4.35	19	43	6.22	20	34	8.10	19	47	5.60	19	58	4.55
	3	18	46	5.53	20	48	5.76	20	34	8.13	20	30	9.11	19	37	7.20	20	45	6.05
	4	13	28	6.15	20	46	5.98	20	29	9.51	20	27	10.30	19	35	7.59	19	43	6.18
	5	12	27	6.25	20	41	6.76	20	27	10.15	20	25	10.88	19	33	8.24	20	41	6.65
	6	18	36	6.95	20	42	6.64	20	25	11.11	20	24	11.61	19	43	6.16	20	42	6.43
	7	19	35	7.39	20	40	6.99	20	25	11.08	20	22	12.25	19	30	8.91	20	39	7.00
	8	18	34	7.54	20	38	7.24	20	26	10.38	20	22	12.55	19	29	9.12	16	49	4.57
	9	18	32	7.92	20	37	7.38	20	25	11.01	14	16	12.20	19	29	9.06	20	36	7.51
	Avg.			7.62			7.21			10.82			12.33			9.03			6.36

Table B-117. 3rd 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	117	2.03	19	69	3.76	18	75	3.39	20	34	7.95	17	110	2.19	18	189	1.30
	2	19	61	4.22	20	32	8.57	19	33	8.13	20	23	12.26	12	28	5.99	19	60	4.39
	3	19	55	4.63	14	20	9.77	20	26	10.35	20	21	13.33	13	31	5.62	19	50	5.34
	4	19	50	5.14	20	24	11.12	20	26	10.57	20	20	13.83	13	21	8.66	19	41	6.48
	5	19	41	6.35	19	23	11.67	19	25	10.91	20	21	12.75	12	26	6.58	20	40	6.80
	6	19	44	5.78	20	22	12.59	20	25	10.89	20	18	15.65	12	29	5.69	13	32	5.74
	7	19	41	6.36	20	21	13.12	20	24	11.27	20	17	16.61	13	19	9.51	10	26	5.17
	8	19	39	6.63	20	21	12.87	20	19	13.97	20	16	16.93	13	19	9.82	9	24	5.43
	9	19	39	6.58	20	20	13.37	19	18	14.42	20	16	17.05	13	19	9.42	19	25	10.39
	Avg.			6.52			13.12			13.22			16.86			9.58			7.00
P2	1	17	118	2.03	19	61	4.25	18	86	2.95	19	100	2.63	19	34	7.72	20	44	6.13
	2	19	44	5.77	19	30	8.92	19	34	8.00	19	29	9.31	19	27	9.69	19	43	6.10
	3	19	36	7.15	19	21	12.28	19	28	9.52	20	27	10.06	14	17	11.18	19	38	6.96
	4	19	34	7.52	19	19	13.99	19	30	8.82	20	23	12.00	19	21	12.70	20	36	7.52
	5	18	31	8.33	21	20	14.17	20	25	10.76	20	21	13.01	19	20	13.51	20	34	8.09
	6	19	29	9.04	19	18	15.07	19	23	11.41	20	20	13.76	19	19	14.07	19	37	7.13
	7	19	29	8.94	19	19	14.16	19	23	11.48	20	20	13.42	19	19	13.88	19	32	8.28
	8	19	29	8.79	19	16	16.19	19	25	10.60	20	21	13.16	19	19	14.38	19	34	7.80
	9	19	28	9.33	19	16	16.80	19	24	11.13	19	19	14.33	19	19	14.07	19	33	8.01
	Avg.			9.02			15.72			11.07			13.64			14.11			8.03

Table B-118. 3rd 8" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	65	3.90	19	32	8.35	18	118	2.08	14	21	9.15	19	763	0.34	19	63	4.20
	2	19	45	5.90	19	30	8.80	20	43	6.28	20	25	10.88	20	39	6.89	13	31	5.75
	3	19	40	6.43	19	24	11.33	20	36	7.66	20	22	12.48	14	22	8.53	13	25	7.27
	4	19	38	6.86	20	25	11.10	20	35	7.91	20	20	14.03	13	22	8.20	13	24	7.46
	5	19	37	7.07	19	24	11.15	20	32	8.59	20	21	13.65	14	20	9.40	19	31	8.43
	6	19	35	7.55	19	25	10.79	20	32	8.64	20	18	15.23	13	20	9.00	19	35	7.58
	7	19	31	8.34	20	22	12.66	20	31	9.00	20	18	15.56	20	26	10.56	19	31	8.71
	8	19	31	8.40	19	20	13.08	20	29	9.34	20	18	15.21	20	23	11.81	13	24	7.81
	9	19	31	8.30	20	22	12.38	20	28	9.62	20	17	16.24	19	23	11.74	19	39	6.71
	Avg.			8.35			12.71			9.32			15.67			11.37			7.75
P2	1	17	116	2.06	18	96	2.59	19	80	3.32	18	177	1.43	20	35	7.73	17	412	0.58
	2	19	46	5.54	19	39	6.74	19	38	7.15	20	34	7.96	20	29	9.55	20	50	5.50
	3	18	38	6.66	19	32	8.35	19	30	8.98	19	30	9.03	20	36	7.42	20	32	8.44
	4	19	39	6.56	19	26	10.14	20	29	9.28	19	30	8.99	19	25	10.64	19	31	8.69
	5	19	32	8.14	19	23	11.39	19	582	0.46	19	36	7.40	19	23	11.48	20	33	8.19
	6	19	31	8.48	19	24	11.13	14	19	9.71	20	32	8.35	19	22	12.31	19	31	8.73
	7	19	33	7.87	19	25	10.62	13	21	8.68	19	32	8.40	20	21	13.07	20	27	10.03
	8	19	29	8.84	19	24	11.26	12	19	8.73	20	24	11.46	20	21	13.09	20	25	10.82
	9	19	32	8.17	19	28	9.22	20	29	9.44	19	30	8.84	20	20	13.50	20	25	10.73
	Avg.			8.29			10.37			8.95			9.57			13.22			10.53

Table B-119. 1st 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	19	57	4.51	7	13	6.74	17	120	2.00	18	687	0.36	1	11	1.44	18	534	0.47
	2	19	43	5.97	19	42	6.47	13	27	6.91	19	40	6.66	19	42	6.17	18	57	4.46
	3	19	39	6.72	20	32	8.55	10	18	7.48	20	38	7.17	13	24	7.72	19	57	4.47
	4	13	25	7.25	20	33	8.36	19	32	8.43	20	35	7.88	13	22	8.55	19	46	5.57
	5	19	36	7.33	20	28	9.80	10	17	8.09	14	21	9.28	13	21	8.85	19	46	5.75
	6	19	31	8.59	20	30	9.06	10	16	8.59	14	21	9.47	10	17	8.18	19	44	6.05
	7	19	61	4.24	20	27	10.23	19	27	9.89	11	15	9.63	14	20	9.22	13	36	5.14
	8	19	29	9.14	20	28	9.87	19	27	10.12	14	20	10.02	13	20	9.23	19	50	5.17
	9	19	29	9.21	20	28	9.92	19	26	10.45	14	19	10.37	10	16	8.76	19	42	6.35
	Avg.			9.17			10.01			10.15			10.01			9.07			5.55
P2	1	19	52	5.04	18	124	1.95	18	108	2.27	18	111	2.22	19	40	6.53	19	67	3.81
	2	19	49	5.34	19	49	5.35	13	20	8.98	19	38	6.88	59	16	49.69	2	10	3.43
	3	19	39	6.71	13	25	7.15	10	13	10.45	19	32	8.24	10	15	9.47	13	34	5.45
	4	19	39	6.81	20	32	8.37	10	12	11.19	20	0	1179.38	10	14	9.89	28	39	10.01
	5	19	38	6.99	20	32	8.58	10	12	11.80	3	3	11.94	7	11	9.50	19	48	5.59
	6	10	18	7.29	10	16	8.64	14	15	12.80	19	24	10.97	6	8	9.44	19	560	0.48
	7	9	19	6.92	3	2	18.97	14	15	12.73	19	23	11.62	7	10	9.71	19	40	6.66
	8	13	25	7.35	19	27	9.80	10	11	12.29	19	21	12.45	8	10	10.38	14	29	6.51
	9	19	31	8.61	19	28	9.31	7	9	11.78	14	16	12.44	14	16	11.65	14	29	6.71
	Avg.			7.63			9.56			12.27			12.17			10.58			6.63
P3	1	15	535	0.39	2	0	70.00	18	122	2.05	18	108	2.29	13	26	6.90	18	116	2.17
	2	12	40	4.12	19	43	5.99	19	39	6.84	19	39	6.68	13	22	8.26	18	556	0.45
	3	13	33	5.33	19	37	7.07	20	31	8.82	19	30	8.92	9	15	8.44	19	57	4.74
	4	19	42	6.34	19	32	8.01	19	28	9.75	19	26	10.18	9	14	9.18	20	552	0.49
	5	93	27	47.58	6	23	3.74	20	26	10.48	14	18	10.75	13	2	77.70	20	555	0.49
	6	20	35	7.75	14	23	8.26	19	24	11.25	14	17	11.18	9	13	9.73	20	43	6.47
	7	108	25	60.46	13	22	8.56	19	23	11.66	20	23	11.61	10	13	10.31	20	43	6.43
	8	19	32	8.29	14	19	9.83	20	23	12.08	20	23	12.06	13	16	11.35	20	40	6.80
	9	20	31	8.72	22	1	307.49	20	22	12.43	19	22	12.36	13	16	11.84	12	557	0.31
	Avg.			8.50			9.19			12.06			12.01			11.17			6.61

Table B-120. 1st 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	90	2.82	18	123	2.01	18	122	2.02	17	499	0.48	18	124	2.03	18	93	2.68
	2	19	72	3.57	19	44	6.08	13	28	6.42	19	47	5.57	18	46	5.58	19	64	4.10
	3	19	62	4.20	19	37	7.24	13	25	7.11	19	38	6.96	10	18	7.91	19	59	4.47
	4	19	877	0.30	19	34	7.81	13	24	7.75	19	34	7.95	8	14	7.87	19	569	0.47
	5	19	65	4.04	20	32	8.53	10	17	8.17	20	32	8.54	6	10	8.48	19	437	0.59
	6	19	59	4.43	19	30	8.94	8	12	8.96	19	33	8.21	6	7	13.11	19	69	3.84
	7	7	40	2.28	20	31	8.72	8	11	9.52	20	30	8.96	4	7	8.93	19	63	4.20
	8	19	60	4.40	20	34	7.98	8	11	9.10	14	22	8.90	8	12	9.06	13	38	4.80
	9	13	39	4.54	20	31	8.77	10	15	9.47	14	22	9.12	8	12	9.45	10	26	5.47
	Avg.			3.74			8.49			9.36			8.99			9.15			4.82
P2	1	14	187	1.05	18	118	2.09	19	45	6.00	18	103	2.47	18	102	2.43	18	74	3.44
	2	18	92	2.68	13	28	6.57	19	41	6.57	19	34	7.96	19	41	6.53	18	48	5.31
	3	19	64	4.00	10	18	7.81	19	35	7.58	19	30	8.76	14	23	8.25	18	43	5.93
	4	12	40	4.23	14	24	7.88	14	23	8.53	14	21	9.27	10	16	8.48	19	41	6.36
	5	12	45	3.64	20	34	7.88	14	21	8.86	11	16	9.24	10	16	8.59	19	41	6.38
	6	6	27	3.17	20	31	8.69	14	20	9.77	14	20	9.78	8	12	9.16	19	39	6.66
	7	12	34	4.96	20	35	7.81	19	28	9.55	11	16	9.51	10	0	1832.70	19	36	7.12
	8	9	27	4.59	14	22	8.74	20	27	10.12	19	27	9.94	6	9	9.40	19	36	7.26
	9	12	34	5.12	19	30	8.89	20	27	10.03	19	26	10.48	10	14	9.93	19	36	7.17
	Avg.			4.89			8.48			9.90			9.98			9.67			7.19
P3	1	18	116	2.12	19	55	4.73	13	27	6.83	18	117	2.08	17	838	0.28	17	110	2.14
	2	12	38	4.52	13	28	6.51	14	25	7.51	13	26	7.14	10	21	6.40	18	67	3.73
	3	13	33	5.21	6	27	2.95	13	24	7.67	19	36	7.30	6	11	7.25	18	54	4.72
	4	13	30	5.95	19	40	6.79	10	17	8.13	19	37	7.14	6	11	7.46	19	49	5.27
	5	19	43	6.09	19	36	7.41	10	17	8.52	19	31	8.39	4	11	5.05	19	50	5.23
	6	13	31	5.62	19	35	7.56	14	22	8.67	19	30	8.59	5	10	7.51	19	48	5.43
	7	19	69	3.76	14	25	7.72	20	30	8.98	14	20	9.47	10	17	8.34	19	41	6.35
	8	19	41	6.48	10	19	7.44	14	21	9.47	14	19	9.93	10	16	8.65	19	42	6.22
	9	19	39	6.81	14	24	8.09	14	21	9.33	14	20	9.51	10	16	8.90	13	31	5.60
	Avg.			5.69			7.75			9.26			9.64			8.63			6.05

Table B-121. 1st 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	83	3.04	17	177	1.36	18	122	2.02	18	62	4.05	17	305	0.77	19	56	4.56
	2	19	59	4.32	18	53	4.77	19	44	6.01	19	49	5.37	10	21	6.39	19	51	5.19
	3	19	59	4.34	19	38	6.89	13	25	7.32	19	44	5.89	10	20	6.68	19	47	5.57
	4	9	28	4.71	19	31	8.43	16	1	272.36	13	29	6.43	13	24	7.59	13	34	5.38
	5	13	34	5.22	19	27	9.93	10	18	8.03	7	16	6.17	10	17	8.13	10	27	5.11
	6	19	43	6.10	19	26	10.26	10	18	8.07	7	15	6.58	10	16	8.40	8	20	5.18
	7	13	32	5.61	13	17	10.85	14	1	148.23	6	11	6.84	10	17	8.37	10	26	5.23
	8	13	33	5.55	13	16	11.55	10	17	8.37	7	15	6.72	10	16	8.53	19	40	6.64
	9	9	24	5.35	13	16	11.90	10	17	8.33	7	15	6.61	10	15	8.90	20	42	6.50
	Avg.			5.50			11.43			8.35			6.72			8.60			6.12
P2	1	11	50	3.15	2	0	203.63	19	77	3.33	18	123	2.08	19	69	3.80	18	129	1.91
	2	12	39	4.40	19	54	4.83	10	18	7.34	19	45	5.93	14	25	7.68	19	76	3.37
	3	13	38	4.65	19	45	5.86	19	32	8.45	19	38	6.89	10	17	8.06	19	65	4.03
	4	19	48	5.51	19	41	6.62	4	1	38.57	19	38	7.01	10	16	8.38	19	60	4.31
	5	19	46	5.75	19	35	7.49	13	21	8.83	20	29	9.43	10	17	8.36	19	559	0.47
	6	19	42	6.29	19	32	8.24	13	20	9.18	20	32	8.48	22	2	185.45	20	564	0.48
	7	19	41	6.52	19	27	9.96	13	20	9.27	15	22	9.13	20	26	10.57	19	65	4.06
	8	13	29	6.16	20	29	9.43	14	20	9.48	7	17	5.63	20	25	11.01	19	565	0.47
	9	9	22	5.86	19	554	0.47	14	20	9.61	11	17	8.81	14	20	9.78	20	554	0.49
	Avg.			6.18			9.69			9.45			7.86			10.45			4.06
P3	1	18	89	2.74	17	274	0.88	19	47	5.53	19	38	6.93	17	117	2.05	18	87	2.91
	2	9	21	5.93	19	47	5.59	13	27	6.96	19	37	7.16	13	32	5.70	19	74	3.50
	3	9	19	6.39	13	33	5.35	2	0	288.48	14	24	8.02	9	20	6.57	19	74	3.48
	4	13	28	6.32	9	22	5.66	19	33	8.02	10	17	8.00	7	14	6.79	19	69	3.82
	5	12	27	6.37	7	16	5.97	19	32	8.33	10	17	8.20	5	10	6.96	19	67	3.91
	6	9	18	6.83	13	28	6.42	14	24	8.02	10	17	8.23	5	10	7.33	19	56	4.74
	7	9	18	6.97	19	39	6.72	10	17	7.75	19	30	8.63	4	8	7.02	19	56	4.65
	8	6	14	5.67	13	28	6.46	14	24	7.92	19	31	8.66	6	10	8.01	19	55	4.88
	9	13	25	7.11	10	21	6.41	10	17	8.27	19	28	9.48	19	30	8.83	19	53	5.00
	Avg.			6.58			6.53			7.98			8.92			7.95			4.84

Table B-122. 1st 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	98	2.56	19	72	3.72	19	59	4.54	19	45	5.85	19	27	9.72	18	816	0.31
	2	19	60	4.37	19	23	11.26	20	27	10.18	19	27	9.79	3	0	339.39	1	0	20.36
	3	13	40	4.60	19	21	12.21	20	23	11.86	19	23	11.66	20	22	12.34	19	54	4.91
	4	13	39	4.66	19	20	13.41	14	16	11.99	19	21	12.59	20	27	10.03	13	39	4.78
	5	5	29	2.38	19	19	13.67	14	15	12.79	20	21	13.14	20	21	12.99	14	37	5.19
	6	13	35	5.17	13	14	13.12	14	16	12.66	17	0	725.44	20	20	13.37	13	38	4.93
	7	13	34	5.36	19	21	12.80	14	15	12.60	20	20	13.52	20	20	13.58	8	29	3.79
	8	19	14	19.07	13	14	13.01	14	15	13.40	20	19	14.04	14	15	13.41	10	28	4.98
	9	13	31	5.81	19	19	13.51	14	15	13.26	20	19	14.61	14	14	13.70	11	29	5.15
	Avg.			5.58			13.11			13.09			14.06			13.56			4.64
P2	1	16	173	1.30	18	107	2.31	19	39	6.87	19	56	4.58	19	57	4.54	18	114	2.19
	2	18	74	3.40	19	46	5.65	14	19	10.05	19	26	10.15	10	17	8.16	1	0	101.82
	3	19	53	4.95	19	40	6.58	14	19	10.40	19	25	10.32	10	16	8.38	19	46	5.58
	4	13	29	6.05	13	24	7.48	14	18	10.86	19	25	10.47	8	11	10.18	18	820	0.31
	5	13	27	6.43	13	22	8.47	10	13	10.64	10	15	9.12	8	0	441.21	19	44	5.96
	6	9	7	19.81	13	20	9.25	5	10	7.19	13	19	9.88	4	6	11.27	18	181	1.39
	7	19	35	7.46	13	21	8.82	10	13	10.76	10	15	8.95	4	5	10.25	19	59	4.34
	8	9	18	7.08	13	23	8.00	14	17	11.33	8	12	8.88	4	5	11.10	19	54	4.91
	9	10	17	7.89	13	20	9.04	14	17	11.65	6	9	8.66	8	11	9.77	19	50	5.22
	Avg.			7.48			8.62			11.24			8.83			10.37			4.83

Table B-123. 1st 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	90	2.74	19	78	3.30	19	95	2.77	18	116	2.17	20	45	6.00	13	43	4.05
	2	19	59	4.40	19	34	7.79	20	39	7.01	19	40	6.56	20	42	6.48	13	38	4.72
	3	13	39	4.52	19	29	9.02	11	23	6.26	19	33	8.15	20	38	7.20	19	1	188.08
	4	13	37	4.92	25	1	326.19	10	17	8.33	19	31	8.65	20	38	7.20	30	26	16.00
	5	13	35	5.16	19	27	9.99	11	16	8.87	19	31	8.37	20	36	7.68	9	26	4.97
	6	13	34	5.31	19	25	10.66	8	12	8.75	19	544	0.48	20	36	7.64	10	26	5.09
	7	13	32	5.65	19	25	10.85	8	13	9.20	19	28	9.51	20	35	7.82	10	27	5.05
	8	9	25	5.26	7	18	5.40	6	9	9.18	19	26	10.23	20	34	8.08	9	25	4.88
	9	13	29	6.36	6	14	6.27	5	7	9.51	14	18	10.75	20	37	7.32	10	27	5.08
	Avg.			5.76			5.84			9.30			10.16			7.74			5.00
P2	1	17	292	0.82	17	196	1.18	20	33	8.31	19	119	2.17	18	119	2.13	18	123	2.02
	2	18	65	3.89	12	32	5.32	14	21	9.33	19	36	7.12	13	31	5.96	19	63	4.26
	3	13	32	5.52	13	26	7.07	10	16	9.14	13	22	8.02	13	27	6.82	19	58	4.58
	4	12	16	10.85	19	33	8.20	8	11	9.55	10	16	8.20	13	25	7.35	19	47	5.60
	5	9	20	6.45	20	31	8.80	8	12	9.29	7	13	7.63	19	32	8.44	19	47	5.64
	6	7	15	7.02	14	22	8.54	6	9	9.57	10	15	8.57	3	0	118.79	19	45	5.95
	7	7	14	7.19	14	22	8.71	6	9	9.60	7	13	8.16	20	32	8.57	19	45	5.93
	8	19	36	7.34	10	17	8.39	5	6	9.87	10	16	8.08	10	24	5.89	19	46	5.75
	9	13	24	7.51	10	17	8.56	4	7	9.18	6	9	9.11	14	23	8.10	19	57	4.74
	Avg.			7.35			8.55			9.55			8.45			7.52			5.47

Table B-124. 2nd 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	19	74	3.54	16	625	0.36	17	281	0.84	17	260	0.88	18	117	2.18	19	77	3.32
	2	19	52	5.01	19	51	5.15	19	45	5.73	13	27	6.73	13	22	8.04	19	43	6.13
	3	19	43	6.21	13	24	7.42	19	34	7.73	13	23	7.87	10	2	70.49	20	34	8.02
	4	19	40	6.65	9	16	7.99	13	20	9.09	19	31	8.71	6	10	7.80	13	22	8.35
	5	19	36	7.37	7	11	8.48	19	28	9.55	20	26	10.46	7	11	9.22	13	21	8.73
	6	20	35	7.66	7	11	8.96	19	26	10.01	20	25	10.77	14	19	10.40	9	15	8.29
	7	20	34	7.95	7	11	8.55	19	25	10.80	20	28	9.85	20	26	10.95	10	16	8.34
	8	20	32	8.48	7	11	8.82	19	23	11.28	20	24	11.57	10	18	7.63	9	15	8.71
	9	20	32	8.69	5	8	8.81	19	22	11.90	20	27	10.00	10	14	9.74	9	15	8.53
	Avg.			8.37			8.73			11.32			10.47			9.44			8.52
P2	1	19	49	5.42	18	123	1.99	17	408	0.56	17	680	0.34	17	556	0.43	18	329	0.74
	2	14	28	6.92	19	45	5.76	12	25	6.99	19	55	4.66	19	46	5.69	18	68	3.63
	3	14	26	7.50	19	34	7.78	13	22	7.98	5	21	2.99	13	22	8.20	12	32	5.37
	4	14	25	7.65	19	30	8.86	13	20	8.86	4	8	7.81	9	15	8.42	9	24	5.08
	5	19	31	8.48	19	28	9.22	9	14	9.35	1	1	9.26	19	36	7.27	12	29	6.03
	6	19	30	8.97	19	26	9.98	6	14	6.53	2	3	9.73	13	19	9.29	4	17	3.25
	7	14	21	8.99	9	13	9.76	13	17	10.74	13	1	344.61	7	11	8.52	4	6	8.59
	8	14	22	8.91	7	10	9.26	19	25	10.63	13	21	8.50	6	2	46.58	9	20	6.51
	9	19	27	9.93	19	24	10.94	19	24	10.98	9	17	7.52	2	2	13.28	9	20	6.25
	Avg.			9.28			9.99			10.78			8.01			10.90			7.12
P3	1	17	128	1.85	19	46	5.67	17	593	0.39	19	45	5.84	17	130	1.85	19	65	4.09
	2	19	57	4.61	19	36	7.30	19	49	5.26	19	39	6.83	19	45	5.78	19	60	4.37
	3	14	26	7.49	19	32	8.16	19	35	7.59	19	34	7.85	19	36	7.34	19	60	4.44
	4	10	18	7.84	19	31	8.79	19	31	8.34	20	32	8.60	19	31	8.52	19	49	5.53
	5	10	18	8.00	19	29	9.05	19	27	9.74	19	30	9.10	19	30	8.81	20	550	0.50
	6	14	22	8.74	20	28	9.57	2	0	330.90	21	31	9.16	19	30	8.99	20	47	5.70
	7	11	17	8.64	19	26	10.00	18	25	9.99	20	28	9.85	20	27	9.99	20	44	6.23
	8	10	17	8.58	19	26	10.43	19	25	10.66	1	3	5.40	19	28	9.51	20	48	5.62
	9	19	29	9.18	19	25	10.69	19	23	11.68	1	1	22.63	19	26	10.32	19	45	5.91
	Avg.			8.80			10.37			10.78			9.85			9.94			5.92

Table B-125. 2nd 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	1243	0.19	17	242	0.99	17	113	2.13	19	98	2.64	18	115	2.12	18	111	2.23
	2	13	34	5.06	18	14	18.43	12	22	7.72	19	5	54.14	9	15	8.69	13	36	5.12
	3	13	29	6.30	7	11	8.40	13	21	8.41	20	29	9.46	7	10	9.45	10	25	5.63
	4	13	27	7.02	7	11	8.91	19	29	9.06	14	18	10.42	7	10	9.56	14	29	6.41
	5	10	20	6.78	7	11	9.26	19	26	10.28	14	18	10.74	7	10	9.45	13	29	6.39
	6	5	14	4.94	10	14	9.13	19	24	10.83	20	23	12.15	10	13	10.57	10	22	6.08
	7	7	14	7.17	10	14	9.64	19	23	11.63	14	16	11.82	10	13	10.53	7	17	5.96
	8	8	13	7.89	14	18	10.43	6	0	-	13	16	11.63	20	22	12.45	8	17	6.32
	9	5	10	7.00	10	13	10.33	19	21	12.92	10	12	11.50	14	15	12.56	8	17	6.20
	Avg.			7.35			10.13			12.27			11.65			11.85			6.16
P2	1	18	125	1.96	18	115	2.14	18	118	2.07	19	42	6.26	18	549	0.45	18	118	2.05
	2	10	25	5.41	19	37	6.96	19	40	6.59	13	20	8.97	9	13	9.68	19	73	3.60
	3	7	18	5.56	19	32	8.15	19	32	8.20	19	27	9.97	13	18	10.18	19	46	5.83
	4	8	18	5.91	13	23	7.79	19	29	9.14	13	18	9.74	14	17	11.00	19	41	6.57
	5	12	1	179.29	13	22	8.42	14	19	9.87	7	10	9.75	20	24	11.47	20	572	0.48
	6	8	17	6.30	13	20	9.02	19	26	10.12	6	8	9.72	20	25	11.34	20	37	7.35
	7	16	17	13.42	20	29	9.70	19	25	10.76	5	1	120.00	20	24	11.64	20	36	7.53
	8	10	20	6.79	13	20	9.40	10	14	9.62	1	1	11.31	20	23	12.18	20	35	7.83
	9	14	25	7.58	19	25	10.39	7	11	8.95	19	21	12.70	20	23	11.96	20	563	0.48
	Avg.			7.19			9.83			9.78			12.01			11.93			7.68
P3	1	18	69	3.63	17	299	0.76	17	243	0.95	17	111	2.16	16	156	1.41	17	139	1.68
	2	10	19	7.01	18	53	4.85	18	45	5.61	19	37	7.13	6	11	7.50	13	35	5.22
	3	11	18	8.10	19	40	6.44	18	36	6.96	19	31	8.53	3	5	7.89	10	26	5.50
	4	19	37	7.09	3	0	585.45	18	32	8.01	19	27	9.97	4	4	11.57	10	25	5.45
	5	19	35	7.59	5	14	4.95	18	29	8.93	19	26	9.95	6	21	3.90	10	24	5.97
	6	19	33	8.07	19	33	7.96	19	29	9.02	19	24	11.11	13	19	9.43	10	23	6.05
	7	19	31	8.48	19	31	8.58	19	27	9.43	19	23	11.59	9	14	9.24	10	23	6.12
	8	13	21	9.07	19	31	8.69	19	28	9.12	20	22	12.29	3	4	10.81	10	24	5.96
	9	14	21	9.14	4	12	5.02	19	29	8.98	20	22	12.52	2	2	13.20	8	19	5.85
	Avg.			8.90			7.43			9.18			12.14			11.08			5.98

Table B-126. 2nd 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	72	3.46	17	253	0.93	18	38	6.59	13	23	7.97	17	114	2.11	20	49	5.59
	2	19	52	5.01	7	12	8.66	14	18	10.56	14	20	9.67	13	20	9.01	13	24	7.56
	3	19	46	5.70	7	11	8.81	19	25	10.86	10	14	10.07	13	20	9.26	10	18	7.66
	4	13	32	5.78	44	14	42.83	20	23	11.79	6	14	6.16	13	17	10.89	7	14	7.03
	5	10	22	6.12	10	13	10.12	14	54	3.66	10	13	10.69	14	16	11.82	7	13	7.36
	6	10	23	5.89	19	25	10.80	20	20	13.22	10	13	10.64	14	16	11.59	7	13	6.93
	7	9	23	5.77	19	24	11.30	14	15	12.83	20	22	12.68	13	15	12.80	7	13	7.34
	8	10	22	6.16	20	25	10.91	19	0	1128.47	14	16	11.74	14	16	12.02	5	13	5.73
	9	14	29	6.54	20	23	11.91	6	11	7.27	10	12	11.31	20	22	12.46	9	17	7.61
	Avg.			6.16			11.37			10.05			11.91			12.43			6.89
P2	1	19	76	3.40	16	98	2.23	18	139	1.81	19	37	7.10	18	119	2.07	2	0	356.36
	2	13	36	5.07	19	41	6.41	13	16	11.65	14	19	9.73	13	18	10.11	20	54	5.01
	3	13	31	5.93	19	30	9.03	19	23	11.86	9	13	10.31	13	15	11.53	13	35	5.02
	4	13	30	6.11	19	26	9.94	19	22	12.13	10	13	10.89	13	14	13.46	9	24	5.26
	5	14	28	6.77	13	17	11.07	20	21	12.92	10	12	11.70	19	19	13.60	9	23	5.66
	6	13	26	7.22	10	12	10.90	14	15	12.56	7	8	12.67	13	14	13.19	10	21	6.23
	7	10	20	6.74	14	16	11.70	14	14	13.40	19	20	13.17	7	8	13.12	12	0	2138.15
	8	4	14	4.42	13	16	11.93	19	19	14.24	19	24	11.00	7	7	13.48	10	23	6.01
	9	7	14	7.15	19	22	12.07	19	19	14.24	20	20	13.66	9	1	110.91	10	24	5.73
	Avg.			6.10			11.90			13.96			12.61			13.30			5.87
P3	1	17	214	1.08	19	45	5.88	18	102	2.38	18	71	3.50	18	132	1.87	17	486	0.49
	2	10	22	5.98	19	37	7.19	3	5	10.35	20	36	7.58	19	38	6.93	20	48	5.65
	3	10	20	6.90	19	31	8.46	19	25	10.39	19	29	9.17	19	28	9.36	13	27	6.77
	4	19	37	7.05	19	28	9.57	19	901	0.29	19	25	10.79	19	24	11.02	9	18	7.21
	5	15	25	8.38	19	28	9.28	19	583	0.45	19	22	12.07	19	22	12.40	9	18	7.40
	6	13	23	7.90	3	1	32.24	19	27	10.02	19	18	14.69	19	22	12.00	7	15	6.50
	7	10	16	8.78	13	17	10.55	19	22	11.87	20	18	15.10	19	20	13.62	7	14	6.87
	8	10	16	8.80	19	24	11.30	19	23	11.63	19	18	14.69	20	20	13.37	7	14	6.81
	9	8	11	9.51	19	24	11.14	19	26	10.21	19	19	14.18	19	24	11.07	7	14	7.04
	Avg.			9.03			11.00			11.24			14.66			12.52			6.91

Table B-127. 2nd 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	19	65	4.00	19	572	0.45	19	28	9.36	13	21	8.70	19	49	5.41	18	103	2.42
	2	10	38	3.59	19	23	11.62	19	24	11.14	20	18	15.62	19	24	11.14	18	64	3.96
	3	10	27	5.33	10	10	13.22	13	17	10.63	20	17	16.61	19	21	12.68	8	20	5.83
	4	10	24	5.86	10	10	13.43	19	33	7.98	13	12	15.17	19	20	13.18	5	12	5.62
	5	11	24	5.97	19	18	14.62	13	16	11.48	14	12	15.79	13	15	11.92	19	32	8.17
	6	11	23	6.30	19	17	15.65	9	11	11.45	14	12	15.86	13	15	12.15	19	30	8.73
	7	10	24	6.06	13	12	14.96	13	15	12.19	10	9	14.83	10	12	11.99	19	28	9.55
	8	10	23	6.40	14	12	15.64	13	13	13.69	10	9	14.67	7	9	10.95	19	28	9.28
	9	10	23	6.39	10	9	14.36	13	13	13.86	13	11	16.91	5	8	9.86	18	30	8.31
	Avg.			6.28			14.99			13.25			15.47			10.94			9.05
P2	1	17	122	1.97	18	70	3.64	19	32	8.02	18	92	2.71	3	0	458.18	18	179	1.41
	2	13	32	5.52	9	16	8.38	12	19	8.92	19	31	8.47	19	27	9.48	13	28	6.31
	3	10	22	6.42	9	15	8.67	12	19	8.92	12	19	9.06	12	19	9.16	9	20	6.54
	4	10	20	6.96	7	11	8.92	19	27	9.84	6	9	8.89	12	19	9.13	9	18	6.95
	5	8	15	6.94	19	24	11.00	19	22	11.74	19	29	9.09	19	23	11.42	7	15	6.74
	6	8	15	7.31	19	23	11.73	19	21	12.73	9	12	10.25	13	17	10.45	13	22	8.44
	7	10	18	7.75	19	21	12.66	12	15	11.12	8	12	9.51	13	16	10.72	13	22	8.32
	8	10	18	7.81	13	16	11.33	13	15	11.46	11	2	94.18	9	13	9.56	13	22	7.78
	9	10	17	8.27	19	21	12.85	13	15	11.99	8	12	9.87	8	1	176.48	13	21	8.88
	Avg.			7.94			12.28			11.52			9.69			10.14			8.33

Table B-128. 2nd 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	115	2.07	18	109	2.27	19	96	2.68	20	84	3.22	18	420	0.60	9	23	5.52
	2	9	26	4.73	32	0	3750.25	19	34	7.83	20	36	7.72	14	22	8.81	7	15	6.25
	3	7	0	282.82	10	0	458.18	19	27	9.87	14	25	7.71	10	16	8.63	9	19	6.64
	4	3	8	6.17	14	20	9.24	19	22	12.29	14	24	7.81	10	15	8.90	9	19	6.42
	5	12	17	9.21	13	19	9.70	19	22	11.95	20	29	9.61	10	15	9.36	13	24	7.55
	6	13	28	6.67	13	18	10.36	20	21	12.66	14	23	8.37	14	17	10.93	10	18	7.24
	7	13	24	7.55	10	14	9.70	19	21	12.94	10	18	7.85	20	22	12.43	10	18	7.51
	8	10	22	6.14	10	14	9.72	19	21	12.59	7	14	7.48	14	17	11.22	10	19	7.18
	9	7	17	5.79	7	11	9.34	19	18	14.53	8	14	7.70	14	16	11.50	10	18	7.51
	Avg.			6.50			9.58			13.35			7.68			11.72			7.40
P2	1	17	505	0.46	19	36	7.17	17	431	0.54	20	32	8.61	19	70	3.74	19	64	4.04
	2	13	37	4.83	19	31	8.39	2	0	407.27	20	31	8.92	19	31	8.59	19	44	6.12
	3	9	23	5.63	19	27	9.91	2	1	20.36	45	21	29.80	20	23	11.53	19	40	6.63
	4	7	16	6.11	20	26	10.54	20	24	11.47	20	28	9.83	19	32	8.42	19	39	6.82
	5	7	16	5.91	19	24	11.33	19	21	12.63	20	29	9.62	19	27	9.90	19	37	7.01
	6	7	12	8.08	19	24	11.34	19	20	13.26	20	26	10.74	19	28	9.48	19	35	7.64
	7	5	12	6.41	19	22	12.27	19	21	12.90	20	26	10.63	20	28	9.88	19	34	7.95
	8	5	11	6.75	20	22	12.39	19	20	13.60	20	25	11.02	3	0	-	19	33	8.03
	9	10	11	11.86	20	23	12.00	19	18	14.47	14	19	9.99	21	18	16.25	20	32	8.48
	Avg.			6.58			12.22			13.65			10.55			9.88			8.15

Table B-129. 3rd 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	169	1.35	16	175	1.26	17	499	0.46	16	169	1.34	18	122	1.98	18	103	2.42
	2	9	26	4.75	18	55	4.61	12	23	7.12	19	582	0.44	12	22	7.62	13	37	4.82
	3	9	25	5.26	8	16	7.49	12	19	9.10	19	36	7.12	12	19	9.03	9	23	5.44
	4	13	30	6.06	6	11	7.86	8	11	10.48	19	32	8.37	9	13	9.01	6	16	5.53
	5	13	29	6.40	3	4	10.09	9	11	10.54	19	27	9.68	4	8	7.81	3	11	3.96
	6	20	39	6.93	3	4	10.64	9	12	10.18	11	16	9.36	3	0	111.07	4	9	5.91
	7	13	26	7.03	3	4	11.20	8	12	10.04	19	25	10.82	3	4	12.46	4	11	5.27
	8	9	19	6.75	8	0	-	11	9	16.45	19	23	11.35	6	9	9.20	5	12	5.40
	9	14	25	7.63	19	28	9.49	4	7	8.17	13	16	11.01	4	6	9.86	4	12	4.18
	Avg.			7.14			10.35			9.11			11.06			10.51			4.95
P2	1	16	154	1.45	12	25	6.72	19	50	5.26	18	685	0.35	18	113	2.18	19	194	1.34
	2	19	72	3.56	5	11	6.20	9	15	8.01	8	14	8.24	13	17	10.30	13	33	5.59
	3	12	33	5.16	2	3	10.06	4	11	5.91	4	8	6.33	13	16	10.93	13	30	6.13
	4	9	20	6.22	5	9	7.67	6	10	8.39	4	7	8.92	19	24	11.04	20	33	8.39
	5	9	17	7.36	7	11	8.64	19	29	9.22	6	8	9.99	13	15	11.87	14	26	7.28
	6	4	10	6.26	7	11	8.15	19	29	9.14	5	7	9.88	20	24	11.42	10	21	6.55
	7	7	15	6.38	5	9	7.99	12	18	9.54	5	7	9.53	19	21	12.77	7	16	6.21
	8	3	6	7.64	4	6	8.48	9	13	9.40	4	6	9.06	13	14	12.91	5	12	5.60
	9	2	3	8.26	5	8	8.81	9	12	10.35	6	8	10.47	13	13	13.40	3	8	5.30
	Avg.			7.95			8.43			9.76			9.68			13.03			5.70
P3	1	12	51	3.20	19	51	5.09	18	125	1.94	18	381	0.65	18	112	2.28	20	57	4.78
	2	9	34	3.59	19	36	7.32	19	47	5.56	20	38	7.16	19	33	8.20	20	46	5.84
	3	7	25	3.74	19	31	8.55	19	36	7.50	20	29	9.31	20	28	9.71	20	44	6.19
	4	13	39	4.74	19	29	9.24	20	32	8.44	20	26	10.54	20	25	10.98	20	42	6.53
	5	7	35	2.76	20	26	10.24	19	30	8.83	20	24	11.30	19	23	11.82	20	40	6.90
	6	13	36	5.14	20	24	11.26	20	27	9.98	20	22	12.08	20	21	12.75	13	28	6.45
	7	13	34	5.54	20	23	11.90	20	28	9.73	20	21	12.73	20	21	13.24	13	29	6.54
	8	10	28	4.72	20	23	11.66	19	27	9.92	19	20	13.30	20	20	13.90	13	29	6.36
	9	9	28	4.66	19	23	11.72	20	27	10.24	20	20	14.03	20	18	15.33	9	21	6.06
	Avg.			4.97			11.76			9.96			13.35			14.16			6.32

Table B-130. 3rd 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	30	5.49	17	112	2.06	19	90	2.86	18	101	2.52	18	97	2.58	17	238	1.01
	2	9	18	6.98	19	44	5.93	13	16	11.02	20	34	7.93	13	20	9.20	9	19	6.43
	3	9	17	7.60	19	33	8.07	9	10	12.10	20	27	10.08	9	13	9.37	7	14	6.64
	4	19	39	6.81	12	19	8.86	7	8	11.40	20	23	11.62	7	9	9.97	7	14	6.74
	5	13	22	8.45	9	13	9.52	9	10	13.30	20	22	12.63	7	9	9.67	9	18	7.22
	6	9	15	8.42	13	18	9.68	10	10	13.18	19	22	11.68	5	7	10.24	7	14	7.06
	7	9	15	8.92	13	17	10.46	5	10	6.80	20	20	13.62	5	4	16.48	5	11	6.43
	8	7	11	8.82	13	16	11.04	20	17	15.74	20	20	13.58	5	7	10.53	6	1	160.56
	9	10	15	9.06	9	12	11.14	20	17	15.71	20	19	14.13	10	11	12.17	3	6	7.59
	Avg.			8.93			10.88			15.73			13.77			13.06			7.01
P2	1	19	71	3.60	17	707	0.33	20	28	9.83	18	98	2.54	18	97	2.59	19	73	3.58
	2	13	28	6.35	19	44	6.00	13	14	12.98	20	30	9.05	19	32	8.12	19	54	4.88
	3	7	13	7.70	19	32	8.34	9	9	13.58	13	18	9.83	13	16	11.27	20	551	0.50
	4	7	12	8.21	13	18	10.25	9	9	13.53	7	9	9.84	9	11	11.89	13	33	5.46
	5	7	12	8.69	9	13	9.96	9	9	14.02	9	12	10.61	9	10	12.53	13	32	5.71
	6	7	12	8.57	7	9	10.58	20	17	15.70	7	9	9.75	11	1	206.31	13	32	5.48
	7	20	33	8.30	7	9	10.36	19	1	217.21	6	9	10.04	9	10	12.29	9	25	5.05
	8	19	35	7.77	9	11	11.31	13	12	15.08	6	9	10.37	20	20	13.64	9	25	5.21
	9	13	20	9.13	9	11	11.45	13	13	14.18	20	20	13.87	13	13	13.84	7	19	4.97
	Avg.			8.40			11.04			14.63			11.43			13.26			5.08
P3	1	9	20	6.17	18	114	2.13	19	90	2.87	18	95	2.66	18	115	2.15	18	193	1.26
	2	6	147	0.59	19	49	5.35	20	28	9.85	20	33	8.30	19	41	6.42	19	71	3.76
	3	9	17	7.48	19	37	7.10	20	24	11.23	19	27	9.97	19	32	8.45	19	55	4.90
	4	19	37	7.11	19	32	8.29	20	22	12.32	20	24	11.39	19	27	9.71	20	49	5.64
	5	13	23	8.28	20	29	9.29	20	22	12.50	20	23	11.76	20	25	10.91	20	48	5.71
	6	10	15	8.82	19	28	9.48	20	21	12.94	20	22	12.70	19	24	11.18	20	44	6.31
	7	7	12	8.31	20	28	9.85	20	20	13.52	20	22	12.75	20	23	12.13	20	45	6.07
	8	9	15	8.55	19	27	9.99	20	19	14.12	20	20	13.34	13	105	1.74	20	41	6.66
	9	13	1	146.16	20	25	10.86	20	19	14.59	21	20	15.09	20	22	12.25	20	38	7.09
	Avg.			8.43			10.23			14.08			13.73			12.19			6.53

Table B-131. 3rd 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	16	765	0.29	19	43	6.18	18	120	2.10	12	24	6.88	9	13	10.09	19	59	4.58
	2	18	79	3.24	13	22	8.12	12	24	7.24	8	13	8.51	9	11	12.26	20	52	5.28
	3	19	49	5.48	13	19	9.63	6	10	8.39	8	13	8.95	9	11	12.17	20	44	6.24
	4	13	23	7.52	9	14	9.14	7	9	10.01	8	12	9.39	9	11	11.58	13	29	6.27
	5	10	16	8.67	13	17	10.98	7	10	9.43	25	14	25.23	10	11	12.17	13	29	6.26
	6	10	15	8.66	23	1	383.02	6	9	9.49	19	23	11.65	9	10	12.83	13	28	6.39
	7	20	31	8.80	13	16	11.62	3	7	6.36	12	17	10.28	9	10	12.83	20	42	6.58
	8	20	28	9.51	13	16	11.41	7	10	9.26	8	12	9.34	10	1	106.59	13	28	6.58
	9	10	14	9.53	11	0	313.93	13	15	11.74	19	21	13.02	10	9	14.87	9	20	6.41
	Avg.			9.28			11.52			9.12			10.88			13.85			6.52
P2	1	12	36	4.67	17	923	0.25	19	107	2.40	19	88	2.92	19	61	4.28	18	100	2.53
	2	27	21	17.41	9	16	7.81	19	26	10.17	20	30	8.98	51	16	45.48	19	1442	0.18
	3	9	19	6.49	13	21	8.64	13	17	10.42	20	25	11.16	13	14	12.99	19	58	4.56
	4	9	18	7.05	19	31	8.59	9	13	9.77	20	24	11.54	13	13	14.23	20	44	6.13
	5	9	18	7.06	20	27	9.99	4	8	8.13	20	22	12.45	13	12	15.17	20	39	6.98
	6	9	18	7.27	19	27	9.82	3	4	13.00	20	21	13.21	20	16	16.97	20	571	0.48
	7	9	18	7.27	20	25	11.01	5	4	15.63	19	20	13.25	13	11	15.39	20	40	6.91
	8	9	17	7.29	20	24	11.29	3	2	14.78	20	19	14.09	20	16	16.76	20	551	0.49
	9	13	21	8.79	19	24	11.07	6	0	226.26	20	19	14.39	20	15	18.47	20	590	0.47
	Avg.			7.79			11.13			15.20			13.91			16.88			6.91
P3	1	15	525	0.40	18	116	2.17	19	94	2.72	19	76	3.38	19	29	9.38	17	174	1.38
	2	18	92	2.72	20	36	7.54	19	36	7.37	20	31	8.86	20	21	12.82	18	590	0.42
	3	12	39	4.27	20	27	10.02	20	29	9.36	13	19	9.52	20	20	13.64	19	56	4.66
	4	8	25	4.61	20	24	11.33	20	25	10.88	9	12	10.38	20	19	14.11	19	49	5.31
	5	7	21	4.48	20	23	12.28	20	24	11.08	13	17	10.91	20	19	14.53	12	35	4.71
	6	5	15	4.53	20	23	12.05	19	23	11.25	20	21	12.85	20	18	14.92	8	24	4.80
	7	3	11	4.48	20	23	12.09	20	22	12.30	20	21	13.09	19	17	15.57	6	18	4.58
	8	3	5	7.43	20	22	12.52	20	22	12.29	20	20	13.70	19	17	15.94	4	14	3.96
	9	2	4	6.86	20	21	12.99	20	22	12.84	20	21	13.11	20	16	17.18	9	22	5.42
	Avg.			6.26			12.53			12.48			13.30			16.23			4.65

Table B-132. 3rd 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	39	4.42	19	118	2.20	19	63	4.16	19	79	3.31	18	41	6.27	19	127	2.02
	2	7	16	5.85	12	22	7.95	8	15	7.54	9	11	10.64	19	24	11.09	12	43	3.71
	3	13	28	6.48	9	12	10.21	19	25	10.81	7	8	11.39	19	34	7.60	19	50	5.30
	4	10	19	7.09	5	7	9.03	9	13	9.09	7	8	11.85	19	31	8.33	19	47	5.58
	5	6	14	5.45	5	10	6.59	7	10	8.80	7	7	13.78	19	19	13.63	20	37	7.26
	6	7	13	7.19	19	24	11.15	13	17	10.49	3	3	14.90	12	15	10.63	20	35	7.74
	7	10	18	7.47	19	22	11.88	9	12	9.80	4	6	9.90	12	19	8.59	19	36	7.49
	8	10	16	8.04	13	15	12.42	9	12	9.98	7	7	13.13	7	13	7.78	19	40	6.55
	9	10	17	8.08	9	12	10.97	9	11	10.46	10	9	14.00	12	16	9.93	19	35	7.54
	Avg.			7.86			11.76			10.08			13.56			8.86			7.19
P2	1	18	71	3.57	19	29	9.17	19	120	2.14	18	87	2.87	18	890	0.28	17	423	0.54
	2	13	31	5.66	19	25	10.70	13	24	7.31	19	30	8.77	8	18	6.30	12	32	5.46
	3	9	19	6.31	19	24	11.12	9	16	7.95	20	27	9.92	11	2	64.71	20	37	7.50
	4	7	14	7.21	20	22	12.06	7	12	7.91	20	28	9.70	11	0	3970.85	14	27	6.98
	5	13	27	6.70	19	21	12.54	7	11	8.45	20	24	11.18	20	23	11.67	13	26	7.28
	6	13	26	6.79	20	21	12.92	6	11	8.33	13	18	9.94	13	18	9.84	14	26	7.22
	7	19	34	7.78	19	21	12.66	9	14	9.11	13	18	10.00	33	12	37.05	10	19	7.24
	8	13	24	7.50	19	20	13.14	9	14	9.54	13	18	9.72	13	16	10.60	10	22	6.26
	9	9	18	7.26	19	19	13.68	9	14	9.48	19	22	12.29	9	12	9.85	20	30	9.22
	Avg.			7.51			13.16			9.38			10.67			10.22			7.57

Table B-133. 3rd 12" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	33	5.18	19	70	3.72	13	26	6.85	18	682	0.36	18	119	2.12	12	33	5.27
	2	9	19	6.68	19	42	6.30	13	25	7.16	20	49	5.54	9	17	7.50	10	19	6.87
	3	7	14	7.06	13	17	10.79	9	17	7.48	13	22	8.36	5	9	6.97	9	18	7.18
	4	7	13	7.34	13	16	11.34	9	16	7.75	13	21	8.69	5	9	7.76	10	17	7.94
	5	5	10	7.47	9	13	10.15	13	21	8.27	7	16	6.35	3	1	46.48	14	22	8.47
	6	7	13	7.02	13	15	11.95	9	16	8.15	13	19	9.70	5	9	7.18	14	20	9.32
	7	9	16	7.94	13	15	12.19	7	12	7.41	14	19	10.18	7	13	7.80	20	30	9.27
	8	9	16	8.25	9	14	8.76	7	12	7.53	20	23	12.37	7	12	7.88	20	30	9.30
	9	7	13	7.75	13	18	10.05	9	15	8.60	20	21	12.96	7	12	7.48	20	27	10.24
	Avg.			7.98			10.33			7.85			11.84			7.72			9.60
P2	1	18	84	3.03	18	114	2.21	18	122	2.00	17	102	2.36	19	41	6.35	19	903	0.28
	2	13	29	6.05	20	35	7.69	19	64	4.20	20	31	8.83	19	23	11.59	19	49	5.48
	3	13	27	6.58	20	27	10.12	19	37	7.19	20	26	10.40	19	20	13.30	19	44	6.07
	4	10	18	7.45	20	23	11.73	19	34	7.91	20	23	11.96	19	19	14.07	19	45	5.92
	5	10	18	7.90	20	24	11.37	19	35	7.68	20	22	12.41	19	17	15.74	19	42	6.32
	6	10	17	8.19	20	23	11.96	19	33	7.97	20	22	12.54	19	17	15.67	19	39	6.78
	7	10	16	8.12	20	24	11.66	20	29	9.27	20	21	12.89	19	17	15.77	20	34	7.89
	8	7	13	7.86	20	23	11.91	20	24	11.56	20	21	12.92	19	15	18.14	19	562	0.47
	9	3	6	7.10	20	21	13.34	19	22	12.16	20	20	13.52	19	15	17.68	19	36	7.42
	Avg.			7.69			12.30			11.00			13.11			17.20			7.66

Table B-134. 1st 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	95	1.48	9	62	1.97	10	26	5.47	13	109	1.65	13	107	1.67	12	114	1.47	12	803	0.21
	2	13	56	2.49	13	61	2.87	11	23	6.30	8	15	7.60	10	16	8.76	10	21	6.43	10	33	4.24
	3	14	49	2.88	13	57	3.12	13	26	7.07	10	17	8.20	10	15	9.80	13	26	7.15	10	19	7.23
	4	14	44	3.25	13	51	3.50	10	20	7.09	10	16	8.81	13	18	10.03	10	18	7.64	10	30	4.77
	5	11	37	3.01	10	38	3.72	10	19	7.64	8	13	9.10	13	17	10.65	13	21	8.70	10	29	5.03
	6	10	36	2.98	10	37	3.67	8	15	7.63	7	11	8.76	8	13	8.81	13	21	8.77	10	28	5.13
	7	11	37	2.99	13	6	30.28	8	15	7.67	8	13	9.29	10	13	10.79	13	20	9.39	9	22	5.46
	8	10	37	2.95	11	33	4.37	9	15	7.98	8	13	9.10	21	11	27.51	13	19	9.94	8	3	39.90
	9	10	37	2.94	10	32	4.42	8	14	8.17	9	12	9.66	8	10	10.99	13	18	10.23	8	21	5.40
	Avg.			2.96			4.39			7.94			9.35			10.89			9.85			5.43
P2	1	12	136	0.93	6	18	4.43	12	255	0.67	13	129	1.44	13	29	6.42	13	118	1.48	13	139	1.29
	2	9	73	1.31	8	22	4.82	10	23	6.03	10	21	6.85	13	26	7.13	13	30	6.16	13	53	3.35
	3	14	61	2.30	8	21	5.23	13	25	7.14	6	21	3.98	13	21	8.61	13	26	7.04	9	30	4.39
	4	14	49	2.87	10	25	5.70	14	23	8.21	14	22	8.61	13	20	9.12	13	24	7.63	13	34	5.23
	5	14	46	3.04	10	24	5.76	13	21	8.69	10	17	8.71	11	24	6.16	13	32	5.64	10	30	4.51
	6	10	38	2.78	10	23	6.27	13	21	8.87	13	21	8.75	13	23	7.97	13	20	9.06	13	29	6.31
	7	9	2	56.32	10	22	6.61	13	20	8.91	13	19	9.80	13	18	10.57	14	18	10.29	10	27	5.18
	8	10	43	2.28	10	22	6.52	13	19	9.57	14	18	10.66	13	37	5.01	13	19	9.95	10	39	3.37
	9	9	38	2.51	10	21	6.78	13	19	9.57	13	18	10.62	13	18	10.09	13	18	10.23	13	27	6.69
	Avg.			2.40			6.64			9.35			10.36			10.33			10.15			5.08
P3	1	14	44	3.24	8	25	4.34	13	26	6.91	8	17	6.89	13	27	6.69	13	139	1.30	5	15	4.80
	2	7	29	2.53	10	0	#DIV/0!	10	18	8.24	8	15	7.59	13	22	8.55	8	18	6.31	13	33	5.26
	3	10	28	3.70	11	35	4.22	13	20	9.17	8	14	8.20	13	17	10.66	8	16	7.04	13	31	5.76
	4	10	28	3.73	13	31	5.89	13	19	9.38	11	1	206.46	14	17	11.05	10	19	7.46	12	58	2.92
	5	10	29	3.70	13	29	6.22	13	20	9.23	9	13	9.27	14	19	9.81	10	18	7.73	13	34	5.25
	6	13	2	81.95	13	28	6.49	13	18	10.23	10	16	9.19	13	18	10.54	8	14	7.65	13	111	1.57
	7	14	37	3.85	13	26	6.98	13	18	10.34	9	13	9.24	14	17	10.83	6	12	7.62	13	28	6.48
	8	14	45	3.18	13	24	7.79	14	17	10.83	9	13	8.97	14	16	11.77	8	14	8.16	13	27	6.72
	9	13	44	3.15	13	20	8.91	13	17	10.77	11	1	132.73	14	16	11.56	8	14	8.31	13	27	6.62
	Avg.			3.39			7.89			10.65			9.10			11.38			8.03			6.61

Table B-135. 1st 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	30	2.63	11	710	0.21	13	28	6.60	13	104	1.72	13	132	1.33	13	105	1.71	9	35	3.73
	2	6	23	2.79	13	78	2.23	10	18	8.05	13	30	6.19	10	19	7.27	10	26	5.52	8	25	4.41
	3	8	31	2.65	10	38	3.55	10	16	8.85	14	26	7.27	10	18	8.16	10	22	6.32	5	24	3.16
	4	8	3	32.00	13	40	4.49	10	16	8.79	14	25	7.57	13	20	9.12	14	24	7.92	5	24	2.90
	5	8	33	2.61	13	35	5.17	10	16	8.85	13	24	7.92	13	23	8.12	13	22	8.53	8	23	4.72
	6	8	32	2.51	13	32	5.65	10	16	9.23	11	21	7.16	13	18	9.88	14	22	8.53	10	28	4.88
	7	6	25	2.51	13	30	5.93	8	15	7.44	11	20	7.43	13	18	10.29	14	21	8.93	10	27	4.97
	8	6	24	2.59	13	29	6.30	11	15	9.94	8	14	8.27	13	18	10.41	14	21	8.86	8	22	5.01
	9	6	25	2.59	13	28	6.63	9	12	9.75	9	18	6.75	13	16	11.30	14	21	9.10	10	26	5.33
	Avg.			2.56			6.29			9.04			7.48			10.67			8.96			5.11
P2	1	13	43	3.24	11	141	1.13	13	159	1.12	13	105	1.73	13	192	0.94	13	27	6.72	9	30	4.15
	2	13	36	3.81	13	49	3.65	10	18	7.61	13	27	6.99	8	14	8.26	13	23	8.19	9	27	4.59
	3	13	34	4.10	13	37	5.05	13	22	8.45	14	23	8.14	7	11	8.74	14	22	8.56	10	25	5.29
	4	13	31	4.43	13	33	5.65	14	20	9.60	14	22	8.56	8	12	8.89	14	20	9.35	10	24	5.66
	5	13	28	4.86	13	29	6.23	13	21	8.77	14	19	9.89	8	12	9.52	10	16	8.88	10	23	5.99
	6	14	30	4.65	13	27	6.74	13	22	8.42	14	19	10.10	8	11	9.80	10	15	9.09	13	32	5.74
	7	13	32	4.39	13	27	6.91	13	17	10.88	14	18	10.65	8	11	9.94	10	15	9.32	13	28	6.40
	8	14	30	4.64	13	25	7.22	13	19	9.70	14	17	11.08	8	12	9.90	10	15	9.50	13	30	6.08
	9	13	29	4.90	13	24	7.59	13	17	11.11	14	18	10.65	8	11	10.25	10	15	9.34	13	28	6.61
	Avg.			4.64			7.24			10.56			10.79			10.03			9.39			6.36
P3	1	6	20	3.08	13	72	2.42	12	205	0.83	13	106	1.73	12	109	1.53	13	40	4.56	6	17	5.08
	2	6	21	3.19	13	49	3.69	13	33	5.54	14	30	6.42	13	34	5.33	13	33	5.42	7	16	5.66
	3	6	21	3.15	13	42	4.37	13	27	6.86	14	24	7.84	13	27	6.53	13	31	5.88	6	16	5.37
	4	8	27	3.13	13	40	4.55	13	23	7.79	14	22	8.67	13	27	6.62	13	29	6.35	7	16	5.94
	5	8	26	3.16	13	34	5.32	13	22	8.64	14	21	8.78	13	24	7.65	13	28	6.50	7	15	5.89
	6	10	33	3.19	13	37	5.00	6	17	4.93	14	21	9.42	13	24	7.54	13	27	6.72	7	15	6.08
	7	10	33	3.21	13	34	5.37	11	16	9.11	14	20	9.43	13	21	8.71	10	22	6.06	8	18	6.18
	8	10	33	3.28	13	33	5.53	14	19	9.75	14	20	9.63	13	22	8.12	13	26	6.92	7	15	6.36
	9	13	1	101.07	14	38	5.02	13	20	9.41	14	20	9.75	13	20	8.90	13	5	41.17	6	15	5.17
	Avg.			3.24			5.31			9.42			9.60			8.58			6.49			5.91

Table B-136. 1st 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	27	3.01	8	26	4.30	12	934	0.18	13	27	6.90	13	78	2.36	13	109	1.60	4	26	2.31
	2	8	25	3.27	10	31	4.54	8	18	6.18	14	23	8.11	14	27	7.08	13	29	6.17	3	32	1.18
	3	10	30	3.52	10	29	4.90	10	22	6.42	14	21	9.13	14	23	8.28	10	20	6.78	10	33	4.37
	4	14	36	3.91	8	21	5.51	13	24	7.66	13	20	9.38	13	23	8.21	8	15	7.43	11	29	5.13
	5	14	38	3.73	8	20	5.79	13	23	7.95	13	20	9.41	34	21	21.90	5	15	4.36	10	30	4.76
	6	14	35	4.08	7	19	4.91	13	22	8.39	13	19	9.56	11	16	9.06	8	16	7.00	10	30	4.86
	7	14	34	4.21	8	18	6.34	13	22	8.32	13	19	9.94	11	17	8.80	10	17	7.93	13	34	5.41
	8	14	33	4.36	8	18	6.56	13	21	8.55	14	18	10.20	13	19	9.80	10	26	5.41	10	30	4.85
	9	14	32	4.51	8	18	6.53	13	20	8.94	14	19	10.14	8	12	9.39	13	19	9.53	5	30	2.50
	Avg.			4.36			6.48			8.60			10.10			9.33			7.62			4.26
P2	1	7	18	3.82	11	646	0.23	10	18	7.63	13	116	1.59	13	110	1.61	13	93	1.95	7	25	4.00
	2	8	22	3.86	7	29	3.39	10	17	8.29	9	13	9.28	13	27	6.66	13	24	7.72	7	19	4.95
	3	16	22	7.36	13	47	3.83	10	16	8.75	9	13	9.27	13	19	9.73	10	15	9.44	10	27	5.19
	4	11	26	4.16	13	40	4.47	14	0	1196.35	9	12	9.66	13	16	11.45	13	19	9.84	10	24	5.94
	5	10	25	4.26	10	28	5.06	11	15	9.96	9	12	10.11	13	16	11.06	13	17	10.56	10	25	5.54
	6	11	24	4.52	11	28	5.23	13	18	10.34	9	12	10.01	13	16	11.70	13	17	10.68	8	19	5.90
	7	14	29	4.94	10	25	5.68	13	18	10.48	9	12	10.32	13	16	11.55	6	13	5.71	6	19	4.66
	8	14	28	5.02	13	29	6.40	10	14	10.41	9	11	10.53	13	18	10.00	10	13	10.79	8	19	6.16
	9	14	27	5.23	13	25	7.10	13	17	10.75	11	14	10.83	13	15	12.42	10	11	13.04	10	23	6.25
	Avg.			5.07			6.39			10.55			10.56			11.32			11.92			5.69
P3	1	14	141	1.04	9	48	2.73	12	884	0.19	13	317	0.56	10	22	6.36	10	27	5.14	7	27	3.44
	2	7	33	2.10	10	39	3.48	13	34	5.56	14	30	6.28	8	14	7.74	10	24	6.06	11	80	1.87
	3	6	30	2.21	8	27	4.04	14	0	4887.20	10	19	7.24	8	14	8.29	10	21	6.50	10	35	4.06
	4	7	25	3.01	8	28	4.07	13	24	7.66	13	23	8.23	13	22	8.24	10	20	6.90	10	32	4.39
	5	10	30	3.26	8	26	4.40	13	23	8.11	14	22	8.65	10	16	8.77	10	19	7.41	10	32	4.49
	6	13	35	4.00	8	26	4.39	14	22	8.70	14	20	9.32	10	16	8.73	10	18	7.63	11	29	4.97
	7	13	32	4.30	8	25	4.55	13	22	8.56	13	20	9.55	8	13	9.20	13	21	8.76	11	30	4.86
	8	13	32	4.31	8	23	4.75	13	21	9.04	14	19	9.91	13	19	10.05	13	20	9.05	14	40	4.74
	9	13	28	4.85	10	28	5.07	13	21	8.69	13	18	10.27	13	18	10.14	13	20	9.14	14	29	6.55
	Avg.			4.49			4.79			8.76			9.91			9.80			8.98			5.38

Table B-137. 1st 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	23	3.35	13	66	2.65	13	88	2.03	14	119	1.60	13	39	4.76	14	150	1.28	12	164	1.00
	2	13	48	2.91	9	36	3.60	9	19	6.75	10	18	7.83	10	16	8.98	4	12	5.12	7	20	4.60
	3	6	28	2.11	9	34	3.88	10	21	6.74	11	17	8.43	13	18	10.32	10	15	9.21	10	27	5.14
	4	5	27	1.98	13	39	4.72	10	14	9.85	14	21	9.23	13	17	10.66	13	18	10.32	9	20	6.31
	5	10	26	4.05	13	34	5.27	13	17	10.71	14	18	10.27	13	15	12.19	13	17	10.94	8	20	5.91
	6	10	25	4.12	13	32	5.61	13	17	10.63	14	17	10.88	13	15	12.42	13	15	12.33	7	19	4.87
	7	10	25	4.22	10	26	5.17	13	17	10.90	14	19	10.27	13	15	12.39	13	15	12.27	8	19	6.19
	8	10	24	4.32	10	29	4.63	13	17	11.00	10	15	9.35	13	15	12.49	13	15	12.43	13	27	6.73
	9	10	24	4.45	9	47	2.67	13	16	11.24	11	15	9.91	13	16	11.30	13	15	12.33	10	22	6.44
	Avg.			4.33			4.16			11.05			9.84			12.06			12.34			6.45
P2	1	13	84	1.61	11	718	0.21	13	118	1.56	13	186	0.98	13	41	4.45	13	108	1.69	13	60	3.04
	2	13	35	3.95	9	33	3.92	40	26	21.27	14	27	7.13	8	12	9.45	10	23	5.73	13	39	4.50
	3	13	32	4.30	9	34	3.76	13	26	6.92	14	23	8.43	10	14	9.90	8	16	6.55	13	37	4.83
	4	13	31	4.53	8	21	4.99	13	28	6.31	14	21	9.06	10	14	10.36	8	16	6.80	13	34	5.23
	5	14	28	5.04	7	32	2.93	13	21	8.45	14	20	9.34	10	14	10.56	8	15	7.15	13	35	5.11
	6	14	28	4.98	7	33	2.89	13	22	7.93	14	20	9.63	10	13	10.45	8	15	7.21	10	27	5.00
	7	13	27	5.05	8	7	14.66	13	23	7.88	14	20	9.58	10	13	10.88	8	15	7.31	8	21	5.16
	8	14	28	5.12	9	52	2.43	13	24	7.34	14	18	10.58	10	13	10.88	8	14	7.33	8	22	4.84
	9	13	26	5.32	10	27	4.89	13	26	6.76	14	22	8.84	8	11	9.97	8	14	7.56	8	21	5.12
	Avg.			4.16			3.66			7.33			9.67			10.57			7.40			5.04

Table B-138. 1st 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	33	2.81	11	301	0.51	13	37	5.01	14	83	2.26	13	30	6.24	29	29	13.74	8	25	4.23
	2	9	28	3.34	12	69	2.46	13	26	7.14	10	23	6.02	13	24	7.71	10	27	5.37	8	62	1.88
	3	9	25	3.77	10	41	3.30	13	27	6.69	10	21	6.82	13	23	7.97	13	28	6.60	13	40	4.58
	4	7	18	3.87	10	35	3.96	13	22	8.13	10	20	7.05	13	21	8.75	14	28	6.67	9	31	4.03
	5	6	55	1.20	10	32	4.40	13	22	8.66	10	19	7.30	13	23	7.97	13	25	7.39	9	30	4.21
	6	6	19	3.36	13	36	4.94	10	18	7.82	10	18	7.85	14	21	9.15	10	22	6.26	6	67	1.17
	7	6	14	4.59	13	33	5.40	6	16	5.00	11	18	8.22	13	20	9.21	11	22	6.74	7	23	4.31
	8	6	15	4.49	13	32	5.70	9	16	7.47	10	18	7.84	13	19	9.62	7	21	4.72	7	26	3.44
	9	7	18	3.97	10	28	5.13	10	1	111.07	9	15	7.78	13	20	9.26	11	22	6.77	6	31	2.71
	Avg.			4.35			5.41			6.24			7.95			9.36			6.08			3.49
P2	1	13	78	1.74	9	1	214.54	13	180	1.01	13	435	0.42	13	40	4.65	13	111	1.67	7	36	2.79
	2	13	72	1.90	10	45	3.04	11	30	4.89	13	40	4.55	14	33	5.72	8	23	4.82	8	38	2.85
	3	14	75	1.89	10	38	3.79	13	41	4.41	14	35	5.31	14	30	6.26	5	22	3.00	13	47	3.99
	4	14	64	2.20	10	40	3.54	11	27	5.42	13	34	5.39	10	26	5.48	10	28	5.07	13	45	4.18
	5	13	73	1.92	10	38	3.75	11	25	5.75	13	31	6.05	11	24	6.10	10	27	5.28	13	41	4.53
	6	13	72	1.93	10	36	3.91	13	29	6.44	13	32	5.78	13	26	7.06	10	27	5.36	13	41	4.52
	7	14	64	2.22	10	36	3.97	13	28	6.77	13	30	6.21	14	26	7.28	10	24	5.65	13	34	5.47
	8	13	79	1.76	10	35	4.15	13	26	7.07	13	29	6.37	13	25	7.46	10	23	5.89	11	35	4.16
	9	14	73	1.96	10	34	4.17	14	27	7.04	14	28	6.66	13	27	6.84	8	19	5.70	10	33	4.34
	Avg.			1.98			4.10			6.96			6.41			7.19			5.75			4.66

Table B-139. 2nd 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	1	295.27	12	109	1.53	13	166	1.05	13	89	1.99	13	83	2.21	8	20	5.31
	2	13	48	3.86	10	18	7.86	8	13	8.82	13	24	7.72	14	26	7.28	9	21	5.65
	3	10	32	4.50	10	16	8.69	10	15	9.53	14	0	1196.35	10	16	8.69	9	21	5.84
	4	10	30	4.87	13	21	8.57	7	10	9.33	10	14	10.35	10	17	8.54	9	20	5.88
	5	9	22	5.36	13	19	9.57	8	11	10.25	11	13	10.96	10	16	8.85	8	19	5.92
	6	13	30	6.17	13	19	9.37	13	18	10.09	10	13	11.14	9	13	8.83	9	0	1018.17
	7	13	28	6.55	13	19	9.64	10	13	10.73	5	13	5.62	11	15	9.66	9	20	6.16
	8	11	25	6.02	10	14	10.15	10	13	11.18	11	0	322.42	11	16	9.54	9	19	6.07
	9	9	20	5.97	8	12	9.80	13	15	11.79	10	12	11.64	11	15	9.68	9	19	6.21
	Avg.			6.18			9.87			11.23			11.64			9.62			6.15
P2	1	11	763	0.21	12	111	1.53	13	89	1.96	13	110	1.58	13	95	1.93	14	514	0.39
	2	9	48	2.71	10	24	5.68	8	14	7.71	13	32	5.59	10	19	7.51	9	26	4.60
	3	8	26	4.11	10	21	6.45	11	9	16.75	8	14	7.89	10	17	8.60	9	22	5.46
	4	13	38	4.78	8	16	6.75	5	9	8.72	7	12	7.77	9	14	8.51	7	17	5.93
	5	13	32	5.62	8	15	7.22	3	5	8.76	3	7	6.83	8	13	8.63	7	18	5.69
	6	13	30	6.07	11	0	309.69	6	8	9.13	4	7	8.30	7	11	8.76	7	17	5.60
	7	8	26	4.53	8	15	7.44	8	12	9.39	6	27	3.07	6	9	8.83	11	25	6.11
	8	13	46	3.90	13	20	8.87	7	10	9.33	6	9	9.30	7	11	9.27	9	19	6.53
	9	13	28	6.65	10	17	7.95	6	8	9.59	7	11	8.76	9	12	9.88	9	19	6.48
	Avg.			5.03			8.09			9.44			9.03			9.33			6.37
P3	1	6	20	3.99	12	111	1.53	13	149	1.19	13	107	1.63	13	83	2.23	13	40	4.52
	2	7	21	4.44	10	20	6.88	10	19	7.53	10	20	7.35	11	18	8.10	13	33	5.34
	3	7	21	4.59	8	15	7.54	13	21	8.59	8	14	8.15	11	17	8.70	13	33	5.64
	4	7	19	4.86	10	17	8.14	13	19	9.44	8	14	8.53	9	13	9.09	11	26	5.70
	5	8	22	5.31	10	16	8.50	13	19	9.42	8	13	8.89	10	15	9.33	7	22	4.12
	6	9	21	5.51	10	17	8.34	13	19	9.70	8	13	9.14	8	12	9.30	14	28	6.78
	7	9	21	5.72	13	32	5.53	13	20	9.28	9	13	9.39	5	10	6.72	11	24	5.98
	8	11	27	5.45	13	20	9.04	10	14	9.55	8	12	9.84	7	10	9.81	10	24	6.03
	9	11	26	5.80	10	15	9.40	10	14	9.88	8	12	9.64	9	12	9.69	13	29	6.43
	Avg.			5.66			9.22			9.57			9.62			9.75			6.15

Table B-140. 2nd 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	60	2.92	12	106	1.63	12	113	1.50	13	113	1.55	13	28	6.62	13	36	4.94
	2	13	44	4.10	10	20	6.83	8	19	6.03	13	31	5.79	11	18	8.08	13	33	5.62
	3	10	31	4.44	8	15	7.43	16	14	15.47	10	18	7.84	10	18	8.20	13	32	5.73
	4	8	21	5.45	8	14	7.90	7	14	6.94	10	15	9.36	11	17	8.93	14	29	6.39
	5	7	16	5.59	8	13	8.46	7	13	7.23	9	13	9.30	8	13	8.84	14	30	6.20
	6	7	16	5.61	8	13	8.38	7	12	7.81	11	0	381.81	9	13	9.61	14	29	6.56
	7	7	17	5.37	10	16	8.69	8	15	7.85	9	12	9.79	9	12	10.08	14	28	6.66
	8	7	21	4.38	8	12	8.81	9	15	7.94	8	12	9.24	7	10	9.61	14	28	6.67
	9	8	18	5.95	10	15	8.94	7	12	8.09	9	11	10.50	7	10	9.45	14	27	7.06
	Avg.			5.23			8.81			7.96			9.84			9.71			6.80
P2	1	12	67	2.59	13	511	0.34	13	109	1.64	13	90	1.99	14	75	2.51	13	1018	0.18
	2	13	66	2.63	13	29	6.23	8	14	7.95	7	11	8.95	13	23	8.00	10	24	5.82
	3	13	50	3.54	13	26	7.15	8	13	8.74	7	10	9.47	9	13	9.02	13	30	6.15
	4	13	49	3.65	13	21	8.48	8	13	9.26	4	7	8.84	7	10	9.45	14	27	7.06
	5	13	40	4.55	13	20	8.85	9	12	9.82	3	4	8.11	6	8	10.28	13	27	7.01
	6	13	36	5.01	13	20	9.22	8	11	9.80	2	2	13.17	4	6	9.37	13	27	6.92
	7	13	35	5.20	13	19	9.71	9	12	9.91	2	2	14.29	3	4	10.84	14	24	7.86
	8	13	38	4.75	13	19	9.65	7	10	9.71	13	17	10.91	7	9	10.39	14	25	7.48
	9	10	29	4.72	10	16	8.97	9	11	10.61	10	14	9.99	9	11	10.61	14	24	7.89
	Avg.			4.89			9.44			10.08			10.45			10.62			7.74
P3	1	4	14	4.59	12	114	1.51	12	111	1.56	13	31	5.96	13	154	1.20	13	37	4.80
	2	8	24	4.56	8	17	5.98	8	18	6.25	10	18	7.90	11	21	7.23	13	38	4.80
	3	8	21	5.30	7	13	7.20	13	26	6.99	10	16	8.50	9	15	7.85	13	28	6.57
	4	13	33	5.60	7	12	7.51	10	13	10.83	8	13	8.56	9	0	388.18	13	30	6.11
	5	8	20	5.75	8	15	7.66	8	15	7.66	7	10	9.13	8	14	8.36	13	32	5.85
	6	13	28	6.60	8	15	7.81	7	12	8.01	20	13	21.86	7	12	8.32	10	24	5.47
	7	8	19	6.24	7	12	7.98	7	12	8.11	9	13	9.13	7	11	8.75	13	28	6.69
	8	10	21	6.66	7	11	8.52	7	12	8.14	8	13	9.07	7	11	9.14	10	22	6.25
	9	14	24	7.82	7	11	8.60	7	11	8.34	8	12	9.46	14	16	11.63	14	32	5.94
	Avg.			6.91			8.37			8.20			9.22			9.84			6.29

Table B-141. 2nd 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	452	0.33	13	33	5.58	13	111	1.59	13	104	1.72	14	23	8.21	14	118	1.59
	2	8	29	3.61	13	23	7.84	13	34	5.44	7	11	8.78	14	21	9.08	13	45	3.87
	3	10	34	3.98	13	22	8.27	13	24	7.45	10	15	9.60	10	14	10.27	13	31	5.84
	4	13	34	5.27	13	20	9.21	13	21	8.58	8	12	9.74	11	14	10.35	13	61	2.98
	5	13	33	5.52	13	19	9.41	13	22	8.18	7	9	10.83	11	13	10.90	10	26	5.16
	6	13	31	5.83	13	18	10.03	13	21	8.88	9	11	10.95	9	11	10.88	10	24	5.75
	7	13	28	6.35	13	18	10.27	13	20	9.27	7	9	11.21	19	9	30.04	10	22	5.99
	8	13	26	6.90	13	17	10.77	13	20	9.09	7	9	11.01	9	11	11.40	10	25	5.74
	9	13	27	6.80	13	17	10.34	13	19	9.40	6	7	11.41	9	10	11.67	10	23	6.20
	Avg.			6.68			10.46			9.25			11.21			11.54			5.98
P2	1	11	342	0.43	13	28	6.45	13	26	7.09	13	22	8.14	13	356	0.51	13	104	1.80
	2	5	21	3.44	13	22	8.47	13	18	10.25	10	13	11.37	14	28	6.75	10	11	12.06
	3	26	29	12.43	13	19	9.37	13	18	10.20	5	10	7.27	11	15	9.86	8	13	8.61
	4	8	26	4.13	13	18	10.39	13	17	10.63	33	10	46.37	11	13	11.28	11	16	8.95
	5	10	30	4.62	13	17	10.57	13	18	10.29	8	10	12.00	11	13	11.38	13	19	9.88
	6	6	23	3.78	13	17	10.91	13	17	10.64	8	9	12.30	11	13	12.17	13	20	9.22
	7	11	14	10.56	13	16	11.50	13	16	11.27	9	9	12.57	11	13	11.61	13	16	12.02
	8	10	26	5.53	13	15	11.82	13	17	10.64	7	8	11.96	9	10	11.57	14	0	444.29
	9	8	21	5.35	13	14	12.59	13	16	11.46	13	0	585.45	9	10	11.60	10	17	7.92
	Avg.			5.44			11.97			11.13			12.27			11.59			7.92
P3	1	12	455	0.35	13	101	1.74	10	19	7.44	13	80	2.29	10	16	8.96	8	28	3.88
	2	12	66	2.62	8	13	8.41	10	16	8.83	13	21	8.42	14	20	9.72	13	37	4.95
	3	10	40	3.48	9	9	14.71	13	21	8.94	8	11	10.55	11	14	10.77	11	29	5.04
	4	13	41	4.50	3	4	9.81	10	15	9.48	8	10	11.27	8	11	10.29	13	39	4.61
	5	13	38	4.65	2	3	12.54	10	14	10.50	5	8	9.60	7	9	11.11	14	43	4.37
	6	13	36	5.11	3	4	10.28	10	14	10.66	5	7	10.89	4	8	7.46	11	26	5.54
	7	13	34	5.37	7	10	9.18	8	11	10.33	6	7	11.09	7	9	11.26	9	22	5.36
	8	13	33	5.49	8	11	10.36	8	11	10.58	7	8	11.71	7	8	11.64	14	32	5.87
	9	13	31	5.93	8	11	10.59	11	13	10.96	7	8	11.20	7	8	11.88	13	29	6.51
	Avg.			5.60			10.05			10.62			11.34			11.59			5.92

Table B-142. 2nd 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	52	3.42	13	39	4.67	13	109	1.71	13	153	1.16	10	17	8.15	12	41	4.23
	2	13	37	5.00	13	31	5.93	13	23	8.05	8	13	8.69	10	16	9.28	13	38	4.72
	3	13	34	5.44	13	28	6.55	13	20	8.98	8	13	8.83	11	15	9.81	10	30	4.65
	4	13	31	5.97	13	26	7.28	61	16	53.86	13	20	9.37	11	15	9.94	8	24	4.69
	5	13	29	6.53	13	25	7.49	13	17	10.49	13	18	10.14	10	15	9.44	4	19	3.00
	6	13	28	6.74	13	24	7.76	13	16	11.47	10	14	10.47	11	14	10.24	7	20	4.70
	7	13	27	6.95	13	21	8.77	13	18	10.16	10	13	10.84	11	14	10.44	8	24	4.77
	8	13	24	7.90	13	22	8.07	13	17	10.81	21	11	25.54	11	14	10.91	8	23	4.97
	9	13	26	7.09	13	21	8.97	13	16	11.15	8	11	10.07	14	14	13.29	10	26	5.65
	Avg.			7.31			8.60			10.70			10.46			11.54			5.13
P2	1	13	56	3.21	13	104	1.78	13	105	1.70	13	170	1.03	14	77	2.46	9	23	5.23
	2	13	44	4.06	13	30	6.22	10	20	6.81	8	13	8.26	14	20	9.74	14	33	5.72
	3	13	36	5.12	13	25	7.25	8	13	8.41	5	11	6.87	11	14	10.70	11	24	6.19
	4	13	35	5.32	14	23	8.34	8	14	7.95	6	11	8.14	9	11	10.79	14	29	6.58
	5	13	32	5.73	13	22	8.59	13	20	8.65	4	7	8.05	8	11	10.29	14	26	7.22
	6	13	30	6.08	13	21	8.74	13	20	9.09	5	10	6.75	9	10	11.92	14	27	7.14
	7	10	23	6.30	13	21	8.80	13	19	9.47	7	26	3.49	7	9	11.19	14	26	7.39
	8	10	24	6.05	13	20	9.22	10	15	9.21	8	11	9.70	7	9	11.21	14	26	7.50
	9	10	24	6.14	13	19	9.66	13	19	9.63	8	11	10.26	7	9	11.34	14	25	7.64
	Avg.			6.16			9.23			9.43			9.98			11.25			7.51

Table B-143. 2nd 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	61	2.15	13	161	1.12	10	20	7.30	13	31	6.04	14	136	1.43	14	102	1.89
	2	7	29	3.13	8	18	5.96	10	18	7.94	14	26	7.29	13	34	5.39	5	21	3.39
	3	7	28	3.31	8	16	6.75	10	17	8.37	14	25	7.71	11	1	221.60	8	21	5.06
	4	7	27	3.47	7	15	7.04	8	14	8.31	11	19	7.82	9	14	8.18	8	21	5.29
	5	4	23	2.37	8	15	7.21	11	17	8.81	7	13	7.68	7	12	8.05	8	20	5.59
	6	5	22	3.31	6	13	6.72	13	20	9.35	9	15	8.05	7	12	8.26	8	20	5.44
	7	4	22	2.34	5	10	6.85	10	171	0.81	9	14	8.46	7	12	8.00	8	19	5.79
	8	13	37	4.99	6	11	8.14	10	16	9.14	11	16	9.15	7	11	8.48	8	18	6.06
	9	10	34	4.22	6	14	6.09	9	13	9.13	10	17	8.67	9	0	254.54	10	21	6.76
	Avg.			3.85			7.03			9.14			8.76			8.24			6.20
P2	1	13	75	2.37	10	18	7.72	13	197	0.89	6	12	7.18	15	105	1.91	13	403	0.45
	2	10	36	3.93	10	18	8.04	6	13	6.61	4	10	6.14	9	21	5.79	10	33	4.28
	3	13	40	4.66	8	14	8.44	8	15	7.42	7	13	7.00	7	17	5.93	10	32	4.43
	4	13	36	5.17	7	11	8.42	8	15	7.33	7	12	7.46	7	15	6.35	7	26	3.87
	5	14	34	5.53	7	11	8.42	7	12	7.32	6	11	7.89	7	15	6.61	8	26	4.32
	6	13	29	6.33	9	13	8.86	5	12	6.17	8	13	8.56	9	18	6.65	9	26	4.76
	7	13	30	6.26	9	13	8.99	4	10	5.39	7	11	7.85	9	18	6.75	11	28	5.34
	8	14	28	6.78	11	16	9.11	3	6	6.20	8	13	8.80	7	14	6.79	11	28	5.39
	9	13	29	6.50	10	16	9.10	4	8	6.36	6	18	4.44	7	16	6.21	11	27	5.44
	Avg.			6.51			9.07			5.98			8.32			6.58			5.39

Table B-144. 3rd 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	68	2.61	13	81	2.16	13	142	1.28	13	26	7.15	13	112	1.67	1	2	11.18
	2	12	51	3.37	13	25	7.35	14	25	7.43	13	20	9.17	14	28	6.77	6	18	4.52
	3	13	40	4.54	13	20	9.04	13	21	8.85	11	14	10.15	14	21	9.08	10	26	5.30
	4	13	43	4.22	13	19	9.43	10	14	10.01	10	14	10.38	11	14	10.73	10	22	6.25
	5	13	32	5.65	10	15	9.33	8	11	10.25	11	14	10.74	9	11	10.50	13	30	6.20
	6	13	41	4.41	5	12	6.01	7	9	10.18	10	13	10.79	8	11	10.86	14	32	5.86
	7	13	38	4.81	10	14	10.06	7	9	9.79	8	11	10.07	9	10	11.29	14	27	6.87
	8	13	33	5.42	13	16	11.62	8	10	10.99	10	12	11.40	11	13	11.82	10	24	6.14
	9	13	37	4.86	10	13	10.70	14	15	12.31	10	12	11.47	14	16	12.47	14	2	119.20
	Avg.			5.03			10.80			11.03			10.98			11.86			6.50
P2	1	13	59	3.06	13	80	2.24	14	90	2.08	13	57	3.19	13	781	0.24	13	83	2.21
	2	13	37	5.10	13	24	7.52	13	20	9.13	9	13	8.99	8	14	8.51	12	0	540.90
	3	13	32	5.73	13	21	8.68	7	11	9.48	7	9	10.14	11	16	9.20	10	35	3.88
	4	13	42	4.32	13	18	9.98	6	0	1018.17	5	9	8.29	13	20	8.80	8	28	3.72
	5	13	30	6.15	13	18	9.94	13	18	10.05	7	9	10.09	10	13	10.45	6	21	3.95
	6	13	27	6.85	10	13	10.30	10	13	10.49	6	9	8.79	10	14	10.04	8	26	3.97
	7	13	25	7.42	10	14	10.44	8	10	10.34	4	7	7.27	8	10	10.91	8	25	4.18
	8	13	24	7.71	10	14	10.24	5	6	9.87	5	7	10.07	8	11	10.87	9	33	3.90
	9	13	22	8.30	13	16	11.23	4	1	121.40	7	10	9.22	7	8	11.10	8	24	4.29
	Avg.			7.81			10.64			10.11			8.86			10.96			4.02
P3	1	13	65	2.77	13	21	8.42	13	58	3.10	10	14	9.93	13	179	1.02	13	235	0.79
	2	13	41	4.50	13	20	8.96	10	15	9.66	8	11	10.11	13	32	5.57	7	17	5.75
	3	13	33	5.47	13	19	9.51	10	14	10.24	7	9	10.05	13	21	8.77	6	13	6.40
	4	13	31	5.86	13	18	10.09	8	10	10.57	5	7	9.97	13	19	9.63	6	12	7.32
	5	13	29	6.19	13	18	10.50	6	8	10.87	7	9	10.59	13	20	9.24	6	12	7.27
	6	13	26	7.02	13	19	9.49	6	8	10.67	5	7	10.52	13	18	9.81	6	11	7.60
	7	14	26	7.37	10	13	10.76	8	10	11.24	6	7	10.46	13	18	10.45	9	9	12.67
	8	13	26	7.09	8	11	10.41	7	8	11.42	5	7	10.35	13	18	10.34	6	11	8.08
	9	13	23	8.16	10	13	10.57	7	0	398.78	8	7	15.04	13	18	10.50	6	10	8.36
	Avg.			7.54			10.58			11.33			10.40			10.43			8.22

Table B-145. 3rd 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	37	3.69	13	20	9.45	13	52	3.55	13	43	4.17	13	82	2.22	13	585	0.30
	2	8	25	4.65	13	18	10.29	10	14	10.21	10	0	1221.80	8	13	8.79	8	21	5.22
	3	8	23	5.09	9	13	9.11	8	10	10.95	10	13	10.86	7	10	9.65	6	15	5.71
	4	8	20	5.69	11	13	11.15	6	8	10.77	13	16	11.73	7	9	9.93	6	15	5.97
	5	8	20	5.69	9	11	11.07	8	10	10.96	10	12	11.80	7	9	10.48	6	15	5.97
	6	8	19	6.15	14	15	12.83	8	9	12.30	10	12	12.16	7	9	10.14	8	18	6.20
	7	8	19	6.23	13	14	13.34	8	10	11.89	13	14	13.31	7	9	11.11	6	14	6.14
	8	13	24	7.81	11	12	12.27	8	10	11.70	13	14	13.27	7	9	10.73	6	14	6.03
	9	14	26	7.44	10	12	11.81	8	10	11.99	13	13	13.98	7	9	10.71	8	17	6.57
	Avg.			7.16			12.47			11.86			13.52			10.85			6.25
P2	1	7	32	3.15	13	51	3.63	13	49	3.76	13	39	4.67	13	130	1.42	8	28	3.69
	2	8	29	3.75	10	16	8.71	8	13	8.70	13	17	10.74	13	23	7.65	6	21	4.17
	3	8	26	4.17	10	15	9.54	7	9	9.71	8	10	11.73	10	14	10.33	6	18	4.57
	4	6	20	4.40	8	11	10.15	5	7	9.53	7	8	11.77	7	9	10.51	8	23	4.68
	5	6	18	4.97	7	9	10.71	10	14	10.07	7	8	12.13	13	18	9.76	8	0	483.63
	6	13	35	5.35	6	7	10.35	10	12	11.44	5	6	12.64	13	16	11.57	6	17	4.93
	7	14	31	6.03	6	0	237.57	13	15	12.04	5	6	12.14	7	8	11.57	7	0	468.36
	8	13	29	6.39	7	9	10.99	10	11	11.90	5	6	11.72	7	8	11.89	8	22	5.12
	9	13	29	6.44	7	9	11.14	8	10	10.96	5	6	11.88	7	7	12.19	6	16	5.22
	Avg.			6.29			11.06			11.63			11.91			11.88			5.17
P3	1	10	41	3.25	13	86	2.16	13	26	6.88	13	25	7.17	12	117	1.48	7	22	4.30
	2	8	22	4.82	13	24	7.58	10	16	8.91	10	15	9.29	8	12	8.67	7	23	4.20
	3	8	19	5.61	13	21	8.74	8	11	9.59	8	11	10.55	6	9	9.33	8	20	5.12
	4	11	24	5.99	14	19	9.91	8	11	10.11	8	11	9.93	5	7	9.36	6	16	5.12
	5	13	26	7.10	13	18	10.45	7	9	10.35	7	9	9.88	8	11	10.45	6	16	5.40
	6	14	25	7.47	14	18	10.45	10	13	10.49	10	13	10.63	8	10	11.12	6	6	11.72
	7	14	24	7.92	14	16	12.05	10	13	10.64	13	16	11.62	8	10	11.01	5	12	5.16
	8	14	24	7.95	10	14	9.85	9	11	11.17	10	13	10.92	8	10	11.36	5	12	5.20
	9	13	23	8.01	10	15	9.11	8	10	11.01	10	13	11.26	8	10	11.01	5	12	5.49
	Avg.			7.96			10.34			10.94			11.27			11.12			5.28

Table B-146. 3rd 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	58	3.06	13	72	2.49	13	123	1.49	13	23	8.28	13	135	1.33	10	31	4.33
	2	13	40	4.56	10	16	8.84	8	11	9.90	14	17	11.03	7	8	11.10	10	29	4.90
	3	13	39	4.66	10	14	9.96	7	9	10.05	10	13	10.99	7	8	11.65	8	24	4.78
	4	13	32	5.69	10	14	10.21	8	10	10.71	8	10	11.45	6	0	339.39	7	19	4.96
	5	13	31	6.00	8	11	10.75	7	8	11.40	7	9	10.40	4	5	10.88	5	15	4.56
	6	13	31	5.84	8	11	11.06	6	8	11.28	5	7	10.89	4	5	11.50	5	14	4.99
	7	13	27	6.76	8	10	11.09	6	0	#DIV/0!	10	11	13.18	3	3	14.22	7	1	106.24
	8	13	26	7.23	9	9	12.57	10	12	12.01	10	16	8.65	4	5	11.50	9	1	231.05
	9	10	20	6.92	10	12	11.28	13	12	15.77	10	10	14.15	6	5	19.48	8	21	5.25
	Avg.			6.97			11.65			13.89			13.67			12.86			5.25
P2	1	9	64	1.87	13	133	1.34	13	118	1.55	13	113	1.65	10	13	10.76	8	18	5.97
	2	10	106	1.25	8	13	8.24	10	16	8.28	8	13	8.74	10	13	11.49	6	12	7.42
	3	13	42	4.38	8	12	9.64	10	0	#DIV/0!	9	12	9.75	8	10	12.05	5	14	4.79
	4	25	33	10.68	13	18	10.18	10	12	11.15	8	12	9.94	10	11	13.14	8	15	7.31
	5	13	36	5.10	13	17	10.77	13	16	11.41	14	17	10.78	9	9	13.23	8	15	7.35
	6	13	34	5.54	13	16	11.59	10	12	12.29	10	13	10.72	4	7	8.30	8	15	7.55
	7	10	27	5.19	13	16	11.81	8	9	11.91	13	16	11.46	9	8	14.04	8	17	6.36
	8	5	25	2.91	13	16	11.22	10	11	12.46	14	16	11.79	8	9	13.43	10	21	6.45
	9	13	29	6.35	13	15	12.52	10	11	12.68	14	16	12.21	6	8	9.04	10	20	6.97
	Avg.			4.82			11.85			12.35			11.82			13.73			6.59
P3	1	11	450	0.35	13	79	2.32	13	27	6.68	12	79	2.18	14	20	9.57	9	34	3.56
	2	6	44	1.90	13	27	6.78	10	13	10.18	13	23	7.85	10	13	11.18	10	24	5.74
	3	10	34	4.13	10	17	8.35	10	12	11.12	10	13	10.58	8	9	12.04	8	18	6.16
	4	8	23	4.92	8	12	9.29	8	0	399.99	7	8	10.71	8	10	11.72	5	14	4.57
	5	7	15	6.00	10	15	9.38	6	8	11.19	4	6	9.43	7	8	12.40	10	21	6.72
	6	15	15	13.41	10	14	9.79	5	6	10.44	4	4	11.82	7	8	12.33	10	26	5.46
	7	8	18	6.36	10	14	10.18	6	7	12.38	5	7	10.36	7	7	13.28	11	19	7.89
	8	7	14	6.56	8	11	10.44	6	7	12.03	7	6	14.88	7	8	11.29	8	17	6.63
	9	7	15	5.97	8	11	10.67	6	7	12.30	7	7	12.25	7	8	12.46	8	17	6.65
	Avg.			6.30			10.43			12.23			11.09			12.34			7.05

Table B-147. 3rd 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	160	0.95	13	76	2.43	13	36	4.88	14	52	3.67	10	14	9.73	3	12	4.16
	2	8	30	3.57	11	19	7.77	10	13	10.43	14	21	9.13	10	14	10.54	6	19	4.24
	3	28	26	14.66	10	17	8.25	10	13	10.52	14	18	10.68	13	17	10.80	6	18	4.76
	4	8	24	4.73	8	14	8.11	10	11	11.86	11	14	10.43	13	16	11.30	6	18	4.78
	5	8	23	4.86	8	14	8.58	13	15	12.12	11	14	10.41	10	13	10.89	8	22	5.02
	6	8	21	5.33	10	15	9.22	10	11	12.41	8	12	9.68	8	10	11.47	8	22	4.90
	7	7	16	5.75	13	17	10.87	13	14	13.13	8	12	10.04	5	9	7.87	8	21	5.21
	8	8	21	5.46	11	14	10.10	13	13	13.94	11	14	10.83	10	13	10.84	8	21	5.17
	9	8	20	5.82	10	16	8.99	5	10	6.94	5	11	5.77	8	11	10.48	8	20	5.43
	Avg.			5.68			9.99			13.54			10.44			10.66			5.27
P2	1	12	1150	0.14	13	63	2.86	13	36	5.03	13	17	10.82	13	88	2.03	13	137	1.29
	2	9	36	3.61	10	15	9.66	12	30	5.72	13	15	12.23	8	11	9.86	9	38	3.17
	3	10	27	5.10	8	9	13.18	13	17	10.30	8	8	13.69	5	7	9.33	13	47	3.68
	4	10	23	5.80	6	1	71.65	8	10	10.71	7	7	12.86	4	4	12.60	10	35	3.82
	5	8	16	6.77	8	10	11.75	6	8	10.44	5	8	9.47	3	2	16.36	7	26	3.74
	6	8	16	6.58	10	12	11.62	6	8	11.34	6	0	290.90	2	2	13.97	5	17	4.07
	7	8	16	6.76	10	12	11.62	6	8	10.23	7	7	13.15	3	0	140.00	3	9	3.88
	8	8	16	6.67	8	9	12.04	8	9	11.29	5	8	9.47	3	2	15.86	4	15	3.89
	9	8	15	7.25	5	10	7.30	8	9	11.68	5	7	11.15	4	5	10.61	5	17	4.26
	Avg.			6.90			11.83			11.07			11.25			10.61			4.01

Table B-148. 3rd 15" Lift of Surface Saturated AASHTO #57 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	67	2.52	13	94	1.93	13	174	1.05	14	259	0.75	13	110	1.67	13	338	0.54
	2	7	30	3.44	13	30	6.22	8	14	7.84	10	17	8.26	8	13	8.56	8	26	4.39
	3	9	34	3.75	11	18	7.96	8	13	8.01	8	13	8.76	8	13	9.29	8	21	5.35
	4	8	26	4.02	10	18	8.05	6	10	8.23	9	13	9.42	7	10	9.13	8	19	5.78
	5	7	24	4.21	10	16	8.77	5	9	7.11	11	14	10.50	7	10	9.03	9	19	6.26
	6	8	23	4.53	10	17	8.33	6	10	8.55	14	21	8.78	8	12	9.33	7	15	6.14
	7	8	23	4.60	13	21	8.82	6	10	8.42	14	18	10.75	6	10	8.58	7	15	6.14
	8	6	17	4.95	14	2	117.96	8	12	9.04	14	74	2.58	7	10	9.10	4	14	4.50
	9	8	21	5.07	14	19	10.03	8	13	8.62	14	16	11.96	7	10	9.38	8	18	6.41
	Avg.			4.87			9.43			8.69			11.36			9.02			5.68
P2	1	13	53	3.45	13	32	5.73	13	110	1.59	6	15	5.31	13	69	2.71	6	18	4.92
	2	13	37	4.95	11	21	6.84	4	10	6.44	2	4	6.60	10	16	9.15	5	14	5.26
	3	10	26	5.27	11	19	7.63	3	4	9.55	3	3	11.31	7	10	9.13	4	11	4.85
	4	13	29	6.35	8	16	7.22	2	3	8.04	3	3	15.11	7	10	9.73	6	19	4.34
	5	13	28	6.77	11	19	7.82	2	2	14.71	3	2	18.36	7	10	9.85	7	16	6.03
	6	13	28	6.52	10	19	7.53	2	2	17.76	3	2	15.02	9	13	9.33	4	16	3.60
	7	13	28	6.72	11	18	8.52	4	6	8.66	4	6	8.65	8	11	9.94	6	15	5.76
	8	10	20	6.89	14	20	9.27	5	8	8.64	11	14	10.38	13	17	10.67	8	17	6.42
	9	10	20	7.17	11	19	7.74	10	13	11.01	11	0	313.93	9	12	9.95	7	15	6.03
	Avg.			6.93			8.51			9.44			9.52			10.18			6.07

Table B-149. 1st 4" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	14	61	2.37	12	251	0.65	12	116	1.46	12	829	0.21	12	293	0.58	12	116	1.43
	2	10	39	2.74	8	27	4.23	13	63	2.83	13	1	289.54	8	37	3.02	8	33	3.29
	3	10	38	2.84	8	24	4.60	8	40	2.60	7	40	2.31	8	34	3.33	6	23	3.72
	4	5	24	2.05	8	24	4.77	10	49	2.74	8	29	3.82	14	24	7.78	5	17	4.21
	5	7	24	2.86	8	22	5.11	8	39	2.78	8	30	3.73	7	23	3.96	8	28	3.94
	6	7	23	3.02	10	28	5.11	14	29	6.73	6	21	4.10	8	30	3.79	8	28	3.99
	7	7	24	2.99	8	22	5.19	5	21	3.19	7	22	4.06	8	30	3.80	10	34	4.15
	8	9	29	3.02	8	21	5.28	5	20	3.39	6	22	4.10	5	23	2.83	8	26	4.35
	9	14	45	3.26	8	21	5.57	5	20	3.43	8	26	4.24	7	22	4.28	10	32	4.45
	Avg.			3.09			5.35			3.34			4.13			3.64			4.32
P2	1	8	33	2.54	8	30	3.51	9	57	2.26	10	55	2.47	12	341	0.49	13	42	4.21
	2	3	1	43.64	2	108	0.20	7	37	2.73	8	36	3.00	6	27	3.07	13	55	3.21
	3	5	19	2.70	6	0	186.66	6	26	3.14	6	25	3.42	6	27	3.09	9	47	2.73
	4	9	1	140.79	5	16	4.37	4	18	3.55	10	44	3.15	5	20	3.23	7	36	2.80
	5	7	24	2.78	6	20	4.39	3	12	3.84	7	25	3.67	7	26	3.46	13	48	3.71
	6	7	24	2.92	4	20	2.86	13	42	4.25	8	33	3.24	3	13	3.81	13	46	3.95
	7	4	15	2.67	8	25	4.28	13	42	4.30	8	32	3.49	4	13	3.90	10	45	3.01
	8	3	9	3.22	6	19	4.51	10	41	3.40	8	32	3.50	4	0	147.63	8	33	3.17
	9	2	0	61.09	7	18	5.08	8	31	3.41	6	23	3.81	5	16	4.03	6	32	2.43
	Avg.			2.95			4.62			3.70			3.60			3.97			2.87
P3	1	13	113	1.19	12	145	1.15	12	116	1.42	8	27	3.99	12	240	0.69	11	228	0.68
	2	13	42	3.35	13	72	2.48	13	46	3.91	8	25	4.29	10	55	2.39	13	97	1.81
	3	14	38	3.68	8	33	3.32	13	39	4.66	4	18	3.21	8	38	2.81	7	52	1.84
	4	14	36	4.05	7	24	3.77	18	31	8.18	6	18	4.67	8	38	2.88	7	51	1.92
	5	14	34	4.11	7	23	3.97	10	29	4.83	7	18	4.91	10	48	2.90	5	38	1.91
	6	14	34	4.26	7	23	3.98	10	28	5.17	5	14	5.15	8	37	2.90	4	38	1.43
	7	14	33	4.28	8	29	3.89	8	22	5.12	6	10	8.48	8	36	3.04	5	36	2.02
	8	14	32	4.43	13	40	4.46	6	16	5.67	5	13	5.33	8	36	3.10	13	61	2.93
	9	14	31	4.55	5	26	2.66	7	16	5.84	7	17	5.29	6	27	3.31	9	57	2.28
	Avg.			4.42			3.67			5.54			6.37			3.15			2.41

Table B-150. 1st 4" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	4	45	1.04	12	113	1.52	3	26	1.52	12	123	1.33	12	124	1.33	9	65	1.90
	2	3	30	1.22	10	58	2.28	11	75	1.99	2	30	1.15	7	47	1.90	9	63	1.91
	3	1	8	1.39	6	32	2.41	6	44	1.72	13	74	2.39	5	31	2.16	12	84	2.02
	4	13	90	1.49	6	33	2.51	7	59	1.54	3	30	1.22	2	11	2.82	7	46	2.06
	5	13	87	1.57	6	31	2.68	3	29	1.29	7	56	1.62	3	21	2.33	5	32	2.13
	6	13	86	1.58	13	50	3.55	1	8	2.39	5	43	1.56	4	21	2.41	4	44	1.29
	7	9	79	1.22	10	48	2.83	12	123	1.39	5	44	1.56	3	12	3.13	4	31	1.93
	8	7	61	1.14	10	49	2.80	7	47	1.93	5	41	1.67	4	22	2.32	5	29	2.17
	9	3	32	1.09	8	38	2.84	2	13	2.54	5	43	1.58	3	12	2.97	8	45	2.51
	Avg.			1.15			2.37			1.95			1.60			2.81			2.20
P2	1	12	246	0.52	7	42	2.34	12	122	1.39	6	51	1.73	12	111	1.54	9	70	1.78
	2	9	67	1.46	8	31	3.34	7	47	1.96	4	35	1.73	10	46	2.89	6	53	1.66
	3	7	50	1.46	6	30	2.51	9	62	2.00	4	35	1.80	7	36	2.86	7	52	1.74
	4	9	68	1.40	13	53	3.36	7	47	2.06	4	37	1.61	6	26	3.11	6	57	1.55
	5	7	51	1.46	10	51	2.63	7	48	1.91	3	26	1.56	4	19	3.14	7	52	1.75
	6	9	68	1.42	6	30	2.71	3	22	2.11	2	21	1.63	4	17	3.34	6	55	1.61
	7	13	79	1.74	5	15	4.24	1	3	4.19	4	37	1.53	6	25	3.19	9	65	1.88
	8	9	68	1.41	4	22	2.61	13	64	2.71	3	21	1.75	6	25	3.17	13	70	2.50
	9	10	67	1.48	7	1	108.18	9	59	2.11	3	23	1.66	6	25	3.30	9	66	1.86
	Avg.			1.54			3.17			3.00			1.65			3.22			2.08

Table B-151. 1st 4" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	165	0.79	12	377	0.43	7	39	2.64	9	56	2.34	12	104	1.62	12	113	1.52
	2	8	33	2.43	7	48	2.10	3	21	2.14	6	31	2.49	5	2	32.15	10	58	2.28
	3	7	1	91.64	6	35	2.30	3	14	3.21	4	22	2.78	6	35	2.32	6	32	2.41
	4	6	25	2.64	6	34	2.40	6	28	3.10	2	9	3.92	4	18	3.49	6	33	2.51
	5	3	13	2.67	6	33	2.47	6	27	3.11	3	15	2.87	2	6	3.66	6	31	2.68
	6	13	0	394.54	4	24	2.56	5	24	2.72	6	28	2.83	2	7	3.76	13	50	3.55
	7	13	42	3.33	6	32	2.66	8	35	3.12	7	36	2.81	3	12	3.08	10	48	2.84
	8	14	42	3.40	6	31	2.69	13	45	4.05	7	36	2.76	3	12	3.09	10	49	2.79
	9	14	42	3.39	8	40	2.67	10	42	3.27	8	37	2.84	3	12	3.08	8	38	2.85
	Avg.			3.38			2.67			3.48			2.80			3.08			2.83
P2	1	13	122	1.07	12	212	0.79	12	122	1.41	13	63	2.78	12	124	1.36	7	42	2.34
	2	9	67	1.40	6	22	3.62	10	56	2.38	7	42	2.42	9	56	2.30	8	31	3.33
	3	7	50	1.48	4	10	6.00	7	42	2.43	5	30	2.47	7	43	2.29	6	30	2.51
	4	5	35	1.42	2	4	5.04	6	32	2.48	4	22	2.49	6	30	2.64	13	53	3.37
	5	5	37	1.39	2	4	5.87	4	1	39.60	6	29	2.71	6	30	2.79	10	51	2.62
	6	9	63	1.54	1	2	8.67	13	51	3.57	3	20	2.26	7	41	2.45	6	30	2.71
	7	13	73	1.86	3	11	4.35	8	40	2.58	4	20	2.66	9	51	2.53	5	15	4.23
	8	9	62	1.57	3	12	4.05	6	30	2.60	6	28	2.78	10	7	19.34	4	22	2.61
	9	9	63	1.55	6	21	4.04	6	29	2.81	4	20	2.53	7	38	2.67	7	1	108.18
	Avg.			1.66			4.14			2.66			2.65			2.60			3.42

Table B-152. 2nd 4" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	138	1.17	12	448	0.37	13	49	3.77	12	382	0.45	7	29	3.44
	2	8	28	3.97	8	23	4.71	14	40	4.81	13	41	4.47	8	28	3.98
	3	7	20	4.70	8	22	5.15	14	36	5.24	13	35	5.20	6	21	4.23
	4	5	15	4.97	8	4	30.77	14	31	6.16	10	27	5.22	8	27	4.20
	5	5	14	5.09	7	16	5.66	14	32	5.84	8	21	5.53	7	21	4.48
	6	7	18	5.03	7	16	5.91	14	30	6.54	5	19	3.52	8	26	4.47
	7	7	18	5.19	7	15	5.89	7	19	4.73	8	20	5.79	13	36	5.18
	8	5	14	5.31	8	19	6.08	10	26	5.53	10	25	5.74	5	24	2.95
	9	7	18	5.38	8	19	6.03	11	25	5.91	10	25	5.84	8	24	4.85
	Avg.			5.29			6.00			5.39			5.79			4.32
P2	1	10	55	2.43	12	112	1.52	10	37	3.77	7	25	4.04	9	40	3.23
	2	13	49	3.59	13	48	3.65	13	38	4.97	8	24	4.54	6	18	4.72
	3	8	27	4.01	13	39	4.66	11	30	4.81	10	30	4.63	8	24	4.45
	4	6	20	4.46	10	33	4.18	8	23	4.86	8	22	4.90	6	13	5.89
	5	5	14	5.06	10	29	4.78	8	22	5.15	6	16	5.40	5	12	5.66
	6	4	10	5.11	10	30	4.54	10	28	5.06	6	16	5.60	3	5	7.64
	7	8	24	4.61	8	22	5.13	8	22	5.23	6	15	5.75	3	4	8.11
	8	7	18	5.22	6	17	5.22	7	16	5.77	5	11	5.89	4	7	7.92
	9	7	18	5.10	5	12	6.13	7	16	5.81	5	11	6.34	4	8	6.06
	Avg.			4.98			5.49			5.60			5.99			7.36
P3	1	8	30	3.52	13	62	2.84	7	38	2.68	11	310	0.49	13	72	2.44
	2	8	27	4.13	13	55	3.26	10	48	2.79	7	42	2.28	13	54	3.25
	3	8	25	4.49	13	53	3.40	8	41	2.56	4	22	2.50	10	0	1679.98
	4	8	24	4.89	10	40	3.37	6	30	2.83	9	47	2.74	10	41	3.32
	5	8	23	4.94	10	39	3.54	8	39	2.68	9	51	2.56	6	25	3.20
	6	8	21	5.41	8	30	3.50	13	46	4.03	9	49	2.69	4	19	3.26
	7	8	21	5.35	10	37	3.73	10	45	3.15	13	49	3.70	10	7	17.97
	8	5	16	4.21	10	38	3.73	8	38	2.79	13	48	3.67	8	31	3.35
	9	8	20	5.65	5	30	2.19	8	36	2.95	13	46	3.95	13	42	4.25
	Avg.			5.07			3.22			2.96			3.77			3.80

Table B-153. 2nd 4" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	4	18	2.78	10	42	3.22	10	45	3.15	10	38	3.47	13	45	3.97
	2	4	19	2.80	8	28	3.80	13	46	4.01	7	28	3.62	10	32	4.07
	3	3	11	3.56	5	10	7.01	10	39	3.53	7	28	3.65	6	18	4.57
	4	3	12	3.54	4	7	7.53	13	39	4.70	13	35	5.06	5	13	4.86
	5	4	19	3.13	3	11	4.21	13	39	4.77	7	28	3.70	6	17	4.82
	6	3	19	2.14	6	21	4.00	14	39	4.97	5	15	4.71	5	13	5.03
	7	5	15	4.63	5	21	3.19	14	37	5.05	6	19	4.22	4	14	3.75
	8	4	19	3.14	13	35	5.34	14	37	5.03	7	24	4.19	13	31	5.81
	9	4	19	3.13	10	34	4.10	14	37	5.12	6	20	4.09	13	3	66.63
	Avg.			3.63			4.21			5.07			4.17			4.78
P2	1	7	45	2.18	12	124	1.39	13	119	1.49	12	157	1.06	12	126	1.35
	2	6	31	2.61	5	29	2.43	8	30	3.77	6	20	4.02	10	41	3.25
	3	7	39	2.61	6	23	3.79	8	28	4.06	8	27	3.92	13	24	7.20
	4	6	31	2.74	7	23	4.02	10	35	4.05	4	19	2.95	5	16	4.48
	5	8	37	2.83	5	17	3.87	8	28	4.08	7	26	3.99	6	23	3.66
	6	8	38	2.72	5	17	3.82	7	21	4.38	7	26	3.99	5	18	3.65
	7	10	47	2.85	5	17	3.74	8	26	4.40	8	25	4.09	5	17	3.68
	8	10	48	2.82	8	27	3.95	13	36	5.02	7	25	4.09	10	37	3.70
	9	13	47	3.76	8	27	4.12	10	32	4.39	10	32	4.23	13	40	4.55
	Avg.			3.14			3.94			4.60			4.14			3.98

Table B-154. 2nd 4" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	46	2.25	12	107	1.61	13	109	1.62	10	41	3.34	6	34	2.59
	2	6	31	2.68	10	38	3.71	10	42	3.33	6	21	3.92	7	35	2.60
	3	5	21	3.10	8	27	4.03	10	40	3.48	6	20	4.22	5	1	50.91
	4	5	21	3.14	8	25	4.39	13	39	4.69	8	26	4.19	5	22	3.30
	5	5	21	3.21	7	19	4.75	13	39	4.78	4	19	2.90	3	14	3.23
	6	5	20	3.23	5	14	4.88	10	36	3.90	6	19	4.33	3	9	4.13
	7	5	20	3.28	7	19	4.82	10	36	4.00	6	19	4.69	4	16	3.24
	8	5	20	3.36	7	18	5.00	10	29	5.05	8	25	4.43	4	15	3.37
	9	5	19	3.51	15	17	11.70	13	35	5.33	10	32	4.49	9	37	3.49
	Avg.			3.38			4.91			4.79			4.54			3.37
P2	1	8	26	3.94	13	92	1.91	8	25	4.10	13	825	0.21	13	48	3.70
	2	6	18	4.85	10	29	4.73	6	20	4.30	10	31	4.30	8	28	3.77
	3	6	18	4.70	8	21	5.24	14	37	5.14	8	21	5.32	6	19	4.42
	4	6	17	5.15	7	16	5.48	13	35	5.30	6	16	5.67	6	20	4.17
	5	7	17	5.35	13	16	11.65	13	34	5.37	8	20	5.50	6	12	7.25
	6	6	16	5.37	8	20	5.53	13	35	5.21	6	16	5.64	3	10	3.74
	7	7	1	170.91	10	25	5.70	14	33	5.66	8	19	5.82	3	9	5.63
	8	5	13	5.43	8	20	5.71	13	32	5.74	8	19	5.94	3	9	5.03
	9	5	12	5.40	8	19	5.82	8	23	4.72	7	14	6.28	6	18	4.69
	Avg.			5.41			5.74			5.37			6.02			5.11

Table B-155. 3rd 4" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	6	20	4.10	7	23	4.40	6	16	5.49	10	29	4.86	6	16	5.30
	2	10	37	3.72	13	37	4.90	8	20	5.20	11	26	5.62	6	16	5.56
	3	10	1	227.39	8	19	5.62	13	30	6.15	7	14	6.78	5	11	6.43
	4	6	28	3.13	8	18	5.74	10	25	5.77	5	11	6.70	7	16	5.64
	5	6	16	5.56	5	10	6.36	7	14	6.38	7	13	6.87	7	15	6.11
	6	8	20	5.48	5	10	6.72	7	13	7.10	7	13	7.01	6	14	6.12
	7	13	25	7.46	6	13	6.54	7	1	76.36	13	24	7.50	5	15	4.46
	8	13	28	6.68	13	30	6.12	13	25	7.33	8	16	7.25	6	14	6.20
	9	13	27	6.79	10	22	6.33	8	16	7.02	7	12	7.37	7	15	6.01
	Avg.			6.97			6.33			7.18			7.37			5.56
P2	1	8	27	3.82	9	36	3.37	4	11	5.34	13	39	4.57	12	367	0.46
	2	6	19	4.42	6	14	5.34	10	26	5.17	10	23	5.86	8	17	6.42
	3	6	18	4.86	4	10	5.09	8	18	5.88	7	13	6.76	8	16	6.81
	4	6	17	4.95	3	8	5.94	7	13	6.80	3	4	9.21	8	15	7.48
	5	6	16	5.25	4	11	5.07	13	25	6.93	2	2	11.88	8	13	8.46
	6	8	21	5.37	4	10	5.68	10	22	6.48	3	4	9.39	7	1	114.54
	7	8	1	75.67	3	7	5.72	7	13	7.18	13	21	8.47	5	9	7.46
	8	13	30	6.02	1	1	14.97	8	13	8.28	10	18	7.65	6	11	8.17
	9	10	24	6.04	3	7	6.58	13	25	7.52	8	14	7.82	8	14	8.05
	Avg.			6.03			6.15			7.66			7.98			7.89
P3	1	10	42	3.15	7	1	184.05	13	49	3.57	13	41	4.30	11	139	1.10
	2	13	42	4.26	6	20	4.23	10	31	4.46	13	36	5.01	12	116	1.42
	3	10	37	3.62	10	30	4.59	6	18	4.79	13	33	5.35	13	38	4.68
	4	8	21	5.30	6	23	3.34	3	10	4.63	10	27	4.91	8	19	5.67
	5	7	16	5.80	10	27	4.88	3	9	5.53	8	21	5.32	8	18	6.32
	6	6	12	6.18	8	21	5.25	5	13	5.44	6	16	5.60	7	14	6.58
	7	5	12	6.24	6	17	4.87	6	16	5.56	8	19	5.56	5	11	6.76
	8	5	12	6.25	8	21	5.11	13	29	6.05	8	20	5.58	4	8	6.55
	9	8	18	6.27	13	31	5.86	8	20	5.59	7	16	5.67	9	10	12.09
	Avg.			6.25			5.28			5.73			5.60			6.65

Table B-156. 3rd 4" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	62	2.76	13	34	5.34	13	81	2.27	13	87	2.04	13	30	6.11
	2	10	29	4.57	10	26	5.19	10	22	6.55	13	34	5.26	10	21	6.53
	3	8	22	5.00	8	18	5.97	8	17	6.63	10	22	6.14	10	20	6.93
	4	6	16	5.57	4	14	3.88	8	16	7.09	8	19	5.93	8	16	7.07
	5	8	20	5.44	5	6	10.68	7	12	7.51	6	15	5.72	8	15	7.39
	6	8	19	5.64	2	6	5.82	8	15	7.68	8	17	6.73	8	16	6.98
	7	8	20	5.62	3	6	7.51	9	15	7.97	7	13	7.23	15	12	17.08
	8	10	23	6.11	5	10	6.46	13	21	8.74	13	22	8.15	7	14	6.94
	9	8	19	5.96	6	13	6.57	10	2	93.98	13	23	7.89	13	22	7.97
	Avg.			5.90			6.85			8.35			7.76			7.45
P2	1	5	19	3.94	7	20	5.02	13	117	1.55	13	94	1.88	13	98	1.86
	2	3	10	4.28	3	8	6.07	10	32	4.45	6	17	4.37	13	38	4.69
	3	3	9	4.69	4	2	36.36	4	19	3.01	4	9	5.54	8	20	5.35
	4	3	9	5.32	1	1	14.04	4	13	4.33	4	10	5.47	6	1	64.48
	5	8	21	5.06	13	27	6.69	10	26	5.19	4	9	5.56	8	19	5.91
	6	6	16	5.22	13	27	6.77	8	21	5.18	6	16	5.56	8	13	8.51
	7	6	16	5.42	8	17	5.96	6	16	5.41	6	17	5.10	8	18	6.10
	8	8	21	5.06	8	17	6.41	13	1	280.00	4	9	5.86	8	11	10.36
	9	13	31	5.84	8	18	6.03	8	19	5.63	4	8	6.33	5	11	6.36
	Avg.			5.44			6.13			5.30			5.76			6.23

Table B-157. 3rd 4" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	268	0.61	13	34	5.39	10	28	4.88	13	720	0.25	13	96	1.82
	2	5	15	4.25	5	16	4.37	8	17	6.32	7	15	6.77	8	20	5.77
	3	6	0	173.94	8	15	7.20	6	13	6.61	8	14	7.29	7	2	59.82
	4	6	19	4.53	8	1	118.79	3	8	4.61	3	5	8.41	8	17	6.64
	5	6	20	4.23	8	16	7.18	3	7	7.27	5	10	6.54	8	17	6.76
	6	5	14	4.98	4	10	5.43	4	5	12.53	4	10	6.31	8	17	6.53
	7	5	14	4.89	7	12	7.23	5	10	7.21	3	7	6.86	8	17	6.72
	8	5	18	3.80	13	23	7.91	11	20	7.40	3	6	8.36	16	14	16.58
	9	8	9	12.79	10	19	7.42	8	17	6.74	13	22	8.18	8	17	6.96
	Avg.			7.16			7.52			7.12			7.80			6.84
P2	1	11	150	1.01	5	14	5.16	13	469	0.39	13	568	0.32	13	110	1.67
	2	13	71	2.46	6	14	5.83	10	33	4.27	8	24	4.65	10	26	5.21
	3	7	22	4.54	8	19	5.54	8	24	4.67	8	22	5.07	5	17	3.99
	4	6	15	5.57	8	19	5.53	5	14	5.13	6	17	5.17	6	16	5.50
	5	5	12	5.20	10	24	5.85	6	14	5.48	6	17	5.33	5	13	5.78
	6	4	10	5.19	8	17	6.42	7	17	5.32	5	13	5.36	8	18	6.20
	7	6	16	5.60	8	18	6.08	8	22	5.14	5	13	5.39	5	13	5.75
	8	7	14	6.26	6	14	6.31	8	22	5.39	7	16	5.66	7	15	6.07
	9	6	15	5.13	14	25	7.56	14	28	6.78	7	16	5.77	5	12	5.60
	Avg.			5.66			6.65			5.77			5.60			5.80

Table B-158. 1st 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	39	3.28	11	119	1.28	12	29	5.60	12	123	1.32	12	76	2.10	12	177	0.91	8	32	3.41
	2	8	11	7.31	6	21	3.70	8	11	9.56	5	9	7.73	8	13	8.27	12	27	6.18	8	28	3.90
	3	2	3	6.77	3	13	3.71	3	5	9.03	4	7	7.56	2	3	10.44	8	13	8.62	6	21	3.73
	4	12	14	8.94	2	6	5.58	5	7	9.03	2	3	10.58	4	6	8.43	12	21	8.10	6	19	3.96
	5	8	9	8.77	3	11	4.14	5	8	9.03	1	1	9.63	3	5	8.16	8	12	8.95	6	19	3.96
	6	5	6	8.46	3	10	4.61	5	8	8.61	3	3	12.55	4	6	8.32	6	9	8.97	5	18	4.00
	7	8	9	8.86	4	13	3.88	5	8	8.78	3	3	12.38	6	9	9.13	12	17	10.18	9	5	25.89
	8	8	10	8.42	3	1	61.09	12	16	10.95	3	3	13.09	4	8	6.24	12	16	10.35	8	23	5.06
	9	5	7	7.81	6	15	4.96	12	15	11.11	4	6	9.26	5	8	9.23	8	11	9.85	13	31	5.85
	Avg.			8.36			4.42			10.28			12.74			8.20			10.13			5.45
P2	1	11	487	0.24	8	28	3.75	5	12	5.60	12	113	1.49	12	96	1.69	12	79	2.12	12	146	1.18
	2	5	30	1.76	6	17	4.60	2	4	7.42	13	36	4.85	5	13	5.32	12	29	5.82	6	19	4.04
	3	6	28	2.05	6	16	4.87	2	4	7.75	8	17	6.52	2	4	6.62	12	25	6.86	3	13	2.79
	4	12	54	2.24	12	28	5.77	2	4	6.22	8	17	6.00	12	24	7.07	12	22	7.79	3	9	5.11
	5	5	24	2.06	12	29	5.66	3	7	6.47	5	12	5.78	8	16	6.44	12	21	8.34	8	21	5.43
	6	3	15	2.25	12	24	6.84	2	4	6.50	3	8	6.05	8	2	73.82	12	21	8.05	5	16	4.76
	7	12	50	2.48	41	17	33.94	4	4	13.34	6	12	6.26	8	15	7.29	8	14	8.01	13	27	6.46
	8	8	34	2.37	8	17	6.70	2	4	7.58	12	21	8.14	13	21	8.19	8	14	8.46	13	26	6.67
	9	5	24	2.35	8	16	7.15	3	7	6.50	13	21	8.21	8	16	6.73	6	10	7.82	13	26	6.66
	Avg.			2.40			6.92			7.04			7.53			7.40			8.09			6.60
P3	1	11	166	0.71	4	13	4.10	11	108	1.44	12	104	1.57	12	120	1.34	12	85	2.01	12	404	0.42
	2	4	27	1.70	8	30	3.55	12	32	5.22	5	12	6.41	5	12	5.66	5	10	6.89	8	26	4.14
	3	5	28	1.70	8	27	3.97	7	15	7.02	3	7	6.46	3	8	5.60	5	11	6.60	8	4	27.72
	4	7	35	2.10	5	17	4.25	5	10	6.93	3	3	13.04	5	12	6.36	5	11	6.93	8	23	4.66
	5	5	22	2.14	6	17	4.65	5	10	6.85	2	4	9.62	5	11	6.56	7	11	8.90	8	21	4.96
	6	5	24	2.17	6	16	4.71	2	3	7.73	4	7	7.31	8	16	6.84	3	8	6.08	8	21	5.19
	7	5	23	2.12	4	12	4.85	2	3	7.10	4	7	7.11	5	11	6.82	5	11	6.76	6	18	4.34
	8	5	23	2.10	6	16	4.64	2	3	7.83	6	11	7.63	6	1	64.48	5	10	7.24	6	17	4.58
	9	5	19	2.64	12	33	4.99	1	1	10.18	6	10	7.80	3	7	6.50	8	3	40.73	6	17	4.58
	Avg.			2.28			4.82			8.37			7.51			6.66			7.00			4.50

Table B-159. 1st 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	596	0.19	5	29	2.45	11	114	1.37	12	123	1.31	11	143	1.08	7	71	1.34	11	524	0.30
	2	7	62	1.22	4	18	2.83	8	29	3.66	8	44	2.36	7	53	1.93	4	44	1.42	4	51	1.07
	3	8	57	1.40	4	18	2.84	7	34	2.98	5	26	2.51	5	32	2.10	4	42	1.42	3	26	1.38
	4	8	56	1.40	5	18	3.78	5	20	3.48	5	27	2.71	5	34	2.09	4	42	1.47	2	27	1.19
	5	8	54	1.47	4	17	3.02	1	3	4.63	7	41	2.49	5	31	2.31	5	42	1.62	3	27	1.34
	6	5	41	1.29	2	10	3.07	2	0	135.76	13	49	3.59	4	29	1.72	5	41	1.57	5	1	76.36
	7	5	41	1.33	3	16	3.05	2	6	4.27	12	49	3.50	3	14	2.93	7	59	1.62	5	50	1.29
	8	6	11	5.04	3	9	4.87	8	1	105.59	13	50	3.46	5	29	2.35	12	82	2.03	4	50	1.25
	9	5	37	1.42	4	16	3.10	8	28	3.85	12	136	1.19	5	27	2.49	12	83	2.09	5	49	1.30
	Avg.			1.37			3.68			4.06			3.48			2.59			1.91			1.28
P2	1	12	102	1.22	11	72	2.19	11	111	1.42	12	118	1.37	12	58	2.79	12	113	1.43	4	42	1.29
	2	5	9	5.36	12	115	1.41	12	51	3.19	8	40	2.62	12	52	3.18	8	47	2.20	7	67	1.49
	3	4	19	2.22	7	28	3.67	8	33	3.25	4	0	165.45	12	49	3.39	12	52	3.31	5	45	1.42
	4	11	92	1.25	12	36	4.43	8	1	116.07	8	39	2.80	7	42	2.46	12	48	3.44	2	12	2.04
	5	4	4	10.38	12	37	4.37	8	31	3.54	3	22	2.21	8	42	2.57	8	40	2.62	2	13	2.03
	6	7	44	1.75	12	34	4.94	8	32	3.56	2	8	3.29	8	42	2.63	8	40	2.60	5	44	1.50
	7	5	32	1.61	12	33	5.11	8	30	3.73	5	22	3.20	4	26	2.41	8	39	2.70	12	76	2.23
	8	3	19	1.63	8	21	4.85	6	20	3.78	2	6	4.95	3	14	3.35	8	40	2.65	12	74	2.32
	9	5	30	1.72	8	22	4.93	6	20	4.16	12	43	4.03	3	14	3.09	7	37	2.68	12	72	2.36
	Avg.			1.65			4.96			3.89			4.06			2.95			2.67			2.30
P3	1	12	664	0.19	8	60	1.78	11	396	0.38	8	26	4.26	8	33	3.20	11	115	1.36	12	558	0.29
	2	8	24	3.29	5	35	2.07	5	18	3.82	3	8	5.09	5	18	4.04	12	58	2.95	5	30	2.39
	3	3	9	3.65	4	22	2.29	2	6	4.66	2	4	6.76	3	10	4.70	8	32	3.29	2	8	3.05
	4	3	9	3.69	2	12	2.78	3	3	13.05	2	5	6.31	3	10	4.39	8	31	3.38	2	7	3.50
	5	3	9	3.43	4	20	2.53	1	3	5.16	2	5	6.64	3	10	4.59	8	28	3.77	1	3	4.49
	6	5	14	3.66	4	20	2.48	5	17	4.16	2	5	6.64	5	16	4.07	6	18	4.27	2	7	3.70
	7	5	14	3.66	4	21	2.51	5	16	4.50	3	5	8.48	5	16	4.51	8	28	3.81	4	14	3.85
	8	5	14	3.7	3	12	3.26	3	10	4.54	2	5	6.96	3	9	4.77	8	27	3.90	3	16	2.67
	9	6	4	15.6	4	19	2.85	5	17	4.36	4	9	5.87	3	9	5.23	8	28	3.73	3	16	2.71
	Avg.			3.7			2.87			4.47			7.10			4.83			3.82			3.08

Table B-160. 1st 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	1003	0.12	11	78	2.04	11	134	1.17	11	119	1.33	8	27	4.06	12	119	1.37	12	107	1.55
	2	5	13	4.05	12	64	2.63	7	31	3.29	8	31	3.54	6	16	4.74	5	19	3.98	12	59	2.91
	3	3	6	4.59	12	54	3.02	3	10	4.61	6	18	4.24	5	16	4.47	6	19	3.96	12	54	3.19
	4	3	0	93.33	8	43	2.51	3	2	24.30	12	40	4.23	8	24	4.60	6	18	4.26	12	61	2.83
	5	3	6	4.63	8	41	2.51	12	34	4.66	6	17	4.63	8	24	4.42	2	5	5.99	12	53	3.22
	6	2	4	5.11	8	41	2.65	5	16	4.57	4	12	4.63	6	15	5.04	3	10	4.40	8	39	2.84
	7	2	4	5.21	12	48	3.54	4	11	4.50	3	11	4.46	8	23	4.72	2	5	5.66	6	27	2.84
	8	2	4	5.07	12	46	3.58	4	1	49.02	12	16	10.03	5	14	5.31	4	11	4.51	4	18	2.73
	9	5	12	4.28	8	38	2.80	6	17	4.60	5	16	4.77	8	23	5.04	2	5	5.97	3	20	2.11
	Avg.			4.85			3.31			4.55			4.61			5.02			5.38			2.56
P2	1	12	67	1.84	5	15	4.56	12	95	1.70	12	124	1.32	11	114	1.39	12	116	1.38	8	39	2.85
	2	13	26	4.94	4	0	132.36	5	15	4.96	8	36	3.08	4	19	3.32	5	24	2.73	5	24	3.16
	3	8	15	5.38	4	11	5.22	2	4	8.30	6	23	3.36	3	11	3.85	2	7	3.66	4	17	3.12
	4	8	14	6.12	4	10	6.03	12	30	5.68	4	15	3.54	3	6	7.27	2	7	3.92	2	8	3.39
	5	6	10	5.97	6	13	6.28	8	19	5.83	4	15	3.69	3	11	3.92	2	7	4.60	2	8	4.42
	6	5	9	5.81	6	13	6.19	6	14	5.87	4	14	3.77	3	10	4.17	5	23	3.17	3	9	4.11
	7	3	6	4.80	6	13	6.52	3	8	5.52	3	8	4.60	2	5	5.44	8	23	4.97	3	9	3.88
	8	5	9	6.07	6	13	6.36	6	10	8.08	5	19	3.80	3	11	4.39	5	22	3.24	4	17	3.15
	9	5	9	5.96	6	12	6.47	5	13	5.76	8	27	4.08	3	9	4.47	6	22	3.47	6	23	3.42
	Avg.			5.61			6.45			6.45			4.16			4.77			3.89			3.48
P3	1	12	68	1.86	8	25	4.16	12	107	1.55	8	2	54.90	12	118	1.36	3	14	3.32	13	116	1.53
	2	5	17	3.09	12	37	4.41	8	27	4.04	8	23	4.79	5	5	13.95	1	4	4.07	6	24	3.21
	3	4	10	3.62	12	32	5.06	5	15	4.55	5	14	5.22	8	28	3.84	12	39	4.34	3	15	3.23
	4	2	5	4.44	12	32	5.11	3	9	4.67	2	4	7.75	5	17	4.27	12	38	4.57	6	22	3.42
	5	1	3	4.77	12	29	5.57	4	10	5.01	2	4	8.48	6	2	33.35	12	39	4.39	5	23	3.12
	6	12	29	4.51	12	27	6.27	2	4	8.48	2	4	6.50	13	51	3.41	5	19	3.71	3	16	2.31
	7	8	20	4.13	12	26	6.27	3	9	4.26	2	4	7.44	8	25	4.38	3	12	3.83	3	12	4.00
	8	5	13	3.88	12	25	6.55	8	20	5.32	2	4	7.35	5	15	4.89	8	27	3.94	2	6	5.34
	9	4	1	59.39	12	24	6.91	8	19	5.60	13	27	6.46	6	16	4.85	8	25	4.41	4	18	2.86
	Avg.			4.00			6.58			5.06			7.08			4.71			4.06			4.07

Table B-161. 1st 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	138	0.87	8	43	2.53	12	58	2.90	12	130	1.29	5	19	3.70	13	71	2.47	13	407	0.43
	2	12	64	1.98	6	30	2.73	5	15	4.55	6	15	5.08	4	13	3.99	8	23	4.87	9	40	3.00
	3	8	42	1.96	4	20	2.71	3	10	4.44	5	10	7.33	4	12	4.42	8	22	5.04	6	26	2.94
	4	12	58	2.22	4	20	2.84	3	10	4.56	2	5	7.02	4	12	4.12	5	14	5.19	5	25	2.96
	5	5	2	21.82	4	19	2.95	3	10	4.59	4	10	5.24	4	12	4.24	6	15	5.04	6	26	3.26
	6	3	21	1.72	4	19	2.91	3	9	4.86	4	10	5.09	4	12	4.80	6	5	17.84	5	24	3.07
	7	8	40	2.09	4	18	2.93	2	4	5.76	6	14	5.44	4	11	4.43	6	14	5.55	8	36	3.08
	8	5	29	1.95	4	18	3.00	3	9	4.75	6	14	5.70	4	16	3.23	4	11	5.05	8	35	3.26
	9	5	28	1.91	4	19	2.91	3	10	4.40	6	14	5.39	2	4	5.66	6	15	5.52	8	35	3.22
	Avg.			1.98			2.95			5.51			4.44			4.77			5.37			3.19
P2	1	11	718	0.17	11	75	2.12	12	48	3.48	12	96	1.79	13	47	3.70	12	84	2.03	8	46	2.45
	2	5	26	1.82	12	56	3.02	8	20	5.30	6	18	4.25	13	36	4.78	12	36	4.77	5	30	2.46
	3	2	8	2.07	12	49	3.42	12	29	5.88	13	34	5.31	12	33	5.01	13	34	5.23	4	21	2.35
	4	12	55	2.23	12	45	3.77	12	28	6.00	13	35	5.19	8	24	4.45	12	31	5.47	5	20	3.75
	5	6	40	1.44	12	44	3.79	8	20	5.51	13	33	5.41	6	16	4.74	9	24	4.97	12	51	3.40
	6	7	39	1.93	12	38	4.42	6	17	4.62	13	36	5.10	13	31	5.65	13	31	5.84	8	46	2.50
	7	7	39	1.98	12	39	4.35	4	14	3.64	12	34	5.14	8	23	4.76	13	31	5.70	13	45	4.06
	8	3	16	1.73	12	38	4.48	13	27	6.58	13	31	5.69	9	24	5.04	13	30	6.02	9	36	3.33
	9	2	9	1.81	12	37	4.57	8	19	5.73	8	23	4.57	8	23	4.84	13	30	5.89	4	28	2.22
	Avg.			1.84			4.46			5.14			4.88			5.02			5.87			3.21

Table B-162. 1st 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	248	0.49	7	64	1.56	8	22	4.83	11	118	1.35	12	73	2.25	12	58	2.85	12	114	1.52
	2	12	77	1.67	3	22	1.74	3	8	5.63	8	34	3.22	3	10	4.44	7	32	3.19	8	37	3.07
	3	8	46	1.83	2	11	2.77	3	4	10.48	6	20	4.22	1	4	4.98	6	21	3.58	6	24	3.29
	4	8	43	1.95	4	21	2.44	3	8	5.51	2	12	2.85	2	5	5.95	5	20	3.63	4	16	3.22
	5	5	33	1.70	3	19	2.52	3	8	5.28	3	10	4.52	4	10	4.86	5	19	3.68	3	10	4.16
	6	3	24	1.44	2	11	2.69	3	8	5.60	2	6	5.09	5	10	6.85	4	20	2.73	4	16	3.51
	7	6	31	1.86	3	17	2.56	3	8	5.52	5	19	3.82	4	10	5.09	8	29	3.69	6	22	3.50
	8	3	14	2.00	2	10	2.52	3	4	9.52	6	19	4.01	6	15	5.24	5	18	3.91	8	34	3.32
	9	4	1	45.52	2	8	3.11	4	1	54.82	3	11	3.50	8	22	4.94	5	19	3.89	6	24	3.21
	Avg.			1.93			2.73			7.52			3.78			5.09			3.83			3.34
P2	1	11	385	0.30	7	53	1.89	12	67	2.39	12	116	1.40	12	46	3.60	12	63	2.54	12	551	0.31
	2	12	108	1.17	8	46	2.28	5	15	4.84	4	13	3.87	7	36	2.85	12	39	4.19	8	55	2.03
	3	5	30	1.83	12	53	3.13	6	14	5.31	4	13	4.04	8	35	3.09	8	30	3.56	6	32	2.47
	4	4	10	4.32	12	50	3.37	6	15	5.17	2	6	5.39	6	11	7.09	4	13	4.16	6	34	2.33
	5	2	12	1.92	12	46	3.70	6	14	5.56	2	6	5.77	5	22	3.31	8	30	3.51	8	50	2.34
	6	1	7	1.83	12	45	3.86	6	14	5.31	13	34	5.10	5	21	3.51	12	35	4.85	13	58	3.13
	7	1	7	2.02	12	45	3.76	5	14	5.35	8	27	4.18	8	33	3.27	12	34	4.77	13	56	3.13
	8	3	18	1.89	12	43	3.97	12	27	6.13	6	18	4.35	12	39	4.29	12	34	4.84	13	63	2.81
	9	3	18	1.98	12	40	4.18	8	22	5.17	4	12	4.28	12	38	4.37	8	28	3.74	13	56	3.13
	Avg.			1.96			3.97			5.55			4.27			3.98			4.45			3.02

Table B-163. 2nd 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	59	2.83	11	252	0.61	12	132	1.26	12	33	5.13	12	93	1.74	12	346	0.49
	2	8	22	4.82	12	33	4.86	8	18	6.48	8	15	7.66	8	17	6.80	12	42	4.04
	3	8	20	5.27	8	14	7.33	8	17	6.53	6	11	7.22	9	16	7.19	13	36	4.84
	4	8	18	6.06	5	10	7.13	6	11	6.80	3	7	5.94	9	16	7.54	13	34	5.18
	5	8	18	6.02	12	19	8.69	8	15	7.47	6	11	7.38	9	15	7.96	13	31	5.71
	6	5	12	6.12	8	13	8.41	8	14	8.00	6	10	7.97	8	14	8.02	13	28	6.35
	7	12	24	6.91	8	13	8.25	8	14	7.71	6	10	8.12	9	14	8.73	8	21	5.62
	8	8	15	7.25	8	13	8.88	6	10	8.25	6	10	7.92	8	13	9.09	6	15	4.97
	9	8	14	7.61	6	10	7.74	4	10	5.84	6	10	8.12	13	18	10.00	6	15	5.24
	Avg.			7.26			8.29			7.27			8.06			9.27			5.28
P2	1	7	30	3.35	12	112	1.44	11	101	1.53	12	86	1.86	12	111	1.50	6	35	2.39
	2	5	15	4.86	8	22	5.10	12	36	4.62	8	20	5.33	8	16	6.93	8	29	3.73
	3	6	14	5.36	6	16	4.84	8	20	5.71	12	27	6.21	8	14	7.47	5	19	3.87
	4	3	11	4.29	6	14	5.53	5	14	5.40	12	25	6.80	6	11	6.98	12	60	2.73
	5	13	25	7.27	5	13	5.01	4	11	4.87	6	12	6.30	8	14	8.15	5	25	2.81
	6	12	24	7.07	12	25	6.83	13	0	-	6	12	6.59	59	14	58.55	13	30	5.86
	7	12	21	7.92	12	23	7.22	8	17	6.19	6	12	6.45	8	13	8.34	12	35	4.90
	8	6	13	6.08	6	14	5.79	12	22	7.52	6	12	6.36	4	11	5.11	6	19	4.05
	9	4	9	5.33	4	5	10.26	12	23	7.30	6	12	6.68	6	10	8.17	5	20	3.80
	Avg.			6.44			6.50			7.00			6.50			8.25			4.25
P3	1	5	16	4.35	12	96	1.73	12	81	1.97	12	83	2.00	11	98	1.57	7	34	2.97
	2	2	5	6.68	8	17	6.54	8	17	6.09	8	20	5.43	8	18	6.00	7	45	2.03
	3	2	5	7.40	12	29	5.96	3	9	5.45	9	19	6.12	6	12	6.32	12	488	0.34
	4	7	20	5.20	12	25	6.86	5	11	6.25	5	17	4.15	5	12	6.39	12	41	4.09
	5	5	14	5.38	8	3	44.54	6	11	6.87	8	18	6.22	5	11	6.54	12	36	4.70
	6	5	13	5.49	4	9	6.33	4	8	7.66	8	18	6.02	5	11	6.45	12	35	4.76
	7	3	9	5.11	2	4	8.67	5	10	6.89	8	17	6.38	6	11	6.96	12	35	4.96
	8	3	9	5.29	3	4	8.56	9	11	12.16	8	16	6.77	5	11	6.66	12	34	5.04
	9	3	9	4.15	3	4	8.26	8	15	7.53	8	16	6.94	6	11	6.88	8	24	4.30
	Avg.			4.85			8.49			7.21			6.70			6.83			4.77

Table B-164. 2nd 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	43	2.44	12	61	2.81	11	119	1.26	11	116	1.33	11	109	1.45	12	70	2.38
	2	5	21	3.57	8	38	2.79	7	32	3.15	7	39	2.58	8	28	4.06	7	46	2.19
	3	3	11	3.15	12	47	3.67	5	19	3.87	5	25	3.02	8	25	4.42	7	45	2.16
	4	3	9	4.65	6	26	3.46	5	18	3.92	5	23	3.26	6	16	4.86	12	56	2.91
	5	3	11	3.41	3	16	2.91	5	17	4.21	5	3	25.80	8	25	4.63	12	54	3.05
	6	5	18	3.92	5	23	3.13	5	16	4.27	4	1	52.73	8	23	4.88	7	41	2.52
	7	3	12	3.73	2	7	4.55	5	17	4.17	6	21	3.70	5	14	5.15	7	41	2.38
	8	6	17	4.47	3	16	3.00	3	10	4.50	8	30	3.73	6	14	5.44	7	40	2.48
	9	8	26	4.37	12	38	4.51	3	10	4.72	8	29	3.61	8	22	5.12	7	38	2.61
	Avg.			4.19			4.02			4.61			3.68			5.23			2.49
P2	1	5	26	2.49	12	104	1.60	12	91	1.81	12	37	4.57	8	34	3.05	7	48	2.08
	2	5	26	2.83	8	25	4.49	8	24	4.42	12	32	5.22	8	32	3.48	3	19	2.58
	3	7	41	2.44	8	23	5.00	8	23	4.76	12	29	5.67	5	21	3.59	3	9	4.96
	4	5	23	2.99	6	16	4.99	12	30	5.47	8	20	5.27	3	12	3.86	2	9	3.78
	5	5	25	2.93	13	29	6.07	12	30	5.65	8	20	5.50	8	30	3.69	5	25	2.84
	6	4	16	3.17	8	22	5.35	8	22	5.04	5	12	5.89	8	30	3.69	4	17	2.91
	7	2	7	4.88	9	22	5.48	3	9	5.31	3	8	5.88	8	30	3.59	8	38	2.99
	8	3	7	5.37	9	1	91.64	4	10	5.01	5	14	5.18	13	37	4.73	8	37	2.98
	9	5	22	3.41	13	27	6.56	8	21	5.20	4	9	5.58	13	36	4.79	8	36	2.99
	Avg.			4.55			6.02			5.18			5.55			4.37			2.99
P3	1	5	25	2.76	12	109	1.49	12	119	1.35	11	139	1.14	12	105	1.58	5	25	2.80
	2	5	25	2.79	8	25	4.35	12	41	4.20	8	21	5.47	8	24	4.67	5	24	2.95
	3	6	24	3.14	6	11	7.90	8	24	4.73	4	9	5.84	8	22	5.09	3	14	2.52
	4	5	22	3.30	4	10	5.27	3	8	5.45	4	8	6.33	8	21	5.38	6	3	31.82
	5	6	23	3.53	2	5	6.76	4	8	6.90	4	8	6.52	8	21	5.57	5	22	3.27
	6	6	21	3.68	12	27	6.49	2	4	8.12	4	8	6.63	8	20	5.62	8	35	3.16
	7	4	15	3.30	8	19	5.98	3	8	5.83	8	17	6.63	8	19	5.89	8	33	3.50
	8	6	22	3.71	13	25	6.89	3	8	5.66	8	17	6.53	13	27	6.71	5	20	3.52
	9	5	21	3.59	13	25	7.11	3	9	5.55	6	11	7.17	13	26	6.80	6	20	3.94
	Avg.			3.54			6.66			5.68			6.78			6.47			3.65

Table B-165. 2nd 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	4	16	3.45	5	15	5.09	12	148	1.08	11	115	1.37	11	118	1.34	12	49	3.43
	2	2	4	6.19	12	33	5.19	6	15	4.99	12	41	4.07	6	12	6.43	8	27	4.13
	3	1	2	5.01	12	31	5.50	3	9	4.90	12	36	4.47	5	11	6.45	6	17	4.45
	4	2	4	6.31	12	27	6.35	2	4	8.40	12	31	5.19	4	11	4.98	6	13	5.91
	5	2	5	5.38	13	28	6.33	3	4	11.48	12	29	5.90	6	18	4.52	4	12	4.50
	6	3	12	3.40	5	12	6.01	3	4	8.64	12	27	5.98	9	16	7.53	6	17	4.61
	7	2	5	5.70	3	7	6.26	4	10	5.22	12	30	5.68	12	21	8.20	6	16	4.80
	8	3	10	4.27	8	17	6.57	6	13	6.38	12	28	5.82	8	14	7.65	12	27	6.18
	9	2	4	6.49	3	9	4.71	2	4	7.76	8	21	5.14	6	11	7.70	12	26	6.25
	Avg.			5.49			5.85			6.45			5.55			7.85			5.74
P2	1	5	25	2.92	11	798	0.20	11	114	1.39	11	211	0.75	11	112	1.41	12	114	1.40
	2	6	23	3.34	12	49	3.42	8	27	4.06	8	26	4.10	9	0	381.81	8	35	3.10
	3	6	22	3.40	12	64	2.68	6	17	4.53	5	15	4.56	8	25	4.33	8	33	3.44
	4	5	23	3.19	8	28	3.93	6	2	39.93	5	14	5.06	8	22	5.05	8	31	3.79
	5	5	22	3.34	3	11	4.20	6	15	5.18	5	8	8.35	12	30	5.69	12	43	3.98
	6	6	20	3.87	6	18	4.47	4	10	5.01	2	4	5.89	12	27	6.34	12	41	4.21
	7	6	21	3.68	4	12	4.11	4	15	3.26	3	7	6.11	12	26	6.49	12	38	4.48
	8	8	26	4.22	4	12	4.40	5	14	4.87	5	13	5.54	12	25	6.80	13	29	6.07
	9	8	26	4.19	3	7	5.52	6	14	5.56	3	8	5.60	12	16	10.63	13	36	4.80
	Avg.			4.03			4.67			4.57			5.75			6.64			5.12
P3	1	12	56	3.05	12	41	4.03	11	114	1.33	12	114	1.43	11	122	1.24	11	209	0.74
	2	13	39	4.63	6	13	6.08	8	21	4.91	6	0	267.27	8	25	4.20	3	14	3.11
	3	4	16	3.84	4	9	5.51	6	13	6.00	2	4	7.35	6	17	4.80	4	15	3.39
	4	8	22	4.99	2	4	8.85	4	21	2.38	1	2	7.27	5	14	5.25	8	30	3.60
	5	5	15	5.10	11	24	6.41	4	8	6.24	13	27	6.54	12	27	6.02	6	1	90.75
	6	6	14	5.46	6	11	6.91	3	7	4.85	8	19	5.78	6	14	5.30	12	35	4.92
	7	6	14	5.55	3	7	6.16	5	11	6.48	6	13	5.97	3	10	4.72	13	34	5.19
	8	8	20	5.63	5	11	6.74	5	11	6.93	4	9	5.61	2	5	5.52	12	31	5.51
	9	8	19	5.66	12	21	7.98	4	8	6.16	4	8	6.79	4	14	4.02	12	31	5.60
	Avg.			5.61			6.96			6.52			6.12			4.75			5.43

Table B-166. 2nd 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	17	4.46	12	29	5.77	12	54	3.02	12	46	3.63	12	81	1.99	6	16	4.73
	2	3	5	6.84	6	13	5.88	8	15	7.00	8	14	7.85	9	15	8.12	6	15	5.08
	3	2	5	6.51	3	1	36.65	8	16	7.18	8	13	8.51	8	13	8.93	6	15	5.12
	4	4	10	5.74	3	0	#DIV/0!	9	16	7.45	8	13	8.59	9	13	9.53	6	15	5.20
	5	3	5	7.10	3	4	9.75	8	14	7.73	8	13	8.91	6	9	9.04	9	21	5.77
	6	2	5	7.53	2	3	8.00	6	11	7.09	8	12	9.30	6	8	9.85	8	21	5.55
	7	2	5	7.09	12	21	7.80	4	8	7.16	8	12	8.86	9	13	9.21	8	21	5.51
	8	3	9	5.27	8	15	7.18	3	8	5.33	8	12	9.14	12	16	10.81	8	20	5.58
	9	4	10	5.68	4	9	6.25	4	7	7.40	8	12	9.35	9	12	10.01	13	29	6.20
	Avg.			6.01			7.07			6.63			9.12			10.01			5.76
P2	1	12	57	3.00	12	53	3.20	12	67	2.44	12	58	2.87	12	65	2.66	12	102	1.66
	2	12	37	4.36	6	13	5.99	8	17	6.19	12	24	6.93	13	22	8.29	8	24	4.79
	3	12	34	4.80	3	4	9.35	5	12	6.26	12	21	7.98	13	19	9.18	9	23	5.17
	4	6	14	6.33	2	3	10.06	2	4	9.62	8	14	8.08	13	19	9.51	6	16	4.67
	5	5	14	5.48	4	8	6.82	2	3	11.24	8	14	8.11	12	18	9.33	5	16	4.35
	6	8	19	5.56	4	8	6.59	2	3	9.09	8	14	7.58	13	18	9.83	6	15	5.22
	7	8	19	5.66	4	0	424.24	12	18	9.22	8	13	8.54	13	17	10.25	9	21	5.68
	8	12	25	6.74	3	4	10.18	12	19	9.08	6	9	9.19	13	17	10.34	9	21	5.83
	9	8	18	5.90	2	3	8.71	12	19	8.91	6	9	8.96	13	17	10.51	9	20	6.26
	Avg.			6.10			9.44			9.07			8.90			10.37			5.92

Table B-167. 2nd 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	31	2.18	12	39	4.30	12	68	2.43	12	54	3.08	12	117	1.42	13	110	1.64
	2	5	29	2.42	12	33	5.14	6	14	5.75	8	14	7.88	8	23	4.97	8	26	3.99
	3	2	0	814.53	12	30	5.44	3	9	5.34	3	7	5.43	8	20	5.52	8	25	4.33
	4	3	17	2.78	13	29	6.11	4	1	59.05	4	5	9.57	6	15	5.41	5	17	4.34
	5	3	16	2.79	8	23	4.70	3	4	8.90	6	9	8.27	4	11	4.58	8	24	4.56
	6	3	16	2.90	8	24	4.46	4	9	6.14	9	14	8.99	4	10	5.42	8	23	4.69
	7	3	15	3.16	8	22	4.84	2	4	7.59	8	13	8.92	4	10	5.46	13	30	5.88
	8	3	15	3.14	8	20	5.55	4	9	6.54	9	13	8.78	3	9	5.27	8	24	4.77
	9	5	23	3.15	8	21	5.32	4	9	6.07	8	13	8.95	4	10	5.61	6	17	4.65
	Avg.			3.15			5.24			6.73			8.88			5.45			5.10
P2	1	10	148	0.97	12	109	1.56	12	50	3.43	12	102	1.65	12	70	2.30	13	72	2.44
	2	6	25	3.05	12	31	5.55	6	11	6.97	13	29	6.02	8	21	5.43	13	65	2.75
	3	4	16	3.54	6	13	5.97	4	8	6.49	8	15	7.18	8	20	5.58	13	38	4.71
	4	2	4	5.19	6	13	5.76	4	8	6.94	6	10	7.91	6	13	6.15	13	35	5.17
	5	6	22	3.54	8	18	6.21	6	11	7.27	6	10	7.82	6	12	6.40	13	36	5.20
	6	4	15	3.71	8	18	6.21	6	10	7.66	6	10	7.62	8	16	7.15	13	33	5.41
	7	4	13	4.09	8	18	6.10	8	15	7.46	6	10	7.71	8	16	7.04	13	33	5.49
	8	4	13	3.79	8	17	6.22	8	14	7.81	6	10	7.65	8	16	6.94	13	31	5.94
	9	2	6	5.51	8	16	6.59	12	18	9.47	4	10	5.19	12	20	8.40	13	35	5.30
	Avg.			4.46			6.30			8.25			6.85			7.46			5.58

Table B-168. 3rd 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	55	2.98	11	115	1.36	12	165	1.01	11	116	1.37	5	11	6.48	5	16	4.25
	2	12	39	4.23	8	19	5.69	5	11	6.60	5	11	5.95	3	7	6.12	5	17	3.93
	3	12	33	4.93	8	18	6.05	8	14	7.53	3	6	6.49	2	3	8.78	5	17	4.11
	4	12	31	5.34	5	12	6.10	8	8	13.41	8	15	7.21	4	1	66.18	5	17	4.41
	5	12	28	5.95	8	16	6.68	8	15	7.17	5	10	6.99	1	2	6.11	8	23	4.61
	6	8	22	5.10	13	24	7.48	6	10	7.53	2	3	6.59	2	0	203.63	5	15	4.92
	7	8	20	5.57	8	15	7.29	5	9	7.80	3	5	7.43	2	3	9.31	5	15	4.75
	8	9	20	5.83	12	21	8.23	6	9	8.09	3	6	6.99	3	6	7.08	8	21	5.05
	9	12	24	6.79	11	0	3970.85	8	13	8.38	0	1	10.91	5	4	19.22	8	19	5.76
	Avg.			6.06			7.76			8.09			7.21			8.20			5.19
P2	1	11	752	0.19	12	104	1.62	12	85	2.00	12	92	1.83	12	67	2.42	8	29	3.64
	2	8	12	8.75	13	39	4.63	8	19	5.73	8	20	5.35	5	13	5.53	12	43	3.89
	3	4	13	4.57	12	30	5.39	8	18	6.08	8	18	6.16	2	4	6.79	8	25	4.36
	4	5	12	6.00	12	29	5.94	8	18	6.51	1	3	5.92	1	3	5.90	12	34	5.00
	5	6	11	6.63	7	20	5.19	8	16	6.75	13	22	8.03	12	24	7.16	12	32	5.34
	6	9	0	333.73	3	15	3.12	8	17	6.41	5	11	5.96	8	16	6.76	8	23	5.13
	7	8	15	7.18	3	6	5.66	5	11	6.07	3	6	6.70	8	16	6.70	6	16	4.70
	8	12	23	7.25	5	15	4.46	5	12	6.17	8	15	7.31	13	23	7.84	13	31	5.84
	9	12	22	7.64	8	19	5.57	8	16	7.07	12	21	8.40	8	16	6.66	8	22	5.16
	Avg.			7.36			5.23			6.44			7.47			7.06			5.23
P3	1	5	15	4.44	12	88	1.84	12	70	2.36	12	99	1.63	12	84	1.94	11	198	0.77
	2	5	15	5.08	5	12	5.87	8	17	6.58	13	31	5.73	5	11	6.10	5	25	2.79
	3	3	10	4.78	3	8	6.20	6	11	7.14	3	5	7.10	3	7	6.09	3	14	3.05
	4	3	10	4.87	2	3	9.95	5	10	6.72	0	1	8.98	2	3	7.79	8	27	3.81
	5	1	3	5.87	3	7	6.83	5	11	6.76	5	10	6.91	5	11	6.41	12	37	4.66
	6	12	25	6.76	3	7	6.60	6	10	7.50	3	5	8.28	5	11	6.41	12	47	3.65
	7	8	18	6.29	5	10	6.70	3	6	7.23	2	3	8.82	5	10	6.84	8	24	4.30
	8	12	24	6.88	2	7	4.70	3	6	7.27	3	6	7.27	10	11	12.46	8	21	4.86
	9	12	23	7.20	3	5	9.76	6	10	7.74	5	9	7.42	8	14	7.49	5	17	4.26
	Avg.			6.79			5.70			7.41			7.84			8.93			4.47

Table B-169. 3rd 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	33	3.31	12	113	1.45	8	22	4.95	11	93	1.71	12	110	1.46	11	116	1.35
	2	8	27	4.17	7	14	6.36	6	14	5.57	3	7	5.34	5	14	5.05	7	35	2.90
	3	8	24	4.58	3	8	5.49	3	8	4.58	3	7	6.44	5	14	5.28	12	50	3.27
	4	6	17	4.91	6	1	59.39	4	1	109.65	2	4	6.86	3	8	5.60	12	42	4.02
	5	6	16	5.01	5	13	5.87	6	13	5.97	5	12	5.89	3	8	5.44	13	40	4.33
	6	3	5	7.71	6	13	6.08	3	8	5.63	5	11	5.97	3	8	5.57	12	39	4.23
	7	6	15	5.32	3	8	5.55	3	7	6.47	6	2	39.71	2	4	7.79	12	38	4.44
	8	6	0	220.60	5	11	6.19	3	8	4.75	5	12	6.02	6	0	509.08	12	37	4.61
	9	4	10	5.05	5	12	5.90	5	12	6.30	5	11	6.28	8	17	6.23	12	36	4.70
	Avg.			5.18			5.88			5.84			6.15			7.01			4.58
P2	1	5	20	3.25	12	173	0.95	12	111	1.48	12	95	1.70	13	37	4.80	12	95	1.74
	2	3	13	3.84	8	34	3.12	6	20	3.82	5	14	5.11	13	29	5.98	7	35	2.91
	3	3	6	5.73	4	14	4.16	12	40	4.27	3	8	5.43	13	28	6.45	7	39	2.49
	4	5	17	4.05	3	12	3.51	8	25	4.20	12	27	6.28	8	18	6.43	5	25	2.69
	5	12	33	4.94	6	20	3.88	8	26	4.02	12	26	6.45	5	11	6.59	3	11	3.76
	6	12	32	5.14	3	12	3.57	8	24	4.47	8	18	5.66	3	6	6.61	5	19	3.60
	7	12	34	4.72	3	13	3.44	5	18	4.21	8	19	5.67	1	2	7.64	5	25	2.55
	8	7	22	4.64	3	12	3.68	3	12	3.97	8	17	6.06	13	22	8.04	5	20	3.35
	9	5	15	4.60	8	25	4.28	4	12	5.07	13	25	7.04	13	21	8.30	7	37	2.76
	Avg.			4.66			3.80			4.42			6.26			7.99			2.89
P3	1	5	14	4.95	12	116	1.43	12	103	1.58	12	107	1.55	11	708	0.22	8	28	3.90
	2	5	14	5.22	5	14	4.95	8	20	5.14	4	12	4.24	2	3	8.48	5	19	3.90
	3	3	10	3.51	2	8	3.73	5	12	5.84	4	2	28.05	3	7	5.81	5	18	4.01
	4	4	4	17.34	5	14	5.00	8	18	6.07	4	0	132.36	3	8	6.30	5	18	3.92
	5	6	13	5.91	5	13	5.27	12	26	6.52	3	7	6.22	5	11	6.34	8	25	4.17
	6	4	9	6.08	5	13	5.39	8	17	6.07	1	2	7.83	3	7	6.47	5	18	3.71
	7	4	6	10.46	3	13	3.71	8	17	6.57	5	10	6.89	2	3	8.69	5	19	3.51
	8	2	4	6.72	5	13	5.36	5	11	6.05	3	6	7.13	3	5	7.57	5	17	4.16
	9	4	8	6.55	3	8	5.91	3	7	6.60	1	1	7.27	3	7	6.63	8	23	4.80
	Avg.			6.63			5.00			6.41			7.09			7.63			4.16

Table B-170. 3rd 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	25	4.20	12	63	2.63	12	82	2.03	12	119	1.43	12	107	1.56	12	223	0.77
	2	8	22	4.79	8	14	7.43	5	10	7.54	4	12	5.35	5	14	5.19	8	28	4.06
	3	6	14	5.62	6	10	7.77	3	6	7.62	3	4	8.90	3	8	5.57	5	20	3.35
	4	2	4	8.15	1	1	8.48	1	2	7.58	5	10	7.36	2	3	9.63	3	11	3.72
	5	2	4	7.91	13	18	9.50	1	1	8.04	2	2	9.70	3	2	24.30	3	10	4.28
	6	5	0	271.51	8	13	8.97	13	17	10.44	13	20	9.37	1	2	8.31	2	5	5.18
	7	2	3	7.37	3	6	7.32	8	12	9.66	5	9	8.11	15	19	10.37	3	10	4.01
	8	1	3	7.07	12	18	9.41	5	9	8.26	2	2	11.61	8	13	8.38	2	5	5.09
	9	12	25	6.98	8	13	9.06	5	8	8.90	0	0	25.45	8	12	8.81	3	9	4.49
	Avg.			7.14			8.59			8.94			8.11			9.19			4.53
P2	1	5	20	3.56	12	113	1.43	12	101	1.66	12	122	1.39	12	95	1.74	12	123	1.37
	2	5	17	4.04	8	16	6.80	12	36	4.83	13	32	5.41	5	14	5.22	8	27	4.28
	3	6	18	4.21	5	10	7.27	12	31	5.58	8	17	6.86	8	18	5.96	8	22	5.02
	4	12	32	5.24	6	10	7.59	8	20	5.63	8	16	6.98	13	26	6.94	8	11	10.33
	5	13	31	5.63	5	9	7.82	5	12	5.57	4	10	5.59	12	25	6.91	13	34	5.26
	6	12	29	6.04	5	10	7.22	6	8	9.59	8	14	8.09	12	24	7.22	8	21	5.26
	7	13	29	6.15	3	6	7.41	3	9	4.84	8	14	7.54	8	17	6.44	8	21	5.48
	8	13	27	6.56	3	6	7.27	4	2	29.60	5	10	7.56	8	30	3.49	8	21	5.53
	9	8	20	5.73	3	6	7.32	3	8	5.37	5	10	7.45	8	16	7.02	13	30	5.99
	Avg.			6.15			7.33			5.10			7.52			6.73			5.67
P3	1	12	62	2.72	12	26	6.61	12	79	2.12	12	89	1.84	12	28	6.09	13	737	0.24
	2	8	32	3.36	8	16	7.27	8	14	7.58	2	5	6.71	5	8	8.77	8	29	3.65
	3	4	21	2.44	8	14	8.02	8	13	8.26	1	1	13.20	6	9	8.60	5	21	3.61
	4	3	10	4.52	8	14	8.05	3	6	8.08	3	5	10.09	5	9	8.64	3	11	3.90
	5	3	14	3.33	8	14	8.17	1	4	5.53	3	4	10.18	8	11	9.32	3	13	3.57
	6	3	13	3.69	5	10	7.08	3	8	5.80	8	20	5.47	8	11	10.14	3	12	3.76
	7	3	1	56.27	6	10	8.13	3	6	8.31	3	4	9.43	8	10	10.38	3	12	3.56
	8	3	13	3.71	8	12	9.14	8	12	9.32	2	3	10.04	5	9	8.37	2	5	5.75
	9	1	4	3.92	8	13	8.74	5	8	8.56	2	3	8.60	5	8	9.06	3	12	3.75
	Avg.			3.81			8.67			8.73			9.36			9.27			4.35

Table B-171. 3rd 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	145	0.98	12	181	0.91	12	55	3.04	12	66	2.54	12	58	2.84	12	526	0.33
	2	4	15	3.32	13	24	7.58	5	11	6.19	3	7	5.15	5	11	6.27	5	15	4.62
	3	2	1	62.66	8	14	7.69	3	7	7.02	1	3	6.97	3	2	24.93	4	15	3.42
	4	4	14	3.87	8	15	7.77	5	10	7.27	0	0	25.45	5	10	6.32	4	8	7.64
	5	4	1	63.03	5	11	6.30	8	14	7.88	2	3	7.97	13	18	9.44	6	14	5.40
	6	6	0	226.26	5	11	6.50	8	14	7.90	3	4	12.60	13	19	9.15	3	10	4.82
	7	4	14	3.64	3	7	5.93	8	13	7.86	3	6	6.94	2	4	8.48	3	4	8.90
	8	5	18	4.11	3	8	5.82	7	10	10.06	2	3	8.59	5	10	6.93	3	9	5.11
	9	3	14	3.56	3	9	5.63	5	10	7.75	5	10	7.02	5	9	7.00	5	13	5.73
	Avg.			3.77			5.79			8.55			7.52			6.73			5.42
P2	1	11	116	1.36	13	32	5.67	13	55	3.20	12	56	2.96	12	50	3.38	12	143	1.20
	2	8	20	5.16	8	11	9.75	7	14	7.17	12	22	7.67	2	4	5.96	8	34	3.12
	3	6	12	6.26	8	11	10.55	6	10	7.62	8	14	7.77	12	20	8.33	5	22	2.88
	4	5	12	6.18	6	8	9.92	3	5	8.04	8	14	7.78	8	14	7.75	2	4	5.54
	5	6	12	6.68	4	8	6.00	2	3	10.95	5	12	5.58	8	13	8.22	0	0	20.36
	6	6	8	11.03	13	15	12.11	8	27	4.19	12	1	154.54	5	9	7.83	13	29	6.03
	7	8	15	7.43	5	8	9.81	5	9	8.15	5	9	7.24	5	8	8.20	63	20	43.84
	8	5	11	6.93	5	8	9.55	6	7	12.05	3	9	5.31	12	16	10.70	3	10	4.38
	9	6	11	7.09	3	5	9.14	5	9	7.87	8	13	8.41	7	11	8.78	3	5	8.55
	Avg.			7.15			9.50			8.01			6.99			9.27			4.38

Table B-172. 3rd 8" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	25	2.60	12	565	0.29	12	74	2.32	12	83	2.05	12	68	2.47	8	27	4.16
	2	8	37	2.90	8	18	6.41	8	18	5.97	5	15	4.22	5	7	9.90	8	25	4.54
	3	8	32	3.29	9	17	7.31	5	13	5.71	5	15	4.89	5	13	5.83	8	26	4.52
	4	5	21	3.42	6	12	6.45	5	12	6.12	5	15	5.09	2	3	9.58	5	18	4.14
	5	1	4	4.32	3	9	5.34	8	16	6.98	5	14	5.23	5	7	10.36	5	19	3.94
	6	13	35	4.98	6	11	7.17	8	15	7.23	5	13	4.94	5	12	5.71	5	17	4.25
	7	8	27	4.03	6	10	8.08	8	0	392.72	3	8	4.80	5	11	6.62	5	18	3.98
	8	3	15	3.21	4	8	6.66	5	12	6.41	6	0	417.45	5	11	6.14	8	25	4.57
	9	8	27	3.94	1	3	7.07	5	11	6.63	5	12	5.88	3	8	6.04	8	25	4.47
	Avg.			3.73			7.27			6.52			5.34			6.27			4.34
P2	1	10	446	0.30	12	29	5.89	12	133	1.26	12	71	2.40	13	85	2.06	13	1173	0.16
	2	7	41	2.42	8	19	5.91	8	24	4.64	8	19	5.35	5	10	6.73	6	20	3.76
	3	5	19	3.57	8	17	6.38	5	14	4.67	8	18	6.09	2	4	8.01	3	13	3.58
	4	8	26	4.07	8	18	6.64	2	4	7.27	5	12	5.98	12	19	9.12	3	3	14.76
	5	8	26	3.98	8	16	6.52	3	10	4.91	2	3	8.73	5	9	7.40	3	14	3.18
	6	8	23	4.58	9	4	30.55	4	9	5.44	3	6	7.07	3	7	6.73	8	23	4.90
	7	4	16	3.57	8	17	6.54	14	22	8.78	3	6	6.45	1	1	6.79	6	18	4.31
	8	3	8	5.33	8	16	6.85	8	19	5.79	8	16	6.69	14	17	11.12	6	17	4.57
	9	12	29	5.65	13	21	8.29	8	18	6.27	5	11	6.30	13	17	10.23	8	23	5.09
	Avg.			4.85			7.23			6.95			6.48			10.67			4.66

Table B-173. 1st 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	390	0.34	11	210	0.70	12	110	1.49	13	116	1.50	13	32	5.71	5	10	6.19	8	24	4.46
	2	8	33	2.41	9	55	2.22	10	21	6.15	8	16	6.63	13	24	7.34	5	10	6.83	7	20	4.50
	3	8	32	2.71	13	61	2.93	7	15	6.74	6	12	6.88	13	22	8.13	5	9	7.40	8	25	4.29
	4	6	24	2.69	13	52	3.43	6	11	7.92	5	10	6.72	13	21	8.71	5	8	8.29	6	19	4.67
	5	5	20	2.57	10	40	3.48	3	10	4.99	4	7	7.19	13	19	9.38	4	9	6.57	8	17	6.87
	6	4	18	2.50	10	38	3.60	5	9	7.78	5	9	7.21	13	19	9.59	7	11	8.24	7	18	5.10
	7	5	18	2.61	13	43	4.30	6	0	231.92	6	10	8.58	13	18	10.03	5	9	8.45	7	17	5.54
	8	3	19	1.79	13	39	4.76	6	10	8.52	6	10	8.07	13	18	9.87	5	8	8.33	5	14	5.03
	9	8	30	2.84	13	41	4.45	6	10	8.52	5	9	7.76	13	17	10.60	7	0	229.09	7	18	5.41
	Avg.			2.41			4.50			8.52			8.14			10.17			8.39			5.33
P2	1	12	141	0.91	11	447	0.33	12	104	1.60	13	36	5.03	13	35	5.19	13	33	5.52	13	425	0.42
	2	10	47	2.18	12	92	1.88	10	21	6.19	13	29	6.15	13	28	6.75	13	26	7.13	10	36	3.89
	3	7	35	2.18	13	67	2.63	9	20	6.51	10	20	7.01	13	25	7.35	10	21	6.71	8	27	4.13
	4	4	23	2.00	13	59	3.08	13	16	10.90	13	24	7.52	13	24	7.83	10	22	6.51	8	25	4.43
	5	2	10	2.50	10	51	2.76	6	11	7.56	13	23	7.65	10	20	6.85	10	19	7.23	10	29	4.84
	6	13	44	3.10	13	48	3.74	3	6	7.14	13	23	7.52	8	15	7.66	13	21	8.68	8	24	4.61
	7	4	119	0.39	10	44	3.10	2	2	9.18	13	20	8.93	5	13	5.40	10	19	7.64	13	20	9.34
	8	10	36	2.79	6	27	3.26	1	1	10.72	13	1	144.77	8	15	7.29	10	18	8.07	4	16	3.56
	9	6	25	2.43	5	20	3.39	12	21	7.59	10	17	8.05	7	13	7.14	11	18	8.11	6	15	4.95
	Avg.			2.61			3.25			9.16			8.49			6.61			7.94			4.25
P3	1	9	71	1.35	7	47	1.96	12	111	1.51	12	109	1.53	8	17	6.85	10	29	4.72	12	125	1.35
	2	13	84	1.61	4	19	2.72	11	35	4.36	8	20	5.34	5	13	5.00	6	14	6.19	8	31	3.48
	3	9	70	1.40	4	19	2.80	13	32	5.64	4	11	5.72	13	34	5.35	5	11	6.23	5	22	3.22
	4	10	67	1.48	4	19	2.88	7	18	5.60	2	4	7.73	10	26	5.40	7	13	7.03	10	33	4.30
	5	10	2	49.20	8	20	5.28	6	1	168.39	2	4	7.68	13	32	5.75	6	13	6.63	10	31	4.50
	6	7	53	1.44	4	19	3.10	4	11	5.44	2	4	8.01	8	18	5.99	6	12	7.27	18	24	10.72
	7	7	51	1.47	6	27	3.16	6	14	6.22	3	7	6.86	6	15	5.89	8	16	7.07	13	35	5.33
	8	8	51	1.53	6	26	3.21	9	14	9.59	3	7	6.50	6	14	6.10	5	10	6.61	13	34	5.34
	9	6	39	1.48	6	26	3.17	6	13	6.31	9	20	6.49	6	13	6.32	5	10	6.84	13	35	5.28
	Avg.			1.49			3.18			7.37			6.62			6.11			6.84			5.32

Table B-174. 1st 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	119	1.11	4	42	1.37	12	258	0.64	5	25	2.86	12	85	1.95	9	50	2.48	11	856	0.18
	2	9	76	1.24	3	28	1.41	4	34	1.52	8	1	117.31	4	18	2.73	7	33	2.92	11	129	1.14
	3	9	73	1.33	5	42	1.57	3	21	2.21	5	24	3.06	5	25	2.91	4	17	3.23	14	129	1.49
	4	9	70	1.37	5	41	1.76	4	14	3.75	4	17	3.24	6	26	3.15	6	25	3.15	3	56	0.75
	5	9	23	4.32	7	55	1.74	7	41	2.37	4	17	3.10	4	18	2.74	9	39	3.37	13	112	1.56
	6	10	66	1.51	7	54	1.78	7	41	2.37	4	17	3.23	4	19	2.79	7	30	3.33	2	28	0.87
	7	9	69	1.41	5	40	1.77	7	40	2.41	4	17	3.31	2	10	3.04	6	21	3.97	12	112	1.50
	8	8	57	1.38	7	53	1.94	5	30	2.37	6	22	3.50	4	19	2.79	4	17	3.40	12	111	1.49
	9	14	75	1.89	9	66	1.93	5	30	2.40	5	22	3.42	2	10	2.98	2	12	2.62	6	98	0.79
	Avg.			1.56			1.88			2.39			3.41			2.94			3.33			1.26
P2	1	3	71	0.40	10	217	0.65	1	371	0.02	2	16	1.71	12	110	1.54	11	489	0.32	11	153	0.99
	2	4	102	0.44	12	119	1.40	12	81	2.14	12	84	2.02	8	37	3.07	4	41	1.40	5	73	0.87
	3	12	122	1.05	4	46	1.18	12	80	2.16	4	43	1.39	8	37	3.03	4	41	1.38	2	27	0.80
	4	12	121	1.06	1	12	1.71	5	41	1.56	4	43	1.44	7	1	68.80	3	28	1.37	1	10	0.98
	5	8	110	0.73	12	90	1.81	3	28	1.43	2	17	1.63	6	28	2.84	2	16	1.71	2	14	2.21
	6	8	107	0.73	6	62	1.33	12	71	2.42	2	17	1.76	6	27	2.79	2	16	1.73	4	55	0.91
	7	5	83	0.60	3	28	1.35	9	65	1.84	1	8	1.66	6	27	2.82	5	41	1.56	4	53	0.95
	8	5	85	0.60	3	28	1.44	9	62	1.94	3	27	1.32	6	27	2.84	4	41	1.48	4	54	1.00
	9	12	116	1.10	2	16	1.61	5	38	1.74	4	40	1.49	3	21	2.15	7	55	1.65	4	55	0.98
	Avg.			0.76			1.47			1.84			1.49			2.60			1.56			0.98
P3	1	9	81	1.10	4	46	1.26	7	47	1.90	12	138	1.16	12	113	1.42	7	49	1.97	12	310	0.52
	2	5	47	1.14	3	28	1.44	4	33	1.87	9	55	2.35	5	29	2.45	5	36	1.92	4	39	1.60
	3	5	46	1.04	5	44	1.49	5	32	2.22	7	41	2.36	3	18	2.30	3	24	2.03	13	78	2.30
	4	4	35	1.16	6	0	695.75	5	32	2.16	12	54	3.21	4	3	19.64	4	24	2.07	7	56	1.65
	5	4	33	1.15	6	42	1.81	5	31	2.27	13	51	3.44	12	48	3.36	5	34	2.18	2	14	2.01
	6	3	21	1.35	4	29	1.73	5	30	2.30	13	51	3.49	3	17	2.47	3	119	0.41	3	27	1.73
	7	3	23	1.19	5	41	1.80	7	41	2.32	12	49	3.53	5	27	2.75	3	14	2.57	2	16	2.08
	8	4	37	1.02	5	40	1.78	7	39	2.39	12	47	3.63	2	9	3.18	2	13	2.39	2	15	2.21
	9	7	4	18.18	5	39	1.93	7	36	2.54	12	47	3.61	3	16	2.84	4	2	30.30	1	6	3.12
	Avg.			1.11			1.84			2.42			3.59			2.92			2.48			2.47

Table B-175. 1st 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	109	1.21	7	40	2.42	8	30	3.56	12	224	0.73	12	615	0.27	4	13	4.75	9	72	1.69
	2	6	1	84.40	4	19	3.16	7	28	3.63	10	40	3.34	8	29	3.73	6	17	4.84	9	61	2.05
	3	5	19	2.49	3	14	3.22	6	18	4.55	13	40	4.51	6	20	4.30	6	17	4.59	10	58	2.28
	4	2	8	3.11	5	18	3.62	13	43	4.23	13	39	4.69	5	14	4.50	8	22	4.78	7	41	2.41
	5	13	48	2.84	4	12	4.04	8	24	4.33	13	36	4.94	5	14	4.46	8	22	4.75	7	39	2.47
	6	8	28	2.89	4	53	1.06	6	18	4.76	13	36	5.01	4	13	4.67	10	27	4.89	7	36	2.70
	7	6	22	2.92	5	17	3.79	4	13	4.70	13	34	5.24	6	18	4.92	8	20	5.27	6	28	2.77
	8	5	18	2.75	6	23	3.83	6	17	4.82	13	34	5.14	6	17	5.14	6	15	5.72	5	27	2.74
	9	3	13	2.76	6	22	3.93	7	0	572.72	8	23	4.86	6	17	5.01	6	0	185.12	5	28	2.67
	Avg.			2.81			3.85			4.76			5.08			5.02			5.49			2.73
P2	1	13	192	0.73	10	63	2.09	8	33	3.14	10	51	2.62	12	206	0.79	12	119	1.38	9	65	1.85
	2	10	51	1.96	8	41	2.64	4	17	3.47	15	47	4.48	6	28	2.77	6	28	2.82	5	29	2.40
	3	10	47	2.31	6	30	2.90	8	30	3.52	12	28	6.23	4	19	2.99	4	19	2.99	6	29	2.62
	4	10	46	2.25	4	23	2.46	6	23	3.54	8	36	2.99	3	13	3.36	3	13	3.25	11	30	5.10
	5	8	38	2.22	7	28	3.20	4	16	4.00	6	26	3.05	2	7	4.65	1	4	4.85	5	1	49.53
	6	8	37	2.34	6	28	3.15	4	15	3.79	6	26	3.28	13	42	4.44	3	12	3.22	4	16	3.36
	7	7	31	2.19	7	12	7.97	4	15	4.00	10	38	3.49	6	24	3.35	10	41	3.25	3	15	2.73
	8	5	24	2.00	8	34	3.24	4	15	3.82	13	38	4.65	6	23	3.47	6	24	3.54	2	11	2.99
	9	5	26	1.94	6	28	3.19	6	21	3.82	13	39	4.56	6	23	3.46	4	19	3.20	6	13	6.67
	Avg.			2.05			3.22			3.88			4.23			3.43			3.33			2.86
P3	1	13	46	3.01	13	75	2.34	7	32	3.17	9	41	3.10	7	39	2.55	10	38	3.56	10	60	2.20
	2	8	30	2.73	9	51	2.53	6	22	3.72	6	19	4.12	6	18	4.42	7	24	4.17	10	56	2.34
	3	8	30	2.78	6	33	2.52	6	20	4.08	6	18	4.68	8	14	7.42	6	18	4.40	7	43	2.36
	4	10	34	3.12	6	26	3.13	4	15	4.06	4	13	4.70	4	14	4.59	8	21	4.92	7	41	2.43
	5	14	41	3.46	4	19	2.92	6	19	4.27	3	9	4.77	4	13	4.75	10	29	4.81	7	40	2.49
	6	13	41	3.36	3	14	3.20	8	25	4.42	5	13	4.83	4	13	4.90	8	22	4.83	7	39	2.64
	7	14	40	3.50	6	27	2.87	6	19	4.39	3	10	4.82	5	13	4.97	10	28	4.90	10	50	2.71
	8	10	33	3.17	4	20	3.07	6	18	4.80	3	10	4.74	5	13	5.00	8	20	5.13	12	55	3.16
	9	6	24	2.74	7	30	3.37	6	19	4.66	3	9	5.36	6	16	5.53	6	16	5.30	13	57	3.06
	Avg.			3.14			3.10			4.61			4.97			5.17			5.11			2.98

Table B-176. 1st 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	64	1.45	5	91	0.77	13	45	3.98	12	113	1.48	12	114	1.51	7	38	2.61	9	70	1.75
	2	6	43	1.32	13	80	2.24	10	41	3.29	7	38	2.52	9	48	2.71	8	36	2.93	13	73	2.43
	3	5	30	1.61	13	73	2.45	8	31	3.33	11	26	5.56	4	18	3.11	7	35	2.90	7	45	2.18
	4	3	19	1.47	9	64	2.04	8	32	3.34	7	35	2.75	4	19	3.07	7	34	2.91	4	23	2.33
	5	2	11	1.77	8	46	2.25	8	31	3.57	4	26	2.22	5	15	4.43	6	24	3.13	3	16	2.93
	6	1	5	1.83	8	48	2.19	8	29	3.67	5	26	2.88	7	18	5.53	4	20	3.13	2	8	3.98
	7	1	4	2.34	8	47	2.22	7	30	3.01	4	19	3.03	4	18	3.14	6	25	3.18	3	14	2.92
	8	3	22	1.39	9	46	2.81	8	29	3.61	4	19	3.19	6	24	3.32	13	40	4.41	13	60	2.99
	9	5	1	52.32	6	34	2.46	6	22	3.75	3	19	2.17	4	18	3.07	13	39	4.48	8	40	2.68
	Avg.			1.86			2.50			3.45			2.80			3.18			4.02			2.87
P2	1	14	68	2.10	5	0	171.24	10	37	3.66	12	113	1.44	7	27	3.51	12	120	1.35	12	118	1.45
	2	8	42	1.96	2	7	3.94	6	20	4.08	9	51	2.54	5	67	0.98	13	49	3.75	9	11	11.29
	3	8	42	1.99	3	14	2.76	4	14	4.20	7	38	2.70	4	17	3.47	10	44	3.08	5	29	2.36
	4	6	33	2.01	3	14	2.80	3	10	4.55	6	26	3.23	4	15	3.82	7	28	3.63	3	28	1.60
	5	8	40	2.05	3	14	2.85	4	14	4.31	13	44	4.11	3	10	4.26	8	28	3.72	3	14	2.91
	6	8	40	2.11	2	7	4.47	10	29	4.58	13	43	4.23	4	15	3.82	6	21	3.86	4	20	2.51
	7	8	40	2.13	5	24	2.65	6	18	4.63	10	42	3.33	4	14	4.06	7	27	3.78	3	21	2.33
	8	6	32	2.01	4	23	2.60	6	18	4.44	8	34	3.08	4	15	3.85	7	28	3.71	3	19	2.47
	9	5	26	1.91	6	30	2.74	8	23	4.50	6	18	4.74	6	1	95.18	8	27	3.93	3	19	2.38
	Avg.			2.02			2.66			4.52			3.72			3.96			3.81			2.39

Table B-177. 1st 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	53	2.62	5	33	2.10	13	10	17.30	7	22	4.68	13	715	0.26	10	32	4.32	13	261	0.68
	2	10	4	25.82	3	17	2.54	10	31	4.50	6	16	5.22	8	24	4.40	7	18	5.14	5	46	1.47
	3	10	35	2.95	2	9	3.42	8	22	4.92	8	21	5.16	8	23	4.65	7	17	5.33	3	33	1.35
	4	8	30	2.77	3	16	2.67	8	22	5.01	8	20	5.22	7	18	4.98	8	0	356.36	1	5	2.99
	5	7	26	2.57	5	23	2.78	6	16	5.26	8	20	5.37	8	22	4.92	5	13	5.19	13	92	2.01
	6	5	20	2.44	8	41	2.68	6	16	5.33	10	14	9.95	8	22	4.92	13	29	6.13	7	42	2.29
	7	5	20	2.61	8	40	2.75	6	16	5.38	8	20	5.42	8	22	4.91	8	20	5.43	4	22	2.35
	8	3	16	1.72	8	38	2.96	8	20	5.21	8	19	5.49	10	27	4.97	6	16	5.41	6	31	2.48
	9	3	14	2.55	8	38	2.84	8	20	5.40	8	19	5.60	8	21	4.99	5	12	5.43	5	33	2.03
	Avg.			2.29			2.85			5.33			5.50			4.95			5.42			2.29
P2	1	13	73	1.85	5	40	1.86	12	114	1.48	12	605	0.28	6	28	2.79	10	44	3.01	12	107	1.55
	2	8	33	2.48	3	20	2.08	10	41	3.23	10	41	3.19	4	21	2.53	8	33	3.12	7	34	2.98
	3	6	26	2.57	4	30	2.01	6	21	3.79	10	38	3.49	6	21	3.97	6	25	3.14	7	34	2.99
	4	6	27	2.41	4	36	1.60	3	9	4.51	13	39	4.61	6	20	4.11	6	19	4.36	8	33	3.20
	5	7	22	3.07	8	46	2.31	2	5	5.53	13	38	4.73	8	15	7.53	6	24	3.37	8	31	3.44
	6	5	22	2.35	8	46	2.38	13	36	4.94	10	34	3.91	6	20	4.08	8	28	3.75	8	31	3.54
	7	5	21	2.41	8	44	2.44	6	20	4.10	13	38	4.54	6	19	4.50	6	24	3.56	8	31	3.52
	8	6	26	2.45	10	55	2.53	6	19	4.04	10	32	4.13	3	15	3.04	6	23	3.48	10	38	3.66
	9	7	26	2.61	8	44	2.48	4	19	2.99	10	35	3.75	4	14	4.22	6	23	3.56	10	39	3.58
	Avg.			2.49			2.48			3.71			4.14			3.92			3.53			3.59

Table B-178. 2nd 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	85	1.96	13	23	7.73	12	580	0.28	13	35	5.01	12	117	1.42	13	566	0.32
	2	12	50	3.44	10	17	7.87	5	10	6.59	4	14	4.48	13	37	4.95	10	33	3.98
	3	13	40	4.46	6	1	160.00	5	0	183.27	5	11	6.29	8	20	5.54	7	23	4.42
	4	13	35	5.10	4	8	7.27	13	22	8.25	8	16	7.07	7	14	6.24	8	0	449.69
	5	13	32	5.64	4	8	7.56	10	18	7.88	7	13	7.16	8	17	6.42	8	23	4.76
	6	13	29	6.00	4	8	7.49	8	13	8.08	6	11	7.90	8	17	6.67	8	22	4.73
	7	13	27	6.46	3	5	8.74	8	13	7.89	5	10	7.50	13	22	8.29	17	22	10.71
	8	13	25	7.12	4	8	7.87	6	11	8.01	4	7	6.92	13	22	8.41	6	22	3.96
	9	13	25	7.00	4	7	8.07	5	8	7.58	5	10	7.21	13	21	8.79	6	18	4.97
	Avg.			6.86			8.23			7.82			7.21			8.50			4.46
P2	1	10	773	0.18	12	105	1.63	12	83	2.03	10	22	6.16	12	247	0.69	13	314	0.59
	2	7	33	2.90	7	14	7.23	6	14	6.13	7	13	7.07	6	14	6.40	10	36	3.83
	3	8	32	3.30	2	6	5.66	5	10	6.36	4	7	6.81	4	9	6.33	8	27	4.22
	4	10	36	3.74	2	3	9.26	4	8	6.36	2	4	7.83	6	0	248.18	8	24	4.78
	5	10	33	4.09	2	3	9.70	4	7	6.77	4	4	14.25	8	16	7.01	7	19	4.73
	6	10	32	4.43	4	8	7.74	6	12	7.08	3	4	9.13	7	12	7.61	8	23	4.88
	7	10	30	4.76	4	8	7.31	3	7	6.86	2	3	9.73	9	10	12.12	8	22	5.21
	8	10	29	4.75	3	5	8.74	3	7	5.72	2	4	6.72	7	12	8.00	7	18	4.97
	9	10	29	4.98	3	5	8.84	3	6	8.20	3	6	8.26	6	11	8.15	7	18	5.28
	Avg.			4.83			8.29			6.93			8.24			8.07			5.15
P3	1	51	59	12.00	13	30	5.97	12	112	1.45	12	87	1.95	13	32	5.78	14	59	3.21
	2	9	44	2.77	7	15	6.90	5	12	5.22	6	12	6.82	10	22	6.26	10	35	3.99
	3	12	0	480.80	4	9	7.04	3	8	5.83	5	9	6.84	8	16	6.96	13	43	4.38
	4	13	43	4.10	3	5	8.16	3	4	8.04	4	6	8.60	7	12	7.41	6	31	2.43
	5	13	38	4.59	2	3	9.70	6	13	6.46	5	9	7.11	5	10	7.19	13	424	0.44
	6	12	35	4.96	2	3	10.06	2	10	2.20	4	8	7.34	5	10	7.54	10	29	4.97
	7	13	34	5.19	3	5	8.10	5	10	6.34	2	3	9.83	5	10	7.54	8	22	5.28
	8	13	31	5.64	4	8	7.34	5	10	6.61	2	3	9.47	5	10	6.94	7	19	4.76
	9	12	29	6.01	4	8	7.56	5	10	6.80	3	3	11.25	7	11	8.04	7	19	4.79
	Avg.			5.61			7.67			6.58			10.18			7.51			4.94

Table B-179. 2nd 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	33	2.16	7	23	4.30	12	291	0.59	12	118	1.45	13	271	0.64	9	794	0.16
	2	4	19	3.32	4	12	4.82	6	16	5.16	4	18	3.11	10	34	4.06	7	31	3.32
	3	4	1	67.11	2	4	7.54	3	8	6.00	3	8	5.91	8	24	4.54	10	39	3.46
	4	2	5	5.56	2	4	7.54	5	11	5.79	5	12	6.09	8	23	4.75	8	30	3.58
	5	2	5	6.11	3	8	5.49	5	12	5.71	4	9	5.37	4	18	3.29	14	24	7.88
	6	3	13	3.03	3	8	5.31	4	11	5.60	4	0	218.18	2	9	3.86	5	20	3.39
	7	4	11	4.42	6	15	5.34	5	11	5.99	3	5	6.96	6	16	5.24	6	23	3.67
	8	13	36	5.02	4	11	5.82	5	10	6.22	3	5	9.40	6	23	3.26	6	23	3.79
	9	10	34	4.11	4	12	4.86	4	8	6.03	3	5	7.16	10	25	5.77	5	27	2.70
	Avg.			4.52			5.34			6.08			7.84			4.76			3.39
P2	1	10	196	0.71	12	379	0.45	13	117	1.50	12	115	1.50	13	110	1.63	9	53	2.45
	2	3	23	1.98	6	20	3.96	6	15	5.90	8	20	5.22	8	21	5.45	11	31	5.10
	3	4	61	0.85	4	14	4.29	5	12	5.88	10	24	5.68	7	15	6.06	5	24	2.81
	4	2	9	3.20	3	9	4.75	4	9	6.07	6	14	6.01	5	11	6.46	6	0	243.23
	5	3	18	2.41	4	14	4.33	5	11	6.43	6	10	8.58	5	11	6.27	6	30	2.91
	6	4	24	2.34	4	14	4.18	4	8	6.36	7	14	6.53	6	11	7.22	6	29	3.08
	7	3	17	2.72	3	9	4.71	5	11	6.67	5	11	6.48	5	12	6.07	8	36	2.97
	8	4	24	2.49	4	14	4.40	4	7	7.27	3	8	6.33	5	11	6.52	8	35	3.13
	9	3	24	2.02	3	9	4.81	5	10	7.22	5	10	6.70	7	12	7.92	8	34	3.35
	Avg.			2.41			4.64			7.05			6.50			6.84			3.15
P3	1	9	182	0.71	12	484	0.34	12	114	1.49	13	112	1.55	8	19	6.05	9	47	2.63
	2	5	26	2.75	6	15	5.25	6	14	5.86	7	14	6.56	8	18	6.53	8	33	3.25
	3	4	18	3.28	3	6	7.50	4	8	6.15	5	10	6.83	8	17	6.63	6	23	3.72
	4	3	12	3.75	3	7	6.40	4	8	6.03	4	8	6.98	8	16	7.20	8	29	3.65
	5	3	13	3.78	4	0	315.63	5	8	8.12	5	10	7.01	8	16	7.48	8	27	3.99
	6	8	29	3.86	2	4	8.76	4	5	10.97	5	9	7.81	7	12	7.88	5	17	4.01
	7	13	35	4.94	2	4	7.12	5	10	6.58	5	9	7.90	5	9	8.08	5	17	3.92
	8	13	36	4.85	3	6	7.94	3	7	6.64	7	12	7.62	5	9	7.93	6	21	4.13
	9	13	35	5.03	4	9	5.37	4	9	5.89	8	15	7.58	7	11	8.25	8	26	4.13
	Avg.			4.94			6.81			6.37			7.70			8.09			4.06

Table B-180. 2nd 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	55	3.22	12	106	1.58	12	115	1.45	5	1	108.60	10	28	4.91	12	555	0.31
	2	8	21	5.10	7	19	5.11	6	14	5.94	5	11	6.06	4	14	4.01	10	36	3.87
	3	6	16	5.60	4	11	5.18	5	11	5.97	5	0	313.93	6	14	6.49	10	31	4.59
	4	6	15	5.82	6	14	5.58	3	4	8.73	13	28	6.45	10	23	6.25	7	19	4.64
	5	5	12	6.17	4	11	5.37	3	7	7.02	8	18	6.07	7	14	6.73	7	20	4.80
	6	5	12	6.07	3	7	7.06	6	13	6.38	3	0	234.18	5	11	6.81	8	23	5.01
	7	4	8	6.39	3	7	5.62	4	12	4.90	6	14	6.36	5	11	6.98	9	23	5.33
	8	4	9	6.33	4	10	5.59	5	5	14.37	4	8	6.00	4	8	6.59	8	23	5.01
	9	7	13	7.21	4	10	5.84	7	14	7.17	5	11	6.06	4	8	6.58	7	18	5.15
	Avg.			6.64			5.68			6.04			6.14			6.72			5.16
P2	1	7	42	2.26	12	110	1.48	10	27	5.07	12	519	0.32	13	121	1.49	8	27	4.08
	2	9	56	2.21	4	9	5.96	6	14	5.95	6	17	4.97	10	24	6.06	8	26	4.37
	3	13	54	3.23	5	13	5.53	5	11	6.43	3	7	6.09	8	17	6.76	4	2	22.99
	4	9	56	2.20	13	30	6.10	3	8	6.33	6	15	5.55	8	16	7.05	8	25	4.68
	5	9	42	3.07	5	18	3.97	4	8	6.24	5	11	5.87	6	12	7.54	8	11	11.02
	6	13	46	3.95	7	17	6.00	5	10	6.34	6	0	189.75	5	9	7.60	8	25	4.63
	7	8	34	3.17	6	14	6.02	8	10	10.22	3	7	5.56	4	7	8.13	10	30	4.77
	8	6	25	3.47	4	10	5.72	5	10	6.83	5	11	6.01	4	7	7.43	8	24	4.93
	9	3	16	3.07	6	13	6.25	5	10	6.68	4	1	75.02	4	0	127.27	6	23	3.60
	Avg.			3.24			5.99			6.75			5.79			7.78			4.43
P3	1	8	47	2.35	10	24	5.59	13	126	1.39	13	182	1.00	13	111	1.61	9	36	3.42
	2	10	36	3.80	8	16	6.76	6	11	7.74	8	15	7.79	8	15	7.27	13	46	3.91
	3	13	38	4.76	5	9	7.37	5	8	8.32	7	11	8.98	7	10	9.60	13	548	0.34
	4	13	35	5.21	5	9	7.40	5	8	8.81	6	8	9.04	4	6	9.67	13	38	4.96
	5	13	32	5.83	4	9	7.21	5	8	8.94	5	8	8.94	4	6	7.76	14	39	4.84
	6	13	30	5.95	5	9	7.40	5	6	11.51	4	6	9.06	8	13	8.91	10	31	4.28
	7	13	27	6.74	6	11	7.92	4	6	8.21	5	0	254.54	5	8	8.57	7	27	3.76
	8	13	27	6.68	8	14	7.51	5	8	8.91	3	4	11.37	5	8	8.84	5	21	3.53
	9	13	27	7.01	8	13	7.98	6	9	9.12	3	4	11.31	6	1	94.54	5	19	3.73
	Avg.			6.81			7.80			8.75			11.34			8.70			3.67

Table B-181. 2nd 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	4	20	2.49	13	47	3.78	13	96	1.87	13	46	4.10	14	24	7.80	8	29	3.72
	2	6	30	2.64	5	3	25.09	7	14	6.58	10	21	6.79	8	14	7.88	6	23	3.90
	3	4	21	2.75	2	4	8.95	5	11	6.90	8	15	7.57	8	14	8.20	5	26	2.71
	4	5	14	4.76	6	13	6.32	5	10	7.13	7	12	7.48	8	13	8.36	10	31	4.42
	5	1	3	5.92	3	6	6.83	5	10	7.24	5	10	6.93	7	11	8.15	10	31	4.55
	6	1	2	5.27	2	3	9.36	5	9	7.61	4	7	7.00	5	9	7.93	8	24	4.76
	7	2	4	5.54	2	4	9.05	4	7	8.05	4	8	7.16	5	9	8.41	8	23	5.00
	8	3	14	3.34	2	3	10.06	4	7	8.23	4	8	6.67	5	1	108.18	8	1	107.47
	9	3	9	4.13	3	5	8.04	5	9	8.19	7	12	7.27	8	14	8.27	8	21	5.39
	Avg.			4.34			9.05			8.16			7.04			8.34			5.19
P2	1	11	87	1.70	13	46	3.89	13	66	2.63	14	69	2.72	14	1131	0.17	8	24	4.39
	2	13	67	2.61	10	17	8.25	7	12	7.41	8	15	7.54	11	23	6.31	8	22	4.81
	3	13	48	3.68	8	14	7.95	5	9	7.49	7	12	7.97	11	21	6.87	12	34	4.96
	4	13	42	4.22	5	9	7.54	4	7	7.77	7	11	8.27	14	26	7.44	9	28	4.43
	5	13	35	5.09	5	8	8.10	5	9	8.00	7	11	8.33	8	16	7.18	13	34	5.40
	6	12	185	0.90	3	5	9.11	7	10	9.58	5	9	8.04	7	1	135.76	13	32	5.71
	7	13	33	5.55	3	3	16.45	4	6	9.82	5	9	8.22	5	11	6.18	13	31	5.94
	8	13	31	5.88	3	5	8.79	6	0	386.90	4	7	7.81	3	3	15.27	14	25	7.58
	9	13	30	6.04	6	9	9.28	4	6	9.16	6	0	417.45	4	7	7.36	10	25	5.58
	Avg.			5.82			9.03			9.49			8.01			6.77			6.37

Table B-182. 2nd 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	6	27	2.82	13	135	1.30	13	581	0.32	13	103	1.76	13	1104	0.17	7	23	3.88
	2	5	20	3.19	5	10	6.15	6	16	5.57	8	18	6.02	8	16	6.80	5	15	4.54
	3	5	20	3.46	3	6	7.50	7	1	146.36	6	15	5.82	8	16	6.99	15	19	10.37
	4	5	18	3.69	2	3	9.95	5	12	6.08	3	9	5.29	4	11	5.31	7	19	4.93
	5	5	18	3.91	2	3	8.10	4	9	6.22	3	8	5.19	3	7	6.64	8	22	5.31
	6	5	16	4.23	3	4	9.38	4	8	6.27	9	11	11.59	5	11	6.06	7	18	5.34
	7	5	17	4.30	3	7	6.71	3	4	9.39	5	11	5.86	5	11	6.67	7	18	5.36
	8	5	17	4.22	5	9	7.24	4	8	5.92	4	0	123.03	5	10	6.96	4	17	3.58
	9	8	25	4.42	8	15	7.31	4	8	6.16	3	7	6.71	5	10	6.88	11	24	6.11
	Avg.			4.31			7.09			6.04			6.28			6.84			5.02
P2	1	7	33	3.06	13	751	0.24	13	102	1.81	13	132	1.42	13	145	1.28	8	29	3.80
	2	8	30	3.59	6	16	5.28	13	34	5.32	10	28	4.92	8	19	6.05	8	3	37.84
	3	13	40	4.47	8	19	5.67	6	18	5.01	8	21	5.28	7	13	6.82	5	0	1679.98
	4	10	34	4.10	6	14	6.09	5	14	4.79	8	20	5.66	5	11	6.36	7	22	4.37
	5	8	25	4.64	8	17	6.36	4	9	5.66	8	20	5.56	7	13	6.98	7	21	4.41
	6	8	24	4.68	8	17	6.59	3	9	4.26	7	15	5.98	5	10	6.72	7	21	4.61
	7	8	22	4.94	8	16	6.58	3	7	6.23	9	13	9.81	7	1	143.74	8	24	4.78
	8	4	18	3.14	6	14	6.36	4	10	5.07	5	12	5.44	7	12	7.86	9	24	5.05
	9	6	18	4.84	5	11	6.41	4	9	5.58	8	17	6.32	7	12	7.69	9	23	5.30
	Avg.			4.31			6.45			5.63			7.19			7.78			5.04

Table B-183. 3rd 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	98	1.77	12	382	0.43	12	105	1.61	13	79	2.22	14	27	6.87	9	40	3.22
	2	10	44	3.05	7	19	5.49	5	9	7.08	10	19	7.47	13	23	7.94	13	43	4.06
	3	8	29	3.81	6	13	6.58	4	7	7.36	8	14	7.84	13	21	9.05	6	21	4.00
	4	10	20	6.91	3	7	7.05	3	4	11.44	13	21	8.71	13	19	9.58	8	18	6.11
	5	7	19	4.65	3	9	4.91	3	4	10.07	13	21	8.68	13	18	10.31	6	22	3.82
	6	7	18	4.98	8	15	7.21	3	6	7.86	13	21	8.50	10	16	9.13	6	21	3.98
	7	4	15	3.63	8	0	458.18	3	6	7.59	13	17	10.60	11	15	9.53	8	25	4.33
	8	9	23	5.16	6	11	7.75	4	6	9.13	13	17	10.63	10	15	9.63	6	20	4.34
	9	8	23	5.14	8	14	7.67	6	10	8.55	12	17	9.93	13	16	11.16	6	20	3.96
	Avg.			4.64			7.71			8.42			10.39			10.11			4.21
P2	1	6	25	3.15	12	112	1.53	12	83	2.08	13	94	1.87	13	82	2.23	6	32	2.54
	2	4	19	2.68	9	24	5.40	6	0	746.66	10	21	6.44	13	25	7.43	4	19	3.32
	3	4	13	4.26	9	0	3156.32	3	7	7.15	10	19	7.27	13	24	7.90	2	5	6.42
	4	9	14	8.37	10	21	6.38	1	1	9.90	13	22	8.56	13	19	9.60	1	2	4.74
	5	7	20	4.62	8	15	6.90	13	18	9.85	13	22	8.21	9	15	8.69	12	576	0.30
	6	8	24	4.74	8	15	7.04	6	10	8.65	8	14	7.65	8	11	9.60	11	28	5.49
	7	10	27	5.25	8	14	7.61	3	6	8.31	13	20	9.07	6	9	9.74	6	21	3.75
	8	9	23	5.18	7	14	7.36	6	10	8.32	9	17	7.70	8	11	9.71	6	23	3.51
	9	8	22	5.22	8	14	7.82	13	17	10.42	6	11	7.45	4	7	9.07	8	25	4.39
	Avg.			5.21			7.59			9.01			8.07			9.50			3.89
P3	1	10	51	2.65	12	100	1.71	13	91	1.94	12	104	1.64	13	24	7.68	8	563	0.19
	2	10	39	3.56	8	20	5.13	8	18	6.06	10	23	5.76	10	18	7.80	9	46	2.67
	3	8	26	4.43	4	11	5.68	5	10	6.22	13	27	6.82	10	17	8.06	12	515	0.32
	4	9	25	4.81	3	7	6.12	5	10	6.81	13	26	6.90	10	16	8.67	8	40	2.78
	5	7	19	5.14	2	4	8.92	5	10	6.73	13	22	8.59	13	17	10.55	12	42	4.10
	6	8	22	5.21	5	10	6.80	16	15	14.86	10	19	7.32	13	17	10.34	13	33	5.25
	7	10	26	5.53	6	12	7.08	8	15	7.35	8	14	7.72	13	17	10.72	13	85	2.15
	8	11	26	5.69	6	11	6.97	8	15	7.55	8	14	8.10	13	17	11.19	9	29	4.39
	9	10	25	5.69	4	9	6.83	6	12	7.35	8	14	8.00	9	15	8.48	9	29	4.52
	Avg.			5.64			6.96			7.41			7.94			10.13			3.68

Table B-184. 3rd 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	79	2.27	11	145	1.09	13	104	1.68	13	935	0.19	12	68	2.48	6	19	4.04
	2	8	29	3.86	6	23	3.32	13	37	4.94	13	34	5.37	10	25	5.47	10	29	4.64
	3	8	27	4.09	3	11	3.92	10	29	4.72	10	23	6.07	6	14	6.35	9	30	4.25
	4	7	21	4.44	2	5	5.61	8	21	5.14	6	14	6.53	6	13	6.85	10	30	4.42
	5	7	19	4.75	2	5	5.70	8	21	5.42	7	15	6.64	8	15	7.44	9	29	4.45
	6	10	16	8.94	2	10	3.23	8	20	5.45	5	9	6.99	7	11	8.04	9	29	4.44
	7	6	14	5.69	4	13	4.17	8	20	5.47	6	12	7.13	6	11	7.62	10	30	4.60
	8	6	13	5.97	4	9	6.69	8	20	5.74	5	10	6.92	6	11	7.68	10	26	5.20
	9	7	16	5.98	3	9	5.24	8	19	5.85	6	11	7.92	6	11	7.89	13	31	5.91
	Avg.			5.88			5.37			5.69			7.32			7.73			5.24
P2	1	10	157	0.89	12	112	1.48	13	110	1.58	12	113	1.51	13	89	2.00	12	569	0.30
	2	9	62	2.09	8	21	5.01	6	13	6.29	6	16	5.19	19	14	18.51	1	4	2.85
	3	8	33	3.21	6	16	5.56	5	10	6.58	6	15	5.73	6	10	8.26	13	64	2.76
	4	8	32	3.53	5	12	5.91	3	4	8.64	6	14	6.01	10	16	8.57	4	24	2.27
	5	7	24	3.81	12	14	12.15	2	0	84.85	6	14	6.06	8	12	8.83	13	589	0.30
	6	7	23	4.25	6	13	6.42	0	1	11.75	8	18	6.28	7	9	9.51	9	40	3.11
	7	7	22	4.23	8	16	6.46	13	20	9.32	8	17	6.41	5	8	8.92	6	27	3.15
	8	7	21	4.55	8	16	6.54	10	16	8.85	8	17	6.41	5	8	8.53	5	2	35.41
	9	5	16	4.52	6	12	6.51	10	16	8.26	6	16	4.80	6	9	9.86	5	22	3.36
	Avg.			4.43			6.50			8.81			5.87			9.10			3.26
P3	1	7	35	2.59	12	113	1.41	10	25	5.53	12	105	1.65	13	107	1.63	9	33	3.89
	2	6	23	3.43	4	10	5.55	10	22	6.17	13	41	4.32	8	3	38.72	10	30	4.50
	3	13	48	3.70	4	10	6.47	10	21	6.57	10	20	6.79	5	9	7.60	8	28	3.83
	4	10	35	3.81	8	10	11.61	10	20	6.79	4	11	5.27	6	11	8.11	8	21	5.45
	5	7	2	46.75	5	9	7.18	10	19	7.13	10	18	7.60	6	10	8.16	10	27	5.05
	6	13	39	4.72	3	7	7.02	10	18	7.71	8	14	7.95	8	13	8.59	8	20	5.42
	7	13	36	5.17	3	7	6.93	10	18	8.09	6	11	8.09	8	12	8.87	8	18	5.86
	8	10	31	4.33	4	7	7.40	8	14	7.57	6	10	8.26	8	12	9.13	10	25	5.63
	9	8	24	4.42	5	6	10.75	10	17	8.25	5	9	7.85	8	12	9.52	10	23	6.07
	Avg.			4.64			8.36			7.97			8.07			9.17			5.86

Table B-185. 3rd 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	205	0.69	13	94	1.90	13	24	7.55	13	598	0.30	13	91	2.02	13	81	2.28
	2	4	19	2.67	5	13	5.35	8	9	11.93	7	13	7.84	8	13	8.75	13	857	0.20
	3	5	21	3.03	5	10	6.54	5	8	8.27	6	9	9.02	4	7	8.72	13	33	5.50
	4	5	22	3.20	4	10	6.34	2	3	11.39	6	9	9.19	8	12	9.52	13	1110	0.16
	5	5	21	3.50	5	9	7.00	3	0	122.18	13	18	10.48	6	9	9.41	13	51	3.55
	6	5	20	3.66	7	0	208.26	2	2	11.03	13	18	10.16	8	11	9.79	8	22	4.65
	7	6	21	3.68	5	9	7.09	13	16	11.30	8	11	9.59	10	14	9.94	7	23	4.40
	8	5	19	3.90	3	7	7.06	8	11	9.72	4	7	8.67	8	11	10.18	5	18	3.97
	9	7	23	3.95	3	7	6.90	7	9	9.92	2	2	15.37	4	6	9.86	6	18	4.34
	Avg.			3.84			7.02			10.31			9.13			10.00			4.24
P2	1	5	23	2.89	13	539	0.33	13	54	3.36	13	104	1.70	13	112	1.61	13	167	1.04
	2	3	13	3.44	6	12	6.81	8	14	7.61	9	9	12.94	8	12	8.97	9	33	3.97
	3	10	45	2.96	3	6	6.83	8	14	7.99	4	7	8.92	6	9	9.08	10	30	4.61
	4	8	31	3.53	2	3	10.86	6	10	8.45	3	4	9.55	4	8	6.59	10	29	4.99
	5	7	23	3.89	3	6	7.18	6	10	8.45	2	2	11.20	4	7	8.78	8	23	5.07
	6	6	22	3.98	5	9	7.64	8	12	8.82	2	2	13.17	6	9	10.00	8	23	5.12
	7	7	22	4.11	6	11	8.02	8	11	9.41	2	2	15.18	6	8	10.42	8	23	4.98
	8	8	25	4.55	6	11	7.68	8	12	8.90	3	4	10.09	8	10	10.33	8	22	5.22
	9	8	27	4.22	8	13	8.23	13	19	9.88	1	2	11.75	13	14	12.73	10	26	5.56
	Avg.			4.29			7.98			9.40			10.92			11.16			5.25
P3	1	10	49	2.70	7	17	5.78	6	11	6.97	13	105	1.75	10	16	8.59	8	21	5.15
	2	8	30	3.75	4	9	6.42	3	7	6.47	8	12	8.51	7	11	9.65	7	18	5.01
	3	8	26	4.20	4	8	6.93	2	3	9.58	6	9	9.30	6	8	9.98	6	16	5.18
	4	8	25	4.61	3	6	7.27	3	3	10.66	4	7	8.87	6	8	10.58	8	20	5.92
	5	8	24	4.63	7	12	7.86	2	3	12.73	3	5	8.94	10	12	11.05	8	20	5.76
	6	8	23	4.90	4	8	7.71	2	2	12.73	5	5	14.07	13	15	12.11	7	16	5.87
	7	8	23	4.94	2	0	89.09	1	1	12.29	5	7	9.53	8	9	12.28	7	16	5.71
	8	13	31	6.01	3	5	8.62	1	1	15.49	5	8	7.92	6	7	11.15	4	16	3.54
	9	13	30	6.21	13	19	9.09	3	5	8.75	8	10	10.45	6	8	11.19	7	16	5.71
	Avg.			5.72			8.85			10.52			9.30			11.54			4.99

Table B-186. 3rd 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	23	3.17	13	76	2.39	13	48	3.77	13	45	3.91	13	53	3.36	8	20	5.39
	2	6	23	3.64	13	30	6.13	13	17	11.07	10	15	9.12	8	0	529.45	8	20	5.58
	3	5	16	3.98	13	27	6.66	13	16	11.42	13	36	4.92	8	11	9.78	8	20	5.69
	4	5	9	8.41	10	22	6.48	10	13	10.96	13	24	7.39	8	11	9.91	8	20	5.57
	5	7	4	22.52	10	21	6.35	8	10	10.30	5	8	9.76	10	13	10.55	8	1	118.11
	6	7	20	4.59	8	17	6.32	8	10	10.45	2	3	9.95	10	13	10.64	8	19	6.07
	7	5	16	4.49	13	2	90.07	10	13	10.71	4	6	10.11	10	13	10.49	8	18	6.38
	8	7	18	4.99	10	19	7.05	10	13	10.55	3	3	11.98	10	13	10.53	8	18	6.52
	9	6	18	4.57	7	14	6.47	8	10	10.22	4	5	10.10	8	10	11.15	8	18	6.18
	Avg.			4.68			6.76			10.49			10.73			10.72			6.36
P2	1	12	102	1.67	13	875	0.21	13	45	4.10	14	82	2.29	13	61	3.04	14	328	0.57
	2	8	28	3.78	8	14	7.65	14	18	10.43	8	11	10.48	8	10	10.78	6	18	4.43
	3	7	20	4.46	6	10	8.66	10	11	13.43	8	11	9.96	6	7	11.90	8	23	4.54
	4	8	25	4.64	6	9	8.95	10	11	13.01	8	11	10.29	3	4	10.91	5	1	48.23
	5	8	21	5.23	6	9	9.53	10	11	12.77	8	11	9.85	1	1	18.18	4	14	4.18
	6	7	18	5.08	6	9	9.61	10	11	13.54	8	11	10.59	3	3	14.36	8	39	2.86
	7	8	20	5.70	5	8	8.08	8	9	12.56	8	11	10.56	2	1	24.04	13	585	0.31
	8	8	19	5.77	3	5	8.89	6	8	11.73	10	13	10.83	5	5	11.80	13	1461	0.12
	9	7	15	6.35	2	3	10.04	7	9	10.32	11	13	11.47	5	3	21.37	13	1401	0.13
	Avg.			5.94			9.00			11.54			10.95			11.80			0.19

Table B-187. 3rd 12" Lift of Surface Dry AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)			Middle (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	33	3.17	13	91	1.99	13	74	2.39	13	99	1.86	13	94	1.97	7	24	4.22
	2	10	41	3.46	6	10	9.14	13	22	8.35	9	23	5.67	10	22	6.48	8	23	4.98
	3	8	27	4.31	3	6	8.20	10	15	9.21	13	29	6.23	6	13	6.72	8	23	4.99
	4	8	24	4.69	3	3	11.04	5	13	4.91	8	17	6.22	6	11	7.44	8	22	5.23
	5	14	32	5.99	3	6	8.09	11	16	9.15	6	14	5.99	6	11	8.08	7	17	5.23
	6	13	29	6.41	5	7	8.89	8	12	9.51	4	9	5.73	5	6	13.36	8	20	5.68
	7	13	28	6.73	5	7	8.94	10	15	9.10	2	3	8.07	3	6	8.13	8	20	5.63
	8	14	27	6.94	5	7	9.39	8	11	9.85	2	4	7.87	2	2	11.67	11	25	5.93
	9	13	27	6.98	6	9	10.18	6	9	9.53	2	3	8.27	2	2	12.44	14	30	6.27
	Avg.			6.89			9.50			9.49			8.07			12.06			5.95
P2	1	11	113	1.31	14	126	1.54	14	91	2.13	13	116	1.55	13	1430	0.13	13	944	0.19
	2	13	91	1.92	10	22	6.11	6	15	5.80	13	29	6.25	10	20	7.05	5	18	3.64
	3	10	45	3.08	10	24	5.68	5	11	6.05	13	27	6.72	10	19	7.27	5	22	3.35
	4	10	38	3.63	8	16	6.76	8	1	161.21	16	20	10.87	13	22	8.11	2	10	2.69
	5	7	21	4.34	4	13	3.87	8	16	6.71	10	19	7.30	10	17	7.97	13	35	5.22
	6	7	21	4.37	3	3	10.78	8	16	6.81	10	18	7.43	10	17	8.14	13	31	5.86
	7	7	20	4.72	10	19	7.32	8	15	7.20	13	17	10.32	10	16	8.51	10	26	5.11
	8	7	20	4.66	8	15	7.23	10	18	8.00	13	19	9.61	10	17	8.35	7	21	4.64
	9	11	3	56.31	5	11	6.29	14	22	8.83	13	19	9.06	10	16	8.59	10	26	5.25
	Avg.			4.69			6.95			8.01			9.66			8.48			5.00

Table B-188. 1st 4" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	116	1.06	11	114	1.39	8	43	2.56	11	137	1.16	11	449	0.34	11	115	1.33
	2	2	10	2.15	8	38	2.83	6	28	2.84	5	17	3.92	12	47	3.60	8	31	3.50
	3	12	56	2.30	6	23	3.42	8	39	2.78	5	16	4.47	8	30	3.86	8	27	4.12
	4	5	26	2.05	13	45	3.90	4	25	2.18	5	14	5.11	6	20	4.00	12	37	4.46
	5	5	25	2.14	12	43	3.98	6	25	3.15	5	14	4.84	4	13	4.33	12	36	4.59
	6	5	24	2.23	12	41	4.25	8	34	3.24	7	19	5.38	4	13	4.17	12	33	5.08
	7	3	17	2.14	12	40	4.28	8	32	3.52	8	21	5.21	4	13	4.43	12	33	4.96
	8	12	50	2.49	12	39	4.44	6	23	3.48	8	20	5.44	4	12	4.51	12	33	5.10
	9	12	49	2.57	13	37	4.73	5	23	3.13	8	20	5.45	6	17	4.74	12	23	7.37
	Avg.			2.40			4.48			3.38			5.36			4.56			5.81
P2	1	11	111	1.02	11	551	0.29	12	73	2.35	11	115	1.38	12	48	3.40	11	110	1.39
	2	3	15	2.12	3	15	2.41	12	66	2.56	8	44	2.53	8	31	3.67	8	0	421.81
	3	4	14	2.68	3	14	3.10	13	64	2.74	8	33	3.27	3	15	2.65	4	15	3.55
	4	2	7	3.27	3	15	3.18	5	30	2.47	6	22	3.56	3	13	3.71	2	5	6.22
	5	12	44	2.81	12	54	3.00	2	7	3.16	2	8	4.42	6	19	4.09	1	2	4.04
	6	5	19	2.76	7	33	3.11	13	56	3.09	2	7	5.06	6	19	4.14	4	15	3.70
	7	5	18	3.08	2	7	4.39	5	28	2.64	4	13	4.14	6	19	4.06	3	14	2.80
	8	5	12	4.01	2	4	7.19	2	11	2.87	4	12	4.18	8	22	5.10	3	8	4.72
	9	3	13	2.88	3	13	3.38	3	19	2.52	4	12	4.24	8	25	4.58	2	5	5.28
	Avg.			2.88			4.99			2.68			4.19			4.58			4.27
P3	1	10	126	0.84	13	80	2.23	11	110	1.43	7	59	1.67	11	138	1.12	11	468	0.32
	2	12	83	1.47	13	67	2.61	8	54	1.97	7	55	1.81	12	74	2.20	8	51	2.12
	3	6	51	1.16	13	61	3.04	8	51	2.08	5	36	1.97	8	53	2.00	6	35	2.20
	4	5	34	1.56	13	58	3.14	8	49	2.21	5	35	1.87	5	38	1.94	4	24	2.13
	5	3	2	19.96	13	55	3.34	5	34	2.18	6	2	50.91	8	18	5.98	4	23	2.32
	6	1	9	1.55	13	54	3.41	8	47	2.30	12	65	2.67	12	62	2.70	4	22	2.36
	7	2	9	1.93	13	52	3.42	5	32	2.34	12	63	2.69	12	62	2.77	4	22	2.44
	8	4	23	1.61	9	41	2.91	5	32	2.30	8	49	2.20	8	49	2.23	8	44	2.44
	9	4	23	1.67	8	38	2.97	5	22	3.22	3	24	2.04	8	50	2.26	8	43	2.60
	Avg.			1.74			3.10			2.62			2.31			2.42			2.49

Table B-189. 1st 4" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	39	1.97	11	397	0.37	12	115	1.41	12	68	2.49	12	114	1.40	11	108	1.39
	2	7	34	2.25	5	32	2.26	8	52	2.16	12	62	2.63	3	17	2.64	12	107	1.53
	3	12	48	2.56	2	12	2.89	12	62	2.67	5	33	2.24	3	17	2.77	12	65	2.52
	4	12	42	3.01	2	12	2.88	8	45	2.48	3	20	2.25	2	6	3.86	8	41	2.56
	5	8	26	2.98	2	7	3.03	8	44	2.50	2	11	2.60	1	6	3.49	3	21	2.27
	6	8	27	2.89	1	4	2.55	4	23	2.23	12	52	3.19	1	6	3.49	12	53	3.20
	7	8	25	3.10	4	20	2.81	12	47	3.50	5	31	2.28	12	60	2.66	8	39	2.77
	8	12	35	3.50	12	52	3.25	12	50	3.44	1	6	2.66	6	23	3.28	12	49	3.47
	9	12	35	3.56	6	27	2.86	13	48	3.62	3	1	74.40	4	17	3.02	5	20	3.45
	Avg.			3.39			2.97			3.52			2.47			2.99			3.23
P2	1	12	97	1.24	10	493	0.28	11	115	1.33	11	109	1.45	10	393	0.35	11	453	0.33
	2	5	29	1.87	5	47	1.42	8	20	5.57	5	24	3.12	3	37	1.25	12	52	3.07
	3	5	28	1.92	8	43	2.64	8	35	3.32	12	44	3.87	3	21	1.98	12	51	3.29
	4	8	40	2.03	12	3	62.71	4	23	2.40	5	21	3.39	3	23	1.99	12	42	3.93
	5	12	50	2.59	8	38	2.99	6	23	3.45	5	20	3.53	6	35	2.23	7	30	3.46
	6	8	38	2.19	8	36	3.12	6	23	3.39	5	21	3.52	5	34	2.16	7	28	3.63
	7	6	27	2.12	8	35	3.19	4	15	3.46	6	13	5.81	5	32	2.27	7	27	3.69
	8	6	27	2.14	8	9	12.56	6	22	3.54	3	13	3.61	3	22	2.06	3	15	3.18
	9	4	19	2.09	8	33	3.54	6	21	3.62	6	20	3.96	3	22	2.18	5	21	3.51
	Avg.			2.12			3.37			3.54			4.46			2.17			3.46

Table B-190. 1st 4" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	111	1.0	11	115	1.29	7	57	1.79	11	117	1.36	11	120	1.31	11	108	1.42
	2	12	87	1.4	3	665	0.06	12	66	2.54	3	19	2.24	7	48	2.11	5	25	2.97
	3	12	82	1.5	3	22	2.08	5	33	2.22	2	9	3.03	4	20	2.60	4	16	3.23
	4	12	76	1.6	1	7	2.69	6	32	2.34	12	61	2.73	11	52	2.87	12	44	3.73
	5	12	72	1.7	1	7	2.99	13	59	2.93	5	30	2.18	8	44	2.52	11	23	6.83
	6	12	70	1.8	1	7	2.53	8	48	2.31	12	57	2.94	6	28	2.79	6	21	3.65
	7	11	853	0.1	1	6	2.41	4	21	2.41	12	59	2.87	4	20	2.92	6	15	5.23
	8	8	55	1.5	12	55	3.12	2	7	3.18	8	49	2.23	4	19	2.88	2	7	4.58
	9			1.5			2.68			2.60			2.48			2.97			4.47
	Avg.	8	52	1.5	8	44	2.52	8	49	2.22	5	30	2.35	6	25	3.12	4	14	3.60
P2	1	11	111	1.0	11	271	0.54	11	126	1.25	5	23	3.11	8	51	2.18	11	75	2.11
	2	8	53	1.5	7	66	1.53	7	49	2.03	8	43	2.62	8	44	2.51	12	66	2.42
	3	5	35	1.5	5	37	1.82	5	29	2.36	8	40	2.70	6	28	2.75	8	48	2.28
	4	3	23	1.5	8	56	1.89	5	28	2.45	13	4	50.91	5	29	2.23	6	31	2.50
	5	3	22	1.6	8	54	1.96	7	42	2.41	8	39	2.81	6	27	2.85	8	43	2.46
	6	2	13	1.8	8	51	2.08	4	26	2.08	6	24	3.12	8	41	2.76	8	44	2.43
	7	12	58	2.2	8	52	2.09	2	8	3.46	6	24	3.14	6	26	2.95	8	44	2.58
	8	8	42	1.9	5	34	2.15	1	5	3.16	6	24	3.28	4	18	3.03	8	42	2.72
	9	8	42	1.9	8	49	2.19	8	43	2.45	6	24	3.24	4	18	3.07	8	42	2.58
	Avg.			2.0			2.14			3.02			3.22			3.02			2.63

Table B-191. 2nd 4" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	35	3.04	11	118	1.28	11	115	1.38	11	138	1.13	11	112	1.40
	2	12	49	3.34	5	15	4.79	9	24	4.97	8	23	4.92	8	23	4.52
	3	8	28	3.87	8	21	4.86	6	15	5.37	4	15	3.55	5	14	4.98
	4	8	1	120.91	5	14	5.21	9	22	5.35	4	14	3.69	5	13	5.24
	5	8	24	4.53	5	14	5.48	9	20	5.90	6	14	5.75	5	13	5.38
	6	6	16	4.90	12	13	12.28	6	14	5.89	6	14	6.22	5	7	9.00
	7	4	10	4.99	9	0	258.78	6	13	6.12	6	13	6.25	5	10	6.93
	8	6	15	5.23	8	19	5.88	6	13	6.12	8	18	6.51	4	5	10.40
	9	5	14	5.44	6	13	5.76	13	27	6.80	6	13	6.63	4	9	5.91
	Avg.			5.22			5.82			6.35			6.46			6.42
P2	1	11	414	0.36	12	191	0.85	12	43	3.88	11	113	1.37	11	113	1.37
	2	12	53	3.06	11	43	3.66	8	25	4.70	6	18	4.22	12	49	3.38
	3	8	28	4.13	8	29	3.64	12	34	4.92	6	17	4.37	12	36	4.53
	4	6	17	4.70	5	17	4.03	8	23	5.12	6	0	534.54	5	15	4.89
	5	4	10	4.78	12	37	4.38	12	31	5.37	8	25	4.32	2	10	3.56
	6	6	11	7.65	3	11	4.34	13	32	5.41	8	22	5.08	8	22	5.14
	7	2	5	6.76	3	11	4.35	12	29	5.65	6	15	5.06	4	9	5.42
	8	3	10	4.81	13	24	7.55	12	30	5.68	4	11	4.95	4	9	5.30
	9	2	5	6.32	4	12	4.43	12	29	5.85	8	24	4.76	2	3	7.00
	Avg.			5.96			5.44			5.73			4.92			5.91
P3	1	10	172	0.83	10	127	1.13	10	111	1.30	7	54	1.67	11	130	1.12
	2	12	75	2.15	12	64	2.55	5	28	2.56	6	26	3.05	12	54	3.01
	3	8	44	2.50	8	40	2.81	5	26	2.87	5	25	2.98	12	49	3.34
	4	8	42	2.63	5	23	3.28	5	26	2.85	6	24	3.30	12	46	3.65
	5	8	40	2.84	3	14	3.34	6	27	2.87	6	6	12.97	12	43	3.83
	6	12	53	3.14	12	46	3.68	8	40	2.76	7	15	5.89	12	43	3.77
	7	8	39	2.95	12	46	3.71	6	26	2.90	4	15	3.85	12	41	3.96
	8	6	25	2.99	12	44	3.81	6	26	2.94	4	15	3.70	12	40	4.16
	9	12	44	3.78	12	42	3.91	2	9	3.74	6	23	3.45	12	39	4.18
	Avg.			3.24			3.81			3.19			3.67			4.10

Table B-192. 2nd 4" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	49	2.13	12	60	2.76	11	84	1.86	12	96	1.70	12	86	1.85
	2	3	19	2.48	12	38	4.25	8	30	3.69	12	44	3.67	8	34	3.27
	3	12	46	3.75	8	30	3.52	12	228	0.71	11	0	347.10	5	21	3.45
	4	8	35	3.26	5	19	3.71	13	20	8.91	8	29	3.78	1	4	4.67
	5	8	35	3.18	12	35	4.75	12	36	4.47	6	18	4.12	2	4	6.60
	6	6	25	3.15	12	35	4.64	8	27	4.09	2	7	4.92	12	39	4.38
	7	3	14	2.95	12	37	4.46	12	36	4.63	2	7	4.95	12	39	4.45
	8	8	34	3.25	12	33	5.08	6	19	4.11	1	4	4.94	6	20	3.87
	9	8	33	3.45	8	28	3.84	4	13	4.41	4	12	4.04	2	6	4.32
	Avg.			3.22			4.46			4.38			4.64			4.21
P2	1	7	60	1.71	12	95	1.69	11	83	1.88	12	77	2.08	12	112	1.43
	2	7	47	2.12	5	16	4.32	12	45	3.66	6	22	3.79	8	33	3.25
	3	8	44	2.35	8	26	4.24	8	31	3.50	6	20	3.87	10	19	7.48
	4	8	42	2.52	8	24	4.39	6	22	3.71	6	21	3.89	5	20	3.67
	5	5	27	2.71	8	22	4.89	4	14	3.77	6	20	3.99	5	19	3.77
	6	2	17	1.99	8	24	4.62	4	14	3.69	6	20	4.20	5	19	3.83
	7	8	36	2.93	5	16	4.72	4	14	3.86	6	19	4.04	5	19	3.87
	8	8	37	2.94	5	17	4.42	5	13	5.37	3	14	2.82	5	19	3.95
	9	5	25	2.91	4	5	12.73	4	14	3.83	3	12	3.43	5	19	3.92
	Avg.			2.93			4.57			4.35			3.43			3.91

Table B-193. 2nd 4" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	74	2.14	11	109	1.40	12	99	1.62	11	112	1.38	11	108	1.44
	2	3	14	3.26	3	15	2.46	12	45	3.59	8	40	2.66	5	22	3.38
	3	13	50	3.68	1	3	3.59	12	38	4.26	5	24	3.14	3	13	3.39
	4	5	24	3.01	12	37	4.36	8	31	3.45	2	8	4.24	4	4	14.17
	5	3	14	3.56	12	51	3.31	8	30	3.72	1	3	4.24	2	6	4.74
	6	12	44	3.74	12	58	2.89	12	54	3.01	2	9	3.81	12	37	4.55
	7	3	13	3.59	8	33	3.18	15	29	6.91	2	6	4.69	5	20	3.72
	8	1	4	4.58	8	49	2.31	6	18	4.21	2	6	4.56	2	6	5.09
	9	2	6	5.03	8	33	3.26	6	19	4.22	1	3	4.24	2	6	5.09
	Avg.			4.40			2.92			5.11			4.50			4.63
P2	1	7	33	2.95	12	238	0.68	11	130	1.20	11	115	1.31	12	86	1.87
	2	3	10	4.02	8	44	2.48	8	43	2.54	8	38	2.86	12	67	2.44
	3	4	8	6.42	8	56	1.94	8	40	2.75	8	38	2.94	8	38	2.77
	4	3	9	4.37	5	22	3.30	8	39	2.81	8	34	3.33	8	36	2.93
	5	5	16	4.61	6	23	3.45	8	39	2.77	6	27	2.94	5	24	2.97
	6	3	9	4.75	8	35	3.18	8	38	2.99	6	22	3.62	5	23	3.05
	7	5	16	4.43	8	46	2.42	6	25	3.08	4	18	3.18	3	14	3.15
	8	8	22	5.20	6	21	3.62	6	25	3.21	3	10	3.65	3	14	3.11
	9	5	15	4.97	8	35	3.25	4	16	3.14	6	22	3.50	4	2	25.93
	Avg.			4.87			3.10			3.15			3.44			3.13

Table B-194. 3rd 4" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	684	0.22	11	107	1.41	12	101	1.59	11	89	1.78	12	148	1.11
	2	8	25	4.57	8	22	5.04	8	20	5.51	12	31	5.23	8	21	5.46
	3	6	15	5.49	6	14	6.02	8	18	6.30	8	18	6.06	8	19	5.90
	4	6	14	5.52	5	10	7.69	8	18	6.48	12	24	6.88	12	1	218.91
	5	6	14	5.80	6	13	6.50	8	7	16.68	12	21	7.75	12	26	6.38
	6	6	13	5.98	6	12	6.75	6	12	7.10	12	21	7.97	12	25	6.89
	7	6	13	6.23	6	12	6.93	6	11	7.20	12	22	7.55	8	17	6.65
	8	6	13	6.54	6	12	6.84	6	11	7.50	8	16	7.18	8	17	6.79
	9	6	12	6.61	6	12	7.10	8	16	7.36	12	14	11.86	4	11	4.84
	Avg.			6.46			6.96			7.35			7.36			6.09
P2	1	12	84	2.04	11	116	1.34	12	37	4.41	12	158	1.01	12	39	4.44
	2	12	38	4.37	12	42	3.85	4	14	3.96	3	9	4.71	5	8	7.92
	3	5	14	5.18	6	14	5.40	2	4	6.48	12	32	4.98	3	9	5.66
	4	4	21	2.90	2	3	9.70	11	26	5.98	5	13	5.55	1	2	6.68
	5	8	21	5.22	2	5	7.09	6	13	6.25	4	13	4.16	2	4	8.57
	6	3	1	61.63	2	3	8.59	4	9	6.34	12	27	6.18	13	25	7.33
	7	12	26	6.68	6	8	11.08	2	3	8.48	12	26	6.68	6	12	6.93
	8	8	18	6.06	6	13	6.12	12	22	7.49	12	22	7.57	2	3	9.14
	9	6	12	6.82	6	13	6.19	8	18	6.31	8	18	6.17	13	22	7.76
	Avg.			6.52			6.15			7.43			6.81			7.94
P3	1	10	646	0.21	12	58	2.80	11	115	1.33	11	117	1.32	11	462	0.33
	2	8	38	2.78	8	35	3.11	8	46	2.36	8	39	2.75	8	32	3.48
	3	5	22	3.35	8	35	3.26	6	27	2.89	5	24	3.06	6	19	4.16
	4	6	4	21.30	8	33	3.37	8	40	2.74	5	23	3.24	8	28	4.16
	5	6	19	4.07	8	33	3.44	6	26	3.14	5	22	3.21	8	27	4.28
	6	5	17	4.25	6	21	3.66	7	40	2.37	8	35	3.07	8	25	4.41
	7	6	17	4.37	9	20	6.03	8	37	3.00	5	23	3.23	12	32	5.39
	8	6	17	4.61	6	20	3.92	6	25	3.18	5	21	3.39	12	32	5.37
	9	6	17	4.52	6	20	3.96	6	24	3.38	8	9	11.62	8	24	4.71
	Avg.			4.50			4.64			3.19			3.31			5.15

Table B-195. 3rd 4" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	106	1.47	11	86	1.85	12	51	3.27	12	152	1.11	12	78	2.21
	2	6	19	3.92	3	10	4.83	8	18	6.34	8	17	6.36	8	21	5.54
	3	8	27	4.05	6	15	4.99	12	24	7.16	6	11	6.82	5	12	5.94
	4	6	18	4.41	5	16	4.69	12	23	7.36	6	11	6.82	6	13	6.06
	5	4	12	4.76	3	9	5.09	12	22	7.70	8	16	6.84	2	4	7.34
	6	4	12	4.54	6	3	28.36	12	31	5.31	13	23	7.69	2	3	7.67
	7	4	12	4.82	6	14	5.31	12	21	8.04	12	22	7.86	0	0	25.45
	8	4	12	4.92	5	14	5.12	12	23	7.12	8	16	7.18	13	23	7.48
	9	4	12	4.97	8	22	4.78	12	22	7.49	3	11	4.56	8	17	6.89
	Avg.			4.91			5.07			7.55			6.53			7.19
P2	1	10	159	0.91	12	90	1.77	12	405	0.43	12	123	1.34	12	84	1.98
	2	7	34	2.96	12	34	4.78	8	23	4.86	12	31	5.53	8	25	4.53
	3	12	51	3.25	8	24	4.73	6	14	5.64	12	26	6.56	9	25	4.78
	4	12	40	4.02	8	24	4.76	4	10	5.86	14	19	9.89	9	22	5.29
	5	8	29	3.72	8	24	4.72	4	9	5.52	8	19	6.24	8	22	5.05
	6	12	35	4.64	8	24	4.67	4	10	5.91	12	30	5.81	8	23	5.08
	7	4	27	2.24	8	24	4.74	6	14	5.96	8	19	6.28	9	23	5.21
	8	5	17	3.88	5	1	99.14	4	8	7.24	8	18	6.25	6	14	5.56
	9	8	18	6.11	9	0	339.39	4	10	5.82	9	19	6.27	6	15	5.38
	Avg.			4.08			4.74			6.34			6.27			5.38

Table B-196. 3rd 4" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	66	2.45	12	104	1.55	12	118	1.38	12	30	5.41	12	65	2.46
	2	4	14	3.65	6	17	4.89	12	36	4.75	8	20	5.44	12	37	4.40
	3	4	14	3.53	4	11	5.45	6	15	5.10	7	21	4.79	8	26	4.14
	4	1	1	6.17	3	6	6.25	12	26	6.47	3	8	5.57	8	24	4.44
	5	0	1	4.43	2	4	8.23	12	29	5.80	11	23	6.32	8	2	51.80
	6	3	7	5.52	2	4	7.99	6	22	3.45	5	12	5.30	4	9	6.33
	7	12	38	4.32	1	2	8.85	8	22	4.94	2	3	8.78	2	2	14.29
	8	8	33	3.45	4	11	5.58	6	14	5.52	2	0	190.91	2	4	8.48
	9	3	12	3.57	2	6	5.09	2	3	8.27	5	13	5.26	1	3	7.16
	Avg.			3.78			5.33			6.24			5.26			7.82
P2	1	11	466	0.32	12	155	1.07	8	30	3.84	8	23	4.68	11	207	0.76
	2	29	32	12.42	12	38	4.31	8	27	4.25	8	21	4.99	8	21	5.00
	3	8	29	3.92	8	26	4.24	8	26	4.39	8	20	5.44	8	20	5.17
	4	8	27	4.22	6	17	4.80	6	17	4.74	12	28	6.01	8	20	5.23
	5	12	35	4.66	6	18	4.57	5	0	271.51	8	20	5.40	3	13	3.65
	6	12	32	5.29	8	25	4.53	6	16	4.88	8	20	5.54	3	6	7.02
	7	12	31	5.52	6	17	4.89	6	17	4.97	7	12	7.39	6	13	5.79
	8	8	24	4.83	6	16	4.99	6	16	5.01	5	12	5.90	5	13	5.54
	9	9	23	5.21	6	16	4.93	8	23	5.06	8	18	5.87	12	27	6.34
	Avg.			5.19			4.94			5.01			6.39			5.89

Table B-197. 1st 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	107	2.38	17	265	0.89	18	63	3.98	18	54	4.67	18	82	3.02	18	528	0.46
	2	19	80	3.23	19	69	3.73	18	56	4.53	19	45	5.89	19	34	7.83	19	67	3.83
	3	19	72	3.64	19	57	4.61	18	52	4.92	19	39	6.64	19	30	8.76	19	56	4.70
	4	12	52	3.22	19	52	5.01	19	48	5.36	19	38	6.89	19	28	9.52	19	52	5.08
	5	19	64	4.16	19	58	4.56	19	48	5.47	19	37	7.16	19	27	9.97	19	47	5.63
	6	19	61	4.29	19	54	4.86	19	46	5.70	19	36	7.37	14	19	10.40	19	46	5.75
	7	19	59	4.44	19	45	5.73	19	44	5.95	19	35	7.44	19	26	10.29	19	47	5.74
	8	19	57	4.60	19	44	5.94	12	32	5.31	11	25	5.78	20	25	10.82	19	46	5.64
	9	19	55	4.79	19	49	5.40	19	41	6.30	19	34	7.79	19	25	10.78	19	45	5.90
	Avg.			4.61			5.69			5.86			7.00			10.63			5.76
P2	1	18	109	2.34	19	63	4.14	17	236	0.99	18	114	2.14	18	83	3.03	18	117	2.07
	2	19	85	3.05	19	52	5.13	18	83	3.05	18	56	4.55	19	46	5.65	18	84	3.03
	3	19	80	3.23	13	33	5.44	12	53	3.28	19	45	5.76	19	38	6.95	19	69	3.73
	4	19	73	3.60	10	23	5.95	9	37	3.39	19	43	6.06	19	46	5.74	18	67	3.79
	5	19	67	3.90	13	30	6.23	7	28	3.35	19	40	6.60	19	35	7.67	18	65	3.89
	6	19	67	3.89	13	27	6.72	5	21	3.38	19	40	6.62	19	37	7.06	19	61	4.23
	7	13	55	3.18	20	36	7.66	19	54	4.88	19	34	7.70	19	35	7.56	19	61	4.26
	8	19	63	4.20	11	27	5.53	19	51	5.11	19	35	7.38	19	36	7.34	19	60	4.33
	9	12	52	3.31	20	57	4.80	19	50	5.29	19	33	7.94	19	31	8.47	19	61	4.25
	Avg.			3.56			6.00			5.09			7.67			7.79			4.28
P3	1	16	183	1.22	18	184	1.32	19	94	2.74	17	119	2.02	17	111	2.14	19	69	3.70
	2	19	83	3.08	19	85	3.13	19	94	2.74	10	33	4.04	19	64	4.02	19	58	4.54
	3	19	66	3.98	19	59	4.47	19	76	3.42	25	2	193.67	13	38	4.62	19	56	4.69
	4	19	61	4.23	19	70	3.75	19	76	3.42	19	44	5.88	7	19	5.19	19	52	5.03
	5	19	55	4.81	19	50	5.33	19	68	3.92	11	29	5.29	7	19	5.14	19	51	5.17
	6	19	52	5.12	20	46	5.82	19	68	3.92	19	40	6.54	6	17	4.86	19	51	5.15
	7	19	51	5.19	19	48	5.56	19	68	3.85	19	40	6.43	13	34	5.33	19	51	5.28
	8	18	47	5.39	19	40	6.74	19	68	3.85	19	40	6.52	19	47	5.57	19	49	5.44
	9	18	45	5.69	20	40	6.93	19	62	4.30	13	27	6.63	19	46	5.76	19	48	5.53
	Avg.			5.42			6.41			4.00			6.53			5.55			5.41

Table B-198. 1st 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	113	2.16	18	114	2.15	18	119	2.12	17	145	1.62	18	94	2.60	18	599	0.41
	2	18	91	2.76	19	72	3.58	12	85	1.92	19	88	2.92	19	84	3.04	19	103	2.51
	3	18	90	2.80	19	235	1.12	12	78	2.08	19	77	3.37	19	74	3.57	19	92	2.84
	4	18	79	3.22	19	70	3.73	12	78	2.14	19	71	3.64	19	75	3.55	19	89	2.94
	5	18	75	3.38	19	65	4.05	12	72	2.32	19	68	3.85	19	71	3.68	19	88	3.01
	6	18	75	3.36	19	53	4.89	8	53	2.20	19	64	4.07	19	71	3.75	19	86	3.07
	7	18	80	3.19	19	51	5.20	9	50	2.37	19	63	4.17	19	68	3.92	12	76	2.21
	8	19	72	3.61	19	49	5.46	19	74	3.57	19	62	4.26	19	66	4.01	19	83	3.20
	9	18	68	3.72	19	47	5.57	19	80	3.32	19	66	4.00	19	71	3.62	19	83	3.18
	Avg.			3.51			5.41			3.09			4.14			3.85			2.86
P2	1	12	78	2.16	18	93	2.69	19	112	2.31	18	122	1.98	19	80	3.20	19	103	2.51
	2	12	70	2.37	19	81	3.18	18	106	2.35	19	80	3.27	19	97	2.64	19	91	2.95
	3	9	50	2.48	12	68	2.38	19	93	2.78	19	71	3.71	12	68	2.49	19	81	3.28
	4	18	76	3.32	19	71	3.78	19	85	3.07	19	64	4.14	12	67	2.57	19	76	3.51
	5	19	70	3.68	19	73	3.57	19	97	2.67	19	66	4.00	12	65	2.58	19	70	3.78
	6	19	72	3.61	19	67	3.90	19	86	3.04	19	62	4.30	12	64	2.70	19	70	3.78
	7	19	69	3.74	19	65	3.99	19	82	3.15	19	63	4.26	19	71	3.62	19	74	3.53
	8	19	66	3.91	19	66	3.96	19	79	3.30	19	61	4.30	12	67	2.56	19	71	3.69
	9	19	67	3.85	19	64	4.05	19	81	3.20	19	63	4.17	9	47	2.63	20	69	3.99
	Avg.			3.83			4.00			3.22			4.24			2.94			3.74
P3	1	18	103	2.40	1	16	1.22	18	113	2.20	17	138	1.71	18	113	2.21	19	112	2.30
	2	18	95	2.61	18	88	2.89	19	85	3.08	12	85	1.93	18	98	2.60	18	107	2.31
	3	18	86	2.93	19	80	3.26	19	78	3.35	9	51	2.31	19	87	2.95	18	105	2.43
	4	18	79	3.16	19	77	3.45	19	73	3.62	9	52	2.37	18	89	2.87	19	105	2.48
	5	18	72	3.55	19	70	3.74	19	73	3.67	13	73	2.39	19	84	3.11	18	103	2.47
	6	18	87	2.87	19	74	3.49	19	71	3.77	9	49	2.55	19	79	3.26	19	102	2.56
	7	18	86	2.94	19	71	3.70	19	74	3.58	13	72	2.42	19	84	3.11	19	101	2.57
	8	19	70	3.72	19	64	3.98	19	66	4.09	12	72	2.38	19	78	3.34	19	100	2.56
	9	18	67	3.78	19	67	3.92	19	69	3.82	19	70	3.68	19	80	3.29	19	100	2.59
	Avg.			3.48			3.87			3.83			2.83			3.25			2.57

Table B-199. 1st 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	58	2.89	17	148	1.61	18	99	2.55	17	127	1.86	18	111	2.19	18	111	2.25
	2	18	72	3.53	19	85	3.10	19	82	3.14	18	77	3.29	18	69	3.67	19	78	3.30
	3	19	68	3.77	19	70	3.84	19	80	3.29	19	69	3.74	19	61	4.22	19	72	3.67
	4	18	62	4.06	13	46	3.96	12	55	3.12	19	65	4.02	19	60	4.41	19	69	3.85
	5	19	61	4.21	20	60	4.52	19	73	3.56	19	64	4.04	19	57	4.59	19	62	4.17
	6	13	45	3.84	9	30	4.38	12	51	3.33	13	51	3.51	19	59	4.44	19	62	4.29
	7	12	44	3.91	13	40	4.52	13	50	3.46	5	37	1.92	19	53	5.00	19	63	4.23
	8	9	34	3.82	20	52	5.20	13	49	3.56	13	48	3.69	19	54	4.80	19	58	4.49
	9	9	35	3.67	20	50	5.37	19	59	4.51	19	57	4.57	8	40	2.67	19	56	4.75
	Avg.			3.80			5.03			3.84			3.39			4.16			4.49
P2	1	18	94	2.64	19	115	2.22	17	289	0.81	16	813	0.26	18	124	2.02	18	125	1.98
	2	18	79	3.15	19	115	2.28	18	112	2.17	17	208	1.16	18	116	2.15	19	107	2.42
	3	19	73	3.50	19	118	2.22	18	118	2.11	17	275	0.87	18	114	2.19	19	101	2.59
	4	18	68	3.73	19	109	2.43	18	112	2.25	18	112	2.22	19	116	2.24	19	96	2.73
	5	19	67	3.86	19	103	2.55	18	113	2.20	11	117	1.34	18	115	2.19	19	100	2.64
	6	18	73	3.44	19	112	2.36	18	108	2.33	18	117	2.14	19	113	2.29	19	99	2.64
	7	18	65	3.88	19	108	2.42	18	104	2.41	18	113	2.21	18	111	2.29	19	97	2.69
	8	19	62	4.16	19	115	2.30	19	107	2.39	12	109	1.50	19	108	2.40	19	94	2.79
	9	19	60	4.30	20	100	2.73	17	115	2.10	12	111	1.46	19	109	2.36	19	99	2.64
	Avg.			4.12			2.48			2.30			1.73			2.35			2.70
P3	1	17	145	1.62	19	108	2.44	17	383	0.61	15	540	0.39	18	97	2.61	18	183	1.32
	2	18	90	2.77	19	101	2.56	18	98	2.56	18	118	2.09	19	88	2.91	19	103	2.49
	3	18	79	3.14	19	89	2.98	18	88	2.86	18	111	2.23	19	84	3.10	19	92	2.82
	4	18	77	3.21	19	95	2.78	18	84	3.00	18	115	2.22	13	74	2.35	19	92	2.89
	5	50	484	1.42	19	94	2.83	18	82	3.08	19	106	2.41	19	464	0.56	19	91	2.88
	6	18	72	3.53	18	73	3.47	18	80	3.16	18	101	2.52	13	73	2.40	19	90	2.89
	7	18	70	3.59	18	74	3.45	18	78	3.26	19	103	2.50	13	73	2.43	19	92	2.86
	8	18	70	3.57	19	71	3.61	19	77	3.37	19	95	2.70	9	51	2.40	19	87	3.02
	9	19	65	3.97	18	73	3.46	18	76	3.36	19	99	2.58	9	50	2.50	19	89	2.97
	Avg.			3.71			3.51			3.33			2.59			2.44			2.95

Table B-200. 1st 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	107	2.34	18	115	2.20	18	93	2.68	19	72	3.61	19	82	3.14	19	104	2.48
	2	18	92	2.74	19	70	3.78	19	63	4.09	19	63	4.26	19	62	4.23	19	66	4.01
	3	19	95	2.73	19	66	4.02	19	59	4.47	19	60	4.43	19	60	4.37	19	61	4.31
	4	19	82	3.16	13	54	3.30	18	59	4.31	19	60	4.44	19	56	4.75	19	58	4.61
	5	19	80	3.27	9	39	3.12	19	57	4.59	19	60	4.47	19	54	4.79	19	58	4.61
	6	19	78	3.31	6	28	3.08	19	56	4.66	19	56	4.76	19	57	4.67	19	55	4.81
	7	18	71	3.57	12	52	3.26	19	54	4.89	19	53	5.02	19	56	4.72	19	52	5.11
	8	19	76	3.42	19	61	4.35	19	54	4.81	19	55	4.81	19	56	4.72	19	56	4.75
	9	19	70	3.67	12	54	3.14	19	53	4.89	19	57	4.70	19	62	4.27	19	54	4.87
	Avg.			3.55			3.58			4.86			4.84			4.57			4.91
P2	1	17	149	1.56	18	119	2.12	18	113	2.21	18	114	2.21	18	106	2.39	18	110	2.30
	2	19	97	2.64	19	62	4.22	19	61	4.33	19	57	4.60	13	47	3.81	19	70	3.72
	3	13	71	2.46	3	6	6.83	19	54	4.84	19	56	4.69	13	45	3.97	19	60	4.29
	4	9	51	2.38	19	56	4.71	19	49	5.38	19	55	4.68	13	44	4.26	19	61	4.25
	5	7	37	2.53	19	53	5.04	19	49	5.26	19	55	4.74	13	43	4.22	19	56	4.66
	6	9	49	2.62	19	51	5.29	19	47	5.55	19	58	4.49	13	43	4.26	19	52	5.09
	7	19	77	3.34	20	51	5.30	19	47	5.57	19	47	5.54	13	43	4.11	19	55	4.82
	8	19	72	3.66	19	50	5.34	19	46	5.72	19	48	5.57	19	50	5.30	19	52	4.97
	9	19	65	4.05	20	48	5.73	19	46	5.84	19	46	5.75	19	52	5.15	19	54	4.90
	Avg.			3.69			5.45			5.71			5.62			4.85			4.90

Table B-201. 1st 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	106	2.33	17	119	1.96	18	113	2.17	17	134	1.79	17	120	2.01	16	508	0.44
	2	18	108	2.32	17	119	1.97	18	110	2.20	17	120	2.01	18	117	2.07	18	124	1.96
	3	19	85	3.03	11	96	1.52	18	108	2.25	17	119	2.02	18	106	2.32	18	125	1.94
	4	18	79	3.23	10	125	1.11	18	106	2.31	18	116	2.10	18	108	2.27	18	123	1.97
	5	19	78	3.32	18	122	1.98	18	105	2.31	18	118	2.06	18	101	2.48	17	124	1.94
	6	19	74	3.48	14	342	0.57	18	104	2.34	18	120	2.07	18	102	2.39	17	113	2.13
	7	19	71	3.69	18	119	2.04	18	103	2.39	18	121	2.03	18	104	2.37	17	113	2.12
	8	18	70	3.65	10	125	1.07	18	104	2.36	18	121	2.03	18	102	2.42	17	126	1.87
	9	19	69	3.71	7	101	0.93	18	102	2.39	18	121	2.01	18	96	2.61	17	129	1.83
	Avg.			3.68			1.35			2.38			2.02			2.46			1.94
P2	1	18	87	2.92	18	131	1.86	18	104	2.39	18	115	2.13	18	127	1.94	18	32	7.72
	2	19	73	3.52	19	80	3.28	18	77	3.32	19	77	3.32	19	90	2.86	18	96	2.65
	3	13	51	3.43	19	73	3.63	19	72	3.56	19	72	3.63	19	84	3.15	19	79	3.26
	4	19	60	4.26	19	69	3.80	19	69	3.74	19	69	3.79	19	80	3.34	19	81	3.16
	5	19	61	4.21	19	69	3.80	19	68	3.84	19	68	3.86	19	75	3.48	18	77	3.29
	6	13	48	3.70	19	65	4.02	13	61	2.91	19	65	4.04	34	832	0.56	19	76	3.42
	7	5	33	2.04	19	64	4.02	9	43	2.91	19	65	4.04	19	69	3.88	19	77	3.39
	8	13	43	4.06	19	59	4.43	9	44	2.87	19	64	4.12	19	72	3.73	12	61	2.71
	9	19	53	4.91	19	60	4.33	11	57	2.65	19	61	4.24	19	70	3.80	13	58	3.01
	Avg.			3.67			4.26			2.81			4.13			3.80			3.04

Table B-202. 2nd 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	19	88	3.0	18	118	2.12	13	38	4.66	18	338	0.74	18	80	3.08	1	0	101.82
	2	19	69	3.8	13	28	6.22	13	34	5.21	19	57	4.69	18	55	4.63	20	86	3.23
	3	19	65	4.0	19	41	6.32	53	24	30.95	13	32	5.38	12	31	5.37	19	73	3.57
	4	20	58	4.6	13	25	7.47	9	22	5.66	13	31	5.95	19	43	5.94	19	84	3.04
	5	19	59	4.6	13	25	7.43	19	43	6.11	13	29	6.44	12	30	5.54	36	509	0.98
	6	20	54	5.1	11	2	92.12	13	29	6.19	13	27	6.77	19	41	6.51	15	15	14.10
	7	20	49	5.5	19	32	8.38	9	20	6.30	20	43	6.45	12	29	5.90	19	60	4.44
	8	20	48	5.6	24	24	13.95	9	20	6.30	20	46	5.91	12	28	5.96	20	58	4.69
	9	20	48	5.7	14	23	8.08	10	21	6.38	20	43	6.36	19	38	6.86	20	47	5.76
	Avg.			5.61			10.14			6.33			6.24			6.24			4.96
P2	1	16	220	1.0	17	254	0.93	18	63	4.05	17	370	0.63	17	194	1.20	19	501	0.52
	2	18	94	2.6	14	34	5.56	19	48	5.46	19	70	3.66	19	48	5.42	13	48	3.83
	3	19	75	3.5	20	46	5.85	19	42	6.32	19	52	5.04	19	40	6.68	19	77	3.34
	4	19	62	4.2	20	43	6.24	19	36	7.41	19	47	5.53	19	37	7.17	19	56	4.61
	5	19	57	4.6	20	39	6.93	19	40	6.56	19	41	6.41	19	36	7.42	19	51	5.17
	6	19	52	5.1	14	26	7.44	19	35	7.54	19	43	6.09	20	34	8.07	19	51	5.15
	7	19	49	5.4	14	25	7.94	19	33	8.01	19	39	6.81	20	34	7.91	19	47	5.55
	8	19	49	5.4	14	25	7.88	19	34	7.84	20	42	6.56	19	32	8.35	19	45	5.88
	9	19	45	5.9	14	25	7.91	19	30	8.88	20	35	7.84	19	31	8.65	19	46	5.74
	Avg.			5.6			7.91			8.24			7.07			8.30			5.72
P3	1	11	57	2.8	19	57	4.54	13	44	3.95	18	110	2.29	16	424	0.52	16	141	1.60
	2	12	48	3.5	19	50	5.13	13	36	5.19	19	81	3.18	11	46	3.46	18	109	2.27
	3	6	49	1.6	19	45	5.79	14	33	5.73	19	62	4.27	8	25	4.24	18	110	2.28
	4	19	58	4.5	19	42	6.34	14	32	5.92	19	68	3.90	8	26	4.29	16	558	0.41
	5	19	62	4.2	19	39	6.75	14	34	5.56	19	67	3.90	8	24	4.62	18	81	3.06
	6	19	52	5.0	19	42	6.29	6	22	3.51	12	39	4.30	9	23	5.07	18	83	3.08
	7	13	38	4.5	19	41	6.47	10	21	6.43	9	22	5.73	12	37	4.65	18	107	2.28
	8	19	48	5.6	19	39	6.80	10	21	6.87	20	54	5.00	19	55	4.72	5	52	1.42
	9	13	36	4.9	19	41	6.54	20	37	7.40	20	49	5.54	19	50	5.26	19	71	3.66
	Avg.			5.0			6.60			6.90			5.42			4.88			2.45

Table B-203. 2nd 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	113	2.17	18	64	3.95	8	30	3.79	18	122	1.98	19	71	3.73	18	109	2.33
	2	18	93	2.72	19	60	4.28	12	49	3.38	18	77	3.26	19	57	4.74	19	85	3.12
	3	13	73	2.39	19	53	5.00	12	46	3.64	12	55	2.94	20	52	5.18	19	84	3.12
	4	19	81	3.22	19	53	4.86	18	68	3.72	8	33	3.28	14	43	4.42	19	71	3.77
	5	19	75	3.48	19	50	5.28	13	43	4.03	8	31	3.63	13	40	4.61	19	70	3.83
	6	19	72	3.65	19	49	5.44	13	42	4.17	6	20	4.24	10	27	5.25	19	65	4.11
	7	19	71	3.67	19	50	5.32	19	60	4.38	12	52	3.15	10	26	5.29	19	68	3.94
	8	19	68	3.84	19	46	5.74	13	41	4.26	12	50	3.31	23	26	12.18	20	62	4.38
	9	19	68	3.80	19	45	5.86	13	41	4.27	19	63	4.17	20	42	6.53	19	61	4.43
	Avg.			3.77			5.64			4.30			3.54			5.91			4.25
P2	1	12	60	2.74	12	56	2.94	19	84	3.09	18	93	2.68	18	122	2.04	18	91	2.80
	2	19	68	3.83	12	51	3.26	19	72	3.64	18	93	2.75	18	67	3.82	19	70	3.78
	3	19	61	4.27	9	31	4.01	19	66	3.97	18	87	2.92	19	52	4.94	12	50	3.48
	4	13	46	3.79	9	27	4.32	19	62	4.28	19	84	3.07	19	47	5.52	12	48	3.44
	5	19	51	5.13	9	28	4.45	19	55	4.85	12	97	1.70	19	44	5.91	13	47	3.82
	6	19	50	5.30	13	42	4.34	19	55	4.90	18	80	3.19	450	37	167.32	12	48	3.61
	7	19	48	5.48	19	57	4.57	19	52	5.16	18	77	3.29	19	42	6.23	13	47	3.68
	8	19	51	5.19	13	41	4.43	20	50	5.42	19	79	3.27	13	36	5.10	19	54	4.79
	9	19	52	5.16	13	41	4.51	19	53	5.07	12	92	1.80	13	35	5.03	13	44	4.00
	Avg.			5.28			4.51			5.22			2.79			5.45			4.16
P3	1	18	117	2.17	18	112	2.23	6	29	2.70	18	121	2.01	16	389	0.57	2	0	814.53
	2	18	95	2.67	18	75	3.41	4	19	3.17	11	110	1.35	12	70	2.30	18	113	2.21
	3	19	87	2.97	19	68	3.77	7	29	3.23	11	103	1.42	9	37	3.20	12	66	2.50
	4	13	87	2.04	19	68	3.79	12	9	18.78	6	59	1.50	6	23	3.84	11	68	2.33
	5	12	90	1.90	19	64	4.01	12	71	2.33	11	92	1.66	5	15	4.27	11	60	2.64
	6	13	83	2.09	19	63	4.07	13	68	2.60	11	94	1.59	7	22	4.08	12	65	2.55
	7	13	80	2.28	19	64	4.01	9	42	3.07	19	87	2.96	5	15	4.44	19	66	3.97
	8	19	74	3.52	19	68	3.78	9	42	3.10	11	92	1.69	6	21	4.14	19	66	4.02
	9	13	75	2.37	18	62	4.11	7	42	2.33	7	56	1.82	9	33	3.69	19	64	4.13
	Avg.			2.72			3.97			2.83			2.16			4.09			4.04

Table B-204. 2nd 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	96	2.65	18	112	2.24	18	87	2.80	18	81	3.09	18	107	2.38	19	70	3.71
	2	19	65	4.01	19	55	4.81	16	95	2.38	18	60	4.25	19	46	5.75	19	621	0.43
	3	19	59	4.54	19	49	5.40	18	62	4.01	19	46	5.53	20	44	6.13	19	59	4.48
	4	19	51	5.24	13	36	5.14	18	58	4.39	19	49	5.31	20	42	6.42	19	70	3.74
	5	19	49	5.43	19	44	5.95	18	50	5.12	19	39	6.73	20	41	6.61	19	56	4.77
	6	20	47	5.81	19	42	6.41	19	44	5.77	19	46	5.76	19	41	6.47	19	58	4.58
	7	14	35	5.35	19	42	6.33	18	67	3.81	18	86	2.95	20	40	6.80	19	50	5.37
	8	20	42	6.41	19	42	6.43	19	42	6.18	18	89	2.76	10	21	6.56	19	48	5.48
	9	19	43	6.26	13	32	5.81	19	44	5.77	19	41	6.49	7	17	5.64	19	46	5.82
	Avg.			6.01			6.19			5.25			2.85			6.33			5.56
P2	1	18	113	2.14	18	96	2.58	12	99	1.68	18	572	0.44	18	87	2.85	18	118	2.10
	2	19	108	2.38	12	78	2.08	9	63	1.95	12	58	2.85	18	78	3.26	11	89	1.78
	3	19	60	4.26	12	76	2.15	9	62	1.97	12	54	3.10	18	72	3.51	12	88	1.87
	4	18	90	2.82	12	74	2.29	19	84	3.10	2	1	32.58	12	74	2.22	12	79	2.12
	5	12	85	1.97	12	76	2.15	12	87	1.93	19	61	4.26	18	69	3.70	19	86	3.01
	6	19	87	2.98	12	72	2.35	7	59	1.65	12	49	3.51	18	67	3.81	19	83	3.09
	7	19	84	3.12	12	71	2.38	8	57	2.03	12	47	3.60	19	67	3.81	19	89	2.89
	8	19	84	3.10	7	69	1.30	12	84	2.06	12	46	3.78	18	64	3.96	19	84	3.12
	9	12	76	2.17	18	63	4.07	19	76	3.38	19	49	5.49	19	62	4.14	19	82	3.11
	Avg.			2.80			2.58			2.49			4.29			3.97			3.04
P3	1	12	71	2.32	46	1529	0.41	19	78	3.39	15	218	0.96	17	128	1.82	18	155	1.59
	2	12	67	2.58	19	65	4.06	19	68	3.88	18	116	2.12	12	56	2.88	19	93	2.79
	3	13	61	2.86	19	58	4.56	19	66	4.01	12	68	2.50	9	31	3.94	19	71	3.69
	4	19	64	4.13	11	49	3.11	19	70	3.64	5	41	1.74	9	29	4.31	19	70	3.74
	5	19	62	4.24	9	27	4.68	19	57	4.60	19	64	4.10	13	48	3.69	19	66	3.94
	6	13	57	3.20	13	6	32.08	19	54	4.83	13	61	2.87	13	46	3.81	12	58	2.88
	7	6	36	2.29	19	47	5.64	13	46	3.82	9	38	3.34	12	52	3.16	19	67	3.81
	8	13	53	3.43	19	46	5.84	19	52	4.99	13	57	3.09	19	55	4.78	19	63	4.20
	9	13	52	3.52	13	42	4.40	19	51	5.15	13	56	3.18	19	64	4.16	19	65	4.02
	Avg.			3.08			5.29			4.65			3.20			4.03			4.01

Table B-205. 2nd 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	110	2.23	18	111	2.27	13	37	4.73	18	123	2.01	19	76	3.46	18	108	2.33
	2	19	83	3.13	19	42	6.45	13	33	5.37	19	70	3.66	19	45	5.91	19	62	4.22
	3	19	73	3.61	19	43	6.30	9	20	6.29	13	29	6.10	13	24	7.48	19	53	5.02
	4	19	66	4.01	19	34	7.87	10	19	7.06	13	29	6.25	13	24	7.18	19	49	5.36
	5	19	69	3.82	20	36	7.45	10	19	7.15	13	26	6.93	15	1	296.97	19	65	4.12
	6	19	60	4.31	20	31	8.78	7	15	6.26	9	17	7.82	13	22	8.36	19	55	4.81
	7	19	60	4.42	19	30	8.85	7	15	6.62	9	16	7.81	13	22	8.42	19	64	4.05
	8	20	59	4.56	19	28	9.61	8	15	6.93	20	32	8.58	12	31	5.58	19	51	5.22
	9	19	57	4.67	19	36	7.42	8	14	7.56	20	41	6.65	20	34	7.97	19	53	5.11
	Avg.			4.55			8.63			7.03			7.68			7.33			4.80
P2	1	8	54	1.98	18	114	2.19	19	118	2.19	19	118	2.20	18	96	2.64	19	108	2.37
	2	18	91	2.77	19	44	5.97	14	35	5.54	19	42	6.33	19	47	5.53	19	56	4.61
	3	18	75	3.39	19	36	7.36	14	34	5.81	19	36	7.50	13	33	5.47	19	44	5.91
	4	18	72	3.51	19	35	7.58	14	33	5.77	19	32	8.23	13	31	5.89	19	44	5.98
	5	7	60	1.67	19	34	7.90	19	39	6.71	13	24	7.90	13	30	5.99	19	42	6.28
	6	12	57	2.90	19	29	9.07	19	36	7.39	19	36	7.41	20	2	134.76	19	40	6.49
	7	12	56	3.05	13	24	7.59	8	27	4.04	20	35	7.77	20	38	7.23	19	41	6.48
	8	19	55	4.65	6	24	3.63	11	21	6.92	19	39	6.88	19	37	7.21	19	44	6.02
	9	19	66	3.94	13	23	8.01	10	21	6.81	19	39	6.89	20	37	7.46	19	43	6.32
	Avg.			3.88			6.41			5.93			7.18			7.30			6.27

Table B-206. 2nd 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	116	2.09	17	314	0.77	17	361	0.64	19	49	5.51	18	82	3.04	17	104	2.30
	2	18	99	2.52	19	43	6.16	9	24	5.24	20	44	6.17	11	58	2.64	19	75	3.42
	3	12	85	1.93	19	38	6.85	9	24	5.44	19	38	6.90	18	56	4.51	18	100	2.54
	4	12	82	2.02	19	38	6.93	10	23	5.73	19	47	5.53	12	36	4.76	18	85	2.98
	5	12	81	2.07	19	34	7.72	9	23	5.70	19	40	6.51	12	43	3.86	19	86	3.00
	6	12	81	2.11	19	34	7.97	20	39	6.86	19	37	6.96	12	40	4.32	19	72	3.55
	7	12	76	2.22	19	33	7.85	13	32	5.79	19	44	5.81	12	42	4.06	19	72	3.57
	8	18	74	3.46	19	33	8.07	13	33	5.59	19	35	7.49	12	45	3.62	19	69	3.77
	9	19	71	3.63	19	39	6.66	10	22	6.40	19	37	7.10	12	36	4.76	19	71	3.60
	Avg.			3.10			7.53			5.93			6.80			4.15			3.65
P2	1	16	256	0.86	18	153	1.64	18	94	2.70	19	108	2.38	18	418	0.60	18	103	2.45
	2	18	103	2.45	19	44	5.93	14	29	6.46	19	59	4.52	19	64	4.00	20	58	4.68
	3	19	74	3.54	19	51	5.20	19	36	7.44	19	44	6.04	18	51	4.95	19	53	5.00
	4	19	63	4.24	12	26	6.42	20	34	8.07	19	43	6.28	19	44	5.87	13	39	4.83
	5	13	49	3.81	13	25	7.00	14	26	7.53	20	40	6.71	19	41	6.29	14	38	4.93
	6	9	33	3.81	13	25	7.26	19	41	6.46	19	42	6.38	19	37	7.13	14	37	5.14
	7	19	51	5.29	6	24	3.62	14	24	7.93	20	36	7.75	19	36	7.39	19	51	5.13
	8	20	51	5.32	13	23	7.69	20	32	8.45	20	33	8.32	13	28	6.34	14	36	5.17
	9	20	49	5.51	13	23	7.71	13	23	7.86	20	33	8.32	19	33	7.94	13	36	5.16
	Avg.			5.37			7.70			8.08			8.13			7.22			5.15

Table B-207. 3rd 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	2	0	559.99	17	196	1.18	17	120	1.98	17	123	1.94	16	180	1.23	10	37	3.57
	2	18	84	2.93	19	54	4.83	2	25	1.20	13	27	6.60	9	20	6.45	14	43	4.39
	3	18	53	4.79	13	24	7.55	18	37	6.92	10	18	7.46	6	11	7.02	14	39	4.90
	4	18	50	5.02	20	1	196.36	13	19	9.31	7	12	8.23	4	7	7.88	14	38	5.05
	5	18	46	5.49	14	22	8.77	13	19	9.59	10	16	8.57	6	10	8.17	10	29	4.83
	6	89	27	45.15	14	21	9.27	41	1	535.48	10	16	8.55	10	14	9.65	8	24	4.67
	7	19	39	6.71	10	16	8.77	10	13	10.06	10	2	67.55	10	15	9.39	14	566	0.33
	8	19	39	6.70	10	16	8.95	13	16	11.33	7	11	8.54	10	14	10.18	10	28	5.10
	9	13	28	6.26	19	25	10.31	10	13	10.31	7	11	8.95	10	14	9.85	10	28	5.03
	Avg.			6.56			9.35			10.56			8.75			9.81			5.06
P2	1	18	91	2.68	16	681	0.33	17	125	1.91	19	54	4.88	17	142	1.67	2	0	237.57
	2	18	57	4.43	13	29	6.49	19	42	6.23	19	40	6.65	18	55	4.60	19	75	3.43
	3	8	21	5.43	10	20	7.17	14	20	9.45	14	25	7.88	19	41	6.51	5	34	2.21
	4	19	56	4.62	11	20	7.45	14	19	10.06	14	25	7.88	19	37	7.00	14	41	4.74
	5	19	51	5.06	11	18	7.92	11	14	10.74	14	24	8.18	19	33	7.92	10	32	4.50
	6	19	45	5.76	10	18	8.18	10	13	10.45	15	23	8.70	14	21	9.03	11	31	4.69
	7	19	37	7.00	10	17	7.75	14	18	10.67	14	23	8.50	14	21	9.36	11	30	4.92
	8	19	38	7.00	11	17	8.48	2	28	1.07	14	21	9.40	14	18	10.85	11	30	4.98
	9	19	39	6.81	11	16	8.99	20	23	11.92	14	21	9.23	14	18	10.69	10	28	5.00
	Avg.			6.94			8.41			11.29			9.04			10.30			4.97
P3	1	16	181	1.23	13	36	5.12	17	291	0.80	17	335	0.69	9	23	5.59	17	775	0.31
	2	12	41	4.24	10	22	6.51	13	32	5.70	13	43	4.06	10	22	6.10	19	66	3.99
	3	10	24	5.70	14	30	6.39	13	28	6.74	9	29	4.50	10	21	6.64	14	41	4.65
	4	13	1	231.63	11	21	7.13	10	19	7.41	9	25	5.16	12	2	105.73	14	571	0.34
	5	10	22	6.23	10	20	7.38	10	19	7.30	7	20	4.83	10	19	7.15	14	560	0.34
	6	10	21	6.34	19	31	8.48	14	24	7.96	7	20	5.16	8	14	7.49	20	47	5.81
	7	10	20	6.76	20	30	8.90	14	4	54.30	7	18	5.23	8	14	7.83	14	565	0.33
	8	10	19	7.09	20	29	9.31	21	1	323.16	7	17	5.64	8	14	7.64	19	41	6.60
	9	10	20	6.72	20	29	9.36	10	17	8.17	7	17	5.93	8	14	7.78	14	33	5.85
	Avg.			6.86			9.19			8.17			5.60			7.75			6.23

Table B-208. 3rd 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	19	101	2.57	17	220	1.08	17	529	0.43	18	109	2.26	18	54	4.65	18	116	2.19
	2	13	37	5.00	14	32	5.96	19	59	4.38	13	26	6.92	7	1	81.14	13	560	0.33
	3	13	33	5.64	20	39	7.07	19	51	5.05	10	18	8.01	19	36	7.30	10	32	4.33
	4	10	24	5.95	14	26	7.49	13	34	5.45	8	13	8.48	19	33	8.12	8	25	4.10
	5	10	22	6.36	14	25	7.72	13	33	5.42	10	16	8.65	19	32	8.15	10	1	219.54
	6	97	0	33904.95	11	18	8.22	9	24	5.34	10	16	8.72	19	31	8.41	8	24	4.45
	7	14	4	43.57	11	18	8.33	25	0	4378.12	10	16	9.00	19	30	8.76	19	41	6.50
	8	14	30	6.29	11	17	8.52	14	30	6.41	8	12	9.35	19	29	8.94	14	32	6.04
	9	14	29	6.76	20	29	9.48	14	30	6.36	8	12	9.19	19	29	9.19	20	39	7.03
	Avg.			6.53			8.78			6.38			9.18			8.96			6.52
P2	1	12	52	3.29	17	236	0.98	19	35	7.50	18	122	1.99	19	53	4.91	13	41	4.50
	2	10	32	4.08	13	34	5.23	19	31	8.57	14	34	5.51	19	41	6.46	10	29	4.83
	3	5	19	3.89	13	30	6.24	19	29	8.96	14	32	6.04	1	1	14.25	10	27	4.96
	4	8	23	4.46	14	26	7.37	19	28	9.38	20	36	7.60	8	13	8.48	9	24	5.54
	5	10	28	4.90	14	26	7.44	19	31	8.56	20	35	7.67	10	17	8.08	10	23	5.75
	6	13	37	4.78	14	25	7.60	19	27	9.80	20	31	8.77	10	17	8.21	10	23	6.02
	7	13	36	5.12	15	25	8.17	19	25	10.45	14	27	7.04	14	24	8.13	10	23	6.13
	8	7	20	5.07	15	24	8.43	19	26	10.06	15	27	7.36	13	23	8.09	10	22	6.39
	9	14	31	6.14	15	23	8.54	14	19	10.46	52	26	27.77	9	16	7.94	10	22	6.48
	Avg.			5.44			8.38			10.32			7.20			8.05			6.33
P3	1	13	59	3.02	16	177	1.28	16	882	0.26	19	70	3.65	17	497	0.46	17	471	0.50
	2	10	38	3.67	9	27	4.77	13	41	4.38	19	52	4.97	9	25	5.11	12	43	3.89
	3	10	36	3.73	10	25	5.51	2	0	814.53	19	45	5.78	19	46	5.76	12	49	3.40
	4	10	36	3.87	10	24	5.40	20	40	6.88	19	40	6.59	19	41	6.37	9	27	4.73
	5	10	35	4.06	14	38	4.99	29	0	2570.87	19	38	7.00	14	32	5.81	9	27	4.68
	6	10	34	4.25	14	36	5.24	19	38	6.99	19	37	7.12	10	22	6.19	9	27	4.65
	7	10	33	4.13	14	35	5.62	14	29	6.60	19	36	7.42	10	21	6.54	6	21	4.14
	8	10	32	4.45	10	24	6.13	14	29	6.82	19	36	7.31	8	15	7.27	5	16	4.12
	9	10	32	4.48	14	33	5.79	10	21	7.01	19	35	7.52	8	15	7.14	13	2	78.12
	Avg.			4.35			5.84			6.81			7.42			6.98			4.13

Table B-209. 3rd 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	79	3.15	19	43	6.24	18	120	2.07	17	1344	0.17	19	44	5.93	18	95	2.56
	2	18	69	3.64	14	22	8.66	19	43	6.02	10	19	7.14	13	24	7.55	13	37	5.01
	3	18	61	4.13	14	21	9.48	14	21	8.88	10	18	7.73	9	16	7.95	10	26	5.29
	4	19	42	6.24	14	21	9.27	14	20	9.38	10	17	8.45	6	10	7.59	8	21	5.01
	5	19	40	6.50	14	20	10.04	19	26	9.91	10	16	8.98	10	15	8.81	7	20	4.99
	6	13	27	6.63	15	20	10.26	14	18	10.73	11	15	9.76	7	11	8.72	7	19	4.99
	7	13	25	7.37	20	24	11.45	14	18	11.01	11	14	10.26	7	11	9.08	7	19	5.26
	8	19	34	7.85	20	23	11.81	10	14	10.33	11	13	10.93	9	14	9.19	13	29	6.34
	9	13	25	7.47	15	18	11.29	14	18	10.52	11	13	11.13	7	11	9.04	13	28	6.63
	Avg.			7.56			11.52			10.62			10.77			9.10			6.08
P2	1	16	745	0.30	19	46	5.76	17	120	1.93	18	420	0.60	14	29	6.41	18	112	2.19
	2	12	44	3.93	19	38	6.92	13	12	15.03	19	48	5.40	10	19	7.65	13	51	3.56
	3	13	36	4.94	14	27	7.32	19	40	6.52	19	38	6.94	6	10	8.38	10	33	4.22
	4	9	24	5.44	14	26	7.66	14	26	7.42	14	26	7.74	6	10	7.92	10	30	4.51
	5	13	33	5.55	10	17	8.29	14	25	7.73	14	24	7.94	6	10	9.00	14	1	166.77
	6	20	23	12.42	8	13	8.74	14	23	8.18	19	30	8.79	8	13	8.10	10	25	5.47
	7	10	22	5.94	11	17	8.66	11	17	8.58	19	29	9.27	8	12	9.14	10	26	5.25
	8	6	22	3.54	15	23	8.56	11	17	8.68	19	27	9.70	8	12	9.43	10	27	4.84
	9	7	16	6.17	11	17	8.91	11	17	8.66	19	27	9.72	8	12	9.00	10	30	4.67
	Avg.			5.22			8.71			8.64			9.56			9.19			4.92
P3	1	19	66	3.86	17	198	1.21	17	124	1.94	19	76	3.39	19	37	6.90	18	114	2.20
	2	19	49	5.46	14	30	6.55	3	0	-	14	23	8.04	19	32	8.28	19	58	4.51
	3	19	41	6.52	14	27	7.24	19	39	6.68	14	22	8.66	13	20	8.90	6	38	2.16
	4	11	27	5.91	14	25	7.83	19	32	8.09	12	2	89.35	13	3	55.10	20	14	20.36
	5	10	19	7.24	15	23	8.73	14	21	8.81	20	25	10.82	13	16	11.11	10	28	5.17
	6	10	18	7.52	20	28	9.69	19	30	8.71	19	25	10.87	10	12	11.18	13	0	4581.75
	7	10	18	7.84	20	28	9.98	19	26	10.21	20	24	11.18	6	9	8.83	8	21	5.17
	8	10	17	8.21	20	29	9.39	14	19	9.91	3	4	10.37	13	18	9.94	10	26	5.50
	9	8	14	8.01	15	21	9.43	14	19	10.16	14	19	10.52	13	20	9.04	10	25	5.45
	Avg.			8.02			9.60			10.10			10.69			9.27			5.37

Table B-210. 3rd 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	95	2.66	18	75	3.32	2	0	59.39	19	30	8.83	19	35	7.48	9	32	3.71
	2	13	37	4.72	6	14	6.10	19	27	9.70	19	23	11.14	19	28	9.08	9	31	4.00
	3	13	32	5.64	10	14	10.01	13	14	13.08	19	22	11.81	13	7	26.78	10	29	4.57
	4	13	31	6.02	10	14	10.62	13	16	11.33	19	21	12.28	10	14	10.06	9	29	4.48
	5	19	40	6.72	13	17	10.83	7	10	9.72	14	17	10.99	6	9	8.38	10	29	4.70
	6	19	38	6.94	14	17	11.33	19	17	15.63	19	23	11.40	5	9	8.30	10	27	5.04
	7	19	35	7.63	14	18	10.40	19	17	15.83	19	20	13.45	4	7	8.01	10	25	5.27
	8	14	27	7.11	14	17	11.34	14	15	12.63	14	16	12.18	6	8	9.32	6	22	3.53
	9	14	28	6.84	19	21	12.61	14	13	15.11	14	16	12.53	6	9	9.24	19	580	0.46
	Avg.			7.19			11.45			14.52			12.72			8.85			4.40
P2	1	17	298	0.77	19	99	2.60	19	75	3.45	18	89	2.80	19	50	5.22	13	41	4.54
	2	18	78	3.27	19	36	7.23	19	32	8.12	25	9	37.14	19	28	9.20	10	33	4.17
	3	13	44	4.11	14	27	7.21	19	29	9.22	14	20	9.75	13	17	11.17	8	25	4.20
	4	19	52	5.04	10	20	7.09	13	21	8.69	14	23	8.37	14	17	11.64	13	565	0.33
	5	19	46	5.75	14	25	7.70	14	20	9.58	14	21	9.39	19	22	12.20	11	29	5.03
	6	19	50	5.30	6	20	4.00	19	25	10.73	13	19	9.80	10	13	11.17	13	1	132.36
	7	13	38	4.92	10	18	7.95	14	20	9.67	14	19	10.22	14	17	11.43	10	28	5.08
	8	13	36	5.11	10	19	7.59	130	20	87.91	10	16	9.21	10	12	11.24	10	28	5.08
	9	9	186	0.69	10	19	7.40	19	24	10.97	15	2	90.21	10	12	11.47	10	28	5.08
	Avg.			3.57			7.65			10.32			9.72			11.38			5.08

Table B-211. 3rd 8" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	16	195	1.14	18	81	3.08	19	59	4.35	19	72	3.67	18	80	3.05	18	167	1.49
	2	13	52	3.44	14	19	10.03	5	16	4.40	19	35	7.51	13	27	6.46	20	52	5.28
	3	19	67	3.86	14	19	10.48	19	25	10.55	19	28	9.43	19	31	8.41	11	26	5.64
	4	19	55	4.83	10	14	10.59	19	27	9.55	20	25	10.79	13	23	7.70	8	21	5.32
	5	14	38	5.02	10	13	10.73	14	18	10.81	19	27	9.87	12	1	108.52	6	16	5.22
	6	8	28	3.75	14	17	11.47	10	14	9.60	19	23	11.73	10	15	9.14	4	7	6.73
	7	20	45	6.07	14	17	11.62	10	14	10.12	19	22	12.13	10	2	81.95	3	1	31.65
	8	14	37	5.19	14	17	11.50	10	13	10.68	19	23	11.36	19	23	11.57	19	559	0.47
	9	14	36	5.33	14	17	11.67	10	13	10.76	14	19	10.50	13	18	10.29	15	28	7.28
	Avg.			5.53			11.60			10.52			11.33			10.93			7.28
P2	1	19	100	2.68	19	55	4.62	19	41	6.29	1	2	3.34	19	59	4.44	19	603	0.43
	2	13	49	3.69	19	26	10.18	19	33	7.86	19	30	8.69	13	22	8.35	10	27	5.05
	3	19	54	4.80	19	23	11.36	19	31	8.30	14	18	10.75	10	12	11.46	8	20	5.31
	4	10	29	4.54	14	17	11.76	3	3	13.28	10	12	11.39	10	12	11.06	5	16	4.07
	5	19	1	389.30	14	16	12.31	19	28	9.69	7	9	10.39	14	14	13.04	3	4	9.79
	6	21	45	6.37	14	16	12.57	19	27	10.02	8	8	13.04	10	11	12.59	3	9	4.86
	7	19	44	6.02	14	15	12.83	19	27	10.11	10	9	14.79	10	11	11.90	8	2	69.18
	8	13	35	5.34	14	15	12.50	11	21	7.14	30	0	5294.47	8	8	12.85	8	17	6.16
	9	19	41	6.36	11	12	12.31	19	24	10.87	20	16	16.48	8	11	9.78	8	18	5.83
	Avg.			5.91			12.54			10.49			15.63			11.51			6.00

Table B-212. 1st 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	15	294	0.70	17	150	1.52	19	65	3.97	19	50	5.26	18	116	2.14	18	90	2.82
	2	8	28	3.70	8	22	5.03	9	23	5.48	13	25	7.06	13	28	6.52	19	52	5.06
	3	4	18	3.07	8	20	5.73	9	22	5.84	13	23	7.61	13	26	7.06	19	44	5.98
	4	4	9	6.25	9	19	6.52	10	22	6.12	19	33	7.92	13	25	7.40	19	43	6.22
	5	3	7	6.40	6	14	6.22	10	21	6.23	19	31	8.42	5	17	4.03	19	41	6.47
	6	5	12	5.62	6	14	5.91	9	21	6.14	19	31	8.68	9	17	7.67	19	41	6.50
	7	7	16	5.73	5	11	6.13	9	21	6.30	13	20	8.62	13	23	8.13	19	41	6.57
	8	9	21	5.79	5	11	6.03	10	21	6.53	13	20	8.78	10	16	8.08	19	39	6.95
	9	9	21	6.05	5	10	6.63	10	19	6.89	7	15	6.88	7	12	7.87	19	311	0.86
	Avg.			5.86			6.27			6.57			8.09			8.03			6.76
P2	1	18	97	2.53	17	119	2.00	18	68	3.73	18	186	1.32	18	120	2.07	19	85	3.13
	2	12	44	3.70	19	58	4.54	18	53	4.75	19	50	5.19	10	19	7.03	9	36	3.56
	3	3	7	6.23	19	45	5.88	12	33	5.16	19	37	7.19	6	11	7.14	7	28	3.37
	4	3	0	130.91	19	39	6.72	19	46	5.62	12	24	7.24	4	7	8.34	4	14	3.71
	5	6	18	4.85	19	37	7.11	12	31	5.57	9	17	7.00	3	4	10.98	3	6	6.36
	6	8	23	4.86	19	37	7.06	9	22	5.32	7	13	6.90	3	4	10.87	7	27	3.50
	7	6	17	5.21	13	24	7.48	8	16	7.22	5	10	6.92	3	4	11.26	13	43	4.12
	8	3	7	6.40	10	18	7.69	5	8	8.23	4	9	5.33	4	7	7.79	19	55	4.87
	9	18	46	5.47	7	13	7.21	3	7	6.18	7	13	7.30	8	12	8.68	13	46	3.79
	Avg.			5.69			7.46			7.21			6.51			9.24			4.26
P3	1	11	78	1.93	16	184	1.18	18	75	3.41	19	54	4.97	18	592	0.41	19	78	3.33
	2	5	27	2.38	19	80	3.19	19	56	4.67	19	44	6.09	9	23	5.53	12	42	3.94
	3	6	25	3.35	19	61	4.29	19	54	4.85	20	39	7.04	9	21	6.09	8	32	3.57
	4	9	36	3.40	19	52	5.09	19	48	5.57	13	23	7.96	5	17	3.77	12	42	3.84
	5	9	31	3.88	19	48	5.42	19	47	5.68	13	12	14.86	7	15	6.27	12	39	4.14
	6	12	46	3.67	19	46	5.72	13	34	5.22	13	22	7.93	7	16	6.47	12	37	4.64
	7	9	32	3.88	19	44	6.08	13	33	5.53	13	22	8.05	10	20	7.00	12	37	4.64
	8	19	55	4.75	19	43	6.08	20	44	6.08	13	22	8.45	13	25	7.25	12	37	4.54
	9	19	54	4.83	19	40	6.69	20	43	6.25	9	16	8.15	10	19	7.23	19	47	5.50
	Avg.			4.49			6.28			5.95			8.22			7.16			4.89

Table B-213. 1st 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	109	1.42	11	76	2.00	8	53	2.01	17	289	0.79	18	77	3.29	17	411	0.57
	2	5	28	2.31	8	41	2.81	8	48	2.29	8	40	2.68	9	40	2.92	19	94	2.76
	3	18	79	3.20	7	26	3.40	12	76	2.21	3	18	2.63	7	26	3.56	19	87	2.99
	4	9	54	2.31	7	25	3.56	12	72	2.27	6	24	3.38	9	36	3.32	19	818	0.32
	5	5	26	2.58	7	26	3.47	19	72	3.61	6	24	3.53	9	37	3.32	19	83	3.13
	6	3	11	3.49	7	26	3.44	19	70	3.77	6	23	3.73	9	37	3.22	19	80	3.24
	7	4	18	2.73	5	18	3.85	19	69	3.81	6	23	3.72	9	36	3.37	19	79	3.31
	8	2	6	3.79	6	25	3.50	19	66	4.00	8	23	4.85	7	24	3.87	19	80	3.24
	9	2	6	4.40	9	38	3.37	19	65	4.09	4	16	3.95	12	53	3.27	19	77	3.41
	Avg.			3.64			3.57			3.97			4.17			3.50			3.32
P2	1	2	9	3.62	18	81	3.09	12	57	3.00	19	83	3.12	10	60	2.38	18	106	2.40
	2	18	120	2.03	18	66	3.89	11	0	3869.03	12	58	2.97	9	34	3.67	20	93	2.94
	3	18	97	2.51	19	58	4.44	19	57	4.64	19	63	4.17	9	33	3.88	18	90	2.84
	4	18	87	2.88	19	55	4.70	9	32	3.96	12	53	3.20	7	21	4.50	19	81	3.24
	5	18	79	3.21	19	51	5.13	17	0	1501.80	9	33	3.74	7	21	4.48	19	82	3.18
	6	18	83	3.02	19	51	5.04	9	30	4.21	9	31	4.00	9	30	4.09	19	89	2.91
	7	19	76	3.39	19	45	5.77	9	29	4.41	12	21	7.91	19	50	5.32	11	64	2.42
	8	19	76	3.36	5	27	2.75	9	28	4.44	7	20	4.51	13	45	4.07	19	71	3.63
	9	19	80	3.22	9	28	4.36	13	43	4.34	9	30	4.21	13	44	4.02	19	74	3.58
	Avg.			3.32			4.29			4.39			4.36			4.47			3.21
P3	1	8	54	1.96	18	93	2.66	17	99	2.43	8	40	2.76	6	28	3.12	19	106	2.45
	2	4	29	2.16	18	82	3.10	18	77	3.28	8	39	2.97	9	44	2.75	19	73	3.59
	3	5	6	12.12	18	75	3.37	18	74	3.43	9	37	3.19	9	42	2.82	12	77	2.24
	4	6	35	2.39	18	74	3.40	18	71	3.59	6	23	3.75	9	41	3.05	19	92	2.86
	5	13	78	2.23	19	70	3.67	18	67	3.78	9	36	3.32	9	39	3.25	19	89	2.91
	6	13	74	2.37	18	67	3.77	12	65	2.55	9	36	3.30	9	40	3.14	13	72	2.41
	7	3	15	2.61	19	71	3.61	12	64	2.70	12	56	3.03	9	39	3.20	13	73	2.43
	8	12	73	2.36	19	67	3.88	9	42	2.86	9	35	3.41	7	26	3.65	13	73	2.40
	9	13	75	2.38	19	67	3.84	5	19	3.56	6	24	3.65	5	18	3.79	12	70	2.45
	Avg.			2.45			3.78			3.04			3.36			3.55			2.43

Table B-214. 1st 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	112	2.14	9	32	3.71	12	48	3.49	11	48	3.28	9	48	2.55	19	90	2.85
	2	18	91	2.74	9	30	4.28	9	28	4.45	12	41	4.01	9	27	4.54	19	80	3.27
	3	18	77	3.30	9	28	4.44	7	27	3.62	12	37	4.45	19	53	5.00	19	67	3.90
	4	18	66	3.79	13	41	4.30	13	38	4.66	8	23	5.10	9	25	5.23	19	68	3.87
	5	19	64	4.01	13	40	4.52	13	37	4.73	3	12	3.92	20	45	6.00	19	67	4.03
	6	19	64	4.03	13	39	4.75	19	51	5.30	19	45	5.82	9	23	5.41	19	62	4.30
	7	19	78	3.29	18	2	151.48	19	48	5.56	19	46	5.74	5	12	5.89	19	64	4.15
	8	19	63	4.16	10	24	5.58	19	47	5.63	12	34	5.14	13	2	96.62	19	62	4.27
	9	19	60	4.32	9	23	5.60	19	46	5.64	5	15	4.56	19	41	6.52	19	57	4.67
	Avg.			3.93			5.59			5.61			5.15			6.21			4.36
P2	1	17	125	1.83	8	71	1.47	11	137	1.07	16	175	1.24	16	387	0.56	17	534	0.44
	2	7	71	1.42	8	70	1.63	4	40	1.29	5	34	2.20	6	35	2.30	19	114	2.26
	3	7	69	1.48	18	94	2.66	5	40	1.82	3	21	1.95	3	14	3.32	11	83	1.85
	4	5	49	1.50	18	87	2.93	6	40	2.05	12	78	2.13	8	54	2.15	12	85	1.93
	5	3	14	2.50	12	94	1.75	6	41	1.91	12	78	2.04	8	52	2.21	12	81	2.03
	6	18	93	2.60	12	91	1.82	4	24	2.46	9	52	2.28	8	51	2.23	12	48	3.51
	7	8	62	1.71	21	1458	0.20	6	39	2.05	4	22	2.78	9	50	2.36	8	59	1.88
	8	18	86	2.89	19	80	3.21	8	61	1.85	6	34	2.46	8	50	2.28	12	878	0.19
	9	14	28	6.89	12	86	2.00	9	10	12.93	4	22	2.76	5	22	2.85	19	91	2.85
	Avg.			2.30			2.61			1.95			2.67			2.50			2.37
P3	1	8	40	2.68	17	114	2.10	18	116	2.09	19	83	3.08	18	77	3.25	15	1052	0.20
	2	6	25	3.25	18	82	3.01	9	36	3.29	5	22	3.12	8	30	3.77	11	91	1.69
	3	4	16	3.58	18	73	3.43	9	35	3.46	3	8	5.63	6	20	4.40	19	111	2.32
	4	8	36	3.06	18	72	3.49	6	22	4.04	7	20	4.42	6	19	4.72	12	84	1.96
	5	6	23	3.47	18	67	3.77	9	34	3.56	19	56	4.73	3	9	5.38	12	80	2.05
	6	6	23	3.53	18	67	3.82	9	12	10.18	19	54	4.90	6	19	4.63	12	79	2.08
	7	12	54	3.07	18	63	4.05	9	32	3.77	19	53	5.05	13	43	4.09	8	56	2.05
	8	19	60	4.26	19	64	4.03	9	32	3.84	9	29	4.35	14	18	10.60	8	55	2.06
	9	8	52	2.04	19	66	3.88	13	52	3.41	7	20	4.78	4	8	6.56	6	41	1.97
	Avg.			3.12			3.99			3.67			4.72			7.08			2.03

Table B-215. 1st 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	118	2.08	18	60	4.14	17	625	0.37	17	392	0.61	19	51	5.25	19	94	2.77
	2	18	108	2.26	8	41	2.52	8	29	3.70	9	25	4.69	19	45	5.86	13	68	2.55
	3	18	103	2.39	4	15	3.90	8	31	3.76	6	26	2.93	19	43	6.20	12	64	2.71
	4	18	100	2.52	6	21	3.68	8	29	4.01	6	18	4.54	317	36	120.59	12	63	2.69
	5	18	97	2.55	18	55	4.64	6	19	4.23	12	36	4.69	13	37	4.78	13	62	2.82
	6	18	97	2.55	12	55	2.94	6	21	4.00	12	37	4.57	9	24	5.22	9	47	2.66
	7	18	94	2.72	19	53	4.86	8	31	3.70	12	36	4.85	9	24	5.29	6	35	2.51
	8	18	93	2.73	19	52	4.98	8	30	3.87	9	23	5.19	9	24	5.39	9	45	2.71
	Avg.			2.73			4.30			3.80			5.05			5.75			2.74
P2	1	10	94	1.53	18	63	3.91	17	131	1.74	17	307	0.78	18	46	5.44	18	106	2.40
	2	7	45	2.00	11	50	3.11	18	87	2.83	19	60	4.37	11	38	4.16	19	93	2.84
	3	5	30	2.44	8	30	3.44	18	68	3.56	19	52	5.00	7	49	1.83	19	99	2.62
	4	5	31	2.23	15	1	267.94	18	67	3.67	12	39	4.39	19	35	7.39	19	83	3.15
	5	18	84	2.91	8	27	4.06	18	66	3.74	11	2	91.16	5	33	2.27	19	84	3.20
	6	11	80	1.88	8	29	3.71	18	515	0.47	18	51	5.00	8	22	5.18	19	79	3.41
	7	5	28	2.51	8	29	3.86	18	56	4.53	12	36	4.76	8	20	5.81	19	76	3.50
	8	20	81	3.35	8	29	3.83	18	56	4.46	13	1	123.03	6	14	6.27	19	74	3.59
	Avg.			2.93			3.94			4.45			4.93			6.08			3.58

Table B-216. 1st 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	116	1.17	18	123	1.99	4	43	1.43	19	53	4.92	18	111	2.22	18	570	0.43
	2	4	56	1.08	8	62	1.80	3	11	3.86	20	47	5.89	19	64	4.10	19	117	2.19
	3	2	14	1.66	8	60	1.86	6	27	3.06	13	38	4.61	19	58	4.49	19	111	2.35
	4	3	12	3.21	6	37	2.22	4	15	3.64	9	24	5.26	19	55	4.82	18	111	2.29
	5	4	29	1.72	6	35	2.29	4	16	3.89	13	35	4.94	19	54	4.97	19	109	2.35
	6	2	14	2.46	6	35	2.41	4	15	4.00	13	35	4.99	19	53	5.08	18	106	2.40
	7	5	50	1.36	6	36	2.31	4	16	3.81	9	23	5.35	19	52	5.09	18	104	2.44
	8	3	14	2.67	6	36	2.42	2	8	4.06	9	23	5.39	19	51	5.24	19	101	2.54
	9	5	26	2.58	6	37	2.31	6	26	3.07	9	23	5.41	20	50	5.37	19	103	2.49
	Avg.			2.20			2.35			3.65			5.38			5.23			2.49
P2	1	18	89	2.80	17	116	2.07	19	113	2.28	19	61	4.20	19	100	2.56	19	85	3.04
	2	43	61	9.60	19	66	3.91	19	49	5.36	5	18	3.62	19	51	5.21	8	39	2.89
	3	4	25	2.15	19	46	5.72	9	24	5.46	4	6	8.38	13	39	4.56	12	54	3.07
	4	4	13	4.22	13	38	4.71	7	16	6.13	4	6	8.48	19	44	6.00	19	68	3.85
	5	5	16	4.01	13	36	4.96	19	40	6.44	2	2	11.22	19	42	6.36	19	64	4.09
	6	6	23	3.80	9	23	5.44	13	33	5.54	3	3	10.41	20	40	6.73	19	64	4.06
	7	7	23	3.94	19	38	6.93	13	34	5.41	2	2	9.85	20	39	7.12	19	60	4.38
	8	7	23	3.96	19	38	6.91	10	21	6.22	19	32	8.10	19	39	6.83	19	61	4.32
	9	3	16	2.94	13	34	5.23	7	15	6.68	13	25	7.16	19	39	6.98	19	60	4.39
	Avg.			3.61			6.36			6.10			8.37			6.98			4.36

Table B-217. 2nd 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	41	3.99	19	68	3.85	19	55	4.84	19	63	4.19	16	180	1.23	2	0	381.81
	2	19	53	4.97	13	28	6.26	13	25	7.15	19	44	6.09	19	51	5.13	19	58	4.63
	3	13	29	6.09	9	19	6.72	13	23	7.60	19	37	7.15	19	40	6.73	13	34	5.12
	4	9	19	6.40	7	13	6.72	13	22	8.29	20	33	8.11	19	34	7.67	13	34	5.23
	5	7	15	5.95	13	24	7.45	13	21	8.69	19	31	8.57	10	20	6.61	13	566	0.33
	6	7	15	6.48	19	34	7.80	20	30	9.21	13	21	8.68	12	19	9.20	13	568	0.33
	7	7	14	6.67	13	23	7.90	20	29	9.38	9	15	8.73	13	14	12.69	13	29	6.21
	8	7	14	6.73	9	16	7.62	20	27	10.02	9	15	8.80	20	27	9.95	13	27	6.73
	9	5	10	6.69	14	1	151.13	20	25	10.80	19	29	9.32	19	26	10.32	13	28	6.47
	Avg.			6.70			7.76			10.07			8.95			10.99			6.47
P2	1	17	104	2.24	19	59	4.50	19	52	4.99	19	55	4.73	18	259	0.94	19	69	3.79
	2	18	68	3.75	9	19	6.82	19	39	6.90	9	20	6.38	20	42	6.39	19	55	4.89
	3	19	60	4.29	19	39	6.77	19	34	7.79	9	19	6.44	20	34	7.98	13	37	4.88
	4	19	51	5.04	9	16	7.43	19	30	8.75	7	14	6.66	19	30	8.94	19	50	5.27
	5	12	36	4.60	7	13	7.50	19	28	9.47	5	11	6.36	20	27	9.95	19	45	6.01
	6	8	25	4.45	9	16	8.07	20	27	10.08	3	7	6.64	20	29	9.27	13	33	5.53
	7	6	18	4.46	13	23	7.71	13	19	9.53	5	10	7.42	19	26	10.17	20	44	6.25
	8	12	34	4.89	20	34	8.17	20	26	10.59	7	13	7.34	20	25	10.95	13	32	5.50
	9	8	24	4.76	13	21	8.77	20	24	11.10	20	28	9.66	20	24	11.05	13	33	5.45
	Avg.			4.71			8.22			10.41			8.14			10.72			5.73
P3	1	16	259	0.85	8	26	4.44	19	42	6.38	17	700	0.33	13	32	5.48	18	114	2.18
	2	18	94	2.67	6	17	4.55	19	39	6.81	19	60	4.46	13	29	6.11	19	73	3.56
	3	19	70	3.68	6	17	5.18	19	35	7.52	19	45	5.94	9	17	7.34	19	12	22.37
	4	19	60	4.35	4	12	5.33	20	33	8.19	20	40	6.75	9	18	7.24	12	40	4.24
	5	19	57	4.67	4	12	4.76	19	31	8.61	19	36	7.48	36	1	509.08	9	27	4.51
	6	19	53	4.90	4	11	5.49	19	30	8.89	20	35	7.89	19	31	8.55	7	21	4.20
	7	20	47	5.81	3	7	6.69	20	30	9.16	20	33	8.38	20	29	9.29	4	15	4.06
	8	19	45	5.90	3	7	6.62	19	28	9.57	20	31	8.59	20	28	9.65	6	2	40.73
	9	19	46	5.85	5	12	5.52	19	28	9.44	20	31	8.91	19	27	9.77	5	17	3.99
	Avg.			5.85			6.28			9.39			8.63			9.57			4.02

Table B-218. 2nd 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	40	2.88	8	23	4.92	16	171	1.33	19	55	4.75	19	64	4.08	18	104	2.44
	2	5	20	3.21	8	20	5.95	12	36	4.59	13	28	6.47	19	52	5.02	12	46	3.72
	3	3	13	3.27	7	14	6.66	13	31	5.89	13	27	6.65	19	47	5.68	9	31	3.92
	4	5	18	3.62	8	1	121.74	13	28	6.43	19	36	7.39	13	35	5.06	6	24	3.45
	5	7	25	3.80	9	18	6.70	13	25	7.06	19	34	7.93	13	33	5.34	4	17	3.57
	6	7	25	3.72	13	27	6.62	13	25	7.46	19	32	8.37	13	33	5.42	4	7	9.07
	7	13	47	3.67	13	26	6.89	13	24	7.52	19	30	8.95	13	32	5.45	4	16	3.96
	8	13	46	3.91	9	17	7.46	9	16	8.40	13	22	8.39	20	38	7.17	4	16	3.98
	9	13	44	4.11	9	17	7.21	10	16	8.30	13	23	7.85	13	31	5.71	13	34	5.14
	Avg.			3.89			7.18			8.07			8.40			6.11			4.36
P2	1	17	121	1.95	19	63	4.06	16	175	1.28	12	33	5.28	19	52	5.10	17	488	0.48
	2	18	95	2.59	7	31	3.07	19	66	3.94	9	19	6.68	9	20	6.35	19	71	3.62
	3	18	75	3.35	13	16	11.20	19	46	5.79	9	18	6.80	5	11	6.20	3	6	6.28
	4	19	70	3.65	9	19	6.72	19	38	6.92	9	2	68.26	20	35	7.74	12	41	4.14
	5	19	65	4.03	9	18	6.99	19	34	7.74	19	34	7.80	9	19	6.90	12	39	4.34
	6	12	51	3.39	13	25	7.32	20	33	8.30	19	32	8.27	7	14	6.63	12	37	4.41
	7	9	31	3.86	20	32	8.36	19	31	8.60	19	31	8.54	5	10	6.71	12	37	4.56
	8	9	32	3.76	19	31	8.48	19	30	8.91	2	25	1.03	5	10	6.53	6	27	2.95
	9	12	43	3.83	13	25	7.38	20	28	9.70	7	11	8.82	5	9	7.81	8	26	4.38
	Avg.			3.82			8.07			9.07			8.68			7.02			3.96
P3	1	19	86	2.99	8	23	4.77	6	35	2.34	19	70	3.67	19	51	5.22	18	113	2.22
	2	19	65	4.04	4	10	6.00	12	32	5.34	19	51	5.13	19	39	6.80	19	86	3.05
	3	19	57	4.58	3	6	7.52	4	14	4.08	19	43	6.07	19	35	7.72	19	56	4.76
	4	19	51	5.19	4	5	11.31	7	2	54.46	19	40	6.64	19	33	8.08	19	1104	0.24
	5	19	48	5.50	5	10	6.75	9	19	6.25	19	40	6.66	20	31	8.76	19	50	5.23
	6	19	46	5.67	5	9	6.84	5	14	4.74	19	38	6.93	19	31	8.60	19	582	0.45
	7	19	49	5.32	7	14	6.54	9	12	10.08	20	37	7.34	19	29	9.23	2	4	7.35
	8	19	45	5.75	9	8	14.65	9	19	6.70	19	36	7.54	20	28	9.75	20	45	6.05
	9	19	44	5.98	7	13	6.87	7	13	6.95	20	35	7.80	19	28	9.73	20	45	5.99
	Avg.			5.68			6.70			7.17			7.56			9.57			6.47

Table B-219. 2nd 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	38	3.04	18	70	3.56	17	121	1.99	20	39	7.04	19	54	4.80	19	83	3.10
	2	8	35	3.37	12	32	5.02	8	15	7.67	20	38	7.26	19	43	6.26	11	48	3.25
	3	9	32	3.69	8	21	5.49	7	10	9.05	13	22	8.29	20	37	7.32	18	2	115.45
	4	9	29	4.15	4	0	789.08	6	1	112.00	13	21	8.39	13	26	6.83	12	39	4.37
	5	12	43	3.98	12	28	6.08	6	9	9.24	21	15	19.88	9	19	6.36	12	38	4.25
	6	13	40	4.32	19	43	6.16	9	14	9.35	9	15	8.35	4	14	4.25	12	28	5.90
	7	9	29	4.22	12	28	6.15	9	13	9.86	9	14	9.30	6	13	6.55	9	25	4.77
	8	9	27	4.45	12	28	6.16	6	9	9.44	9	13	10.24	9	17	7.36	9	25	4.91
	9	13	38	4.75	6	15	5.96	9	12	10.35	10	13	10.18	19	29	9.20	9	25	5.08
	Avg.			4.47			6.09			9.88			9.91			7.70			4.92
P2	1	18	102	2.37	8	33	3.46	19	70	3.68	17	164	1.39	19	65	4.01	18	97	2.63
	2	18	79	3.18	6	0	-	19	56	4.70	12	45	3.77	19	52	5.04	19	58	4.50
	3	19	66	3.94	4	13	4.68	19	50	5.30	9	25	4.84	19	45	5.86	7	43	2.35
	4	19	64	4.02	4	13	4.68	19	48	5.51	6	16	5.33	16	35	6.10	9	27	4.33
	5	12	54	3.07	4	13	4.73	13	39	4.54	24	1	316.76	19	41	6.51	9	29	4.23
	6	12	54	3.05	6	18	4.64	9	24	5.16	9	22	5.35	19	41	6.50	9	28	4.24
	7	12	51	3.40	19	47	5.67	4	0	210.91	9	23	5.56	19	39	6.83	12	39	4.44
	8	12	51	3.29	9	25	4.75	9	25	5.15	9	22	5.82	19	39	6.88	9	28	4.25
	9	12	49	3.50	6	17	4.89	9	24	5.52	9	21	6.12	20	38	7.20	9	27	4.43
	Avg.			3.40			5.10			5.16			5.83			6.97			4.38
P3	1	17	176	1.30	17	356	0.65	18	382	0.64	18	114	2.13	18	102	2.50	18	108	2.26
	2	18	67	3.81	12	34	5.07	19	52	5.04	19	44	6.07	19	39	6.97	19	66	4.08
	3	19	53	4.94	41	29	19.65	19	41	6.52	19	34	7.55	9	14	8.70	20	56	4.84
	4	19	46	5.74	9	18	6.74	19	35	7.57	19	31	8.47	6	10	8.65	19	51	5.21
	5	19	42	6.29	9	18	7.00	19	33	8.08	19	30	8.85	8	1	183.27	19	47	5.68
	6	19	39	6.85	9	17	7.26	19	33	8.26	19	29	9.12	7	9	10.18	19	45	5.84
	7	19	38	7.03	9	17	7.40	20	31	8.82	19	29	9.21	7	9	10.91	19	45	6.01
	8	20	35	7.68	7	12	7.57	19	31	8.69	20	29	9.57	9	12	10.84	19	41	6.44
	9	19	35	7.61	3	5	8.55	20	30	8.89	19	27	10.11	13	18	10.16	20	42	6.41
	Avg.			7.44			7.84			8.39			9.63			10.63			6.29

Table B-220. 2nd 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	119	2.02	18	74	3.42	19	55	4.83	19	60	4.43	19	39	6.94	18	96	2.61
	2	12	58	2.84	12	30	5.49	20	31	8.79	19	27	9.84	20	35	7.83	8	24	4.94
	3	6	26	3.06	9	19	6.59	19	102	2.54	20	22	12.16	19	31	8.77	20	46	5.98
	4	13	51	3.43	9	20	6.15	20	27	10.26	13	19	9.74	20	29	9.48	13	25	6.91
	5	19	62	4.24	9	20	6.46	13	22	8.41	14	20	9.59	20	28	9.78	9	18	6.86
	6	19	59	4.45	9	20	6.57	13	21	8.74	14	18	10.42	20	27	10.05	6	12	6.74
	7	19	56	4.70	9	21	6.34	9	16	7.85	9	13	10.21	20	27	10.23	9	17	6.86
	8	19	54	4.83	7	16	6.33	9	16	7.79	10	13	10.58	20	27	10.06	9	17	7.44
	9	13	42	4.32	7	16	6.12	13	22	8.32	10	13	10.15	20	26	10.52	13	26	6.84
	Avg.			4.61			6.26			7.99			10.31			10.27			7.05
P2	1	12	54	3.10	19	74	3.50	20	40	6.82	19	67	3.93	19	67	3.84	18	584	0.43
	2	7	18	4.97	9	15	8.11	20	24	11.25	13	21	8.50	12	30	5.69	12	37	4.54
	3	5	12	5.64	19	27	9.77	3	3	12.73	13	18	10.47	19	34	7.81	12	35	4.82
	4	5	12	5.46	19	25	10.65	20	22	12.50	10	12	11.18	19	32	8.21	12	35	4.86
	5	5	12	5.97	13	19	9.15	20	21	12.80	7	10	9.94	12	25	6.91	4	20	2.46
	6	3	5	8.28	7	9	10.05	13	17	11.17	11	0	386.90	6	13	6.60	6	18	4.38
	7	5	11	6.30	5	7	9.51	19	20	12.92	5	10	7.42	4	10	6.21	4	14	4.18
	8	6	11	7.19	7	7	13.58	20	20	13.74	7	10	9.65	3	3	11.45	4	15	4.15
	9	5	11	6.74	7	10	10.06	20	20	13.45	10	13	10.09	20	29	9.58	4	14	4.14
	Avg.			6.74			11.05			13.37			9.05			9.08			4.16

Table B-221. 2nd 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	18	124	1.96	18	105	2.34	19	74	3.54	18	89	2.84	19	132	2.00	19	96	2.72
	2	18	103	2.38	6	12	7.13	20	41	6.76	19	46	5.78	20	35	7.79	13	40	4.50
	3	18	91	2.72	5	9	7.30	19	39	6.86	13	28	6.32	20	30	9.24	9	29	4.20
	4	18	84	2.98	3	6	7.13	20	35	7.66	9	21	6.20	20	28	9.88	7	1	66.98
	5	18	78	3.24	9	18	7.32	19	33	7.98	9	21	6.15	13	20	8.98	13	36	5.04
	6	19	72	3.58	9	17	7.39	20	33	8.19	10	21	6.27	13	21	8.50	13	38	4.71
	7	19	71	3.69	13	23	7.78	20	32	8.46	10	21	6.33	9	15	8.51	13	37	4.95
	8	19	68	3.85	19	28	9.10	19	31	8.48	9	20	6.33	7	1	69.82	13	564	0.31
	9	19	65	3.95	9	17	7.47	20	32	8.50	6	16	5.15	35	1	935.93	13	35	5.15
	Avg.			3.83			8.12			8.48			5.94			8.51			5.05
P2	1	9	28	4.31	19	42	6.33	19	54	5.02	20	36	7.58	19	64	4.18	18	109	2.33
	2	7	18	5.38	19	34	8.02	13	27	6.95	20	28	9.67	13	22	8.24	20	69	3.93
	3	7	18	5.58	19	35	7.76	9	19	6.78	19	28	9.61	10	16	8.46	20	59	4.59
	4	7	17	5.90	13	23	8.00	7	14	6.78	20	26	10.55	10	15	8.82	20	54	5.02
	5	5	13	5.75	9	16	8.13	9	17	7.47	20	24	11.43	7	12	8.51	20	50	5.47
	6	5	12	5.73	9	15	8.31	7	14	6.93	20	22	12.30	7	12	8.60	20	422	0.65
	7	10	22	6.06	7	12	7.78	7	14	7.13	20	22	12.75	7	12	8.48	19	45	5.96
	8	10	22	6.34	5	10	7.15	7	14	7.25	20	21	12.92	6	11	7.72	20	45	6.07
	9	7	16	6.25	5	9	7.78	13	1	194.78	20	22	12.34	7	11	8.72	20	570	0.48
	Avg.			6.22			7.57			7.19			12.67			8.31			6.01

Table B-222. 3rd 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	15	234	0.88	1	1	16.97	11	25	6.06	9	29	4.47	12	23	7.05	19	70	3.65
	2	11	65	2.25	19	54	4.73	11	20	8.00	11	25	6.18	8	14	7.71	19	56	4.69
	3	8	32	3.45	13	23	7.54	19	33	8.06	19	36	7.16	8	14	8.19	19	53	5.00
	4	4	16	3.62	13	22	7.99	19	30	8.80	19	33	7.87	6	10	8.39	19	558	0.47
	5	8	27	4.11	20	33	8.32	12	18	9.27	19	32	8.03	8	13	9.03	19	44	6.13
	6	12	39	4.20	13	21	8.45	8	12	9.36	11	20	7.98	12	18	9.48	19	553	0.47
	7	11	37	4.15	9	15	8.09	8	12	9.05	8	12	8.40	12	18	9.64	19	560	0.48
	8	8	26	4.11	13	20	8.96	8	11	9.82	17	1	177.41	9	12	9.54	19	39	6.73
	9	8	25	4.40	9	14	8.84	8	11	9.55	19	26	10.12	8	13	8.95	19	38	7.05
	Avg.			4.22			8.63			9.47			9.26			9.37			6.89
P2	1	13	234	0.79	16	166	1.34	17	682	0.35	18	58	4.37	17	741	0.32	19	75	3.49
	2	5	28	2.49	15	17	12.43	19	54	4.93	5	25	2.80	19	52	5.00	19	65	4.10
	3	11	56	2.76	17	0	975.74	19	41	6.44	12	23	7.35	19	40	6.71	19	548	0.49
	4	8	31	3.48	19	40	6.64	12	24	7.18	13	22	7.87	19	35	7.68	20	51	5.29
	5	8	28	3.86	19	34	7.64	19	33	8.21	12	19	8.71	19	32	8.40	20	560	0.49
	6	8	28	3.94	13	22	8.13	20	31	8.82	19	30	8.82	20	31	8.89	20	46	5.86
	7	4	19	2.73	12	22	7.96	20	29	9.25	19	29	9.16	20	27	9.99	20	45	6.04
	8	8	26	4.16	12	21	8.10	20	28	9.59	20	26	10.29	20	26	10.35	20	42	6.54
	9	8	25	4.72	6	11	7.63	13	20	8.65	20	26	10.47	20	26	10.55	20	559	0.48
	Avg.			3.87			7.90			9.16			9.97			10.45			6.29
P3	1	11	60	2.42	8	21	5.56	19	63	4.13	17	933	0.25	17	223	1.04	19	96	2.70
	2	5	17	4.29	9	18	6.53	19	46	5.72	19	51	5.04	12	32	5.13	12	44	3.82
	3	2	6	4.66	13	26	6.84	20	40	6.77	19	39	6.81	20	44	6.09	8	29	4.06
	4	19	60	4.34	13	25	7.25	20	35	7.68	19	33	8.03	19	39	6.86	12	38	4.56
	5	19	61	4.33	9	17	7.05	20	34	7.95	19	29	9.34	19	38	7.14	9	26	4.59
	6	8	22	5.10	13	24	7.66	20	32	8.39	19	27	9.76	20	31	8.65	6	19	4.45
	7	19	47	5.68	9	16	7.45	20	31	8.63	20	27	10.08	20	30	9.08	7	19	4.68
	8	12	29	5.92	20	32	8.37	19	29	9.19	20	26	10.33	19	29	9.13	9	27	4.56
	9	12	29	5.66	20	29	9.39	19	28	9.55	19	26	10.35	20	28	9.69	9	25	4.87
	Avg.			5.75			8.40			9.12			10.25			9.30			4.70

Table B-223. 3rd 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	17	116	2.05	12	29	5.90	17	164	1.39	19	51	5.08	17	312	0.77	19	68	3.81
	2	19	85	3.01	9	18	6.77	12	36	4.59	19	40	6.55	19	50	5.38	12	35	4.85
	3	18	108	2.30	5	12	5.27	13	33	5.29	19	34	7.75	8	18	6.39	20	49	5.53
	4	19	66	3.93	9	16	7.47	13	30	5.72	19	31	8.56	4	9	5.99	20	45	6.00
	5	11	44	3.60	9	16	7.91	9	21	5.93	19	30	8.93	4	9	6.50	19	42	6.39
	6	8	30	3.58	9	15	8.28	9	20	6.16	19	28	9.75	4	8	6.90	19	40	6.59
	7	7	2	57.27	9	15	8.35	9	19	6.48	20	26	10.24	6	12	6.85	20	39	6.92
	8	12	39	4.15	9	15	8.51	17	0	2952.68	19	26	10.21	13	23	7.66	20	40	6.83
	9	19	52	5.14	8	15	7.56	20	31	8.82	20	25	10.81	8	16	7.13	13	28	6.16
	Avg.			4.64			8.14			7.65			10.42			7.21			6.64
P2	1	7	37	2.62	16	169	1.32	19	50	5.17	18	123	1.97	18	116	2.10	18	662	0.38
	2	16	4	58.78	19	58	4.52	19	39	6.73	9	14	8.55	19	37	7.18	19	64	4.04
	3	8	29	3.65	19	43	6.18	19	35	7.50	12	20	8.79	19	28	9.58	19	51	5.16
	4	8	28	3.74	19	39	6.84	19	34	7.85	20	26	10.52	12	16	10.40	19	45	5.94
	5	8	27	3.90	19	35	7.60	13	25	7.24	13	16	11.01	8	12	9.73	19	42	6.28
	6	8	20	5.20	20	33	8.25	20	31	8.68	9	12	10.45	12	16	10.77	19	560	0.47
	7	4	13	4.04	20	29	9.20	13	24	7.50	13	16	11.08	12	16	10.52	19	40	6.71
	8	6	20	3.89	20	29	9.36	13	23	7.66	9	11	10.98	12	16	10.40	19	39	6.86
	9	6	7	10.85	20	29	9.62	19	28	9.44	9	11	11.02	12	15	11.24	19	42	6.21
	Avg.			3.96			9.39			8.20			11.03			10.72			6.59
P3	1	11	71	2.07	19	54	4.82	18	410	0.59	1	2	6.23	17	147	1.55	17	298	0.81
	2	5	26	2.82	13	25	7.18	19	41	6.52	19	38	6.97	19	46	5.60	18	74	3.44
	3	4	17	3.73	9	17	7.48	19	34	8.02	19	34	7.76	19	35	7.52	19	551	0.48
	4	19	62	4.14	7	12	7.83	19	28	9.64	19	30	8.94	19	31	8.60	19	543	0.48
	5	11	44	3.60	13	22	8.11	19	28	9.76	19	29	9.30	19	28	9.51	7	41	2.24
	6	12	42	3.88	12	2	101.82	20	27	10.14	19	36	7.54	19	26	10.28	12	589	0.27
	7	8	28	4.08	9	15	8.44	20	26	10.38	20	26	10.35	19	24	10.89	19	848	0.31
	8	8	28	4.01	7	11	8.30	19	25	10.76	20	27	10.05	19	22	11.88	19	852	0.32
	9	19	51	5.10	7	10	8.94	19	25	10.63	20	27	10.14	19	24	11.07	19	52	5.15
	Avg.			4.40			8.56			10.59			10.18			11.28			5.15

Table B-224. 3rd 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	14	4.99	18	95	2.65	17	729	0.32	18	380	0.65	19	32	8.34	18	146	1.74
	2	6	13	5.84	19	40	6.65	19	39	6.68	19	27	9.94	20	30	9.01	19	64	4.10
	3	6	12	6.18	13	23	7.76	12	19	8.69	13	14	12.90	20	26	10.52	19	59	4.50
	4	8	17	6.51	13	23	7.78	13	18	9.85	6	10	8.68	19	23	11.54	20	50	5.44
	5	8	18	6.18	13	20	9.00	20	24	11.51	20	18	15.17	19	26	10.34	20	50	5.41
	6	8	17	6.46	13	20	9.05	20	23	11.71	20	18	15.53	19	24	11.04	20	555	0.49
	7	4	17	3.71	13	20	8.93	20	20	13.46	20	15	17.62	19	23	11.66	20	593	0.47
	8	5	10	6.75	12	20	8.50	20	20	13.48	20	16	16.89	19	24	11.22	20	48	5.63
	9	6	11	7.40	13	20	8.95	20	19	14.38	13	12	15.72	19	21	12.77	20	46	5.98
	Avg.			7.08			8.80			13.77			16.74			11.89			5.81
P2	1	17	112	2.12	18	114	2.22	18	82	3.09	18	133	1.83	18	110	2.27	19	56	4.75
	2	18	81	3.00	13	27	6.50	19	33	8.03	19	34	7.75	19	32	8.43	20	40	6.83
	3	11	43	3.40	9	14	8.75	20	27	9.96	19	25	10.76	19	23	11.67	20	39	7.08
	4	18	56	4.40	8	14	8.36	19	26	10.38	19	22	12.22	19	21	12.66	20	36	7.49
	5	11	37	4.15	6	13	6.55	15	18	11.71	19	21	12.99	19	20	13.28	20	33	8.10
	6	10	47	2.97	6	9	8.91	13	18	9.91	19	20	13.75	19	19	13.37	12	24	7.00
	7	18	59	4.12	9	14	8.73	9	14	8.78	20	19	14.20	20	19	14.22	13	23	7.66
	8	18	50	5.01	13	20	8.67	9	13	9.21	20	19	14.41	19	19	13.97	13	22	8.02
	9	18	53	4.62	9	13	8.97	13	17	10.28	20	19	14.59	20	18	15.04	19	31	8.69
	Avg.			4.58			8.79			9.42			14.40			14.03			8.12
P3	1	7	25	3.98	17	104	2.31	18	63	4.02	18	77	3.25	18	70	3.60	18	91	2.79
	2	7	22	4.60	11	31	5.15	19	25	10.73	20	27	10.15	12	16	10.56	20	45	6.05
	3	8	1	179.88	9	54	2.39	19	23	11.73	19	24	11.15	8	11	10.71	20	36	7.53
	4	5	14	4.83	19	28	9.17	19	21	13.07	20	21	12.61	8	10	10.72	20	33	8.14
	5	3	8	5.55	101	4	331.14	19	19	14.14	19	20	13.25	12	15	11.53	19	33	8.08
	6	18	47	5.33	18	34	7.56	19	19	14.01	19	20	13.41	8	10	11.45	20	31	8.80
	7	11	29	5.37	17	99	2.36	19	20	13.41	20	19	14.00	8	10	10.65	20	29	9.27
	8	8	19	5.35	18	24	10.41	19	20	13.64	20	19	14.70	6	7	10.91	20	27	10.11
	9	8	19	5.52	19	28	9.08	19	19	14.15	20	18	15.22	8	11	9.96	19	29	9.20
	Avg.			5.41			7.28			13.73			14.03			10.51			9.53

Table B-225. 3rd 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	59	2.52	19	48	5.55	19	42	6.18	19	61	4.30	19	84	3.07	12	590	0.27
	2	12	49	3.30	19	38	6.99	13	15	11.49	19	23	11.64	20	32	8.57	13	571	0.31
	3	19	68	3.83	20	36	7.67	13	16	11.06	19	21	12.58	12	16	9.99	12	33	5.23
	4	19	60	4.41	20	33	8.25	19	19	13.87	19	19	13.71	12	17	10.25	19	40	6.68
	5	19	56	4.70	13	171	1.08	13	15	11.55	19	18	14.96	12	15	10.65	19	42	6.34
	6	19	53	4.92	19	32	8.40	19	20	13.59	19	18	14.75	12	13	12.88	20	879	0.31
	7	19	52	5.11	20	30	9.01	19	19	13.76	19	16	16.43	8	11	10.52	19	36	7.48
	8	12	37	4.66	20	30	9.15	13	14	12.80	19	16	16.28	8	11	10.71	19	35	7.62
	9	12	36	4.80	20	27	10.03	13	15	12.18	19	16	17.27	12	15	11.00	20	36	7.59
	Avg.			4.86			9.40			12.91			16.66			10.74			7.57
P2	1	1	2	4.39	18	58	4.32	19	139	1.84	18	459	0.55	19	95	2.72	19	73	3.64
	2	18	100	2.49	5	17	4.42	19	42	6.39	19	35	7.58	9	19	6.50	20	603	0.45
	3	8	26	4.41	19	23	11.65	19	35	7.58	20	30	9.11	5	10	6.54	20	57	4.72
	4	6	18	4.80	19	21	12.56	19	31	8.73	20	26	10.60	9	17	7.15	20	55	4.99
	5	6	17	4.79	20	21	13.16	20	29	9.29	19	24	11.26	13	24	7.62	20	55	4.99
	6	6	16	5.13	20	20	13.62	20	28	9.60	19	23	11.59	9	16	7.56	20	52	5.20
	7	6	17	5.19	19	20	13.39	19	28	9.51	19	22	12.40	9	16	7.59	20	442	0.61
	8	6	16	5.37	20	19	13.99	20	28	9.83	20	21	13.26	7	13	7.11	20	51	5.33
	9	6	16	5.57	20	19	14.44	19	30	8.89	20	20	13.71	6	13	6.93	20	51	5.29
	Avg.			5.38			13.94			9.41			13.13			7.21			5.31

Table B-226. 3rd 12" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	15	770	0.27	19	86	3.00	18	85	2.99	19	44	6.03	19	35	7.51	18	71	3.49
	2	17	119	2.01	19	30	8.89	19	40	6.63	12	25	6.48	19	27	9.72	18	65	3.84
	3	18	82	3.07	19	28	9.60	19	37	7.19	8	15	7.46	19	26	9.98	18	61	4.10
	4	11	43	3.56	20	25	10.64	19	33	8.07	9	16	7.45	19	26	10.34	17	939	0.25
	5	11	44	3.50	20	23	11.69	19	27	10.05	6	12	7.25	19	24	11.32	18	57	4.40
	6	7	29	3.44	19	24	11.02	19	25	10.66	9	14	8.51	13	16	10.60	19	459	0.56
	7	11	40	3.83	20	27	10.06	19	25	10.86	9	13	9.01	13	9	18.88	19	48	5.37
	8	12	37	4.36	19	27	10.03	19	24	11.27	12	19	9.01	13	16	10.72	19	56	4.60
	9	13	1	269.51	20	25	10.96	13	19	9.17	20	23	11.85	19	22	12.09	19	48	5.35
	Avg.			4.09			10.35			10.43			9.96			11.40			5.11
P2	1	16	452	0.50	19	97	2.67	18	66	3.79	19	67	3.88	19	79	3.26	19	65	4.12
	2	8	26	4.23	13	1	158.18	19	31	8.44	13	24	7.67	12	24	7.05	8	22	4.95
	3	6	16	5.03	9	17	7.46	19	26	10.41	11	2	96.85	13	22	8.15	5	29	2.47
	4	6	15	5.58	7	12	8.27	19	25	10.62	9	14	9.32	19	30	8.92	7	19	5.32
	5	6	16	5.40	6	12	7.32	19	23	11.61	17	2	142.07	20	30	9.25	6	15	5.51
	6	6	15	5.47	7	12	7.55	19	22	11.78	13	16	10.92	20	27	10.06	8	19	6.00
	7	9	14	8.16	7	12	7.55	19	22	12.20	20	20	13.73	20	26	10.62	8	18	6.19
	8	6	15	5.64	7	12	7.67	19	22	12.04	13	16	11.42	19	26	10.45	12	26	6.51
	9	6	14	5.91	6	11	7.52	19	22	12.27	13	16	11.64	19	25	10.78	8	19	5.91
	Avg.			6.57			7.58			12.17			12.26			10.61			6.20

Table B-227. 1st 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	114	1.06	10	138	1.05	12	87	1.85	12	130	1.25	12	114	1.41	8	20	5.59	12	111	1.56
	2	8	27	2.93	6	24	3.24	5	24	2.92	12	33	5.17	12	31	5.35	9	18	6.56	12	44	3.86
	3	8	25	3.10	6	21	3.69	12	48	3.48	12	26	6.54	8	15	7.59	8	16	7.20	8	24	4.50
	4	5	18	2.98	6	20	4.17	6	0	992.71	12	23	7.26	8	15	7.39	6	11	8.02	8	23	5.00
	5	5	17	3.13	12	37	4.56	12	40	4.18	12	22	7.67	8	14	7.90	6	11	7.63	8	23	5.00
	6	5	17	3.10	12	36	4.76	6	19	4.21	12	23	7.60	12	20	8.67	6	10	8.55	6	19	4.32
	7	8	22	3.58	6	18	4.69	3	7	5.01	12	21	8.14	12	19	9.04	9	15	7.86	8	21	5.41
	8	5	16	3.14	3	8	4.89	2	4	5.71	13	20	8.70	12	18	9.32	9	14	8.51	6	16	4.80
	9	5	16	3.28	3	8	5.04	6	19	4.26	8	14	7.73	12	19	9.04	6	10	8.22	8	21	5.32
	Avg.			3.33			4.87			4.99			8.19			9.13			8.20			5.18
P2	1	11	139	0.80	11	145	1.02	11	145	1.01	12	90	1.85	12	92	1.77	12	26	6.32	12	69	2.38
	2	8	56	1.40	4	14	3.80	8	64	1.67	8	17	6.65	8	21	5.20	6	12	6.40	12	42	3.92
	3	5	35	1.46	1	3	3.98	5	29	2.46	8	16	7.07	6	15	5.26	2	4	8.16	5	17	4.14
	4	4	3	15.82	1	4	4.80	3	18	2.72	4	8	6.93	6	14	5.66	2	4	9.51	2	4	5.81
	5	1	7	1.75	4	11	4.48	3	18	2.63	6	10	7.52	4	10	5.47	2	4	8.92	4	1	73.82
	6	12	56	2.30	12	33	5.04	6	10	7.30	2	4	7.95	1	3	6.21	4	8	6.12	2	4	6.25
	7	5	28	1.91	6	18	4.33	12	45	3.79	3	6	7.14	6	13	6.28	4	8	6.21	2	5	5.13
	8	3	19	1.78	2	6	5.48	8	37	3.08	4	8	6.82	6	12	6.26	3	4	10.08	3	4	8.96
	9	3	19	1.79	12	33	5.23	13	45	3.92	6	11	7.97	9	17	6.90	3	4	8.90	13	31	5.69
	Avg.			1.83			5.01			3.60			7.31			6.48			9.49			5.41
P3	1	11	97	1.20	10	136	1.02	12	71	2.30	12	116	1.40	12	198	0.83	11	194	0.81	12	149	1.16
	2	7	55	1.28	12	80	2.06	12	57	2.93	12	37	4.63	12	29	5.90	8	21	5.16	12	47	3.59
	3	9	35	2.68	12	67	2.46	13	0	4479.9 3	13	29	6.03	12	23	7.52	5	13	5.66	13	45	3.91
	4	5	35	1.41	8	39	2.75	13	0	1145.4 4	13	28	6.31	12	20	8.42	12	30	5.74	13	35	5.10
	5	7	46	1.66	12	45	3.71	12	45	3.77	13	28	6.47	13	107	1.63	8	18	6.29	8	24	4.70
	6	8	44	1.76	12	43	3.90	8	32	3.60	13	26	6.75	13	20	8.79	8	17	6.55	4	18	2.78
	7	8	44	1.78	12	40	4.17	8	32	3.47	8	18	6.03	12	19	8.82	8	17	6.88	5	16	4.25
	8	8	42	1.85	5	22	3.27	12	40	4.27	13	23	7.55	12	18	9.37	8	16	7.11	5	19	3.98
	9	4	30	1.58	6	22	3.51	12	39	4.39	13	25	7.10	12	18	9.20	8	15	7.39	12	18	9.43
	Avg.			1.73			3.65			4.04			6.90			9.13			7.13			4.12

Table B-228. 1st 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	245	0.47	11	143	1.04	11	119	1.26	12	39	4.30	12	103	1.56	6	17	4.63	11	548	0.29
	2	7	80	0.94	5	36	1.91	8	33	3.19	12	33	4.97	12	46	3.69	12	40	4.16	5	20	3.14
	3	7	79	0.97	3	21	2.33	8	30	3.66	8	21	5.19	12	40	4.11	8	21	5.36	5	21	3.08
	4	8	76	1.09	1	4	3.15	8	29	3.87	8	21	5.25	12	37	4.53	8	22	5.20	5	19	3.55
	5	12	87	1.41	12	54	3.13	12	36	4.59	8	20	5.44	12	35	4.82	6	14	5.82	7	30	3.29
	6	12	89	1.42	6	31	2.58	12	36	4.60	8	20	5.53	12	33	5.12	8	20	5.77	8	30	3.46
	7	12	87	1.45	3	1	44.54	12	39	4.25	8	20	5.47	12	33	5.13	8	20	5.82	5	20	3.67
	8	12	87	1.46	13	47	3.76	12	31	5.48	8	20	5.83	12	31	5.38	6	14	5.63	4	3	17.20
	Avg.			1.45			3.24			5.16			5.73			4.93			5.67			3.74
P2	1	11	114	1.00	12	74	2.19	11	112	1.36	12	43	3.93	11	115	1.33	11	161	0.92	12	127	1.32
	2	8	50	1.56	6	29	2.61	24	36	9.44	8	28	3.99	5	20	3.79	4	20	3.14	2	7	3.74
	3	6	36	1.63	3	17	2.76	12	41	3.99	6	11	6.98	4	13	4.46	3	11	4.49	1	4	3.46
	4	6	35	1.69	4	18	2.73	6	20	4.24	3	6	6.19	3	7	5.21	4	12	4.41	1	4	2.86
	5	6	33	1.73	3	17	2.79	4	13	4.31	4	11	5.16	4	12	4.29	12	33	5.04	3	16	2.65
	6	6	34	1.71	6	26	3.03	6	20	3.79	12	31	5.58	3	7	5.21	6	17	4.61	5	26	2.68
	7	6	32	1.80	4	18	2.83	6	19	4.19	4	10	5.11	13	31	5.62	4	11	4.96	8	40	2.66
	8	4	26	1.46	6	17	4.37	4	12	4.38	4	10	5.45	5	16	4.62	4	11	5.15	8	49	2.15
	9	3	25	1.46	3	16	3.02	6	19	4.34	4	10	5.50	6	16	4.84	4	11	4.94	3	17	2.62
	Avg.			1.66			3.41			4.30			5.35			5.03			5.02			2.48
P3	1	12	115	1.09	10	167	0.85	11	110	1.42	12	117	1.37	11	114	1.36	6	17	4.53	12	577	0.28
	2	8	44	1.88	7	41	2.48	8	26	4.18	8	25	4.58	8	24	4.52	6	16	4.99	8	34	3.22
	3	8	42	2.06	8	36	2.87	8	24	4.67	12	35	4.88	8	22	5.11	6	15	5.32	5	24	3.03
	4	8	42	1.98	8	34	3.21	12	33	4.99	12	30	5.61	8	22	4.99	8	22	5.15	4	22	2.27
	5	9	38	2.36	8	33	3.39	12	31	5.48	13	28	6.25	8	21	5.24	8	20	5.46	5	21	3.32
	6	9	37	2.42	8	30	3.63	12	30	5.67	13	28	6.34	8	20	5.39	8	0	254.54	6	21	3.56
	7	8	36	2.31	8	31	3.54	12	28	5.93	12	27	6.25	8	20	5.40	6	14	6.00	6	22	3.50
	8	8	35	2.46	5	18	4.10	8	22	5.29	12	26	6.44	8	20	5.32	6	13	5.93	5	20	3.57
	9	12	46	2.83	6	18	4.18	6	15	5.60	8	346	0.32	12	26	6.33	8	19	6.02	5	21	3.48
	Avg.			2.54			3.94			5.61			6.35			5.69			5.98			3.52

Table B-229. 1st 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	85	1.47	12	87	1.85	11	430	0.36	11	102	1.52	12	46	3.56	5	5	13.01	12	112	1.54
	2	4	18	2.05	5	24	2.92	8	31	3.60	6	7	12.00	8	21	5.23	2	5	6.61	5	28	2.61
	3	5	25	2.18	12	48	3.48	4	13	4.05	2	4	6.88	8	18	5.90	2	5	6.76	3	15	2.99
	4	6	26	2.36	6	0	992.71	4	12	4.58	12	32	5.27	8	18	5.75	4	11	4.43	3	14	3.19
	5	4	18	2.06	12	40	4.18	2	6	5.58	12	31	5.58	8	17	6.23	3	5	7.27	2	5	5.20
	6	4	19	2.09	6	19	4.21	2	5	6.03	12	29	5.85	6	13	5.96	4	11	5.05	3	14	3.27
	7	2	10	2.28	3	7	5.01	1	3	5.21	8	19	5.62	12	25	6.84	4	11	4.81	2	6	5.74
	8	4	19	2.09	2	4	5.71	6	16	4.75	5	13	5.39	12	24	6.96	4	10	5.09	2	6	5.47
	9	2	10	2.24	6	19	4.26	6	15	5.22	4	10	5.23	12	24	6.99	6	14	5.48	2	4	5.83
	Avg.			2.20			4.99			5.06			5.41			6.93			5.13			5.68
P2	1	12	110	1.15	11	145	1.01	11	124	1.22	12	84	1.96	12	61	2.63	8	24	4.69	11	123	1.28
	2	8	37	2.31	8	64	1.67	7	40	2.54	12	48	3.44	8	27	4.13	6	23	3.38	8	40	2.65
	3	8	37	2.27	5	29	2.46	8	37	2.86	8	32	3.36	8	34	3.16	6	23	3.37	8	38	2.84
	4	7	1	51.60	3	18	2.72	8	36	3.00	8	31	3.40	8	33	3.16	8	34	3.22	5	22	3.30
	5	6	28	2.13	3	18	2.63	8	34	3.11	8	31	3.45	5	19	3.52	8	34	3.23	5	22	3.15
	6	6	27	2.09	6	10	7.30	8	35	3.00	8	31	3.58	12	38	4.49	6	21	3.75	8	37	3.02
	7	6	27	2.11	12	45	3.79	8	33	3.24	8	29	3.85	12	37	4.55	8	32	3.41	5	21	3.36
	8	6	27	2.13	8	37	3.08	8	32	3.28	8	29	3.65	12	36	4.73	8	30	3.60	5	22	3.24
	9	3	21	1.61	13	45	3.92	8	33	3.24	8	29	3.70	12	36	4.73	10	20	6.87	13	44	3.99
	Avg.			1.95			3.60			3.25			3.73			4.67			4.63			3.53
P3	1	12	113	1.06	12	71	2.30	11	128	1.14	11	371	0.41	11	665	0.23	8	35	3.00	12	116	1.40
	2	5	29	1.84	12	57	2.93	5	22	3.33	12	49	3.34	12	48	3.47	3	12	4.09	3	9	5.11
	3	3	18	1.73	13	0	4479.93	12	46	3.65	8	24	4.26	8	25	4.20	2	5	5.28	5	29	2.59
	4	4	3	14.73	13	0	1145.44	4	19	2.67	3	10	4.70	4	10	5.19	2	5	5.66	6	0	496.36
	5	12	48	2.52	12	45	3.77	4	10	4.99	4	10	4.80	3	5	7.50	2	5	7.02	3	9	3.82
	6	3	17	1.85	8	32	3.60	2	4	6.48	6	14	5.33	2	3	6.44	4	10	4.84	2	10	3.53
	7	5	27	2.06	8	32	3.47	12	34	4.83	4	10	5.26	3	5	7.05	6	15	4.99	4	16	3.08
	8	2	9	2.39	12	40	4.27	8	26	4.29	4	10	5.11	8	22	5.09	2	5	6.53	4	2	33.20
	9	3	16	2.13	12	39	4.39	12	33	4.89	5	14	5.27	4	12	4.34	1	3	5.90	2	6	4.99
	Avg.			2.19			4.04			4.67			5.21			5.49			5.80			4.04

Table B-230. 1st 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	63	2.10	10	143	1.00	12	96	1.70	12	56	3.03	12	61	2.69	7	28	3.67	12	93	1.84
	2	13	57	2.33	11	92	1.68	4	19	2.76	12	1	152.73	8	20	5.29	5	17	4.21	8	29	3.88
	3	13	56	2.35	12	70	2.34	5	17	4.29	12	25	6.62	8	20	5.26	7	25	4.10	8	28	3.95
	4	12	52	2.49	8	54	2.06	8	24	4.86	8	17	6.53	8	19	5.73	8	22	4.64	8	27	4.11
	5	8	40	2.08	8	51	2.16	12	30	5.53	8	17	6.44	8	19	5.70	5	16	4.38	8	27	4.12
	6	9	0	225.27	8	49	2.24	12	28	5.96	8	17	6.47	8	19	5.79	8	3	32.40	8	25	4.49
	7	8	40	2.17	8	46	2.51	12	28	5.98	12	23	7.36	6	13	6.05	5	15	4.96	6	18	4.31
	8	8	40	2.15	6	29	2.61	8	23	4.93	13	22	7.76	6	12	6.14	5	15	4.87	6	18	4.24
	9	4	30	1.56	4	19	2.63	8	22	4.96	13	23	7.69	6	8	9.00	8	21	5.17	8	25	4.58
	Avg.			1.96			2.58			5.29			7.60			7.06			5.00			4.38
P2	1	13	125	1.04	11	131	1.13	12	109	1.52	12	53	3.18	11	115	1.37	12	41	4.15	12	280	0.60
	2	5	46	1.22	2	8	3.59	8	34	3.23	11	69	2.29	7	18	5.14	6	15	5.37	5	30	2.30
	3	4	25	1.52	12	53	3.09	9	30	4.07	4	15	4.01	7	17	6.15	5	15	5.06	5	28	2.56
	4	4	24	1.54	2	9	3.74	3	18	2.62	3	9	5.31	5	12	6.11	2	6	5.51	4	18	2.79
	5	4	23	1.60	1	4	3.95	5	20	3.43	4	8	5.95	3	8	5.87	2	6	5.39	2	8	4.26
	6	2	13	1.92	12	60	2.75	6	3	26.50	2	4	8.58	5	12	6.19	1	2	8.21	1	4	4.32
	7	9	1	90.11	12	44	3.81	5	20	3.76	2	4	7.27	4	2	35.15	4	10	5.35	1	4	4.87
	8	4	25	1.64	8	37	2.97	6	20	3.82	1	2	6.11	3	1	42.05	3	8	5.85	12	37	4.52
	9	2	12	2.13	8	34	3.26	12	31	5.43	12	29	5.89	3	8	5.14	4	9	5.81	8	32	3.56
	Avg.			1.88			3.35			4.34			6.42			5.14			5.67			4.32

Table B-231. 1st 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	143	0.82	12	94	1.70	11	118	1.32	12	106	1.52	12	115	1.43	12	1012	0.16	13	781	0.23
	2	8	53	1.57	12	74	2.28	8	28	4.12	12	38	4.40	8	25	4.40	8	26	4.22	8	41	2.66
	3	7	48	1.60	8	55	2.03	8	26	4.32	12	35	4.99	8	24	4.60	6	15	5.23	8	37	2.94
	4	8	47	1.73	8	51	2.18	6	17	4.53	8	25	4.60	6	15	5.09	6	16	4.91	8	39	2.91
	5	8	47	1.73	8	52	2.18	6	17	4.71	8	24	4.70	6	15	5.34	6	15	5.00	8	36	3.13
	6	8	45	1.81	8	47	2.37	8	25	4.69	6	16	5.00	8	21	5.26	6	14	5.50	8	33	3.47
	7	4	35	1.30	8	45	2.45	8	25	4.55	6	16	4.98	8	21	5.37	6	14	5.56	8	35	3.24
	8	6	34	1.68	8	46	2.37	8	24	4.86	8	21	5.20	8	20	5.48	6	15	5.63	6	23	3.37
	9	8	41	1.93	6	30	2.54	8	25	4.39	8	22	5.11	9	20	5.94	6	15	5.50	4	16	3.21
	Avg.			1.64			2.45			4.60			5.10			5.60			5.56			3.27
P2	1	11	113	1.03	5	33	1.98	12	64	2.58	11	92	1.72	12	30	5.69	12	107	1.50	12	561	0.30
	2	12	96	1.31	8	55	1.94	6	16	5.28	8	20	5.26	12	26	6.51	6	44	1.84	3	17	2.58
	3	5	41	1.32	3	10	3.48	1	3	6.97	12	28	6.04	8	17	6.70	3	10	4.76	2	7	4.27
	4	3	27	1.29	2	9	3.61	1	1	10.18	8	19	6.12	6	12	6.96	4	9	5.90	4	18	2.81
	5	1	9	1.15	1	5	4.17	12	28	6.09	5	12	6.23	3	4	8.90	4	9	5.81	3	15	3.04
	6	3	26	1.41	3	10	3.74	6	13	6.00	4	8	6.48	5	1	93.78	4	9	6.22	3	17	2.54
	7	12	68	1.81	4	18	2.89	4	10	4.91	6	12	6.75	2	4	9.02	3	8	5.58	4	14	3.98
	8	6	36	1.57	2	9	3.80	3	9	5.07	4	9	6.57	2	4	9.11	4	8	6.87	2	7	3.80
	9	4	27	1.50	1	4	4.51	2	4	6.76	3	7	5.17	2	4	8.24	4	9	6.34	2	6	4.01
	Avg.			1.63			3.73			5.58			6.17			8.79			6.26			3.93

Table B-232. 2nd 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	77	2.11	12	116	1.45	11	114	1.33	11	114	1.39	12	87	1.93	13	69	2.54
	2	8	32	3.52	6	14	5.80	12	32	5.10	8	19	5.83	12	26	6.62	17	24	9.69
	3	12	41	4.14	12	26	6.32	12	26	6.32	8	16	7.07	8	14	8.44	6	17	5.16
	4	9	27	4.46	8	18	6.41	12	23	7.29	8	17	6.81	6	10	8.35	13	27	6.50
	5	9	25	4.72	2	5	5.53	12	22	7.63	8	16	6.90	8	13	9.23	13	28	6.40
	6	12	37	4.64	3	5	7.89	12	21	7.72	12	22	7.99	6	11	8.39	13	26	6.85
	7	9	22	5.31	1	1	6.36	12	20	8.37	4	12	4.34	6	10	8.62	8	20	5.68
	8	9	22	5.31	12	20	8.35	12	20	8.04	6	11	7.12	6	9	8.66	9	19	6.15
	9	9	22	5.46	6	12	6.71	8	14	7.89	8	14	8.29	6	10	9.26	9	20	6.02
	Avg.			5.36			7.14			8.10			6.58			8.85			5.95
P2	1	11	80	1.96	12	114	1.44	11	92	1.72	12	70	2.36	12	64	2.66	12	102	1.69
	2	12	55	3.01	12	32	5.26	12	26	6.54	12	25	6.65	13	22	7.89	4	22	2.75
	3	8	27	3.96	8	17	6.84	12	23	7.19	6	11	7.43	6	10	8.10	4	14	3.97
	4	14	28	6.86	12	24	6.80	8	16	7.16	6	12	6.70	6	10	8.04	4	14	4.04
	5	12	38	4.30	9	16	7.56	4	10	6.10	4	8	6.66	12	18	9.69	3	7	4.85
	6	6	17	4.71	12	22	7.82	5	1	85.74	2	3	8.98	9	12	10.15	4	14	4.40
	7	4	13	4.11	12	21	8.25	8	16	6.66	2	2	9.18	13	17	10.34	3	8	4.91
	8	4	12	4.41	13	21	8.45	6	12	6.22	12	17	9.57	9	12	9.70	1	2	4.17
	9	2	4	8.06	8	15	7.78	4	8	6.87	12	18	9.31	13	16	11.12	2	3	8.82
	Avg.			4.26			8.16			6.58			9.35			10.39			4.54
P3	1	7	42	2.44	12	87	1.89	11	636	0.24	12	126	1.30	12	108	1.58	12	147	1.17
	2	8	24	4.63	6	15	5.46	6	18	4.24	12	35	4.89	4	10	5.87	6	21	3.67
	3	4	21	2.60	3	6	6.93	6	17	4.65	13	32	5.48	9	14	8.25	0	0	#DIV/0!
	4	3	11	4.18	3	5	8.79	6	15	5.29	13	29	6.07	6	11	8.02	13	25	6.89
	5	6	18	4.45	4	10	5.44	8	20	5.59	13	26	6.59	3	4	8.41	12	25	6.92
	6	6	18	4.36	4	10	6.01	8	19	5.93	12	24	6.77	3	4	10.80	6	17	4.50
	7	6	18	4.49	4	10	5.61	6	14	5.61	8	19	6.01	6	10	8.26	2	5	5.95
	8	6	18	4.48	4	10	6.01	8	18	6.36	9	19	6.27	9	12	9.66	2	5	6.08
	9	6	17	4.57	4	10	5.68	48	18	36.60	9	19	6.34	9	13	9.24	2	3	8.48
	Avg.			4.51			5.77			5.99			6.21			9.05			6.84

Table B-233. 2nd 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	51	1.94	11	116	1.34	12	138	1.16	12	116	1.38	12	35	4.76	13	597	0.29
	2	5	26	2.78	6	19	4.28	8	29	3.76	12	53	3.20	6	16	4.80	12	52	3.30
	3	6	24	3.47	2	6	4.32	8	28	3.90	12	34	5.07	12	28	5.87	6	26	2.96
	4	6	24	3.20	14	30	6.33	8	26	4.08	13	3	61.23	8	20	5.52	2	10	3.42
	5	7	23	4.36	8	23	5.04	8	24	4.43	8	22	5.33	6	14	5.27	4	19	2.85
	6	6	25	3.24	6	16	5.01	8	24	4.46	9	23	5.44	12	24	6.84	4	19	3.02
	7	8	33	3.45	3	6	5.73	8	24	4.55	4	16	3.28	8	19	6.24	6	23	3.47
	8	6	24	3.20	2	3	7.10	8	23	4.65	6	15	5.22	6	15	5.64	4	16	3.31
	9	5	22	3.32	9	20	5.82	8	23	4.79	8	20	5.59	12	23	7.16	4	21	2.33
	Avg.			3.32			6.22			4.67			4.70			6.35			3.04
P2	1	11	196	0.76	12	114	1.44	12	103	1.57	12	116	1.38	12	33	5.07	13	183	1.00
	2	4	14	3.47	12	38	4.48	8	23	5.07	12	35	4.86	6	12	6.75	4	17	3.22
	3	1	4	5.47	6	16	5.41	6	15	5.44	8	19	5.82	5	9	7.11	13	34	5.17
	4	3	7	5.17	12	28	6.09	4	5	11.62	6	14	6.01	6	11	7.51	6	23	3.74
	5	5	2	36.20	8	21	5.36	6	14	5.41	4	9	5.94	8	15	8.00	2	8	4.48
	6	12	38	4.59	6	15	6.04	4	11	5.11	4	10	5.86	8	14	8.13	3	8	5.04
	7	6	19	4.50	12	26	6.44	6	14	5.69	4	10	6.08	9	15	7.85	4	15	3.83
	8	3	8	5.14	12	23	7.29	4	10	5.45	8	17	6.46	8	14	8.02	3	8	4.68
	9	2	5	5.56	9	18	6.64	4	9	5.49	6	12	6.32	8	15	7.76	4	16	3.64
	Avg.			5.07			6.79			5.55			6.29			7.88			4.05
P3	1	8	41	2.71	11	281	0.54	12	109	1.49	11	424	0.36	11	261	0.59	12	44	3.90
	2	6	20	3.89	8	25	4.50	8	22	5.07	12	39	4.35	8	21	5.19	9	0	814.53
	3	8	30	3.67	8	21	5.30	6	14	5.29	12	31	5.52	4	11	5.49	4	15	3.54
	4	6	18	4.72	6	16	5.40	6	13	5.81	12	27	6.20	8	19	5.90	6	20	3.98
	5	6	18	4.46	6	15	5.52	6	13	5.82	12	0	437.81	5	1	44.03	4	15	3.69
	6	6	16	4.98	6	15	5.84	6	13	5.93	8	18	6.49	3	6	6.32	1	3	4.18
	7	4	12	4.87	6	15	5.64	6	13	6.08	6	13	6.34	2	3	8.19	13	31	5.85
	8	4	11	5.07	6	13	6.10	6	13	6.19	4	12	5.06	1	2	6.50	12	23	7.10
	9	9	23	5.23	6	13	6.10	6	13	6.58	6	12	6.60	11	22	7.19	4	14	3.85
	Avg.			5.06			5.95			6.28			6.00			7.29			5.60

Table B-234. 2nd 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	166	0.93	12	29	5.86	12	100	1.63	12	27	6.23	12	103	1.66	12	76	2.23
	2	6	24	3.19	9	18	6.58	12	29	5.69	8	15	7.66	6	12	6.30	5	22	3.23
	3	3	9	4.39	6	12	6.75	8	18	6.52	6	13	5.76	8	16	7.33	3	13	3.60
	4	4	15	3.86	3	5	7.93	8	17	6.59	4	9	6.42	6	11	7.22	3	8	4.77
	5	3	11	3.80	3	5	8.06	4	9	5.91	5	5	12.26	6	11	7.30	1	4	4.80
	6	4	15	3.93	5	15	4.21	3	4	8.26	2	3	8.48	38	13	40.15	2	7	4.92
	7	4	14	4.29	12	20	8.45	6	12	6.98	4	7	7.23	8	13	8.59	1	4	5.36
	8	6	21	3.91	12	19	9.07	4	9	6.34	4	9	7.14	9	13	8.86	13	29	6.11
	9	6	19	4.54	13	20	9.05	12	19	9.04	3	4	9.70	5	13	5.11	8	24	4.60
	Avg.			4.25			8.86			7.45			8.02			8.72			5.36
P2	1	7	46	2.23	11	107	1.46	12	81	2.01	12	92	1.73	12	28	6.25	8	44	2.45
	2	6	24	3.27	6	18	4.72	8	19	5.96	9	19	6.32	6	12	6.65	6	44	1.74
	3	6	23	3.39	4	11	4.74	12	25	6.96	12	23	7.35	4	9	5.94	12	75	2.21
	4	6	23	3.54	3	7	5.72	12	23	7.64	8	17	6.67	3	1	34.44	8	32	3.52
	5	6	22	3.45	3	7	5.92	12	22	7.58	9	17	7.38	3	4	8.71	6	25	3.07
	6	6	21	3.72	6	16	5.54	8	16	6.95	6	12	6.57	4	4	11.71	5	31	2.42
	7	6	21	4.04	3	7	6.15	8	15	7.46	9	16	7.95	2	3	9.63	4	16	3.28
	8	6	20	3.95	1	2	5.99	9	1	108.60	5	12	5.66	3	4	10.18	4	16	3.13
	9	6	19	4.15	2	4	8.30	8	16	7.05	9	15	8.11	6	10	8.07	4	15	3.39
	Avg.			4.05			6.81			7.26			7.24			9.29			3.27
P3	1	11	117	1.32	12	120	1.37	12	78	2.17	12	71	2.31	12	90	1.89	13	183	0.98
	2	12	58	2.74	6	16	5.18	6	12	6.30	6	13	6.33	5	15	4.74	8	29	3.98
	3	6	20	3.97	4	11	5.22	6	12	6.79	5	12	5.67	6	9	8.48	6	19	4.43
	4	2	7	5.06	4	10	5.86	8	16	6.99	4	8	7.39	6	9	8.66	6	18	4.46
	5	1	4	4.93	2	4	8.09	6	12	6.62	4	9	6.77	6	10	8.59	6	17	4.77
	6	5	17	4.33	13	23	7.74	6	10	8.52	4	9	6.28	6	9	8.88	6	18	4.57
	7	7	13	6.94	13	20	8.93	6	10	7.52	9	14	8.77	6	9	9.16	6	16	4.99
	8	4	11	4.84	13	20	8.73	6	10	7.56	6	11	7.83	9	12	9.88	4	13	4.39
	9	5	4	14.29	9	16	7.60	6	10	7.74	6	11	7.48	8	11	10.55	9	21	5.74
	Avg.			5.89			8.42			7.61			8.03			9.86			5.04

Table B-235. 2nd 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	52	2.05	12	60	2.90	12	215	0.75	13	761	0.23	12	68	2.48	12	107	1.57
	2	6	28	2.96	8	19	6.16	8	21	5.53	9	18	6.57	6	12	6.93	6	24	3.12
	3	6	27	3.00	6	13	6.25	13	24	7.41	9	17	7.19	4	9	6.50	6	21	3.85
	4	6	25	3.32	6	10	8.69	9	18	6.73	9	15	8.09	6	12	7.25	4	13	4.00
	5	6	25	3.37	4	11	5.51	8	17	6.77	7	13	7.25	7	9	11.52	13	40	4.36
	6	6	25	3.42	7	13	6.98	8	17	6.78	9	14	8.65	3	5	8.36	6	24	3.33
	7	8	32	3.52	6	12	6.49	9	16	7.40	13	8	21.44	2	3	9.70	6	18	4.41
	8	8	31	3.73	6	12	6.53	12	12	13.27	13	17	10.28	3	6	6.96	3	13	3.66
	9	8	32	3.58	6	12	6.77	6	12	6.72	13	17	10.56	7	12	7.82	6	17	4.75
	Avg.			3.61			6.65			7.06			10.42			8.16			4.27
P2	1	10	150	0.96	12	44	3.86	12	35	4.65	13	51	3.39	12	64	2.65	7	41	2.51
	2	6	23	3.30	12	23	7.36	6	10	7.61	13	24	7.42	8	20	5.72	4	26	2.24
	3	3	8	4.28	13	22	8.09	12	17	9.72	12	21	8.20	6	14	5.71	5	24	3.05
	4	2	5	4.85	13	20	9.03	6	12	6.86	9	16	7.52	8	1	167.70	8	1	87.50
	5	2	5	5.05	12	19	8.88	3	3	15.66	6	11	7.15	8	18	6.36	8	33	3.35
	6	12	34	4.72	12	18	9.03	3	3	10.78	9	15	7.76	6	13	5.83	8	30	3.71
	7	6	19	4.49	9	15	8.10	3	3	10.78	6	11	7.27	6	13	6.22	8	34	3.23
	8	4	13	4.12	9	15	8.42	1	2	8.04	4	8	7.06	6	13	6.22	8	31	3.53
	9	3	8	4.89	9	15	8.04	11	15	9.97	3	4	10.72	6	12	6.60	5	23	3.09
	Avg.			4.50			8.19			9.59			7.17			6.35			3.28

Table B-236. 2nd 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	77	2.11	12	116	1.44	13	905	0.19	12	63	2.65	12	121	1.41	8	37	3.12
	2	8	35	3.12	8	19	5.98	12	45	3.75	12	25	6.66	6	14	6.20	6	23	3.46
	3	10	23	5.91	5	10	6.36	9	18	6.75	12	22	7.63	4	10	6.21	6	13	6.17
	4	5	20	3.74	4	9	6.34	9	18	6.54	12	20	8.42	3	5	7.50	6	21	3.74
	5	8	28	3.76	4	9	6.45	13	23	7.80	12	20	8.37	4	10	6.28	3	16	2.56
	6	8	28	4.05	12	20	8.54	18	17	14.68	12	19	9.09	4	10	6.44	4	11	4.45
	7	4	19	2.91	9	16	7.61	9	17	7.12	8	14	8.09	2	3	8.78	13	32	5.52
	8	5	18	3.93	6	11	7.35	9	17	7.26	9	14	8.21	12	19	9.18	9	25	4.81
	9	8	26	4.09	4	9	6.53	8	15	7.55	12	17	9.95	6	12	7.27	6	20	4.08
	Avg.			3.64			7.16			7.31			8.75			8.41			4.80
P2	1	5	27	2.78	12	134	1.24	8	24	4.84	13	85	2.11	12	120	1.42	13	41	4.20
	2	2	10	2.64	8	22	5.26	3	10	4.87	12	20	8.40	6	15	5.51	8	25	4.51
	3	11	46	3.34	9	18	6.47	8	39	2.90	8	15	7.96	4	11	5.70	6	19	4.10
	4	3	14	3.22	9	19	6.19	4	12	4.69	8	13	8.61	4	11	5.51	6	18	4.53
	5	6	21	4.06	9	18	6.85	4	11	5.15	12	19	8.91	6	13	6.44	6	17	4.57
	6	2	7	4.63	8	18	6.50	2	5	6.90	12	1	180.30	6	12	6.82	6	17	4.71
	7	2	8	4.48	9	17	6.86	2	3	7.10	8	13	8.71	6	12	6.77	5	11	6.39
	8	3	7	6.01	9	17	6.94	12	23	7.30	9	14	8.32	4	9	6.15	4	12	5.11
	9	1	4	5.04	9	16	7.29	6	14	5.85	13	16	10.72	4	9	6.34	6	15	5.50
	Avg.			5.18			7.03			6.75			9.25			6.42			5.66

Table B-237. 3rd 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 15-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	20	3.24	12	112	1.43	12	37	4.60	12	106	1.53	12	109	1.57	13	307	0.61
	2	5	18	3.76	8	20	5.45	8	18	5.88	8	17	6.88	4	17	3.39	8	19	5.91
	3	8	25	4.19	8	18	5.88	5	11	6.45	6	11	7.22	5	10	7.18	6	15	5.47
	4	8	25	4.26	13	28	6.66	4	8	6.46	6	11	7.40	6	11	7.38	6	13	5.95
	5	5	1	45.55	13	27	6.96	3	7	6.09	6	10	8.07	6	11	6.76	6	12	6.47
	6	8	23	4.82	13	25	6.93	5	7	9.71	8	13	8.69	6	11	6.99	6	12	6.86
	7	8	22	5.07	12	23	7.47	5	10	7.13	8	13	9.07	4	8	7.12	6	12	6.28
	8	13	33	5.36	13	23	7.81	3	7	6.58	6	10	8.62	4	7	7.08	8	15	7.46
	9	8	20	5.48	6	12	6.55	4	1	39.90	6	9	8.16	4	8	6.55	8	15	7.18
	Avg.			5.30			7.28			6.86			8.62			6.92			6.97
P2	1	12	87	1.86	11	104	1.51	11	115	1.38	12	83	1.96	12	71	2.39	12	99	1.74
	2	12	61	2.67	12	36	4.76	2	4	6.11	3	9	5.18	7	17	5.87	8	14	8.44
	3	7	34	2.98	5	14	5.18	13	25	6.93	2	3	7.78	6	11	7.58	5	16	4.52
	4	5	24	2.85	3	7	5.75	3	8	6.04	13	20	8.57	3	4	11.31	4	15	3.43
	5	12	44	3.80	12	24	7.14	13	22	7.80	8	15	7.37	3	4	9.48	8	24	4.82
	6	12	42	3.93	3	8	6.10	3	7	6.13	3	8	5.87	13	19	9.06	6	19	4.02
	7	12	40	4.28	5	11	6.30	12	21	8.19	3	4	9.13	3	7	6.26	6	19	3.99
	8	5	19	3.90	12	20	8.58	5	11	5.95	2	4	8.09	2	3	9.58	4	15	3.52
	9	12	39	4.35	6	12	6.56	2	3	7.70	3	4	9.30	2	3	9.26	4	1	56.36
	Avg.			4.18			7.15			6.76			8.84			8.37			3.76
P3	1	5	18	3.74	12	1148	0.14	8	20	5.63	8	16	6.90	12	79	2.10	8	24	4.47
	2	3	9	4.47	12	38	4.44	12	25	6.65	4	9	5.53	6	12	6.62	6	17	4.52
	3	8	27	4.05	8	19	5.51	8	16	7.04	5	12	6.16	4	9	6.10	6	16	5.15
	4	8	24	4.44	8	20	5.41	5	11	6.27	5	12	6.22	4	9	5.44	6	15	5.13
	5	7	25	4.15	5	11	6.61	3	7	6.81	6	0	241.81	3	8	5.93	9	21	5.73
	6	8	23	4.93	5	12	6.21	3	7	6.77	4	9	6.42	4	8	6.00	8	20	5.80
	7	4	14	3.76	13	22	7.93	3	6	7.18	4	8	6.27	4	8	6.18	8	20	5.89
	8	2	7	4.36	12	22	7.79	3	9	4.73	4	9	6.50	4	8	7.20	13	29	6.24
	9	3	8	5.45	10	10	13.31	4	9	6.65	4	8	6.55	6	11	7.01	13	26	6.59
	Avg.			4.52			7.86			6.19			6.44			6.80			6.24

Table B-238. 3rd 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by 7.5-ton Smooth Single-drum Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	92	1.77	5	13	5.52	12	30	5.75	12	95	1.72	12	673	0.25	12	202	0.85
	2	12	70	2.35	10	12	10.76	6	11	7.38	6	13	5.66	6	10	7.67	8	44	2.39
	3	8	37	2.87	6	12	6.45	6	4	18.51	4	9	5.90	5	9	7.91	12	51	3.27
	4	5	24	2.98	6	11	7.17	6	11	7.98	5	12	6.25	3	7	5.43	12	74	2.28
	5	5	23	3.14	6	11	7.35	4	7	7.15	5	12	5.81	5	10	7.24	12	60	2.83
	6	6	23	3.38	4	8	7.12	4	7	8.11	6	11	6.82	8	14	8.17	12	46	3.74
	7	6	23	3.42	8	15	7.92	5	6	10.80	4	8	6.71	8	12	8.99	8	34	3.28
	8	6	23	3.56	8	11	9.74	6	9	8.41	6	12	6.95	6	9	8.77	12	56	3.09
	9	8	31	3.33	6	10	8.12	8	12	9.33	6	12	6.81	6	9	8.52	13	57	3.16
	Avg.			3.44			8.59			9.51			6.82			8.76			3.18
P2	1	12	60	2.84	12	351	0.48	8	22	4.83	12	38	4.45	6	13	7.02	12	44	3.82
	2	5	25	2.84	4	9	6.98	6	1	53.66	8	16	6.86	13	23	7.69	12	39	4.32
	3	4	15	3.39	2	3	7.78	1	3	6.28	6	11	7.25	9	14	8.63	12	37	4.56
	4	3	17	2.89	12	35	4.75	12	21	7.94	4	7	7.56	4	7	7.54	13	35	4.97
	5	3	2	27.77	6	11	7.40	8	16	7.11	6	10	7.92	2	5	7.40	6	20	4.03
	6	2	8	4.42	3	4	8.81	6	11	6.82	8	14	8.27	1	3	7.38	4	16	3.45
	7	4	15	3.29	1	0	22.63	4	8	6.55	8	13	8.79	1	1	8.85	3	8	5.14
	8	8	30	3.75	12	19	8.81	4	8	7.13	5	11	6.10	4	8	6.55	4	14	3.81
	9	2	8	4.53	5	10	6.93	3	5	7.57	2	5	6.32	4	9	6.15	6	1	57.98
	Avg.			3.86			7.87			7.08			7.07			7.18			4.47
P3	1	10	183	0.77	11	957	0.16	8	22	4.85	11	331	0.46	12	152	1.08	12	47	3.63
	2	5	25	2.87	8	12	8.92	5	9	7.43	4	11	4.73	12	30	5.68	8	23	5.01
	3	5	24	3.14	12	11	14.60	5	13	5.75	4	10	5.15	9	15	7.80	6	17	4.53
	4	12	48	3.62	8	15	7.33	3	8	4.89	2	5	6.52	6	11	7.65	13	27	6.52
	5	8	29	3.99	8	15	7.35	5	7	9.13	4	10	5.52	6	11	7.57	13	27	6.38
	6	8	29	3.89	8	14	7.73	3	8	6.04	1	3	6.44	6	10	8.08	6	16	4.82
	7	6	20	3.88	8	2	50.91	3	8	6.13	13	24	7.37	6	10	7.89	4	12	4.26
	8	8	27	4.19	8	13	8.21	5	11	6.48	8	17	6.82	4	8	7.42	6	16	4.83
	9	8	27	4.26	8	13	8.38	6	13	6.22	6	12	6.65	6	9	8.45	6	15	5.00
	Avg.			4.11			8.30			6.28			6.95			7.92			4.70

Table B-239. 3rd 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	3	13	3.13	12	402	0.42	8	16	6.35	12	530	0.32	12	136	1.20	12	154	1.08
	2	12	56	2.98	3	9	5.45	2	3	11.47	8	18	6.36	2	3	7.88	3	13	3.34
	3	5	21	3.05	1	2	7.10	12	18	9.52	8	15	7.03	13	20	8.84	3	14	3.23
	4	3	11	4.00	12	20	8.45	6	8	9.00	4	7	7.48	6	0	248.18	3	40	1.11
	5	3	4	10.83	8	15	7.27	4	6	8.43	1	3	6.45	5	9	7.73	0	0	12.73
	6	12	39	4.23	4	7	7.62	3	3	15.77	3	5	8.55	4	6	7.76	13	29	5.94
	7	3	12	4.05	13	19	9.35	4	1	67.11	2	3	12.02	5	6	11.85	5	20	3.68
	8	2	4	7.21	6	10	7.82	3	6	8.08	1	2	8.48	2	3	12.54	4	14	3.74
	9	2	5	6.14	6	2	46.48	4	6	7.95	2	3	11.01	0	0	15.27	5	17	4.31
	Avg.			5.80			8.58			8.01			10.50			13.22			3.91
P2	1	10	729	0.20	12	308	0.53	12	156	1.05	8	14	7.63	12	131	1.30	12	112	1.54
	2	5	19	3.67	6	11	6.82	5	10	7.30	6	9	8.06	7	12	7.66	8	22	4.95
	3	5	17	4.13	6	3	22.24	6	9	8.27	4	6	8.48	6	8	9.83	6	16	4.87
	4	11	15	10.37	3	7	6.93	6	9	8.75	2	3	11.64	9	14	8.62	5	16	4.17
	5	7	23	4.40	6	10	8.01	5	9	8.52	2	3	11.98	6	11	7.57	3	10	4.59
	6	12	16	10.03	6	9	8.41	5	8	9.26	3	5	9.26	6	10	8.78	13	26	6.87
	7	5	15	5.04	8	1	88.24	6	9	8.31	6	9	9.53	6	10	8.19	4	16	3.81
	8	7	21	4.84	6	9	8.70	6	9	8.90	6	8	9.93	6	10	8.45	5	15	4.97
	9	8	21	5.01	6	9	8.91	6	8	9.13	8	11	10.75	6	10	8.85	3	9	4.88
	Avg.			4.96			8.81			8.78			10.07			8.50			4.55
P3	1	7	47	2.18	12	108	1.56	11	108	1.43	12	89	1.83	12	149	1.15	12	391	0.44
	2	12	62	2.72	4	9	5.79	3	8	5.83	6	11	6.98	3	7	6.15	5	21	3.41
	3	4	17	3.23	13	22	8.02	12	21	8.18	4	8	6.39	1	1	12.38	2	5	5.01
	4	2	8	3.86	6	10	7.97	6	4	19.77	1	2	8.33	13	16	11.05	2	5	5.66
	5	1	5	4.31	4	1	97.90	1	1	9.38	12	16	10.68	4	6	7.76	2	5	5.99
	6	13	40	4.53	1	0	22.63	12	17	10.23	5	10	6.75	6	9	8.84	3	14	3.40
	7	5	21	3.44	13	18	9.67	12	16	10.48	3	4	10.74	12	16	10.84	2	5	6.36
	8	4	15	3.52	6	9	8.90	4	6	9.23	4	7	7.85	13	6	31.33	7	3	36.81
	9	3	1	35.48	3	3	11.18	6	9	9.30	2	3	12.34	9	11	10.87	13	43	4.09
	Avg.			3.48			9.92			9.67			10.31			10.85			5.23

Table B-240. 3rd 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Vibratory Plate Compactor

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	4	13	4.17	12	107	1.52	13	151	1.16	12	110	1.50	12	152	1.12	12	104	1.60
	2	3	12	3.65	8	18	6.21	6	9	8.13	8	16	6.91	8	17	6.79	5	19	3.82
	3	6	18	4.14	8	17	6.69	4	6	7.71	6	10	7.58	3	11	4.41	4	14	3.46
	4	6	18	4.27	6	12	6.26	2	3	9.92	8	14	7.93	5	10	6.92	3	6	6.23
	5	6	18	4.55	6	12	6.55	4	6	7.71	8	13	8.46	6	10	7.56	4	13	3.95
	6	4	12	4.44	6	12	6.71	6	9	8.74	8	13	8.80	5	10	7.47	4	12	4.05
	7	6	16	4.85	6	11	7.00	8	12	9.18	6	10	8.11	8	13	8.53	4	12	4.66
	8	5	16	4.16	6	11	6.67	8	12	9.46	4	10	5.86	7	0	1298.16	6	17	4.49
	9	6	16	4.87	6	12	6.90	8	12	9.48	8	13	8.51	5	10	7.69	6	17	4.83
	Avg.			4.63			6.86			9.38			7.49			8.11			4.66
P2	1	8	21	5.17	8	20	5.42	6	12	6.56	12	59	2.89	13	86	2.08	8	36	3.04
	2	3	19	2.43	4	4	14.62	3	6	7.18	6	14	5.93	6	0	1985.43	9	34	3.47
	3	1	4	3.60	4	0	190.91	2	3	9.47	2	5	5.70	3	11	4.44	5	6	10.93
	4	2	10	3.27	2	4	8.57	13	17	10.44	1	3	6.03	3	5	6.59	4	17	3.08
	5	2	5	4.24	2	4	8.65	5	11	6.98	2	3	7.37	2	1	34.62	9	31	3.94
	6	14	44	4.29	13	20	8.60	3	7	6.30	2	3	7.70	2	5	6.57	13	39	4.51
	7	13	41	4.31	6	12	6.58	2	3	9.36	2	3	7.27	1	3	6.28	13	37	4.65
	8	11	24	6.44	2	4	8.40	4	2	36.36	4	9	6.64	4	10	5.79	4	16	3.24
	9	4	17	3.26	12	20	8.69	2	3	10.46	3	5	6.84	2	5	7.04	1	4	4.55
	Avg.			4.67			7.89			9.91			6.92			6.37			4.15

Table B-241. 3rd 15" Lift of Surface Saturated AASHTO #8 Aggregate Compacted by Hand Impact Rammer

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)			Middle (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	2	9	3.74	12	82	2.03	13	216	0.81	12	142	1.19	13	82	2.24	13	383	0.46
	2	2	8	3.15	5	13	5.52	8	16	6.71	8	15	7.80	6	12	6.67	12	45	3.63
	3	5	23	3.17	3	8	4.43	6	12	6.72	6	10	7.95	4	8	6.42	5	21	3.46
	4	5	22	3.35	3	7	7.01	6	12	6.57	4	7	7.39	3	8	6.23	12	38	4.56
	5	8	31	3.51	4	6	8.48	6	12	6.81	4	8	7.27	6	11	7.87	8	27	4.05
	6	5	21	3.45	5	11	6.43	6	12	6.81	6	9	8.66	4	8	6.30	4	13	3.99
	7	6	21	3.56	5	12	6.17	6	12	7.30	6	8	10.77	4	7	7.61	2	5	5.52
	8	5	21	3.46	5	11	6.41	8	16	7.07	4	8	6.84	4	8	7.53	2	4	5.66
	9	5	20	3.66	5	11	6.41	8	15	7.55	6	9	8.63	9	14	8.16	12	33	5.10
	Avg.			3.56			6.33			7.31			8.75			7.77			5.42
P2	1	2	9	3.01	12	118	1.47	13	170	1.03	12	117	1.45	13	61	2.94	13	717	0.24
	2	13	61	2.98	5	16	4.61	3	8	5.07	6	15	5.42	6	12	6.47	6	18	4.26
	3	6	29	2.61	2	4	6.54	2	3	8.29	4	10	5.34	6	12	6.81	5	18	4.06
	4	13	50	3.59	12	29	5.70	1	2	8.31	2	5	5.61	2	3	10.05	5	17	4.39
	5	5	26	2.89	5	15	4.92	12	20	8.22	12	22	7.83	1	1	11.57	6	17	4.52
	6	4	0	218.18	3	4	9.85	8	15	7.52	13	23	7.66	13	16	11.35	6	17	4.46
	7	2	9	3.39	13	24	7.17	6	12	6.64	8	17	6.93	6	9	8.59	5	16	4.37
	8	2	10	3.42	5	14	5.49	4	8	6.43	6	12	6.43	2	3	9.67	6	16	4.85
	9	2	9	3.80	3	9	5.41	6	12	6.88	4	9	6.31	4	7	7.62	8	22	4.93
	Avg.			3.54			6.02			6.65			6.55			8.63			4.72

Table B-242. 1st 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by 15-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	23	4.77	12	105	1.60	13	464	0.38	7	23	4.38
	2	5	13	5.47	6	21	3.76	6	16	5.69	7	21	4.91
	3	5	13	5.81	3	8	5.66	4	9	6.11	10	26	5.15
	4	5	12	5.91	4	9	5.68	4	8	6.42	6	15	5.70
	5	5	12	6.20	5	12	5.85	4	8	6.48	4	9	6.25
	6	4	9	5.73	4	9	5.81	4	7	7.08	4	9	5.46
	7	4	9	6.09	4	9	5.88	4	8	6.84	3	5	7.74
	8	4	9	5.94	2	5	5.95	4	8	7.42	5	11	5.82
	9	4	9	6.31	5	10	6.12	4	8	6.65	8	18	6.22
	Avg.			6.11			5.98			6.97			6.59
P2	1	10	37	3.72	12	856	0.19	7	19	4.69	12	264	0.65
	2	8	22	5.02	6	18	4.75	7	17	5.29	13	40	4.61
	3	10	27	5.19	5	13	5.60	7	18	5.25	8	21	5.41
	4	7	15	5.95	6	12	6.78	7	17	5.60	7	14	6.51
	5	7	14	6.49	5	12	5.60	6	13	5.97	8	18	6.36
	6	11	23	6.70	10	25	5.67	7	15	6.14	8	18	6.21
	7	13	29	6.36	7	14	6.65	7	16	5.92	8	17	6.51
	8	10	22	6.33	6	12	6.60	7	15	6.20	7	1	187.97
	9	7	14	6.64	4	9	6.54	7	15	6.48	7	14	6.96
	Avg.			6.44			6.60			6.20			6.73
P3	1	12	142	1.14	8	21	5.36	12	348	0.48	12	64	2.64
	2	6	14	6.10	7	15	6.02	7	17	5.28	5	12	5.68
	3	3	8	6.23	7	15	6.35	4	13	4.11	4	9	6.03
	4	4	8	6.82	5	11	6.34	4	9	5.91	6	11	6.63
	5	4	8	6.63	6	8	9.80	3	5	7.54	7	13	7.25
	6	5	10	6.54	4	9	6.71	4	9	6.08	8	17	6.58
	7	6	12	6.82	5	11	6.95	4	9	6.54	10	21	7.02
	8	10	19	7.26	5	11	6.98	4	9	6.48	8	16	7.20
	9	8	15	7.22	5	10	7.19	4	8	6.51	7	13	7.61
	Avg.			7.10			7.04			6.51			7.28

Table B-243. 1st 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	36	3.95	10	32	4.27	12	418	0.40	12	1099	0.15
	2	8	26	4.38	10	27	5.33	6	17	4.77	8	23	4.68
	3	13	31	5.98	8	19	5.91	5	13	4.98	4	10	5.19
	4	10	29	4.91	7	14	6.54	4	10	5.26	5	6	10.98
	5	14	30	6.32	7	14	6.49	5	12	5.33	4	10	5.50
	6	13	29	6.37	6	11	7.06	5	1	104.81	3	6	7.50
	7	11	27	5.47	7	14	6.83	14	16	11.97	4	9	5.85
	8	13	27	6.87	7	13	7.14	4	9	6.04	5	12	5.93
	9	13	27	7.01	7	13	7.21	6	9	8.98	7	15	6.33
	Avg.			6.45			7.06			7.51			6.04
P2	1	13	59	3.01	13	69	2.60	12	275	0.60	10	39	3.59
	2	8	29	3.69	10	39	3.53	6	20	4.49	6	18	4.79
	3	6	19	4.48	8	27	4.11	5	14	4.99	5	14	5.32
	4	7	19	4.75	8	26	4.31	4	11	5.00	5	14	4.82
	5	8	25	4.30	8	24	4.86	3	7	6.04	4	11	5.26
	6	6	18	4.80	8	24	4.71	3	7	5.99	4	10	4.99
	7	6	18	4.89	8	24	4.77	3	0	167.27	3	7	6.59
	8	7	18	5.19	10	31	4.52	5	13	5.66	5	12	6.05
	9	4	18	3.28	8	23	5.00	5	13	5.73	5	11	6.56
	Avg.			4.45			4.76			5.69			6.40
P3	1	10	38	3.54	10	34	3.96	12	114	1.52	12	111	1.50
	2	8	24	4.59	6	16	5.69	8	22	4.78	13	49	3.58
	3	5	13	5.42	8	20	5.44	3	13	3.84	10	29	4.75
	4	5	12	5.79	8	20	5.54	5	11	5.99	10	27	5.18
	5	8	20	5.43	10	25	5.58	5	12	5.77	8	20	5.75
	6	8	20	5.57	13	33	5.62	3	9	5.31	7	15	6.13
	7	7	16	5.91	10	25	5.79	5	11	6.30	8	18	6.09
	8	8	19	5.69	10	23	6.07	6	12	6.95	8	18	6.16
	9	13	29	6.29	8	18	6.36	7	14	6.62	8	18	6.31
	Avg.			5.97			6.08			6.62			6.19

Table B-244. 1st 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	62	1.55	10	1279	0.11	13	56	3.16	11	210	0.75	11	221	0.72	6	1669	0.05
	2	5	36	1.55	3	21	1.79	10	52	2.54	6	31	2.43	13	68	2.55	3	13	3.15
	3	6	34	1.69	3	11	3.38	6	28	2.89	4	24	2.48	5	72	0.90	4	20	2.86
	4	6	32	1.82	6	28	2.76	4	19	3.02	5	24	2.71	6	25	3.37	4	22	2.85
	5	6	32	1.82	7	38	2.54	6	28	2.94	5	24	2.86	8	32	3.33	6	28	2.99
	6	5	26	1.93	4	19	2.99	13	45	3.98	5	24	2.70	6	24	3.53	3	14	3.22
	7	4	25	1.85	4	14	3.75	10	46	2.91	5	24	2.77	5	17	3.76	5	6	11.28
	8	5	24	1.99	4	20	2.92	6	27	3.10	5	23	2.79	3	11	3.35	5	20	3.25
	9	6	32	1.98	3	13	3.17	6	26	3.16	6	28	3.05	5	17	3.80	4	20	3.09
	Avg.			1.94			3.28			3.05			2.87			3.64			3.17
P2	1	13	90	1.51	10	241	0.57	12	74	2.34	12	584	0.28	13	1	238.47	7	37	2.73
	2	13	66	2.04	12	104	1.58	7	41	2.38	13	56	3.18	10	47	2.84	8	36	2.86
	3	6	34	1.83	7	35	2.66	4	18	3.16	10	45	3.05	7	32	3.22	6	24	3.42
	4	4	25	1.77	12	57	2.97	3	12	3.49	8	31	3.45	6	23	3.59	6	23	3.39
	5	13	54	2.52	9	46	2.77	6	26	3.10	6	23	3.78	5	17	3.79	6	24	3.50
	6	8	40	2.05	6	27	3.19	4	17	3.57	6	22	4.07	6	1	92.12	4	17	3.75
	7	4	23	1.93	6	21	3.70	4	18	3.50	8	30	3.60	4	16	3.86	5	23	3.10
	8	6	29	2.12	4	13	3.75	2	11	2.97	6	22	3.90	3	11	4.14	13	40	4.60
	9	10	46	2.21	3	9	4.69	3	11	4.07	5	27	2.33	5	16	4.17	10	38	3.61
	Avg.			2.08			4.05			3.51			3.28			4.05			3.77
P3	1	10	175	0.60	9	417	0.30	12	79	2.15	5	32	2.16	5	27	2.72	12	160	1.00
	2	6	57	1.09	3	14	3.06	5	29	2.45	9	69	1.83	10	54	2.44	5	30	2.43
	3	6	64	0.98	5	26	2.68	4	20	2.90	7	47	2.18	8	37	2.89	3	12	3.35
	4	8	87	1.01	6	26	3.04	3	6	5.97	6	32	2.41	8	37	2.94	2	8	4.39
	5	8	86	1.00	4	17	3.52	1	4	4.90	4	21	2.61	6	26	3.23	3	12	3.24
	6	8	88	0.99	3	12	3.82	2	6	4.83	3	14	2.55	6	26	3.26	4	10	5.68
	7	3	46	0.72	6	23	3.34	2	6	4.97	5	30	2.46	6	25	3.42	1	5	3.95
	8	6	63	0.90	6	23	3.48	6	26	3.12	3	13	3.33	6	25	3.46	8	39	2.65
	9	8	83	1.04	6	23	3.39	6	26	2.88	3	12	3.05	8	32	3.38	6	28	2.99
	Avg.			0.89			3.40			3.66			2.95			3.42			3.20

Table B-245. 1st 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by Vibratory Plate Compactor

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	116	1.42	12	178	0.90	12	109	1.56	12	114	1.50
	2	13	63	2.79	4	19	2.62	11	87	1.70	9	63	1.87
	3	13	58	3.04	4	19	2.70	13	53	3.31	5	35	2.02
	4	9	53	2.44	4	18	2.98	8	39	2.65	3	14	2.76
	5	9	54	2.40	6	26	2.96	6	30	2.71	4	24	2.47
	6	7	38	2.58	4	18	2.97	4	23	2.74	7	38	2.56
	7	6	29	2.64	6	26	2.93	4	15	3.82	11	32	4.88
	8	10	3	40.73	3	11	3.62	4	21	3.01	6	30	2.68
	9	10	49	2.72	4	17	3.15	3	0	186.66	6	30	2.71
	Avg.			2.68			3.23			3.42			3.42
P2	1	13	95	1.86	13	143	1.22	13	89	2.06	7	29	3.32
	2	7	31	3.19	10	40	3.37	10	43	3.14	9	40	3.27
	3	5	21	3.46	9	38	3.47	7	31	3.27	6	22	3.45
	4	9	39	3.20	7	26	3.92	13	42	4.40	3	13	3.79
	5	13	45	4.06	12	34	5.09	13	40	4.65	4	14	4.10
	6	13	50	3.56	9	31	4.20	10	37	3.69	7	24	4.28
	7	13	47	3.74	6	1	112.00	6	20	4.01	10	32	4.22
	8	13	37	4.85	5	18	3.98	5	21	3.12	7	25	4.03
	9	13	42	4.27	4	12	4.75	3	7	5.66	7	23	4.27
	Avg.			4.29			4.37			4.26			4.17
P3	1	9	42	3.03	12	134	1.29	7	36	2.73	13	108	1.64
	2	6	22	3.62	8	25	4.16	6	29	2.81	13	53	3.35
	3	4	21	2.83	7	24	4.30	3	13	3.50	10	47	2.84
	4	6	21	3.73	8	24	4.37	2	6	5.36	10	46	2.90
	5	6	1	138.18	6	18	4.54	2	7	3.68	4	26	2.16
	6	7	14	6.82	5	13	5.06	2	6	5.43	6	26	3.08
	7	4	15	3.36	3	8	5.69	2	6	5.48	6	26	3.14
	8	4	15	3.99	5	13	4.98	3	12	4.10	6	27	3.03
	9	4	14	4.32	4	13	4.89	4	16	3.81	6	26	3.27
	Avg.			3.89			5.18			4.46			3.15

Table B-246. 1st 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by Hand Impact Rammer

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	39	2.46	13	128	1.36	9	61	2.14	13	110	1.58
	2	4	20	2.75	7	38	2.55	10	55	2.39	7	34	2.89
	3	5	26	2.81	4	20	2.93	10	52	2.58	4	17	3.36
	4	5	1	130.91	3	13	3.33	10	50	2.64	7	30	3.35
	5	6	25	3.09	3	12	3.39	10	48	2.74	13	53	3.43
	6	4	18	3.15	4	0	492.11	9	48	2.74	10	38	3.51
	7	4	19	2.98	4	13	4.07	9	46	2.81	7	30	3.42
	8	3	12	3.51	2	7	3.50	7	33	2.85	10	38	3.49
	9	5	12	5.41	3	11	3.89	13	61	2.85	13	57	3.10
	Avg.			3.97			3.82			2.84			3.34
P2	1	13	117	1.51	12	116	1.49	12	90	1.90	13	107	1.63
	2	13	47	3.81	7	35	2.93	8	31	3.40	7	32	3.21
	3	7	30	3.40	5	19	3.37	7	30	3.45	6	23	3.69
	4	6	22	3.69	8	31	3.36	6	22	3.80	5	18	3.78
	5	2	4	7.07	5	18	3.74	6	21	3.92	5	16	4.08
	6	3	9	4.81	2	6	5.34	6	22	4.00	4	22	2.49
	7	12	30	5.76	5	17	3.94	6	21	4.05	8	27	3.89
	8	7	23	4.36	3	12	3.99	6	20	4.03	8	27	4.04
	9	6	18	4.35	3	11	4.24	14	36	5.24	13	35	4.94
	Avg.			4.82			4.06			4.44			4.29
P3	1	12	178	0.94	5	29	2.43	12	124	1.38	12	110	1.54
	2	7	51	1.86	7	42	2.18	7	37	2.67	13	56	3.17
	3	9	62	2.11	4	20	2.49	7	35	2.88	13	50	3.50
	4	10	2	65.05	3	19	1.87	6	26	3.11	7	31	3.23
	5	6	36	2.24	5	29	2.35	3	13	3.48	6	24	3.28
	6	4	24	2.20	7	39	2.43	5	16	4.18	7	31	3.25
	7	3	15	2.70	4	28	2.22	2	6	4.04	4	16	3.62
	8	5	33	2.28	4	19	2.68	3	11	3.77	3	12	3.97
	9	6	32	2.41	4	20	2.62	3	12	3.64	3	7	5.45
	Avg.			2.46			2.51			3.81			4.35

Table B-247. 2nd 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by 15-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	22	5.01	10	36	3.86	13	419	0.42	8	21	5.01
	2	6	8	10.23	8	22	4.92	10	31	4.55	6	15	5.85
	3	6	14	6.01	6	18	4.99	6	16	5.54	6	14	6.10
	4	8	17	6.33	7	16	5.73	6	15	5.76	7	14	6.43
	5	8	17	6.59	6	16	5.50	8	18	6.10	13	24	7.47
	6	8	16	6.78	7	15	6.14	8	17	6.39	13	24	7.79
	7	7	13	7.18	13	24	7.59	8	17	6.69	11	21	7.05
	8	6	12	7.44	10	22	6.47	7	13	6.84	8	17	6.79
	9	8	15	7.25	10	21	6.62	8	17	6.54	8	16	7.29
	Avg.			7.29			6.89			6.69			7.04
P2	1	10	28	5.05	8	23	4.89	8	23	4.72	8	22	4.89
	2	8	17	6.39	6	15	5.76	7	16	5.78	6	14	5.86
	3	7	13	6.94	5	11	6.41	5	11	6.12	13	30	6.22
	4	6	13	7.00	3	5	7.74	4	1	101.82	8	18	6.41
	5	5	10	6.92	3	5	7.71	13	27	6.74	5	10	7.01
	6	4	8	7.05	2	25	1.37	10	23	6.24	4	7	7.12
	7	3	5	8.22	13	21	8.63	7	13	6.85	2	3	8.91
	8	3	0	127.27	10	19	7.53	7	13	7.12	1	2	9.55
	9	3	5	8.63	5	12	5.44	14	24	7.84	1	2	9.55
	Avg.			8.43			7.20			7.27			9.33
P3	1	12	130	1.29	10	34	4.23	10	33	4.17	13	39	4.68
	2	10	31	4.60	8	22	5.00	10	30	4.59	10	26	5.60
	3	10	26	5.30	8	20	5.65	8	21	5.26	8	19	5.88
	4	13	28	6.55	8	20	5.69	8	20	5.54	8	19	6.05
	5	10	23	6.19	8	19	5.86	8	20	5.38	8	18	6.36
	6	8	17	6.73	7	15	6.10	10	26	5.41	6	14	6.51
	7	8	17	6.86	7	15	6.28	10	25	5.55	7	13	6.80
	8	8	16	6.95	8	18	6.08	10	24	5.84	7	13	6.95
	9	8	16	7.27	10	23	6.19	10	23	6.04	6	13	6.89
	Avg.			7.03			6.18			5.81			6.88

Table B-248. 2nd 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	117	1.47	12	112	1.52	8	27	4.23	13	286	0.61
	2	10	35	4.00	8	24	4.46	7	19	4.87	10	15	9.58
	3	8	23	4.85	7	16	5.80	8	24	4.63	8	23	4.88
	4	7	17	5.32	5	12	6.02	6	17	5.19	7	17	5.45
	5	7	17	5.71	7	15	6.11	5	12	5.62	5	13	5.53
	6	7	16	5.84	8	19	5.78	5	13	5.38	4	10	5.68
	7	7	16	5.78	6	15	6.07	4	9	6.07	2	4	8.76
	8	7	15	6.21	7	6	15.47	4	9	5.75	3	6	7.22
	9	7	15	6.23	7	16	5.91	5	12	6.03	4	8	6.39
	Avg.			6.08			5.99			5.95			7.46
P2	1	12	465	0.37	12	514	0.33	13	43	4.20	13	38	4.81
	2	8	24	4.37	8	25	4.32	10	32	4.48	13	33	5.59
	3	8	22	5.04	8	24	4.67	8	22	4.95	10	27	5.25
	4	7	15	6.13	7	16	5.81	8	19	5.66	13	28	6.60
	5	7	15	6.48	5	11	6.73	8	19	5.96	13	26	7.17
	6	7	13	6.89	5	11	6.43	10	24	6.11	13	24	7.80
	7	7	14	6.68	6	11	7.25	8	18	6.34	13	23	7.96
	8	5	11	6.86	6	10	7.38	4	14	4.04	10	21	6.69
	9	5	10	7.33	7	13	6.99	6	13	6.57	8	17	6.76
	Avg.			6.96			7.21			5.65			7.14
P3	1	12	120	1.37	2	3	8.69	13	121	1.45	12	122	1.40
	2	10	10	14.22	4	8	6.45	10	43	3.23	13	37	4.95
	3	8	20	5.48	6	11	6.96	10	39	3.56	13	29	6.23
	4	7	15	6.13	5	11	6.80	8	28	4.06	13	28	6.67
	5	4	11	4.60	7	14	6.60	8	25	4.42	13	26	7.00
	6	5	12	6.21	8	17	6.41	6	18	4.99	13	25	7.48
	7	7	15	6.33	7	14	6.71	7	18	4.95	13	24	7.63
	8	4	12	4.17	6	10	7.47	7	18	5.15	13	22	8.20
	9	4	11	4.76	7	13	7.10	7	18	5.29	10	22	6.55
	Avg.			5.09			7.09			5.13			7.46

Table B-249. 2nd 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	23	4.24	12	114	1.48	10	33	4.07	12	117	1.44	12	156	1.10
	2	8	22	4.64	7	16	5.74	13	36	4.95	10	33	4.17	13	37	4.78
	3	5	12	5.43	7	15	6.28	8	20	5.37	7	20	5.10	8	22	5.16
	4	13	40	4.54	6	23	3.28	6	14	6.27	8	21	5.30	6	15	5.74
	5	8	19	5.45	3	6	7.48	6	14	6.26	8	20	5.32	6	15	5.79
	6	8	19	5.50	5	12	6.20	6	14	5.96	10	24	5.68	7	15	6.16
	7	6	15	5.79	5	13	5.32	8	19	5.77	10	26	5.36	8	19	5.59
	8	6	14	6.44	7	13	6.78	8	18	6.17	10	24	5.80	8	19	5.86
	9	13	26	7.02	8	17	6.55	13	25	7.00	10	24	5.78	7	15	6.13
	Avg.			6.42			6.22			6.31			5.65			5.86
P2	1	7	24	4.24	12	108	1.54	13	502	0.35	12	116	1.47	6	19	4.09
	2	6	17	5.19	6	17	4.93	13	42	4.38	10	34	3.98	13	37	4.89
	3	7	16	5.78	7	2	43.50	13	32	5.71	14	17	11.26	6	17	5.10
	4	7	16	5.77	5	12	5.79	13	28	6.41	6	15	5.72	6	16	5.01
	5	8	19	5.98	7	15	6.11	8	17	6.32	6	14	6.05	4	16	3.56
	6	6	8	10.08	5	11	6.12	7	13	6.70	13	28	6.38	6	15	5.44
	7	5	11	6.45	5	11	6.14	5	10	6.92	10	24	6.04	6	15	5.73
	8	7	14	6.70	5	11	6.34	7	13	7.05	6	15	6.04	4	9	5.68
	9	13	30	5.96	6	6	12.48	5	11	6.81	10	22	6.37	3	8	4.96
	Avg.			6.37			6.24			6.93			6.15			5.46
P3	1	13	49	3.74	4	31	1.80	12	117	1.48	12	115	1.46	9	46	2.81
	2	6	16	5.29	5	18	3.58	10	33	4.22	8	21	5.27	13	45	4.01
	3	5	15	4.81	8	26	4.13	8	21	5.22	7	15	6.21	8	31	3.48
	4	3	4	10.45	10	33	3.98	7	15	6.00	4	10	5.23	6	21	3.97
	5	2	3	8.80	8	23	4.60	8	20	5.67	10	23	5.91	5	17	4.13
	6	9	15	7.79	7	23	4.54	8	20	5.84	13	23	7.81	8	27	3.99
	7	5	12	5.69	5	22	2.95	8	18	6.27	8	16	6.69	8	29	3.83
	8	5	11	6.27	6	16	5.22	7	14	6.42	6	12	7.32	6	18	4.98
	9	7	14	6.38	6	16	5.54	6	11	6.94	4	9	5.71	7	26	3.90
	Avg.			6.12			5.38			6.54			6.57			4.24

Table B-250. 2nd 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by Vibratory Plate Compactor

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	31	5.83	13	1397	0.13	3	4	10.69	12	62	2.74
	2	8	21	5.40	13	29	6.49	8	20	5.48	13	30	5.98
	3	7	17	5.54	8	20	5.63	9	1	101.82	13	25	7.08
	4	5	13	5.62	5	12	5.83	8	19	5.88	13	35	5.18
	5	6	13	5.76	3	5	7.68	8	18	6.17	10	25	5.72
	6	6	13	6.15	4	8	6.40	10	22	6.36	10	24	5.88
	7	7	16	6.07	4	8	6.49	13	25	7.31	10	23	6.22
	8	7	16	5.88	4	8	6.48	10	22	6.47	7	22	4.58
	9	7	15	6.13	7	14	6.84	8	18	6.29	6	16	5.57
	Avg.			6.03			6.60			6.69			5.46
P2	1	13	41	4.38	13	73	2.47	13	82	2.12	13	44	4.01
	2	2	27	1.28	13	37	4.97	10	23	6.04	13	23	7.71
	3	13	17	10.55	8	23	4.84	8	16	7.07	13	20	8.80
	4	8	13	8.56	5	14	4.95	7	12	7.51	10	17	7.81
	5	7	10	8.85	4	9	5.68	8	16	7.04	8	14	7.81
	6	6	11	8.27	4	10	5.15	5	11	6.57	7	11	8.55
	7	8	12	9.35	3	5	7.11	13	19	9.92	6	11	7.96
	8	8	11	9.49	4	9	5.70	10	15	9.39	10	6	24.92
	9	8	11	9.69	3	6	6.83	8	13	8.94	8	12	8.70
	Avg.			9.51			6.55			9.42			8.33
P3	1	13	71	2.45	13	34	5.41	13	82	2.19	13	45	4.04
	2	8	16	6.58	8	20	5.37	10	24	5.97	13	23	8.12
	3	8	16	6.90	7	16	5.51	10	23	6.05	10	16	8.42
	4	6	13	6.67	5	13	5.36	8	16	6.99	8	13	8.56
	5	5	11	6.12	5	13	5.48	7	13	7.21	7	0	244.36
	6	4	11	5.64	5	12	5.55	5	10	7.39	4	0	264.72
	7	3	5	8.61	10	22	6.30	6	10	7.41	5	8	9.00
	8	5	9	7.50	8	19	6.03	5	10	7.11	7	9	9.88
	9	5	9	8.01	7	15	5.98	7	11	8.13	5	7	10.01
	Avg.			8.04			6.10			7.55			9.63

Table B-251. 2nd 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by Hand Impact Rammer

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	105	1.74	13	67	2.72	8	29	3.78	13	72	2.55
	2	8	22	5.18	8	39	2.92	7	20	4.56	8	23	4.86
	3	13	26	6.90	8	20	5.65	5	15	4.58	8	23	5.07
	4	8	17	6.31	8	19	5.92	4	12	4.45	8	22	5.11
	5	5	12	6.01	7	15	6.08	4	11	4.91	8	22	5.13
	6	5	11	6.81	9	1	113.13	5	15	4.81	8	20	5.38
	7	7	13	6.99	8	18	6.35	5	15	4.69	8	21	5.46
	8	6	16	5.41	7	13	7.03	13	31	5.82	8	21	5.51
	9	3	29	1.45	7	13	6.94	8	23	4.94	7	16	5.68
	Avg.			6.20			6.77			5.15			5.55
P2	1	10	31	4.36	12	70	2.47	13	97	1.84	7	17	5.55
	2	13	30	6.06	5	19	3.78	6	19	4.14	13	144	1.25
	3	8	22	5.12	8	18	6.43	4	10	5.29	8	26	4.12
	4	6	17	5.28	10	21	6.77	4	10	5.50	6	20	4.37
	5	8	1	145.09	10	19	7.32	3	10	3.96	5	16	3.97
	6	7	16	5.98	8	14	8.08	4	5	11.98	6	19	4.48
	7	6	15	5.88	7	12	7.74	7	17	5.33	6	18	4.91
	8	13	23	8.15	8	14	8.29	7	16	5.63	6	17	5.18
	9	8	17	6.32	5	9	8.15	7	16	5.71	6	17	5.06
	Avg.			6.78			8.06			5.56			5.19
P3	1	13	65	2.76	4	14	3.93	13	99	1.79	6	16	5.35
	2	10	23	5.76	13	35	5.21	9	27	4.78	13	35	5.15
	3	8	16	6.68	10	29	4.58	8	20	5.37	8	20	5.39
	4	8	15	7.08	13	40	4.42	8	19	5.85	6	15	5.85
	5	13	21	8.74	7	22	4.55	8	19	5.74	7	21	4.69
	6	13	20	9.13	6	17	4.61	6	14	6.33	4	13	4.09
	7	10	19	7.08	2	4	7.27	5	11	5.72	4	8	6.67
	8	8	16	6.71	1	3	6.79	5	11	5.81	5	10	6.49
	9	6	13	6.67	3	4	10.09	5	11	5.98	6	9	9.22
	Avg.			6.82			8.05			5.84			7.51

Table B-252. 3rd 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by 15-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	95	1.86	12	100	1.66	10	24	5.58	12	115	1.48
	2	10	19	7.17	8	16	6.63	8	16	6.82	13	41	4.43
	3	10	18	7.57	6	11	7.45	7	14	7.07	10	23	6.13
	4	8	14	8.17	8	14	7.52	13	22	8.19	10	21	6.58
	5	8	13	8.62	10	18	7.49	7	14	7.25	12	581	0.30
	6	8	12	8.92	10	17	7.88	14	35	5.43	8	38	2.97
	7	8	12	9.15	10	17	7.80	11	18	8.08	14	10	19.21
	8	10	15	9.39	10	16	8.53	6	15	5.52	4	11	4.91
	9	10	15	9.43	13	18	10.00	10	17	8.15	13	560	0.32
	Avg.			9.32			8.77			7.25			4.91
P2	1	12	107	1.59	13	32	5.59	11	109	1.38	12	111	1.53
	2	6	14	5.92	10	21	6.46	12	65	2.46	8	21	5.18
	3	12	26	6.37	8	16	7.00	13	27	6.64	8	20	5.61
	4	13	25	7.44	7	12	7.65	12	32	5.05	10	21	6.48
	5	10	21	6.98	8	14	7.89	13	22	8.02	10	22	6.28
	6	8	16	7.20	8	14	8.05	12	24	7.08	10	21	6.69
	7	7	12	7.68	6	10	8.38	12	47	3.66	10	20	7.13
	8	5	9	7.97	5	9	8.22	13	23	8.07	13	11	16.32
	9	7	12	7.98	10	17	8.31	13	25	7.20	13	21	8.75
	Avg.			7.87			8.30			7.64			7.94
P3	1	12	112	1.49	12	273	0.62	12	383	0.45	13	112	1.59
	2	10	23	5.84	8	19	5.91	10	25	5.50	10	25	5.72
	3	8	15	7.47	10	22	6.42	10	22	6.40	10	23	6.34
	4	8	13	8.74	10	21	6.82	8	15	7.03	14	23	8.21
	5	10	16	8.69	10	20	7.17	8	15	7.37	13	42	4.29
	6	13	18	9.89	10	19	7.57	13	21	8.56	13	45	3.99
	7	13	18	10.09	8	15	7.51	13	27	6.48	10	18	8.09
	8	13	18	10.07	8	15	7.63	10	18	7.83	9	22	5.60
	9	13	18	10.11	8	15	7.58	10	17	8.41	10	18	7.85
	Avg.			10.09			7.57			7.57			7.18

Table B-253. 3rd 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	109	1.60	13	67	2.64	8	20	5.41	12	87	1.96
	2	8	19	6.00	13	32	5.65	8	18	6.03	8	16	6.88
	3	8	18	6.41	13	25	7.38	10	22	6.60	8	15	7.41
	4	10	20	7.06	13	24	7.78	10	1	212.62	10	18	7.77
	5	10	20	7.08	13	22	8.41	10	19	7.21	10	17	8.39
	6	10	18	7.71	13	21	8.74	10	19	7.49	10	16	8.69
	7	10	18	8.16	13	20	9.04	10	19	7.46	8	13	8.46
	8	13	19	9.57	13	20	9.44	13	20	9.24	8	13	8.67
	9	10	17	8.04	13	19	9.66	13	19	9.51	11	16	9.54
	Avg.			8.59			9.38			8.74			8.89
P2	1	11	255	0.62	12	115	1.50	12	110	1.57	12	104	1.64
	2	13	36	5.05	13	32	5.69	13	31	5.77	13	43	4.07
	3	10	24	5.86	11	21	6.82	8	17	6.36	10	20	7.08
	4	7	14	6.79	8	16	7.13	8	14	7.89	8	14	8.13
	5	7	12	7.32	7	12	7.79	10	21	6.70	5	8	8.32
	6	8	3	35.57	6	10	8.72	5	15	4.82	5	9	8.56
	7	6	15	5.38	6	11	8.21	7	2	40.19	6	10	8.68
	8	8	5	23.18	4	8	6.55	13	21	8.79	7	12	8.46
	9	7	11	8.01	5	8	8.31	10	19	7.64	10	16	8.80
	Avg.			6.69			7.69			8.22			8.65
P3	1	13	38	4.54	12	305	0.56	12	110	1.56	12	87	1.97
	2	10	27	5.14	7	16	5.53	10	25	5.48	10	28	4.76
	3	13	28	6.35	7	15	5.89	10	23	6.18	10	24	5.67
	4	13	26	6.88	8	19	5.91	10	21	6.71	15	1	395.52
	5	13	25	7.00	10	21	6.47	10	21	6.75	13	26	7.07
	6	13	23	7.53	10	21	6.43	13	22	8.44	10	21	6.58
	7	12	24	7.03	10	21	6.73	13	20	9.09	13	19	9.72
	8	13	25	7.42	13	23	8.01	13	21	9.00	13	22	8.17
	9	10	22	6.51	13	22	8.29	13	19	9.70	13	21	8.84
	Avg.			6.99			7.68			9.26			8.91

Table B-254. 3rd 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SD)			2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	7	26	3.61	12	581	0.30	13	91	1.94	12	92	1.88	13	46	3.92
	2	7	24	4.16	8	17	6.55	14	10	18.99	13	25	7.13	8	13	8.51
	3	7	1	162.27	8	15	7.39	7	10	9.09	13	9	21.72	8	12	9.11
	4	7	20	5.03	8	15	7.49	4	0	212.12	10	15	9.50	10	15	8.96
	5	7	20	5.20	6	11	7.92	8	11	9.64	10	15	9.27	10	15	9.29
	6	5	18	3.50	6	11	8.15	8	12	9.56	10	14	9.55	10	14	9.87
	7	8	17	5.99	7	10	8.64	14	17	10.90	10	14	9.90	10	14	9.73
	8	8	18	5.66	6	10	8.58	14	17	11.39	7	11	8.91	10	13	10.33
	9	6	14	5.58	8	12	9.34	13	16	11.93	8	11	10.63	10	13	10.33
	Avg.			5.74			8.86			11.41			9.81			10.13
P2	1	3	12	4.13	13	96	1.81	13	31	5.95	13	111	1.59	12	68	2.51
	2	3	12	3.88	7	17	6.18	13	22	8.50	13	28	6.55	10	21	6.48
	3	2	4	7.61	6	13	6.86	8	13	8.48	9	17	7.39	13	24	7.48
	4	6	14	5.26	6	12	7.47	6	10	8.58	8	12	8.68	5	13	5.29
	5	13	36	4.99	5	9	7.18	5	8	8.44	8	12	8.97	5	8	7.87
	6	10	30	4.49	4	8	8.09	5	8	8.28	13	1	243.82	3	3	10.53
	7	6	22	4.07	3	5	8.61	4	6	9.78	8	12	9.38	2	2	10.91
	8	5	12	5.47	2	2	11.22	3	3	12.22	13	17	10.63	2	2	11.03
	9	3	5	7.83	1	1	14.25	1	1	11.50	13	16	11.41	3	3	12.40
	Avg.			5.79			11.36			11.16			10.48			11.45
P3	1	1	1	8.26	12	112	1.53	12	107	1.61	13	48	3.65	12	111	1.54
	2	13	52	3.37	8	17	6.29	8	17	6.38	13	30	5.94	8	14	7.99
	3	10	36	3.80	6	12	7.30	6	12	7.18	10	17	8.32	8	13	8.19
	4	8	23	4.78	8	14	7.49	6	12	7.62	13	19	9.40	6	16	4.78
	5	8	22	4.91	8	14	7.70	8	15	7.66	10	15	9.27	8	12	8.70
	6	6	15	5.34	13	20	8.86	10	18	7.95	10	15	9.51	6	9	9.45
	7	6	15	5.66	10	16	8.28	8	14	7.77	10	14	9.65	6	9	9.35
	8	10	25	5.56	8	13	8.72	8	13	8.59	13	16	11.50	8	12	9.33
	9	10	23	5.86	8	12	8.74	5	1	116.36	13	16	11.68	8	11	10.07
	Avg.			5.69			8.58			8.18			10.94			9.59

Table B-255. 3rd 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by Vibratory Plate Compactor

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	44	4.12	13	566	0.31	13	16	11.19	13	16	11.30
	2	10	12	11.85	13	15	12.03	8	7	14.47	13	12	14.92
	3	10	11	12.73	10	9	15.14	6	6	13.97	13	13	14.32
	4	10	11	13.15	8	7	15.82	6	6	14.79	10	9	16.03
	5	10	11	12.86	8	7	15.38	3	3	14.37	8	6	17.51
	6	8	7	14.47	8	7	16.28	4	1	34.83	13	9	19.17
	7	5	1	111.36	26	6	56.25	2	1	20.36	13	11	17.10
	8	8	8	14.40	7	7	14.12	1	1	27.41	9	8	15.51
	9	10	9	16.58	9	0	763.63	13	11	16.30	6	6	15.56
	Avg.			15.49			14.12			16.30			16.05
P2	1	13	49	3.63	13	43	4.08	14	101	1.87	12	48	3.53
	2	8	14	8.26	9	8	15.65	7	13	6.88	10	11	11.76
	3	5	10	6.99	7	6	17.69	8	1	82.91	8	7	14.23
	4	4	7	7.39	13	10	17.56	7	11	8.18	6	5	16.34
	5	3	3	12.91	7	9	11.49	7	10	8.85	6	5	18.40
	6	5	9	7.67	6	5	16.08	7	10	9.47	13	12	15.73
	7	13	475	0.37	13	10	16.91	5	9	8.41	13	14	13.22
	8	13	31	5.94	8	6	17.08	13	15	12.35	14	10	18.82
	9	10	19	7.44	4	4	12.98	10	13	11.07	11	8	18.11
	Avg.			6.69			16.99			10.61			18.46
P3	1	13	90	1.93	13	39	4.42	13	22	7.96	13	118	1.58
	2	10	19	7.29	13	18	10.03	10	13	10.58	8	15	7.49
	3	8	14	8.24	13	16	11.33	13	15	12.03	6	12	7.52
	4	8	13	8.70	13	15	12.29	13	14	13.20	8	11	9.41
	5	8	12	8.70	13	14	13.58	13	14	12.45	6	9	9.69
	6	8	13	8.56	13	12	14.90	10	12	10.70	5	8	8.88
	7	10	15	9.03	13	12	14.90	6	7	11.90	8	10	10.81
	8	8	14	7.52	10	11	12.68	5	5	13.44	8	11	10.49
	9	13	1	197.27	13	12	15.09	6	7	12.14	13	13	13.71
	Avg.			8.28			14.22			12.49			11.67

Table B-256. 3rd 8" Lift of Surface Dry AASHTO #8 Aggregate Successive Compaction by Hand Impact Rammer

Location	Drop	2 Passes (SD)			4 Passes (SD)			6 Passes (SD)			8 Passes (SD)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	61	2.94	13	87	2.14	13	81	2.19	13	61	2.94
	2	10	14	10.39	8	10	10.72	10	19	7.44	10	14	9.43
	3	6	8	11.03	6	7	11.58	8	14	7.93	10	13	10.55
	4	13	19	9.14	6	7	11.52	6	11	8.14	10	12	11.87
	5	13	46	3.83	6	7	11.96	5	9	8.25	13	14	12.62
	6	10	14	9.89	6	7	12.04	5	8	8.53	13	13	14.32
	7	8	11	10.48	6	7	10.40	6	8	10.18	13	13	14.01
	8	7	9	10.14	8	9	12.24	8	9	11.34	13	13	13.68
	9	7	9	10.46	10	11	12.25	10	13	10.89	10	10	13.26
	Avg.			10.36			11.63			10.80			13.65
P2	1	13	58	3.19	13	52	3.48	14	584	0.32	13	98	1.85
	2	9	17	7.57	8	8	13.53	8	11	9.61	7	8	10.76
	3	5	9	7.53	7	6	14.23	4	7	7.50	3	4	11.75
	4	2	3	11.75	10	9	15.27	8	11	10.41	5	6	12.10
	5	14	17	10.80	6	6	14.36	13	16	11.63	13	11	16.20
	6	7	11	9.14	8	7	15.05	10	13	10.80	13	12	15.44
	7	5	9	7.67	8	7	15.27	10	13	11.33	10	9	14.76
	8	5	8	8.05	6	6	15.56	10	12	11.29	8	7	15.30
	9	6	9	9.49	8	7	14.81	6	8	11.26	8	5	20.44
	Avg.			8.40			15.21			11.29			15.03
P3	1	13	715	0.25	13	22	7.95	13	124	1.50	13	102	1.73
	2	8	11	9.69	8	8	13.16	7	8	11.48	8	9	11.81
	3	10	0	865.44	5	5	13.96	7	7	12.06	7	7	13.09
	4	10	13	10.55	8	8	13.28	7	7	12.46	8	9	12.09
	5	10	12	11.76	13	556	0.32	7	7	12.80	7	7	12.32
	6	10	11	12.33	13	15	11.81	8	8	13.91	7	7	13.23
	7	13	14	12.87	5	11	6.56	10	10	13.36	6	6	13.91
	8	10	11	12.20	8	10	10.61	13	12	15.14	8	8	14.00
	9	10	10	13.45	10	11	12.42	13	12	15.22	10	6	22.33
	Avg.			12.84			11.52			14.57			13.96

Table B-257. 1st 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 15-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	104	1.55	11	102	1.54	12	209	0.80	12	123	1.32
	2	12	44	3.80	8	3	33.35	8	21	5.10	12	38	4.44
	3	8	23	4.53	5	16	4.77	6	14	5.85	12	35	4.98
	4	6	16	4.99	3	9	4.67	6	13	5.84	8	20	5.36
	5	8	14	7.77	2	5	5.66	3	9	5.37	8	20	5.36
	6	13	33	5.34	2	4	5.23	3	9	5.11	6	14	5.61
	7	8	20	5.31	2	4	5.41	8	18	5.98	3	9	5.48
	8	6	14	5.45	3	9	4.98	12	18	9.07	2	4	7.54
	9	4	10	5.66	13	30	5.82	8	17	6.36	3	9	5.40
	Avg.			5.47			5.40			7.14			6.14
P2	1	11	138	1.12	11	116	1.33	3	9	4.53	8	25	4.22
	2	12	43	3.90	5	17	4.13	4	9	5.61	6	14	5.26
	3	8	23	4.69	2	5	6.58	5	14	4.99	2	5	6.62
	4	6	15	5.10	0	1	4.63	3	9	5.05	3	9	5.31
	5	5	13	5.69	2	5	4.87	2	4	6.24	6	13	5.67
	6	8	19	5.61	12	43	3.96	2	4	6.79	3	8	5.52
	7	8	18	6.07	8	24	4.84	2	2	13.79	5	13	5.37
	8	8	19	6.03	6	14	5.26	14	31	6.07	5	13	5.43
	9	8	3	34.36	12	31	5.28	6	13	5.95	5	13	5.40
	Avg.			6.05			5.13			6.01			5.40
P3	1	11	117	1.34	11	169	0.89	12	117	1.37	11	122	1.28
	2	5	14	5.24	5	14	5.02	5	14	5.18	8	17	6.59
	3	2	5	6.53	3	8	5.63	1	1	5.66	4	9	5.81
	4	4	1	101.82	2	4	7.75	13	30	5.95	6	13	5.67
	5	5	13	5.87	5	10	7.45	6	13	5.81	1	2	6.85
	6	6	12	6.43	5	11	6.45	5	12	6.25	2	4	7.76
	7	5	11	6.41	8	19	6.05	6	12	6.60	4	8	6.33
	8	5	11	6.41	8	18	6.43	3	6	6.91	3	1	35.00
	9	5	11	6.43	13	23	7.69	2	4	8.12	3	8	5.99
	Avg.			6.42			6.73			7.21			6.16

Table B-258. 1st 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	11	96	1.65	11	221	0.69	11	374	0.42	8	29	3.86
	2	5	14	5.23	7	29	3.37	5	23	3.10	2	5	6.16
	3	2	4	7.76	3	11	3.82	4	15	3.38	3	9	4.75
	4	3	0	101.82	3	10	3.87	7	31	3.25	5	2	42.81
	5	3	9	5.45	2	5	5.01	8	30	3.51	3	8	5.24
	6	5	12	5.87	5	8	8.53	8	28	3.81	3	8	5.31
	7	6	13	6.22	3	7	6.79	8	29	3.66	5	14	5.22
	8	6	12	6.30	3	9	4.61	8	29	3.79	2	4	7.20
	9	6	12	6.24	1	3	6.08	8	28	4.04	3	13	3.65
	Avg.			6.26			5.82			3.83			5.36
P2	1	13	115	1.55	11	433	0.35	11	403	0.37	5	28	2.54
	2	12	40	4.35	5	21	3.26	2	6	5.16	1	3	4.02
	3	3	8	5.16	2	6	4.80	3	11	4.15	1	2	4.85
	4	1	2	5.30	2	6	4.41	2	6	5.32	13	46	3.76
	5	1	2	7.58	2	6	5.02	1	4	4.16	3	12	3.84
	6	12	29	5.90	2	6	5.09	1	4	4.48	12	43	3.97
	7	6	13	5.98	2	6	5.00	1	4	4.38	12	20	8.60
	8	3	4	9.48	3	11	4.05	3	6	6.56	3	12	3.89
	9	2	4	7.50	5	18	3.97	2	6	4.92	3	12	3.89
	Avg.			7.66			4.34			5.28			3.89
P3	1	12	119	1.43	11	338	0.45	11	121	1.27	5	16	4.11
	2	5	17	4.29	5	17	4.18	4	16	3.87	2	4	6.94
	3	3	4	10.18	3	11	4.53	2	5	5.61	1	2	5.66
	4	2	4	6.79	3	10	3.57	3	9	5.00	2	5	6.64
	5	8	22	5.21	2	5	6.73	2	5	6.26	12	33	5.19
	6	3	8	5.29	3	9	5.38	3	8	5.51	12	31	5.47
	7	1	2	6.36	2	4	6.82	1	2	6.48	8	22	5.29
	8	14	28	6.64	2	4	6.76	1	2	7.13	5	14	5.34
	9	6	12	6.12	4	1	53.03	1	2	6.64	2	4	7.20
	Avg.			6.37			6.79			6.75			5.94

Table B-259. 1st 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Self-propelled Trench-type Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	148	1.09	7	64	1.53	3	14	2.79	3	14	2.79
	2	5	23	2.91	5	36	1.88	5	24	2.67	5	24	2.67
	3	2	7	4.24	5	35	1.99	4	25	2.37	4	25	2.37
	4	1	3	4.79	5	36	1.95	12	57	2.95	12	57	2.95
	5	3	13	3.53	11	64	2.46	12	53	3.24	12	53	3.24
	6	2	3	8.98	8	50	2.11	13	50	3.47	13	50	3.47
	7	3	13	3.56	12	62	2.57	12	51	3.19	12	51	3.19
	8	6	19	4.06	12	57	2.88	12	51	3.32	12	51	3.32
	9	13	41	4.30	12	59	2.76	12	49	3.49	12	49	3.49
	Avg.			3.97			2.74			3.33			2.84
P2	1	12	117	1.40	7	64	1.51	4	37	1.69	4	37	1.69
	2	8	26	4.20	7	61	1.67	1	9	2.20	1	9	2.20
	3	4	11	5.07	7	59	1.69	1	9	2.05	1	9	2.05
	4	3	11	4.24	8	57	1.82	3	19	1.93	3	19	1.93
	5	3	9	5.48	8	57	1.82	3	19	1.91	3	19	1.91
	6	1	3	6.84	7	56	1.84	2	10	2.26	2	10	2.26
	7	14	30	6.38	7	54	1.87	0	3	2.12	0	3	2.12
	8	12	30	5.75	5	34	2.02	1	4	1.80	1	4	1.80
	9	13	29	6.18	8	53	1.97	12	64	2.58	12	64	2.58
	Avg.			6.10			1.95			2.17			2.59
P3	1	5	18	3.82	7	63	1.59	7	54	1.77	7	54	1.77
	2	13	46	3.87	2	7	3.22	7	53	1.86	7	53	1.86
	3	5	17	4.13	12	62	2.70	3	16	2.65	3	16	2.65
	4	4	11	4.55	7	51	1.97	1	4	3.39	1	4	3.39
	5	4	10	5.25	7	47	2.15	1	5	3.48	1	5	3.48
	6	6	16	5.00	4	11	4.92	12	57	2.83	12	57	2.83
	7	2	4	6.36	5	28	2.28	8	47	2.22	8	47	2.22
	8	1	3	6.28	3	6	6.25	2	8	3.71	2	8	3.71
	9	8	23	5.06	1	2	4.04	2	8	3.64	2	8	3.64
	Avg.			5.90			4.19			3.19			3.25

Table B-260. 1st 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Vibratory Plate Compactor

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	76	2.22	12	116	1.44	11	250	0.62	11	114	1.35
	2	2	6	5.02	5	39	1.66	4	43	1.36	3	17	2.42
	3	13	37	4.77	2	10	2.60	2	21	1.59	2	2	14.55
	4	4	18	3.34	3	1	40.38	7	71	1.33	7	60	1.61
	5	2	5	4.80	12	64	2.65	4	40	1.40	12	57	2.94
	6	2	6	5.85	7	36	2.79	7	68	1.39	12	58	2.78
	7	2	6	5.77	3	21	2.14	12	74	2.25	7	49	2.04
	8	6	17	4.60	2	9	2.55	7	68	1.44	12	55	3.07
	9	3	5	6.96	3	1	50.91	4	59	1.06	5	29	2.24
	Avg.			5.77			2.34			1.58			2.45
P2	1	13	105	1.70	12	86	1.97	4	28	2.17	11	104	1.50
	2	3	8	5.71	13	54	3.32	12	55	3.00	7	39	2.41
	3	4	2	30.30	3	14	2.86	5	29	2.25	5	24	2.80
	4	3	8	6.27	7	41	2.50	4	28	2.21	3	14	2.87
	5	1	2	6.36	1	3	2.99	5	27	2.38	2	7	4.13
	6	12	28	5.99	3	14	2.77	4	27	2.30	5	23	2.76
	7	9	19	6.31	8	40	2.72	1	6	2.92	2	8	3.58
	8	9	19	6.36	2	8	3.56	2	7	3.51	12	43	3.74
	9	6	12	6.89	2	7	3.48	12	48	3.54	5	23	3.25
	Avg.			6.52			3.26			3.32			3.52
P3	1	12	62	2.74	11	98	1.61	11	117	1.34	11	114	1.37
	2	8	23	4.78	13	52	3.33	12	64	2.66	8	35	2.96
	3	3	8	6.07	8	22	5.30	2	8	3.71	4	5	9.80
	4	13	29	6.05	5	20	3.47	7	46	2.17	3	11	3.59
	5	5	13	5.87	5	20	3.61	12	55	3.12	2	5	4.21
	6	2	4	7.19	8	33	3.39	5	25	2.56	12	45	3.64
	7	1	2	6.36	5	20	3.47	3	1	32.84	5	20	3.35
	8	1	2	6.04	13	43	4.09	3	25	1.89	1	6	3.61
	9	4	7	6.73	4	32	1.81	4	24	2.46	3	10	4.08
	Avg.			6.38			3.12			2.18			3.68

Table B-261. 1st 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Hand Impact Rammer

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	5	41	1.16	11	193	0.76	12	121	1.37	12	112	1.47	6	61	1.28	7	75	1.25
	2	7	36	1.99	5	20	3.37	13	58	3.06	7	43	2.40	4	35	1.67	3	24	1.56
	3	7	38	1.87	5	20	3.47	8	31	3.66	3	13	2.99	4	4	14.62	3	24	1.60
	4	3	20	1.73	6	20	3.87	8	29	3.92	12	53	3.20	4	33	1.89	12	84	1.99
	5	1	4	2.37	8	30	3.71	5	19	4.01	12	52	3.34	3	18	2.18	3	24	1.62
	6	0	1	3.58	8	28	3.99	3	12	3.90	12	54	3.18	2	10	2.72	3	25	1.49
	7	1	2	3.08	6	18	4.31	8	26	4.14	13	52	3.39	3	18	2.32	11	81	1.89
	8	2	6	3.27	8	27	4.20	8	26	4.27	8	40	2.69	2	10	2.52	12	80	2.10
	9	1	6	2.69	13	39	4.51	8	25	4.34	13	49	3.53	5	33	1.95	5	47	1.36
	Avg.			3.01			4.34			4.25			3.20			2.26			1.79
P2	1	3	13	2.58	7	32	3.11	13	38	4.66	12	111	1.48	12	125	1.28	12	82	1.99
	2	8	35	2.29	5	16	4.01	8	24	4.50	8	50	2.09	7	54	1.88	4	16	3.78
	3	6	20	2.81	3	9	5.34	6	15	5.35	4	30	2.02	7	51	2.01	13	35	5.11
	4	8	32	2.53	14	35	5.37	6	15	5.34	3	14	2.51	12	58	2.84	8	26	4.16
	5	8	24	3.39	6	15	5.21	4	10	5.45	3	17	2.30	12	56	2.99	5	7	9.95
	6	8	24	3.44	5	15	5.06	2	4	8.74	5	26	2.70	12	56	2.91	3	9	4.93
	7	8	23	3.56	4	5	11.07	5	13	5.78	5	29	2.22	7	48	2.03	5	15	4.35
	8	5	0	141.27	4	9	5.61	6	12	6.14	5	29	2.38	12	54	3.05	2	4	6.17
	9	4	14	2.70	2	5	6.58	2	4	7.34	5	29	2.27	3	16	2.78	2	4	6.30
	Avg.			3.13			6.10			6.42			2.29			2.62			5.61
P3	1	11	89	1.33	12	82	2.01	12	82	2.03	12	57	2.98	11	117	1.25	12	123	1.32
	2	5	18	2.97	12	62	2.70	13	32	5.52	5	26	2.49	7	61	1.60	12	70	2.35
	3	5	19	2.85	13	51	3.45	6	12	6.87	2	7	3.18	7	58	1.73	5	31	2.11
	4	8	27	3.00	8	25	4.53	2	4	8.95	12	49	3.41	12	64	2.66	3	17	2.38
	5	7	26	2.92	6	16	4.73	1	2	8.04	5	25	2.86	12	62	2.73	2	9	2.89
	6	5	18	3.10	12	36	4.76	13	24	7.53	5	25	3.02	12	23	7.26	2	9	3.05
	7	3	6	4.86	8	22	4.96	13	24	7.36	6	2	46.17	12	59	2.78	1	4	3.15
	8	2	6	3.71	5	14	5.19	4	7	7.00	12	47	3.62	7	51	1.99	2	10	3.09
	9	2	6	3.87	4	9	6.04	8	16	7.11	12	45	3.80	3	30	1.55	1	4	3.18
	Avg.			4.15			5.40			7.16			3.71			2.11			3.14

Table B-262. 2nd 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 15-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	39	3.57	10	32	4.31	12	328	0.52	10	39	3.54
	2	8	27	4.10	8	28	3.92	13	38	4.82	10	35	4.07
	3	6	19	4.69	8	27	4.11	13	34	5.29	10	33	4.23
	4	7	19	4.75	10	34	4.21	13	32	5.67	10	32	4.51
	5	8	25	4.71	10	33	4.31	13	30	6.18	8	23	4.75
	6	8	25	4.69	10	31	4.57	13	28	6.43	7	18	5.14
	7	8	24	4.77	9	32	3.79	10	28	5.12	8	22	5.02
	8	8	23	4.80	10	30	4.72	13	28	6.63	10	28	5.07
	9	10	28	4.96	10	30	4.79	13	30	6.20	10	27	5.32
	Avg.			4.84			4.44			5.98			5.14
P2	1	13	72	2.48	13	60	3.03	13	54	3.40	10	51	2.67
	2	10	39	3.63	13	57	3.16	13	42	4.39	10	38	3.57
	3	13	38	4.94	13	44	4.11	13	39	4.67	10	34	4.11
	4	14	36	5.31	10	36	3.76	10	36	3.92	9	48	2.73
	5	14	35	5.45	10	35	4.00	13	37	5.01	5	34	2.13
	6	13	34	5.45	13	36	5.07	13	34	5.44	7	30	3.16
	7	10	31	4.46	10	33	4.37	13	34	5.37	10	27	4.83
	8	10	31	4.66	10	31	4.40	14	33	5.71	10	28	5.12
	9	11	30	4.88	10	33	4.21	13	31	6.02	13	29	6.29
	Avg.			4.67			4.32			5.70			5.42
P3	1	12	263	0.63	10	38	3.65	13	50	3.60	12	586	0.28
	2	10	38	3.62	8	25	4.41	10	30	4.54	6	19	4.59
	3	10	33	4.25	8	23	4.65	10	29	4.69	7	19	4.98
	4	13	37	5.00	8	22	4.99	13	32	5.62	8	23	4.89
	5	13	34	5.48	10	28	5.01	13	31	5.84	6	22	3.42
	6	10	28	5.04	9	27	4.57	13	29	6.20	8	21	5.22
	7	13	29	6.46	10	1	89.76	10	25	5.46	8	21	5.30
	8	10	25	5.75	14	29	6.62	8	19	5.70	8	21	5.40
	9	8	19	5.89	10	26	5.66	10	24	5.79	8	20	5.75
	Avg.			6.03			6.14			5.65			5.48

Table B-263. 2nd 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	850	0.20	11	48	3.08	12	114	1.47	12	121	1.41
	2	6	19	4.06	10	40	3.48	8	27	4.04	6	21	3.79
	3	6	19	4.45	8	28	3.94	7	20	4.50	7	20	4.48
	4	6	19	4.35	8	28	3.99	6	20	4.50	5	15	4.52
	5	6	18	4.61	8	27	4.26	7	19	4.77	7	19	4.75
	6	6	19	4.76	8	27	4.22	6	18	4.86	7	19	4.68
	7	6	18	4.79	16	20	11.26	6	19	4.06	7	19	4.68
	8	6	18	4.78	7	19	4.79	8	23	5.14	7	18	4.97
	9	6	17	4.84	7	19	4.83	8	22	5.14	7	18	5.02
	Avg.			4.80			4.81			4.78			4.89
P2	1	10	47	2.93	13	66	2.83	12	160	1.03	13	53	3.41
	2	10	40	3.51	14	50	3.78	9	47	2.76	13	52	3.46
	3	10	39	3.69	14	48	3.99	10	41	3.19	13	39	4.78
	4	10	34	4.14	14	44	4.40	10	42	3.21	13	35	5.23
	5	10	33	4.32	14	43	4.45	10	39	3.46	13	35	5.32
	6	10	33	4.39	14	41	4.70	10	38	3.70	10	32	4.44
	7	10	32	4.47	14	40	4.84	13	37	4.89	13	33	5.70
	8	11	31	4.65	14	39	4.85	147	36	57.22	10	30	4.66
	9	14	33	5.84	14	38	5.03	13	38	4.88	10	29	4.87
	Avg.			4.99			4.91			4.88			5.08
P3	1	13	896	0.19	10	37	3.78	13	298	0.59	8	25	4.41
	2	5	25	2.68	8	24	4.67	5	19	3.85	8	23	4.84
	3	8	24	4.81	11	31	4.78	6	18	4.81	13	33	5.50
	4	8	23	4.82	13	34	5.51	7	18	5.24	10	28	5.13
	5	10	29	4.90	14	33	5.84	7	17	5.40	10	27	5.18
	6	10	29	4.94	14	32	6.02	8	21	5.44	8	21	5.44
	7	10	27	5.18	14	31	6.29	14	32	6.00	8	21	5.51
	8	10	27	5.28	14	29	6.59	14	30	6.40	7	16	5.57
	9	10	26	5.43	14	29	6.54	14	30	6.61	8	20	5.45
	Avg.			5.30			6.47			6.34			5.51

Table B-264. 2nd 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	8	33	3.19	12	116	1.41	10	44	3.00	8	28	3.67	13	50	3.70
	2	8	30	3.60	7	25	4.02	7	27	3.74	6	20	4.40	10	39	3.43
	3	7	22	4.16	12	17	9.71	6	19	4.32	6	19	4.51	9	36	3.59
	4	5	17	4.05	5	12	5.42	6	17	4.65	8	25	4.33	9	34	3.86
	5	7	21	4.39	6	16	4.90	6	18	4.64	10	33	4.42	13	36	5.21
	6	6	21	3.65	8	22	4.97	10	33	4.09	8	25	4.40	13	36	5.21
	7	7	21	4.49	8	21	5.02	8	23	4.46	8	23	4.68	10	32	4.25
	8	8	25	4.56	8	21	4.96	6	18	4.62	7	19	4.78	8	24	4.41
	9	8	25	4.63	8	22	5.06	5	13	5.19	4	1	79.54	8	24	4.47
	Avg.			4.56			5.01			4.75			4.73			4.38
P2	1	12	279	0.57	13	58	3.07	12	149	1.11	10	43	3.06	12	135	1.27
	2	13	79	2.27	10	41	3.27	9	50	2.47	10	40	3.40	6	22	3.82
	3	10	50	2.71	13	43	4.38	10	43	3.07	8	28	3.95	5	16	4.10
	4	10	44	3.14	13	40	4.57	10	41	3.24	10	34	3.98	6	20	4.40
	5	10	42	3.36	13	37	4.99	9	40	3.29	10	34	4.04	6	21	4.06
	6	6	39	2.21	13	35	5.22	8	29	3.66	10	38	3.50	6	20	4.32
	7	14	42	4.55	13	34	5.46	7	26	3.89	10	31	4.35	6	20	4.51
	8	14	40	4.91	13	33	5.59	10	35	3.77	10	31	4.49	6	19	4.56
	9	14	37	5.15	13	33	5.60	13	35	5.16	10	31	4.42	6	19	4.66
	Avg.			4.87			5.55			4.27			4.42			4.58
P3	1	11	1030	0.14	12	360	0.47	10	40	3.31	8	23	4.61	13	49	3.79
	2	5	21	3.19	8	21	5.06	8	23	4.67	8	21	5.04	10	32	4.42
	3	7	34	2.97	8	20	5.12	8	21	5.27	6	16	5.49	14	33	5.74
	4	8	31	3.47	8	19	5.39	8	21	5.23	7	16	5.80	10	27	5.27
	5	6	21	3.86	6	14	5.88	8	20	5.38	6	15	5.69	10	27	5.29
	6	8	29	3.73	8	18	5.94	8	17	6.08	7	15	6.06	10	26	5.43
	7	6	21	4.06	8	19	5.69	8	19	5.53	7	14	6.23	10	26	5.29
	8	7	4	23.86	8	18	5.80	6	15	5.88	7	14	6.31	10	24	5.81
	9	8	26	4.20	6	14	6.17	9	11	10.54	6	14	6.15	8	25	4.34
	Avg.			4.13			5.89			5.70			6.23			5.15

Table B-265. 2nd 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Vibratory Plate Compactor

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	33	5.67	13	130	1.43	14	728	0.26	8	19	5.68
	2	10	25	5.59	8	21	5.12	7	16	5.60	6	15	5.99
	3	8	19	5.74	8	20	5.44	5	13	5.52	8	18	5.91
	4	8	19	5.84	6	15	5.73	7	3	30.17	10	2	74.24
	5	6	14	6.15	6	14	5.96	8	20	5.93	8	18	6.10
	6	6	13	6.44	5	11	5.97	8	20	5.83	8	18	6.22
	7	5	11	6.21	5	12	5.71	7	15	6.10	8	17	6.36
	8	6	11	7.14	6	14	6.10	8	18	6.28	8	18	6.39
	9	7	14	6.42	4	14	4.03	5	15	4.54	10	20	6.88
	Avg.			6.59			5.28			6.07			6.55
P2	1	14	130	1.44	13	87	2.13	14	83	2.31	14	617	0.32
	2	10	21	6.52	14	27	7.04	10	22	6.40	7	24	4.09
	3	10	19	7.26	14	22	8.40	10	20	7.00	10	27	5.07
	4	10	19	7.57	13	22	8.55	10	19	7.51	10	25	5.58
	5	13	21	8.87	11	18	8.26	11	19	7.77	13	24	7.53
	6	13	21	9.09	13	20	9.27	10	19	7.35	10	24	6.04
	7	14	20	9.35	14	20	9.52	14	21	9.11	10	20	6.89
	8	13	20	9.39	13	20	9.30	14	20	9.85	13	24	7.58
	9	14	19	9.81	13	20	9.32	14	19	9.71	13	23	8.06
	Avg.			9.51			9.38			8.77			7.51
P3	1	1	1	11.31	13	55	3.24	14	84	2.23	13	86	2.18
	2	13	24	7.57	10	19	7.69	8	15	7.62	5	15	4.19
	3	10	19	7.59	8	14	8.15	6	12	7.37	6	11	7.43
	4	10	18	7.65	7	7	14.63	4	9	5.58	8	15	7.35
	5	10	18	7.76	8	14	8.58	7	12	8.23	6	11	7.86
	6	10	18	7.85	8	13	8.56	13	20	9.04	12	11	15.45
	7	13	19	9.61	8	13	8.59	10	17	8.45	6	11	8.27
	8	22	17	17.59	8	13	8.69	22	13	23.13	6	11	8.09
	9	8	14	8.12	8	13	8.90	4	1	88.24	6	10	8.32
	Avg.			8.86			8.73			8.45			8.23

Table B-266. 2nd 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Hand Impact Rammer

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	91	1.98	13	34	5.47	13	112	1.60	14	93	2.02
	2	10	31	4.63	8	20	5.16	10	31	4.56	14	33	5.71
	3	8	22	5.06	8	21	5.40	13	31	6.08	14	29	6.60
	4	8	21	5.47	8	21	5.34	14	29	6.59	13	27	6.80
	5	5	15	4.42	8	21	5.07	14	28	6.81	14	27	6.90
	6	7	16	5.71	10	26	5.32	13	26	7.12	14	26	7.12
	7	8	0	458.18	13	27	6.79	14	26	7.13	14	26	7.21
	8	8	20	5.55	8	20	5.59	13	26	7.11	14	27	7.09
	9	7	0	299.09	10	26	5.55	14	26	7.41	14	25	7.57
	Avg.			5.55			5.98			7.22			7.29
P2	1	13	114	1.62	13	72	2.59	13	76	2.34	14	114	1.73
	2	10	23	6.05	13	27	6.80	7	14	7.46	8	16	6.78
	3	14	25	7.42	13	30	6.25	4	8	6.52	6	12	7.15
	4	13	24	7.90	13	26	7.25	4	8	6.55	4	9	5.73
	5	13	22	8.45	14	22	8.48	3	8	5.49	5	9	7.63
	6	13	22	8.36	13	22	8.39	7	14	7.42	6	12	7.42
	7	13	22	8.56	13	22	8.36	8	13	7.97	6	11	7.70
	8	13	22	8.44	14	23	8.16	8	1	127.27	6	11	7.83
	9	13	21	8.66	13	21	8.67	6	11	7.65	7	12	7.77
	Avg.			8.55			8.40			7.81			7.77
P3	1	14	125	1.50	13	29	6.42	13	245	0.76	13	111	1.64
	2	8	21	5.65	10	24	5.92	14	32	5.84	10	28	4.95
	3	8	19	6.07	8	19	6.07	14	28	6.73	13	31	6.02
	4	8	18	6.18	6	15	5.99	13	26	7.07	14	28	6.78
	5	8	18	6.48	5	12	5.98	14	25	7.50	14	29	6.60
	6	8	12	9.08	8	17	6.67	13	24	7.64	14	27	7.06
	7	7	13	6.85	13	25	7.31	13	24	7.70	14	26	7.39
	8	7	13	7.34	13	25	7.49	13	24	7.85	13	25	7.47
	9	4	14	4.48	13	24	7.63	13	23	8.09	14	24	7.74
	Avg.			6.22			7.48			7.88			7.54

Table B-267. 3rd 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 15-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	112	1.61	13	34	5.37	13	41	4.41	10	26	5.34
	2	8	14	7.79	10	25	5.88	13	34	5.33	10	23	6.17
	3	8	18	6.19	10	24	6.13	13	32	5.54	9	18	6.45
	4	8	18	6.53	12	18	9.00	10	26	5.26	10	22	6.51
	5	8	17	6.70	9	17	6.91	10	26	5.44	8	18	6.59
	6	7	14	6.88	8	18	6.52	13	29	6.29	8	17	6.79
	7	8	17	6.87	7	14	7.00	10	25	5.46	8	17	6.91
	8	9	17	7.20	7	13	6.85	10	24	5.95	9	17	7.10
	9	8	16	7.05	10	19	7.47	10	22	6.35	9	17	7.15
	Avg.			7.04			7.10			5.92			7.06
P2	1	13	89	2.02	13	106	1.66	9	23	5.64	13	115	1.55
	2	10	26	5.54	13	32	5.54	13	30	5.99	13	31	5.69
	3	10	24	6.12	13	28	6.46	10	20	6.50	13	27	6.80
	4	10	22	6.43	13	25	7.28	7	15	6.61	13	25	7.26
	5	13	25	7.45	10	21	6.70	6	12	7.03	13	24	7.75
	6	13	23	8.05	10	1	261.81	6	11	7.25	13	23	8.08
	7	13	23	7.98	10	20	7.07	5	1	123.63	10	19	7.36
	8	14	21	9.40	13	21	8.64	6	11	8.08	13	22	8.61
	9	14	22	8.45	13	21	8.69	7	11	8.48	13	21	8.77
	Avg.			8.61			8.14			8.28			8.25
P3	1	10	28	4.95	12	116	1.47	12	420	0.41	10	27	5.32
	2	10	24	5.96	8	20	5.51	10	28	4.94	8	18	6.25
	3	8	19	6.05	8	19	5.85	8	0	2952.68	10	22	6.45
	4	8	19	6.27	8	18	6.15	10	21	6.45	10	22	6.49
	5	13	18	9.93	8	17	6.66	13	27	6.85	8	18	6.58
	6	10	21	6.73	13	14	13.46	10	22	6.50	8	17	6.77
	7	10	21	6.76	7	14	6.55	10	22	6.43	7	14	6.90
	8	9	17	7.02	7	13	6.93	11	20	7.15	7	13	7.12
	9	8	16	6.95	8	16	7.13	13	23	7.90	8	16	7.38
	Avg.			6.91			6.87			7.16			7.13

Table B-268. 3rd 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	110	1.58	13	653	0.27	8	21	5.45	12	114	1.48
	2	13	43	4.16	10	26	5.17	7	15	6.62	13	39	4.61
	3	13	31	5.74	10	23	6.19	8	18	6.48	13	31	5.84
	4	7	22	4.04	10	23	6.17	9	17	6.83	13	29	6.19
	5	13	24	7.68	10	22	6.50	7	14	6.98	13	26	6.88
	6	13	24	7.72	13	25	7.34	9	17	7.12	13	26	7.26
	7	13	23	7.77	13	24	7.75	10	18	7.95	13	25	7.38
	8	13	23	7.97	13	24	7.86	10	19	7.36	13	24	7.48
	9	13	23	8.18	10	20	7.17	13	22	8.39	13	24	7.81
	Avg.			7.97			7.60			7.90			7.56
P2	1	13	110	1.58	13	47	3.85	13	107	1.63	13	115	1.52
	2	10	25	5.56	13	30	6.12	10	27	5.31	8	21	5.55
	3	10	23	6.00	13	27	6.71	10	23	6.18	7	15	6.20
	4	10	22	6.51	10	23	6.40	10	23	6.17	8	18	6.40
	5	10	21	6.77	10	24	5.88	13	25	7.22	8	18	6.49
	6	10	22	6.32	13	21	8.56	13	24	7.64	9	18	6.72
	7	13	22	8.24	32	23	19.39	13	23	7.92	9	17	6.89
	8	10	20	7.27	35	17	28.41	13	22	8.16	8	16	6.84
	9	10	20	7.29	10	22	6.40	13	22	8.26	8	16	6.95
	Avg.			7.60			6.40			8.11			6.89
P3	1	12	270	0.62	13	40	4.53	13	39	4.64	12	112	1.52
	2	8	24	4.64	8	19	5.82	10	25	5.52	13	41	4.50
	3	7	16	5.49	8	18	6.34	9	19	6.08	13	31	5.73
	4	8	20	5.56	8	18	6.25	7	15	6.30	10	24	5.96
	5	8	20	5.69	7	15	6.26	7	8	12.60	10	24	5.94
	6	10	23	6.31	5	12	6.02	8	17	6.67	13	25	7.08
	7	10	21	6.76	7	15	6.45	8	17	6.69	13	23	7.69
	8	13	24	7.47	8	16	6.79	8	17	6.75	10	20	6.88
	9	13	24	7.66	8	17	6.49	7	13	6.91	8	17	6.74
	Avg.			7.30			6.58			6.78			7.10

Table B-269. 3rd 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	104	1.68	10	27	5.11	13	114	1.53	51	24	28.80	13	614	0.28
	2	9	55	2.37	10	22	6.40	13	33	5.63	10	22	6.69	13	35	5.10
	3	13	53	3.39	10	22	6.45	13	28	6.65	10	20	7.36	13	26	7.11
	4	13	48	3.80	8	17	6.78	13	25	7.49	13	22	8.39	13	23	7.95
	5	13	45	4.13	10	21	6.59	14	24	7.69	13	21	8.59	13	22	8.36
	6	13	42	4.36	8	16	6.82	13	23	8.08	13	20	9.06	14	22	8.51
	7	13	41	4.42	10	20	7.10	13	22	8.23	14	20	9.50	13	21	8.59
	8	13	38	4.81	10	20	7.29	14	24	7.98	13	19	9.56	14	21	9.15
	9	14	35	5.35	13	21	8.92	13	22	8.22	13	19	9.72	13	20	9.10
	Avg.			4.86			7.77			8.14			9.59			8.95
P2	1	11	389	0.38	3	8	5.99	13	136	1.29	13	127	1.44	13	30	6.21
	2	12	86	2.01	10	25	5.68	13	33	5.55	13	33	5.46	13	22	8.41
	3	10	49	2.76	13	27	6.88	13	26	7.31	13	27	6.91	13	21	8.64
	4	8	28	3.90	13	25	7.37	13	25	7.22	13	24	7.60	13	23	8.15
	5	6	22	4.07	13	25	7.50	13	24	7.80	13	23	8.12	10	17	8.38
	6	3	17	2.90	13	23	8.02	13	23	8.06	13	23	8.12	13	20	9.01
	7	8	20	5.84	13	23	7.80	13	23	8.08	13	21	8.77	14	19	9.95
	8	6	19	4.60	13	26	7.22	10	19	7.47	13	20	9.18	13	17	10.62
	9	7	19	4.93	13	22	8.38	10	19	6.80	13	21	8.75	13	19	9.69
	Avg.			5.12			7.80			7.45			8.90			10.09
P3	1	12	97	1.76	13	360	0.48	13	33	5.57	8	18	6.48	10	19	7.42
	2	13	70	2.50	10	28	4.74	13	27	6.86	8	16	6.85	10	17	8.02
	3	13	53	3.36	13	30	5.99	13	24	7.51	10	21	6.98	13	22	8.14
	4	13	50	3.58	10	21	6.78	13	22	8.29	10	19	7.59	13	21	8.76
	5	13	44	4.08	10	20	7.08	10	18	7.93	8	15	7.40	13	20	9.08
	6	13	44	4.13	10	21	6.83	7	18	5.47	8	15	7.92	13	19	9.50
	7	13	40	4.54	10	20	6.93	10	18	8.12	8	15	7.89	13	18	10.01
	8	13	37	4.86	10	20	7.07	10	18	7.86	9	15	8.07	13	19	9.75
	9	13	42	4.29	8	16	6.89	10	18	8.07	5	14	4.76	13	19	9.61
	Avg.			4.56			6.96			8.02			7.98			9.79

Table B-270. 3rd 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Vibratory Plate Compactor

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	14	116	1.66	13	90	2.07	13	80	2.34	14	70	2.69
	2	8	14	8.53	11	19	7.82	10	13	10.66	14	25	7.68
	3	7	16	6.44	11	18	8.28	8	10	11.16	13	22	8.44
	4	13	19	9.53	10	18	8.15	9	10	11.51	14	21	8.98
	5	13	18	10.25	8	14	8.02	8	10	11.72	14	20	9.65
	6	13	17	10.79	9	14	8.56	8	10	11.67	13	19	9.74
	7	13	17	10.82	9	14	8.30	13	35	5.30	11	16	9.21
	8	13	17	11.12	9	14	8.51	10	12	12.13	10	16	8.51
	9	13	16	11.12	13	19	10.05	10	11	13.24	9	13	9.73
	Avg.			11.02			8.95			12.68			9.15
P2	1	13	51	3.60	13	72	2.59	13	22	8.52	13	73	2.54
	2	13	21	8.92	13	20	9.07	13	19	9.46	14	20	9.26
	3	14	18	10.75	13	23	7.87	14	19	9.87	14	16	11.93
	4	13	16	11.51	13	16	11.18	31	16	27.15	13	17	10.74
	5	13	16	11.45	13	16	11.31	13	18	10.41	13	15	12.42
	6	13	17	11.15	13	15	12.04	13	17	10.74	13	16	11.58
	7	13	16	11.65	13	17	10.60	13	18	10.57	13	14	13.01
	8	13	16	11.65	13	17	10.93	13	15	12.20	13	15	11.94
	9	13	15	12.20	13	16	11.18	13	17	10.98	14	14	13.33
	Avg.			11.83			10.90			11.25			12.76
P3	1	13	46	3.97	13	97	1.83	13	18	10.20	14	144	1.35
	2	66	15	60.21	13	19	9.69	10	14	10.39	10	17	8.08
	3	14	17	11.21	11	13	11.40	10	13	10.93	14	21	9.16
	4	14	17	11.43	13	15	12.06	8	10	11.27	13	20	9.55
	5	13	15	12.05	13	14	12.59	8	11	10.87	13	20	9.47
	6	14	15	12.59	13	14	13.12	7	9	10.78	13	18	10.07
	7	13	16	11.99	13	14	13.64	7	9	10.56	14	18	10.34
	8	14	15	12.53	13	13	13.73	8	10	11.09	13	15	12.49
	9	14	14	13.36	13	13	13.63	14	14	13.63	13	17	10.74
	Avg.			12.62			13.67			10.82			11.19

Table B-271. 3rd 8" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Hand Impact Rammer

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	14	425	0.46	14	97	1.94	14	115	1.71	14	98	1.99
	2	14	21	9.05	13	35	5.20	10	20	7.21	10	17	8.61
	3	14	20	9.46	13	21	8.50	8	15	7.38	10	16	9.12
	4	14	19	9.85	10	16	8.85	8	14	7.89	10	16	9.26
	5	13	23	8.25	8	13	8.10	8	15	7.68	11	14	10.13
	6	14	18	10.59	4	11	5.62	6	15	5.19	10	14	10.07
	7	14	20	9.26	9	13	9.30	8	15	7.71	9	12	10.01
	8	14	18	10.31	8	13	8.84	9	15	7.99	10	14	10.44
	9	13	16	11.35	11	14	10.32	8	14	8.05	14	17	11.37
	Avg.			10.31			9.49			7.91			10.61
P2	1	14	140	1.38	14	61	3.08	14	104	1.91	13	105	1.77
	2	14	23	8.16	14	23	8.50	10	17	8.48	13	26	7.21
	3	11	17	8.98	14	19	10.08	14	19	9.67	13	19	9.66
	4	11	17	8.84	14	18	10.77	14	19	10.16	13	18	10.64
	5	11	17	8.66	13	17	10.72	13	17	11.04	13	17	11.27
	6	11	17	8.91	14	18	10.61	14	17	11.08	13	17	11.14
	7	11	1	200.95	13	16	11.59	13	16	11.55	14	17	11.18
	8	9	13	9.19	13	16	11.65	13	16	11.78	13	16	11.35
	9	9	13	9.19	13	16	11.80	13	16	11.35	13	16	11.54
	Avg.			9.19			11.68			11.56			11.36
P3	1	13	154	1.20	14	80	2.38	13	88	2.12	14	223	0.86
	2	13	32	5.69	10	20	7.36	10	16	8.63	10	17	8.45
	3	13	21	8.59	10	18	7.87	10	15	9.07	11	16	9.00
	4	14	21	9.15	8	15	7.78	10	15	9.43	10	16	9.15
	5	13	166	1.08	7	12	7.84	10	15	9.85	11	15	9.63
	6	14	19	10.16	7	12	7.95	10	14	10.04	10	15	9.85
	7	13	18	10.18	9	14	8.53	10	14	9.90	10	15	9.80
	8	14	17	10.85	8	14	8.48	10	14	10.47	13	17	10.60
	9	14	17	11.26	11	16	9.19	10	14	10.54	13	16	11.40
	Avg.			10.76			8.74			10.30			10.60

Table B-272. 1st 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 15-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	269	0.63	10	32	4.44	12	113	1.52	8	27	4.14
	2	13	41	4.25	7	18	5.28	8	22	5.20	10	6	24.77
	3	13	33	5.35	7	17	5.70	7	17	5.50	8	25	4.55
	4	13	30	6.17	6	13	5.84	9	20	5.89	7	19	4.76
	5	13	30	6.05	6	13	5.96	8	20	5.85	7	19	5.03
	6	13	27	6.70	7	15	6.20	7	16	6.17	7	19	5.09
	7	13	36	4.95	7	16	6.12	6	13	6.27	8	22	5.22
	8	13	25	7.01	10	24	5.78	6	13	6.38	8	23	5.06
	9	13	24	7.59	10	23	6.19	7	15	6.60	10	28	5.21
	Avg.			6.52			6.03			6.42			5.16
P2	1	10	42	3.35	12	145	1.14	12	373	0.45	12	218	0.77
	2	8	25	4.41	13	42	4.21	13	41	4.36	10	3	42.93
	3	7	18	5.16	13	37	4.92	13	37	4.93	10	28	5.01
	4	7	18	5.34	13	31	5.87	13	30	5.92	13	30	6.20
	5	10	31	4.69	13	29	6.26	13	29	6.28	10	25	5.52
	6	8	22	5.30	13	29	6.27	13	36	4.87	13	26	7.17
	7	12	17	10.30	13	27	6.57	13	26	7.11	13	26	6.96
	8	8	21	5.46	13	26	6.82	13	26	6.91	13	24	7.64
	9	13	34	5.30	13	25	7.15	13	25	7.40	13	24	7.45
	Avg.			5.38			6.85			7.14			7.35
P3	1	12	174	0.97	12	116	1.44	12	1121	0.15	13	1085	0.16
	2	13	48	3.64	8	23	4.79	10	32	4.33	10	30	4.71
	3	13	30	5.94	10	26	5.33	10	30	4.66	9	22	5.95
	4	13	30	6.14	13	28	6.40	8	22	5.23	10	26	5.51
	5	13	27	6.78	13	29	6.26	7	17	5.67	11	25	5.97
	6	13	24	7.79	10	24	6.01	7	16	5.82	5	20	3.47
	7	13	26	7.07	10	23	6.19	7	15	6.10	10	23	6.11
	8	13	26	6.90	7	15	6.08	8	19	6.11	10	23	6.15
	9	13	23	7.73	7	15	6.45	8	18	6.41	10	23	6.04
	Avg.			7.23			6.24			6.21			6.10

Table B-273. 1st 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	47	3.04	6	18	4.21	12	123	1.40	12	109	1.56
	2	8	32	3.49	10	36	3.95	13	43	4.25	13	55	3.20
	3	8	30	3.80	13	36	4.96	13	36	5.22	13	35	5.13
	4	13	40	4.42	13	32	5.50	13	30	6.05	13	33	5.65
	5	13	40	4.46	10	29	4.76	13	36	5.03	13	29	6.38
	6	13	34	5.29	8	22	5.12	13	30	6.06	13	30	6.07
	7	13	31	5.75	8	22	5.16	13	1	302.06	13	30	6.07
	8	13	40	4.39	5	13	5.60	13	27	6.74	13	30	6.08
	9	13	31	5.92	3	8	5.71	13	27	6.93	13	28	6.49
	Avg.			5.35			5.49			6.84			6.21
P2	1	13	56	3.28	12	190	0.87	12	143	1.20	7	21	4.24
	2	10	40	3.49	8	33	3.14	8	0	269.81	8	26	4.29
	3	8	27	4.10	6	23	3.82	5	21	3.29	8	24	4.50
	4	8	27	4.22	8	28	3.78	7	21	4.34	8	19	5.88
	5	8	26	4.24	8	29	3.82	5	19	3.46	8	23	4.88
	6	5	26	2.64	8	28	4.01	7	20	4.67	6	18	4.53
	7	4	19	2.95	13	32	5.56	8	25	4.47	7	18	5.22
	8	7	20	4.62	6	31	2.51	8	24	4.61	8	22	5.18
	9	7	19	4.91	10	32	4.39	8	24	4.55	13	43	4.28
	Avg.			4.16			4.15			4.55			4.89
P3	1	13	52	3.60	10	52	2.64	12	115	1.49	13	52	3.50
	2	10	34	4.24	13	46	3.85	13	45	4.02	10	33	4.15
	3	10	31	4.71	13	42	4.27	13	36	5.02	10	31	4.51
	4	10	28	5.08	6	41	2.06	13	32	5.62	13	35	5.26
	5	13	32	5.90	8	32	3.49	13	34	5.40	13	34	5.36
	6	13	32	5.75	8	32	3.49	13	30	6.13	13	31	5.81
	7	10	27	5.34	10	36	3.85	13	28	6.43	13	32	5.69
	8	10	26	5.50	13	36	5.19	10	24	5.76	13	28	6.20
	9	11	26	5.53	13	35	5.18	10	23	6.06	10	24	5.71
	Avg.			5.46			4.74			6.09			5.87

Table B-274. 1st 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Self-propelled Trench-type Roller

Location	Drop	Bottom			Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	4	45	0.91	8	107	1.03	7	35	2.71	13	46	3.84	13	58	3.06	12	168	0.99
	2	6	7	8.71	6	63	1.38	6	1	75.48	13	40	4.54	13	53	3.28	13	54	3.43
	3	5	43	1.16	9	84	1.46	7	31	3.34	10	28	4.80	13	50	3.55	8	30	3.68
	4	5	43	1.19	9	75	1.66	8	31	3.39	10	28	4.82	13	49	3.72	13	40	4.62
	5	5	45	1.18	7	51	1.90	13	41	4.32	8	21	5.35	13	49	3.67	13	37	4.97
	6	5	44	1.13	7	50	2.00	6	38	2.08	8	21	5.28	13	46	3.93	13	36	5.12
	7	5	42	1.24	5	33	2.20	10	36	3.63	8	20	5.43	13	46	3.92	10	35	3.85
	8	5	41	1.24	5	33	2.27	10	36	3.75	8	21	5.52	13	46	3.99	10	34	3.98
	9	13	74	1.81	5	32	2.29	10	35	3.79	8	20	5.61	10	45	3.15	10	34	4.25
	Avg.			1.43			2.25			3.72			5.52			3.68			4.03
P2	1	11	144	0.81	12	119	1.38	11	709	0.22	8	38	2.75	13	67	2.66	12	311	0.52
	2	12	118	1.07	9	69	1.76	13	67	2.64	6	28	2.88	10	48	2.77	10	52	2.59
	3	8	87	0.97	13	67	2.61	10	51	2.60	5	20	3.33	13	49	3.67	13	0	2316.33
	4	12	97	1.29	13	60	2.96	10	47	2.81	3	12	3.65	13	49	3.72	10	44	3.10
	5	3	34	1.03	10	51	2.61	10	44	3.05	4	12	4.66	13	46	3.96	13	45	4.08
	6	0	2	1.88	10	48	2.78	13	43	4.16	3	7	5.03	13	43	4.22	13	44	4.20
	7	13	90	1.50	9	46	2.85	13	42	4.22	5	0	148.48	13	43	4.29	13	42	4.30
	8	8	74	1.11	10	44	3.02	10	40	3.45	10	39	3.38	13	41	4.44	13	41	4.43
	9	6	51	1.11	13	44	4.10	10	38	3.56	10	37	3.76	13	40	4.56	13	41	4.55
	Avg.			1.24			3.32			3.75			3.57			4.43			4.43
P3	1	12	533	0.23	12	122	1.33	13	63	2.87	12	635	0.26	12	116	1.45	12	181	0.88
	2	12	91	1.39	12	79	2.15	13	50	3.71	10	47	2.80	4	19	3.27	13	54	3.28
	3	11	3	43.23	12	67	2.55	14	40	4.71	8	36	2.99	7	18	4.88	13	43	4.23
	4	13	372	0.37	12	60	2.87	10	33	4.25	8	34	3.15	5	14	5.03	13	39	4.63
	5	12	79	1.63	9	51	2.55	13	33	5.47	8	20	5.52	6	4	19.94	13	37	4.95
	6	9	67	1.32	9	49	2.63	10	29	4.77	8	32	3.37	7	17	5.32	13	35	5.29
	7	8	67	1.31	9	47	2.79	8	22	4.94	6	24	3.44	7	17	5.39	13	33	5.53
	8	8	66	1.32	10	46	2.89	8	21	5.04	6	24	3.57	5	13	5.47	13	35	5.26
	9	6	48	1.32	7	33	3.14	8	21	5.20	6	24	3.52	5	13	5.57	155	27	80.07
	Avg.			1.31			2.94			5.06			3.51			5.47			5.40

Table B-275. 1st 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Vibratory Plate Compactor

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	196	0.90	13	114	1.57	13	115	1.61	13	311	0.58
	2	13	47	3.82	9	30	4.23	13	36	5.01	7	23	4.44
	3	13	42	4.21	7	27	3.78	13	37	4.84	6	16	4.77
	4	10	36	3.65	7	25	4.14	13	34	5.32	6	16	4.94
	5	10	35	3.98	7	20	5.07	13	36	4.93	6	16	4.96
	6	13	35	5.25	5	21	3.51	13	31	5.74	10	27	4.96
	7	13	36	4.97	7	19	4.95	13	33	5.64	10	26	5.25
	8	13	33	5.41	6	26	3.27	13	38	4.70	10	26	5.13
	9	13	33	5.48	10	26	5.26	13	32	5.78	10	25	5.35
	Avg.			5.29			4.49			5.37			5.24
P2	1	13	90	2.04	12	76	2.27	13	59	3.01	12	101	1.67
	2	10	26	5.21	10	30	4.38	13	48	3.72	9	32	4.05
	3	8	20	5.28	13	24	7.70	13	37	4.95	4	21	2.83
	4	6	15	5.57	13	28	6.36	13	31	5.86	4	17	3.13
	5	8	19	5.68	13	23	7.72	13	29	6.17	4	21	2.69
	6	6	15	5.93	13	23	8.01	13	28	6.58	9	29	4.52
	7	6	14	6.24	13	24	7.42	13	25	7.13	7	24	3.81
	8	13	24	7.56	13	21	8.74	13	26	6.87	13	40	4.52
	9	10	20	6.66	10	20	6.52	13	23	7.94	9	55	2.29
	Avg.			6.82			7.56			7.31			3.54
P3	1	13	33	5.32	5	12	5.58	13	160	1.17	13	109	1.65
	2	12	61	2.78	13	42	4.16	10	30	4.66	13	32	5.64
	3	10	23	5.85	13	33	5.45	10	28	5.14	13	27	6.78
	4	12	48	3.63	13	8	22.24	10	26	5.41	9	29	4.24
	5	13	25	7.19	13	27	6.71	8	21	5.42	6	24	3.68
	6	13	41	4.27	13	35	5.02	8	21	5.50	4	22	2.69
	7	13	28	6.35	13	25	7.17	7	17	5.46	6	27	3.24
	8	13	30	5.76	13	23	7.89	7	17	5.35	6	23	3.76
	9	13	29	6.00	13	25	7.27	8	20	5.57	7	23	3.98
	Avg.			6.03			7.44			5.46			3.66

Table B-276. 1st 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Hand Impact Rammer

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	158	1.15	13	101	1.73	12	111	1.56	10	49	2.68
	2	13	51	3.58	10	23	5.91	8	41	2.53	10	47	2.84
	3	13	48	3.91	7	32	3.15	8	37	2.82	5	36	1.76
	4	10	46	3.04	4	19	3.23	6	29	2.89	4	28	2.11
	5	13	45	4.10	8	35	3.05	6	26	3.04	6	29	2.94
	6	13	40	4.61	10	39	3.44	6	27	2.97	4	22	2.81
	7	10	41	3.39	10	37	3.56	8	34	3.08	4	21	2.95
	8	10	43	3.16	6	29	2.65	8	34	3.07	6	28	2.98
	9	13	40	4.67	13	42	4.16	12	25	6.76	6	27	3.02
	Avg.			3.74			3.46			3.08			2.98
P2	1	13	39	4.79	12	82	2.10	13	127	1.39	12	116	1.45
	2	10	30	4.54	10	36	3.83	8	34	3.12	9	44	2.97
	3	8	23	4.83	8	27	3.90	13	43	4.23	7	32	3.10
	4	8	21	5.03	6	20	4.07	13	41	4.38	8	33	3.13
	5	4	17	3.37	5	16	4.23	13	40	4.58	10	40	3.34
	6	4	13	4.46	4	15	4.19	8	30	3.61	13	59	2.94
	7	5	13	5.29	5	15	4.33	10	35	3.98	13	45	3.85
	8	7	17	5.56	5	15	4.34	8	29	3.69	13	42	4.17
	9	8	21	5.50	4	16	3.98	10	35	3.85	13	38	4.57
	Avg.			5.45			4.22			3.84			4.20
P3	1	13	81	2.22	13	98	1.89	12	149	1.16	13	73	2.43
	2	13	37	5.02	14	38	5.02	8	24	4.40	10	26	5.31
	3	13	33	5.58	13	36	5.18	4	18	3.43	10	24	5.77
	4	14	32	5.84	10	26	5.51	4	12	4.82	10	24	6.02
	5	13	31	6.05	10	26	5.55	7	1	134.76	10	24	6.03
	6	14	30	6.21	13	27	6.62	8	20	5.34	8	19	6.13
	7	10	26	5.50	13	36	4.97	8	20	5.22	8	18	6.21
	8	10	25	5.58	13	27	6.79	8	0	#DIV/0!	8	18	6.17
	9	10	25	5.73	13	27	6.61	8	19	5.69	8	18	6.22
	Avg.			5.60			6.12			5.46			6.20

Table B-277. 2nd 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 15-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	46	3.97	13	49	3.82	12	674	0.25	13	37	4.87
	2	13	38	4.74	8	25	4.19	7	28	3.60	8	20	5.34
	3	13	35	5.21	4	19	3.14	6	19	4.25	3	12	3.86
	4	13	32	5.59	4	13	4.71	4	20	2.90	6	15	5.90
	5	13	31	5.78	5	14	4.86	6	19	4.17	7	14	6.36
	6	13	30	6.10	4	10	4.82	6	19	4.64	6	14	6.35
	7	13	29	6.14	3	10	4.41	4	14	3.55	7	14	6.75
	8	13	28	6.45	6	16	5.27	6	18	4.67	6	13	6.55
	9	13	27	6.65	6	16	5.45	7	17	5.17	7	14	6.58
	Avg.			6.41			5.04			4.46			6.63
P2	1	13	35	5.10	10	28	4.87	13	38	4.91	13	111	1.59
	2	13	29	6.21	13	30	5.93	13	30	6.23	10	26	5.33
	3	13	26	7.06	10	23	6.05	13	27	6.64	8	20	5.83
	4	13	24	7.67	10	22	6.36	13	25	7.20	7	15	6.33
	5	13	23	7.91	8	17	6.48	13	24	7.64	7	14	6.43
	6	7	19	4.69	6	13	6.59	13	24	7.82	6	11	6.69
	7	6	13	6.69	7	13	6.87	13	23	8.10	7	14	6.98
	8	7	13	7.11	6	13	6.91	13	22	8.32	10	20	6.97
	9	6	12	7.18	6	13	6.78	10	20	6.99	8	15	7.29
	Avg.			7.00			6.85			7.80			7.08
P3	1	13	36	5.06	13	39	4.55	12	118	1.42	13	40	4.56
	2	10	23	5.95	8	19	5.76	13	37	4.96	10	24	5.84
	3	10	22	6.43	8	18	5.77	13	31	5.95	10	22	6.26
	4	8	17	6.39	7	14	6.65	13	28	6.55	8	17	6.55
	5	8	17	6.59	6	14	6.17	13	26	7.25	7	13	7.10
	6	8	16	6.98	6	14	6.46	13	25	7.51	5	10	6.49
	7	8	15	7.29	7	13	6.72	13	25	7.40	6	13	6.73
	8	25	16	22.17	5	11	6.43	13	24	7.88	4	10	4.86
	9	8	15	7.29	6	13	6.81	14	23	8.25	5	10	6.83
	Avg.			7.29			6.65			7.84			6.14

Table B-278. 2nd 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	10	34	4.01	13	42	4.30	10	29	4.71	13	112	1.59
	2	8	23	4.68	10	28	5.13	8	20	5.32	6	19	4.47
	3	8	22	4.93	8	20	5.38	10	25	5.87	6	18	4.75
	4	7	18	5.08	8	20	5.74	10	24	6.01	7	18	5.09
	5	6	17	5.25	6	15	5.99	8	18	6.05	7	17	5.41
	6	8	20	5.54	6	17	5.03	8	18	6.31	8	21	5.38
	7	10	16	8.73	5	12	5.71	7	15	6.59	7	17	5.30
	8	10	0	288.48	3	12	3.94	8	17	6.64	7	17	5.50
	9	13	26	6.92	7	14	6.49	7	14	6.63	8	19	6.12
	Avg.			7.83			5.38			6.62			5.64
P2	1	13	333	0.53	13	100	1.76	8	17	6.68	13	361	0.49
	2	6	14	6.10	10	22	6.08	6	13	6.89	13	17	10.61
	3	8	17	6.26	6	13	6.71	5	10	7.19	8	16	7.05
	4	7	13	6.82	7	0	271.51	4	8	6.91	8	15	7.37
	5	8	15	7.20	13	24	7.48	4	8	6.87	8	15	7.50
	6	8	16	7.04	10	20	6.99	5	9	7.55	10	18	7.76
	7	6	35	2.26	8	15	7.52	4	7	7.31	10	18	8.00
	8	8	14	7.72	15	12	18.00	4	8	7.12	11	1	119.88
	9	8	15	7.47	7	12	7.74	3	5	8.42	8	14	8.08
	Avg.			7.59			7.63			7.62			8.04
P3	1	13	31	5.88	13	111	1.63	13	112	1.61	13	115	1.53
	2	13	28	6.52	10	22	6.03	10	21	6.40	8	17	6.42
	3	13	27	6.64	5	13	5.38	12	13	13.45	4	10	5.55
	4	10	20	7.13	6	12	7.18	5	10	7.01	3	4	9.87
	5	13	23	7.81	7	12	7.81	7	12	7.56	4	8	6.75
	6	10	19	7.47	5	10	6.91	7	10	9.35	4	7	7.47
	7	8	15	7.33	5	10	7.10	28	14	26.72	7	13	7.36
	8	8	15	7.37	8	14	8.09	8	14	7.82	8	14	8.12
	9	6	11	7.50	8	14	7.63	7	11	8.01	8	14	7.85
	Avg.			7.40			7.61			7.92			7.78

Table B-279. 2nd 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	12	104	1.64	6	18	4.78	12	117	1.46	13	119	1.47	13	118	1.51
	2	9	60	2.16	7	17	5.29	8	23	4.64	8	23	4.76	13	37	4.95
	3	13	50	3.56	8	21	5.31	7	17	5.34	10	27	5.14	10	25	5.57
	4	10	41	3.36	7	16	5.68	7	15	6.28	10	23	6.30	8	19	5.87
	5	13	45	4.05	7	17	5.43	7	15	6.40	8	19	6.09	10	23	6.12
	6	13	43	4.20	7	17	5.55	7	14	6.63	9	19	6.38	13	25	7.38
	7	8	29	3.83	7	16	5.60	11	22	6.60	7	14	6.57	13	25	7.42
	8	13	21	8.11	6	13	6.03	8	17	6.73	6	18	4.25	13	23	7.64
	9	6	24	3.73	6	3	28.87	8	17	6.54	9	17	7.22	13	25	7.42
	Avg.			3.78			5.82			6.62			6.02			7.50
P2	1	11	312	0.49	13	102	1.71	13	101	1.75	13	112	1.57	13	94	1.88
	2	12	86	2.00	8	18	5.78	13	28	6.47	13	28	6.63	8	16	7.09
	3	12	55	3.08	7	13	6.74	10	20	6.83	13	24	7.65	8	15	7.56
	4	13	50	3.54	7	14	6.70	10	20	7.08	10	19	7.41	8	14	8.18
	5	13	42	4.22	13	24	7.83	10	18	7.61	10	18	7.98	19	14	19.72
	6	13	41	4.45	10	20	7.08	13	20	8.85	10	18	7.96	8	13	8.66
	7	13	38	4.70	13	22	8.38	13	19	9.62	8	14	8.58	8	6	19.30
	8	13	39	4.48	10	19	7.14	10	17	8.61	8	14	8.41	7	11	8.58
	9	13	35	5.09	13	22	8.36	13	19	9.37	9	13	8.94	7	11	8.55
	Avg.			4.75			7.96			9.20			8.64			8.56
P3	1	9	71	1.70	12	130	1.31	10	24	5.95	13	92	1.92	12	115	1.48
	2	8	34	3.07	5	19	3.34	8	17	6.77	10	23	5.95	8	18	6.28
	3	6	22	3.85	10	23	5.97	11	1	224.60	7	12	7.46	10	21	6.70
	4	6	21	4.14	8	17	6.65	14	21	8.99	7	12	7.46	7	12	7.34
	5	7	21	4.30	8	17	6.57	11	18	8.33	5	10	7.42	6	1	91.21
	6	13	43	4.29	8	17	6.77	10	19	7.77	5	9	7.95	9	18	7.02
	7	13	41	4.54	7	13	7.38	8	14	8.20	7	11	8.25	13	21	8.76
	8	10	32	4.39	7	13	7.50	8	14	8.10	7	11	8.25	13	19	9.65
	9	8	25	4.69	10	19	7.47	7	8	11.20	5	9	8.12	13	18	9.87
	Avg.			4.54			7.45			9.17			8.20			9.43

Table B-280. 2nd 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Vibratory Plate Compactor

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	22	8.32	13	50	3.72	13	36	5.11	14	21	8.81
	2	13	22	8.53	10	21	6.84	14	25	7.83	12	1	231.92
	3	14	20	9.61	7	14	6.38	14	26	7.14	10	15	9.36
	4	13	19	9.74	8	15	7.52	14	20	9.22	5	12	5.26
	5	14	19	9.85	8	15	7.40	14	22	8.57	10	14	9.93
	6	13	19	9.97	7	12	7.25	15	0	5141.74	10	14	9.95
	7	13	18	10.03	5	11	6.39	14	21	9.24	10	14	10.36
	8	13	18	10.29	5	10	7.21	13	34	5.36	14	16	11.96
	9	14	18	10.25	8	14	8.03	14	20	9.56	13	15	12.39
	Avg.			10.19			7.21			9.40			11.57
P2	1	14	17	11.17	13	30	6.16	13	52	3.49	13	67	2.77
	2	14	16	11.48	10	11	12.86	14	17	11.30	13	17	10.65
	3	10	13	10.12	8	9	12.67	14	17	10.99	13	15	12.69
	4	13	21	8.84	8	9	13.31	14	15	12.83	13	15	12.19
	5	13	15	12.46	8	8	13.58	14	14	13.22	13	13	13.94
	6	10	13	10.94	11	7	19.93	14	14	13.92	13	13	13.82
	7	10	12	11.22	7	7	13.44	14	13	14.07	13	13	14.66
	8	8	11	10.68	7	7	13.64	14	13	14.50	10	11	13.09
	9	7	9	10.37	8	8	13.91	14	13	14.16	8	9	12.03
	Avg.			10.76			13.66			14.24			13.26
P3	1	13	202	0.92	13	35	5.19	13	59	2.96	13	38	4.86
	2	10	15	8.95	10	12	11.42	10	14	10.27	14	18	10.54
	3	10	16	8.72	8	9	11.55	8	10	10.91	13	0	514.74
	4	13	19	9.60	15	7	28.28	7	8	10.89	14	16	12.19
	5	10	14	9.75	6	7	11.91	8	10	11.57	10	13	11.16
	6	13	22	8.38	6	7	12.24	8	10	11.73	11	12	12.11
	7	13	17	10.62	6	7	12.87	10	11	12.59	10	12	11.47
	8	10	13	10.98	7	7	12.45	11	11	13.42	14	15	12.63
	9	10	12	10.83	10	10	13.68	8	9	12.19	11	12	12.19
	Avg.			10.81			13.00			12.73			12.10

Table B-281. 2nd 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Hand Impact Rammer

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	121	1.49	13	76	2.29	13	117	1.55	13	31	5.91
	2	13	26	7.10	13	32	5.71	8	17	6.66	13	28	6.36
	3	10	21	6.90	13	28	6.38	10	20	7.29	10	23	5.87
	4	11	20	7.23	10	21	6.65	10	19	7.50	14	26	7.11
	5	13	24	7.55	13	22	8.17	10	18	8.06	13	25	7.34
	6	10	20	7.33	13	22	8.39	8	15	7.84	13	28	6.42
	7	11	0	309.69	13	21	8.71	8	14	8.02	13	24	7.75
	8	11	19	7.55	13	22	8.13	7	12	8.00	14	23	8.32
	9	5	16	4.36	13	21	8.58	8	13	8.34	13	22	8.26
	Avg.			5.96			8.47			8.12			8.11
P2	1	13	24	7.37	13	132	1.37	13	88	2.04	13	27	6.70
	2	13	22	8.64	8	0	559.99	13	0	2265.42	10	20	7.29
	3	13	18	10.14	10	19	7.59	13	19	9.92	13	20	9.31
	4	13	17	10.77	10	16	8.73	10	15	9.55	13	21	8.96
	5	13	17	10.43	13	20	9.27	13	19	9.39	13	19	9.53
	6	7	15	6.28	11	16	9.13	10	15	9.34	13	21	9.05
	7	10	14	10.01	11	16	9.06	10	15	9.39	13	19	9.60
	8	13	18	10.27	13	18	10.32	14	1	375.94	13	18	10.23
	9	13	16	11.70	13	18	10.41	14	18	10.68	14	18	10.47
	Avg.			10.66			9.93			10.03			10.10
P3	1	13	150	1.19	13	21	8.88	13	72	2.56	13	70	2.56
	2	10	22	6.53	13	18	10.03	10	19	7.42	10	17	8.57
	3	10	20	7.24	13	17	10.58	10	18	8.10	13	25	7.20
	4	11	19	7.84	13	17	10.78	8	14	8.31	13	20	9.00
	5	8	15	7.75	13	23	7.77	6	11	6.79	13	16	11.24
	6	13	23	7.93	13	16	11.33	5	9	7.55	6	14	5.50
	7	13	20	9.06	13	17	11.03	7	11	8.24	10	13	10.94
	8	10	17	8.45	13	16	11.61	8	13	8.59	11	13	11.23
	9	11	16	9.01	13	15	11.94	8	12	9.55	8	11	10.60
	Avg.			8.84			11.53			8.79			10.92

Table B-282. 3rd 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 15-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	101	1.73	13	29	6.12	13	30	6.03	12	82	2.11
	2	10	19	7.13	12	0	422.54	13	25	7.15	8	16	7.16
	3	8	14	7.83	13	22	8.20	10	18	7.64	10	19	7.46
	4	8	13	8.41	10	17	8.14	10	17	7.99	10	17	8.17
	5	8	13	8.59	10	16	8.73	10	16	8.57	8	14	7.90
	6	8	13	8.56	8	13	8.69	13	19	9.17	7	11	8.33
	7	8	13	8.91	10	16	8.99	13	18	9.76	13	10	16.84
	8	6	10	8.59	10	15	9.07	15	16	13.43	13	20	9.16
	9	4	0	164.04	10	15	9.39	13	18	9.94	13	21	8.53
	Avg.			8.75			9.15			9.85			8.85
P2	1	13	85	2.09	13	108	1.64	13	111	1.60	13	104	1.70
	2	8	16	6.80	8	18	6.19	10	22	6.34	10	20	6.76
	3	10	19	7.18	7	13	7.16	10	20	6.86	10	19	7.44
	4	13	24	7.45	7	13	6.89	8	16	6.95	13	23	7.91
	5	10	17	7.94	4	10	6.23	7	12	7.39	13	22	8.13
	6	7	12	7.68	5	10	7.04	7	12	7.62	13	20	8.73
	7	7	11	8.19	5	11	6.55	7	12	7.46	13	19	9.30
	8	7	11	8.27	4	8	6.76	8	14	7.87	13	18	9.96
	9	6	9	8.20	5	9	7.82	7	11	8.04	13	18	9.57
	Avg.			8.22			7.04			7.79			9.61
P3	1	13	101	1.72	12	110	1.54	13	114	1.54	10	24	5.67
	2	13	32	5.53	10	23	5.89	13	34	5.35	8	17	6.42
	3	13	26	6.81	10	20	6.68	10	21	6.84	13	23	7.80
	4	13	24	7.55	10	19	7.09	13	25	7.16	10	19	7.10
	5	13	22	8.11	10	20	7.16	8	16	7.05	8	15	7.29
	6	13	20	9.03	8	15	7.33	7	10	9.22	10	18	8.05
	7	10	18	7.88	8	15	7.56	5	10	7.01	10	18	7.89
	8	13	20	9.25	8	14	7.76	8	14	8.06	8	14	7.71
	9	13	20	8.95	8	14	7.81	8	14	8.01	10	17	8.28
	Avg.			8.70			7.71			7.69			7.96

Table B-283. 3rd 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by 7.5-ton Smooth Single-drum Roller

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	27	6.81	13	95	1.87	13	75	2.35	12	81	2.09
	2	10	17	8.48	13	28	6.43	10	17	8.19	8	14	8.12
	3	10	16	8.53	8	13	8.26	10	16	8.61	4	11	5.85
	4	9	13	9.19	6	10	8.48	10	15	9.22	10	0	328.59
	5	8	12	8.95	10	16	8.98	10	15	9.42	10	16	8.82
	6	10	15	9.44	10	15	9.43	8	11	9.86	10	15	9.15
	7	10	15	9.48	8	12	9.26	8	12	9.55	8	12	9.12
	8	10	15	9.66	8	12	9.39	8	12	9.53	8	12	8.76
	9	8	12	9.67	8	1	82.02	8	11	9.86	8	12	8.90
	Avg.			9.60			9.32			9.65			8.93
P2	1	13	95	1.91	13	88	2.05	13	73	2.45	13	87	2.13
	2	8	16	6.93	8	16	7.06	8	15	7.27	10	19	7.02
	3	8	16	7.15	7	15	6.13	8	14	8.61	10	17	8.01
	4	3	7	6.81	5	10	7.33	6	11	7.83	8	14	7.68
	5	3	4	8.98	5	10	7.30	7	11	8.39	13	20	8.97
	6	5	9	7.33	8	13	8.21	7	12	7.69	10	16	8.40
	7	13	20	9.07	8	13	8.38	7	10	8.80	10	14	9.41
	8	10	16	8.71	8	13	8.77	6	0	280.00	10	16	8.65
	9	7	11	8.30	8	13	8.61	4	9	5.51	8	12	8.65
	Avg.			8.69			8.59			7.16			8.90
P3	1	13	95	1.86	13	97	1.80	13	80	2.20	13	91	1.92
	2	10	19	7.12	10	18	7.48	12	0	1069.08	13	29	6.07
	3	10	18	7.63	10	18	8.09	13	23	7.75	10	17	7.57
	4	8	15	7.73	13	20	8.76	13	22	8.35	10	17	8.01
	5	10	16	8.76	13	21	8.42	6	16	5.22	5	14	5.18
	6	10	16	8.73	13	21	8.63	10	16	9.17	4	11	5.41
	7	10	17	8.61	13	20	8.83	8	13	8.88	8	12	8.86
	8	10	15	9.45	13	18	10.00	10	15	9.35	8	13	8.38
	9	10	15	9.14	10	15	9.26	10	15	9.32	8	12	9.40
	Avg.			9.06			9.36			9.18			8.88

Table B-284. 3rd 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Self-propelled Trench-type Roller

Location	Drop	Uncompacted (SS)			2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	9	54	2.31	13	176	1.04	11	18	8.30	13	159	1.17	14	929	0.20
	2	9	43	3.04	10	19	7.38	9	0	375.45	8	12	9.61	11	6	23.37
	3	8	26	4.14	13	25	7.41	8	0	475.14	8	11	10.07	11	14	10.65
	4	8	24	4.39	10	18	8.12	8	11	10.71	7	9	10.27	11	13	11.43
	5	6	17	5.09	11	17	8.47	7	9	10.45	8	8	14.40	10	13	11.35
	6	3	13	3.79	14	20	9.24	7	9	10.75	9	11	11.40	8	10	11.27
	7	6	16	5.51	14	19	9.85	9	11	10.92	11	12	12.16	8	10	11.40
	8	6	16	5.35	14	20	9.43	10	13	11.18	11	12	12.14	10	12	12.30
	9	8	20	5.34	14	19	9.79	11	13	11.26	8	10	11.51	11	12	12.18
	Avg.			5.40			9.69			11.12			11.94			11.96
P2	1	9	50	2.50	14	31	6.24	14	99	1.95	14	125	1.50	14	197	0.98
	2	7	27	3.82	8	13	8.91	8	14	8.41	8	13	8.87	333	16	286.36
	3	6	19	4.29	6	13	5.97	8	13	8.96	7	10	9.31	8	11	10.25
	4	8	24	4.26	8	12	9.14	7	10	9.29	30	12	35.84	11	14	10.38
	5	5	18	3.96	8	12	9.05	14	18	10.56	7	9	10.23	11	13	11.45
	6	8	23	4.63	10	15	9.44	14	18	10.60	5	8	9.60	7	11	8.27
	7	6	17	4.65	10	14	9.74	14	17	11.27	5	7	10.13	11	12	12.56
	8	10	28	5.11	11	15	9.99	10	14	10.27	7	9	10.49	14	14	13.11
	9	10	26	5.16	10	15	9.63	11	14	10.94	11	13	11.66	11	11	12.86
	Avg.			4.41			9.79			10.83			10.76			12.84
P3	1	4	13	3.83	13	171	1.09	13	68	2.74	13	94	1.98	11	16	9.24
	2	6	18	4.31	10	20	7.10	14	25	7.51	14	26	7.54	8	11	10.51
	3	101	34	40.93	8	14	8.11	14	22	8.68	11	15	9.91	14	17	11.39
	4	9	30	4.34	5	9	7.46	10	15	9.77	14	19	9.87	14	17	11.38
	5	10	29	4.59	4	0	381.81	8	12	9.84	14	18	10.57	11	12	11.72
	6	10	28	4.87	3	4	10.30	7	9	10.18	14	17	11.31	11	13	11.54
	7	10	28	4.94	4	0	137.45	6	11	7.14	14	18	10.65	9	10	11.69
	8	24	21	16.16	5	9	8.14	7	9	10.23	11	14	10.83	8	10	11.64
	9	8	19	5.46	5	9	8.48	6	0	496.36	7	13	7.19	8	10	12.00
	Avg.			5.20			8.31			8.68			10.74			11.78

Table B-285. 3rd 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Vibratory Plate Compactor

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	106	1.75	14	20	9.33	13	55	3.35	13	52	3.39
	2	11	13	11.13	14	18	10.65	14	21	8.96	10	18	7.59
	3	10	12	11.56	13	17	10.91	14	18	10.75	5	14	4.43
	4	10	12	11.89	14	16	11.50	14	18	10.71	4	9	6.98
	5	10	12	12.01	10	13	10.70	10	14	10.36	10	16	8.42
	6	10	11	12.15	13	14	12.94	10	13	10.94	10	16	8.44
	7	11	11	12.81	10	12	11.86	10	14	10.69	10	16	8.26
	8	10	11	12.86	10	12	12.29	10	13	11.07	8	13	8.11
	9	10	11	12.97	10	12	11.55	11	13	11.16	10	17	8.00
	Avg.			12.88			11.90			10.97			8.12
P2	1	14	99	1.90	10	13	10.58	14	201	0.95	15	192	1.04
	2	13	26	6.81	10	12	11.74	10	13	11.07	13	20	9.12
	3	10	15	9.52	10	12	12.12	8	9	12.09	10	14	9.81
	4	13	18	10.23	10	12	12.43	14	14	13.91	8	11	10.25
	5	13	17	10.92	10	11	12.86	14	14	13.98	8	11	10.14
	6	23	13	24.69	13	12	15.63	11	11	13.82	8	10	10.99
	7	6	9	9.57	10	11	13.24	9	9	13.47	10	12	11.39
	8	5	7	9.31	8	9	12.79	11	10	14.75	8	10	11.34
	9	4	6	9.61	7	8	12.20	8	8	13.75	10	12	11.75
	Avg.			9.50			12.74			13.99			11.49
P3	1	13	70	2.67	15	89	2.26	15	71	2.97	13	62	2.90
	2	8	11	10.11	14	18	10.27	10	12	11.75	11	14	10.32
	3	7	9	11.44	13	16	11.38	10	12	11.55	10	13	11.05
	4	6	8	11.11	13	16	11.48	10	11	12.20	13	17	10.69
	5	8	10	11.70	13	15	12.49	8	10	12.20	13	17	11.27
	6	8	9	12.02	10	12	12.18	8	9	12.33	14	15	12.90
	7	8	9	12.14	10	12	12.34	8	9	11.91	14	15	13.04
	8	8	1	164.70	10	11	13.04	8	9	12.33	11	12	12.19
	9	8	0	466.66	10	11	12.82	7	8	11.48	9	10	12.21
	Avg.			12.14			12.73			11.91			12.48

Table B-286. 3rd 12" Lift of Surface Saturated AASHTO #8 Aggregate Successive Compaction by Hand Impact Rammer

Location	Drop	2 Passes (SS)			4 Passes (SS)			6 Passes (SS)			8 Passes (SS)		
		Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}	Stress	Def.	E_{LWD}
		psi	mil	ksi	psi	mil	ksi	psi	mil	ksi	psi	mil	ksi
P1	1	13	29	6.44	13	214	0.87	13	76	2.45	13	75	2.50
	2	13	23	8.03	13	25	7.39	13	22	8.36	8	11	9.93
	3	10	17	8.48	10	16	8.67	13	19	9.70	7	9	9.97
	4	10	16	8.44	8	13	8.62	10	14	10.33	7	9	10.14
	5	13	21	8.71	8	12	9.44	10	14	9.95	7	9	10.45
	6	13	18	9.94	8	12	9.18	10	13	10.55	8	10	11.08
	7	10	15	9.40	10	14	10.01	5	11	6.06	8	10	10.94
	8	11	13	12.45	10	14	10.12	10	12	11.44	8	11	10.67
	9	10	15	9.11	8	12	9.24	25	11	32.38	10	12	11.46
	Avg.			9.26			9.79			11.44			11.02
P2	1	14	231	0.83	13	245	0.75	14	82	2.30	10	19	7.58
	2	13	30	6.14	8	14	7.74	10	21	6.52	8	15	7.07
	3	13	25	7.26	6	11	7.68	8	17	6.65	10	19	7.42
	4	13	23	8.13	5	9	8.17	8	15	7.43	8	14	8.22
	5	13	22	8.21	5	8	8.64	7	14	6.79	7	11	8.19
	6	13	21	8.72	5	6	10.25	8	14	8.08	8	13	8.61
	7	13	21	8.74	4	6	8.59	7	12	7.25	10	16	8.96
	8	10	18	7.96	4	1	105.21	8	14	7.65	10	15	8.92
	9	8	14	7.79	8	12	9.10	6	12	7.20	8	13	8.82
	Avg.			8.16			8.85			7.37			8.90
P3	1	15	106	1.95	13	76	2.43	14	102	1.89	14	132	1.45
	2	8	15	7.92	8	12	9.07	10	16	8.65	8	10	10.80
	3	10	15	9.34	10	1	166.61	13	20	9.10	8	9	11.98
	4	11	16	9.24	8	11	9.82	13	19	9.93	8	9	11.67
	5	11	16	9.62	8	11	10.07	10	15	9.91	8	9	12.03
	6	11	15	9.68	7	10	9.60	8	13	8.72	6	7	11.43
	7	11	16	9.54	5	8	8.85	8	12	8.89	8	9	12.33
	8	11	15	9.77	8	11	10.07	7	11	8.67	8	9	11.67
	9	8	13	9.03	8	11	10.37	7	10	8.98	8	9	12.33
	Avg.			9.44			9.77			8.85			12.11

APPENDIX C

FIELD TEST RESULTS IN GRAPHIC FORMAT

Table C-1. Figures for All Tests

Tests	Figures
AASHTO #1 Aggregate, Surface Dry, 4" Lifts	C-1 to C-3
AASHTO #1 Aggregate, Surface Dry, 8" Lifts	C-4 to C-8
AASHTO #1 Aggregate, Surface Dry, 12" Lifts	C-9 to C-13
AASHTO #1 Aggregate, Surface Dry, 15" Lifts	C-14 to C-18
AASHTO #57 Aggregate, Surface Dry, 4" Lifts	C-19 to C-21
AASHTO #57 Aggregate, Surface Dry, 8" Lifts	C-22 to C-26
AASHTO #57 Aggregate, Surface Dry, 12" Lifts	C-27 to C-31
AASHTO #57 Aggregate, Surface Saturated, 4" Lifts	C-31 to C-34
AASHTO #57 Aggregate, Surface Saturated, 8" Lifts	C-35 to C-39
AASHTO #57 Aggregate, Surface Saturated, 12" Lifts	C-40 to C-44
AASHTO #57 Aggregate, Surface Saturated, 15" Lifts	C-45 to C-49
AASHTO #8 Aggregate, Surface Dry, 4" Lifts	C-50 to C-52
AASHTO #8 Aggregate, Surface Dry, 8" Lifts	C-53 to C-57
AASHTO #8 Aggregate, Surface Dry, 12" Lifts	C-58 to C-62
AASHTO #8 Aggregate, Surface Saturated, 4" Lifts	C-63 to C-65
AASHTO #8 Aggregate, Surface Saturated, 8" Lifts	C-66 to C-70
AASHTO #8 Aggregate, Surface Saturated, 12" Lifts	C-71 to C-75
AASHTO #8 Aggregate, Surface Saturated, 15" Lifts	C-76 to C-80
AASHTO #8 Aggregate, Surface Dry, 8" Lifts, Successive Compaction	C-81 to C-83
AASHTO #8 Aggregate, Surface Saturated, 8" Lifts, Successive Compaction	C-84 to C-86
AASHTO #8 Aggregate, Surface Saturated, 12" Lifts, Successive Compaction	C-87 to C-89

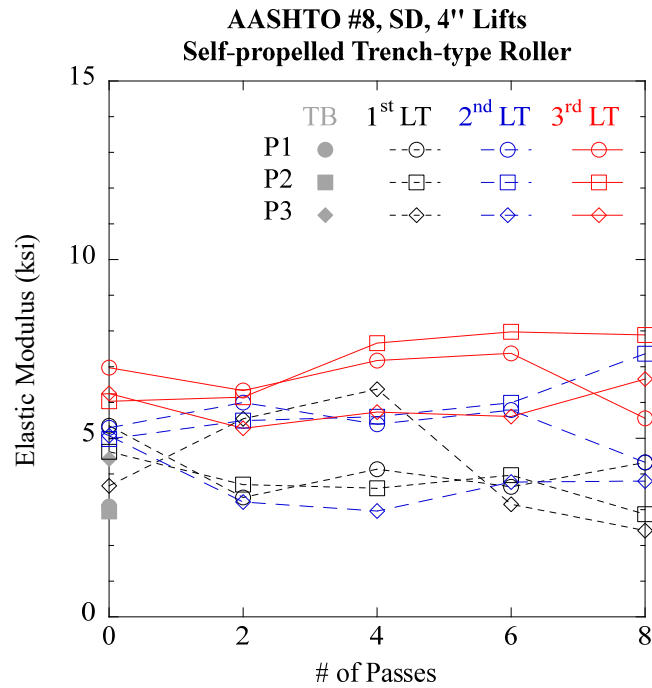


Figure C-1. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 4" lifts self-propelled trench-type roller

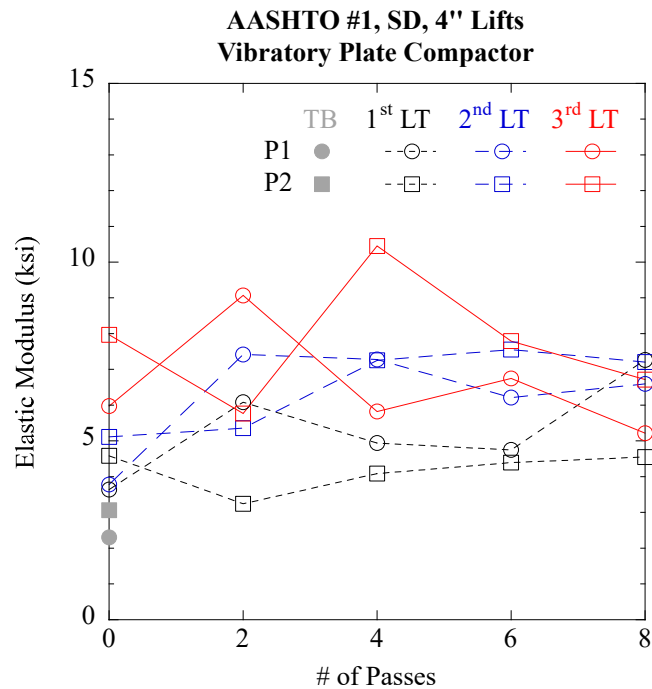


Figure C-2. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 4" lifts vibratory plate compactor

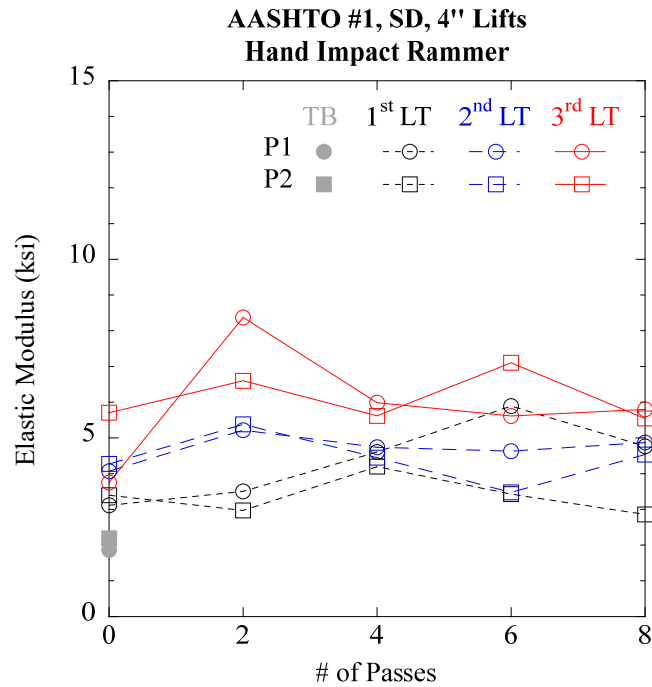


Figure C-3. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 4" lifts hand impact rammer

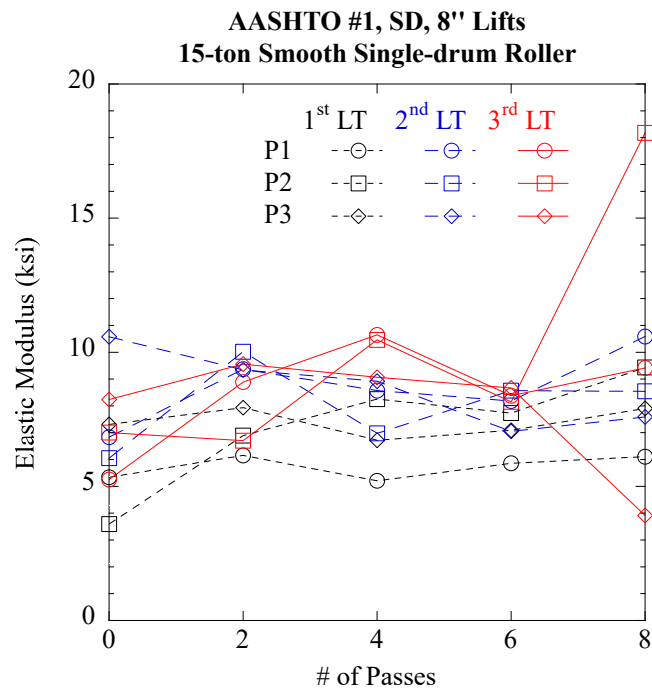


Figure C-4. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 8" lifts 15-ton smooth single-drum roller

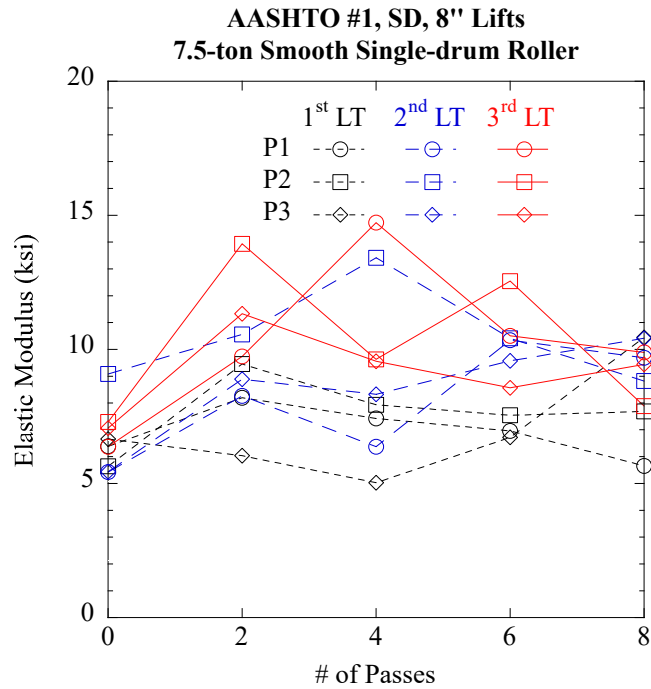


Figure C-5. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 8" lifts
7.5-ton smooth single-drum roller

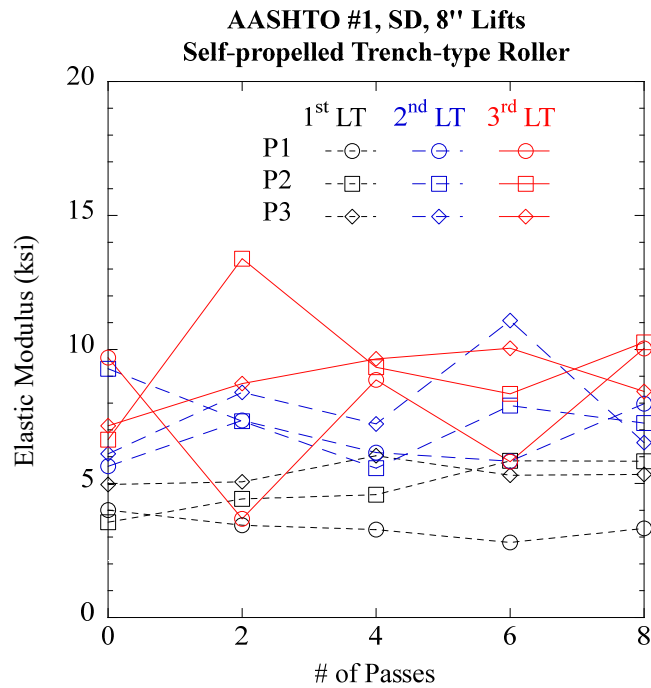


Figure C-6. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 8" lifts
self-propelled trench-type roller

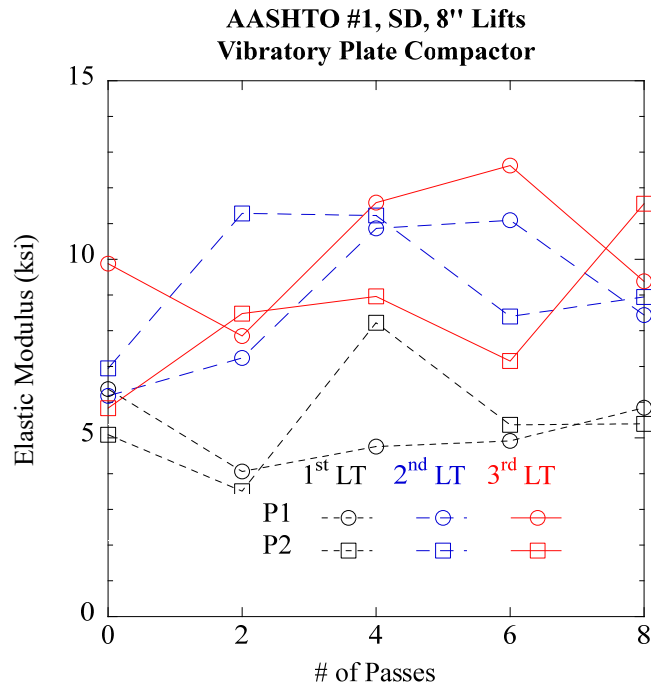


Figure C-7. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 8" lifts vibratory plate compactor

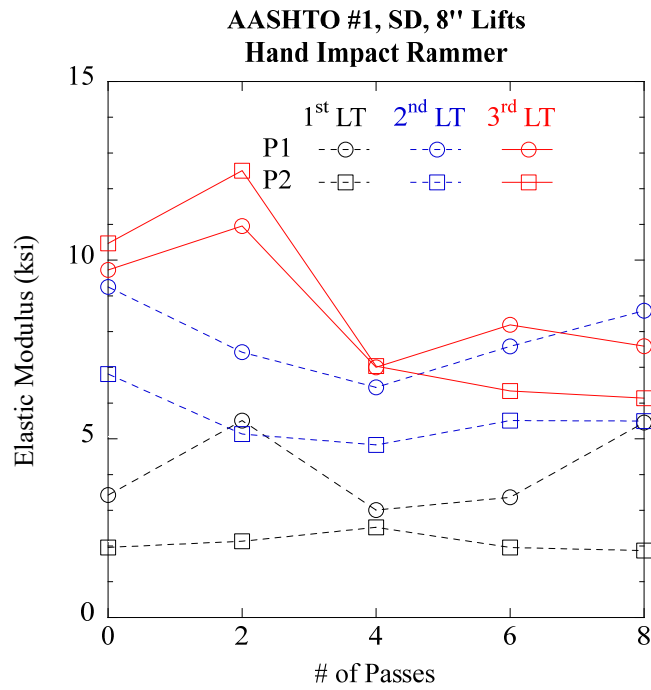


Figure C-8. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 8" lifts hand impact rammer

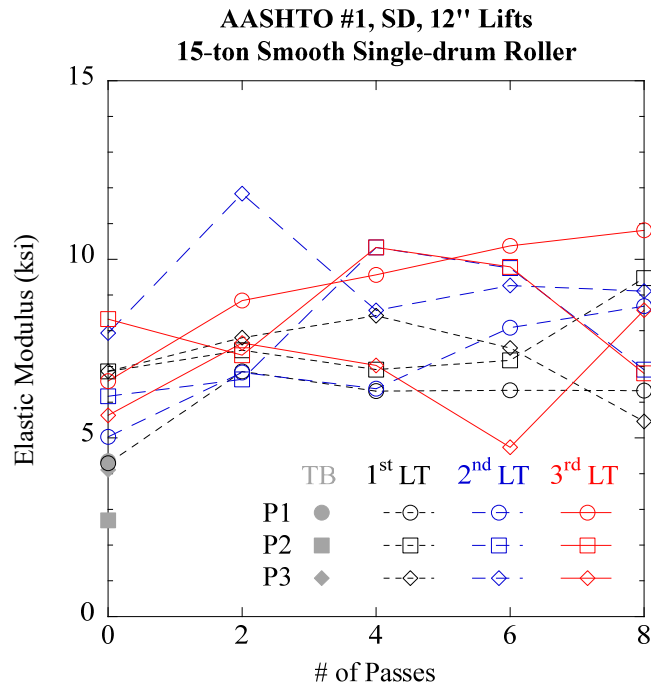


Figure C-9. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 12" lifts
15-ton smooth single-drum roller

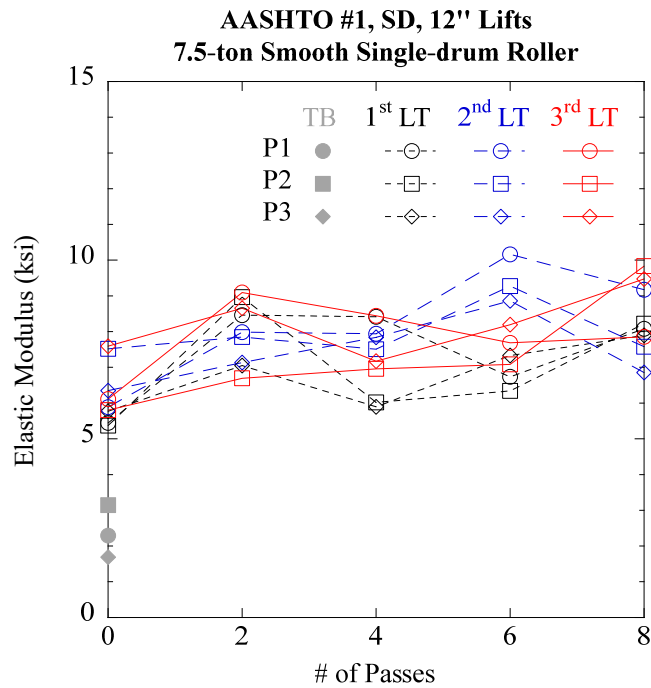


Figure C-10. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 12" lifts
7.5-ton smooth single-drum roller

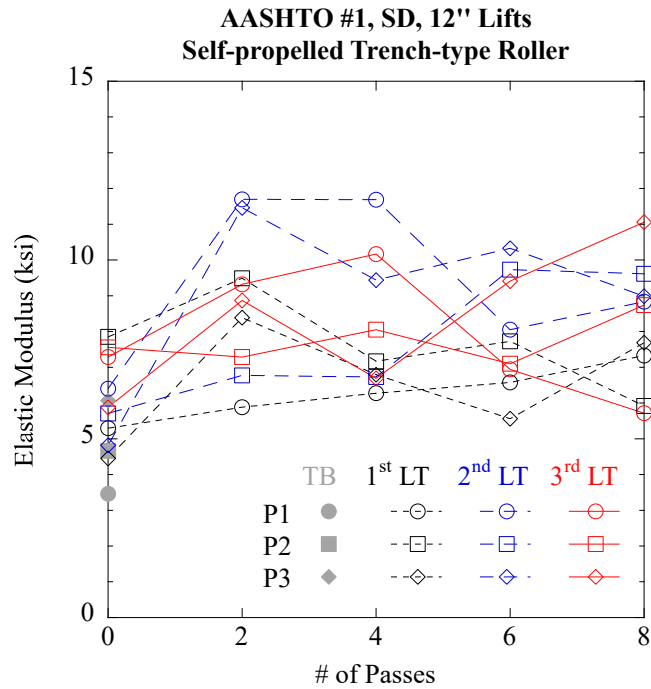


Figure C-11. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 12" lifts self-propelled trench-type roller

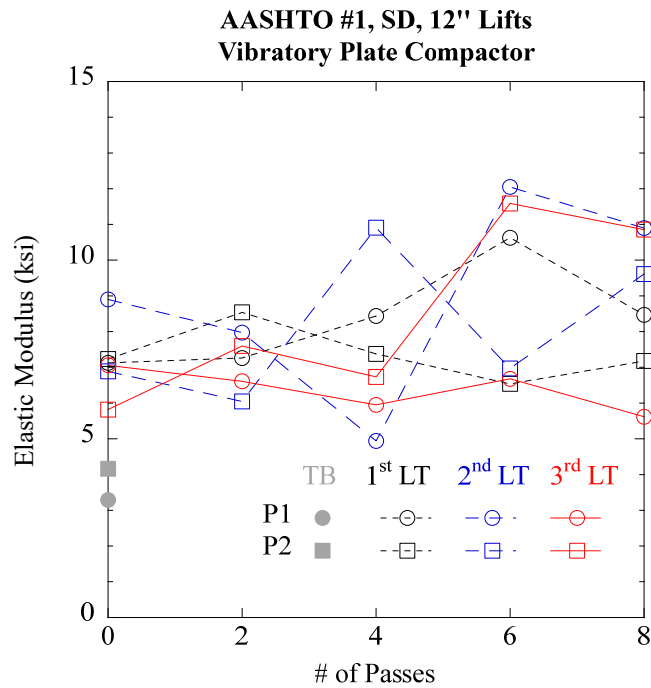


Figure C-12. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 12" lifts vibratory plate compactor

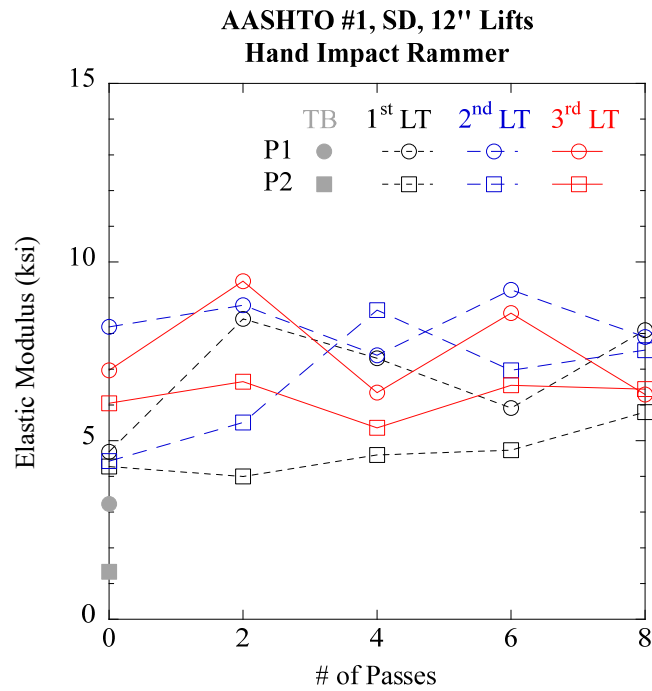


Figure C-13. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 12" lifts hand impact rammer

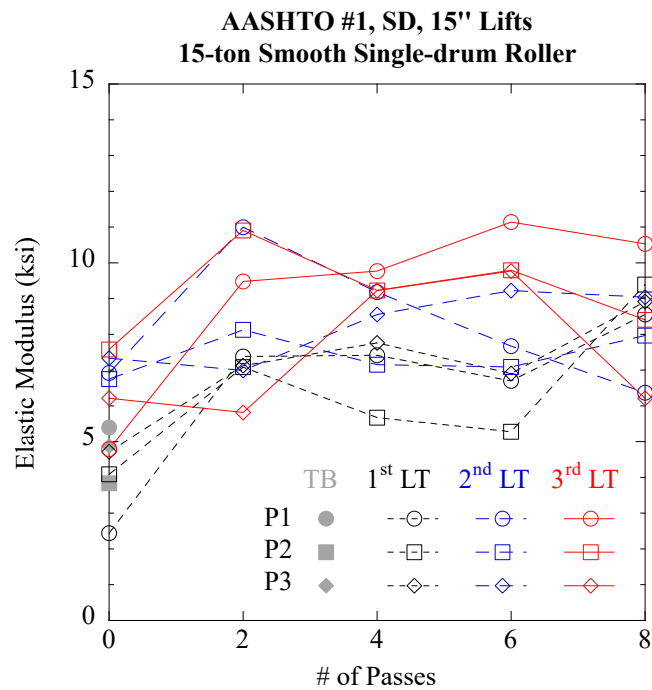


Figure C-14. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 15" lifts 15-ton smooth single-drum roller

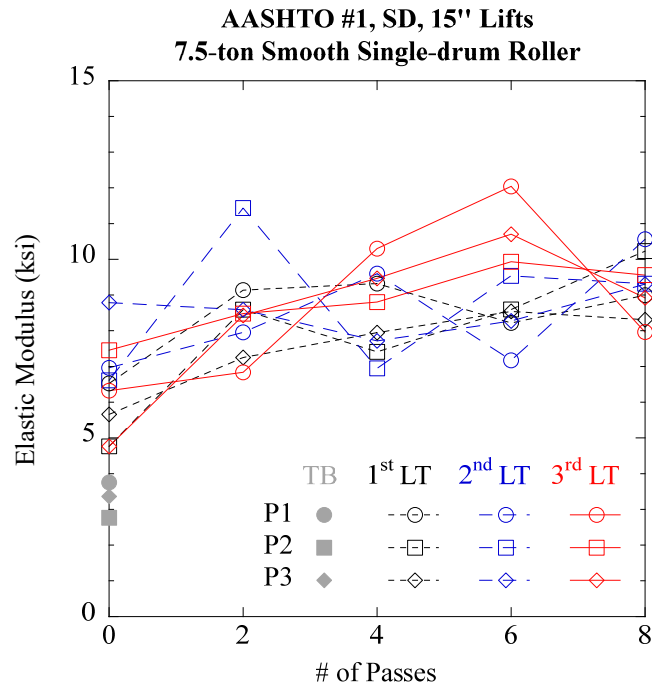


Figure C-15. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 15" lifts
7.5-ton smooth single-drum roller

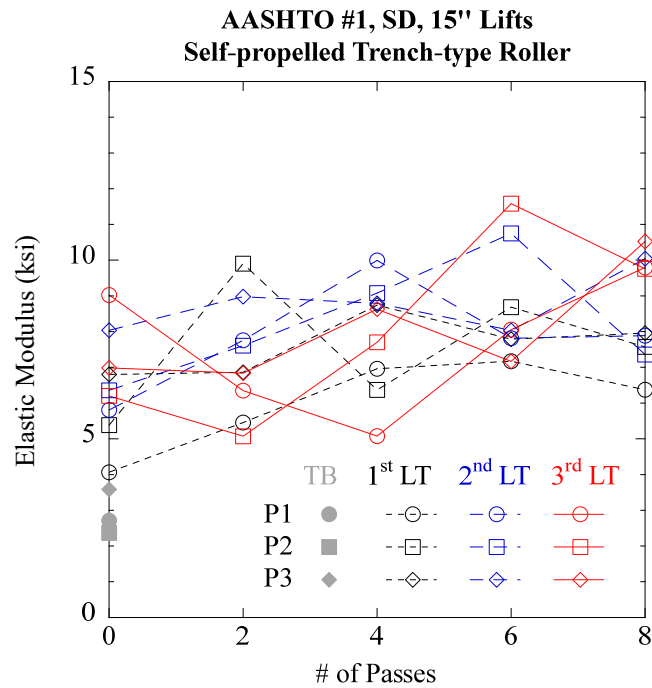


Figure C-16. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 15" lifts
self-propelled trench-type roller

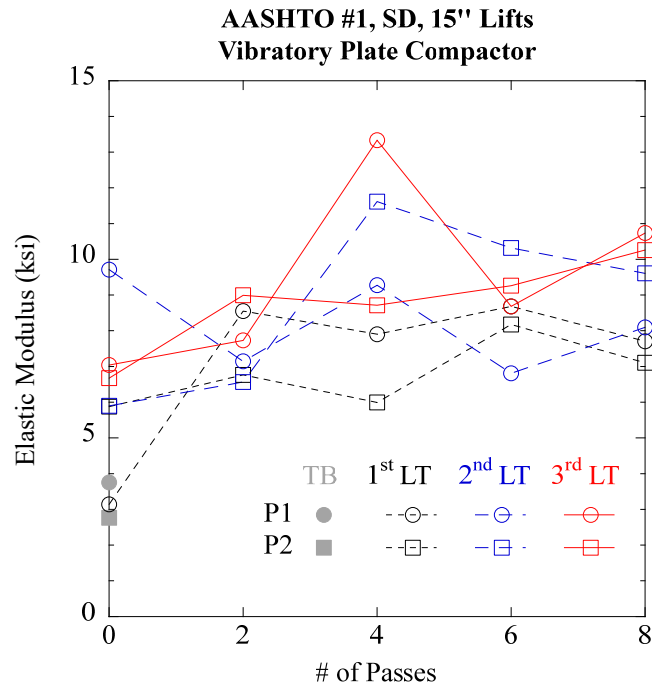


Figure C-17. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 15" lifts vibratory plate compactor

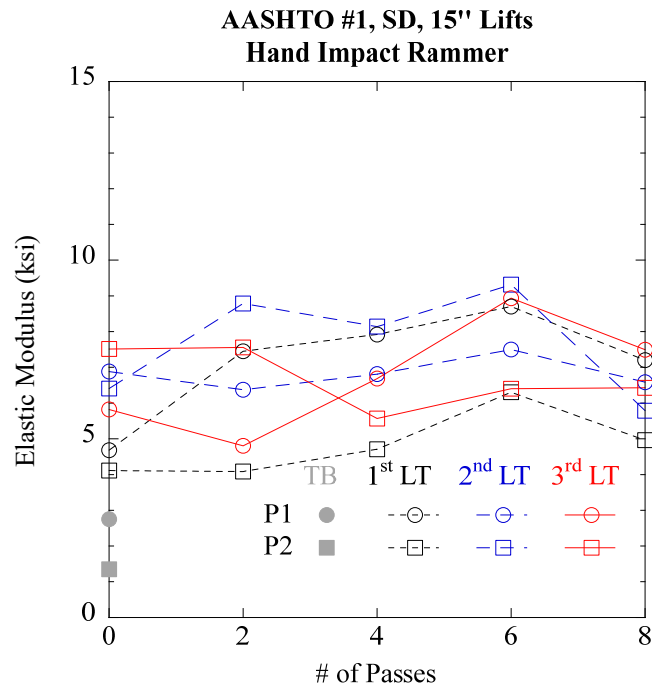


Figure C-18. Elastic modulus vs # of pass for AASHTO#1 aggregates, SD, 15" lifts hand impact rammer

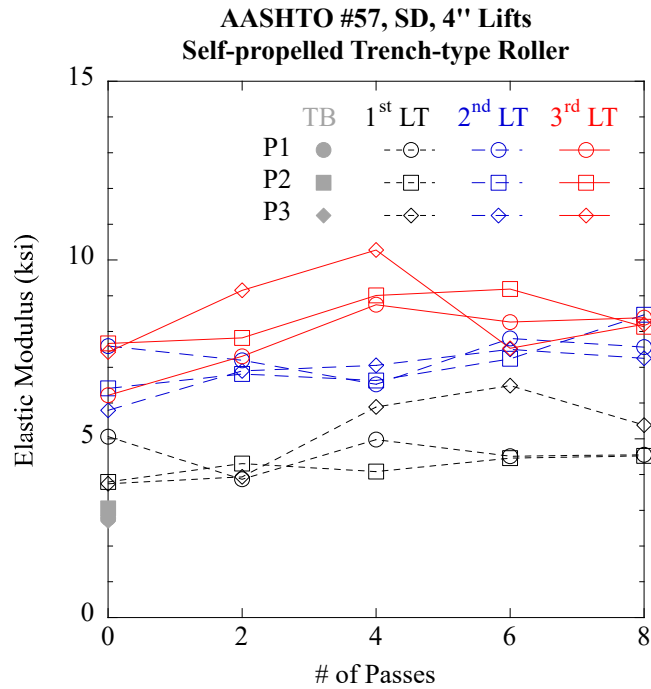


Figure C-19. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 4" lifts self-propelled trench-type roller

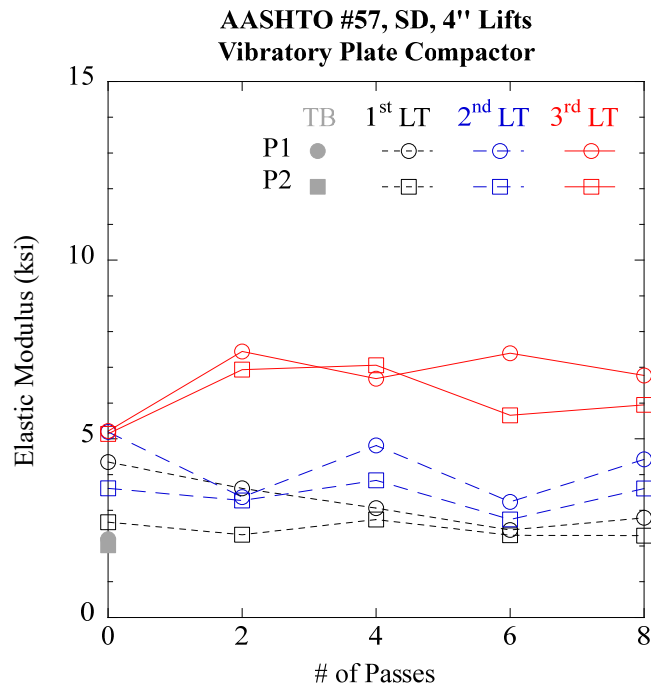


Figure C-20. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 4" lifts vibratory plate compactor

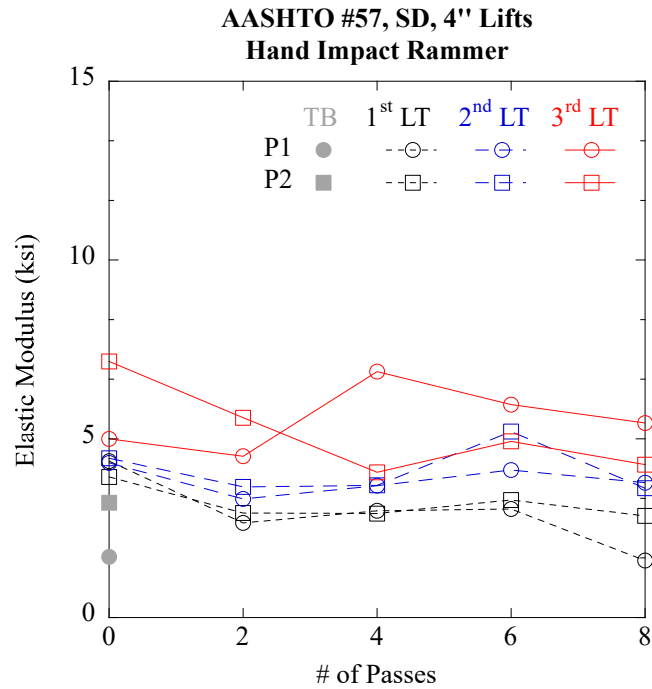


Figure C-21. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 4" lifts hand impact rammer

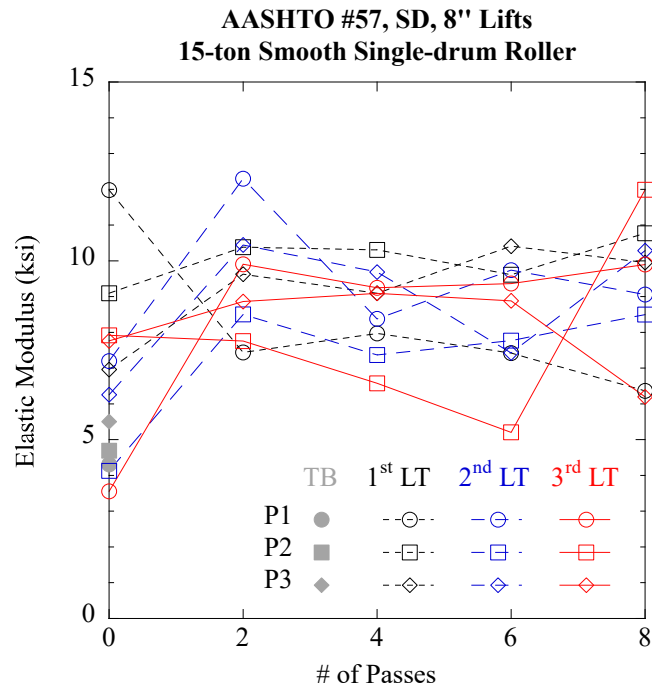


Figure C-22. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 8" lifts 15-ton smooth single-drum roller

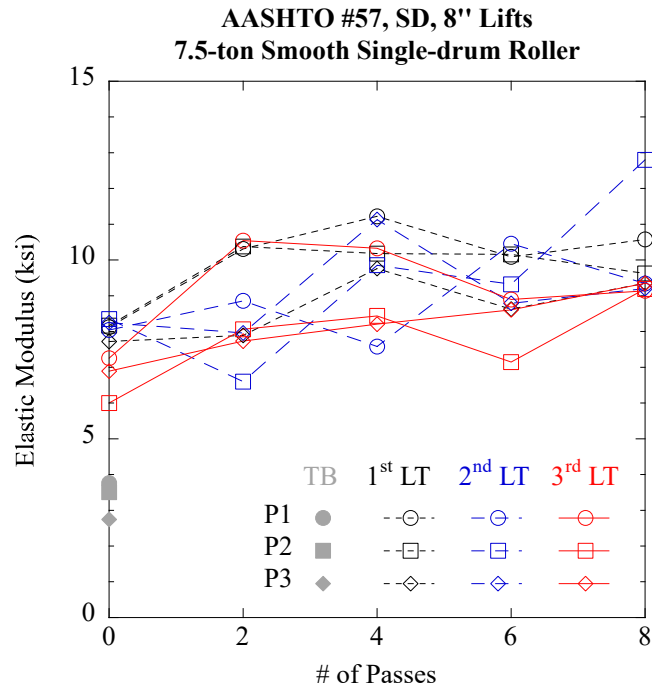


Figure C-23. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 8" lifts
7.5-ton smooth single-drum roller

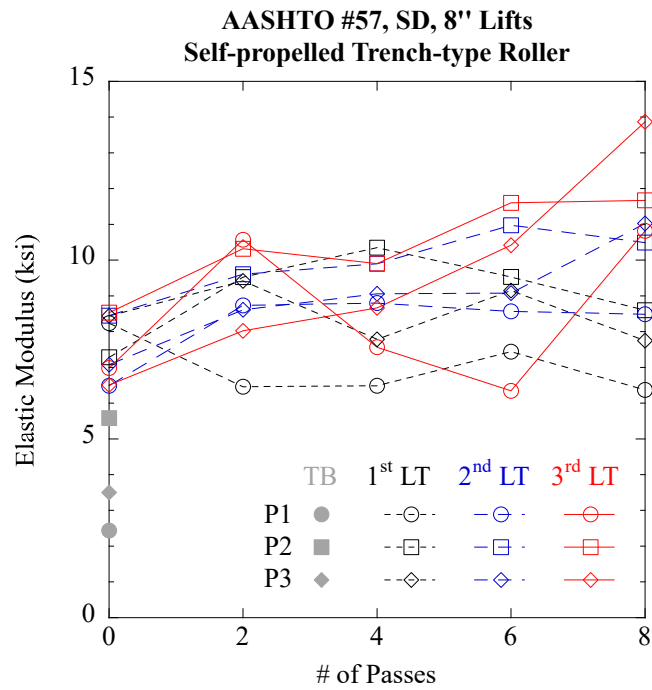


Figure C-24. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 8" lifts
self-propelled trench-type roller

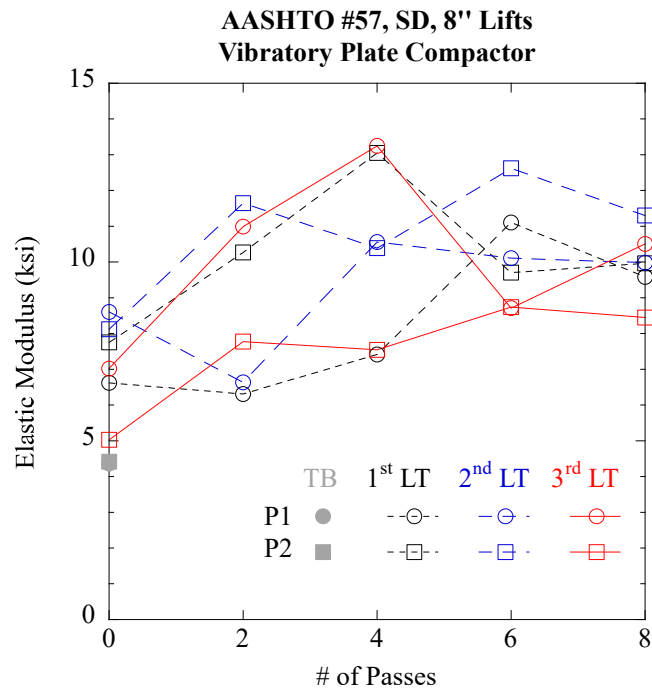


Figure C-25. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 8" lifts vibratory plate compactor

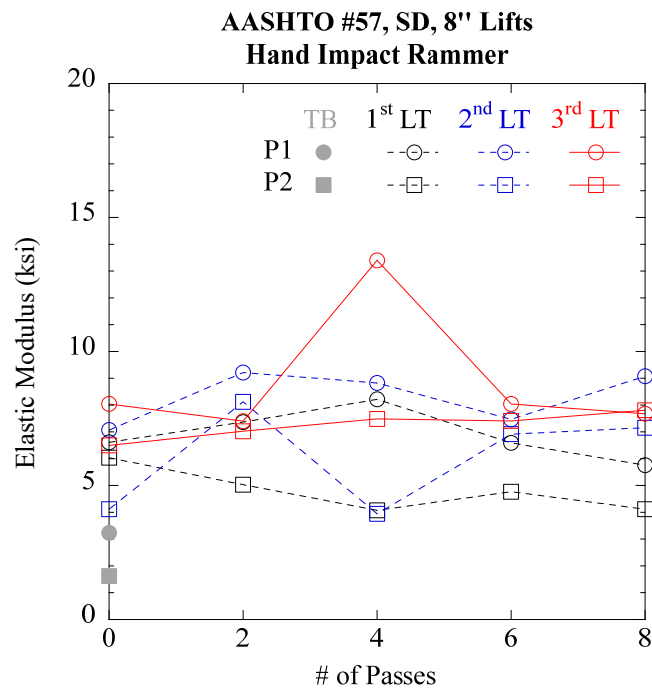


Figure C-26. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 8" lifts hand impact rammer

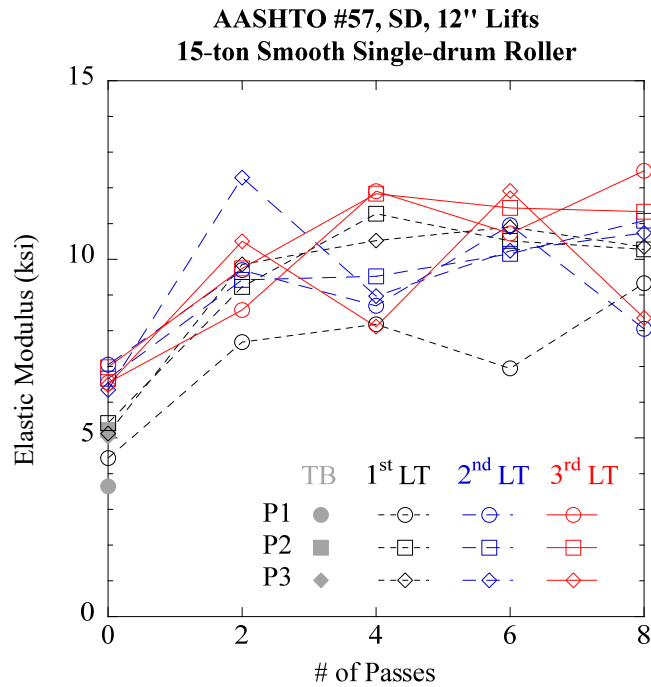


Figure C-27. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 12" lifts
15-ton smooth single-drum roller

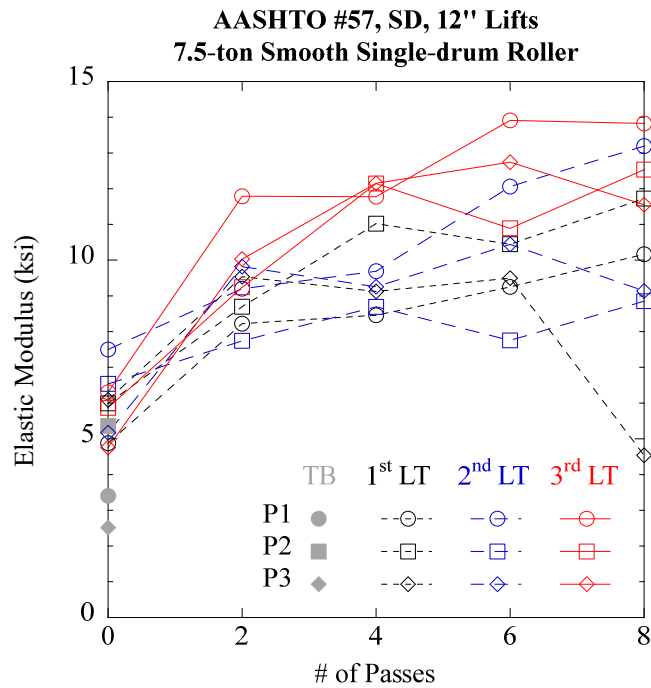


Figure C-28. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 12" lifts
7.5-ton smooth single-drum roller

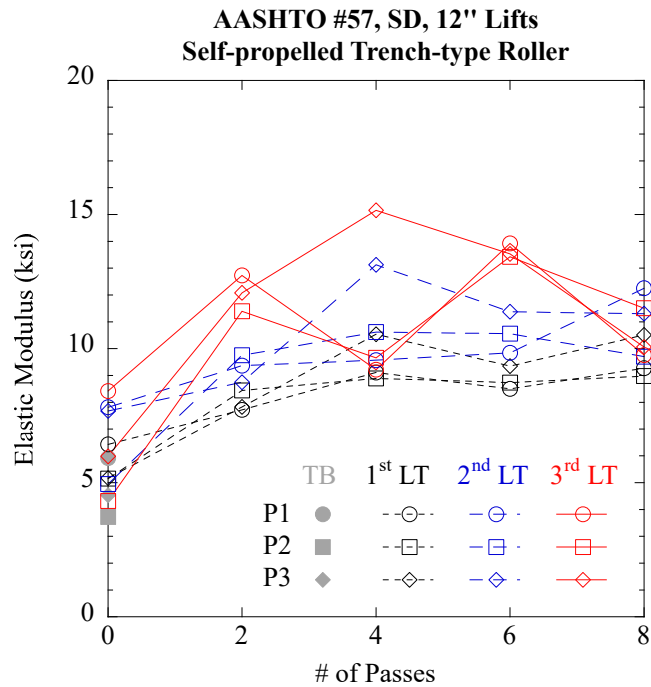


Figure C-29. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 12" lifts self-propelled trench-type roller

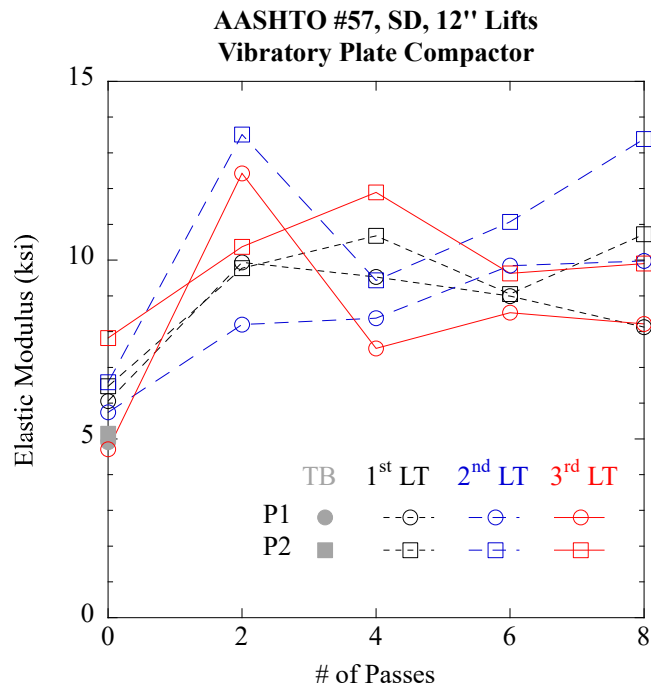


Figure C-30. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 12" lifts vibratory plate compactor

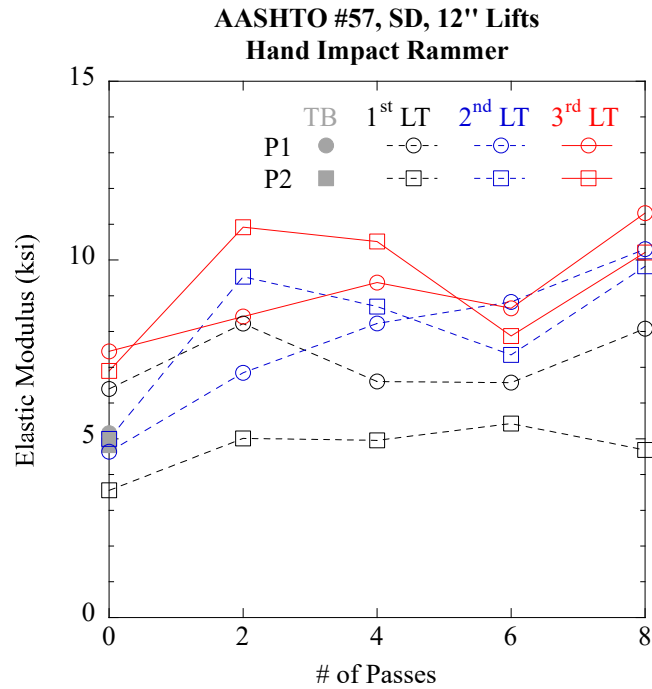


Figure C-31. Elastic modulus vs # of pass for AASHTO#57 aggregates, SD, 12" lifts hand impact rammer

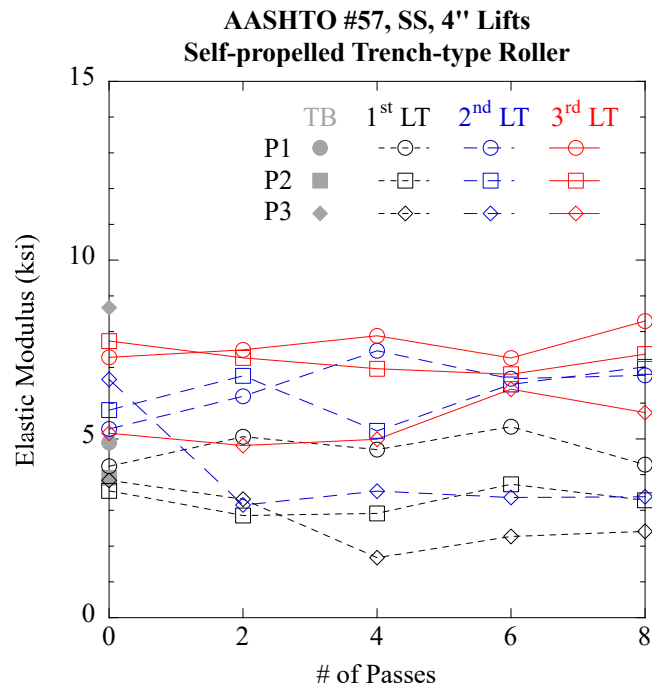


Figure C-32. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 4" lifts self-propelled trench-type roller

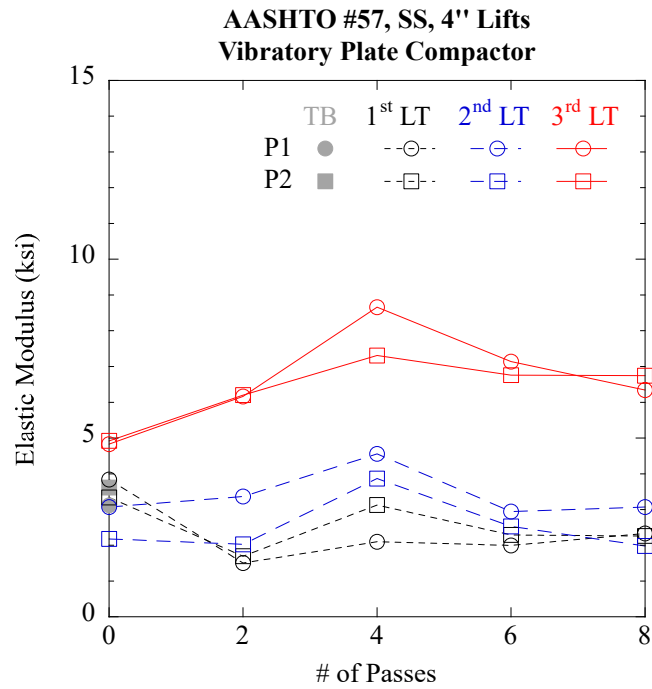


Figure C-33. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 4" lifts vibratory plate compactor

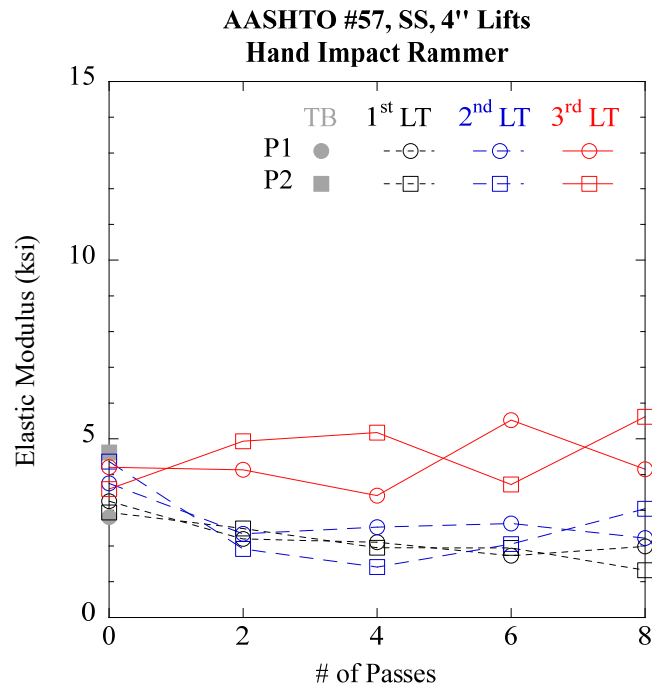


Figure C-34. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 4" lifts hand impact rammer

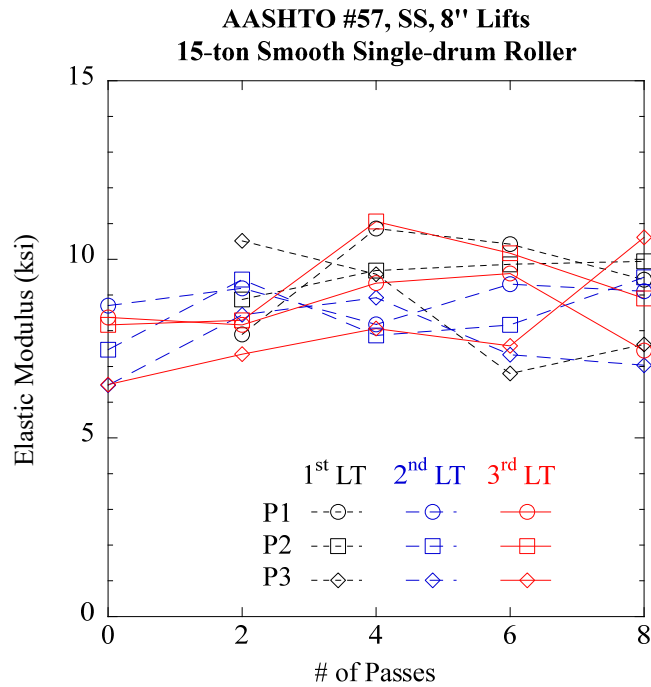


Figure C-35. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 8" lifts
15-ton smooth single-drum roller

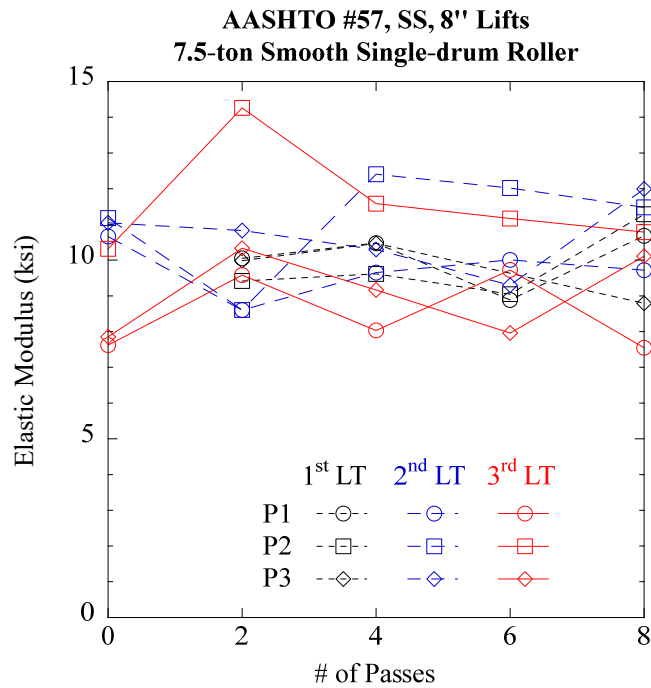


Figure C-36. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 8" lifts
7.5-ton smooth single-drum roller

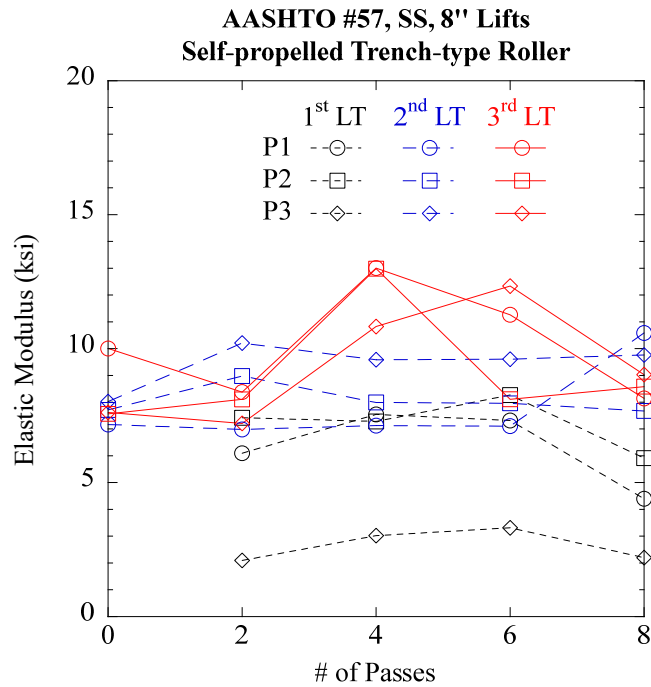


Figure C-37. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 8" lifts self-propelled trench-type roller

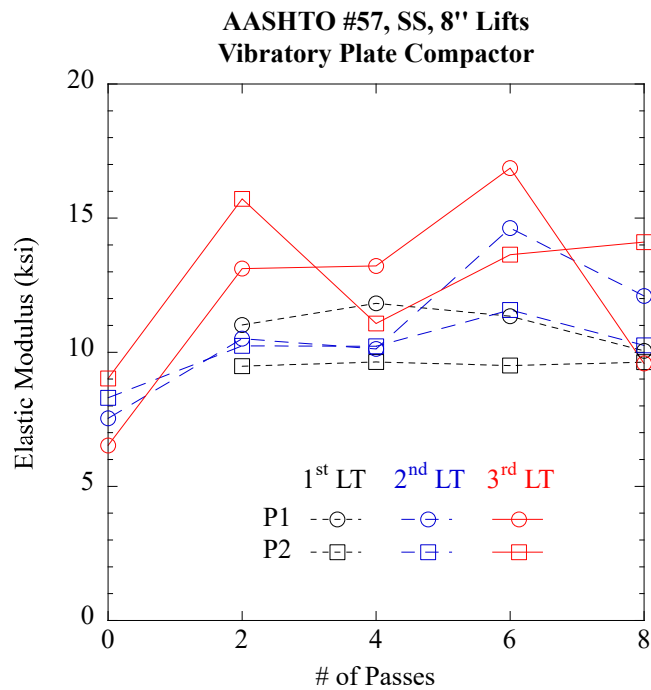


Figure C-38. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 8" lifts vibratory plate compactor

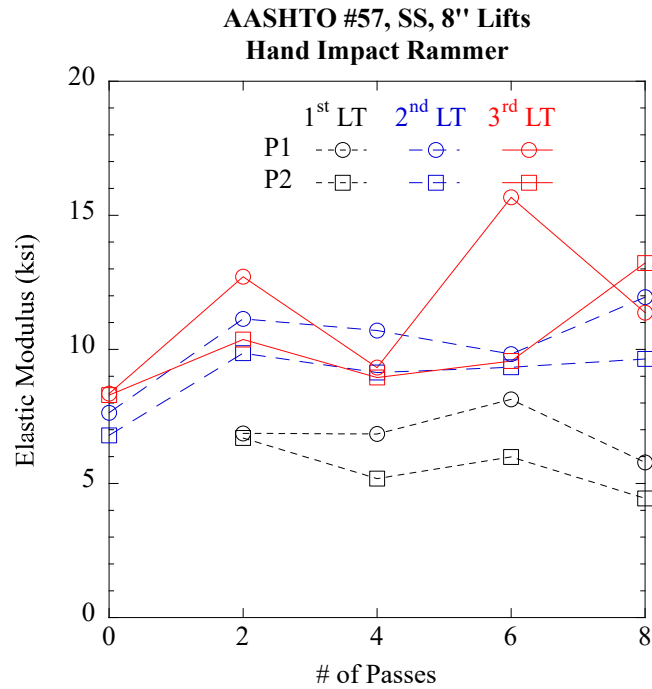


Figure C-39. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 8" lifts hand impact rammer

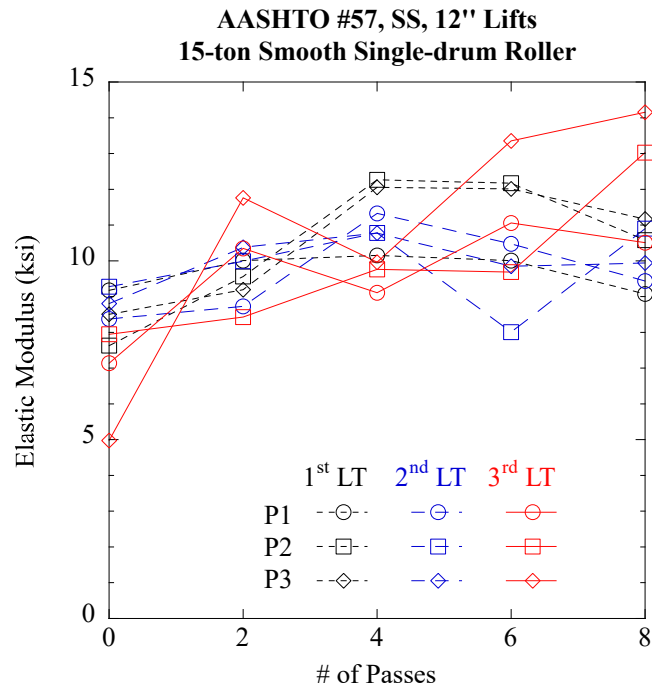


Figure C-40. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 12" lifts 15-ton smooth single-drum roller

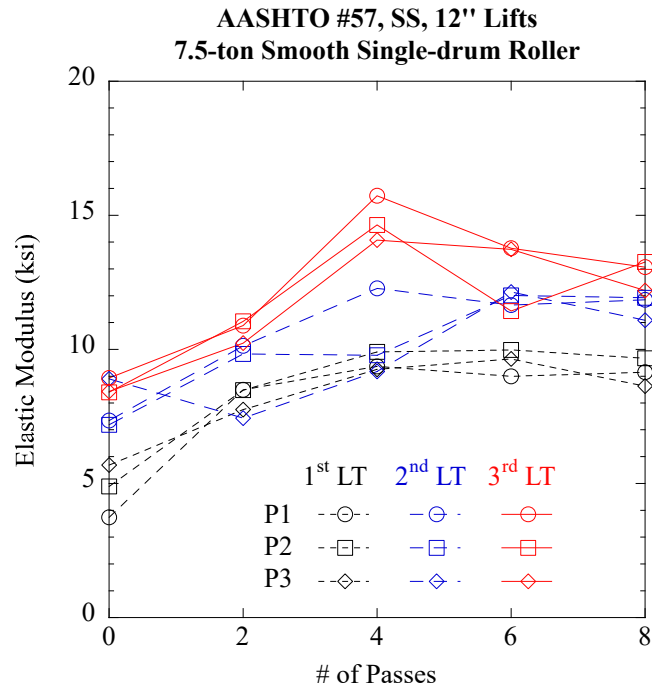


Figure C-41. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 12" lifts
7.5-ton smooth single-drum roller

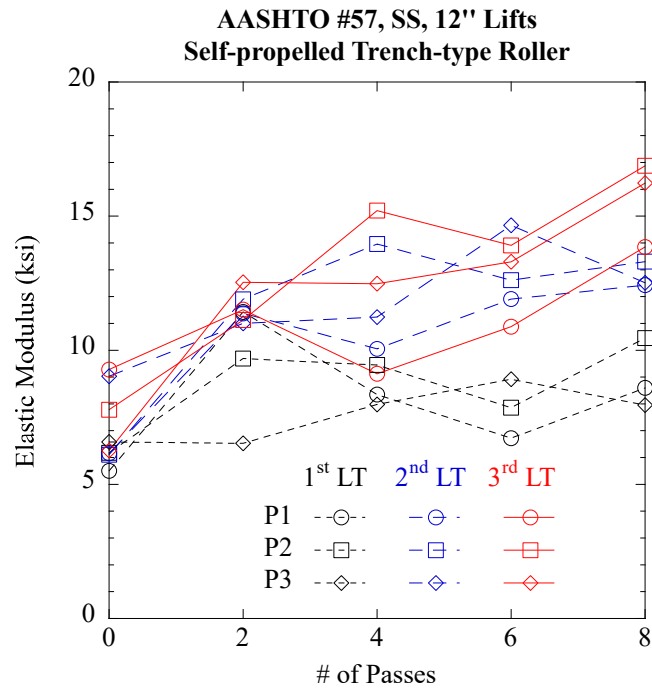


Figure C-42. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 12" lifts
self-propelled trench-type roller

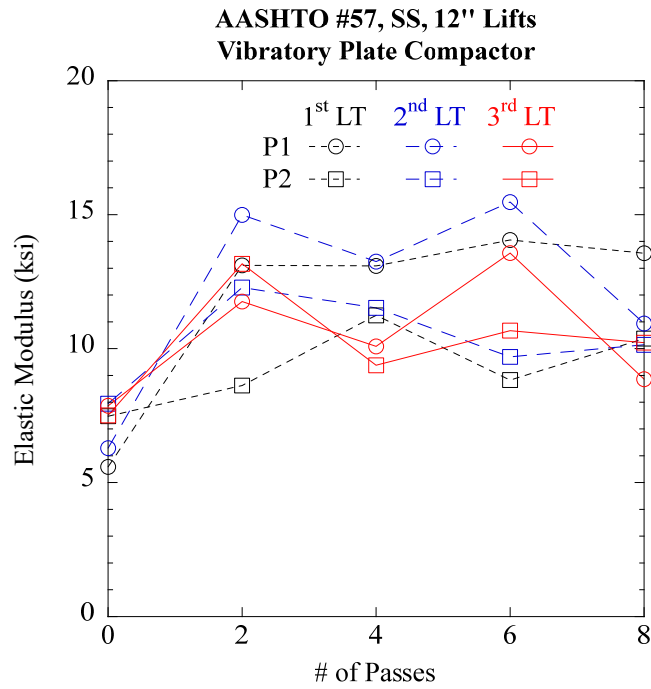


Figure C-43. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 12" lifts vibratory plate compactor

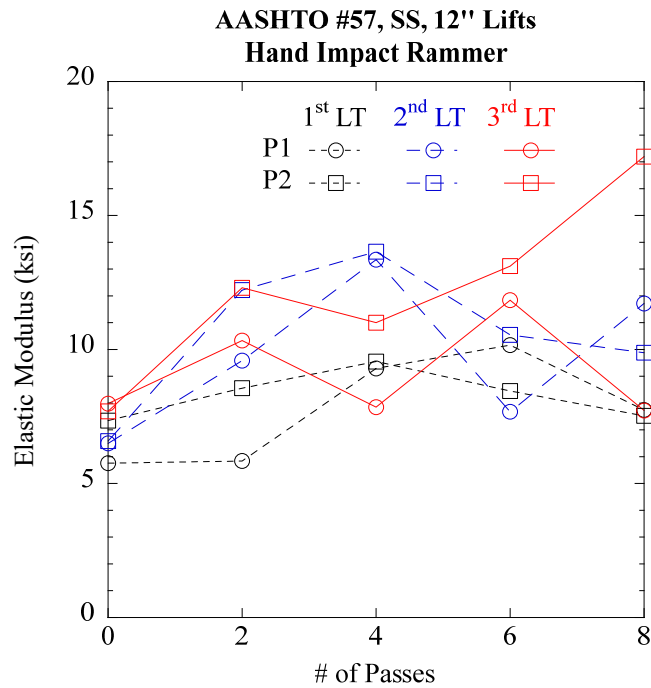


Figure C-44. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 12" lifts hand impact rammer

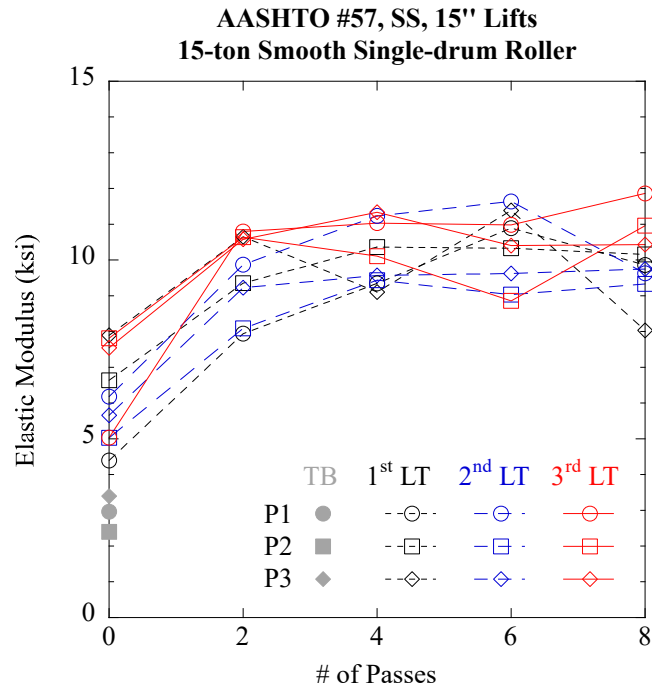


Figure C-45. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 15" lifts
15-ton smooth single-drum roller

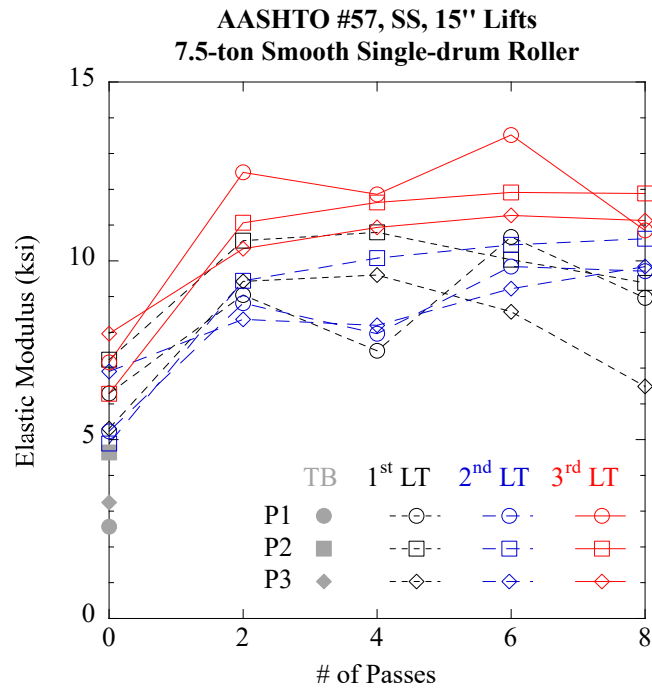


Figure C-46. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 15" lifts
7.5-ton smooth single-drum roller

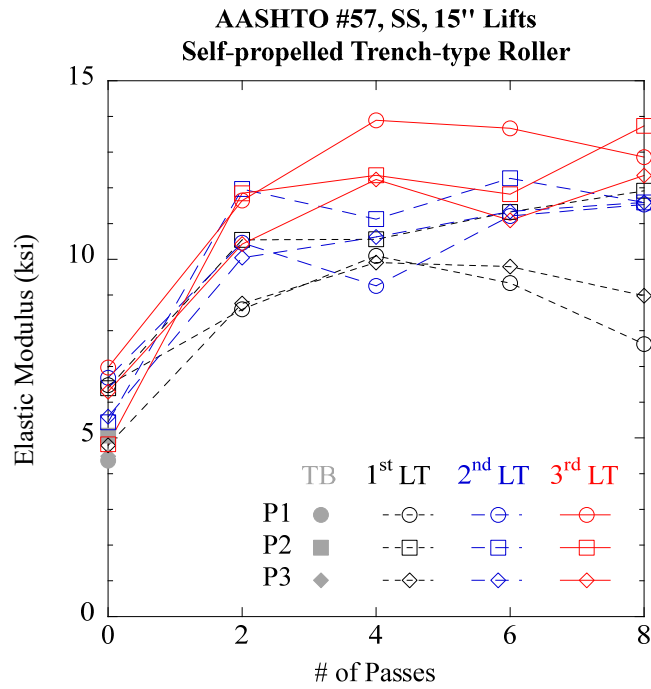


Figure C-47. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 15" lifts self-propelled trench-type roller

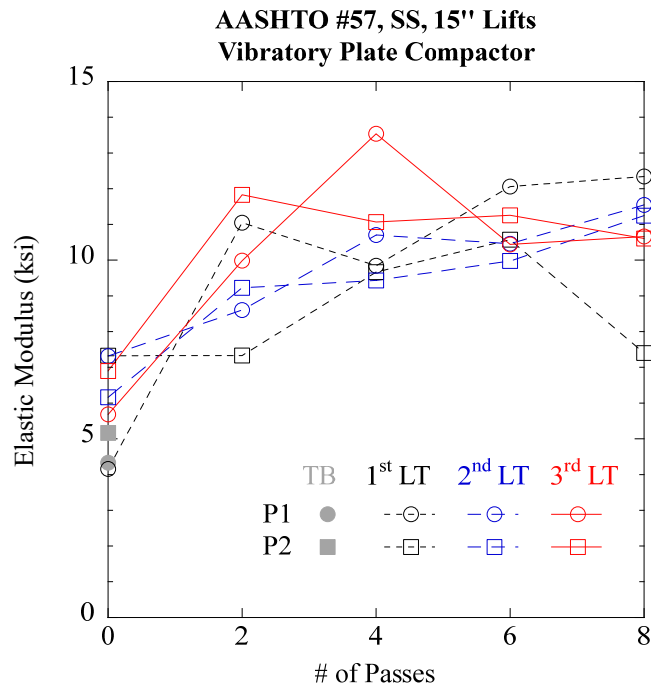


Figure C-48. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 15" lifts vibratory plate compactor

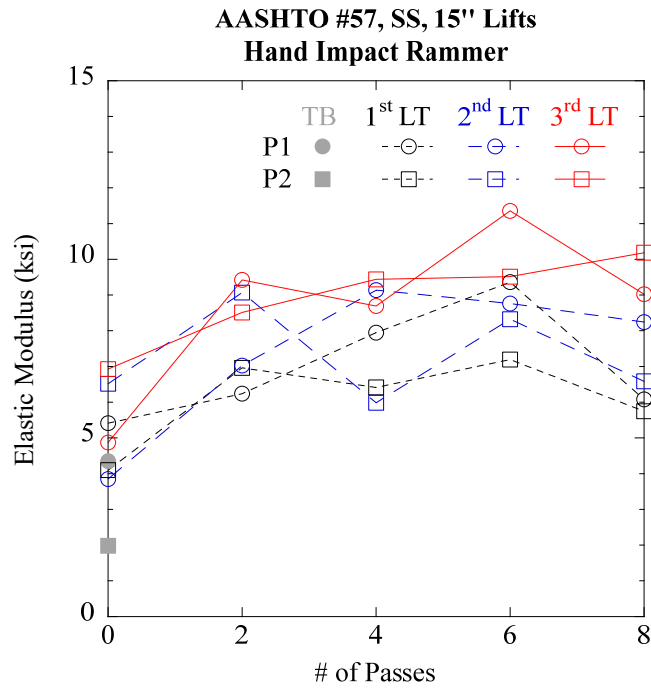


Figure C-49. Elastic modulus vs # of pass for AASHTO#57 aggregates, SS, 15" lifts hand impact rammer

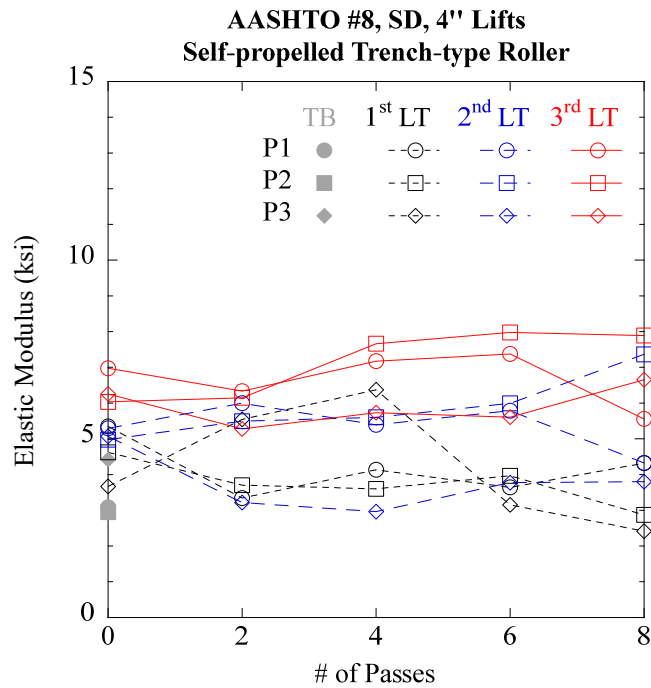


Figure C-50. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 4" lifts self-propelled trench-type roller

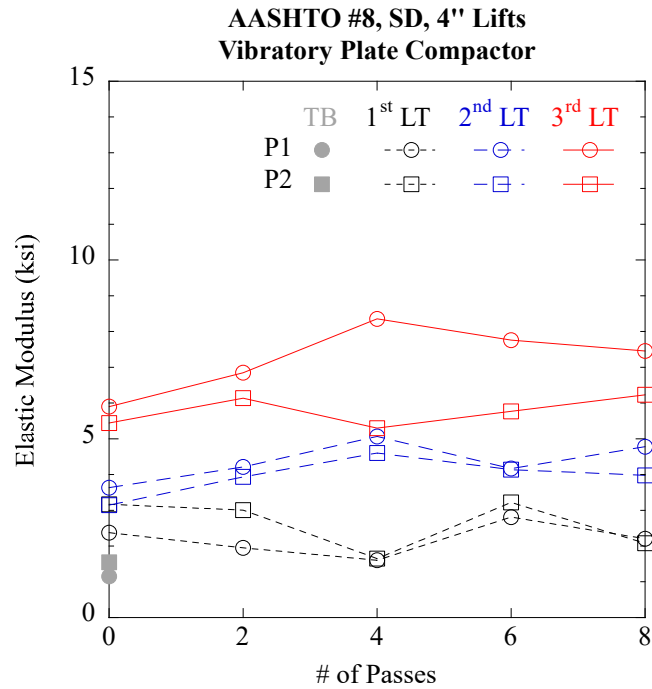


Figure C-51. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 4" lifts vibratory plate compactor

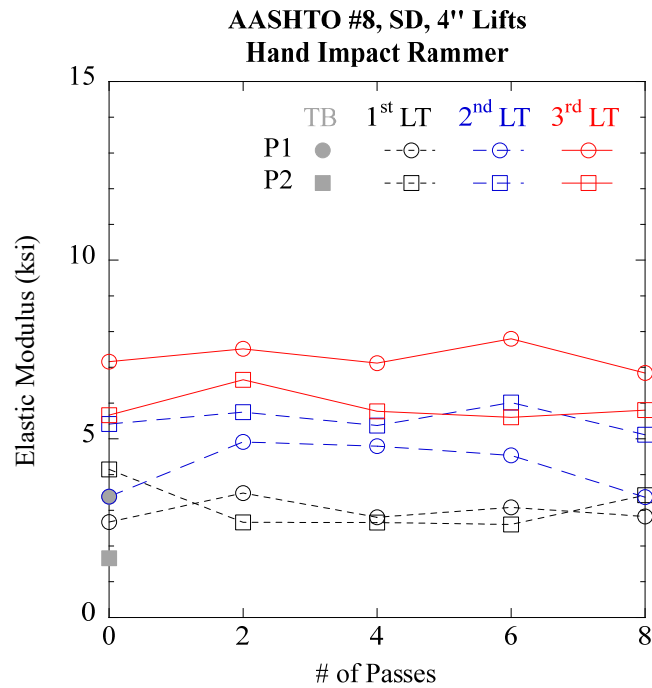


Figure C-52. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 4" lifts hand impact rammer

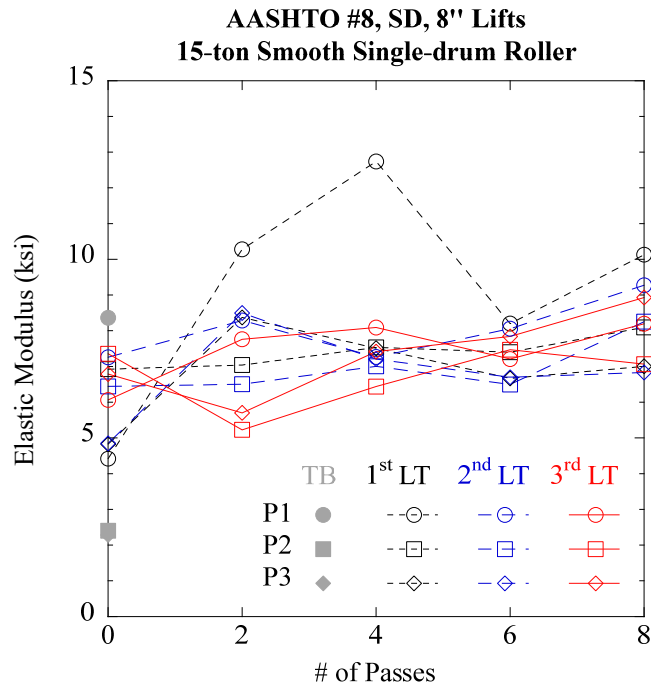


Figure C-53. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 8" lifts
15-ton smooth single-drum roller

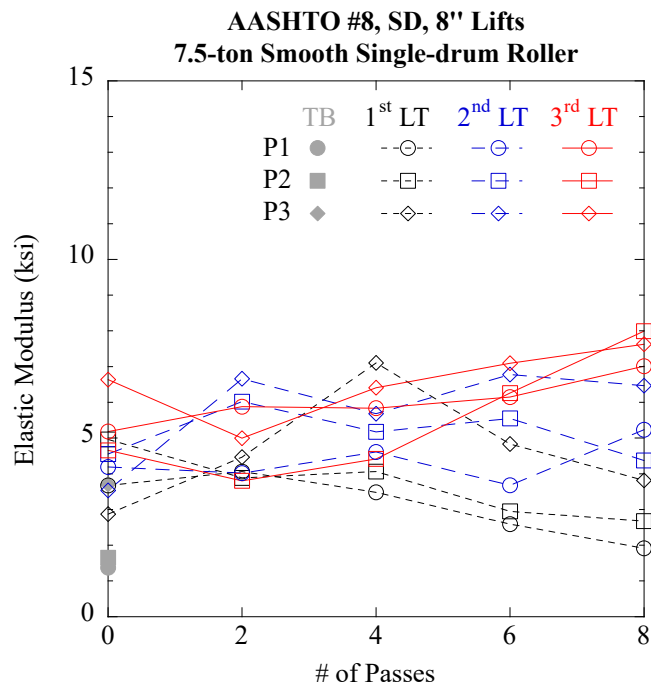


Figure C-54. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 8" lifts
7.5-ton smooth single-drum roller

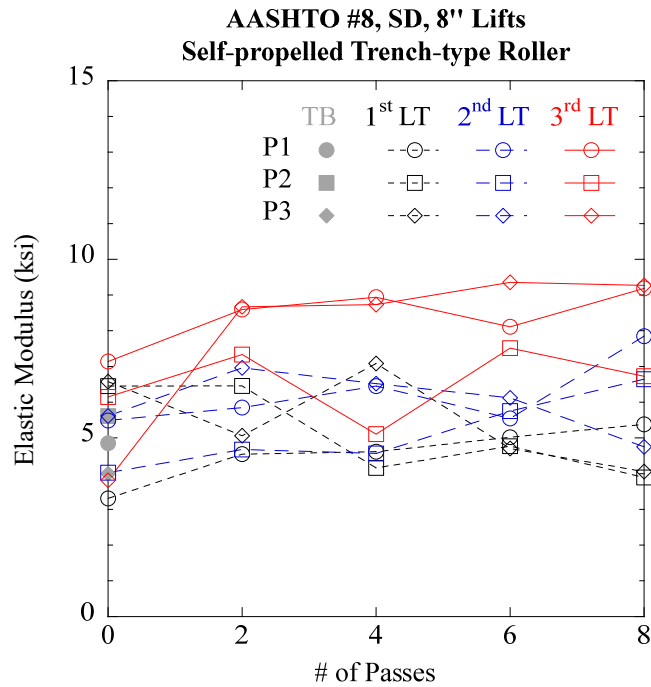


Figure C-55. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 8" lifts self-propelled trench-type roller

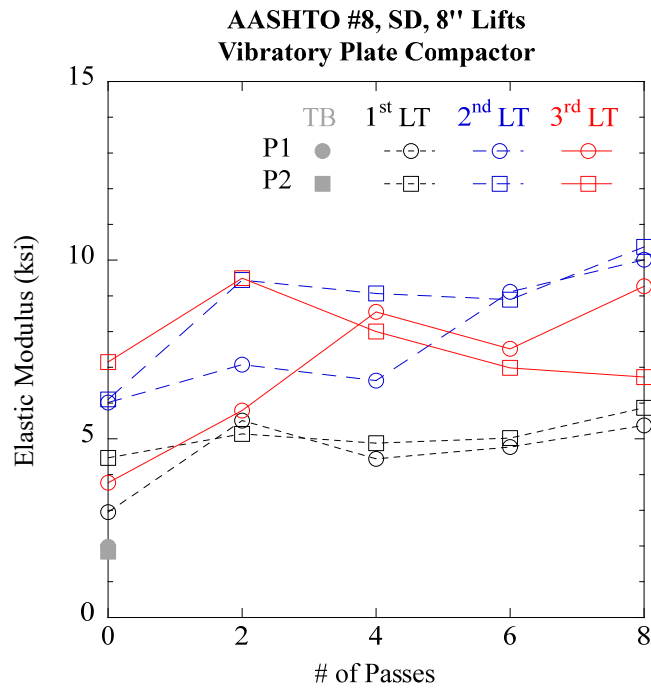


Figure C-56. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 8" lifts vibratory plate compactor

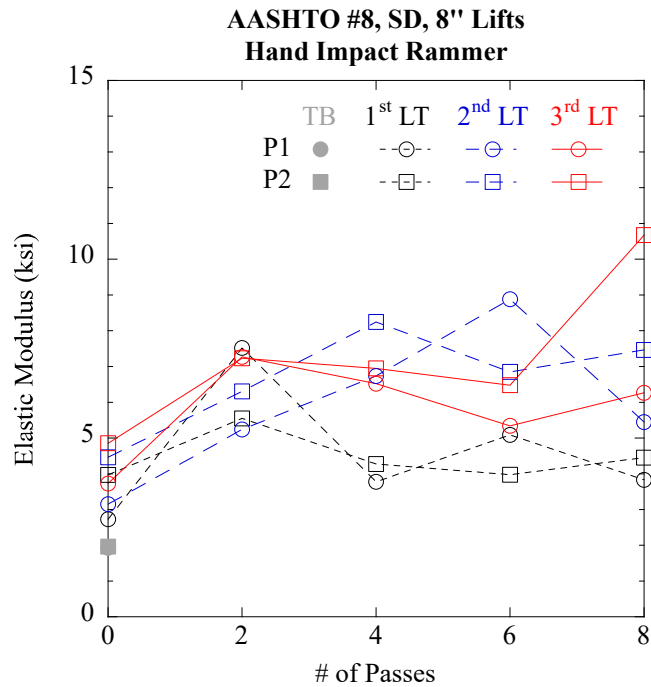


Figure C-57. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 8" lifts hand impact rammer

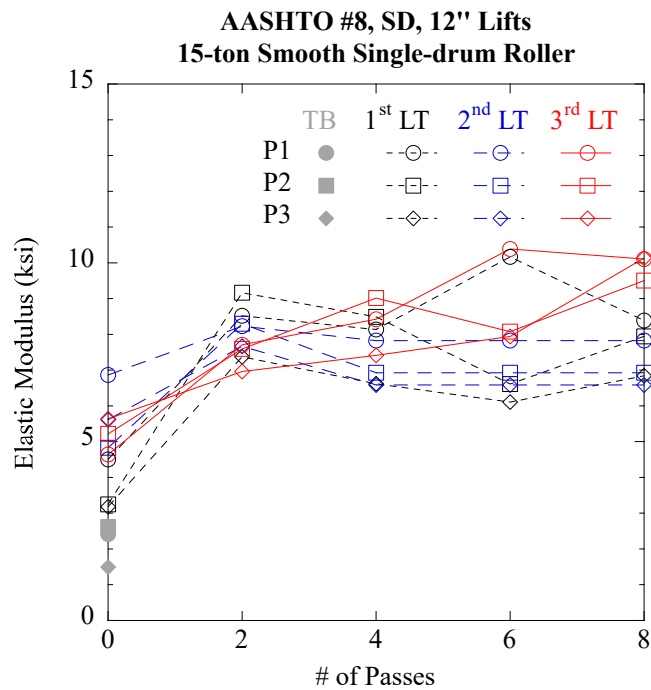


Figure C-58. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 12" lifts 15-ton smooth single-drum roller

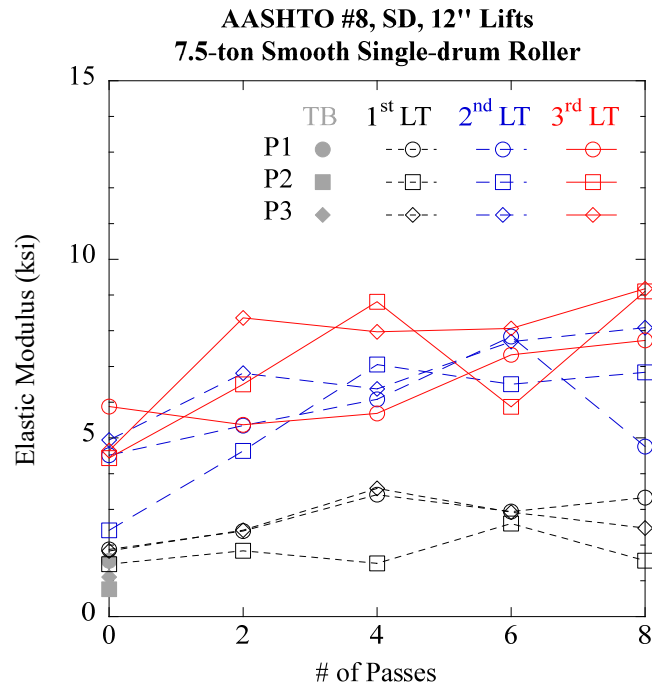


Figure C-59. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 12" lifts
7.5-ton smooth single-drum roller

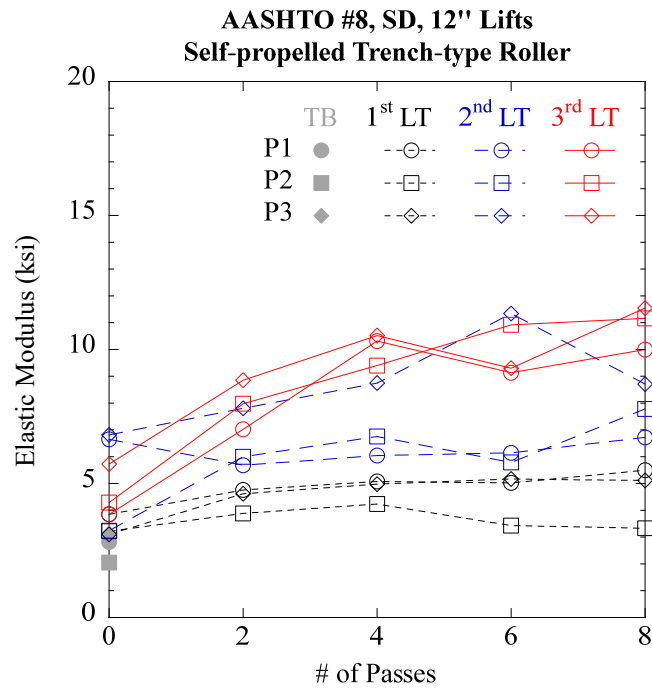


Figure C-60. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 12" lifts
self-propelled trench-type roller

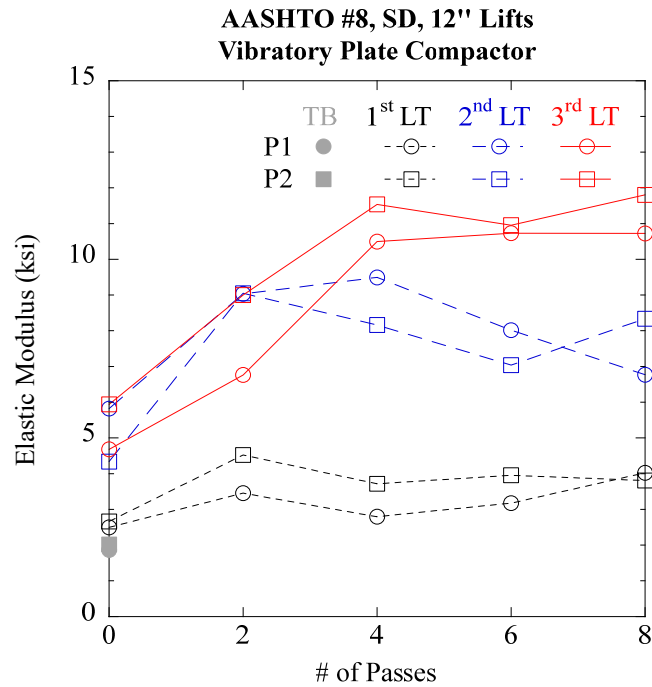


Figure C-61. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 12" lifts vibratory plate compactor

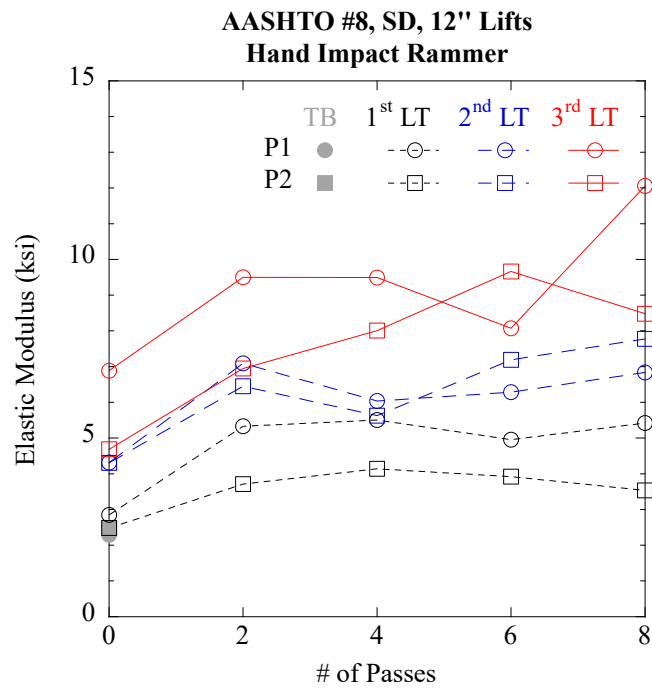


Figure C-62. Elastic modulus vs # of pass for AASHTO#8 aggregates, SD, 12" lifts hand impact rammer

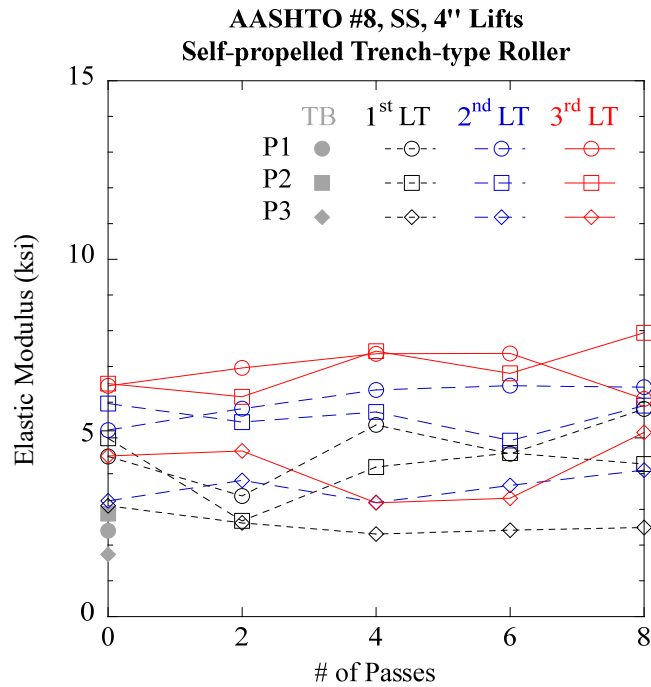


Figure C-63. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 4" lifts self-propelled trench-type roller

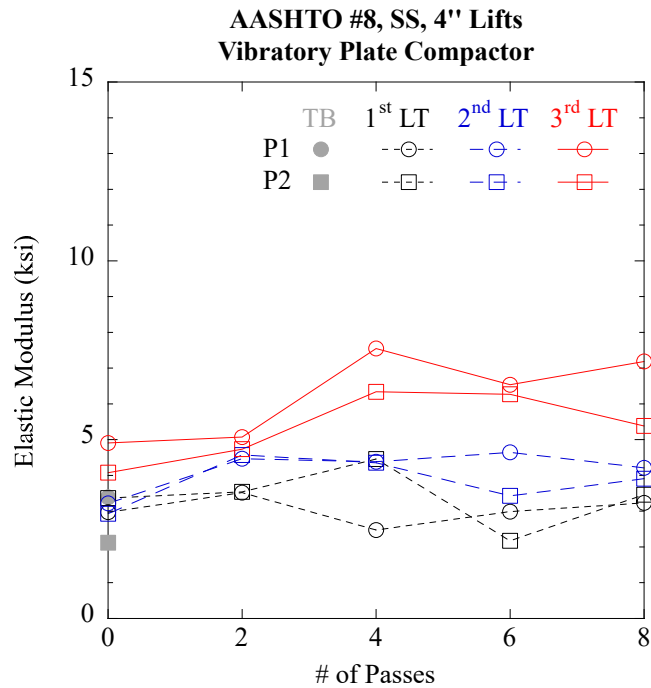


Figure C-64. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 4" lifts vibratory plate compactor

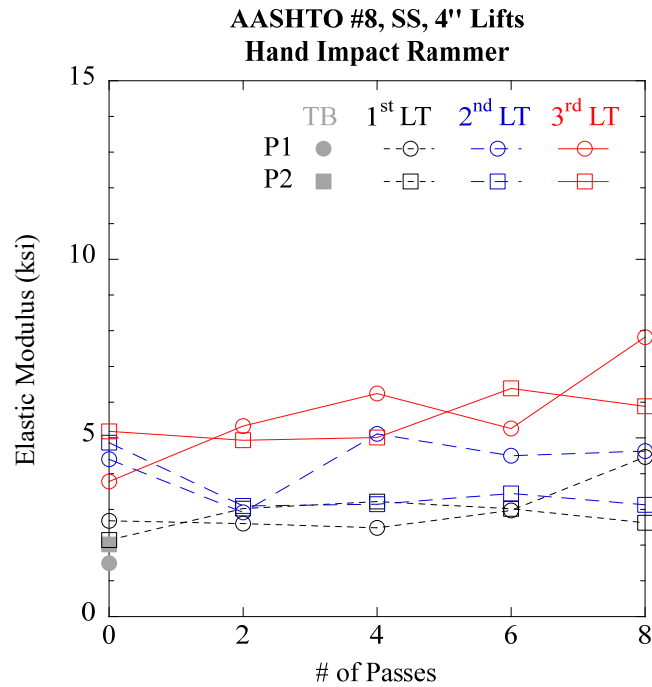


Figure C-65. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 4" lifts hand impact rammer

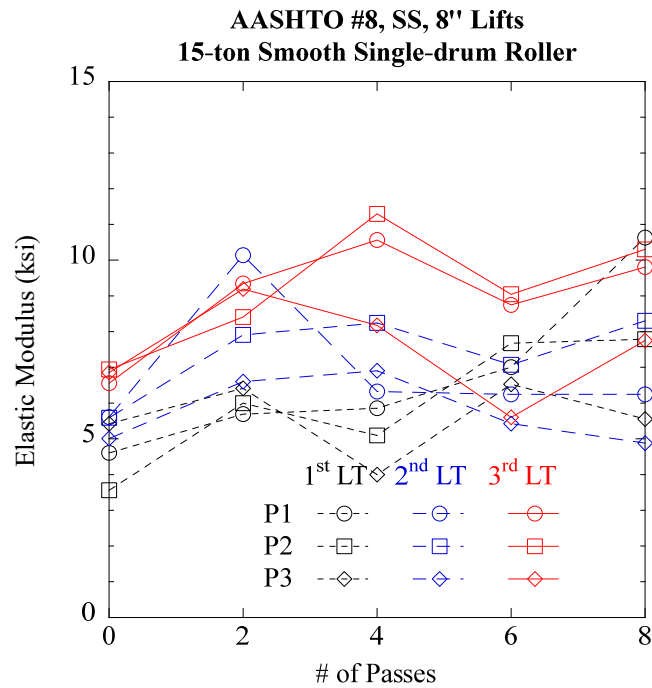


Figure C-66. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 8" lifts 15-ton smooth single-drum roller

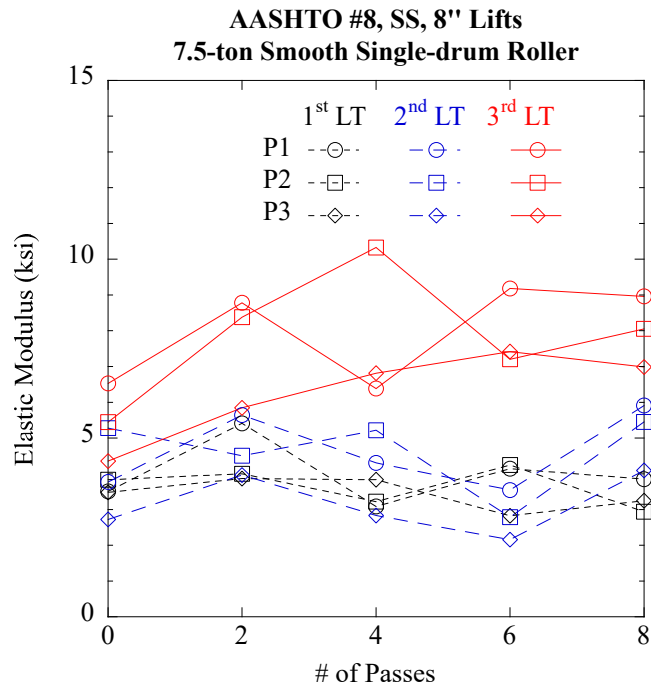


Figure C-67. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 8" lifts
7.5-ton smooth single-drum roller

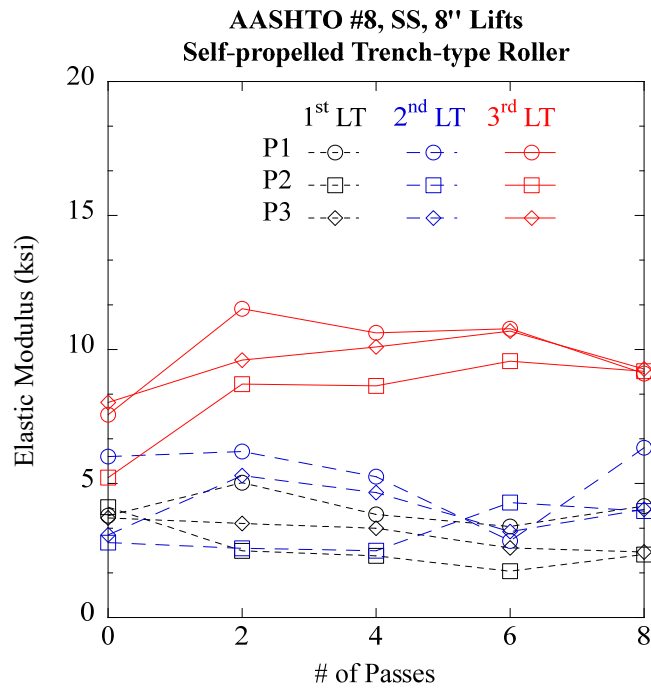


Figure C-68. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 8" lifts
self-propelled trench-type roller

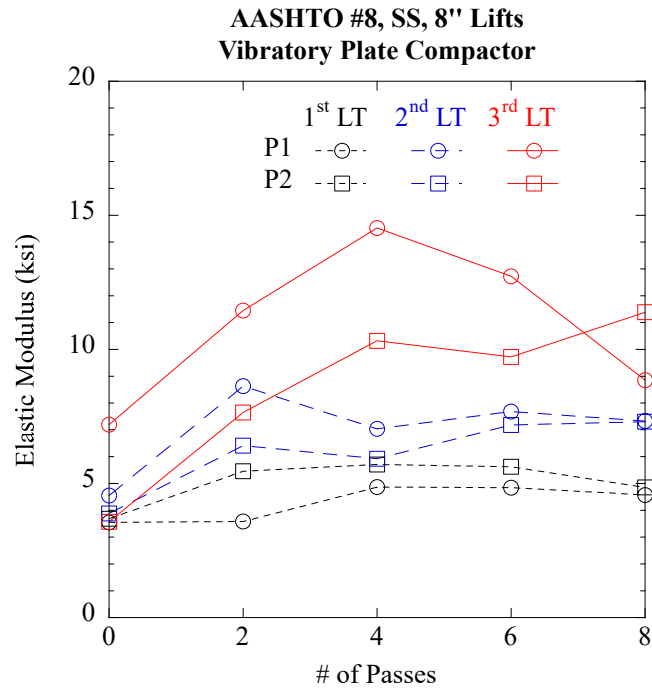


Figure C-69. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 8" lifts vibratory plate compactor

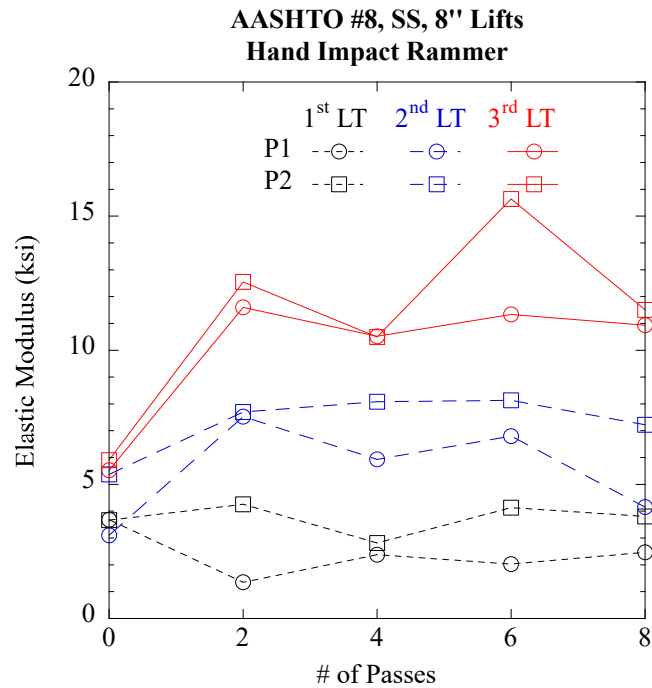


Figure C-70. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 8" lifts hand impact rammer

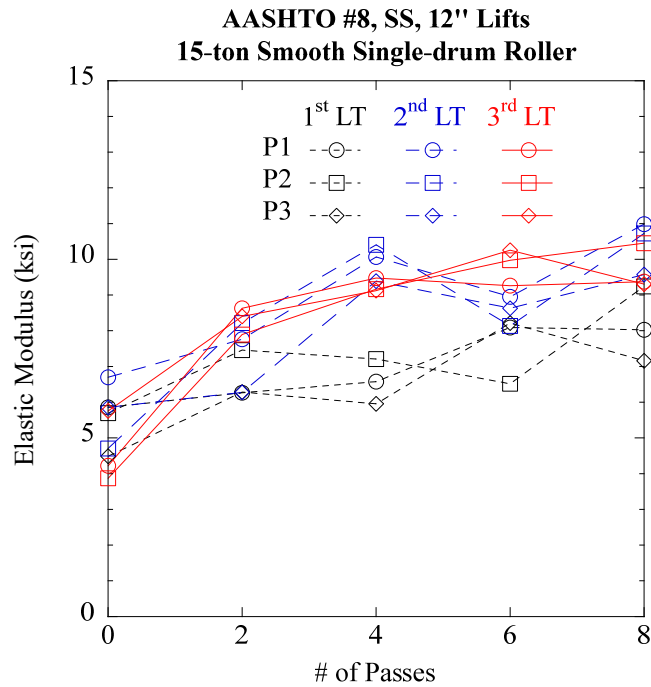


Figure C-71. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 12" lifts
15-ton smooth single-drum roller

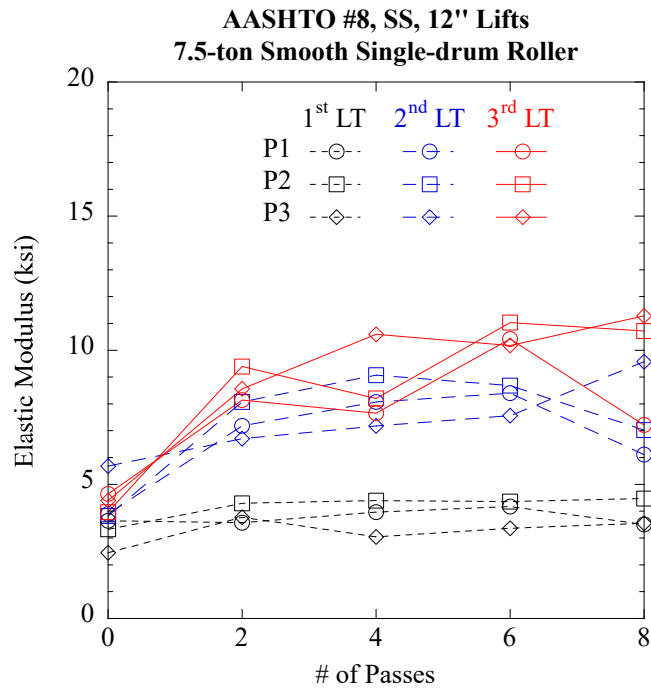


Figure C-72. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 12" lifts
7.5-ton smooth single-drum roller

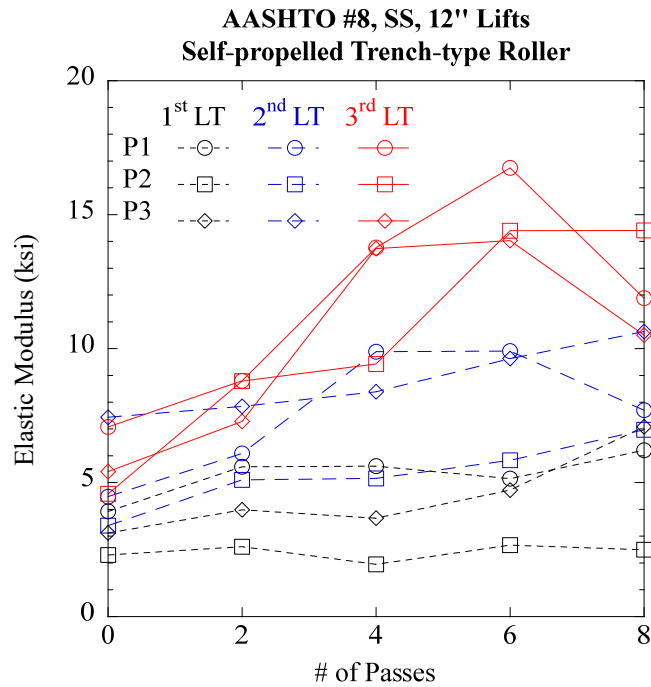


Figure C-73. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 12" lifts self-propelled trench-type roller

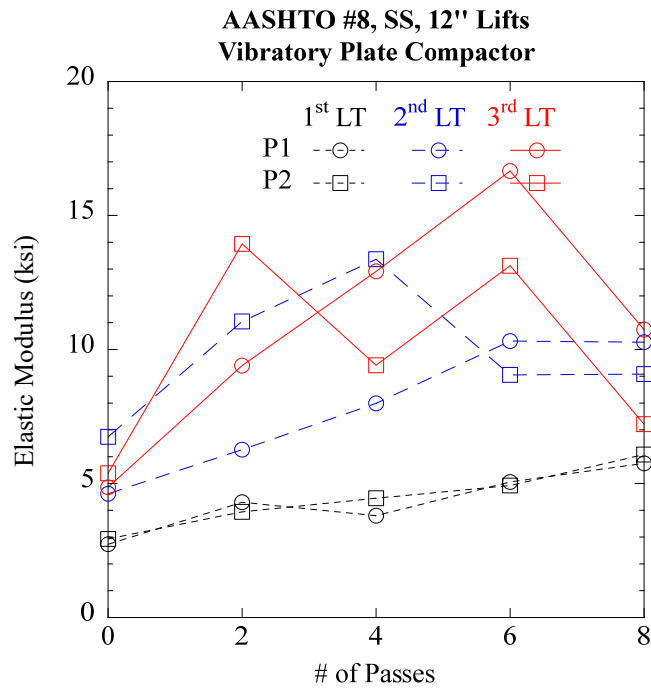


Figure C-74. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 12" lifts vibratory plate compactor

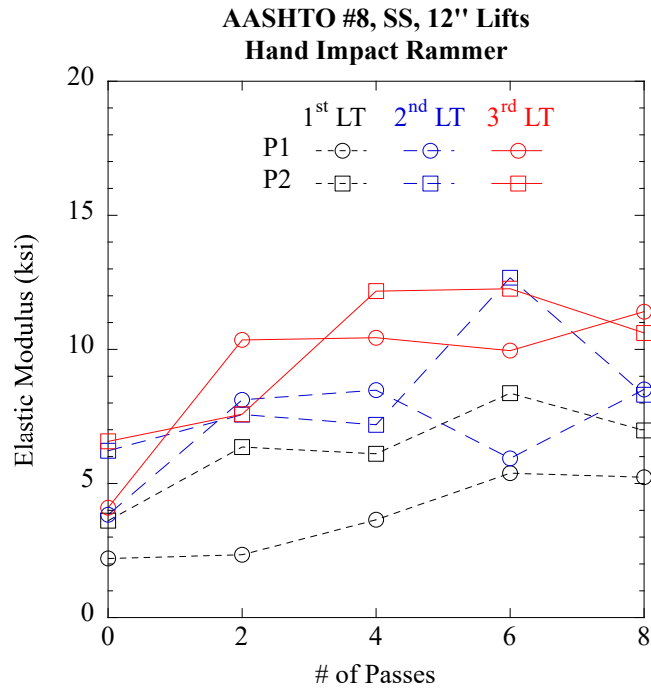


Figure C-75. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 12" lifts hand impact rammer

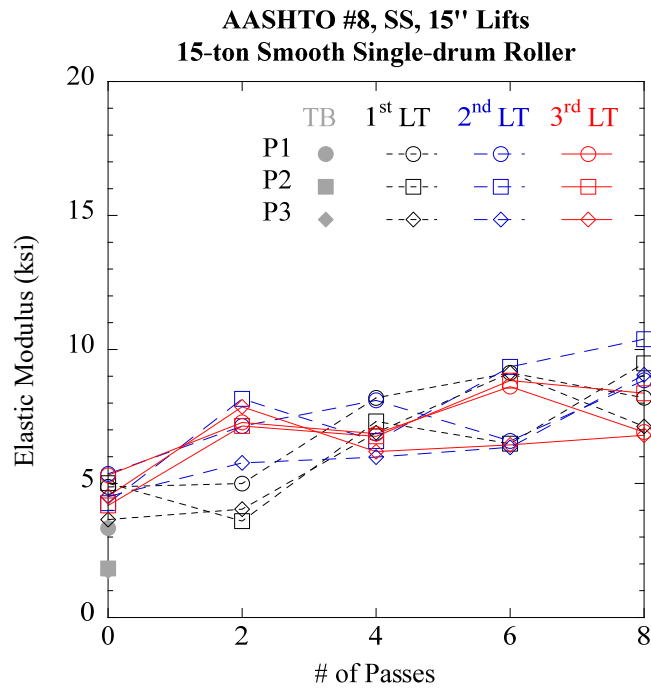


Figure C-76. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 15" lifts 15-ton smooth single-drum roller

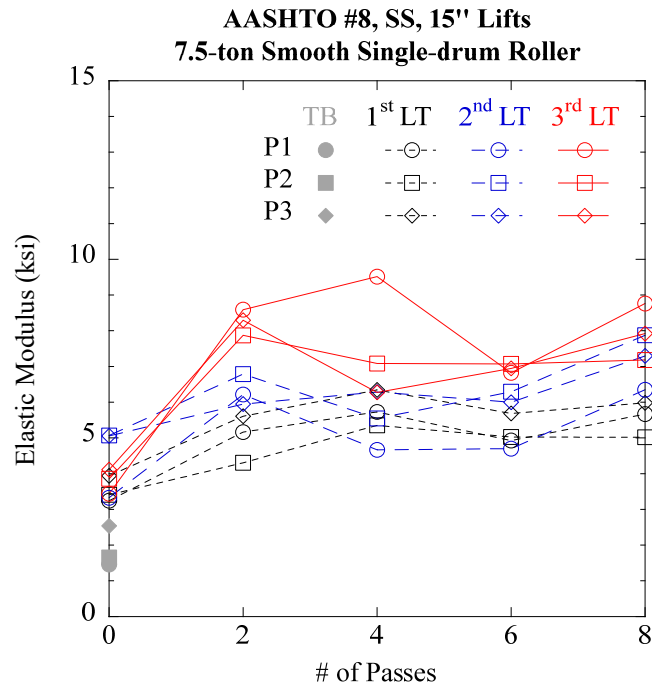


Figure C-77. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 15" lifts
7.5-ton smooth single-drum roller

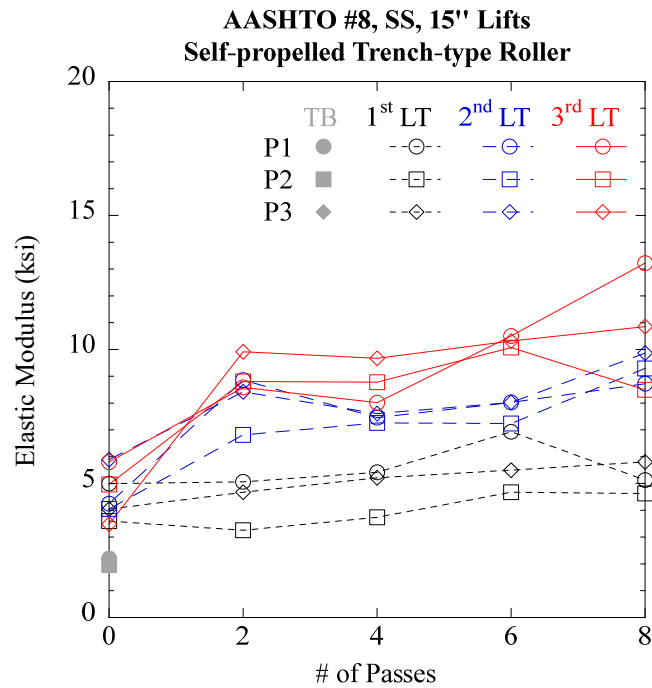


Figure C-78. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 15" lifts
self-propelled trench-type roller

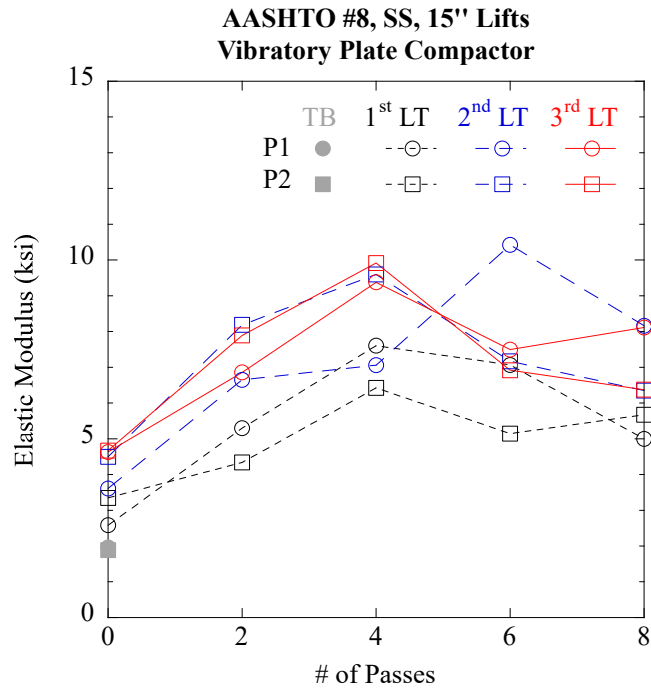


Figure C-79. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 15" lifts vibratory plate compactor

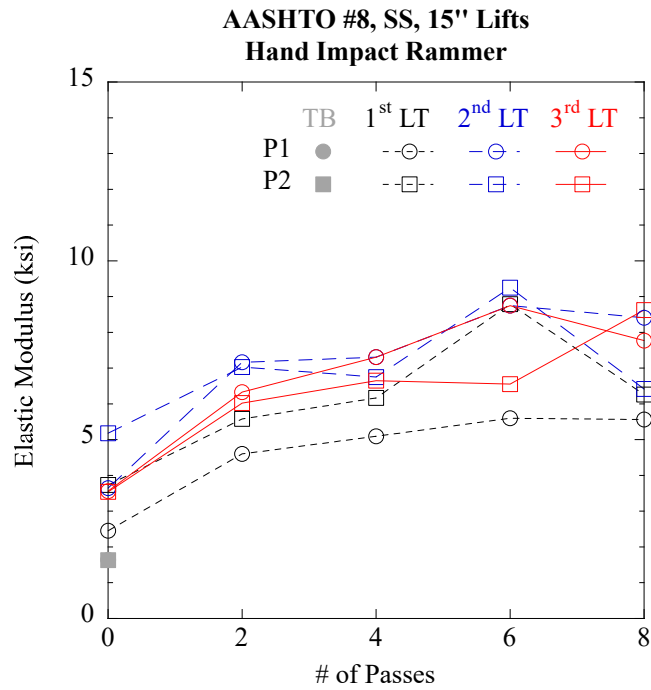


Figure C-80. Elastic modulus vs # of pass for AASHTO#8 aggregates, SS, 15" lifts hand impact rammer

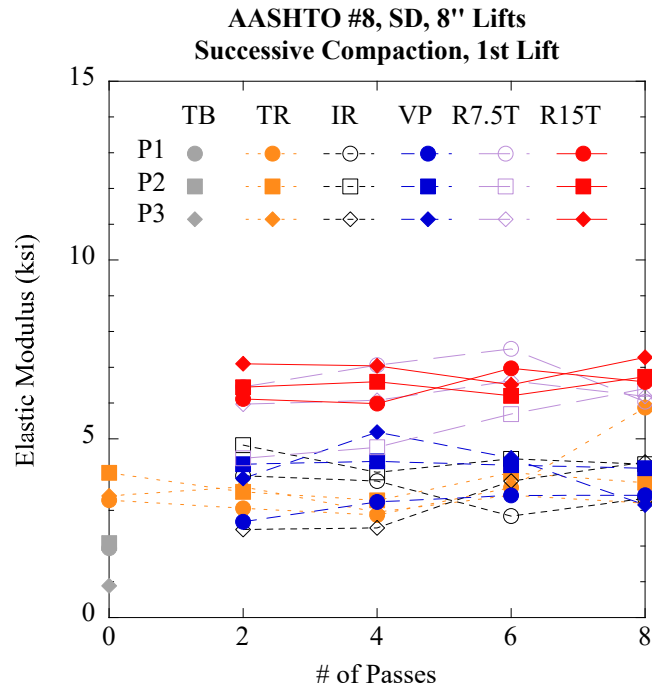


Figure C-81. Elastic modulus vs # of pass, SD, 8" lifts in successive compaction tests first lift

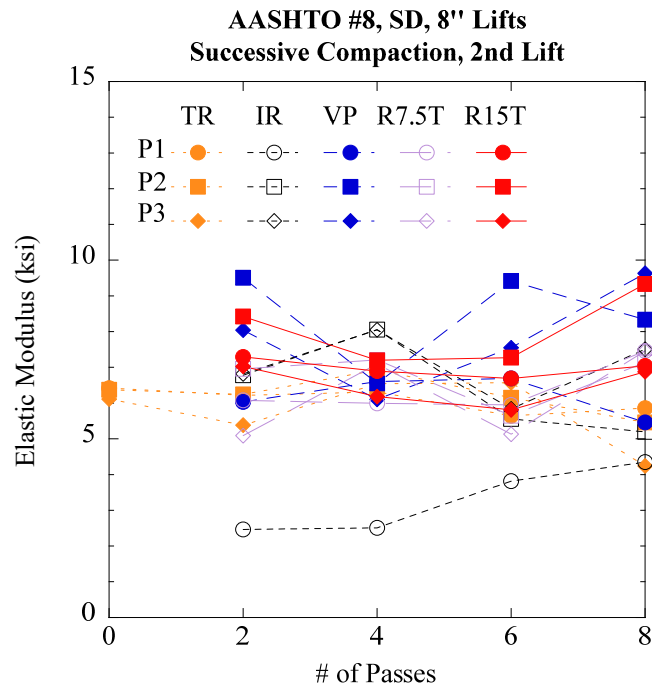


Figure C-82. Elastic modulus vs # of pass, SD, 8" lifts in successive compaction tests second lift

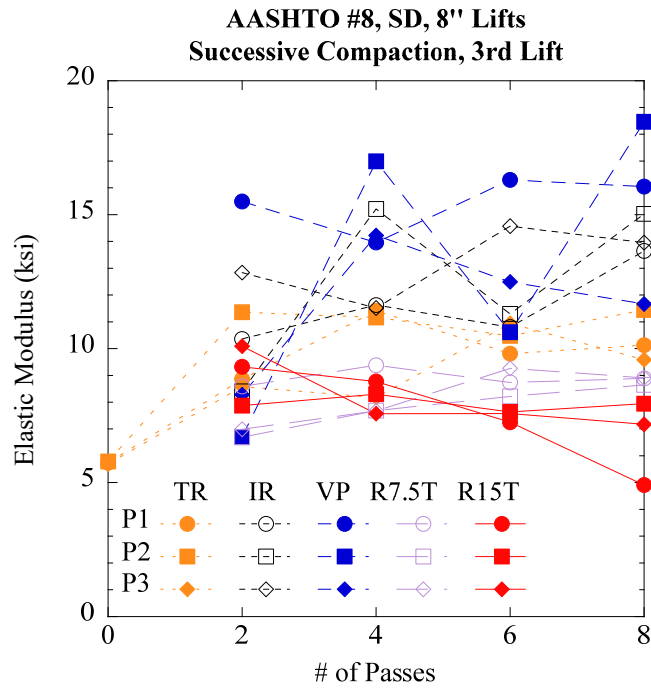


Figure C-83. Elastic modulus vs # of pass, SD, 8" lifts in successive compaction tests third lift

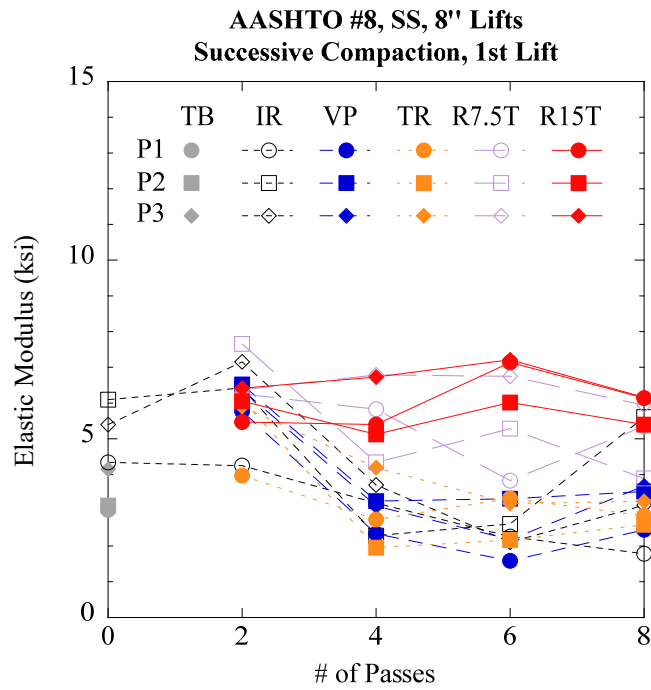


Figure C-84. Elastic modulus vs # of pass, SS, 8" lifts in successive compaction tests first lift

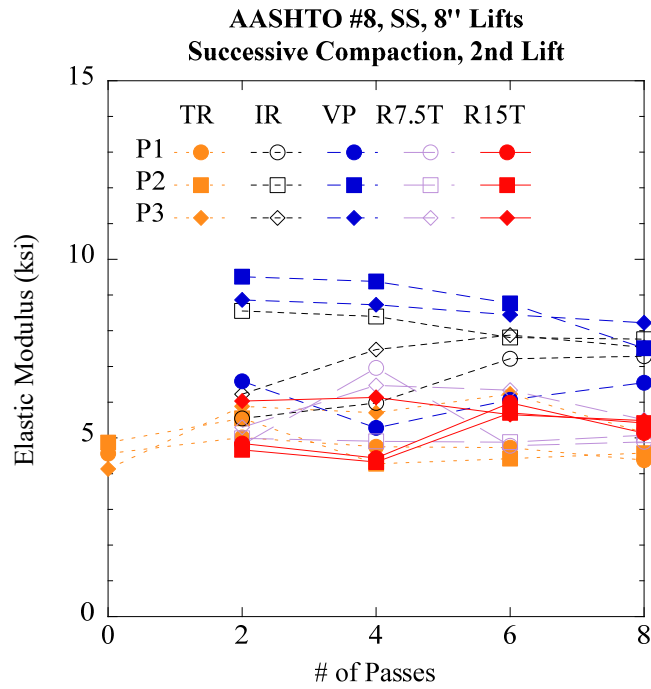


Figure C-85. Elastic modulus vs # of pass, SS, 8" lifts in successive compaction tests
second lift

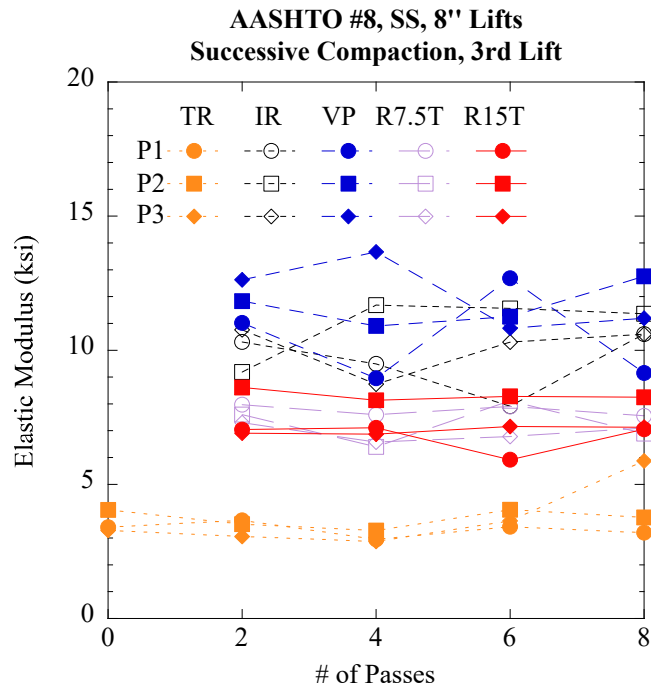


Figure C-86. Elastic modulus vs # of pass, SS, 8" lifts in successive compaction tests
third lift

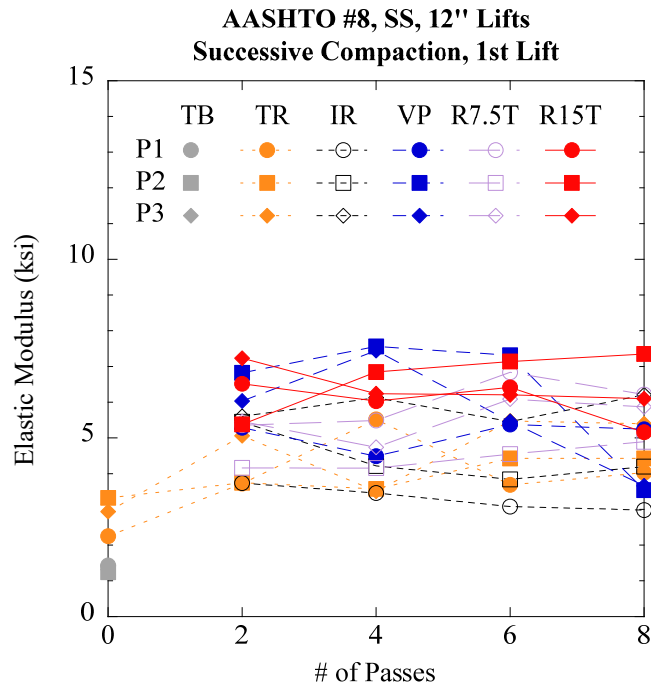


Figure C-87. Elastic modulus vs # of pass, SS, 12" lifts in successive compaction tests first lift

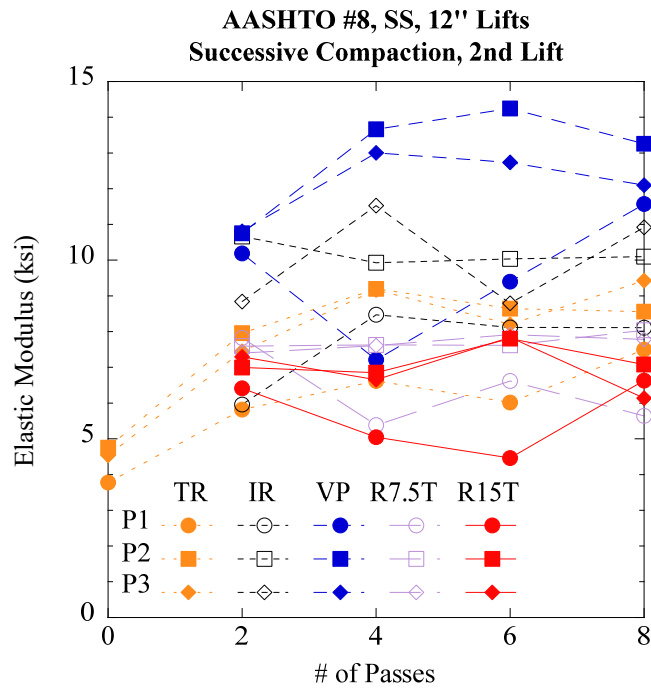


Figure C-88. Elastic modulus vs # of pass, SS, 12" lifts in successive compaction tests second lift

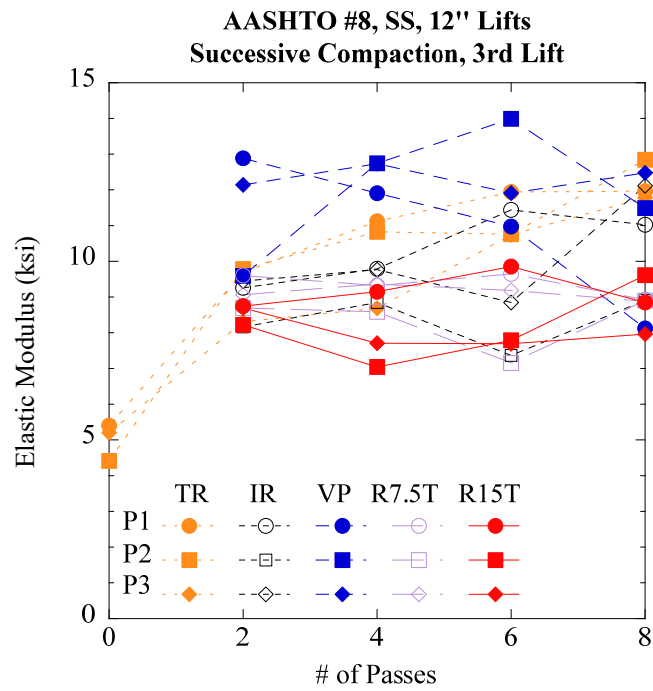


Figure C-89. Elastic modulus vs # of pass, SS, 12" lifts in successive compaction tests
third lift