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LOADING SPECTRUM EXPERIENCED BY BRIDGE STRUCTURES IN THE UNITED STATES

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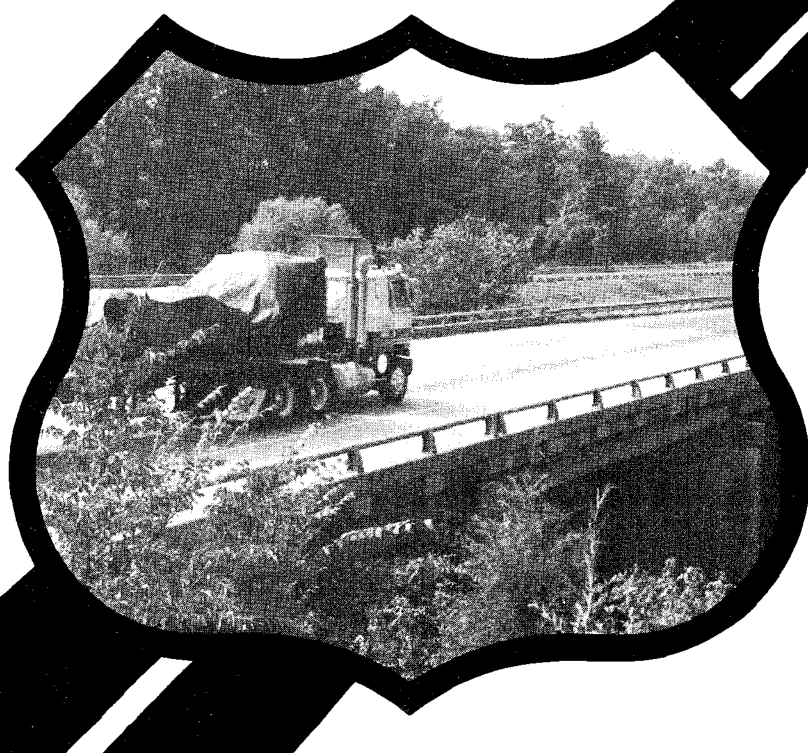

FOREWORD

In the last decade, highway engineers and planners have devoted considerable attention to the collection and evaluation of detailed information on truck weights and characteristics. This information is vital for evaluating structural performance and determining maintenance requirements of the Nation's bridges and pavements.

Extensive research has been conducted to develop new techniques for collecting the required data in a more efficient and cost effective manner. A number of automated instrumentation systems which are capable of weighing and classifying heavy vehicles as they travel down the highway have resulted from this research. These weigh-in-motion (WIM) systems can collect large volumes of information which accurately reflects the loading spectrum in the traffic stream.

The purpose of this study was to use bridge weigh-in-motion technology to collect truck weight and classification data at a representative sample of bridge sites in the United States and to develop a loading spectrum from the information obtained. In the process of conducting this work, a number of significant improvements were made to bridge WIM instrumentation.

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16. Abstract

More than 27,000 trucks were weighed in seven states using a Bridge Weigh-in-Motion system. The system used instrumented highway bridge girders to act as equivalent static scales to obtain truck gross and axle weights, dimensions and speed. Improvements were made in the system software and hardware such that weighing can now be performed automatically with no traffic observer necessary. The weighing operation is undetectable by truck drivers hence the results are not biased due to heavy trucks avoiding the scale. Night weighing has been performed with no danger to crew personnel or highway traffic. The accuracy of the in-motion weighing has been established by repeatability tests which show standard deviations of 1.1 kips and by comparison with static weigh stations which show standard deviations of 2.3 kips on gross weight for random traffic. Three systems have been designed, developed, tested and delivered to FHWA for operation by two crew members at the technician level with part time supervision by an engineer. Weighing rates in excess of 200 trucks per hour have been realized.

The Loading Spectrum obtained for all trucks weighed at 33 sites is similar to previous studies with the exception of vehicles weighing more than 80,000 pounds for which a frequency of approximately 50 per 1000 was observed. Sixty nine percent of all trucks weighed in this study had velocities greater than 55 mph and seven percent had velocities greater than 64 mph.

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STRUCTURES IN THE UNITED STATES

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CHAPTER ONE

Introduction

1.1 General Remarks

The acquisition of truck axle and gross weight information has received considerable attention from highway engineers and planners. These data are essential for determining the structural and maintenance requirements of bridges and pavements. In addition, accurate truck weights are important in planning, economic and enforcement surveys.

In the last two years the need for vast amounts of accurate truck weight data has become further intensified. Section 16 of the Surface Transportation Assistance Act of 1978 called for a study of uniform weight limits throughout the United States. Simultaneously, Section 506 of the same act provided for a Cost Allocation Study to analyze costs and impacts on roadway construction and maintenance associated with different vehicle classes. With this increased interest in the effects of heavy truck loads, the Federal Highway Administration (FHWA) issued a Notice of Proposed Rulemaking setting forth the requirements for administering a program of vehicle weight enforcement. The proposed regulation requires each state to formulate a plan that provides for an evaluation of its enforcement accomplishments.

The General Accounting Office (GAO) has also issued its report "Excessive Truck Weight: An Expensive Burden We Can No Longer Support" and proposed the need for (a) a model weight enforcement program and (b) assurances that complete geographic coverage is achieved (1).* In addition, the Transportation Research Board has completed a study compiling data on weight regulation, enforcement and permit operation and has completed a new study entitled "Criteria for Evaluation of Truck Weight Enforcement" (2,3).

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* Numbers in parentheses refer to references.

In the context of all these activities, the discussion of truck weights and the effectiveness of enforcement operations is still being carried out with a lack of adequate information. There have been only a few systematic and unbiased field studies conducted of current weight statistics. Both loadometer surveys and weigh stations can easily be avoided by drivers with the aid of CB radios and considerable bias is added to the massive data now reported. In addition, the cost of acquiring truck survey data has increased dramatically to the point where many states have reduced weighing operations and the number of survey sites.

1.2 Truck Weight Data Requirements

"The characteristic requirements for truck weight data has been divided into several categories. Each user group has unique applications which affect the quantity, accuracy and type of truck data needed."(4)

PLANNING - Highway planners utilize truck data for economic studies, forecasts and freight modelling. Statistical data is needed on hourly, daily and seasonal variations, number of trucks, weights and type. Thus, certain information on hauling categories is needed in addition to the weight and truck axle configuration. These categories can only be visually identified such as tankers, open steel flatbeds, equipment haulers, etc. Gross weight rather than axle weight is generally more important to planners.

ENFORCEMENT - As an aid to weight enforcement, truck weight data can be used to determine routes with significant numbers of overweight trucks, the presence of by-pass routes around fixed weigh stations and the magnitude and percentage of overweights among various types of haulers, e.g., by hauling category or axle configuration. Visual information may not be necessary, but accurate axle spacings are needed for a check on legal limits. In order to directly help enforcement officials the data gathering must be totally undetected.

PAVEMENT DESIGN - Pavement life is sensitive to the number and statistical distribution of equivalent number of axle loads. Data for planning the maintenance, rehabilitation and reconstruction of pavements uses such axle load distribution (tandems and other closely spaced groups must be distinguished because of their different axle equivalent factors). Since only the distributions are important, the accuracy of any individual weighing is not so critical as long as no systematic bias is introduced into the data.

BRIDGE DESIGN - It has been recognized that a major obstacle to a probabilistic based design for bridges is the limited knowledge of the loading spectrum. A complete bridge loading model requires individual truck weight distributions, and axle loads and the spacing or headway between trucks to establish maximum lifetime loading. For an application such as fatigue design of steel bridges, the statistical distribution of individual truck weights is sufficient. Gross weight accuracy is more important than individual axle loads since bridges are usually long relative to the axle spacings.

1.3 Weigh-In-Motion

It is thus well recognized that large volumes of inexpensively gathered truck data is needed which survey the total truck population in an undetected weighing operation. In attempting to achieve these goals a number of organizations have participated in the development of pavement scales for weigh-in-motion operations. The difficulty with these systems is that the relatively light scale "bounces" during the truck passage, leads to high scatter and possibly bias of results at normal speeds (5). Pavement scales are effective, however, when used on special low speed ramps adjacent to fixed scales for sorting the heavy truck population. Attention must be given to the maintenance of such scales especially in cold climates and frequent pavement resurfacing near the scale is needed.

In recognition of some of the limitations with pavement systems the FHWA launched a series of feasibility studies to recommend alternative weigh-in-motion systems. One feasibility study by Moses and Goble (5) has led to the system described herein. The passage of vehicles over existing bridges is used to carry out the weighing operation. The system combines strain gage response on main longitudinal bridge members carrying the traffic stream with tapeswitches to provide vehicle dimensions and velocity. In effect, the bridge becomes a massive scale and provides the equivalent static weight of the vehicle. The approach described herein offers several advantages over pavement scales. The dynamic oscillations in tire contact force are filtered and reduced by the relatively massive inertia of the bridge. Further, they are almost totally eliminated by a statistical smoothing algorithm that has been derived for processing the bridge girder strains and calculating the truck gross and axle weights (6). Utilizing existing highway bridges as the scales provide numerous potential scale locations and permits an easily portable operation. These "scales" are not easily detected by drivers since the instrumentation is primarily located under the bridge leaving no visible indications of a scale. Inexpensive reusable strain transducers are quickly clamped to the bridge and the portable monitoring instrumentation is rapidly moved to different sites for heavy vehicle surveys.

1.4 Background

A series of projects to investigate strains in bridge girders was begun in 1971 at Case Western Reserve University (CRWU) (7),(8). The investigators noticed that given the truck axle configuration there was good correlation between gross vehicle weight and peak girder strain.

The initial field testing of the bridge weigh-in-motion concept was done at CWRU with a research prototype system delivered to FHWA in 1978 (9). The system used strain gages attached to steel bridge girders and the field testing was patterned after an earlier CWRU study for Ohio Department Of Transportation (ODOT) to obtain bridge strain histories (10). The concept was further broadened by developing a truck weight loadometer system for ODOT and is presently being used by their Bureau of Transportation Services. This system was utilized to provide seasonal variation on truck weights at four Ohio sites as part of the Cost Allocation data program. Their results are not described herein. The ODOT system is currently being used to assist loadometer operations and also to provide enforcement assistance.

1.5 Objectives

The study objectives were to:

(a) Design, fabricate, and test three mobile weigh-in-motion (WIM) systems using the latest bridge weighing technology;

(b) Advance Bridge WIM technology;

(c) Use the Bridge WIM systems to acquire representative U.S. truck data in seven states and transmit the data to the DOT Cost Allocation team assessing the effect of current vehicle loadings on the life of the highway systems.

Data was to be collected for periods of 20 to 28 hours at approximately 40 sites along corridors chosen by FHWA and state officials. In some cases data collection at specific sites was required. The first system was to be designed, fabricated, tested, and data collection begun after three months from the start of the project. The second system was to be fabricated, tested, and delivered to FHWA within five months from the beginning of the project for use by FHWA in collecting data for the Cost Allocation Study.

Field personnel were to be trained to operate the system without an engineer present. Two teams of two men each were assigned to field positions. The first team consisted of a student and an engineering technician, both with no previous experience with computers or electronics. In the second team were a fourth year civil engineering student and an electronics technician. Civil engineers assigned to the project were occasionally in the field for demonstrations, correlations or to relieve the field technicians.

1.6 Report Outline

The weighing operation and the equipment used is described in Chapter 2. A more detailed account is presented in the operation and maintenance manuals prepared for FHWA. Previous reports on projects performed at CWRU provide historical insight to the development of the current system (9,4).

Several modifications were made to the state-of-the-art system developed at CWRU including the change in software enabling higher acquisition rates, automatic operation, real time in-field weight processing and improved signal conditioning. These modifications are discussed in Chapter 3.

The survey results, including weight data from more than 27,000 trucks obtained at 32 sites, are presented and discussed in Chapter 4. Other WIM data acquired by FHWA and ODOT using the same type of operation are not discussed in this report. An evaluation of the Bridge Weigh-In-Motion system and an extensive section on its accuracy is presented in Chapter 5.

Conclusions and recommendations are discussed in Chapter 6. Improvements are suggested to broaden the routine use of the system in other areas. The system in its present state performs well and is designed for routine use by state agencies. The suggested improvements would be primarily in software and would be adaptable to present hardware systems. The further application of WIM output to bridge load models is not discussed herein but is the subject of several research reports and proposals (4,14).

CHAPTER TWO

Weighing Operation

The Bridge Weigh-In-Motion method uses strain transducer response measured during a vehicle passage over an instrumented span to calculate a vehicle's weights. The position of each axle as a function of time during the crossing is also required and is obtained from tapeswitches. The weight processing procedure is described in Section 2.3.

2.1 Equipment Set-up

Figure 1 shows the field equipment setup for a typical weighing operation. Reusable strain transducers, which measure bridge structural response for vehicle weight determination, are attached to the girders. Tape switches used to determine vehicle velocity and axle spacing are placed on the roadway surface. An optional keypad may be used to record visual hauling information. The signals from the tape switches, strain transducers and keypad are carried by cables to an instrumentation van located below the bridge out of view of drivers.

The instrumentation van houses the entire weigh-in-motion system (Figure 2) including a portable power supply. At the heart of the system is a MINC minicomputer (PDP 11) manufactured by Digital Equipment Corporation (DEC). MINC laboratory modules required for this application include two hardware clocks, an analog to digital converter, and a digital input device. The MINC is supplied with a dual floppy disk drive for software and data storage. A signal conditioning center constructed by the project is used to collect, condition and amplify the strain signals and to condition the keypad and tapeswitch signals through a debounce circuit. As part of this project an autobalancing signal conditioning system was developed and tested that will maintain a constant zero on the strain channels. This constant zeroing aids in detecting other vehicles that may be on the instrumented span during a weighing. Strain responses from individual girders are summed to provide the overall bridge response.

During operation, an operator stationed in the instrumentation van monitors the strain and tapeswitch signals on an oscilloscope and the computer output on a CRT display. An intercom system is used between the keypad operator and the van.

2.2 Data Acquisition

As a vehicle approaches the instrumented span, the appropriate hauling category (box, flat, tank, auto carrier, open hauler, log carrier, etc) may be input by the optional keypad observer. The system then operates automatically as if the observer were not present. When the steering axle arrives at the first tapeswitch which is located approximately four feet before the bridge the computer begins acquiring strain data from the strain transducers. The crossing of each axle on each tape switch is timestamped to provide vehicle velocity and axle spacing. All axles of the vehicle have been received when one of two constraints has been met. The first constraint is the limitation on axle spacing of 37 feet (11.3 meters). The second constraint is the limitation on the vehicle length from the first axle to the last axle which for this study was set to 65 feet (19.8 meters). Hence, data acquisition continues until no axle pulse has been received for the time equivalent to 37 feet (11.3 meters) (37 divided by the vehicle velocity) or the time equivalent to 65 feet (19.8 meters) from the time the first axle was received. This distance was based on the maximum expected axle length and could be modified if necessary.

Once either of the constraints have been met, the computer program classifies the vehicle, i.e., as a truck or a car. A car has been arbitrarily defined as any two axle vehicle with an axle spacing less than 12.1 feet (3.7 meters) or any vehicle causing a girder peak strain that is less than a preset level. A vehicle is classified as a truck if the number of axles is greater than two, or in the case of a two axle vehicle the axle spacing is at least 12.1 feet (3.7 meters) and the peak strain measured during the vehicle crossing on any girder is greater than a preset level. This preset strain level is site dependent and on the order of 10 microstrain. The purpose of this constraint is to prevent a car pulling a trailer from being classified as a truck.

If the vehicle is determined by the program to be a truck, strain acquisition is continued until the last axle has reached the end of the instrumented span. Velocity and axle spacing information is displayed on the CRT and the strain data, tape switch activation times, and site information are recorded on a floppy disk. The recording process has been programmed to allow the computer to perform other tasks such as processing the data to obtain the vehicle gross and axle weights simultaneously. Data acquisition times range from 1.2 to 2.0 seconds without processing and between 1.7 to 2.5 seconds with processing for each truck. Note that these times are dependent on the span length, vehicle length and vehicle velocity. For example, a 60 foot (18.3 meter) truck traveling 80 feet per second, 55 mph (24.6 m/s, 34 km/h) and crossing a span 38 feet (11.6 meters) in length would require 1.23 seconds for a crossing of the entire truck over the span.

Once the vehicle is determined by the program to be a car, strain sampling is discontinued. The car velocity is classified, however, and this data is stored in a separate file and can be used for velocity statistics. The program then prepares for the next vehicle.

In order to process the vehicle in real time during data acquisition, the bridge moment influence line must have been previously determined, stored on disk, and read into the computer memory. The influence line can be determined by an engineer in the office with a structural analysis program that is available for this purpose. The influence line is discussed further in Section 2.4.

2.3 Weight Processing

The concept of correlating truck weight with girder strain record has been suggested by several investigators since the bridge responds primarily by longitudinal beam action. The correlation has been found accurate when the class of vehicles being compared includes the number and spacing of axles(5). The conclusion was that accurate weigh-in-motion predictions of static axle and gross weights must also contain vehicle axle configuration including number and spacing of axles in addition to strain records.

The Bridge Weigh-In-Motion analysis is an "inverse" type problem in that the structural response (bending moment) is measured, but the live loads causing this moment must be calculated. In theory, the number of unknowns for each vehicle equals the number of axles, N, and these could be determined by N different bending moments, i.e. strains, recorded for N different positions of the truck along the bridge. Since data are recorded continuously during truck passage this "redundant" data effectively increases the number of separate "weighings" of the vehicle so the results could be averaged to reduce any errors. The principle of data redundancy was extended to its logical conclusion in the statistical smoothing algorithm derived to remove the effects of bridge vibration. In effect, the axle weights are found which minimize the least square difference between the measured strain and the value calculated from the vehicle dimensions and bridge influence line.

Figure 3 shows a typical beam slab bridge suitable for use as a scale. Generally, such bridges must be long and stiff in the longitudinal (traffic) direction relative to the transverse direction. During the passage of a truck, the bridge will oscillate about a static displacement position as illustrated in Figure 4. Assume each girder has a strain transducer in the longitudinal direction at midspan. The gross bending moment in the beam slab bridge can be found by summing the individual girder moments. Each girder stress is related to girder moment from the relationship (as presented by Moses (6)):

$$\sigma_i = \frac{M_i}{S_i} \qquad (1)$$

where σ_i - stress in the i-th girder
M_i - bending moment in the i-th girder
S_i - section modulus of the i-th girder with respect to gage location
$i = 1, \ldots N$ (number of girders)

The moment can be expressed in terms of the strain as

$$M_i = S_i \sigma_i = E S_i \varepsilon_i \qquad (2)$$

where E - modulus of elasticity
ε_i - strain measured in the i-th girder

The sum of the individual girder moments equals the gross bending moment (M) or

$$M = \Sigma M_i = \Sigma E S_i \varepsilon_i \qquad (3)$$

Taking E and S as constant for each girder gives

$$M = E\ S\ \Sigma\ \varepsilon_i \tag{4}$$

Thus, the sum of the girder strains is proportional to the gross bending moment.

To set up the necessary equations requires the bending moment influence line, I(x) for the transducer location. This is illustrated in Figure 6 for a simple span bridge. The value of the ordinate is the bending moment for a unit axle load located at this point along the bridge. Consider a vehicle illustrated in Figure 5 with axle weights A(1), A(2), ... A(N) and axle spacings L(1), L(2), ... L(N-1). The bending moment can be expressed for any location, X, of the first axle measured from the support as follows

$$M(x) = A_1 I(X) + A_2 I(X-L_1) + A_3(X-(L_1+L_2)) +\ldots+ A_N I(X-(L_1=L_2+\ldots L_{N-1})) \tag{5}$$

$$= \sum_{i=1}^{N} A_i\ I(X - \sum_{j=1}^{i-1} L_j)$$

By using Equation 5 and picking N location X(1), X(2), ... X(N), there would be N equations to solve for the N unkown values A(1), A(2), ... A(N). Instead of this calculation, a statistical smoothing procedure has been derived. Using a high rate of sampling of the strain record, the gross bending moment can be expressed as a function of time. In a similar way, using the velocity and axle spacing, the influence line for each axle can be written as a function of time. Summing the effects of each axle, the expected static bending moment can be written as

$$M(t) = \sum_{i=1}^{N} A_i \; I_i(t) \qquad (6)$$

where M(t)- induced bending moment at gage location

t - time

$I_i(t)$- gross bending moment influence value at gage location for i-th axle

M(t) in equation 6 is the predicted static moment in terms of the axle weights. The dynamic bridge response can be filtered out by defining an error function (e) which is the difference between the predicted record M(t) and the measured record denoted as M*(t). Thus

$$e = \sum_{t=1}^{T} \left(M(t) - M^*(t)\right)^2 \qquad (7)$$

or substituting for the predicted moment, M(t) gives

$$e = \sum_{t=1}^{T} \left(\sum_{i=1}^{N} A_i \; I_i(t) - M^*(t)\right)^2 \qquad (8)$$

where T is the number of time increments used in the smoothing process.

The difference between M(t) and M*(t) is squared in Equation 7 so that a least square fit to axle weights is found. This minimizes the influence of the dynamic oscillation which occurs about the static response. Minimizing the scalar error, e, leads to the following equation for finding A(i).

$$\sum_{t=1}^{T} \left(\sum_{i=1}^{N} A_i \, I_i(t) \right) I_j(t) = \sum_{t=1}^{T} M^*(t) I_j(t) \qquad (9)$$

To put in matrix form let

$$F_{ij} = \sum_{t=1}^{T} I_i(t) I_j(t) \qquad (10)$$

$$M_j = \sum_{t=1}^{T} M^*(t) \, I_j(t) \qquad (11)$$

In matrix form, the axle weights are found by solving the equation

$$F \, A = M \qquad (12)$$

where the square matrix $F = (F_{ij})$

column matrix $M = \{M_j\}$

and column matrix $A = \{A_j\}$

The solutions for axle weights can be expressed in the matrix form as

$$A = F^{-1}M \tag{13}$$

The gross vehicle weight (GVW) is found by summing axle weights or

$$GVW = \sum_{i=1}^{N} A_i \tag{14}$$

In general, due to dynamic oscillations, a moving vehicle will cause individual axle loads within a group to continually change. Thus, it is not possible to accurately measure or distinguish individual axle weights within a tandem group so the output of the processing program automatically combines axle weights of a tandem group.

The square matrix (F) is a function only of the influence line and axle spacings while the column matrix {M} depends on the measured record as well as the influence line. For a single span bridge, the influence line is a simple triangle as illustrated in Figure 6. For continuous spans as in Figure 7 showing a three span example, the influence line must be calculated by indeterminate structural analysis. The results are dependent on the section properties which affect the stiffness. However, the influence line is not itself very sensitive to approximations in section moment properties as shown by Kriss (11).

The above algorithm is basically an averaging procedure which smooths the strain record by a least square prediction method. It is thus biased towards the accuracy of the heavier axles. The gross weight predicted has been shown (11) to be insensitive to small errors in velocity, axle spacing and arrival time at the start of the record. The front axle, however, because it is usually light relative to the other axle combinations is more sensitive to small errors in the timing. Front axle weights are discussed in more detail in Section 3.2.2.

2.4 Calibration Procedure

The equations to solve for axle weight use the bending moments that are linearly related to strains. In principle, the elastic modulus and section modulus can be calculated from the section drawings and material properties. In practice, especially for concrete bridges, this strain-moment relationship is more accurately found by using a calibration vehicle with known weights.

In calibrating a bridge, a vehicle of known weight (including each axle weight), such as a three axle dump, a loaded five axle flat bed, or an open hauler loaded with gravel may be used to make several (4 to 6) passes in each instrumented lane. This is accomplished during normal data acquisition. During the first one or two passes the calibration factor is established. Subsequent passes are for confirmation and to determine the variation at the site. An engineer need not be present. This procedure need only be done once for each bridge unless, of course, the bridge is completely resurfaced or has undergone other structural changes.

2.5 Influence Line Calculation

The bending moment influence line can be calculated from the geometrical properties of the bridge. Two Fortran IV (RT-11) programs were written for this purpose; BILINE for continuous bridges and SIMPLE for simply supported spans. BILINE uses the structural analysis program STAN while SIMPLE calculates a linear function with a maximum at the transducer location. Once calculated, the influence line is normalized to a peak of 1.0. Each program allows the position of the transducers to be specified. The calculated influence line is then stored in a file with a name that identifies the bridge location and the length of the influence line in feet. An example influence line for a continuous 3 span bridge with span lengths of 44, 63 and 44 feet (13.4, 19.2 and 13.4 meters) is presented in Figure 7. These programs are very easy to use and require only the section moduli of the girders and the span lengths. The time needed to input the information is one to two minutes while the analysis done by the computer requires three to seven minutes depending on the length of the bridge. This is done only once at each site and may be stored for later testing.

The program PLINFL displays a plot of the influence line on the terminal screen along with the numerical values. This serves as a check on the input properties as well as the calculations.

CHAPTER THREE

System Modifications

One major objective of the study was to advance bridge weigh-in-motion technology. Research efforts were directed toward three areas:

1) the system's operational efficiency and capabilities,
2) measurement and analysis techniques and
3) equipment and instrumentation improvements.

3.1 System Operation - Data Acquisition

Significant changes were made in the software enabling the system to operate automatically, process the weights in the field, and to eliminate the input of the number of axles from an observer via the keypad box. The greatest improvement resulting from completely rewriting the software is the decrease in time needed to acquire data for each truck. The initial BASIC software required approximately 30 seconds per vehicle whereas the new FORTRAN software requires less than 2 seconds per vehicle for most bridges. The program permits simultaneous analog (strain) and digital (tapeswitch) data acquisition, hence the first tapeswitch now need be only a few feet from the beginning of the bridge as compared to the 60 feet (18.2 meters) required with the previous programs. The second tapeswitch can be placed on the bridge. This change reduced the errors associated with determining the truck's position on the bridge with time.

The duration of strain acquisition is flexible and is a function of vehicle velocity, vehicle length and the instrumented span length. The result is the acquisition of more closely spaced trucks; in fact, the headway limitation is now practically equal to the instrumented span length (when the system is not in the processing mode).

Acquisition no longer requires the number of axles to be input. Axles are counted and the vehicles are classified automatically with no observer needed when taking data in one lane. Night weighing is accomplished without sacrificing the safety of the highway traffic or that of the weighing crew. The system is, for the most part, undetectable by traffic when there is no observer. An optional keypad allows visual hauling category data to be input. This information classifies the vehicle into one of sixteen categories (i.e. box, flat, dump, tank, etc. discussed in Section 3.3.2) for later statistical analysis. When an observer was used, the truckers' reactions, as monitored via CB radio, were that of curiosity and at no time did they suspect that a weighing operation was in progress. The observer can also be used to avoid the recording of bad weighings and observe if there are tapeswitch problems.

Other key advantages realized in the software change include better file organization which decreased time and increased flexibility of data management for processing. Also added were the capability of weighing traffic in either one of two lanes, the ability to process the data and obtain gross and axle weights in real time (this requires approximately .5 seconds), maintaining an automobile velocity histogram, and a feature allowing the program start-up data to be input from a file. A special disk writing routine was assembled to allow simultaneous data acquisition and data storage or data processing and data storage. The standard Fortran writing routines previously used required exclusive use of the processor so that no other activity such as calculations or hardware initializations could take place. This feature reduces the headway limitation by approximately .7 seconds thus adding to weighing efficiency in dense traffic streams.

3.2 Measurement and Analysis Techniques

3.2.1 Transducer Location

During the planning phase of the project the effect of transducer location was examined. It was deemed undesireable to be constrained to placing the transducers at midspan since at some sites this installation would be difficult due to limited access to the bridge girders. The software used to calculate influence lines was modified to accommodate any transducer location. This reduced setup time as the crew could place the transducers at the most easily accessed location. This has not resulted in a loss of accuracy and in the case of long spans actually improved the accuracy of the individual axle weights.

Prior to this project, data had been acquired on only a few carefully selected bridges. Many of the bridge structures used in the data acquisition phase of this project were less than ideal and, as such, provided the opportunity to test the limits of the concept and equipment. In fact, it was intended by the FHWA research manager to test the extreme limits of the WIM capability. The system proved capable of accurately weighing vehicles on every structure utilizing longitudinal beams to carry the loads. Included were skewed bridges (up to 50 degrees), two-girder (plategirder) bridges, prestressed and reinforced concrete structures and a concrete pan formed bridge.

The instrumentation cable system to transfer data to the computer was designed such that only two types of cables were used. The system proved to be very flexible and easily adapted to all bridges used in this study.

3.2.2 Front Axle Weight Determination

The accuracy of the gross vehicle weight (GVW) was very good on all of the bridges tested during this project. With a few of these structures, axle weight distributions, in particular the front or steering axle, were not as accurate as desired. One minor cause is the least-square prediction procedure which is biased towards the accuracy of the heavier axles (tandems). The front axle is usually light relative to the other axle combinations and is therefore sensitive to small errors in timing. This is especially true for bridges with large skews as one wheel of an axle can be up to 9 feet (2.7 meters) onto the bridge when the other wheel first reaches the span.

The weight of the front axle A(1) is calculated by the algorithm derived in section 2.3. Front axle weights were also computed by two other techniques:

a) calculate the front axle weight, A(1)i, using just the initial portion of the record when only the front axle is on the instrumented span.

b) calculate a typical front axle weight, A(1)*, based on axle configuration and gross vehicle weight.

The weight from the processing algorithm, A(1), is compared to the typical weight, A(1)*. If A(1) is within -2 to +4 kips (910 to 1810 kg) of A(1)*, A(1) is accepted as being correct. If A(1) is not within this tolerance, A(1)* is compared with A(1)i, the value calculated while the front axle is alone on the span. If this is within the same tolerance, the value A(1)i is accepted as correct. Otherwise the value of A(1)* is assigned and the drive axle(s) are adjusted so that the gross vehicle weight is maintained. The empirical equations for A(1)* for each type of axle configuration are presented in Table 1. In most cases the front axle computed from the strain record and influence line were within the tolerance and accepted. The typical values A(1)* computed as a function of GVW and axle configuration were not often used.

3.2.3 Data Inspection and Output

Several programs were developed to inspect the data. One program, PLDATA, reads the strain data for each truck and graphically displays the records on the CRT for each instrumented girder. Inspection of these records allows the engineer to decide if the data for any truck should be discarded from the data set. Inspecting general data quality, spotting data with other vehicles on the bridge, and selection of appropriate girder weighting factors can be more easily accomplished. Girder weighting factors are further discussed in Section 5.5.

A program called INDTRK was developed to sort processed truck data by weight, axle configuration, and hauling category. Output consists of a table with one line per truck which includes axle weights and spacings, gross weight, arrival time, speed, hauling category, and axle configuration. Typical output is presented in Table 2.

The program SUMARY statistically combines the truck data. Vehicles are sorted by speed, length, gross weight, axle configuration, and visual hauling code. Results are presented in a single page summary, examples of which are shown in Tables 5, 6 and 12 for the three formats available.

3.3 Equipment and Instrumentation Improvements

3.3.1 Tapeswitches

A tapeswitch is made of two copper strips so that as an axle crosses the switch, the insulation layer compresses allowing the copper strips come into contact and close the switch. A typical axle crossing will produce an electrical pulse 15 milliseconds in length.

Three methods of installation have been used: duct tape, silicon caulking, and aluminum channels.

The duct tape is used with only the tapeswitch insert (the actual switch) which is approximately one half inch wide and one tenth inch high. One piece of duct tape four inches wide and slightly longer than the switch will hold the tapeswitch in place for several days. The tape will also hold once the pavement becomes wet but must be applied to a dry pavement. Due to the color of the duct tape and the extremely low profile, the tapeswitches applied in this manner were not easily noticed by traffic. The duct tape will not adhere to the pavement in temperatures below 20 degrees F.

Silicon caulking is used with a rubber boot in which the tapeswitch is inserted. The caulking does require more time for application. Afterwards, the hardened caulking must be cleaned from the boot. The caulking holds well and was successfully applied even when the pavement was wet.

The aluminum channels hold the rubber boot in which the tapeswitch is inserted and are held in place by anchor bolts that have been shot into the road surface with the use of a Ramset gun. Problems encountered with this method are the time required to install the anchor bolts, the varying pavement types and strengths, and the time required to bolt the channels to the pavement. In addition, the crossing of an axle over a channel produces a loud sharp noise that is clearly heard by the driver. Otherwise the channels do work well and can be applied when the pavement is wet.

In general the tapeswitch system worked well. Installation of four tapeswitches was usually completed within 5 to 10 minutes by a two man crew. Duct tape was the preferred and most used method of attachment. The switches were essentially undetectable when attached with the duct tape. Once installed the switches rarely came off and provided accurate axle pulses. They were applied to every bridge site, a particularly good feature since each location tested for this project was a "new" site. They are also applicable to data acquistion on bridges with bidirectional traffic.

Tapeswitches usually last through five to twenty days of data acquisition depending on weather, traffic, proper installation, etc. Since they sometimes fail and since they are not always easily installed, several other methods of axle detection were investigated. The problem is not that of velocity determination, which could be accomplished with loop detectors or radar, but that of axle detection so that axle spacing can be accurately determined.

Another method investigated was the use of the shear wave generated in the girder web due to the wheel impact as the vehicle's tires first reach the bridge. Two instruments were used to measure this phenomena, an accelerometer and a strain transducer. The energy of the wave has two components, potential, which is stored as elastic strain energy, and kinetic, which is the movement of the mass of the girder. The strain measurement worked best when the transducer was attached vertically at the leading edge of the bridge near the top of the girder. The accelerometers performed best when attached either at the same location as the strain transducer or on the support bearing. The best location for accelerometers varied from bridge to bridge. Both instruments worked well in determining the presence of the first axle but gave unreliable results for subsequent axles due to the forward axles statically and dynamically loading the structure. A sample record of a strain transducer used in this manner is presented in Figure 8.

Other axle detection systems were considered. In an earlier girder strain/fatigue life study at Case Western Reserve University, a photocell arrangement was used with a source (infrared) on one side of the roadway and a receiver on the other. The passage of an axle broke the beam and triggered the circuitry. The advantage of this system is that it requires no attachments to the road surface and it will work in most weather conditions. However, for multiple lane highways, it is difficult to distinguish in which lane the vehicle is traveling. Another problem occurs when traffic is along side the truck being weighed since additional axles would be detected. This method would therefore require mandatory use of the keypad or the development of additional software logic to reliably sort axles of simultaneous vehicle crossings. A minimum of two sets of photocells would be needed to obtain velocity and axle spacings.

Another variation of the photocell arrangement would incorporate loop detectors in each lane to determine vehicle velocity, length, and the lane in which the vehicle is traveling. One photocell set would be needed to obtain axle spacings. The advantage of this system is that the operation could be fully automated; the visual observer would not be needed to sort multiple vehicle crossings. The loop detectors would necessarily be installed permanently. This would reduce setup time on return visits. Since loop detectors are not portable, each bridge for which data is desired would require installation.

A slightly different off roadway photocell system would use narrow beam proximity detectors. This type of detector has both sender and receiver in a single unit. Current technology of these devices limits their range to about 7 to 10 feet (2.1 to 3.0 meters); therefore they must be used on the outside lanes of traffic. These detectors are also more sensitive to dirt, etc., coating the lens than are the cross roadway sender/receiver paired detectors.

This project used tape switches exclusively for acquiring weight data. The short time constraint of this study and the large number of structures tested prohibited the use of another unproven system. It is likely that future systems could successfully employ some combination of photocells and/or loop detectors to avoid placing tapeswitches on the road surface.

3.3.2 Keypad

In previous Bridge WIM systems, a keypad or button box was used to indicate truck arrival and the number of axles to be taken. With improvement in the acquisition program, this axle counting task is now performed automatically, freeing the keypad for use in higher level tasks. For this project the keypad was assigned the tasks of providing information on the lane (up to two) and the truck type. The fifteen categories assigned are given in Table 3. These categories allowed some breakdown by hauling category or body type for later statistical analysis.

The system could be operated in three modes with respect to the keypad. First, the keypad could be omitted entirely, requiring the program to decide which vehicle crossings were trucks. In the second mode the keypad entry was optional and could be used to supply information on lane and hauling category while the system decided on which vehicles data would be acquired as above. In the third mode, the keypad mandatory mode, the keypad was used to signal vehicle arrival, lane and hauling category. The system would then consider only those vehicles whose arrival was signaled by the receipt of a hauling category. The system still counts the axles and decides which vehicles to accept based on the user input constraint values on maximum strain and axle spacing. The third mode should be used at sites with high traffic density.

An audio headphone set was included with the keypad to facilitate communications between keypad operator and the instrumentation van.

3.3.3 Signal Conditioning Center

Two different units were assembled and tested. A commercial strain conditioning unit manufactured by Vishay was used in Systems 1 and 2. These units were installed in a rack that also housed the input/output connectors and the digital debouncing circuitry. System 3 used an autobalancing strain conditioning unit designed and built which is similar to that used in the previous FHWA sponsored bridge WIM project at CWRU. The autobalancing feature provided a constant zero thereby eliminating drift. The zero also allows for easy detection of other vehicles that may be on the instrumented span during the crossing of a vehicle being weighed. This is important when the system is operating in the automatic mode and no observer is present. Although all three systems were more compact than previous systems, the signal conditioning center for System 3 was also modularized for greater flexibility. Circuitry was included to accommodate accelerometers or photocells as substitutes for the tapeswitches.

3.3.4 Strain Transducers

Earlier bridge WIM systems used foil strain gages. Reuseable transducers which can be installed with clamps or bolts are much more desireable in that they can be quickly installed on any bridge in any weather condition. Clamping strain transducers that are small and lightweight with reproducible sensitivities were designed and used in this project with great success. They were originally developed for use in the rugged environment of pile driving to measure the pile impact. These transducers are used world wide with some transducers still in use after 10 years.

3.3.5 Other Considerations

The system will operate in most any weather environment. The temperature extremes encountered in this project were -5 degrees F in Ohio to 110 degrees F in California. A temperature of 45 degrees F to 100 degrees F must be maintained in the the instrumentation van. In adverse weather conditions it may be necessary to place the instrumentation van or an unmarked car along the roadway so that the observer (if necessary) is sheltered. Alternatively, a camera/monitor system could be used so that the weighing operation is undetected.

The floppy disk drives are sensitive to the frequency of the AC power. The manufacturers' specifications indicate a tolerance of 2 Hz. The field personnel for this project reported a slightly greater range, about 3 Hz., depending on the van temperature and humidity.

CHAPTER FOUR

Survey Results

The data presented herein was collected as part of the FHWA Cost Allocation Study. FHWA and ODOT also collected truck weight data with Bridge WIM systems as part of the same study, however their results are reported elsewhere. The truck weight data collected was turned over to FHWA. Conclusions and implications drawn from the data are to be made by FHWA.

4.1 Vehicle Weight Data

Data has been acquired at 33 sites in the States of Arkansas, California, Georgia, Illinois, New York, Ohio and Texas. The results presented in the statistical summary for a total of 27,513 vehicles (which does not include the I-880 California site) include gross vehicle weights, vehicle velocities, vehicle length, lane, and arrival times. In addition, each vehicle was classified by axle configuration and visual hauling information was acquired on approximately 70 percent. Two hundred fifteen vehicles from the I-880 site near Sacremento, California were not included in any summary tables as discussed in Section 5.3.2. A summary of the number of trucks weighed by state, weekday/weekend, and type of route is presented in Table 4. Axle and tandem weights and arrival times were acquired for each vehicle and are stored on the floppy disks that have been submitted to FHWA. Printing individual data for each of the 27,513 vehicles is beyond the scope of this report as the data would require 500 to 600 additional pages. An example is presented in Table 2.

A summary of all trucks weighed (except I-880) is presented in two formats in Tables 5 and 6. The table formats, the routes tested and the testing procedure were all approved by FHWA. Histograms are presented for: all trucks, Figure 9; all tractor trailers, Figure 10; all 3S-2 vehicles, Figure 11; all single units, Figure 12; and all truck velocities, Figure 13. In addition, the data has been classified by weekday or weekend and is given in Tables 7 and 8 with the corresponding histograms presented in Figures 14 and 15 for all trucks, all tractor trailers and all single units. The entire population has also been classified by route type with histograms presented for all trucks, tractor trailers, and single units for each type: Interstate, Table 9 and Figure 16; U.S. routes, Table 10 and Figure 17; and State routes, Table 11 and Figure 18.

The data for each of the seven states is summarized in Tables 12 through 18 with histograms for all trucks, all tractor trailers, and all single units for each state presented in Figures 19 through 25. Each site is summarized in Tables 19 through 51.

Girder weighting factors (see Section 5.5) were used in all cases to de-emphasize any car traffic that may be on the bridge in another lane. These weighting factors vary depending on the bridge and girder configuration and are listed on the processing log submitted with the site logs and floppy disks. Most vehicle data presented herein were weighed while alone on the bridge.

A total of 73 days were spent acquiring data of which 10 were weekend days. Typically the data was collected during one 12 hour shift and one 8 hour shift at each site. A third 8 hour shift was added for each site in the state of Texas. As Table 4 shows, there is clearly a difference in the volume of traffic as an average of 403 trucks per day were weighed on weekdays whereas the average was 209 trucks per day on weekend days. The weight histograms presented for all weekdays and all weekends, Figures 14 and 15, indicate the vehicle weights on the weekdays were slightly heavier. This is also apparent with the loadometer survey factor, Lo, discussed below, as the value was 0.414 for the weekday traffic and 0.385 for the weekend traffic.

4.2 Discussion of Results

4.2.1 Trends

The model and corridors were chosen by FHWA personnel who were assisted by personnel from the individual states. In at least two cases, sites were chosen that were believed to have a large number of heavy vehicles. These sites were SR 36 near Caldwell, Texas, and SR 51 near Peru, Illinois. An FHWA report entitled "1975 National Truck Characteristics Report" published April, 1978 (12), includes data to which the data acquired in this project can be compared. The comparison is made between the Interstate Rural Roads data by FHWA and All Sites and Interstate Sites by BWS. The two sites mentioned above as having a large proportion of heavy vehicles is included in the All Sites category but is not included in the Interstate Sites category. The comparison of the cumulative distribution of these data is presented in Table 52. The agreement with the FHWA results is excellent for both BWS categories. The major point of difference is in the 80 kip (36,360 kg) or more range where the BWS results predict 41 to 58 trucks per thousand and the FHWA results indicate 17 trucks per thousand. This could be due to the fact that the Bridge Weigh-In-Motion system is undectable by truck drivers and thus is not avoided by heavier vehicles.

The field personnel were instructed to be as unbiased as possible in acquiring data. At most sites this was not a problem since headways were large enough to permit the acquisition of most vehicles. The crews were instructed not to weigh pickup trucks, recreational vehicles, house trailers in tow, or cars pulling trailers. In addition, any two axle vehicle with an axle spacing less than 12.1 feet (3.7 meters) was not weighed. A typical large pickup truck has an axle spacing close to 12 feet (3.65 meters).

4.2.2 Loadometer Survey Value

The loadometer survey value, Lo, is a damage spectrum factor applicable to bridge fatigue and pavement distress. Damage is proportional to loading cubed. The equation is (10):

$$L_o = \sum_{i=1}^{N} \frac{(W_i)^3}{72} f(W_i) \qquad (15)$$

where

W_i = Weight Category i

$f(W_i)$ = Frequency of W_i

A previous study performed at CWRU calculated Lo values from strain measurements on bridge girders (10). The "typical" value from both the strain measurements and loadometer surveys was determined to be 0.4. A similar value was used in preparing the AASHTO bridge fatigue requirement. Lo can be considered a measure of the shape of the loading spectrum and the predicted "damage" for which a bridge must be designed. A higher Lo corresponds to a more severe loading environment. A value of 0.41 was obtained from the all sites data. The range of values for the seven states was 0.26 in Georgia to 0.51 in Illinois. The data are presented in Table 53.

4.3 Velocities

Velocity is needed in order to weigh a vehicle and to calculate axle spacings needed to classify a vehicle as a truck or a car. The velocities from all crossings can be retained and a histogram presented for all truck traffic, all car traffic, and all car and truck traffic. In addition, the truck velocity data can be presented in hourly intervals. Each summary table provides a breakdown in increments of 3 mph for the vehicles summarized in the table. A few of the sites tested had maximum speed limits that were less than 55 mph. The summary of all sites, presented in Table 5 and Figure 13, shows 69 percent of the trucks weighed were traveling in excess of 55 mph. However, only 18 percent were going faster than 61 mph and 7 percent greater than 64 mph.

4.4 Strain Data

The weight calculation algorithm requires strain as a function of time for each vehicle. This strain data for each channel has been recorded on the data disks. Using the shunt voltage and transducer calibration, both recorded on the site logs, the actual strain at the transducer location can be determined. An example of the strain record is presented in Figure 8.

In addition, the peak strain for each vehicle weighed can be determined for each instrumented girder and presented in a peak strain histogram. An example is presented for the Caldwell site on Highway 36, Texas. This data is presented in Figures 26 through 29.

The strain data could be used to develop a load-strain model or to examine the dynamic response of the structure.

4.5 Histogram Comparison: Weigh Station and Bridge WIM

A correlation was performed on January 22, 1982 with a weigh station on I-90 in northeast Ohio (Section 5.1.3). A total of 293 trucks were weighed at the weigh station while 330 were weighed at the bridge site located 17 miles (27 kilometers) downstream, both weighing east bound traffic. The histograms for the weigh station and the bridge site are presented in Figure 30 and superimposed in Figure 31. Tables 54 and 55 contain the statistical weigh station and Bridge WIM data for this comparison.

Three exits are located between the weigh station and bridge site. It is possible that these exits are used by a higher percentage of lighter trucks which could affect a frequency presentation. The number of trucks over 50 kips (22,730 kg) was still nearly the same at both the weigh station (107 out of 293 total trucks) and at the bridge (100 of 218 trucks). In addition, 5 steel haulers were recorded at the bridge site while none were observed at the weigh station. The processed results from the bridge data indicate that four of the five had rear tandems loaded close to the allowable limit if not greater.

While acquiring the data at the weigh station, 5 vehicles were issued citations for overweight axles, none for exceeding the gross weight limit. Each of the five drivers made the unprompted statement that he would bypass the weigh station in the future. This weigh station issued citations to 0.3% of the vehicles weighed in 1980.

CHAPTER FIVE

Evaluation Of Bridge Weigh-In-Motion System

5.1 System Accuracy

During the course of the project several opportunities were available to assess the accuracy of the WIM system and to compare it with other weighing methods. It should be noted that the values to which the bridge WIM weights are compared are not in themselves exact but do have some variability. This is shown in repeatability measures performed on these "reference" scales with the calibration vehicle used to calibrate the bridge. It has been noted that two different platform scales have weighed the same truck and found a difference of 2.5 to 3 percent. The following measures are presented:

A. Repeatability: Data from 74 crossings of calibration vehicles ranging in weight from 36.2 to 58.5 kips (16,450 to 26,590 kg) at 11 sites. Section 5.1.1.

B. Repeatability: Data from 28 crossings of the same calibration vehicle at 6 sites in Arkansas. Section 5.1.2.

C. Static Scale Comparison: Two correlations performed at the same site in Northeast Ohio. Repeatability is presented for both systems. Section 5.1.3.

D. Portable Scale Comparison: Correlation with a two-wheel portable scale. Repeatability is presented for both systems. Section 5.1.4.

E. Radian WIM Comparison: Section 5.1.5.

The accuracy measures reported for cases A and B and for all repeatability data are the standard deviation and the coefficient of variation (c.o.v.). For the correlations in cases C, D, and E two comparisons are made, the ratio of the weight predicted by the WIM system to that of the other method in which case the c.o.v. is given, and the difference between the WIM weight and the other weight in which case the standard deviation is given. The ratio method is biased toward the lower magnitude weights. For example consider an error of 2 kips (910 kg) in a weighing. For a truck weighing 8 kips (3,640 kg) this would give a ratio of 8/6 or 1.33. The same error with a vehicle weight of 65 kips (29,550 kg) would have a ratio of 65/63 or 1.03. The difference method is unbiased to the magnitude of the weight and thus is a better measure.

The system accuracy as a result of these studies is a standard deviation of 1.1 kips (500 kg) on gross weight for repeatability and a standard deviation of 2.3 kips (1,045 kg) on gross weight for random traffic when compared to a static scale.

5.1.1 Repeatability: General

As a typical illustration, the data from 74 calibration truck crossings at the initial 11 sites in the states of Georgia, Arkansas, and Texas are presented in Table 56. The standard deviation of the gross weight is 1.12 kips (510 kg) which corresponds to a c.o.v. of 2.3 percent. The standard deviation on the rear tandem weight is 1.34 kips (610 kg) and the c.o.v. is 7.2%. The c.o.v. of the ratio is greater for the rear tandem comparison. The rear tandem magnitudes are lower than the gross weight magnitudes but the standard deviation of the difference comparison is only slightly greater. The results are presented in Table 57.

5.1.2 Repeatability: Arkansas

The same five axle truck was used to calibrate all six sites in Arkansas over a period of 24 days. The vehicle was loaded at the beginning of the project and left undistrubed for the 24 day period. Each bridge had steel girders with span lengths ranging from 39 to 84 feet (12 to 25.6 meters). Five were simply supported and one was continuous over the piers. Two bridges had skews of 45 degrees and one had a skew of 50 degrees. The data from 28 crossings is presented in Table 56. The c.o.v. and the standard deviation are 1.74% and 1.02 kips (460 kg).

5.1.3 Static Scale Comparison: Ohio

Two correlations were performed at the same site located on I-90 over Paine Road in Northeast Ohio. The same weigh station which is located approximately 17 miles (27 km) upstream from the bridge was used in both studies (see Section 4.5). The scale was 12 feet (3.7 meters) in length and could weigh single axles or tandems. The first correlation was performed by CWRU and ODOT personnel on June 3 and 4, 1980. A total of 149 vehicles could be matched using visual descriptions and times of arrival.

Repeatability tests were done on the static scale and the Bridge system. Due to the weighing procedure at the weigh station the standard deviation of 1.74 kips (790 kg) was actually greater than the standard deviation of the Bridge system which was 1.10 kips (500 kg). The data for both repeatability tests are presented in Tables 58 and 59. The static scale requires a short period of time for the free vibrations of the scale to dampen out. This time is usually 5 to 10 seconds per axle or tandem except for tank trucks with liquid cargo which could require several minutes per axle or tandem. The ODOT personnel felt this time requirement was too long as the truck traffic would back up considerably, hence each axle was weighed as the scale was still moving. In a few cases the weights were obtained as the vehicle was moving slowly across the scale. In addition, tandems were sometimes partially off the scale. Not surprisingly, the standard deviation of the difference was 3.08 kips (1,400 kg) with a c.o.v. of 7.12%. Of course, the standard deviation of 3.08 kips (1,400 kg) includes the variation inherent in the static scale weights. The accuracy of the Bridge system could be estimated from the relationship:

$$\sigma^2_{BWIM} = \sigma^2_{Sample} - \sigma^2_{Static} \qquad (16)$$

The second correlation was performed by project personnel on January 22, 1982. This time the weights were not taken on the static scale until the scale had stopped moving. This procedure resulted in a continuous backup of truck traffic. If the backup became too severe, the trucks were passed through and no accurate weighings were recorded. With this procedure, the highest rate of trucks which could be measured was 52 per hour. Tank trucks with liquid cargo were not weighed with the same accuracy. A few weighings were obtained with the scale moving slightly. The resulting correlation of 87 vehicles had a standard deviation of 2.32 kips (1050 kg). The data is plotted in Figure 32.

A calibration vehicle was used on February 11, 1982 to measure the repeatability of the static scale. The standard deviation was .15 kips (68 kg) on gross weight for 21 repeat weighings. Since each axle or tandem is a separate and independent weighing, the number of independent gross weights obtained would be n cubed, the number of weighings for each axle raised to the third power (it takes three weights to make up a gross weight, steering axle, drive tandem and rear tandem). Thus there are close to 7,000 independent estimates of the gross weight with a range from 80.05 to 81.85 kips (36,390 to

37,210 kg). That same day the vehicle was used to calibrate a bridge on I-80 in Eastern Ohio. The standard deviation was .80 kips (364 kg) with a range of 79.7 to 81.5 kips (36,390 to 37,050 kg). A summary of the repeatability of the static scale is presented in Table 60.

5.1.4 Portable Scale Comparison: Arkansas

A correlation study was performed in Arkansas with a portable scale that was also collecting data for the HPMS study. A total of 56 trucks were correlated for a standard deviation of 3.01 kips (1,370 kg) of the difference between gross weight obtained by BWS and the portable scale. An attempt was made to measure the repeatability of the portable scale, however, of approximately 15 weighings only 5 weighings were considered good by the scale personnel and reported to BWS. These weights are presented in Table 61. It should be noted that these weighings were performed with greater care than weighings of normal traffic. The driver reported that the vehicle was moved while on the scale so that the "best" weight could be obtained. Presumably, the "best" weight was the already known axle weights. Even so, the standard deviations on gross and rear tandem weights were .58 kips and .93 kips (260 and 430 kg). The average of the gross weights is 2.5% higher than the gross weight as measured on a platform scale, however the average of the rear tandem weight was 30.7 kips (13,950 kg) which compares very well with the platform scale weight of 30.6 kips (13,910 kg). The conclusion is drawn that this study does not measure the true accuracy of either the Bridge WIM system or the portable scale, although the correlation is good since the one to one comparison agrees well.

5.1.5 Radian WIM Comparison: Texas

A comparison study was performed with a Radian in-pavement weigh-in-motion system near Iowa Park, Texas on Route 287. The Radian system uses two pavement scales approximately 18 inches (.46 meters) long, one for each wheel of an axle. Texas has several Radian WIM sites around the state. The scale transducers must be installed each time a site is visited, a process that takes about one and one-half hours during which the lane must be closed to traffic. Each axle is weighed separately and the axle weights are summed to obtain the gross weight. The pavement appeared to be in very good condition, a must with the Radian system.

The sample is 99 trucks that were weighed by both systems. The ratio of the gross weights has a mean of .89 and a c.o.v. of 10.0%. The standard deviation of the difference in gross weight is 5.3 kips (2,410 kg). The Radian c.o.v. can be estimated by equation 16 using 10.0% for the combined c.o.v. and 2.3% for the BWS c.o.v. The result is a c.o.v. of 9.7% for the Radian system alone. This corresponds very well to their published c.o.v. of 10.0% for gross vehicle weights of traffic traveling faster than 40 mph (64 km/h). It should be noted that the Bridge WIM system accuracy should be independent of vehicle velocity because of the smoothing algorithm described in Chapter 2.

The calibration truck was weighed by both systems a number of times for a repeatability measure. The data is presented in Table 62. The actual weight is 67.34 kips (30,610 kg). For gross weights the Bridge WIM standard deviation and c.o.v. are 1.08 kips (490 kg) and 1.60% while the Radian standard deviation and c.o.v. are 2.11 kips (960 kg) and 3.17%. It should be noted that the random traffic was tested at normal highway speeds near 55 mph (88 km/h). The test truck speed was consistently lower, about 45 mph (72 km/h). The Radian system performs better with slower traffic, less than 35 mph (57 km/h).

5.2 Velocity Accuracy - Effect on Gross Weight

Analytical parameter studies by Kriss (11) have shown that small errors in velocity measurements can produce small errors in gross vehicle weight. This relationship is presented in Figure 33. The tapeswitches are sampled at least 50 times per millisecond. Once an axle is detected, a clock is read to provide a "timestamp" for that axle. This hardware clock is running at 1 kilohertz (1000 counts/second) which means that the timestamp, an integer, is given in milliseconds. The clockrate does introduce some error in the velocity calculation since the timestamp may be off by at most 1 millisecond. For example, if 125.3 milliseconds is the time required for the steering axle of the truck to travel the distance between the first and second tapeswitches, the timestamp will be 125. The resulting error in velocity will depend on the vehicle velocity and the tapeswitch spacing which along with the time will be used to compute the velocity.

The maximum velocity error for various tapeswitch spacings are given in Figure 34. A vehicle traveling 50 mph (82 km/h) crossing tapeswitches spaced at 7 feet (2.1 meter) will have an error that is at most 1.05%. Referring to Kriss's work and Figure 33, one can see that this small error will produce gross weight errors that are also very small (slightly less than the velocity error).

During the initial projects at CWRU the velocities measured by the tapeswitches were compared with radar and found to be in excellent agreement. As discussed above, the error in velocity is random and of low magnitudes. There is no loss of accuracy in the Bridge Weigh-In-Motion method as the velocity of the vehicle being weighed increases.

5.3 Bridge Selection

Prior to this project, only bridges in Ohio and Virginia had been used to collect truck weight data and those sites that were used were more or less ideal. One of the project's objectives was to determine the limits of the bridge weigh-in-motion concept. The bridge structures tested during this project were chosen by FHWA or the State involved, with some input from BWS, after the routes were fixed. A list of the structures tested is presented in Table 63.

Although several of the structures tested proved to be difficult, good agreement for gross weights were obtained from all bridges. The axle weights from only one bridge, I-880, California, were thought to be questionable. This conclusion was made since for unknown reasons the axle weights on two (of four) of the calibration vehicle crossings were not good, although the gross weights were excellent. The axle weights of the random traffic on this bridge appear to be normal in almost every case.

5.3.1 Skewed Bridges

Six of the thirty-three structures had large skews defined here to be 30 degrees or greater. Four had skews of 45 degrees or greater. The difficulty with these structures is the shift in influence line for each side of the truck. For example, a truck with a wheelbase of 9 feet (2.8 meters) on a bridge with a 45 degree skew, one wheel of the front axle is on the bridge when the other wheel is 9 feet (2.8 meters) 'behind'. The best approach in processing this data is to redefine the beginning of the record, the start of the vehicle on the bridge, by shifting the strain record in time. This is easily done with several calibration truck crossings.

The gross weights from the skewed bridges were excellent as Table 56 shows. Four of the six Arkansas bridges had large skews. The standard deviation on gross weights for these four bridges is 1.01 kips (460 kg).

Axle or tandem weights were not quite as good. Three of the skewed bridges in Arkansas gave very good rear tandem weights as shown in Table 56. The standard deviation is 1.68 kips (760 kg) compared to 1.34 kips (610 kg) for all of the bridges presented in the table. The fourth Arkansas bridge, I-30 at Route 67, had a 50 degree skew and a span of 84 feet (25.6 meters). The calibration vehicle data for this bridge is presented in Table 64. Although the gross weights are excellent, the variation in the rear tandem weights is significant. The standard deviation on the rear tandem weights is 3.28 kips (1,490 kg) for these four crossings. This variation is believed to be due to the combination of the large skew and the long length of the span. In general, axle or tandem weights are not as well defined on long spans as compared to shorter spans.

Skewed bridges presented no special difficulty in obtaining good agreement for gross vehicle weights. Most skewed bridges (including skews of 45 degrees) also provided excellent axle weights. If a structure with a skew greater then 30 degrees must be used to collect axle weights, a greater number of calibration vehicle crossings (say 10 to 15) should initially be made.

5.3.2 Difficult Bridges

A few structures required special effort to assure good vehicle weights. The primary reason for the difficulty is other traffic on the bridge contributing to the measured strain of the vehicle being weighed. This is due to either extremely dense traffic (57,000 average daily traffic (ADT)) or very long bridges. In all cases, the gross weights obtained when the vehicle was alone on the bridge were in good agreement. Axle weights were considered to be good in all but one case, the box girder bridge on I-880 in California. Each structure is discussed below.

US 101 - Ventura

This site had a high ADT and a relatively long span of 84 feet (26 meters). Data from this site was further complicated by the fact that the bridge had four traffic lanes that were carried by these plate girders, making separation of cars and the vehicle being weighed difficult.

I-5 - California - Mokelumne River

This was a reinforced concrete continuous bridge. Due to restricted access to the girders for transducer installation, the last span of the bridge was instrumented. The processing program had to be modified to analyze the data. At the time of vehicle arrival at the instrumented span, a strain was already induced at the transducer location since the vehicle was entirely on the preceeding span. A processing program in use at CRWU was used for this instance. The analysis routine was changed so that the truck appears to be driven backwards over the bridge. The analysis is begun when the last axle is at the end of the span and continues until the front axle reaches the beginning of the span. The results from this bridge with this analysis technique are considered to be excellent.

I-880 - California - Sacramento

This prestressed concrete bridge was a box girder. Theoretically, the strain due to a vehicle at any lateral position would produce the same strain at any point along the cross-section of the bottom member. The box girder was continuous across the supports with the instrumented span length being 83 feet (25.3 meters). To complicate matters further, the ADT of this bridge is 57,000 vehicles which was extremely dense.

Due to the relatively low strains encountered, the transducers were placed such that the transducers spanned cracks thereby magnifying the apparent strain. Assuming the cracks are minute the transducer response should be linear.

The calibration vehicle used had a gross weight of 60.3 kips (27,410 kg). Of the four good crossings, the predicted gross weight ranged from 60.0 to 60.7 kips (27,270 to 27,590 kg) which is excellent repeatability. However, the variation in axle weights was found to be unacceptable.

Due to the questionable reliability of the calibration truck axle weights, this data was not included in the final tables combining all trucks, California trucks, etc. Examination of the axle weights of the random traffic recorded at this site would indicate that most axle weight distributions for the random traffic appear to be reasonable.

I-80 Illinois

The traffic over this two lane bridge was carried by two deep plate girders. The instrumented span length was 90 feet (27.4 meters) and the overall bridge length was greater than 400 feet (122.0 meters). The girders were continuous over the supports. This made the isolation of vehicles difficult while acquiring data. During processing, however, it was quite easy to determine when another vehicle was affecting the weighing. Only those vehicles that were alone on the bridge are included in the statistical summaries.

5.4 Processing Results Using Shorter Span Lengths

During this project, strain data was acquired from the time the first axle of a vehicle arrived at the first tapeswitch until the last axle had reached the end of the instrumented span. Thus, the length of time of strain acquisition is flexible; the acquistion time is determined for each vehicle and is a function of the vehicle velocity, the vehicle length (first axle to last axle) and the distance from the first tapeswitch to the end of the instrumented span. The maximum number of samples that can be acquired is a function of the sampling rate and the number of girders instrumented.

Longer span lengths require a greater headway limitation in order to have only one vehicle on the span at a time. By reducing the length of the span over which the data is processed, the likelihood of a trailing vehicle influencing the results is reduced. This is accomplished during processing by entering a reduced span length in place of the real span length. The data is then processed until the last axle reaches the modified span length.

This technique was tried on only two bridges with span lengths of 53.5 and 37.0 feet (16.3 and 11.3 meters). The results indicate that small reductions (25%) in span length had little effect on the gross weight or weight distributions of heavier trucks.

5.5 Girder Weighting Factors

As a vehicle crosses an instrumented bridge span, the lateral distribution of each axle load has been assumed to be constant with axle position along the bridge. Consider, for example, a bridge with six girders carrying two lanes of an interstate highway. The peak strain for a vehicle in the right lane (girders 2 and 3) would be distributed as (normalized) .20, .90, 1.00, .80, .25, .15 for girders 1 through 6. The strain on girders 1 and 6 is due primarily to the dynamic response of the structure and therefore girders 1 and 6 were usually not recorded during this project. A vehicle in the left lane might have a distribution such as .10, .20, .60, 1.00, .80, .40. By weighting the strain record for each girder the effect of another vehicle can be lessened. Note that the calibration factor must be calculated for each set of weighting factors used. Typical weighting factors used in the data analysis would be:

right lane	0.00	1.00	1.00	.75	.25	0.00
left lane	0.00	.25	.75	1.00	1.00	0.00

The effect of using weighting factors was investigated using the January 22, 1982 correlation data from the Ohio I-90 site (Section 5.1.3). The standard deviation of the prediction was calculated for each set of weighting factors. The results are presented in Table 65. The use of weighting factors does increase the variability. In general, the more the factors are reduced the higher the variability. The best approach to minimize the effects of additional traffic on the span would be to monitor the tapeswitches in both lanes whenever a vehicle is being weighed. Thus when an additional vehicle is detected in the other lane, severe weighting factors would be used. The majority of weighings which would have the vehicle alone on the span would use uniform weighing factors and thus have less variability.

One possible reason for the increased variability with reduced weighting factors could be the effect of lateral position of the vehicle while on the span. When using all of the girder strain records evenly (weighting factors of 1.0), a 5 foot (1.5 meter) difference in lateral position would not be noticeable. However, this would not be the case if the weighting factors of the 3 girders directly beneath the lane were nonuniformly reduced.

Another possible reason is that the lateral distribution is not constant with position along the span, but rather the load appears to be more evenly distributed at the transducer location as the load is further along the span. This is even more apparent for continuous bridges with the load on the second span.

For the general traffic recorded, auto traffic in adjacent lanes sometimes caused minor shifts in the apparent zero strain level in the girders associated with the auto traffic lane. The use of girder weighting factors in this project greatly reduced this influence in most cases.

5.6 Weigh-in-Motion Economics

The need for weigh-in-motion operations has been documented. There are the benefits of added personnel safety with no stopping of traffic when comparing portable weighing with the Bridge WIM operation. There is also the advantage of unbiased results of an undetected operation. In addition, there is the question of economics. Because fixed weigh stations can now cost several million dollars each, the comparison should be made with portable scales. The main advantage to weigh-in-motion in this regard is crew size and weighing rate. A portable system will utilize between 10 and 15 personnel for flagging, positioning, weighing and recording if any meaningful weighing rate is to be maintained. This Bridge Weigh-In-Motion system can be operated by two field personnel and is capable of weighing rates well above 100 trucks per hour, depending on the site. This project saw a maximum weighing rate of 219 trucks per hour.

The Bridge Weigh-In-Motion system is portable and mobile, i.e. the same system can support weighing operations at several different sites. No special construction (ramps, extra lanes, etc.) is required as the system adapts to existing highway bridges.

Setup time at a new site is about 1.5 to 2 hours although the field personnel for this project were able to reduce setup times to near 1 hour due to experience and organization. Repeat visits require even less time. If several consecutive days of weighing are to be done, the transducers and tapeswitches can be left in place, thereby reducing the set-up time to less than one-half hour. In addition to the two field personnel, a calibration vehicle is needed (once per site) and effective supervisory control from an engineer for site selection and weight processing. Although the system can process in the field within one second of a truck crossing, general processing, including the preparation of statistical weight table and summaries, should be done after a test is completed. Allow about one day of processing for each 3 to 5 days of field testing.

Considering initial setup, processing time, travel and routine maintenance, one can expect about 7 weighing shifts for a two man crew during each two week period. Assuming an average traffic of 70 trucks per hour (limited only by the traffic on the route as the Bridge WIM system is capable of weighing over two hundred trucks per hour), this should mean about 3000 trucks every two weeks per test crew, i.e. 70 trucks/hour x 6 hours x 7 shifts/2-week period. This rate would vary with traffic, number of shifts per site, travel time and maintenance responsibilities. The best estimates obtained for a portable scale operation were 42 trucks per hour. Reference 3 gives typical weighing capacities for semi-portable scales at 25 vehicles/hour and for portable scales at 3 vehicles/hour.

As a weighing operation, the system causes no delay to truckers, thus reducing fuel and time costs and hence freight costs. The system was designed to monitor traffic in the normal traffic flow at normal operating speeds. The predictions do not appear to suffer from any loss of accuracy at high speeds. The current system could be modified to include photodetectors and/or loop detectors with additional software logic so that the system could be permanently installed and operate completely unattended. These permanent installations could provide continuous data collection.

In addition to test personnel, supervisory engineer and calibration truck, there are equipment maintenance costs. Of the five systems in use today for a combined period of six years, the total maintenance and replacement costs are less than $10,000. If desired, the major system items could be placed under a service contract for approximately $4,000/year. The other major item is the instrument vehicle; ODOT uses a standard van and FHWA uses a Winnebago type RV designed to facilitate demonstration of the system to others. The large vehicle is more comfortable for heavy use and houses its own generator.

CHAPTER SIX

Conclusions and Recommendations

6.1 Conclusions

1. Three complete Bridge Weigh-In-Motion systems have been designed, assembled, utilized and delivered for operation to FHWA. The systems have been designed to collect unbiased truck weight data in an undetected manner at normal highway speeds. One of these systems uses an autobalancing signal conditioning system designed during this project.

2. More than 27,000 trucks have been weighed during the study in seven states. This weight data is summarized in this report and has been turned over to FHWA. The data appears to be unbiased. The greater percentage of heavy trucks obtained in this study compared to other reports seems to indicate that the weighing operation was probably not bypassed. This may have been the case with other studies using weighing methods that are more apparent to truckers. The data acquired by FHWA and ODOT with Bridge Weigh-In-Motion systems are not discussed here.

3. The state-of-the-art of weighing trucks in motion utilizing bridges as scales has been greatly advanced:

-the time required to acquire each truck has been reduced by more than a factor of ten;

-the weighing operation has been automated such that data in one lane can be acquired without an observer except under heavy traffic conditions;

-the data can be processed in real time in the field to obtain axle and gross weights in less than one second after the vehicle has crossed the instrumented span;

-the system can acquire data in two lanes with an observer operating the keypad;

-the number of axles are automatically counted allowing optional visual hauling information to be input via the keypad and observer;

-the hardware system has been modified to reduce size and increase flexibility and performance.

4. Night weighing has been done easily with no danger to crew personnel or to the traffic.

5. The system was used on a routine basis to acquire large amounts of data with only two crew personnel and part time supervision by an engineer.

6. The weighing operation is undetected by drivers.

7. Accurate and repeatable weighings may be carried out. On a statistical basis the results compare quite favorably with both fixed and portable weighing techniques. The accuracy of the gross weights is better than axle weights. Its application is believed acceptable for unbiased planning studies, pavement loads, economic studies, and undetected enforcement screening.

8. The economics of this in-motion weighing technique indicate high weighing rates with two man crews at low cost. The hardware equipment is primarily off-the-shelf and can be placed under the manufacturer's maintenance contract.

9. Sites can be monitored quickly and routinely. Initially, at each site a calibration vehicle is needed. Usual setup is less than two hours with two personnel. Setup during repeat visits is shorter.

10. The system was demonstrated and/or presentations were made to state and federal officials in 12 states. An estimated 150 officials viewed the system in action.

11. The range of acceptable bridge types has been expanded. Site selection was generally not a problem and weighing sites were found to meet the FHWA data requirements.

12. Crew training required only a minimal effort. A total of 4 people were involved in data acquisition at any one time with two systems operating. FHWA personnel were also instructed in the operation of the systems and have performed their own independent weight studies.

13. Velocity measurements are another indirect benefit of the Bridge WIM operation.

14. Average truck weighings per weekday were double that of weekend days. However, the gross weight histrograms were similar.

15. The study data agrees very well with the interstate rural roads data reported in the "1975 Bational Truck Characteristics Report" by FHWA, April 1978, except in the greater than 80 kip (36,360 kg) category. The 1975 report gives a frequency of 17 per 1,000 whereas this study has found 41 per 1,000 (all sites) and 58 per 1,000 (all interstates).

16. The loadometer survey value from all sites of .41 compares very well to the typical value of .40 as determined by previous studies. The value for each of the seven states ranged from .26 in Georgia to .51 in Illinois. The higher the value, the more severe the loading.

17. A summary of truck velocities for all sites indicate that 69 percent were in excess of 55 mph (88 km/h), 18 percent were greater than 61 mph (98 km/h) and 7 percent were greater than 64 mph (102 km/h).

6.2 Limitations

1. Field crews must be adequately trained and supervised. An engineer must be in charge of the weighing operations to make decisions on test sites and data evaluation.

2. Although there are many potential weighing sites, not all bridges will be satisfactory scales. Bridges with large skew (greater than 45 degrees), or excessive vibration should be used only after careful review of calibration test data. Reinforced concrete bridges with significant cracking should be used with caution. Prestressed concrete beams work well. Trusses, timber bridges and older type structures have not yet been studied.

3. The accuracy of individual axle weights is reduced when trying to sort weights of closely spaced axles (tandems). Gross vehicle weights are not affected. Tandem axles have been treated as one unit in the weighing, as reported by many static weigh stations. Problems have occured on a few bridges with the relatively light front axle weights, but since these axles are generally known within narrow limits, methods of adjustment were employed.

4. The current processing algorithm assumes a constant vehicle velocity over the span, although modifications could be made to also account for vehicles having constant acceleration.

6.3 Future Work

The system in its present state is versatile and capable of handling most weighing situations. Further improvement depends on the needs and uses for truck data and the cost incentives to acquire large volumes of data. Some of the changes that should be considered include:

1. Further automating the system so that two or more lanes of traffic can be obtained with no observer necessary. This would also include a further check for other traffic on the bridge during a weighing. This is being undertaken by Bridge Weighing Systems, Inc.

2. Develop a technique to weigh trucks that are side by side and/or closely spaced such that large amounts of truck headway data can be acquired. This is important in developing bridge design loading models. CWRU has been awarded an HPR study from ODOT for this work.

3. Some sites may be considered for permanent instrumentation as a substitute for the more expensive fixed static scale weighing. Strain gages mounted on some Ohio bridges were successfully performing two years later without any protection from the weather. For permanent installation, strain gages or transducers should be protected from the elements and vandals.

4. Permanent weighing sites may also warrant greater degrees of automation. For example, a stand alone system could be developed and data could be telemetered or sent over phone wire to a central installation.

5. If in the future, trucks are required to carry airplane-type transponders for identification for tolls, etc., this could be tied to weigh-in-motion.

6. The range of sites could be extended, especially for monitoring rural locations, using older bridges to check conformance with the posted weight

limits. The limits of other types of bridges should be investigated such as truss, arch, timber and frame structures.

7. Testing is needed to evaluate enforcement effectiveness by simultaneously weighing on bypass roads. The seasonal variation in the enforcement effectiveness should also be investigated. Some of these operations are now being conducted by ODOT, also using the WIM method.

Table 1: Front Axle Weight Equations

Type Code	Equation
1	0.35(GVW)
5,8,9,13,14,15	7.1 + 0.04(GVW)
12	7.4 + 0.03(GVW)
2,4	3.3 + 0.21(GVW)
3,6,7,10,11	3.2 + 0.15(GVW)

Acceptable Variation: -2 to +4 kips
codes are given in Table 3

1 kip = 454 kilograms

ID#	TIME	LANE	SPEED	TYPE	CONFIG	GVW	< AXLE WEIGHTS						>	< AXLE SPACINGS					>	LENGTH
16	801	1	66	72	8	71.9	10	15	15	16	16	0	0	127	45	217	41	0	0	43
18	803	1	71	72	8	77.8	10	15	15	19	19	0	0	154	43	212	39	0	0	44
19	804	1	49	0	8	76.3	11	16	16	17	17	0	0	128	43	282	40	0	0	49
21	806	1	66	32	8	73.2	9	16	16	16	16	0	0	131	43	212	40	0	0	42
28	813	1	51	40	8	95.2	11	21	21	21	21	0	0	150	45	283	41	0	0	52
31	817	1	51	40	8	84.9	12	17	17	19	19	0	0	149	42	290	40	0	0	52
50	832	1	56	66	13	75.0	12	14	14	12	12	12	0	158	41	265	40	42	0	54
53	833	1	62	0	8	78.1	9	15	15	19	19	0	0	130	43	269	39	0	0	48
57	837	1	51	0	8	80.9	10	17	17	18	18	0	0	142	42	281	40	0	0	50
60	840	1	66	0	8	83.3	11	19	19	18	18	0	0	130	41	238	40	0	0	45
62	841	1	56	0	8	88.8	11	19	19	20	20	0	0	153	40	253	37	0	0	48
74	854	1	60	65	8	74.4	9	16	16	17	17	0	0	156	45	190	41	0	0	43
76	855	1	62	68	8	73.9	10	15	15	17	17	0	0	143	43	285	40	0	0	51
78	856	1	62	72	13	78.4	10	13	13	14	14	14	0	162	44	314	41	41	0	60
82	900	1	61	34	8	74.4	10	16	16	16	16	0	0	114	40	233	39	0	0	42
86	904	1	49	34	8	83.7	11	18	18	19	19	0	0	133	41	282	41	0	0	49
97	912	1	60	40	8	76.4	10	16	16	17	17	0	0	134	41	243	38	0	0	45
100	914	1	46	65	8	73.3	9	12	12	20	20	0	0	126	43	132	39	0	0	34
111	924	1	58	0	8	106.7	13	21	21	26	26	0	0	168	43	290	38	0	0	54
113	925	1	51	0	13	95.2	13	19	19	15	15	15	0	169	45	290	39	39	0	58
122	935	1	55	34	8	80.2	10	18	18	18	18	0	0	134	41	201	42	0	0	41
128	939	1	68	34	8	80.6	10	17	17	18	18	0	0	129	42	231	38	0	0	44
135	942	1	59	0	8	80.8	11	18	18	17	17	0	0	135	41	223	40	0	0	44
140	947	1	50	34	8	88.7	12	18	18	20	20	0	0	143	41	280	42	0	0	50
141	947	1	66	34	8	77.1	11	17	17	16	16	0	0	123	42	255	40	0	0	46
150	954	1	60	34	8	99.3	12	19	19	25	25	0	0	148	40	278	40	0	0	50
159	959	1	30	34	8	74.7	9	17	17	15	15	0	0	148	42	276	38	0	0	50
160	959	1	34	34	6	79.9	15	35	15	15	0	0	0	150	366	44	0	0	0	56
168	1007	1	59	0	8	73.3	10	12	12	20	20	0	0	156	43	334	40	0	0	57
169	1007	1	60	0	13	69.0	10	7	7	15	15	15	0	171	42	263	41	41	0	55
176	1014	1	56	65	8	72.1	10	14	14	17	17	0	0	151	42	134	41	0	0	36
177	1016	1	67	34	5	78.0	10	18	18	33	0	0	0	130	44	252	0	0	0	42
195	1047	1	60	40	5	82.9	12	16	16	38	0	0	0	123	41	303	0	0	0	46
197	1048	1	56	40	8	75.8	12	14	14	18	18	0	0	158	40	255	39	0	0	49
202	1051	1	57	0	8	66.0	9	10	10	18	18	0	0	157	43	280	39	0	0	52
203	1052	1	56	0	8	85.3	11	19	19	18	18	0	0	153	43	238	41	0	0	47
215	1104	1	51	65	8	77.4	9	16	16	19	19	0	0	127	42	165	39	0	0	37
219	1109	1	47	40	8	89.3	12	19	19	20	20	0	0	185	45	295	39	0	0	56
222	1113	1	47	40	8	86.7	10	16	16	22	22	0	0	132	42	196	40	0	0	41
223	1113	1	62	40	8	86.2	11	19	19	19	19	0	0	128	41	229	41	0	0	44
228	1118	1	60	40	6	88.2	17	27	22	22	0	0	0	153	256	42	0	0	0	45
229	1119	1	47	32	8	87.7	10	19	19	20	20	0	0	148	44	288	39	0	0	52
232	1121	1	66	40	8	82.3	9	18	18	19	19	0	0	120	43	254	37	0	0	45
233	1124	1	47	40	8	101.7	14	21	21	23	23	0	0	152	41	279	39	0	0	51
234	1125	1	67	40	8	86.8	12	17	17	20	20	0	0	129	41	307	40	0	0	51
235	1126	1	51	32	8	88.2	11	18	18	20	20	0	0	128	40	293	41	0	0	50
236	1127	1	60	65	6	73.8	15	19	20	20	0	0	0	153	179	41	0	0	0	37
250	1141	1	70	72	8	69.4	9	13	13	17	17	0	0	177	45	300	39	0	0	56
256	1152	1	58	40	8	84.4	12	17	17	19	19	0	0	125	42	281	39	0	0	48
260	1154	1	55	72	13	96.8	12	16	16	18	18	18	0	162	43	306	41	41	0	59
261	1200	1	62	40	8	92.8	11	20	20	21	21	0	0	143	41	258	41	0	0	48
266	1202	1	52	40	8	88.2	12	18	18	20	20	0	0	128	42	282	39	0	0	49
273	1206	1	62	65	9	69.8	11	12	12	12	24	0	0	171	46	266	83	0	0	56
274	1206	1	67	0	8	84.2	11	18	18	18	18	0	0	128	43	227	39	0	0	43
281	1210	1	71	0	8	76.8	10	17	17	17	17	0	0	132	43	331	43	0	0	54
284	1214	1	66	65	8	85.6	11	18	18	19	19	0	0	180	45	295	35	0	0	55
286	1215	1	59	34	8	93.6	9	23	23	19	19	0	0	123	42	314	41	0	0	52
293	1219	1	62	40	8	85.0	12	17	17	19	19	0	0	116	42	276	37	0	0	47

Table 2 - Trucks over 60 Kips GVW - Caldwell, Texas

ID#	TIME	LANE	SPEED	TYPE	CONFIG	GVW	< AXLE WEIGHTS						>	< AXLE SPACINGS					>	LENGTH
298	1221	1	62	0	8	67.2	10	13	13	16	16	0	0	142	41	289	38	0	0	51
301	1223	1	57	34	8	84.9	11	17	17	20	20	0	0	157	43	193	39	0	0	43
302	1224	1	59	0	8	88.6	13	18	18	21	21	0	0	131	41	293	40	0	0	50
304	1224	1	62	0	8	66.1	10	14	14	14	14	0	0	130	40	242	39	0	0	45
313	1230	1	54	0	8	65.7	10	14	14	14	14	0	0	125	46	273	40	0	0	48
314	1303	1	66	72	8	88.9	13	18	18	20	20	0	0	135	43	280	40	0	0	49
315	1304	1	56	40	5	82.1	12	17	17	37	0	0	0	146	45	325	0	0	0	51
320	1306	1	67	0	8	76.1	11	16	16	17	17	0	0	119	40	249	38	0	0	44
324	1311	1	49	0	8	91.2	13	18	18	21	21	0	0	144	42	281	41	0	0	50
325	1312	1	51	0	8	84.0	10	18	18	19	19	0	0	128	41	290	39	0	0	50
328	1313	1	56	0	8	81.2	9	16	16	20	20	0	0	121	41	195	41	0	0	39
329	1314	1	56	0	8	81.7	11	15	15	20	20	0	0	121	42	197	39	0	0	40
330	1315	1	62	0	8	86.3	14	16	16	20	20	0	0	131	42	297	40	0	0	51
333	1316	1	58	136	5	90.3	11	19	19	41	0	0	0	164	44	325	0	0	0	53
340	1319	1	62	136	8	82.8	11	16	16	20	20	0	0	114	42	278	38	0	0	47
343	1323	1	56	72	8	95.0	12	21	21	20	20	0	0	163	41	283	40	0	0	52
345	1325	1	46	136	8	69.3	9	11	11	19	19	0	0	124	39	312	41	0	0	51
346	1325	1	43	34	8	96.5	11	21	21	22	22	0	0	119	42	233	37	0	0	43
347	1325	1	43	34	8	98.3	12	21	21	22	22	0	0	121	41	241	40	0	0	44
348	1326	1	47	34	6	94.1	18	32	22	22	0	0	0	110	283	40	0	0	0	43
349	1326	1	47	65	8	67.3	9	15	15	14	14	0	0	135	42	198	42	0	0	41
351	1327	1	49	34	6	84.0	16	27	20	20	0	0	0	109	281	40	0	0	0	43
353	1329	1	62	72	8	66.7	10	14	14	14	14	0	0	127	41	229	40	0	0	43
357	1331	1	55	0	8	69.5	8	13	13	18	18	0	0	138	44	199	38	0	0	42
358	1332	1	56	65	8	77.1	9	14	14	20	20	0	0	135	42	193	39	0	0	41
359	1332	1	57	34	8	89.3	12	17	17	22	22	0	0	135	39	259	39	0	0	47
369	1340	1	58	34	6	80.1	16	25	20	20	0	0	0	147	241	38	0	0	0	42
380	1538	1	26	0	8	77.2	11	16	16	18	18	0	0	122	43	254	43	0	0	46
387	1349	1	66	34	8	83.5	11	17	17	19	19	0	0	155	42	204	39	0	0	44
389	1350	1	65	34	8	80.3	10	17	17	18	18	0	0	134	43	217	42	0	0	43
392	1355	1	56	34	8	83.4	13	16	16	19	19	0	0	143	42	271	37	0	0	49
394	1357	1	49	0	8	81.8	9	16	16	21	21	0	0	99	42	182	42	0	0	36
395	1357	1	54	34	8	80.3	10	17	17	18	18	0	0	136	43	206	40	0	0	42

Table 2 - Trucks over 60 Kips GVW - Caldwell, Texas
(Continued)

Type - See Table 3

Configuration - See Table 3

Gross Axle Weights in kips (1 kip = 454 kilograms)

Axle spacing in 0.1 feet (1 ft = .305m)

Table 3: Vehicle Category and Configuration Key

Code (Keypad)	Category (Body Type)	Code (Universal)	Classification (Configuration)
17	IGNORE/LANE 2	1	2 SINGLE
18	SPECIAL	2	3 SINGLE
20	OTHER	3	2S-1
24	TEST	4	4 SINGLE
33	CHEMICAL	5	3S-1
34	FUEL	6	2S-2
36	CONCRETE	7	2S-2 SPLIT
40	TANK	8	3S-2
65	OPEN HAULER	9	3S-2 SPLIT
66	MACHINERY	10	2S-3
68	STEEL	11	2S-3 SPLIT
72	FLAT	12	2S-1-2
129	DUMP	13	3S-3
130	BUS	14	3S-3 SPLIT
132	CAR CARRY	15	3S-1-2
136	BOX	16	OTHER/BAD SPACING
0	UNCLASSIFIED*		

*For data acquired automatically without optional keypad input

Table 4: Survey Summary

Vehicle Type	Number Weighed
All Trucks	27513
Singles	5013
Tractor Trailers	22002
3S-2	15802

	No. of Trucks	No. of Days	Average Trucks/Day
State Routes	6957	18	222
U.S. Routes	2665	12	387
Interstate Routes	17891	43	416
All Routes	27513	73	377
Weekdays	25420	63	403
Weekends	2093	10	209
Arkansas	4442	13	342
Texas	7354	22	334
Georgia	3688	8	461
California	4996	10	500
Illinois	2584	9	287
New York	2960	8	370
Ohio	1489	3	496

TABLE 5 ALL SITES, ALL STATES: CAL,GA,ARK,TEX,ILL,NY,OHIO

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 100	100 110	110 120	120 130	130 140	140 150
ALL TRUCKS	27513	1370	3210	5838	3848	2648	2626	3570	2819	1187	269	68	19	9	6	16
SPECIAL	989	49	91	155	113	93	87	111	137	112	38	2	1	0	0	0
OTHER	572	93	271	106	49	25	17	5	2	3	0	0	0	0	0	1
LIVESTOCK	111	5	14	33	24	10	3	10	8	4	0	0	0	0	0	0
FUEL	348	3	19	82	39	11	11	16	52	78	30	7	0	0	0	0
CONCRETE	169	0	4	35	13	13	51	35	10	6	2	0	0	0	0	0
TANK	1343	17	85	453	157	38	57	148	232	126	22	8	0	0	0	0
OPEN	1129	30	64	326	125	64	74	133	176	93	19	1	2	0	0	1
MACHINERY	386	3	30	36	66	55	54	59	39	14	11	11	2	3	1	3
STEEL	287	1	2	10	21	21	30	68	64	35	11	2	1	0	1	0
FLAT BED	2689	94	233	781	407	211	204	320	282	116	24	12	0	1	0	3
DUMP	992	49	235	150	109	107	62	113	89	43	10	5	0	0	0	0
BUS	337	24	140	91	67	9	1	6	0	0	0	0	0	0	0	0
CAR CARRY	285	1	8	34	80	72	44	33	6	6	0	0	0	0	1	0
BOX TRUCK	8795	339	820	1884	1386	1042	1052	1262	809	152	35	5	1	3	1	5
UNCLASSIFY	5092	662	1174	1660	1192	678	689	1252	884	399	68	15	12	2	2	3
2 SINGLE	3337	1352	1616	301	50	12	3	0	0	1	0	0	0	0	0	2
3 SINGLE	1714	7	531	382	332	254	153	51	0	3	1	0	0	0	0	0
2S-1	820	1	240	384	130	40	15	5	2	0	1	0	0	1	0	1
4 SINGLE	32	0	2	3	4	3	6	8	5	0	1	0	0	0	0	0
3S-1	493	0	16	146	91	52	45	73	50	17	2	1	0	0	0	0
2S-2	2380	1	372	790	594	354	133	86	44	12	4	0	0	0	0	0
" " SPLIT	249	0	119	52	27	12	11	17	5	2	2	0	0	0	0	2
3S-2	15602	0	180	3154	2264	1656	1990	2949	2336	978	210	51	9	2	5	6
" " SPLIT	738	0	12	198	85	51	64	114	151	50	9	1	0	1	0	3
2S-3	76	0	23	29	12	3	2	5	2	0	0	0	0	0	0	0
" " SPLIT	129	0	10	24	19	25	11	26	13	1	0	0	0	0	0	0
2S-1-2	974	0	25	261	115	71	100	151	154	86	9	0	0	1	0	1
3S-3	212	0	1	9	31	40	14	25	23	25	20	10	10	2	1	1
" " SPLIT	88	0	0	[illegible]	13	8	10	19	5	3	2	0	0	0	0	0
3S-1-2	61	0	2	11	8	4	9	11	11	[illegible]	0	[illegible]	0	[illegible]	0	0
BAD OR NC	428	9	61	85	73	63	70	31	16	6	9	4	0	1	0	0
ALL SINGLE	5083	1359	2148	686	386	269	162	59	5	4	2	0	0	0	0	2
ALL COMBIN	22002	2	1000	5097	3389	2316	2404	3480	2798	1177	258	64	19	8	6	14
LANE #1	25421	1327	2957	5192	3518	2443	2489	3394	2608	1150	255	64	17	8	6	13
LANE #2	2092	43	253	646	330	205	137	176	211	37	14	4	2	1	0	3

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	213	190	330	435	530	682	997	1907
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	3205	4610	5514	4043	2831	1226	557	259

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	42	77	48	76	92	123	298	378	1040	1613	2334	2830
NO. PM	2968	3054	2835	2780	2133	1508	1224	1025	807	135	121	122

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	1527	2490	992	575	784	1098	3083	9990	5133	1023	384

TABLE 6 ALL SITES, ALL STATES: CAL,GA,ARK,TEX,ILL,NY,OHIO

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	27513	2973	1607	2383	3445	2240	1608	1401	1247	1239	1387	1588	1982	1558	1283	800	387	182	87	48	70
SPECIAL	988	85	44	81	74	58	55	48	45	46	41	59	53	47	80	73	39	25	12	2	1
OTHER	572	238	128	68	38	24	25	16	9	12	5	3	2	2	0	1	2	0	0	0	1
LIVESTOCK	111	12	7	10	23	14	10	9	1	2	1	5	5	3	5	2	2	0	0	0	0
FUEL	348	8	14	33	49	28	10	4	7	8	5	5	11	22	30	49	28	18	12	5	2
CONCRETE	168	0	4	11	24	8	3	6	7	12	39	28	9	4	8	3	3	2	0	0	0
TANK	1343	32	70	222	231	104	53	23	15	22	35	47	101	118	114	84	42	15	7	7	1
OPEN	1128	68	46	121	207	90	35	23	41	35	38	55	78	81	85	58	35	12	8	0	4
MACHINERY	328	15	18	11	25	30	38	33	22	35	19	28	30	20	19	7	7	8	3	7	13
STEEL	287	3	0	3	7	7	14	7	14	18	12	23	45	38	43	18	16	8	5	1	3
FLAT BED	2688	200	127	318	455	257	150	127	84	85	108	138	182	137	145	81	25	17	7	8	8
DUMP	882	118	105	73	77	70	38	58	43	28	34	46	67	52	47	28	15	7	3	5	0
BUS	337	89	65	36	53	48	18	5	3	0	1	3	3	0	0	0	0	0	0	0	0
CAR CARRY	285	5	4	7	27	30	50	38	34	28	18	17	13	3	3	3	3	0	0	0	1
BOX TRUCK	8785	753	408	793	1091	778	808	542	500	508	544	597	985	485	323	124	28	22	13	4	11
UNCLASSIFY	8092	1325	511	608	1054	893	489	462	416	382	487	537	715	534	350	238	141	48	19	9	25
2 SINGLE	3337	2482	508	222	78	38	12	11	1	3	0	0	0	0	0	1	0	0	0	0	2
3 SINGLE	1714	149	388	189	183	180	152	148	103	88	65	38	13	0	0	2	1	1	0	0	0
2S-1	820	70	171	240	144	84	48	28	14	6	9	2	3	1	1	0	0	0	1	0	2
4 SINGLE	32	0	2	3	0	2	2	2	1	3	3	2	8	2	3	0	0	0	1	0	0
3S-1	483	2	14	58	88	48	43	26	28	22	23	24	48	25	25	12	5	2	0	1	0
2S-2	2380	181	182	387	393	280	304	227	127	89	64	44	42	28	18	7	5	3	1	0	0
" " SPLIT	249	61	58	29	23	14	13	4	8	7	4	10	7	3	2	2	0	2	0	0	2
3S-2	15802	0	180	857	2167	1380	884	813	843	913	1077	1300	1848	1324	1014	557	321	145	65	39	34
" " SPLIT	739	0	12	67	131	55	30	30	21	24	40	48	68	67	64	35	15	7	1	0	5
2S-3	78	4	18	13	18	5	7	1	2	0	2	2	3	1	1	0	0	0	0	0	0
" " SPLIT	129	2	8	13	11	9	10	13	12	7	4	6	17	6	7	1	0	0	0	0	0
2S-1-2	974	0	25	108	152	84	51	41	30	44	56	68	85	73	81	64	22	7	2	0	2
3S-3	212	0	1	4	5	22	8	20	20	8	5	13	12	9	14	13	12	10	10	8	18
" " SPLIT	88	0	0	2	7	9	5	5	3	3	7	5	13	2	3	2	1	1	1	0	0
3S-1-2	61	0	2	2	8	5	3	3	1	4	5	4	7	8	3	1	2	0	0	1	1
BAD CR NC	428	32	38	48	37	38	37	31	32	37	33	23	8	8	7	3	3	4	5	1	4
ALL SINGLE	5088	2611	897	424	262	220	166	161	108	94	88	40	18	5	3	13	1	1	1	0	2
ALL COMBIN	22002	330	672	1921	3146	1984	1405	1209	1107	1108	1266	1525	1955	1545	1253	784	383	177	81	47	64
LANE #1	25421	2829	1455	2098	3094	2058	1460	1284	1159	1153	1318	1503	1891	1435	1173	772	379	173	82	46	62
LANE #2	2092	144	152	285	351	182	148	117	88	86	81	85	91	121	90	28	8	9	5	2	8

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	213	180	330	435	530	682	987	1907
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	2205	4810	5514	4040	2831	1228	557	259

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	40	77	48	76	92	123	288	379	1040	1813	2324	2830
NO. PM	2868	3054	2835	2780	2130	1508	1224	1025	607	135	121	122

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	1527	2460	692	575	764	1098	3083	9980	5133	1623	394

TABLE 7 ALL SITES, ALL STATES, WEEKDAYS ONLY (S1)

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	25420	2703	1495	2196	3184	2087	1495	1287	1149	1129	1299	1465	1851	1433	1167	740	370	177	84	47	62
SPECIAL	927	83	39	79	67	54	49	47	41	42	38	54	51	45	86	72	39	26	12	2	1
OTHER	510	203	112	63	35	22	24	16	9	11	5	2	2	2	0	1	2	0	0	0	1
LIVESTOCK	88	9	6	9	18	11	6	6	1	2	1	5	4	3	4	1	2	0	0	0	0
FUEL	305	7	10	28	41	26	9	3	6	5	4	4	7	21	28	44	27	17	12	5	2
CONCRETE	142	0	3	11	24	8	5	6	7	9	26	17	8	4	6	3	3	2	0	0	0
TANK	1226	27	62	194	217	97	49	20	14	17	34	46	98	111	103	69	40	15	7	7	1
OPEN	1016	61	44	104	179	75	31	20	35	32	37	53	76	83	81	52	33	11	6	0	3
MACHINERY	374	15	18	11	25	29	36	31	21	33	18	28	29	20	19	7	6	7	3	7	11
STEEL	276	3	0	3	7	7	13	7	13	17	12	22	45	37	44	18	15	6	4	1	2
FLAT BED	2453	186	116	288	417	241	140	114	76	80	102	123	167	127	128	85	24	16	7	8	8
DUMP	900	109	159	69	70	67	35	54	44	21	27	40	57	45	45	28	15	7	3	5	0
BUS	280	83	57	35	41	39	13	4	3	0	1	2	2	0	0	0	0	0	0	0	0
CAR CARRY	263	4	4	6	21	28	47	34	33	26	16	17	14	3	3	3	3	0	0	0	1
BOX TRUCK	8001	683	384	710	1001	722	566	482	448	460	497	543	613	428	285	109	25	22	11	3	9
UNCLASSIFY	8559	1230	481	586	1021	661	473	443	398	374	481	509	680	504	335	248	136	48	19	9	23
2 SINGLE	3046	2237	466	208	73	34	10	11	1	3	0	0	0	0	0	1	0	0	0	0	2
3 SINGLE	1582	131	373	186	168	167	138	146	103	80	49	26	11	0	0	2	1	1	0	0	0
2S-1	778	67	161	233	137	80	44	22	12	6	9	2	3	1	0	0	0	0	1	0	0
4 SINGLE	32	0	2	3	0	2	2	2	1	3	3	2	6	2	3	0	0	0	1	0	0
3S-1	458	2	14	55	79	44	40	23	26	20	21	22	46	23	23	12	5	2	0	1	0
2S-2	2220	177	171	354	366	275	285	207	120	64	61	42	39	25	18	7	5	3	1	0	0
" " SPLIT	221	54	52	27	21	13	12	4	5	6	2	8	7	3	2	2	0	2	0	0	1
3S-2	14652	0	166	908	2006	1289	820	741	771	834	1015	1211	1538	1216	938	614	308	142	63	39	33
" " SPLIT	696	0	9	63	125	52	29	29	18	21	37	45	68	66	77	29	15	7	1	0	5
2S-3	69	4	15	12	15	5	6	1	2	0	2	2	3	1	1	0	0	0	0	0	0
" " SPLIT	115	2	6	9	11	8	10	11	11	6	4	7	16	6	7	1	0	0	0	0	0
2S-1-2	837	0	21	85	129	52	49	35	26	37	50	58	77	64	73	53	19	6	2	0	1
3S-3	201	0	1	4	5	19	9	20	18	9	5	12	11	9	14	13	11	10	10	6	15
" " SPLIT	65	0	0	2	6	8	5	5	3	3	6	5	12	2	3	2	1	1	1	0	0
3S-1-2	49	0	2	1	6	4	2	3	1	4	4	3	7	6	2	1	2	0	0	0	1
BAD OR NC	399	29	36	46	37	35	34	27	31	33	31	20	7	9	6	3	3	3	4	1	4
ALL SINGLE	4560	2368	841	397	241	203	150	159	105	86	52	28	17	2	3	3	1	1	1	0	2
ALL COMBIN	20361	306	618	1753	2906	1849	1311	1101	1013	1010	1216	1417	1827	1422	1158	734	366	173	79	46	56
LANE #1	23478	2567	1355	1919	2853	1919	1364	1180	1075	1052	1223	1387	1764	1318	1080	713	361	168	80	46	54
LANE #2	1942	136	140	277	331	168	131	107	74	77	76	78	87	115	87	27	9	9	4	1	8

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	209	189	327	429	518	638	930	1799
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	2928	4236	5057	3707	2571	1123	534	244

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	42	77	48	76	92	116	198	308	950	1451	2147	2639
NO. PM	2787	2767	2698	2570	1935	1375	1157	1002	607	135	121	122

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	1405	2297	811	533	740	1036	2888	9292	4692	1461	281

TABLE 8 ALL SITES, ALL STATES, WEEKEND DAYS ONLY (10)

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	2093	270	112	197	261	153	113	114	98	110	98	123	131	123	96	60	17	5	3	1	8
SPECIAL	62	13	5	2	7	4	6	1	4	4	3	4	2	2	4	1	0	0	0	0	0
OTHER	62	35	14	5	3	2	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0
LIVESTOCK	23	3	1	1	5	3	4	3	0	0	0	0	1	0	1	1	0	0	0	0	0
FUEL	43	1	4	5	8	3	2	1	1	1	1	1	4	1	2	5	2	1	0	0	0
CONCRETE	27	0	1	0	0	0	0	0	0	3	13	9	1	0	0	0	0	0	0	0	0
TANK	117	5	8	28	14	7	4	3	1	5	1	1	5	7	11	15	2	0	0	0	0
OPEN	113	7	2	17	28	15	4	3	6	3	2	2	2	8	4	6	2	1	0	0	1
MACHINERY	12	0	0	0	0	1	0	2	1	2	1	0	1	0	0	0	1	1	0	0	2
STEEL	11	0	0	0	0	0	1	0	1	1	0	1	0	1	2	1	1	0	1	0	1
FLAT BED	235	14	11	28	48	16	10	13	8	15	7	15	15	10	17	6	1	1	0	0	0
DUMP	82	10	6	4	7	3	4	4	5	7	7	6	10	7	2	0	0	0	0	0	0
BUS	57	16	8	3	12	9	6	1	0	0	0	1	1	0	0	0	0	0	0	0	0
CAR CARRY	22	1	0	1	6	2	3	4	1	2	0	0	2	0	0	0	0	0	0	0	0
BOX TRUCK	794	70	22	83	90	56	42	60	52	48	47	54	52	57	38	15	3	0	2	1	2
UNCLASSIFY	433	95	30	20	33	32	26	19	18	18	16	28	35	30	15	10	5	1	0	0	2
2 SINGLE	291	225	40	14	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 SINGLE	132	19	16	13	15	13	14	2	3	8	15	12	2	0	0	0	0	0	0	0	0
2S-1	42	3	10	7	7	4	2	4	2	0	0	0	0	0	1	0	0	0	0	0	2
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3S-1	35	0	0	3	9	4	3	3	0	2	2	2	3	2	2	0	0	0	0	0	0
2S-2	160	14	11	33	27	15	19	20	7	5	3	2	3	1	0	0	0	0	0	0	0
" " SPLIT	28	7	6	2	2	1	1	0	3	1	2	2	0	0	0	0	0	0	0	0	1
3S-2	1150	0	14	89	161	91	64	72	72	79	62	69	111	108	76	43	13	3	2	0	1
" " SPLIT	42	0	3	4	6	3	1	1	3	3	3	1	0	1	7	5	0	0	0	0	0
2S-3	7	0	4	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	14	0	2	4	0	1	0	2	1	1	0	2	1	0	0	0	0	0	0	0	0
2S-1-2	137	0	4	24	23	12	2	6	4	7	6	8	8	9	6	11	3	1	0	0	1
3S-3	11	0	0	0	0	3	0	0	2	0	0	1	1	0	0	0	1	0	0	0	3
" " SPLIT	3	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
3S-1-2	12	0	0	1	3	1	1	0	0	0	1	1	0	2	1	0	0	0	0	1	0
BAD OR NC	29	3	2	2	0	1	3	4	1	4	2	3	1	0	1	0	0	1	1	0	0
ALL SINGLE	423	243	56	27	21	17	16	2	3	8	16	12	2	0	0	0	0	0	0	0	0
ALL COMBIN	1641	24	54	168	240	135	94	108	94	98	80	108	128	123	95	60	17	4	2	1	8
LANE #1	1943	262	100	179	241	139	96	104	84	101	93	116	127	117	93	59	17	5	2	0	8
LANE #2	150	8	12	18	20	14	17	10	14	9	5	7	4	6	3	1	0	0	1	1	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	4	1	3	6	12	44	67	111
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	277	374	457	336	260	103	23	15

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	7	70	70	90	162	187	191
NO. PM	181	287	237	190	199	133	87	23	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	122	193	91	42	24	62	195	688	441	162	93

TABLE 9 ALL INTERSTATE ROADS, ALL STATES

GVW IN KIPS-	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	17891	1744	765	1375	2281	1514	1117	984	891	897	1035	1208	1528	1089	731	399	165	72	34	18	44
SPECIAL	456	76	21	35	44	35	32	21	21	15	12	35	35	24	28	9	7	4	1	0	1
OTHER	294	119	60	38	21	15	13	8	6	5	3	1	2	2	0	0	0	0	0	0	1
LIVESTOCK	82	10	5	8	16	11	9	9	0	1	0	2	3	2	3	1	0	0	0	0	0
FUEL	137	2	8	25	27	6	5	0	4	0	2	3	6	15	8	12	7	3	4	0	0
CONCRETE	51	0	2	4	19	5	1	1	3	1	6	3	1	0	1	2	1	1	0	0	0
TANK	773	12	40	144	174	70	37	14	8	7	20	20	59	61	53	35	12	3	0	4	0
OPEN	575	39	21	41	68	38	18	13	24	24	20	28	47	63	60	37	21	7	5	0	1
MACHINERY	240	6	9	5	17	21	20	20	13	29	14	21	19	12	9	5	4	5	1	3	7
STEEL	178	1	0	2	5	6	9	2	12	11	9	16	38	25	24	4	10	3	1	0	1
FLAT BED	1599	106	55	173	289	155	72	77	49	56	71	98	140	91	86	55	9	7	1	2	7
DUMP	420	55	32	31	34	43	19	18	18	14	16	25	37	19	18	19	10	6	2	4	0
BUS	237	57	42	27	42	40	17	2	3	0	1	3	3	0	0	0	0	0	0	0	0
CAR CARRY	219	3	2	6	21	23	44	27	25	22	10	16	14	3	1	1	1	0	0	0	0
BOX TRUCK	6405	457	228	482	780	550	455	428	395	417	457	512	552	372	226	70	11	13	8	2	10
UNCLASSIFY	6225	801	240	354	742	496	366	344	310	295	395	425	572	400	214	149	72	20	11	3	16
2 SINGLE	1903	1432	275	126	41	14	6	5	0	1	0	0	0	0	0	1	0	0	0	0	2
3 SINGLE	712	68	108	103	116	116	78	36	23	28	16	8	9	0	0	1	1	1	0	0	0
2S-1	378	39	83	104	74	45	24	13	6	5	3	1	1	0	0	0	0	0	0	0	0
4 SINGLE	21	0	1	2	0	2	2	1	0	2	0	0	5	2	3	0	0	0	1	0	0
3S-1	297	2	6	31	51	28	26	18	20	18	14	15	35	15	11	5	1	0	0	1	0
2S-2	1644	130	106	253	283	218	240	193	101	47	27	14	17	10	3	1	0	0	1	0	0
" " SPLIT	154	47	49	13	12	9	6	3	1	1	1	3	4	2	2	1	0	0	0	0	1
3S-2	11140	0	98	617	1489	950	636	627	671	724	869	1050	1307	949	600	319	126	52	20	12	24
" " SPLIT	518	0	6	49	104	42	20	26	13	15	29	34	54	45	42	15	12	7	0	0	5
2S-3	49	3	11	9	10	4	5	0	1	0	1	2	2	0	1	0	0	0	0	0	0
" " SPLIT	60	1	3	1	5	5	6	6	7	4	0	6	10	4	1	1	0	0	0	0	0
2S-1-2	517	0	10	32	60	32	30	24	14	23	39	43	55	46	48	43	14	2	0	0	2
3S-3	113	0	1	3	1	16	5	5	7	5	3	12	5	1	11	9	6	7	6	3	7
" " SPLIT	51	0	0	1	3	5	4	4	2	2	5	5	11	2	3	1	1	1	1	0	0
3S-1-2	36	0	2	1	2	0	2	2	1	3	5	3	6	6	1	0	1	0	0	1	0
BAD OR NC	298	22	26	30	28	29	27	21	24	21	23	12	7	7	5	2	3	2	5	1	3
ALL SINGLE	2636	1500	384	231	159	132	86	42	23	29	16	8	14	2	3	2	1	1	1	0	2
ALL COMBIN	14957	222	355	1114	2094	1353	1004	921	844	847	996	1188	1507	1080	723	395	161	69	28	17	39
LANE #1	17137	1694	723	1279	2161	1447	1054	935	853	868	1011	1174	1502	1049	700	380	158	67	30	16	36
LANE #2	754	50	42	96	120	67	63	49	38	29	24	34	26	40	31	19	7	5	4	2	8

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	42	22	44	80	143	255	451	959
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	1891	3101	4008	2941	2336	999	418	213

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	42	77	48	70	73	112	210	268	616	999	1519	1798
NO. PM	1949	1825	1813	1706	1429	938	895	714	451	127	121	121

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	823	1180	489	332	350	659	2039	7649	3419	850	113

TABLE 10 ALL US ROUTES, ALL STATES

GVW IN KIPS-	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	2665	397	153	179	261	247	172	123	104	99	96	122	161	130	137	123	71	39	18	19	14
SPECIAL	43	3	3	1	4	4	2	3	0	1	0	1	4	2	3	3	2	4	1	2	0
OTHER	91	34	23	15	7	4	0	3	1	3	0	1	0	0	0	0	0	0	0	0	0
LIVESTOCK	3	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
FUEL	52	2	0	2	9	5	2	2	3	3	1	2	2	2	3	8	4	1	0	0	1
CONCRETE	13	0	1	3	2	0	1	2	0	0	0	0	0	0	1	1	1	1	0	0	0
TANK	76	6	4	5	6	7	4	1	0	1	0	0	6	5	4	6	7	7	5	2	0
OPEN	111	6	3	6	18	19	6	2	2	2	3	11	15	3	4	5	2	3	1	0	0
MACHINERY	45	0	3	2	1	3	1	4	3	1	3	1	4	6	2	0	2	0	1	4	4
STEEL	61	1	0	0	0	1	1	3	1	4	0	2	2	4	14	12	6	3	4	1	2
FLAT BED	354	27	15	30	52	51	34	16	14	19	11	7	10	10	18	17	10	6	1	5	1
DUMP	98	11	2	7	7	9	8	5	2	1	8	5	7	3	8	2	2	1	1	1	0
BUS	31	12	3	3	8	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CAR CARRY	19	1	0	1	1	0	1	0	6	1	1	0	1	0	1	2	2	0	0	0	1
BOX TRUCK	527	72	20	29	45	49	46	30	27	28	30	33	31	20	21	24	13	7	2	2	0
UNCLASSIFY	1151	222	75	76	103	90	66	51	44	35	39	59	79	75	59	43	20	9	2	2	5
2 SINGLE	417	323	53	21	4	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0
3 SINGLE	175	27	29	25	23	23	14	20	5	7	1	1	0	0	0	0	0	0	0	0	0
2S-1	81	10	10	18	12	10	11	5	2	1	1	0	0	0	1	0	0	0	0	0	0
4 SINGLE	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
3S-1	55	0	2	4	7	12	4	3	1	1	3	5	2	3	1	3	3	1	0	0	0
2S-2	199	23	31	41	28	15	25	8	9	6	2	3	5	2	0	0	1	0	0	0	0
" " SPLIT	22	7	5	7	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
3S-2	1561	0	4	48	172	180	111	80	80	75	80	105	134	111	129	115	61	36	17	17	6
" " SPLIT	18	0	0	3	2	1	0	1	0	1	0	0	3	2	2	2	1	0	0	0	0
2S-3	12	0	3	3	4	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
" " SPLIT	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	43	0	0	2	4	1	1	0	2	1	6	5	10	4	4	1	1	1	0	0	0
3S-3	40	0	0	1	1	1	2	3	3	2	1	0	5	7	0	1	3	0	1	2	7
" " SPLIT	2	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
3S-1-2	5	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1
BAD OR NC	30	6	5	4	3	0	2	0	2	3	2	2	0	0	0	0	0	1	0	0	0
ALL SINGLE	594	350	92	46	27	25	15	23	5	9	1	1	0	0	0	0	0	0	0	0	0
ALL COMBIN	2041	41	56	129	231	222	155	100	97	87	93	119	161	130	137	123	71	38	18	19	14
LANE #1	2664	397	153	179	261	247	171	123	104	99	96	122	161	130	137	123	71	39	18	19	14
LANE #2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	3	4	10	28	42	82	129	284
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	411	517	538	332	211	54	36	7

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	6	19	4	0	15	112	107	203	287
NO. PM	265	353	343	315	211	137	130	77	80	0	0	1

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	218	282	90	53	65	123	206	841	612	153	25

TABLE 11 ALL STATE ROUTES, ALL STATES

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	6957	832	689	839	903	479	319	294	252	243	266	258	293	337	395	278	151	71	35	11	12
SPECIAL	490	17	20	45	25	19	21	24	24	30	29	22	14	21	59	61	30	18	10	0	0
OTHER	187	85	43	15	10	5	12	5	2	4	2	1	0	0	0	1	2	0	0	0	0
LIVESTOCK	26	2	1	2	5	3	1	0	0	1	1	3	2	1	1	1	2	0	0	0	0
FUEL	159	4	6	6	13	18	3	2	0	3	2	0	3	5	19	29	18	14	8	5	1
CONCRETE	105	0	1	4	3	3	3	3	4	11	33	23	8	4	4	0	1	0	0	0	0
TANK	494	14	26	73	51	27	12	8	7	14	15	27	36	52	57	43	23	5	2	1	1
OPEN	443	23	22	74	121	33	11	8	15	9	16	15	16	25	21	16	12	2	0	0	3
MACHINERY	101	9	6	4	7	6	15	9	6	5	2	6	7	2	8	2	1	3	1	0	2
STEEL	48	1	0	1	2	0	4	2	1	3	4	5	5	8	8	3	0	0	0	0	0
FLAT BED	735	67	57	113	124	51	44	34	21	20	27	33	32	36	41	19	6	4	5	1	0
DUMP	474	53	131	35	36	18	12	35	29	13	10	16	23	30	23	7	3	0	0	0	0
BUS	69	30	20	8	5	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
CAR CARRY	47	1	2	0	5	7	5	11	3	5	5	1	1	0	1	0	0	0	0	0	0
BOX TRUCK	1863	224	156	283	286	180	107	84	78	63	57	52	82	93	76	30	4	2	3	0	1
UNCLASSIFY	1716	302	196	176	209	107	67	67	62	62	63	53	64	59	77	66	49	23	6	4	4
2 SINGLE	1017	707	168	75	34	22	5	4	1	1	0	0	0	0	0	0	0	0	0	0	0
3 SINGLE	827	54	252	71	42	41	60	92	78	55	48	29	4	0	0	1	0	0	0	0	0
2S-1	361	21	98	118	58	29	11	8	6	0	5	1	2	1	0	0	0	0	1	0	2
4 SINGLE	9	0	1	1	0	0	0	0	1	0	3	2	1	0	0	0	0	0	0	0	0
3S-1	141	0	6	23	30	8	13	5	5	3	6	4	12	7	13	4	1	1	0	0	0
2S-2	537	38	45	93	82	57	39	26	17	16	35	27	20	14	15	6	4	3	0	0	0
" " SPLIT	73	7	4	9	10	6	6	1	7	6	3	6	3	1	0	1	0	2	0	0	1
3S-2	3101	0	78	332	506	250	137	106	92	114	128	145	208	264	285	223	134	57	28	10	4
" " SPLIT	202	0	6	15	25	12	10	3	8	8	11	12	11	20	40	18	2	0	1	0	0
2S-3	15	1	5	1	2	0	2	1	1	0	1	0	1	0	0	0	0	0	0	0	0
" " SPLIT	66	0	4	11	6	4	4	7	5	3	4	3	7	2	6	0	0	0	0	0	0
2S-1-2	414	0	15	75	88	31	20	17	14	20	11	18	20	23	29	20	7	4	2	0	0
3S-3	59	0	0	0	3	5	2	12	10	2	1	1	2	1	3	3	3	3	3	1	4
" " SPLIT	15	0	0	0	4	3	1	1	1	1	2	0	1	0	0	1	0	0	0	0	0
3S-1-2	20	0	0	1	7	4	1	1	0	1	0	1	0	2	2	0	0	0	0	0	0
BAD OR NC	100	4	7	14	6	7	8	10	6	13	8	9	1	2	2	1	0	1	0	0	1
ALL SINGLE	1853	761	421	147	76	63	65	96	80	56	51	31	5	0	0	1	0	0	0	0	0
ALL COMBIN	5004	67	261	678	821	409	246	188	166	174	207	218	287	335	393	276	151	70	35	11	11
LANE #1	5620	738	579	640	672	364	235	226	202	186	209	207	228	256	336	269	149	67	34	11	12
LANE #2	1337	94	110	199	231	115	84	68	50	57	57	51	65	81	59	9	2	4	1	0	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	168	164	276	327	345	345	417	684
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	903	992	968	770	284	173	103	39

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	7	58	95	312	507	612	775
NO. PM	754	876	779	739	493	433	199	234	76	8	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	486	1028	313	190	349	316	838	1490	1102	620	226

TABLE 12 ARKANSAS ALL SITES

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	4442	424	161	276	440	274	285	272	259	268	336	449	676	223	49	16	11	6	7	7	3
SPECIAL	45	1	0	3	0	0	1	4	0	1	1	6	15	9	3	1	0	0	0	0	0
OTHER	86	36	15	13	6	5	3	2	3	1	1	0	1	0	0	0	0	0	0	0	0
LIVESTOCK	7	0	0	0	2	0	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0
FUEL	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	26	0	1	4	11	0	1	1	3	0	4	0	1	0	0	0	0	0	0	0	0
TANK	113	10	6	15	24	7	6	1	1	2	1	6	22	12	0	0	0	0	0	0	0
OPEN	121	7	2	4	10	2	5	4	6	6	7	21	31	10	3	2	0	0	1	0	0
MACHINERY	92	3	7	3	7	10	3	7	4	11	7	9	6	4	1	0	3	2	1	2	1
STEEL	17	0	0	0	0	2	3	0	2	0	0	4	4	1	0	0	1	0	0	0	0
FLAT BED	312	19	8	40	44	32	23	12	13	13	14	32	43	13	2	1	1	1	0	0	1
DUMP	146	22	4	12	10	5	10	7	10	8	12	12	23	8	2	0	0	0	0	0	0
BUS	28	9	5	1	10	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
CAR CARRY	13	1	0	1	4	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0
BOX TRUCK	1155	94	32	56	147	68	82	88	82	80	98	121	157	27	9	3	0	1	1	1	0
UNCLASSIFY	2280	222	81	124	165	139	147	144	134	135	191	235	369	139	29	9	6	2	4	4	1
2 SINGLE	420	340	61	10	4	1	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0
3 SINGLE	207	27	23	36	39	17	23	13	9	9	8	2	1	0	0	0	0	0	0	0	0
2S-1	99	12	15	18	26	10	13	2	1	0	1	0	0	0	0	0	0	0	0	0	0
4 SINGLE	10	0	1	1	0	0	2	2	0	1	0	0	3	0	0	0	0	0	0	0	0
3S-1	99	0	4	9	15	7	8	3	4	8	7	7	18	7	2	0	0	0	0	0	0
2S-2	390	28	27	58	51	49	54	46	28	13	13	2	12	4	0	0	0	0	1	0	0
" " SPLIT	30	6	11	5	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3S-2	2904	0	5	112	283	169	162	186	202	222	280	407	602	204	43	15	4	3	1	3	2
" " SPLIT	54	0	0	9	2	1	1	8	4	2	8	6	11	0	2	0	0	0	0	0	0
2S-3	23	3	2	6	3	4	2	0	0	0	1	2	0	0	0	0	0	0	0	0	0
" " SPLIT	34	0	1	0	4	2	4	1	5	2	0	5	7	3	0	0	0	0	0	0	0
2S-1-2	46	0	0	1	0	1	3	0	2	6	7	12	10	3	1	0	0	0	0	0	0
3S-3	29	0	0	1	0	2	0	0	0	1	1	5	2	1	1	1	5	3	2	3	1
" " SPLIT	20	0	0	1	2	2	1	2	0	0	1	1	8	0	0	0	0	0	1	0	0
3S-1-2	4	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	1	0	0	0	0
BAD OR NC	73	8	11	7	6	8	10	4	4	2	8	0	0	1	0	0	1	0	2	1	0
ALL SINGLE	637	367	85	47	43	18	26	17	9	11	8	2	4	0	0	0	0	0	0	0	0
ALL COMBIN	3732	49	65	222	391	248	249	251	246	255	320	447	672	222	49	16	10	6	5	6	3
LANE #1	4441	424	161	276	440	274	284	272	259	268	336	449	676	223	49	16	11	6	7	7	3
LANE #2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	21	9	14	17	35	99	165	361
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	643	975	1025	576	382	95	22	14

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	1	76	178	337	455
NO. PM	452	470	485	449	363	301	297	284	146	83	66	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	207	325	124	49	84	168	477	2013	897	94	15

TABLE 13 TEXAS ALL SITES

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	7354	833	511	511	839	565	396	326	280	245	263	297	408	455	445	399	243	105	46	31	36
SPECIAL	70	4	4	6	8	6	4	2	2	3	4	2	6	1	3	5	2	5	1	2	0
OTHER	204	90	43	26	10	4	9	8	4	6	1	1	0	0	0	1	1	0	0	0	0
LIVESTOCK	26	0	1	1	9	4	0	1	1	1	0	0	0	2	3	1	2	0	0	0	0
FUEL	271	6	5	12	40	26	10	4	4	5	4	3	7	10	29	46	26	16	10	5	2
CONCRETE	60	0	1	4	4	1	1	3	1	5	18	15	1	1	1	1	2	1	0	0	0
TANK	387	3	20	49	68	28	13	5	1	9	6	12	29	32	33	30	26	11	7	4	1
OPEN	293	4	5	31	67	24	8	4	4	8	11	12	16	20	23	27	23	4	2	0	0
MACHINERY	161	10	6	3	8	10	14	7	10	10	9	11	12	11	14	3	4	3	2	5	9
STEEL	152	2	0	3	3	2	3	5	7	9	9	10	15	22	25	15	9	5	5	1	3
FLAT BED	779	50	31	68	142	86	59	52	30	28	16	26	29	39	39	42	22	9	4	6	2
DUMP	466	40	122	20	34	27	17	38	27	10	13	18	26	32	31	19	9	1	1	1	0
BUS	63	32	5	4	1	16	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0
CAR CARRY	50	1	0	1	0	5	10	2	7	3	3	2	8	1	2	2	2	0	0	0	1
BOX TRUCK	1126	100	44	74	120	111	92	55	62	43	61	60	95	75	56	39	18	14	4	2	1
UNCLASSIFY	3226	491	224	209	425	235	153	138	120	105	108	125	164	209	187	168	97	36	10	5	17
2 SINGLE	800	635	102	40	11	7	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0
3 SINGLE	723	47	252	61	31	63	60	80	50	32	24	21	1	0	0	1	0	0	0	0	0
2S-1	173	21	26	44	33	21	10	7	3	2	4	0	0	0	1	0	0	0	0	0	1
4 SINGLE	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3S-1	204	0	4	17	39	26	16	11	13	7	10	6	14	10	11	12	5	2	0	1	0
2S-2	621	91	70	99	85	54	49	26	26	20	27	19	13	9	12	4	4	3	0	0	0
" " SPLIT	91	23	19	11	1	1	2	1	0	1	1	1	0	0	0	0	0	0	0	0	0
3S-2	4393	0	20	226	703	358	236	172	160	156	176	220	347	409	398	370	223	94	41	28	19
" " SPLIT	47	0	2	1	1	3	4	3	4	3	1	2	6	7	9	3	1	0	0	0	0
2S-3	22	1	7	3	7	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0
" " SPLIT	4	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	70	0	2	0	8	1	3	1	3	2	9	13	8	6	8	3	1	1	0	0	0
3S-3	122	0	0	1	2	9	6	17	17	4	2	6	8	6	7	5	6	4	5	2	13
" " SPLIT	2	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	15	0	0	0	0	1	1	1	0	0	1	0	4	3	0	1	1	0	0	0	1
BAD OR NC	86	14	6	5	8	1	7	4	2	18	7	9	5	3	4	0	2	1	0	0	2
ALL SINGLE	1524	682	354	102	42	70	61	82	51	33	24	21	1	0	0	1	0	0	0	0	0
ALL COMBIN	5734	137	151	404	889	514	328	240	227	188	232	267	402	452	441	398	241	104	46	31	34

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	63	51	105	133	125	141	205	427
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	683	1094	1626	1318	740	346	224	77

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	3	0	0	5	0	0	18	328	584	681	829
NO. PM	887	926	843	878	558	298	217	147	145	8	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	460	818	215	92	261	301	791	2263	1688	413	56

TABLE 14 CALIFORNIA ALL SITES

GVW IN KIPS	TOTAL	0 TO 15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90	90-95	95-100	100-105	105-150
ALL TRUCKS	4996	527	365	612	764	437	268	215	186	155	181	208	264	309	301	139	36	12	2	1	14
SPECIAL	175	14	19	27	18	7	10	6	9	8	6	19	6	7	12	4	3	0	0	0	0
OTHER	120	45	33	11	10	5	5	2	1	4	0	1	0	1	0	0	1	0	0	0	1
LIVESTOCK	8	1	1	2	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0
FUEL	6	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	45	0	1	3	7	4	3	0	1	2	5	5	7	3	4	0	0	0	0	0	0
TANK	330	11	15	54	47	15	12	8	7	3	9	2	22	42	47	28	8	0	0	0	0
OPEN	393	22	24	63	92	40	8	5	15	4	7	6	13	28	33	24	6	2	0	0	1
MACHINERY	49	0	1	2	5	6	8	10	4	6	0	2	1	2	0	0	0	0	0	0	2
STEEL	29	0	0	0	2	0	1	1	2	3	2	2	6	4	4	2	0	0	0	0	0
FLAT BED	688	45	47	102	115	40	33	28	18	15	33	36	47	40	62	18	1	4	1	1	2
DUMP	68	13	10	14	8	7	0	3	2	3	1	1	3	3	0	0	0	0	0	0	0
BUS	71	18	17	11	16	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CAR CARRY	40	2	1	0	5	4	2	8	4	4	5	2	2	0	1	0	0	0	0	0	0
BOX TRUCK	2063	197	138	231	298	207	121	102	97	86	87	108	122	130	97	33	4	1	1	0	5
UNCLASSIFY	911	159	56	90	136	86	62	41	26	17	26	26	35	45	40	29	13	5	0	0	3
2 SINGLE	689	459	132	57	21	14	4	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3 SINGLE	246	23	49	30	50	27	21	15	9	10	6	3	3	0	0	0	0	0	0	0	0
2S-1	355	16	94	123	54	34	10	11	7	2	2	0	0	1	0	0	0	0	0	0	1
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3S-1	81	0	4	14	12	2	10	4	6	2	2	2	10	5	8	0	0	0	0	0	0
2S-2	289	13	15	47	51	39	31	27	18	5	13	9	9	8	2	1	1	0	0	0	0
" " SPLIT	76	11	10	11	11	5	3	0	7	0	2	6	4	1	1	1	0	1	0	0	2
3S-2	2053	0	24	168	320	229	130	106	104	99	112	149	172	200	164	58	9	4	0	1	4
" " SPLIT	317	0	6	40	85	16	7	6	8	8	12	10	16	29	47	18	4	1	0	0	4
2S-3	6	0	2	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
" " SPLIT	53	0	2	9	6	5	3	5	5	2	1	2	6	1	6	0	0	0	0	0	0
2S-1-2	752	0	23	107	139	58	42	35	19	24	22	22	43	59	71	58	21	6	2	0	1
3S-3	3	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
" " SPLIT	15	0	0	0	4	2	2	1	1	1	2	0	0	0	0	1	1	0	0	0	0
3S-1-2	25	0	1	1	8	4	2	1	0	1	0	1	0	4	2	0	0	0	0	0	0
BAD OR NC	36	5	3	4	1	2	2	3	2	1	7	4	0	1	0	1	0	0	0	0	0
ALL SINGLE	835	482	181	87	71	41	25	15	9	10	6	3	3	0	0	0	0	0	0	0	2
ALL COMBIN	4025	40	181	521	692	394	241	197	175	144	168	201	261	308	301	138	36	12	2	1	12
LANE #1	3723	442	257	415	538	333	195	155	136	107	128	162	207	225	238	129	33	9	2	1	11
LANE #2	1273	85	108	197	226	104	73	60	50	48	53	46	57	84	63	10	3	3	0	0	3

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	30	22	40	68	122	171	306	601
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	918	1113	934	336	245	72	11	7

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	18	34	29	26	54	44	119	107	260	253	374	514
NO. PM	459	618	495	421	289	344	198	224	89	10	0	17

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	301	419	184	237	205	143	320	887	1116	965	219

TABLE 15 ILLINOIS ALL SITES

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	2584	177	67	131	193	194	157	177	153	181	196	203	191	189	162	109	48	28	17	0	1
SPECIAL	371	11	6	25	12	14	15	18	15	22	13	17	10	20	53	58	29	19	10	0	0
OTHER	26	5	4	3	3	4	1	3	1	0	1	1	0	0	0	0	0	0	0	0	0
LIVESTOCK	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TANK	76	3	1	8	10	11	4	3	1	0	2	5	11	8	6	3	1	1	0	0	0
OPEN	71	9	3	3	8	3	0	1	6	2	4	8	6	12	4	0	1	1	0	0	0
MACHINERY	32	0	2	2	1	1	3	3	1	4	1	3	6	1	1	2	0	1	0	0	0
STEEL	19	1	0	0	1	0	1	1	0	2	1	1	5	4	2	0	0	0	0	0	0
FLAT BED	142	3	2	7	20	20	9	7	4	8	8	11	15	13	10	2	0	0	2	0	1
DUMP	34	4	5	3	3	1	0	3	4	2	3	4	1	0	1	0	0	0	0	0	0
BUS	12	2	3	0	1	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
CAR CARRY	30	0	2	1	1	7	0	2	2	1	3	8	2	0	0	0	1	0	0	0	0
BOX TRUCK	793	32	22	23	60	78	65	71	61	72	77	71	62	53	37	8	0	2	1	0	0
UNCLASSIFY	974	107	44	55	72	54	58	64	56	68	82	74	73	58	48	38	16	4	4	0	0
2 SINGLE	258	150	45	39	12	7	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0
3 SINGLE	157	12	13	12	11	16	11	22	26	21	11	2	0	0	0	0	0	0	0	0	0
2S-1	55	3	6	9	6	5	3	3	1	2	2	1	3	0	0	0	0	0	1	0	0
4 SINGLE	3	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
3S-1	32	0	1	3	5	4	2	2	0	1	2	4	5	1	2	0	0	0	0	0	0
2S-2	159	10	3	11	20	27	28	20	15	5	3	8	5	1	1	1	0	0	0	0	0
" " SPLIT	32	2	5	1	2	4	4	2	1	5	1	3	1	0	0	0	0	1	0	0	0
3S-2	1563	0	3	32	108	110	82	95	88	117	145	143	148	153	148	101	47	26	15	0	1
" " SPLIT	99	0	2	4	10	5	6	7	1	3	7	16	11	11	11	3	1	0	1	0	0
2S-3	5	0	1	1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0
" " SPLIT	17	0	2	2	0	0	1	4	1	1	3	1	1	1	0	0	0	0	0	0	0
2S-1-2	74	0	0	1	4	2	3	5	3	11	14	16	12	1	0	2	0	0	0	0	0
3S-3	9	0	0	0	1	0	0	1	2	1	1	0	0	0	0	1	0	0	0	0	0
" " SPLIT	4	0	0	0	0	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0
3S-1-2	7	0	1	0	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0
BAD OR NO	110	0	9	15	11	9	13	14	13	9	9	3	0	1	2	1	0	1	0	0	0
ALL SINGLE	419	162	59	52	23	23	13	24	26	23	11	3	0	0	0	0	0	0	0	0	0
ALL COMBIN	2055	15	28	64	159	162	131	139	114	150	176	184	181	188	160	108	48	27	17	0	1
LANE #1	2375	161	54	116	175	172	136	159	142	159	183	183	180	186	158	109	48	27	16	0	1
LANE #2	209	16	13	15	18	22	21	18	11	22	13	20	11	3	4	0	0	1	1	0	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	83	98	144	161	174	157	101	114
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	128	237	318	369	328	104	45	15

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	5	40	19	50	33	45	54	88	122	102	252	228
NO. PM	207	139	211	169	173	122	112	127	103	26	55	59

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	137	185	82	31	84	159	330	1065	394	85	25

TABLE 16 GEORGIA ALL SITES

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	3688	615	188	430	552	310	188	172	180	208	248	212	158	118	60	18	9	4	1	0	5
SPECIAL	77	45	3	3	3	0	1	1	2	4	6	2	0	0	0	0	1	0	0	0	0
OTHER	74	47	15	6	1	1	2	0	0	1	0	0	0	1	0	0	0	0	0	0	0
LIVESTOCK	12	2	0	0	1	1	0	1	0	0	1	3	2	0	1	0	0	0	0	0	0
FUEL	3	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0
CONCRETE	25	0	1	0	2	1	0	2	2	4	10	3	0	0	0	0	0	0	0	0	0
TANK	112	2	5	26	10	11	8	3	0	8	7	17	4	4	4	2	1	0	0	0	0
OPEN	70	8	8	10	3	3	4	5	5	7	4	2	4	3	2	0	1	1	0	0	2
MACHINERY	22	1	1	1	3	2	6	1	2	1	1	0	0	0	0	1	0	1	0	0	1
STEEL	9	0	0	0	0	2	1	0	1	2	0	1	1	0	1	0	0	0	0	0	0
FLAT BED	263	28	18	40	64	20	5	7	7	18	21	14	13	3	2	0	0	0	0	0	1
DUMP	74	20	13	11	7	10	4	1	3	1	0	2	1	1	0	0	0	0	0	0	0
BUS	13	2	0	3	1	2	3	0	0	0	0	1	1	0	0	0	0	0	0	0	0
CAR CARRY	51	0	1	3	10	3	6	14	7	5	0	0	1	1	0	0	0	0	0	0	0
BOX TRUCK	1476	169	59	230	232	108	68	75	81	101	112	66	75	34	11	3	0	0	0	0	0
UNCLASSIFY	1407	281	78	89	215	145	61	62	66	59	63	68	58	68	36	13	5	2	1	0	1
2 SINGLE	585	518	54	22	5	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
3 SINGLE	202	35	28	30	20	25	18	12	7	8	11	4	2	0	0	0	0	0	0	0	0
2S-1	83	11	10	27	8	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4 SINGLE	13	0	0	0	0	2	0	0	1	1	3	1	3	0	1	0	0	0	1	0	0
3S-1	31	0	0	4	8	5	4	3	2	3	1	1	0	0	0	0	0	0	0	0	0
2S-2	395	33	28	87	88	48	43	25	10	5	5	1	0	1	0	0	0	0	0	0	0
" " SPLIT	23	15	5	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3S-2	2221	0	58	233	384	205	115	124	148	183	218	185	150	113	57	16	9	1	0	0	2
" " SPLIT	23	0	0	4	2	3	1	0	4	3	2	3	2	1	1	0	0	0	0	0	0
2S-3	8	0	3	1	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3S-3	15	0	0	1	1	5	1	0	0	0	1	1	0	0	1	0	0	1	0	0	3
" " SPLIT	20	0	0	0	1	3	1	2	1	1	3	4	1	2	0	0	0	1	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAD OR NO	70	5	[illegible]	11	12	[illegible]	3	3	[illegible]	4	4	[illegible]	[illegible]	1	0	0	[illegible]	1	0	0	0
ALL SINGLE	[illegible]	55[illegible]	[illegible]	52	[illegible]	[illegible]	[illegible]	12	[illegible]	[illegible]	14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0
ALL COMBIN	2804	59	108	367	517	273	167	157	164	185	230	205	153	117	58	18	9	3	0	0	5

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	3	5	7	20	12	23	43	120
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	364	471	804	788	538	288	117	75

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	17	192	289	359
NO. PM	387	403	401	424	379	309	280	197	74	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	268	360	124	72	89	148	540	1702	387	9	3

TABLE 17 NEW YORK ALL SITES

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	2960	308	244	377	402	278	181	142	113	104	101	122	186	177	122	68	18	12	8	9	9
SPECIAL	111	11	7	14	18	18	8	9	4	3	4	3	3	1	5	1	1	0	0	0	0
OTHER	50	9	14	8	7	5	4	1	0	0	1	0	1	0	0	0	0	0	0	0	0
LIVESTOCK	52	9	5	7	8	8	7	8	0	1	0	0	0	0	0	0	0	0	0	0	0
FUEL	63	2	7	19	6	1	0	0	2	0	1	2	4	8	1	3	3	2	2	0	0
CONCRETE	11	0	0	0	0	0	0	0	0	1	2	3	0	0	1	2	1	1	0	0	0
TANK	238	2	20	62	54	23	4	3	3	0	6	3	9	14	16	11	3	3	0	3	0
OPEN	112	16	5	9	19	12	3	4	2	5	2	4	4	11	8	2	2	2	1	0	1
MACHINERY	14	0	1	0	0	0	2	1	1	2	0	2	3	0	1	1	0	0	0	0	0
STEEL	21	0	0	0	0	1	1	0	2	1	0	6	8	1	4	0	0	0	0	0	0
FLAT BED	321	37	20	41	50	29	7	12	9	7	6	7	25	22	23	20	1	2	0	1	0
DUMP	69	17	10	12	9	11	4	4	2	0	2	7	7	3	5	3	0	0	0	3	0
BUS	142	34	35	19	20	20	10	0	2	0	0	1	1	0	0	0	0	0	0	0	0
CAR CARRY	65	1	0	1	7	7	16	8	8	0	0	3	2	1	0	0	0	0	0	0	0
BOX TRUCK	1443	128	84	154	175	126	103	88	71	85	69	78	97	108	51	22	4	2	5	1	5
UNCLASSIFY	218	43	26	31	28	17	12	7	7	8	5	5	10	7	7	1	3	0	0	0	3
2 SINGLE	475	279	103	52	25	8	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0
3 SINGLE	138	4	13	22	23	27	15	4	5	5	5	6	6	0	0	1	1	1	0	0	0
2S-1	53	7	14	11	11	4	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3S-1	24	1	1	11	2	1	2	2	0	0	0	2	1	0	1	0	0	0	0	0	0
2S-2	388	14	34	57	55	49	59	50	20	16	2	4	2	0	3	1	0	0	0	0	0
" " SPLIT	20	3	5	1	1	1	3	1	0	0	0	0	2	1	1	1	0	0	0	0	0
3S-2	1685	0	38	207	263	163	88	70	78	73	88	100	123	158	104	55	16	8	5	7	3
" " SPLIT	80	0	2	7	18	12	0	3	0	1	2	4	11	10	6	2	1	3	0	0	0
2S-3	11	0	4	1	2	0	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0
" " SPLIT	18	1	1	1	1	1	2	2	1	1	0	1	3	1	1	1	0	0	0	0	0
2S-1-2	23	0	0	0	1	2	0	0	3	1	3	2	7	4	1	1	0	0	0	0	1
3S-3	11	0	1	0	0	4	1	1	1	0	0	0	0	0	2	1	0	0	0	0	0
" " SPLIT	4	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0
3S-1-2	10	0	0	1	1	0	0	1	1	0	2	1	0	1	1	0	0	0	0	1	0
BAD OR NC	38	0	0	6	1	7	2	3	3	3	0	2	3	2	1	1	0	1	3	0	2
ALL SINGLE	613	283	116	74	48	35	19	8	5	5	5	6	6	0	0	1	1	1	0	0	0
ALL COMBIN	2309	25	128	297	353	237	160	131	105	96	96	114	157	175	121	64	17	11	5	9	7
LANE #1	2402	268	213	294	299	226	136	109	87	88	90	104	146	147	105	51	13	8	5	8	6
LANE #2	558	40	31	83	103	53	45	33	26	16	11	18	20	30	17	15	5	4	3	2	3

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	3	5	19	36	50	72	120	138
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	231	388	502	468	472	285	120	50

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	19	0	0	0	0	34	95	166	237	304	352	248
NO. PM	351	268	259	166	141	69	66	76	50	8	0	8

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	122	282	131	85	41	118	417	1250	439	34	41

TABLE 18 OHIO BOTH SITES

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 95	95 100	100 105	105 150
ALL TRUCKS	1489	88	31	56	155	161	133	97	76	77	72	97	119	105	124	52	22	15	6	1	2
SPECIAL	140	10	2	0	15	15	16	8	12	5	4	9	10	9	14	4	3	2	1	0	1
OTHER	12	6	2	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
LIVESTOCK	5	0	0	0	1	0	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0
FUEL	4	0	0	0	1	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
CONCRETE	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TANK	85	1	3	6	18	6	6	0	2	2	4	2	5	6	8	10	3	0	0	0	0
OPEN	69	2	1	1	8	6	7	0	3	3	4	2	4	7	12	3	2	2	2	0	0
MACHINERY	16	1	0	0	1	1	0	4	0	1	1	2	0	2	2	0	0	1	0	0	0
STEEL	40	0	0	0	1	0	4	0	0	2	0	2	8	6	10	2	6	1	0	0	0
FLAT BED	183	18	3	15	30	30	13	8	4	6	8	12	10	7	8	8	0	1	0	0	1
DUMP	75	3	1	1	3	8	4	2	1	4	3	2	6	5	8	0	6	8	2	1	0
BUS	8	2	0	0	4	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
CAR CARRY	36	0	0	0	0	4	15	2	4	5	3	1	1	0	0	1	0	0	0	0	0
BOX TRUCK	739	33	17	25	58	75	59	65	45	47	42	81	87	57	62	18	2	2	1	0	0
UNCLASSIFY	76	12	2	7	11	7	8	6	4	2	2	4	8	3	0	2	0	0	0	0	0
2 SINGLE	96	83	8	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
3 SINGLE	41	1	10	8	9	5	4	2	0	2	0	0	0	0	0	0	0	0	0	0	0
2S-1	22	0	4	7	2	3	3	1	1	0	0	1	0	0	0	0	0	0	0	0	0
4 SINGLE	5	0	0	0	0	0	0	0	0	1	0	0	0	2	2	0	0	0	0	0	0
3S-1	22	1	0	0	7	3	1	1	1	1	1	2	1	2	1	0	0	0	0	0	0
2S-2	159	2	4	17	23	24	39	28	10	5	1	1	1	3	0	0	0	0	0	0	0
" " SPLIT	7	1	2	0	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
3S-2	883	0	1	19	96	107	73	60	64	60	60	86	101	88	104	39	13	9	3	0	0
" " SPLIT	115	0	0	2	15	15	11	3	0	4	8	5	11	9	11	9	8	3	0	0	1
2S-3	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	6	0	0	0	0	0	0	0	0	0	1	1	4	0	0	0	0	0	0	0	0
3S-3	23	0	0	1	0	3	1	0	0	1	0	1	1	0	3	4	1	2	3	1	1
" " SPLIT	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	4	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1	0	0	0
ALL SINGLE	142	84	19	10	10	5	4	3	0	3	0	0	0	2	2	0	0	0	0	0	0
ALL COMBIN	1343	4	12	46	145	156	129	94	76	72	71	97	119	103	122	52	22	14	6	1	2
LANE #1	1438	85	31	56	151	158	125	91	75	77	68	96	116	101	116	49	21	14	5	1	0
LANE #2	51	3	0	0	4	3	8	6	1	0	4	1	3	4	8	3	1	1	1	0	2

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	1	0	12	19	54	146
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	238	331	305	189	128	29	18	21

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	0	39	199
NO. PM	225	211	241	223	232	66	54	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	34	71	32	6	20	64	208	800	233	14	5

TABLE 19 ARK. I-30 @ US 67 BENTON

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	636	28	63	96	91	70	82	155	33	10	8
SPECIAL	9	0	0	2	0	0	1	4	2	0	0
OTHER	6	0	4	0	1	0	0	1	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	18	0	3	4	4	0	0	6	1	0	0
OPEN	18	0	2	1	1	1	0	6	6	1	0
MACHINERY	22	0	3	0	7	2	6	2	1	0	1
STEEL	3	0	0	0	1	0	0	1	0	1	0
FLAT BED	56	1	5	14	8	3	8	13	2	1	1
DUMP	4	0	0	0	0	1	0	2	1	0	0
BUS	9	0	6	3	0	0	0	0	0	0	0
CAR CARRY	0	0	0	0	0	0	0	0	0	0	0
BOX TRUCK	165	7	11	20	29	27	27	34	6	1	3
UNCLASSIFY	326	20	29	52	40	36	40	86	14	6	3
2 SINGLE	63	28	33	2	0	0	0	0	0	0	0
3 SINGLE	19	0	5	4	5	2	2	1	0	0	0
2S-1	17	0	8	5	3	1	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	6	0	0	2	2	0	0	2	0	0	0
2S-2	63	0	8	18	23	10	0	2	1	0	1
" " SPLIT	4	0	2	1	1	0	0	0	0	0	0
3S-2	412	0	2	56	49	54	75	136	27	7	6
" " SPLIT	20	0	0	4	1	2	3	8	2	0	0
2S-3	4	0	1	1	2	0	0	0	0	0	0
" " SPLIT	5	0	0	0	2	0	0	3	0	0	0
2S-1-2	6	0	0	1	1	1	0	1	2	0	0
3S-3	4	0	0	0	0	0	1	1	0	1	1
" " SPLIT	2	0	0	0	0	0	1	1	0	0	0
3S-1-2	1	0	0	0	0	0	0	0	0	1	0
BAD OR NC	10	0	4	2	2	0	0	0	1	1	0
ALL SINGLE	82	28	36	6	5	2	2	1	0	0	0
ALL COMBIN	544	0	21	88	84	68	80	154	32	9	8

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	6	2	1	2	4	11	23	68
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	95	157	147	65	33	7	0	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	55	70	69
NO. PM	84	108	91	55	0	0	36	68	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	30	37	21	7	13	29	65	315	110	11	3

TABLE 20 ARK. I-40 @ US 161 PROTHO JUNCTION

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1053	24	70	174	144	135	157	295	44	3	7
SPECIAL	2	0	0	1	0	0	0	1	0	0	0
OTHER	21	1	7	3	4	4	2	0	0	0	0
LIVESTOCK	2	0	0	0	0	0	0	2	0	0	0
FUEL	1	0	0	0	1	0	0	0	0	0	0
CONCRETE	15	0	0	10	1	1	3	0	0	0	0
TANK	33	2	2	17	5	0	0	7	0	0	0
OPEN	31	1	1	3	1	4	6	12	1	1	1
MACHINERY	40	0	4	7	2	1	8	10	2	2	4
STEEL	8	0	0	0	1	1	0	5	1	0	0
FLAT BED	85	2	1	17	15	8	5	29	8	0	0
DUMP	18	2	4	4	3	2	1	2	0	0	0
BUS	6	0	1	4	0	0	0	1	0	0	0
CAR CARRY	3	0	0	1	0	0	1	1	0	0	0
BOX TRUCK	495	6	32	74	72	78	84	141	10	0	0
UNCLASSIFY	293	10	18	33	39	38	47	84	22	0	2
2 SINGLE	62	23	35	4	0	0	0	0	0	0	0
3 SINGLE	49	0	11	27	4	2	5	0	0	0	0
2S-1	17	0	6	10	1	0	0	0	0	0	0
4 SINGLE	2	0	0	1	1	0	0	0	0	0	0
3S-1	5	0	1	1	2	1	0	0	0	0	0
2S-2	104	0	10	33	25	23	7	4	2	0	0
" " SPLIT	5	0	2	3	0	0	0	0	0	0	0
3S-2	707	0	1	83	87	95	135	267	37	1	1
" " SPLIT	17	0	0	0	1	8	4	4	0	0	0
2S-3	9	0	1	1	4	0	1	2	0	0	0
" " SPLIT	25	0	0	4	3	5	2	8	3	0	0
2S-1-2	6	0	0	0	2	0	2	2	0	0	0
3S-3	11	0	0	0	1	0	1	1	2	2	4
" " SPLIT	15	0	0	3	3	1	0	7	0	0	1
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	19	1	3	4	10	0	0	0	0	0	1
ALL SINGLE	113	23	46	32	5	2	5	0	0	0	0
ALL COMBIN	921	0	21	138	129	133	152	295	44	3	6

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	10	2	6	3	2	9	26	67
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	184	268	254	153	55	14	2	1

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	4	15	51	87
NO. PM	126	93	109	96	125	107	98	90	52	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	33	62	29	13	18	23	103	555	204	14	2

TABLE 21 ARK. US 67 JACKSONVILLE

	TOTAL	GVW IN KIPS-0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	467	52	84	117	38	33	49	84	9	1	0
SPECIAL	7	0	0	0	0	0	0	4	3	0	0
OTHER	20	2	12	5	0	1	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	6	0	1	5	0	0	0	0	0	0	0
TANK	22	2	4	9	1	0	1	4	1	0	0
OPEN	39	0	3	6	0	2	5	21	2	0	0
MACHINERY	9	0	2	3	2	0	0	1	0	1	0
STEEL	0	0	0	0	0	0	0	0	0	0	0
FLAT BED	67	4	6	31	12	4	5	5	0	0	0
DUMP	20	3	2	8	1	1	1	4	0	0	0
BUS	2	1	1	0	0	0	0	0	0	0	0
CAR CARRY	3	0	1	1	0	1	0	0	0	0	0
BOX TRUCK	180	23	31	37	13	20	28	27	1	0	0
UNCLASSIFY	92	17	21	12	9	4	9	18	2	0	0
2 SINGLE	108	50	54	4	0	0	0	0	0	0	0
3 SINGLE	32	1	15	11	2	2	1	0	0	0	0
2S-1	18	0	3	8	7	0	0	0	0	0	0
4 SINGLE	1	0	0	0	0	0	1	0	0	0	0
3S-1	10	0	0	4	1	1	0	4	0	0	0
2S-2	46	0	10	20	6	5	1	3	1	0	0
" " SPLIT	2	0	0	2	0	0	0	0	0	0	0
3S-2	227	0	0	61	22	25	43	68	8	0	0
" " SPLIT	4	0	0	3	0	0	0	1	0	0	0
2S-3	3	0	1	2	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	9	0	0	0	0	0	3	6	0	0	0
3S-3	3	0	0	1	0	0	0	1	0	1	0
" " SPLIT	1	0	0	0	0	0	0	1	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	3	1	1	1	0	0	0	0	0	0	0
ALL SINGLE	141	51	69	15	2	2	2	0	0	0	0
ALL COMBIN	323	0	14	101	36	31	47	84	9	1	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	1	1	1	4	5	22	37	85
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	97	124	55	27	7	1	0	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	1	22	25	41	56
NO. PM	49	76	69	77	37	10	1	3	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	58	72	16	3	12	38	56	156	46	9	1

TABLE 22 ARK. I-40 @ SR 25 W.BOUND CONWAY

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1002	49	80	177	124	106	122	288	48	4	4
SPECIAL	17	0	0	0	0	1	0	10	6	0	0
OTHER	25	7	8	9	1	0	0	0	0	0	0
LIVESTOCK	1	0	0	0	0	0	0	1	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	5	0	0	0	0	3	1	1	0	0	0
TANK	29	1	1	5	1	2	2	9	8	0	0
OPEN	20	0	0	3	3	1	2	10	1	0	0
MACHINERY	15	0	1	0	1	5	3	2	2	0	1
STEEL	3	0	0	0	2	0	0	1	0	0	0
FLAT BED	68	3	2	15	16	3	5	21	2	0	1
DUMP	32	4	6	6	5	2	1	7	1	0	0
BUS	6	0	4	2	0	0	0	0	0	0	0
CAR CARRY	4	0	0	2	1	0	1	0	0	0	0
BOX TRUCK	224	9	5	60	29	31	32	55	3	0	0
UNCLASSIFY	553	25	53	75	65	56	75	171	25	4	2
2 SINGLE	90	47	43	0	0	0	0	0	0	0	0
3 SINGLE	53	1	11	14	14	8	4	1	0	0	0
2S-1	21	0	4	11	5	0	1	0	0	0	0
4 SINGLE	6	0	1	0	1	1	0	3	0	0	0
3S-1	22	0	0	6	2	1	4	8	1	0	0
2S-2	72	0	9	23	21	12	4	3	0	0	0
" " SPLIT	8	0	6	2	0	0	0	0	0	0	0
3S-2	696	0	0	115	77	84	102	265	47	4	2
" " SPLIT	5	0	0	2	0	0	1	2	0	0	0
2S-3	5	0	2	3	0	0	0	0	0	0	0
" " SPLIT	2	0	1	0	0	0	0	1	0	0	0
2S-1-2	6	0	0	0	1	0	1	4	0	0	0
3S-3	3	0	0	0	1	0	0	0	0	0	2
" " SPLIT	1	0	0	0	0	0	0	1	0	0	0
3S-1-2	2	0	0	0	0	0	2	0	0	0	0
BAD OR NC	10	1	3	1	2	0	3	0	0	0	0
ALL SINGLE	149	48	55	14	15	9	4	4	0	0	0
ALL COMBIN	843	0	22	182	107	97	115	284	48	4	4

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	2	1	3	6	18	35	51	75
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	145	178	217	131	86	38	10	5

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	0	69	106
NO. PM	64	70	141	115	106	82	86	76	58	29	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	41	80	27	8	13	27	113	442	224	23	5

TABLE 23 ARK. US-65 @ RT 256 PINE BLUFF

GVW IN KIPS	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	226	18	32	38	25	24	21	49	16	2	1
SPECIAL	8	0	1	0	1	3	1	1	1	0	0
OTHER	4	1	2	0	1	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	4	0	1	0	0	0	0	1	2	0	0
OPEN	8	0	2	0	2	1	0	3	0	0	0
MACHINERY	4	0	0	0	1	3	0	0	0	0	0
STEEL	0	0	0	0	0	0	0	0	0	0	0
FLAT BED	11	0	3	5	1	0	1	1	0	0	0
DUMP	18	1	3	1	4	2	3	4	0	0	0
BUS	1	0	0	0	1	0	0	0	0	0	0
CAR CARRY	1	0	0	0	0	0	1	0	0	0	0
BOX TRUCK	17	1	1	6	3	2	0	3	0	1	0
UNCLASSIFY	150	15	19	26	11	13	15	36	13	1	1
2 SINGLE	38	17	15	1	2	2	1	0	0	0	0
3 SINGLE	16	0	6	5	2	3	0	0	0	0	0
2S-1	10	0	3	3	4	0	0	0	0	0	0
4 SINGLE	1	0	0	0	0	1	0	0	0	0	0
3S-1	8	0	2	2	1	0	0	1	2	0	0
2S-2	15	1	4	1	6	2	1	0	0	0	0
" " SPLIT	1	0	1	0	0	0	0	0	0	0	0
3S-2	129	0	0	25	9	15	16	48	14	2	0
" " SPLIT	1	0	0	1	0	0	0	0	0	0	0
2S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0
3S-3	1	0	0	0	0	0	0	0	0	0	1
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	6	0	1	0	1	1	3	0	0	0	0
ALL SINGLE	55	17	21	6	4	6	1	0	0	0	0
ALL COMBIN	165	1	10	32	20	17	17	49	16	2	1
LANE #1	225	18	32	38	24	24	21	49	16	2	1
LANE #2	1	0	0	0	1	0	0	0	0	0	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	1	2	2	0	5	6	14
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	25	53	51	35	21	8	2	2

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	0	13	23
NO. PM	16	30	36	37	24	28	15	4	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	19	27	12	9	9	12	24	92	32	1	0

TABLE 24 ARK. I-30 @ RT 29 HOPE

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1058	31	54	114	137	163	173	254	122	7	3
SPECIAL	2	0	0	0	0	0	0	1	0	1	0
OTHER	10	3	4	2	1	0	0	0	0	0	0
LIVESTOCK	4	0	0	2	0	1	0	1	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	7	0	0	4	2	0	0	1	0	0	0
OPEN	5	0	0	1	0	1	0	0	3	0	0
MACHINERY	2	0	0	0	0	0	1	1	0	0	0
STEEL	3	0	0	0	1	1	0	1	0	0	0
FLAT BED	25	0	0	2	3	7	3	6	3	1	0
DUMP	54	1	0	3	3	9	14	16	8	0	0
BUS	4	1	0	2	1	0	0	0	0	0	0
CAR CARRY	2	0	0	1	0	1	0	0	0	0	0
BOX TRUCK	74	0	0	6	4	14	15	18	16	1	0
UNCLASSIFY	866	26	50	91	122	129	140	209	92	4	3
2 SINGLE	59	31	25	3	0	0	0	0	0	0	0
3 SINGLE	38	0	0	14	13	5	5	1	0	0	0
2S-1	16	0	3	8	3	2	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	48	0	1	9	7	4	11	10	6	0	0
2S-2	90	0	13	15	22	25	13	2	0	0	0
" " SPLIT	10	0	6	2	2	0	0	0	0	0	0
3S-2	733	0	2	55	86	115	131	225	114	5	0
" " SPLIT	7	0	0	1	0	2	2	2	0	0	0
2S-3	2	0	0	2	0	0	0	0	0	0	0
" " SPLIT	2	0	0	0	1	1	0	0	0	0	0
2S-1-2	19	0	0	0	0	1	7	9	2	0	0
3S-3	7	0	0	0	0	0	0	4	0	2	1
" " SPLIT	1	0	0	0	0	1	0	0	0	0	0
3S-1-2	1	0	0	0	0	0	0	1	0	0	0
BAD OR NC	25	0	4	5	3	7	4	0	0	0	2
ALL SINGLE	97	31	25	17	13	5	5	1	0	0	0
ALL COMBIN	936	0	25	92	121	151	164	253	122	7	1

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	2	2	1	0	5	17	22	52
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	97	195	301	145	178	27	8	6

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	50	83	93	114
NO. PM	113	93	39	68	71	74	61	43	36	54	66	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	26	47	19	9	19	38	116	463	281	39	4

TABLE 25 TEXAS US-59 @ FM 444 INEX

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	946	61	125	192	144	85	62	75	122	71	9
SPECIAL	5	0	2	2	1	0	0	0	0	0	0
OTHER	34	8	14	6	1	1	3	1	0	0	0
LIVESTOCK	3	0	1	0	0	1	0	0	1	0	0
FUEL	51	0	2	11	7	5	4	4	5	12	1
CONCRETE	3	0	0	0	0	0	0	0	1	2	0
TANK	3	0	0	0	1	0	0	0	1	1	0
OPEN	9	0	2	5	0	0	0	1	1	0	0
MACHINERY	14	0	0	0	1	1	3	1	4	1	3
STEEL	28	0	1	0	2	3	4	2	9	6	2
FLAT BED	116	6	12	37	13	11	11	4	12	9	1
DUMP	19	1	2	3	8	1	0	3	1	0	0
BUS	11	0	3	1	4	0	0	0	0	0	0
CAR CARRY	7	0	0	1	0	3	1	1	0	1	0
BOX TRUCK	70	0	6	10	25	7	6	7	6	3	0
UNCLASSIFY	573	43	60	116	81	52	30	51	92	36	2
2 SINGLE	136	61	62	12	1	0	0	0	0	0	0
3 SINGLE	70	0	22	15	16	12	5	0	0	0	0
2S-1	28	0	9	11	3	2	2	0	1	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	22	0	0	4	5	3	3	2	2	3	0
2S-2	84	0	22	38	13	5	5	2	0	1	0
" " SPLIT	3	0	3	0	0	0	0	0	0	0	0
3S-2	548	0	0	106	101	56	41	63	111	65	5
" " SPLIT	6	0	0	0	1	1	1	2	1	0	0
2S-3	5	0	1	2	1	0	0	0	1	0	0
" " SPLIT	1	0	0	1	0	0	0	0	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0
3S-3	28	0	0	1	3	5	3	4	6	2	4
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	15	0	6	4	0	1	2	2	0	0	0
ALL SINGLE	206	61	84	27	17	12	5	0	0	0	0
ALL COMBIN	725	0	35	161	127	72	55	73	122	71	9

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	2	2	5	8	21	31	94
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	192	157	218	125	58	20	13	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	5	23	27	59	97
NO. PM	80	135	119	132	75	62	58	41	33	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	75	88	38	17	27	48	82	284	237	41	9

TABLE 26 TEXAS HWY-36 N.BOUND CALDWELL

GVW IN KIPS	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1511	70	296	326	142	133	82	80	128	182	72
SPECIAL	6	0	0	1	1	1	2	1	0	0	0
OTHER	35	6	13	4	6	3	1	0	0	2	0
LIVESTOCK	5	0	0	1	1	0	0	0	1	2	0
FUEL	148	0	3	16	20	2	5	3	24	47	28
CONCRETE	6	0	0	0	0	2	1	2	0	1	0
TANK	57	0	1	6	6	1	3	2	5	27	6
OPEN	145	0	2	72	5	3	12	17	19	15	0
MACHINERY	26	0	1	2	2	3	2	5	5	2	4
STEEL	13	0	0	2	1	0	0	1	8	1	0
FLAT BED	130	1	13	33	22	15	9	9	13	11	4
DUMP	226	3	114	26	15	49	11	3	3	2	0
BUS	4	2	1	0	0	1	0	0	0	0	0
CAR CARRY	7	0	0	0	1	2	3	1	0	0	0
BOX TRUCK	61	4	6	29	12	1	1	1	0	4	3
UNCLASSIFY	642	54	142	134	50	50	32	35	50	68	27
2 SINGLE	146	70	58	9	6	2	1	0	0	0	0
3 SINGLE	352	0	194	24	30	86	14	4	0	0	0
2S-1	28	0	7	14	5	0	2	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	34	0	1	13	3	3	3	2	3	5	1
2S-2	180	0	33	55	15	5	27	19	16	7	3
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-2	701	0	0	209	75	18	22	49	104	165	59
" " SPLIT	4	0	0	0	0	2	0	2	0	0	0
2S-3	4	0	2	0	1	1	0	0	0	0	0
" " SPLIT	1	0	0	0	0	0	1	0	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0
3S-3	37	0	0	1	3	13	2	2	3	5	8
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	24	0	1	1	4	3	10	2	2	0	1
ALL SINGLE	498	70	252	33	36	88	15	4	0	0	0
ALL COMBIN	989	0	43	292	102	42	57	74	126	182	71

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	9	0	4	9	17	15	45	119
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	107	206	386	343	104	70	55	22

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	7	64	132	129	152
NO. PM	161	167	168	180	143	104	38	40	18	8	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	121	337	38	15	91	74	242	305	221	55	12

TABLE 27 TEXAS I-45 @ PARK. RD. 40 HUNTSVILLE

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1448	85	138	308	227	129	86	123	162	158	32
SPECIAL	4	0	1	2	1	0	0	0	0	0	0
OTHER	26	2	9	9	1	3	2	0	0	0	0
LIVESTOCK	10	0	0	6	1	1	0	0	1	1	0
FUEL	61	0	0	22	8	1	1	3	10	13	3
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	18	0	0	7	1	1	0	0	3	5	1
OPEN	47	0	0	7	3	0	3	4	9	20	1
MACHINERY	7	0	0	0	0	2	4	1	0	0	0
STEEL	8	0	0	0	1	3	0	1	1	1	1
FLAT BED	170	3	8	53	25	20	6	14	17	19	5
DUMP	16	4	3	1	4	1	0	2	1	0	0
BUS	14	5	3	0	6	0	0	0	0	0	0
CAR CARRY	14	0	0	0	5	0	1	6	2	0	0
BOX TRUCK	252	9	21	36	54	30	28	28	26	15	5
UNCLASSIFY	801	62	93	165	117	87	41	64	92	84	16
2 SINGLE	157	83	64	10	0	0	0	0	0	0	0
3 SINGLE	70	0	19	15	25	6	5	0	0	0	0
2S-1	38	0	7	15	11	4	1	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	71	0	0	18	13	10	6	10	7	6	1
2S-2	118	0	32	31	29	21	4	1	1	0	0
" " SPLIT	12	0	8	2	0	1	1	0	0	0	0
3S-2	916	0	1	213	145	79	59	97	142	152	28
" " SPLIT	12	0	0	0	3	2	2	1	4	0	0
2S-3	2	0	2	0	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	21	0	0	1	1	0	5	9	5	0	0
3S-3	9	0	0	0	0	5	0	1	0	0	3
" " SPLIT	1	0	0	0	0	1	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	21	2	5	3	1	0	3	4	3	0	0
ALL SINGLE	227	83	83	25	25	6	5	0	0	0	0
ALL COMBIN	1200	0	50	280	201	123	78	119	159	158	32

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	3	0	1	0	3	3	9	23
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	82	168	321	377	226	122	73	37

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	90	154	163	142
NO. PM	168	164	166	160	112	48	57	24	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	79	57	44	19	43	45	135	550	345	85	7

TABLE 28 TEXAS I-10 @ US 77 W.BOUND SCHULENBERG

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1121	42	103	295	145	96	78	161	149	38	14
SPECIAL	2	0	0	1	0	0	0	0	1	0	0
OTHER	24	4	17	2	0	1	0	0	0	0	0
LIVESTOCK	1	0	0	1	0	0	0	0	0	0	0
FUEL	1	0	0	1	0	0	0	0	0	0	0
CONCRETE	1	0	0	1	0	0	0	0	0	0	0
TANK	86	0	7	50	4	1	0	7	14	3	0
OPEN	28	0	1	3	3	2	3	6	7	2	1
MACHINERY	34	1	0	3	9	1	4	7	4	1	4
STEEL	61	0	0	4	0	5	10	16	19	4	3
FLAT BED	83	0	2	28	15	8	4	14	8	4	0
DUMP	9	1	1	0	2	0	0	1	2	2	0
BUS	6	1	1	0	4	0	0	0	0	0	0
CAR CARRY	8	0	0	0	3	3	1	1	0	0	0
BOX TRUCK	211	8	13	51	39	27	17	31	24	1	0
UNCLASSIFY	566	27	61	150	66	48	39	78	70	21	6
2 SINGLE	76	42	29	5	0	0	0	0	0	0	0
3 SINGLE	47	0	26	6	12	3	0	0	0	0	0
2S-1	21	0	3	14	4	0	0	0	0	0	0
4 SINGLE	1	0	0	1	0	0	0	0	0	0	0
3S-1	29	0	1	9	4	5	1	5	4	0	0
2S-2	77	0	20	36	16	2	3	0	0	0	0
" " SPLIT	10	0	7	1	2	0	0	0	0	0	0
3S-2	807	0	13	214	99	80	68	147	140	35	11
" " SPLIT	4	0	0	0	2	1	0	0	1	0	0
2S-3	2	0	0	2	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	9	0	1	5	1	0	1	1	0	0	0
3S-3	22	0	0	1	4	4	1	6	3	1	2
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	1	0	0	0	0	1	0	0	0	0	0
BAD OR NC	15	0	3	1	1	0	4	2	1	2	1
ALL SINGLE	124	42	55	12	12	3	0	0	0	0	0
ALL COMBIN	982	0	45	282	132	93	74	159	148	36	13

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	48-52
NO.TRUCKS	2	0	1	4	15	26	45	82
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	125	208	236	186	101	54	29	9

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	3	0	0	5	0	0	0	46	92	60	106
NO. PM	195	141	136	173	48	16	33	20	47	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	39	58	19	12	29	34	83	367	394	78	10

TABLE 29 TEXAS SR 21 E.BOUND CALDWELL

	TOTAL	GVW IN KIPS-0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	473	17	69	115	64	38	23	68	64	12	3
SPECIAL	5	0	0	2	1	0	0	0	1	1	0
OTHER	14	2	7	1	3	0	1	0	0	0	0
LIVESTOCK	5	0	0	2	2	0	1	0	0	0	0
FUEL	8	3	3	1	1	0	0	0	0	0	0
CONCRETE	3	0	0	3	0	0	0	0	0	0	0
TANK	128	2	11	41	18	2	8	26	18	1	1
OPEN	1	0	1	0	0	0	0	0	0	0	0
MACHINERY	40	1	10	4	7	6	1	6	3	1	1
STEEL	6	0	0	0	1	0	3	2	0	0	0
FLAT BED	80	5	12	31	11	13	2	3	3	0	0
DUMP	119	1	12	11	10	11	4	29	36	5	0
BUS	4	0	4	0	0	0	0	0	0	0	0
CAR CARRY	0	0	0	0	0	0	0	0	0	0	0
BOX TRUCK	46	2	7	18	8	6	3	1	0	1	0
UNCLASSIFY	14	1	2	1	2	0	0	1	3	3	1
2 SINGLE	50	17	29	3	0	1	0	0	0	0	0
3 SINGLE	76	0	19	15	24	15	2	1	0	0	0
2S-1	11	0	2	6	1	1	1	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	17	0	1	8	5	0	1	0	2	0	0
2S-2	36	0	11	11	3	1	3	5	2	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-2	261	0	5	71	28	14	15	57	58	11	2
" " SPLIT	4	0	0	0	0	0	0	3	1	0	0
2S-3	3	0	2	1	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0
3S-3	13	0	0	0	3	6	0	1	1	1	1
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	2	0	0	0	0	0	1	1	0	0	0
ALL SINGLE	126	17	48	18	24	16	2	1	0	0	0
ALL COMBIN	345	0	21	97	40	22	20	66	64	12	3

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	47	49	97	110	76	50	30	9
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	4	1	1	0	0	0	0	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	14	42	60	96
NO. PM	75	79	28	44	35	0	0	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	27	60	35	5	25	28	95	122	57	13	7

TABLE 30 TEXAS SR 114 E.BOUND DALLAS

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	338	43	67	64	22	4	39	33	50	14	2
SPECIAL	1	0	0	0	0	0	0	1	0	0	0
OTHER	14	2	10	2	0	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	1	0	0	1	0	0	0	0	0	0	0
CONCRETE	42	0	1	3	1	0	22	14	1	0	0
TANK	40	0	0	5	1	0	3	4	19	7	1
OPEN	4	0	3	1	0	0	0	0	0	0	0
MACHINERY	6	1	1	1	2	0	1	0	0	0	0
STEEL	3	1	0	0	0	0	0	1	1	0	0
FLAT BED	24	2	4	11	1	1	1	1	1	2	0
DUMP	53	7	13	10	0	0	3	5	12	3	0
BUS	9	1	7	0	1	0	0	0	0	0	0
CAR CARRY	0	0	0	0	0	0	0	0	0	0	0
BOX TRUCK	95	23	18	24	13	1	5	4	6	1	0
UNCLASSIFY	46	6	10	6	3	2	4	3	10	1	1
2 SINGLE	77	42	33	2	0	0	0	0	0	0	0
3 SINGLE	65	1	12	5	2	1	27	16	0	1	0
2S-1	24	0	13	9	1	0	0	0	0	0	1
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	5	0	1	2	0	0	1	0	1	0	0
2S-2	23	0	5	7	6	1	2	2	0	0	0
" " SPLIT	1	0	0	0	0	0	1	0	0	0	0
3S-2	134	0	0	35	13	2	9	13	49	13	1
" " SPLIT	3	0	2	1	0	0	0	0	0	0	0
2S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	1	0	0	1	0	0	0	0	0	0	0
3S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	5	0	1	2	0	0	0	2	0	0	0
ALL SINGLE	142	43	45	7	2	1	27	16	0	1	0
ALL COMBIN	191	0	21	55	20	3	12	15	50	13	2

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	0	1	0	4	13	22
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	37	51	72	58	44	17	17	2

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	8	35	50	44
NO. PM	43	42	40	33	28	15	0	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	20	99	22	7	11	14	35	62	56	9	3

TABLE 31 TEXAS I-40 @ FM 2381 E.BOUND BUSHLAND

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	768	47	89	94	75	61	101	115	128	51	7
SPECIAL	24	0	2	3	2	3	5	6	1	1	1
OTHER	24	8	13	1	0	2	0	0	0	0	0
LIVESTOCK	2	0	0	0	0	0	0	0	2	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	1	0	0	1	0	0	0	0	0	0	0
TANK	11	0	0	6	2	0	1	1	1	0	0
OPEN	16	0	0	1	0	3	1	0	5	6	0
MACHINERY	16	0	0	1	3	1	3	0	5	2	1
STEEL	0	0	0	0	0	0	0	0	0	0	0
FLAT BED	29	0	4	8	3	1	0	3	9	1	0
DUMP	15	0	0	2	1	0	0	0	0	12	0
BUS	7	0	0	3	4	0	0	0	0	0	0
CAR CARRY	7	0	1	0	5	0	0	1	0	0	0
BOX TRUCK	211	3	12	17	18	26	35	60	37	1	2
UNCLASSIFY	405	38	57	51	37	25	56	44	66	28	3
2 SINGLE	92	47	39	5	1	0	0	0	0	0	0
3 SINGLE	22	0	3	6	10	2	1	0	0	0	0
2S-1	7	0	3	2	2	0	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	11	0	0	1	3	3	1	1	2	0	0
2S-2	56	0	24	9	8	12	2	0	1	0	0
" " SPLIT	25	0	19	4	1	0	0	1	0	0	0
3S-2	496	0	0	63	44	39	87	102	108	47	6
" " SPLIT	11	0	0	1	1	1	1	0	6	1	0
2S-3	2	0	0	2	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	24	0	1	1	2	2	4	6	6	2	0
3S-3	5	0	0	0	1	0	0	1	1	1	1
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	9	0	0	0	1	0	2	3	3	0	0
BAD OR NC	8	0	0	0	1	2	3	1	1	0	0
ALL SINGLE	114	47	42	11	11	2	1	0	0	0	0
ALL COMBIN	646	0	47	83	63	57	97	114	127	51	7

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	0	2	3	15	12	48
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	70	176	201	97	86	40	16	2

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	6	52	60	86	102
NO. PM	76	117	108	95	40	16	0	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	63	35	10	10	21	35	81	302	149	60	2

TABLE 32 TEXAS US 287 N.BOUND IOWA PARK

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	749	23	69	56	162	60	37	50	97	116	79
SPECIAL	23	0	3	3	4	0	0	0	1	5	7
OTHER	33	3	15	11	2	2	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	1	0	0	0	0	0	0	0	0	0	1
CONCRETE	4	0	0	0	1	2	0	0	0	0	1
TANK	44	0	2	2	8	1	0	1	4	12	14
OPEN	43	0	0	9	21	0	0	0	2	7	4
MACHINERY	18	0	1	0	0	3	1	3	4	0	6
STEEL	33	0	0	0	0	1	0	2	10	12	8
FLAT BED	147	4	5	9	55	13	11	7	14	18	11
DUMP	29	0	0	1	4	3	5	1	8	4	3
BUS	8	2	4	1	0	1	0	0	0	0	0
CAR CARRY	7	0	0	0	1	1	0	0	1	3	1
BOX TRUCK	180	0	12	9	34	19	9	23	32	31	11
UNCLASSIFY	179	14	27	11	32	14	11	13	21	24	12
2 SINGLE	66	21	40	5	0	0	0	0	0	0	0
3 SINGLE	21	0	3	6	4	5	2	1	0	0	0
2S-1	16	1	2	6	4	3	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	15	0	0	1	9	0	1	0	0	3	1
2S-2	47	0	14	9	14	5	1	3	1	0	0
" " SPLIT	10	0	5	5	0	0	0	0	0	0	0
3S-2	530	0	1	18	129	44	32	39	92	105	70
" " SPLIT	3	0	0	0	0	0	0	0	0	3	0
2S-3	4	0	1	3	0	0	0	0	0	0	0
" " SPLIT	2	0	2	0	0	0	0	0	0	0	0
2S-1-2	15	0	0	0	0	2	1	6	3	2	1
3S-3	8	0	0	0	0	1	0	0	1	1	5
" " SPLIT	1	0	0	1	0	0	0	0	0	0	0
3S-1-2	5	0	0	0	1	0	0	1	0	2	1
BAD OR NC	6	1	1	2	1	0	0	0	0	0	1
ALL SINGLE	87	21	43	11	4	5	2	1	0	0	0
ALL COMBIN	656	1	25	43	157	55	35	49	97	116	78

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	2	0	0	2	3	7	20	30
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	66	127	191	132	121	23	21	5

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	31	42	64	90
NO. PM	89	81	78	62	75	37	31	22	47	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	36	44	9	8	14	23	38	271	229	72	6

TABLE 33 CAL. SR 99 N.BOUND STOCKTON

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1167	43	158	289	147	97	74	108	182	63	6
SPECIAL	88	1	12	17	9	9	12	12	13	3	0
OTHER	35	6	21	6	1	0	0	0	0	1	0
LIVESTOCK	7	1	1	2	1	0	0	0	1	1	0
FUEL	1	0	1	0	0	0	0	0	0	0	0
CONCRETE	5	0	0	1	1	0	2	1	0	0	0
TANK	107	4	13	41	3	6	2	3	19	16	0
OPEN	125	3	11	49	19	5	7	4	12	12	3
MACHINERY	3	0	0	0	0	1	1	0	1	0	0
STEEL	0	0	0	0	0	0	0	0	0	0	0
FLAT BED	219	4	33	69	28	12	12	24	28	8	1
DUMP	17	4	4	5	0	2	1	0	1	0	0
BUS	28	4	15	6	2	1	0	0	0	0	0
CAR CARRY	3	0	0	1	0	2	0	0	0	0	0
BOX TRUCK	487	13	42	86	77	54	37	56	101	20	1
UNCLASSIFY	42	3	5	6	6	5	0	8	6	2	1
2 SINGLE	122	41	70	7	4	0	0	0	0	0	0
3 SINGLE	53	1	22	14	6	6	3	1	0	0	0
2S-1	58	0	19	27	3	6	1	0	1	0	1
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	31	0	2	7	4	4	2	6	6	0	0
2S-2	86	0	10	23	18	14	8	12	1	0	0
" " SPLIT	34	0	6	12	3	5	1	5	1	0	1
3S-2	456	0	10	74	76	37	35	62	130	31	1
" " SPLIT	57	0	1	14	7	3	7	2	14	9	0
2S-3	3	0	1	2	0	0	0	0	0	0	0
" " SPLIT	14	0	2	4	1	3	1	3	0	0	0
2S-1-2	234	0	13	99	22	17	16	15	26	23	3
3S-3	1	0	0	1	0	0	0	0	0	0	0
" " SPLIT	1	0	0	1	0	0	0	0	0	0	0
3S-1-2	11	0	0	4	3	0	0	1	3	0	0
BAD OR NC	6	1	2	0	0	2	0	1	0	0	0
ALL SINGLE	175	42	92	21	10	6	3	1	0	0	0
ALL COMBIN	986	0	64	268	137	89	71	106	182	63	6
LANE #1	1008	39	126	253	128	72	44	99	178	63	6
LANE #2	159	4	32	36	19	25	30	9	4	0	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	4	2	4	6	17	34	91	125
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	233	278	167	148	38	18	2	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	7	57	46	28	71	67	57
NO. PM	46	177	149	135	96	94	51	72	14	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	56	78	35	36	35	21	86	187	290	241	102

TABLE 34 CAL. I-5 N.BOUND MOKELUMNE R.

GVW IN KIPS	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1077	13	88	278	109	102	95	191	165	27	9
SPECIAL	23	0	2	8	2	1	0	6	2	2	0
OTHER	22	1	10	6	3	0	0	0	1	0	1
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	2	0	1	1	0	0	0	0	0	0	0
TANK	76	0	2	16	14	3	4	9	23	5	0
OPEN	112	0	13	38	6	6	0	7	33	9	0
MACHINERY	19	0	0	3	4	7	1	1	1	0	2
STEEL	7	0	0	1	0	1	4	1	0	0	0
FLAT BED	238	3	14	71	22	19	19	41	40	7	2
DUMP	16	0	3	5	0	2	0	4	2	0	0
BUS	10	0	0	7	3	0	0	0	0	0	0
CAR CARRY	2	0	0	0	0	0	1	1	0	0	0
BOX TRUCK	525	7	38	119	51	60	65	117	60	4	4
UNCLASSIFY	25	2	5	3	4	3	1	4	3	0	0
2 SINGLE	77	12	53	10	0	0	0	0	0	0	2
3 SINGLE	24	0	4	12	6	2	0	0	0	0	0
2S-1	35	0	6	21	5	0	3	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	8	0	2	2	2	2	0	0	0	0	0
2S-2	38	0	4	14	7	11	2	0	0	0	0
" " SPLIT	13	0	6	4	1	1	0	0	0	0	1
3S-2	538	0	1	120	56	63	68	143	80	5	2
" " SPLIT	95	0	3	34	5	6	3	14	25	2	3
2S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	2	0	0	0	1	0	1	0	0	0	0
2S-1-2	225	0	8	58	23	15	11	32	59	18	1
3S-3	1	0	0	0	0	0	0	0	0	1	0
" " SPLIT	1	0	0	0	0	0	0	0	0	1	0
3S-1-2	3	0	1	1	0	0	0	0	1	0	0
BAD OR NC	17	1	0	2	3	2	7	2	0	0	0
ALL SINGLE	101	12	57	22	6	2	0	0	0	0	2
ALL COMBIN	959	0	31	254	100	98	88	189	165	27	7
LANE #1	1002	13	76	262	101	96	89	179	155	25	6
LANE #2	75	0	12	16	8	6	6	12	10	2	3

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	0	0	2	4	6	13
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	70	197	449	103	172	48	9	4

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	19	76	98
NO. PM	119	107	113	119	129	119	61	51	56	10	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	25	52	16	36	13	34	67	229	345	252	8

TABLE 35 CAL. SR 17 S.BOUND FRUITVALE AVE.

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1719	45	274	572	267	127	102	114	182	29	7
SPECIAL	34	0	1	17	5	4	2	3	2	0	0
OTHER	52	4	30	7	4	3	3	1	0	0	0
LIVESTOCK	1	0	0	1	0	0	0	0	0	0	0
FUEL	1	0	0	1	0	0	0	0	0	0	0
CONCRETE	27	0	0	0	3	1	5	11	7	0	0
TANK	108	0	3	20	8	3	5	11	44	14	0
OPEN	111	2	6	59	17	7	2	5	13	0	0
MACHINERY	18	0	0	3	8	4	2	1	0	0	0
STEEL	20	0	0	0	1	2	1	6	8	2	0
FLAT BED	182	7	19	61	15	10	14	17	31	4	4
DUMP	25	0	11	8	4	0	2	0	0	0	0
BUS	23	0	15	7	1	0	0	0	0	0	0
CAR CARRY	26	1	1	4	6	7	6	0	1	0	0
BOX TRUCK	825	28	141	286	141	69	47	49	56	8	2
UNCLASSIFY	266	5	47	98	54	17	13	10	20	1	1
2 SINGLE	249	45	160	35	9	0	0	0	0	0	0
3 SINGLE	93	0	22	19	15	10	12	5	0	0	0
2S-1	200	0	70	102	24	4	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	38	0	0	16	6	3	1	5	7	0	0
2S-2	114	0	5	43	33	12	5	5	9	2	0
" " SPLIT	11	0	1	5	1	1	1	0	0	1	1
3S-2	712	0	10	251	134	73	60	70	98	13	3
" " SPLIT	89	0	2	20	6	1	8	10	34	7	0
2S-3	2	0	1	0	1	0	0	0	0	0	0
" " SPLIT	37	0	0	11	6	7	1	5	7	0	0
2S-1-2	155	0	2	61	26	12	8	13	26	4	3
3S-3	1	0	0	0	0	1	0	0	0	0	0
" " SPLIT	12	0	0	3	3	2	3	0	0	1	0
3S-1-2	9	0	0	4	2	1	1	0	1	0	0
BAD OR NC	6	0	1	2	1	0	0	1	0	1	0
ALL SINGLE	332	45	182	54	24	10	12	5	0	0	0
ALL COMBIN	1381	0	91	516	242	117	90	108	182	28	7
LANE #1	699	25	153	206	120	52	38	33	50	18	4
LANE #2	1020	20	121	366	147	75	64	81	132	11	3

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	18	17	26	39	62	83	139	312
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	437	373	184	21	8	0	0	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	19	141	119	115	219
NO. PM	208	238	158	136	60	131	61	94	19	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	98	145	82	110	128	60	126	301	310	275	84

TABLE 36 CAL. US101 VENTURA-OXNARD - JUNE 19,20

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	277	34	52	37	50	25	26	25	23	4	1
SPECIAL	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	3	1	0	0	1	0	0	0	1	0	0
OPEN	12	1	1	4	2	1	0	1	2	0	0
MACHINERY	0	0	0	0	0	0	0	0	0	0	0
STEEL	0	0	0	0	0	0	0	0	0	0	0
FLAT BED	13	1	1	0	4	2	2	0	2	0	1
DUMP	2	0	1	1	0	0	0	0	0	0	0
BUS	9	0	1	7	1	0	0	0	0	0	0
CAR CARRY	1	0	0	0	0	1	0	0	0	0	0
BOX TRUCK	80	3	15	11	19	9	15	4	2	2	0
UNCLASSIFY	157	28	33	14	23	12	9	20	16	2	0
2 SINGLE	69	34	32	3	0	0	0	0	0	0	0
3 SINGLE	36	0	9	11	13	3	0	0	0	0	0
2S-1	9	0	2	2	3	2	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	0	0	0	0	0	0	0	0	0	0	0
2S-2	7	0	3	3	1	0	0	0	0	0	0
" " SPLIT	6	0	3	1	1	0	0	1	0	0	0
3S-2	127	0	3	10	30	20	23	21	15	4	1
" " SPLIT	4	0	0	1	0	0	0	0	3	0	0
2S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	19	0	0	6	2	0	3	3	5	0	0
3S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	0	0	0	0	0	0	0	0	0	0	0
ALL SINGLE	105	34	41	14	13	3	0	0	0	0	0
ALL COMBIN	172	0	11	23	37	22	26	25	23	4	1

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	5	15	25	27	35	41
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	31	56	23	13	4	2	0	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	8	19	4	0	9	36	13	26	21
NO. PM	31	31	41	7	0	0	25	7	0	0	0	1

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	30	51	15	16	3	1	6	48	68	30	9

TABLE 37 CAL. I-10 W.BOUND COLTON

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	756	51	134	200	132	50	39	34	58	52	6
SPECIAL	30	1	16	3	1	1	0	4	2	2	0
OTHER	11	1	5	2	2	0	1	0	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	4	0	1	3	0	0	0	0	0	0	0
CONCRETE	11	0	0	8	3	0	0	0	0	0	0
TANK	36	1	2	24	1	3	1	1	2	1	0
OPEN	33	2	7	5	4	1	2	2	1	9	0
MACHINERY	9	0	1	1	2	2	2	1	0	0	0
STEEL	2	0	0	1	0	0	0	1	0	0	0
FLAT BED	36	8	2	16	4	3	1	1	1	0	0
DUMP	8	0	0	3	3	1	1	0	0	0	0
BUS	1	0	0	0	1	0	0	0	0	0	0
CAR CARRY	8	0	1	0	0	2	2	3	0	0	0
BOX TRUCK	146	8	42	27	40	7	9	2	8	3	0
UNCLASSIFY	421	30	57	107	71	30	20	19	44	37	6
2 SINGLE	172	51	93	23	5	0	0	0	0	0	0
3 SINGLE	50	0	14	24	8	3	1	0	0	0	0
2S-1	53	0	13	25	9	6	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	4	0	0	1	0	1	1	1	0	0	0
2S-2	44	0	6	15	11	8	3	1	0	0	0
" " SPLIT	12	0	5	0	2	0	0	4	1	0	0
3S-2	220	0	0	33	63	17	25	25	41	14	2
" " SPLIT	72	0	0	56	5	4	1	0	0	4	2
2S-3	1	0	0	0	0	0	0	1	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	118	0	0	22	27	10	7	2	14	34	2
3S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	1	0	0	0	1	0	0	0	0	0	0
3S-1-2	2	0	0	0	1	0	0	0	1	0	0
BAD OR NC	7	0	3	1	0	1	1	0	1	0	0
ALL SINGLE	222	51	107	47	13	3	1	0	0	0	0
ALL COMBIN	527	0	24	152	119	46	37	34	57	52	6
LANE #1	737	50	131	195	129	46	38	33	57	52	6
LANE #2	19	1	3	5	3	4	1	1	1	0	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	8	3	5	8	16	23	35	110

SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	147	209	111	51	23	4	0	3

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	18	34	29	20	35	33	62	33	55	31	90	119
NO. PM	54	65	34	24	4	0	0	0	0	0	0	16

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	92	93	36	39	26	27	35	122	103	187	16

TABLE 38 ILL. SR 89 SPRING VALLEY

	TOTAL	GVW IN KIPS-0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	463	16	35	49	30	45	34	9	86	126	33
SPECIAL	241	1	6	14	9	23	15	3	57	86	27
OTHER	0	0	0	0	0	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	5	0	1	0	2	0	0	0	0	1	1
OPEN	2	0	0	1	0	0	0	0	0	1	0
MACHINERY	1	0	0	0	0	1	0	0	0	0	0
STEEL	0	0	0	0	0	0	0	0	0	0	0
FLAT BED	5	0	0	0	5	0	0	0	0	0	0
DUMP	8	0	1	5	0	0	1	1	0	0	0
BUS	0	0	0	0	0	0	0	0	0	0	0
CAR CARRY	0	0	0	0	0	0	0	0	0	0	0
BOX TRUCK	27	3	6	5	5	4	3	0	1	0	0
UNCLASSIFY	174	12	21	24	9	17	15	5	28	38	5
2 SINGLE	85	16	30	35	4	0	0	0	0	0	0
3 SINGLE	75	0	2	3	6	36	26	2	0	0	0
2S-1	1	0	0	0	1	0	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	1	0	0	0	1	0	0	0	0	0	0
2S-2	11	0	2	5	0	2	0	2	0	0	0
" " SPLIT	1	0	1	0	0	0	0	0	0	0	0
3S-2	260	0	0	5	14	4	4	3	76	122	32
" " SPLIT	20	0	0	1	4	1	0	0	9	4	1
2S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0
3S-3	2	0	0	0	0	2	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	7	0	0	0	0	0	4	2	1	0	0
ALL SINGLE	160	16	32	38	10	36	26	2	0	0	0
ALL COMBIN	296	0	3	11	20	9	4	5	85	126	33

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	51	77	119	112	75	17	9	3
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	0	0	0	0	0	0	0	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	23	25	29	55	61
NO. PM	56	44	56	53	43	18	0	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	49	75	36	3	27	33	80	144	15	1	0

TABLE 39 ILL. SR 51 ILLINOIS RIVER @ PERU

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	579	40	93	127	85	45	55	91	38	3	4
SPECIAL	92	5	8	18	15	9	15	15	7	1	1
OTHER	9	1	4	1	1	1	1	0	0	0	0
LIVESTOCK	1	0	0	1	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	1	0	0	0	1	0	0	0	0	0	0
TANK	14	0	1	6	1	0	0	4	2	0	0
OPEN	18	2	5	4	1	3	0	2	1	0	0
MACHINERY	7	0	1	1	2	0	0	1	1	0	1
STEEL	4	0	0	1	0	1	2	0	0	0	0
FLAT BED	31	1	0	8	8	1	2	7	1	0	1
DUMP	5	0	3	1	0	0	1	0	0	0	0
BUS	1	0	1	0	0	0	0	0	0	0	0
CAR CARRY	6	0	1	0	3	0	1	1	0	0	0
BOX TRUCK	103	3	9	22	18	13	11	22	5	0	0
UNCLASSIFY	287	28	60	65	34	17	22	38	18	2	1
2 SINGLE	106	40	48	12	3	2	0	0	0	0	0
3 SINGLE	42	0	15	14	7	3	3	0	0	0	0
2S-1	29	0	7	10	4	3	1	3	0	0	1
4 SINGLE	3	0	1	1	0	0	0	1	0	0	0
3S-1	13	0	1	5	2	0	1	3	1	0	0
2S-2	42	0	6	8	14	5	4	2	1	1	0
" " SPLIT	25	0	2	2	8	2	6	4	0	0	1
3S-2	203	0	4	51	27	11	20	57	30	2	1
" " SPLIT	24	0	1	4	5	3	3	6	2	0	0
2S-3	3	0	0	0	0	1	1	1	0	0	0
" " SPLIT	14	0	2	2	1	2	4	2	1	0	0
2S-1-2	23	0	0	2	3	2	6	10	0	0	0
3S-3	1	0	0	0	0	0	1	0	0	0	0
" " SPLIT	2	0	0	0	1	0	0	1	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	49	0	5	15	10	11	5	1	1	0	1
ALL SINGLE	151	40	65	27	10	5	3	1	0	0	0
ALL COMBIN	379	0	23	85	65	29	47	89	35	3	3
LANE #1	421	33	73	99	52	27	35	65	32	3	2
LANE #2	158	7	20	28	33	18	20	26	4	0	2

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	38	19	25	49	98	138	83	73
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	33	13	6	4	0	0	0	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	1	0	32	22	54	64
NO. PM	61	31	87	61	33	33	47	28	25	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	57	64	25	11	27	59	71	137	86	25	17

TABLE 40 ILL. I-80 W.BOUND VERMILLON RIVER

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	691	15	33	61	98	79	85	114	172	27	7
SPECIAL	25	0	0	5	2	0	1	7	9	0	1
OTHER	9	0	2	1	3	2	0	1	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	38	0	2	7	6	3	0	7	10	3	0
OPEN	35	2	0	5	2	3	3	6	13	0	1
MACHINERY	8	0	0	0	0	1	3	2	0	2	0
STEEL	6	0	0	0	0	0	1	1	4	0	0
FLAT BED	73	0	1	14	9	5	8	10	22	2	2
DUMP	7	0	2	0	0	3	2	0	0	0	0
BUS	2	0	1	0	0	1	0	0	0	0	0
CAR CARRY	6	0	1	1	1	1	0	1	0	1	0
BOX TRUCK	309	1	15	18	57	42	38	54	73	8	3
UNCLASSIFY	173	12	9	10	18	18	29	25	41	11	0
2 SINGLE	38	15	19	1	2	0	1	0	0	0	0
3 SINGLE	14	0	2	0	1	8	3	0	0	0	0
2S-1	16	0	1	4	5	2	3	1	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	11	0	0	1	2	1	2	3	2	0	0
2S-2	40	0	4	6	11	11	2	5	1	0	0
" " SPLIT	3	0	2	1	0	0	0	0	0	0	0
3S-2	513	0	2	39	73	53	65	92	159	23	7
" " SPLIT	23	0	1	7	1	0	2	4	8	0	0
2S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	1	0	0	0	0	1	0	0	0	0	0
2S-1-2	17	0	0	1	1	1	6	5	1	2	0
3S-3	2	0	0	1	0	0	0	0	0	1	0
" " SPLIT	1	0	0	0	1	0	0	0	0	0	0
3S-1-2	1	0	0	0	0	0	0	1	0	0	0
BAD OR NC	11	0	2	0	1	2	1	3	1	1	0
ALL SINGLE	52	15	21	1	3	8	4	0	0	0	0
ALL COMBIN	628	0	10	60	94	69	80	111	171	26	7
LANE #1	681	15	32	60	97	76	85	113	169	27	7
LANE #2	10	0	1	1	1	3	0	1	3	0	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	1	0	0	0	1	2	7	20
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	67	131	165	154	94	31	13	5

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	51	128	92
NO. PM	75	46	64	55	45	1	13	36	36	0	11	38

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	22	23	7	7	18	28	84	367	109	26	0

TABLE 41 ILL. I-70 W.BOUND VANDALIA

GVW IN KIPS	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	851	13	29	87	138	161	203	180	37	1	2
SPECIAL	13	0	0	2	3	2	4	2	0	0	0
OTHER	8	0	2	4	1	1	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	21	0	0	5	6	1	2	5	2	0	0
OPEN	16	3	0	1	0	1	3	6	2	0	0
MACHINERY	16	0	1	2	2	2	2	6	1	0	0
STEEL	9	0	1	0	1	0	0	5	2	0	0
FLAT BED	33	0	3	4	6	5	6	9	0	0	0
DUMP	14	0	3	0	1	4	1	4	1	0	0
BUS	9	0	3	1	3	1	1	0	0	0	0
CAR CARRY	18	0	0	1	3	3	3	8	0	0	0
BOX TRUCK	354	5	12	38	61	73	97	57	11	0	0
UNCLASSIFY	340	5	4	29	51	68	84	78	18	1	2
2 SINGLE	29	13	13	3	0	0	0	0	0	0	0
3 SINGLE	26	0	6	6	13	1	0	0	0	0	0
2S-1	9	0	3	4	2	0	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	7	0	0	2	1	1	0	3	0	0	0
2S-2	66	0	1	11	31	17	2	4	0	0	0
" " SPLIT	3	0	2	0	0	1	0	0	0	0	0
3S-2	587	0	0	45	78	115	173	139	34	1	2
" " SPLIT	32	0	0	2	1	4	5	17	3	0	0
2S-3	2	0	1	1	0	0	0	0	0	0	0
" " SPLIT	2	0	0	0	0	2	0	0	0	0	0
2S-1-2	34	0	0	2	1	5	13	13	0	0	0
3S-3	4	0	0	0	0	1	3	0	0	0	0
" " SPLIT	1	0	0	0	0	0	0	1	0	0	0
3S-1-2	6	0	1	0	0	0	2	3	0	0	0
BAD OR NC	43	0	2	11	11	14	5	0	0	0	0
ALL SINGLE	55	13	19	9	13	1	0	0	0	0	0
ALL COMBIN	753	0	8	67	114	146	198	180	37	1	2
LANE #1	810	13	28	83	129	153	188	176	37	1	2
LANE #2	41	0	1	4	9	8	15	4	0	0	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	3	2	0	0	0	0	2	18
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	28	93	147	211	232	73	32	10

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	5	40	19	50	33	45	53	63	65	0	15	12
NO. PM	15	17	4	0	55	70	52	63	42	28	44	61

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	9	23	14	10	12	36	65	417	184	43	6

TABLE 42 GEORGIA I-75 @ PLEASANT VALLEY

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1518	105	158	357	264	149	139	157	157	27	5
SPECIAL	2	0	0	1	0	0	0	0	0	1	0
OTHER	1	0	1	0	0	0	0	0	0	0	0
LIVESTOCK	4	0	1	0	1	1	0	0	1	0	0
FUEL	3	0	0	0	0	1	0	0	2	0	0
CONCRETE	1	0	0	1	0	0	0	0	0	0	0
TANK	32	1	1	9	11	0	1	0	6	3	0
OPEN	12	0	0	1	2	2	1	2	3	1	0
MACHINERY	17	0	2	4	6	2	1	0	0	1	1
STEEL	6	0	0	0	1	1	1	2	1	0	0
FLAT BED	40	4	3	12	8	3	2	4	4	0	0
DUMP	8	1	2	2	0	1	0	2	0	0	0
BUS	11	2	0	4	3	0	0	2	0	0	0
CAR CARRY	15	0	1	2	1	6	3	1	1	0	0
BOX TRUCK	303	12	20	80	49	30	33	44	32	3	0
UNCLASSIFY	1063	85	127	241	182	102	97	100	107	18	4
2 SINGLE	179	103	66	10	0	0	0	0	0	0	0
3 SINGLE	60	1	22	16	11	5	3	2	0	0	0
2S-1	30	0	12	15	2	1	0	0	0	0	0
4 SINGLE	6	0	0	0	2	0	0	2	1	0	1
3S-1	5	0	0	2	1	2	0	0	0	0	0
2S-2	171	0	38	71	37	17	7	0	1	0	0
" " SPLIT	11	0	9	1	1	0	0	0	0	0	0
3S-2	852	0	1	212	190	107	120	142	151	27	2
" " SPLIT	16	0	0	5	4	2	0	4	1	0	0
2S-3	5	0	1	3	0	1	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0
3S-3	6	0	0	0	2	0	0	1	1	0	2
" " SPLIT	17	0	0	1	4	3	3	4	2	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	60	1	9	21	10	11	6	2	0	0	0
ALL SINGLE	245	104	88	26	13	5	3	4	1	0	1
ALL COMBIN	1213	0	61	310	241	133	130	151	156	27	4

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	1	4	6	16	4	1	10	20
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	81	161	262	361	292	168	78	54

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	64	110	181
NO. PM	184	154	154	159	152	126	98	64	72	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	92	103	35	48	56	62	259	764	95	1	2

TABLE 43 GEORGIA, SR 365 at EXIT 3

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	707	99	156	200	41	57	100	48	4	0	2
SPECIAL	23	1	2	4	0	2	13	1	0	0	0
OTHER	28	12	10	4	2	0	0	0	0	0	0
LIVESTOCK	7	1	0	0	0	0	1	5	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	21	0	0	0	0	4	14	3	0	0	0
TANK	35	1	3	5	0	3	8	13	2	0	0
OPEN	37	2	8	9	2	5	4	4	1	0	2
MACHINERY	0	0	0	0	0	0	0	0	0	0	0
STEEL	2	0	0	0	1	0	1	0	0	0	0
FLAT BED	64	10	13	23	4	3	7	4	0	0	0
DUMP	21	5	6	5	1	2	0	1	1	0	0
BUS	0	0	0	0	0	0	0	0	0	0	0
CAR CARRY	5	0	0	0	2	3	0	0	0	0	0
BOX TRUCK	219	25	54	99	13	14	13	1	0	0	0
UNCLASSIFY	245	42	60	51	16	21	39	16	0	0	0
2 SINGLE	182	99	76	6	1	0	0	0	0	0	0
3 SINGLE	81	0	18	19	11	13	16	4	0	0	0
2S-1	10	0	1	8	1	0	0	0	0	0	0
4 SINGLE	6	0	0	0	0	1	3	2	0	0	0
3S-1	2	0	0	2	0	0	0	0	0	0	0
2S-2	45	0	11	22	7	3	2	0	0	0	0
" " SPLIT	1	0	1	0	0	0	0	0	0	0	0
3S-2	374	0	49	142	20	39	78	42	4	0	0
" " SPLIT	1	0	0	0	0	1	0	0	0	0	0
2S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0
3S-3	4	0	0	1	1	0	0	0	0	0	2
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	1	0	0	0	0	0	1	0	0	0	0
ALL SINGLE	269	99	94	25	12	14	19	6	0	0	0
ALL COMBIN	437	0	62	175	29	43	80	42	4	0	2

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	1	0	1	1	0	4	7	21
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	52	70	152	196	90	68	29	15

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	57	82	82
NO. PM	103	98	93	97	55	38	2	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	58	170	40	3	5	27	103	232	67	1	1

TABLE 44 GEORGIA, I-75 and SR 83

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	1463	138	157	425	193	146	218	165	17	1	3
SPECIAL	52	30	15	4	1	1	0	1	0	0	0
OTHER	45	14	25	3	1	0	1	0	1	0	0
LIVESTOCK	1	0	0	1	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	3	0	1	1	1	0	0	0	0	0	0
TANK	45	0	1	24	8	0	4	8	0	0	0
OPEN	21	1	3	3	3	3	6	0	1	0	1
MACHINERY	5	0	0	0	2	1	1	0	0	0	1
STEEL	1	0	0	0	1	0	0	0	0	0	0
FLAT BED	159	3	11	72	14	8	30	19	1	0	1
DUMP	45	3	16	11	13	1	1	0	0	0	0
BUS	2	0	0	0	2	0	0	0	0	0	0
CAR CARRY	31	0	0	11	6	12	2	0	0	0	0
BOX TRUCK	954	56	61	283	133	112	167	129	13	0	0
UNCLASSIFY	99	31	24	12	8	8	6	8	1	1	0
2 SINGLE	238	136	90	11	0	0	0	0	0	1	0
3 SINGLE	61	2	21	15	21	1	1	0	0	0	0
2S-1	23	0	8	13	2	0	0	0	0	0	0
4 SINGLE	1	0	0	0	0	0	1	0	0	0	0
3S-1	24	0	0	6	8	3	4	1	0	0	0
2S-2	180	0	13	102	47	16	1	1	0	0	0
" " SPLIT	11	0	11	0	0	0	0	0	0	0	0
3S-2	895	0	8	273	110	124	203	161	15	0	1
" " SPLIT	9	0	0	1	0	1	5	1	1	0	0
2S-3	3	0	2	1	0	0	0	0	0	0	0
" " SPLIT	1	0	0	0	0	1	0	0	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0
3S-3	5	0	0	1	3	0	1	0	0	0	0
" " SPLIT	3	0	0	0	0	0	1	1	0	0	1
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	9	0	4	0	2	0	1	0	1	0	1
ALL SINGLE	300	138	111	26	21	1	2	0	0	1	0
ALL COMBIN	1154	0	42	399	170	145	215	165	16	0	2

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	1	1	0	3	8	18	29	79
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	231	240	390	231	156	60	10	6

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	17	71	107	96
NO. PM	100	151	154	168	169	145	180	103	2	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	116	117	49	21	6	59	178	708	205	6	0

TABLE 45 N.Y. THRUWAY @ 203 BERKSHIRE SPUR

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	737	27	111	257	118	59	65	66	21	5	8
SPECIAL	21	1	1	7	4	3	1	4	0	0	0
OTHER	12	0	6	2	2	0	1	1	0	0	0
LIVESTOCK	15	0	4	9	2	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	64	0	8	35	12	3	1	4	0	0	1
OPEN	20	2	3	9	1	1	1	0	2	0	1
MACHINERY	0	0	0	0	0	0	0	0	0	0	0
STEEL	0	0	0	0	0	0	0	0	0	0	0
FLAT BED	66	0	10	28	8	5	4	7	2	1	1
DUMP	17	0	4	4	2	1	1	5	0	0	0
BUS	35	2	10	10	10	1	0	2	0	0	0
CAR CARRY	13	0	0	6	3	2	1	1	0	0	0
BOX TRUCK	415	18	49	129	62	42	50	40	16	4	5
UNCLASSIFY	59	4	16	18	12	1	5	2	1	0	0
2 SINGLE	70	27	34	7	2	0	0	0	0	0	0
3 SINGLE	29	0	5	9	10	2	0	3	0	0	0
2S-1	11	0	7	1	3	0	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	8	0	1	4	1	1	0	1	0	0	0
2S-2	74	0	20	24	18	7	2	3	0	0	0
" " SPLIT	3	0	2	0	1	0	0	0	0	0	0
3S-2	475	0	39	200	72	40	53	50	14	3	4
" " SPLIT	11	0	0	7	0	1	1	1	1	0	0
2S-3	3	0	2	0	1	0	0	0	0	0	0
" " SPLIT	4	0	0	0	2	1	0	1	0	0	0
2S-1-2	13	0	0	0	2	3	4	2	1	0	1
3S-3	5	0	1	0	1	1	0	0	1	1	0
" " SPLIT	1	0	0	0	0	0	1	0	0	0	0
3S-1-2	9	0	0	2	0	2	2	1	1	0	1
BAD OR NC	21	0	0	3	5	1	2	4	3	1	2
ALL SINGLE	99	27	39	16	12	2	0	3	0	0	0
ALL COMBIN	617	0	72	238	101	56	63	59	18	4	6
LANE #1	615	27	102	213	96	41	57	54	16	5	4
LANE #2	122	0	9	44	22	18	8	12	5	0	4

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	0	0	0	3	3	11
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	36	88	112	185	116	121	35	27

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	22	80	67
NO. PM	83	78	62	83	82	64	33	49	46	6	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	19	43	15	26	5	22	117	340	105	14	31

TABLE 46 N.Y. I-90 @ SR 43 RENSSELEAR

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	760	33	180	143	104	72	61	49	60	43	15
SPECIAL	19	0	6	4	3	0	3	1	1	1	0
OTHER	24	0	11	10	3	0	0	0	0	0	0
LIVESTOCK	7	1	1	1	3	1	0	0	0	0	0
FUEL	28	0	1	1	1	1	1	5	8	6	4
CONCRETE	10	0	0	0	0	0	3	3	1	2	1
TANK	54	0	5	16	4	1	4	5	9	9	1
OPEN	36	4	5	6	4	3	5	2	3	3	1
MACHINERY	7	0	1	0	1	1	0	2	1	1	0
STEEL	3	0	0	0	0	1	1	0	1	0	0
FLAT BED	81	7	18	15	7	5	6	7	8	7	1
DUMP	44	4	13	10	5	5	1	1	2	3	0
BUS	74	0	46	18	9	1	0	0	0	0	0
CAR CARRY	22	0	0	2	3	8	7	2	0	0	0
BOX TRUCK	330	17	65	56	60	44	29	20	25	10	4
UNCLASSIFY	21	0	8	4	1	1	1	1	1	1	3
2 SINGLE	210	33	123	45	5	4	0	0	0	0	0
3 SINGLE	60	0	6	17	12	6	10	6	0	2	1
2S-1	13	0	6	5	1	0	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	2	0	1	0	0	0	0	0	1	0	0
2S-2	102	0	18	21	24	24	12	2	1	0	0
" " SPLIT	5	0	4	1	0	0	0	0	0	0	0
3S-2	354	0	20	49	61	37	38	39	56	41	13
" " SPLIT	4	0	0	0	1	0	1	0	2	0	0
2S-3	3	0	1	1	0	0	0	1	0	0	0
" " SPLIT	1	0	1	0	0	0	0	0	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0
3S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	6	0	0	3	0	1	0	1	0	0	1
ALL SINGLE	270	33	129	62	17	10	10	6	0	2	1
ALL COMBIN	484	0	51	78	87	61	51	42	60	41	13
LANE #1	641	30	156	112	81	58	54	43	57	39	11
LANE #2	119	3	24	31	23	14	7	6	3	4	4

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	3	5	19	34	46	58	103	84
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	118	134	90	43	21	1	1	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	19	0	0	0	0	0	0	18	104	100	98	45
NO. PM	72	44	67	66	55	4	33	27	2	0	0	6

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	51	118	71	33	18	31	118	254	64	1	1

TABLE 47 N.Y. I-87 @ SR 146 S.BOUND

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	577	44	95	171	84	51	17	63	37	13	2
SPECIAL	21	2	3	10	3	2	0	0	1	0	0
OTHER	8	1	3	2	1	1	0	0	0	0	0
LIVESTOCK	24	2	5	2	10	5	0	0	0	0	0
FUEL	31	0	8	22	0	0	0	1	0	0	0
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	55	1	8	36	5	1	1	0	2	1	0
OPEN	12	1	1	2	2	2	1	2	0	0	1
MACHINERY	3	0	0	0	1	1	0	1	0	0	0
STEEL	2	0	0	0	0	0	0	1	1	0	0
FLAT BED	58	5	9	13	7	7	0	6	6	5	0
DUMP	13	1	3	4	0	0	0	5	0	0	0
BUS	19	0	10	7	2	0	0	0	0	0	0
CAR CARRY	10	0	1	0	7	1	1	0	0	0	0
BOX TRUCK	201	16	21	41	32	19	11	37	18	5	1
UNCLASSIFY	120	15	23	32	14	12	3	10	9	2	0
2 SINGLE	121	44	67	9	1	0	0	0	0	0	0
3 SINGLE	25	0	5	13	6	1	0	0	0	0	0
2S-1	12	0	4	5	3	0	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	11	0	0	9	0	0	0	2	0	0	0
2S-2	89	0	8	36	29	13	0	1	1	1	0
" " SPLIT	6	0	1	0	3	1	0	1	0	0	0
3S-2	280	0	6	95	36	28	16	54	33	11	1
" " SPLIT	14	0	2	1	1	2	0	3	3	1	1
2S-3	3	0	1	1	1	0	0	0	0	0	0
" " SPLIT	7	0	1	2	0	2	1	1	0	0	0
2S-1-2	0	0	0	0	0	0	0	0	0	0	0
3S-3	2	0	0	0	1	1	0	0	0	0	0
" " SPLIT	1	0	0	0	0	0	0	1	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	6	0	0	0	3	3	0	0	0	0	0
ALL SINGLE	146	44	72	22	7	1	0	0	0	0	0
ALL COMBIN	425	0	23	149	74	47	17	63	37	13	2
LANE #1	408	38	70	102	60	34	14	57	27	4	2
LANE #2	169	6	25	69	24	17	3	6	10	9	0

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	0	1	1	7	5	31
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	26	85	122	106	135	35	19	4

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	28	56	68	47	54	68	31
NO. PM	62	69	47	43	4	0	0	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	25	73	35	13	14	24	81	218	92	2	0

TABLE 48 N.Y. I-90 W.BOUND @ CHAUTAUQUA CREEK

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	886	16	47	208	154	73	62	110	181	23	12
SPECIAL	50	3	2	11	14	8	3	4	4	1	0
OTHER	6	0	2	1	3	0	0	0	0	0	0
LIVESTOCK	6	0	1	3	1	0	1	0	0	0	0
FUEL	4	0	0	2	0	1	0	0	1	0	0
CONCRETE	1	0	0	0	0	0	0	0	0	1	0
TANK	65	0	0	29	6	1	0	2	19	4	4
OPEN	44	2	3	11	8	0	0	4	14	1	1
MACHINERY	4	0	0	0	0	0	2	2	0	0	0
STEEL	16	0	0	0	2	1	0	10	3	0	0
FLAT BED	116	0	8	35	14	3	6	12	29	8	1
DUMP	25	1	1	3	8	0	0	3	6	0	3
BUS	14	0	1	4	9	0	0	0	0	0	0
CAR CARRY	20	0	0	0	10	7	0	2	1	0	0
BOX TRUCK	497	9	27	104	77	52	48	69	101	7	3
UNCLASSIFY	18	1	2	5	2	0	2	2	3	1	0
2 SINGLE	74	16	38	16	4	0	0	0	0	0	0
3 SINGLE	24	0	1	5	14	0	0	3	0	0	0
2S-1	17	0	4	10	2	1	0	0	0	0	0
4 SINGLE	0	0	0	0	0	0	0	0	0	0	0
3S-1	3	0	0	0	2	1	0	0	0	0	0
2S-2	101	0	2	31	37	26	4	0	1	0	0
" " SPLIT	6	0	1	1	0	0	0	1	2	1	0
3S-2	578	0	1	126	80	44	55	88	159	17	8
" " SPLIT	51	0	0	15	10	0	1	11	10	2	2
2S-3	2	0	0	1	0	0	0	0	1	0	0
" " SPLIT	6	0	0	0	1	0	0	2	2	1	0
2S-1-2	13	0	0	1	0	0	0	7	4	1	0
3S-3	4	0	0	0	3	0	0	0	1	0	0
" " SPLIT	2	0	0	0	0	0	1	0	0	1	0
3S-1-2	1	0	0	0	0	0	0	0	1	0	0
BAD OR NC	6	0	0	1	1	1	1	0	0	0	2
ALL SINGLE	98	16	38	22	18	0	0	3	0	0	0
ALL COMBIN	782	0	8	185	135	72	61	107	181	23	10
LANE #1	738	14	45	166	125	63	53	96	152	16	8
LANE #2	148	2	2	42	29	10	9	14	29	7	4

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	0	1	3	4	9	12
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	51	82	178	134	200	128	65	19

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	6	39	90	86	128	126	103
NO. PM	134	97	83	4	0	0	0	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	27	48	10	14	4	41	101	438	177	17	9

TABLE 49 OHIO I80 OVER PAINE

GVW IN KIPS-	TOTAL	0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	739	27	39	127	117	95	91	140	82	20	1
SPECIAL	6	0	1	1	1	0	0	1	2	0	0
OTHER	8	4	2	2	0	0	0	0	0	0	0
LIVESTOCK	3	0	0	0	1	0	0	1	1	0	0
FUEL	3	0	0	1	0	0	0	0	2	0	0
CONCRETE	1	0	0	0	1	0	0	0	0	0	0
TANK	55	1	3	16	7	2	4	7	7	8	0
OPEN	35	1	0	5	6	1	5	6	9	2	0
MACHINERY	6	0	0	1	0	3	1	0	1	0	0
STEEL	7	0	0	0	0	0	2	1	4	0	0
FLAT BED	100	5	5	22	19	10	11	18	6	4	0
DUMP	23	2	1	4	0	1	3	7	4	1	0
BUS	7	0	1	4	0	1	0	1	0	0	0
CAR CARRY	7	0	0	0	0	2	4	0	0	1	0
BOX TRUCK	404	11	15	53	69	66	57	86	43	3	1
UNCLASSIFY	74	3	11	18	13	9	4	12	3	1	0
2 SINGLE	53	27	23	2	0	1	0	0	0	0	0
3 SINGLE	19	0	5	9	3	1	1	0	0	0	0
2S-1	10	0	1	4	4	0	0	1	0	0	0
4 SINGLE	2	0	0	0	0	0	1	0	1	0	0
3S-1	9	0	0	3	3	0	1	0	2	0	0
2S-2	86	0	5	23	26	26	2	1	3	0	0
" " SPLIT	6	0	3	1	0	0	1	0	1	0	0
3S-2	480	0	1	77	70	65	70	121	63	12	1
" " SPLIT	56	0	0	7	8	2	10	13	9	7	0
2S-3	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	2	0	1	0	1	0	0	0	0	0	0
2S-1-2	5	0	0	0	0	0	1	4	0	0	0
3S-3	7	0	0	1	2	0	1	0	2	1	0
" " SPLIT	1	0	0	0	0	0	0	0	1	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	3	0	0	0	0	0	3	0	0	0	0
ALL SINGLE	74	27	28	11	3	2	2	0	1	0	0
ALL COMBIN	662	0	11	116	114	93	86	140	81	20	1

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	1	0	12	15	40	99
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	134	148	130	88	57	12	2	1

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	0	25	85
NO. PM	95	101	104	112	97	66	54	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	22	34	13	5	9	44	113	398	90	7	4

TABLE 50 OHIO I80 OVER RT 43 DISKS 1,2 FEB 11,1982

	TOTAL	GVW IN KIPS-0 TO 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 150
ALL TRUCKS	750	21	32	84	177	78	58	76	147	54	23
SPECIAL	134	4	7	14	30	20	9	18	21	7	4
OTHER	4	0	2	0	1	0	1	0	0	0	0
LIVESTOCK	2	0	0	1	1	0	0	0	0	0	0
FUEL	1	0	0	0	1	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0	0	0	0	0
TANK	30	0	0	9	8	0	2	0	7	5	0
OPEN	34	1	1	4	7	2	2	0	10	3	4
MACHINERY	10	0	1	0	1	1	1	2	3	0	1
STEEL	33	0	0	1	4	0	0	7	12	8	1
FLAT BED	83	5	6	23	24	3	3	4	9	4	2
DUMP	52	0	1	3	12	2	4	1	9	11	9
BUS	1	0	1	0	0	0	0	0	0	0	0
CAR CARRY	29	0	0	0	19	4	4	2	0	0	0
BOX TRUCK	335	11	13	30	88	45	32	42	78	15	2
UNCLASSIFY	2	0	0	0	0	1	0	0	0	1	0
2 SINGLE	43	21	21	1	0	0	0	0	0	0	0
3 SINGLE	22	0	6	8	6	1	1	0	0	0	0
2S-1	12	0	3	5	2	2	0	0	0	0	0
4 SINGLE	3	0	0	0	0	0	0	0	3	0	0
3S-1	13	0	1	4	1	2	1	3	1	0	0
2S-2	73	0	1	17	37	13	4	1	0	0	0
" " SPLIT	1	0	0	1	0	0	0	0	0	0	0
3S-2	503	0	0	38	110	59	50	66	129	40	11
" " SPLIT	59	0	0	10	18	1	2	3	11	10	4
2S-3	1	0	0	0	1	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	1	0	0	0	0	0	0	1	0	0	0
3S-3	16	0	0	0	2	0	0	2	1	4	7
" " SPLIT	2	0	0	0	0	0	0	0	2	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	1	0	0	0	0	0	0	0	0	0	1
ALL SINGLE	68	21	27	9	6	1	1	0	3	0	0
ALL COMBIN	681	0	5	75	171	77	57	76	144	54	22
LANE #1	699	21	29	80	166	71	54	72	137	50	19
LANE #2	51	0	3	4	11	7	4	4	10	4	4

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	0	0	0	4	14	47
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	104	183	175	100	71	16	16	20

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	0	14	113
NO. PM	130	110	137	111	135	0	0	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	12	37	19	3	11	20	95	402	143	7	1

Table 51: Metric Conversions for Tables 5 through 50

1 kip	= 454 kilograms
1 foot	= .305 meters
1 mph	= 1.6 kph

Table 52: Comparison of Study Data with 1975 National Truck Characteristic Report

Weight Group kips	FHWA* Interstate Sites	BWS All Sites	BWS Interstate Sites
	Frequency per 1000 Vehicles		
30 or more	607	622	656
40 or more	466	482	509
50 or more	374	386	404
60 or more	285	290	296
70 or more	150	160	143
80 or more	17	58	41

*1975 National Truck Characteristics Report, US DOT, April 1978

1 kip - 454 kilograms

Table 53: Damage Spectrum Factor (Lo)

Category	Damage Factor
All Sites	.41
Georgia	.26
Ohio	.50
New York	.35
Illinois	.51
Texas	.51
Arkansas	.39
California	.36
Weekdays	.41
Weekends	.39
Interstate	.40
US Routes	.48
State Routes	.40

Table 54: I-90 Static Scale Results - January 22, 1982

GVW IN KIPS	FROM	0	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
	TO	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
	TOTAL																
ALL TRUCKS	293	10	13	11	39	60	17	19	17	9	8	17	22	24	25	2	0
2 SINGLE	29	10	13	6	0	0	0	0	0	0	0	0	0	0	0	0	0
3 SINGLE	8	0	0	3	1	2	2	0	0	0	0	0	0	0	0	0	0
2S-1	6	0	0	1	2	1	0	1	1	0	0	0	0	0	0	0	0
2S-2	20	0	0	1	5	3	3	5	2	0	0	0	0	0	0	0	0
3S-2	206	0	0	0	28	50	12	13	13	7	7	16	18	24	18	0	0
3S-2 SPLIT	16	0	0	0	3	3	0	1	0	0	0	0	1	0	6	2	0
3S-3	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	7	0	0	0	0	0	0	0	0	2	1	0	3	0	1	0	0

BY HAULING CATEGORY		
BOX	194	NOT CLASSIFIED BY WEIGHT
FLAT	48	
TANK	33	
DUMP	9	
OTHER	9	

BY ARRIVAL TIME	
11:00 - 12:00	47
12:00 - 1:00	42
1:00 - 2:00	52
2:00 - 3:00	51
3:00 - 4:00	50
4:00 - 5:00	31
5:00 - 5:45	20

1 kip = 454 kilograms

TABLE 55 OHIO I90 OVER PAINE ALL JAN 22,1982

GVW IN KIPS	TOTAL	0 TO 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80	80 85	85 90	90 150
ALL TRUCKS	218	11	2	10	15	32	14	21	13	8	7	7	13	29	20	13	2	1
SPECIAL	5	1	0	0	0	1	0	0	0	0	0	0	1	0	2	0	0	0
OTHER	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONCRETE	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
TANK	22	0	0	1	3	4	1	0	2	0	1	0	0	1	3	6	0	0
OPEN	15	0	0	1	0	4	2	0	0	1	0	0	0	3	2	1	1	0
MACHINERY	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
STEEL	4	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0
FLAT BED	29	2	1	3	2	6	5	1	1	0	1	0	1	1	2	3	0	0
DUMP	11	2	0	0	2	0	0	1	0	1	1	1	2	1	0	0	0	0
BUS	3	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
CAR CARRY	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
BOX TRUCK	123	3	1	5	8	16	6	17	9	6	4	5	8	22	9	2	1	1
UNCLASSIFY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 SINGLE	12	11	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
3 SINGLE	3	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2S-1	4	0	0	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0
4 SINGLE	2	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
3S-1	8	0	0	0	3	3	0	0	0	0	0	0	0	1	1	0	0	0
2S-2	33	0	0	2	4	6	4	9	3	0	1	0	1	3	0	0	0	0
" " SPLIT	2	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
3S-2	123	0	1	6	6	16	5	11	10	4	3	5	10	21	15	7	2	1
" " SPLIT	22	0	0	0	2	3	4	0	0	0	1	1	0	2	3	6	0	0
2S-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2S-1-2	3	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0
3S-3	4	0	0	0	0	1	1	0	0	1	0	0	0	0	1	0	0	0
" " SPLIT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3S-1-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAD OR NC	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
ALL SINGLE	17	11	1	1	0	1	0	1	0	1	0	0	0	1	0	0	0	0
ALL COMBIN	199	0	1	9	15	31	14	20	13	6	6	7	13	28	20	13	2	1

SPEED-MPH	0-31	31-34	34-37	37-40	40-43	43-46	46-49	49-52
NO.TRUCKS	0	0	1	0	7	8	22	50
SPEED-MPH	52-55	55-58	58-61	61-64	64-67	67-70	70-73	73+
NO.TRUCKS	45	40	26	15	4	0	0	0

ARRIVAL	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
NO. AM	0	0	0	0	0	0	0	0	0	0	0	58
NO. PM	42	32	21	34	31	0	0	0	0	0	0	0

LENGTH	-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60+
NO.	2	9	6	1	2	16	25	122	27	5	3

Table 56: Calibration Vehicle Crossings

Table 56A - Calibration Vehicle Weighings - Gross Weights

Date	Location	Static Wt. kips	WIM Weight (kips)					
2/10/81	I-30 & 67 - ARK	58.50	58.4	57.9	58.8	58.7		
2/17/81	I-40 & 161 - ARK	58.50	58.5	58.3	58.2	59.1	58.7	
2/20/81	I-40 & 25 - ARK	58.50	58.6	58.6	58.7	58.9		
2/23/81	US 67 - ARK	58.50	58.8	60.7	59.7	57.2	56.9	
3/02/81	US 65 & 256 -ARK	58.50	59.0	58.2	56.2	58.1		
3/05/81	I-30 & 29 - ARK	58.50	58.1	58.7	58.0	59.0	61.4	56.6
3/19/81	I-75 - GA	36.18	33.4	34.7	35.5	34.1		
3/19/81	US 59 - TEX	46.10	48.1	48.0	47.2	45.4	46.5	46.7
			47.0	43.8	45.3	44.6		
3/24/81	SR 36 - TEX	45.68	46.5	44.7	47.0	45.0	44.7	44.7
			46.1	45.5	46.7	45.2	46.1	
3/28/81	I-45 - TEX	45.82	45.8	46.1	44.1	45.7	45.9	
4/13/81	I-10 & 77 - TEX	46.03	47.9	44.7	45.1	46.2	46.6	

Table 56B - Calibration Vehicle Weighings - Rear Tandem

2/17/81	I-40 & 161 - ARK	30.60	29.4	31.4	26.4	31.6		
2/20/81	I-40 & 25 - ARK	30.60	30.2	30.0	30.0	29.8		
2/23/81	US 67 - ARK	30.60	31.8	31.6	31.2	30.4	30.2	
3/02/81	US 65 & 256 - ARK	30.60	33.0	31.8	31.6	31.8		
3/05/81	I-30 & 29 - ARK	30.60	29.2	29.6	29.2	30.2	31.4	28.6
3/19/81	US 59 - TEX	14.60	14.0	13.8	13.8	13.8	12.8	14.2
			13.4	9.8	14.0	13.4		
3/24/81	SR 36 - TEX	16.06	17.4	16.8	17.4	16.8	17.1	16.5
			17.1	16.8	17.1	16.8	16.8	
3/28/81	I-45 - TEX	16.06	15.6	16.4	15.4	16.8	16.2	
4/13/81	I-10 & 77 - TEX	16.60	16.0	14.4	14.2	15.8	15.8	

1 kip = 454 kilograms

Data	No. of Crossings	Ratio: Coeff. of Variation	Difference: Standard Deviation	Mean: Ratio	Mean: Differ.
Gross Wt	74	2.3	1.12	.9981	-.0431
Rear Tandem Wt	54	7.2	1.34	.9854	-.2437

Table 57 - Summary of Calibration Vehicle Crossings

Table 58: Weigh-In-Motion Repeatability Test
June 4, 1980
I-90 & Paine Road - Span 1

Crossing	Front Axle kips	Rear Tandem kips	Gross Weight kips
1	14.10	33.20	47.30
2	14.10	36.40	50.50
3	14.20	33.20	47.40
4	10.70	33.90	44.60
5	14.20	32.70	46.90
6	14.00	33.10	47.10
7	12.60	32.60	45.10
8	14.40	32.80	47.10
9	12.90	33.70	46.60
10	13.10	34.10	47.10
11	12.70	33.90	46.50
12	14.00	32.60	46.50
13	11.90	35.00	46.90
14	14.40	33.40	47.80
15	12.50	33.00	45.50
16	14.30	32.80	47.20
17	14.00	33.80	47.80
18	14.10	33.20	47.20
19	15.10	32.70	47.80
20	11.70	34.50	46.10
21	14.30	33.00	47.40
22	12.30	34.20	46.50
23	14.40	32.70	47.10
	-----	-----	-----
Mean (kips)	13.47	33.50	46.96
Standard Deviation (kips)	1.09	.89	1.10
Coefficient of Variaton (%)	8.06	2.67	2.35

1 kip = 454 kilograms

Table 59: Weigh Station Repeatability Test
June 4, 1980
I-90, Ohio

Crossing	Front Axle kips	Rear Tandem kips	Gross Weight kips
1	14.95	32.05	47.00
2	14.35	31.85	46.20
3	15.20	33.65	48.85
4	14.65	32.35	47.00
5	15.75	33.25	49.00
6	13.60	28.60	42.20
7	15.05	33.20	48.25
8	15.55	32.60	48.15
9	14.65	31.75	46.40
10	15.15	33.60	48.75
11	15.55	29.20	44.75
12	14.90	33.25	48.15
13	15.20	32.45	47.65
14	13.75	32.65	46.40
15	13.35	32.30	45.65
	-----	-----	-----
Mean (kips)	14.70	32.18	46.96
Standard Deviation (kips)	.70	1.40	1.74
Coefficent of Variation (%)	4.73	4.35	3.71

1 KiloNewton = 4.45 kips

Table 60: Weigh Station Repeatability Test
February 11, 1982

	Mean kips	Standard Deviation kips
Steering Axle	9.070	.039
Drive Tandem	28.850	.097
Rear Tandem	42.470	.082
Gross Weight	80.380	.115

1 kip = 454 kilograms

Table 61: Repeatability of Portable Scales

Weighing	Gross Weight kips	Rear Tandem Weights kips
1	59.5	30.7
2	60.7	31.4
3	59.1	29.0
4	60.0	31.5
5	60.4	31.3

1 kip = 454 kilograms

Table 62: Bridge WIM and Pavement WIM Repeatability
May 7 ,1981

BWS Weights kips	Radian Weights* kips
68.5	65.152
65.0	71.568
68.1	65.592
67.3	63.784
68.1	65.384
69.2	68.400
68.5	65.816
66.8	67.920
67.8	65.976
65.9	67.912
67.5	72.522**
67.8	
67.8	
N = 13	N = 10
x = 67.56	x = 66.75
σ = 1.08 kips	σ = 2.11 kips
c.o.v. = 1.60%	c.o.v. = 3.17%

*High speed data
**Axle bounced - not used in calculations.
Actual Calibration Truck Weight = 67.34 kips

1 kip = 454 kilograms

Table 63: Bridge Structures used for Data Acquisition

State	Bridge Location	Traffic Direction	Span Type	Instr. Span Length ft	Girder Type	Comments
Arkansas	I-30 & US 67	West	S	84	S	50 degree skew
	I-40 & SR 161	West	S	59	S	45 degree skew
	US 67 & Mp 10.9	South	S	42	S	
	I-40 & SR 25	West	S	55	S	
	US 65 & SR 256	South	S	48	S	30 degree skew
	I-30 & CR 29	West	S	39	S	45 degree skew
Georgia	I-75 & Pleasant Valley	North	C	42	S	20 degree skew
	SR 365 (Exit 3)	North	S	31	S	
	I-75 & 83	North	S	35	S	
Texas	US 59 & FM 444	South	S	49	PC	
	Hwy 36 - Caldwell	North	S	33	S	
	I-45 & Park Road Huntsville	South	C	44	S	45 degree skew
	I-10 & US 77	West	C	59	S	
	SR 21 - Caldwell	East	S	40	RC	Panformed Reinforced Concrete
	SR 114 - Dallas	East	S	49	PC	
	I-40 & FM 2381	East	S	49	PC	
	US 287 - Iowa Park	North	S	52	PC	
California	I-10 - Colton	West	S	47	S	
	US 101 - Ventura	South	S	84	S	4 lanes, 3 deep plate girders
	SR 17 & Fruitvale Ave. - Oakland	South	S	50	S	8 lanes, 18 girders, dense traffic, hinge in first span
	SR 99 - Stockton	North	C	34	S	30 degree skew
	I-5 - Mokelumne River	North	S	42	RC	End span instrumented
	I-880 - Sacramento	East	C	83	PC	Box girder, dense

Table 63: Bridge Structures used for Data Acquisition (cont.)

State	Bridge Location	Traffic Direction	Span Type	Instr. Span Length ft	Girder Type	Comments
Illinois	I-70 - Vandalia	West	S	33	S	
	SR 55 over Ill. River - Peru	North & South	S	73	S	Data acquired simultaneously
	SR 89 - Spring Valley	South	C	50	S	
	I-80 over Little Vermillion River	West	C	90	S	Traffic carried by 2 deep plate girders
New York	I-90 & 43	East	S	87	S	
	I-90 & 203	West	S	33	S	
	I-87 & SR 146	South	S	34	S	
	I-90 over Chautaqua Creek	West	S	68	S	
Ohio	I-90 & Paine Road	East	C	37	S	
	I-80 & SR 43	West	C	36	S	

Span Type: S - Simple, C - Continuous
Girder Type: S - Steel, PC - Prestressed Concrete, RC - Reinforced Concrete

1 foot = .305 meters
1 kip = 454 kilograms

Table 64: Calibration Crossings for Arkansas
I-30 over Route 67
Skew of 50 Degrees

Crossing	Gross Weight kips	Rear Tandem Weight kips
1	58.4	28.8
2	57.9	35.8
3	58.8	39.8
4	58.7	39.8
Actual	58.5	30.6

1 kip = 454 kilograms

Table 65: Variability for Various Girder Weighting Factors

Girder	Weighting Factors 2	3	4	5	Standard Deviation kips
	1.00	1.00	1.00	1.00	2.32
	1.00	1.00	0.50	0.00	2.71
	1.00	1.00	0.60	0.20	2.60
	1.00	1.00	0.00	0.00	3.12
	0.60	1.00	0.60	0.20	2.51
	1.00	1.00	1.00	0.00	2.50
	1.00	1.00	0.60	0.00	2.65
	0.80	1.00	0.60	0.20	2.55
	1.00	1.00	1.00	0.60	2.38
	1.00	1.00	0.80	0.20	2.52
	1.00	0.70	1.00	1.00	2.28
	0.40	0.75	1.00	0.25	2.39
	0.40	1.00	1.00	0.40	2.39
	0.25	0.50	1.00	0.50	2.45
	0.25	1.00	0.75	0.25	2.43

1 kip = 454 kilograms

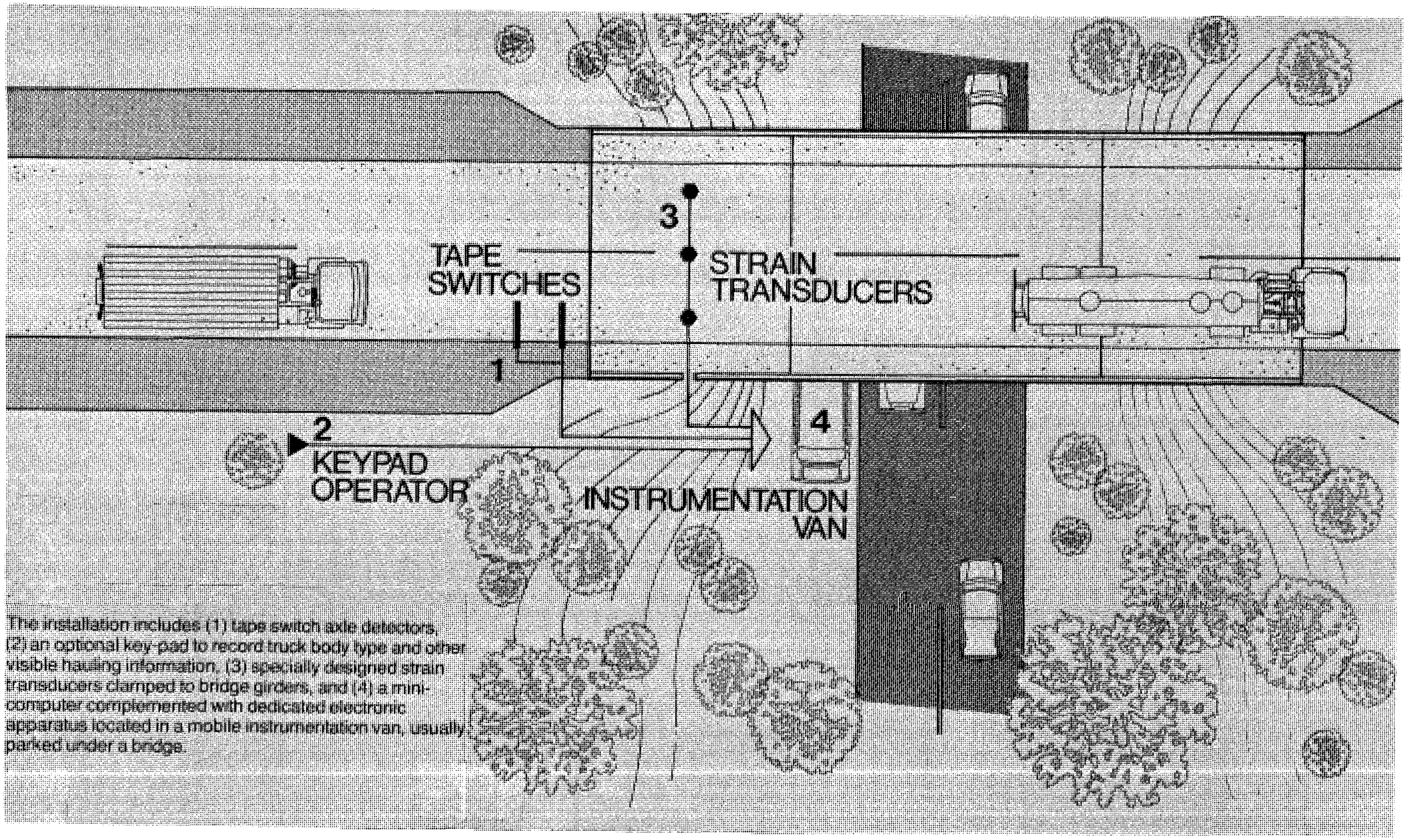

Figure 1: Typical System Setup

Figure 2 - Bridge WIM System

Figure 3 - Typical Beam Slab Bridge

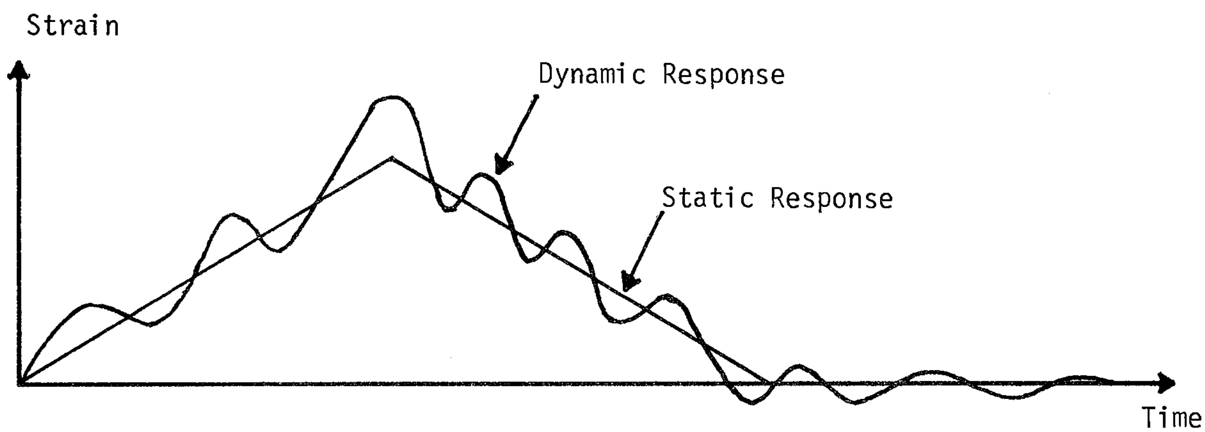

Figure 4: Strain Response due to Truck Axle Crossing

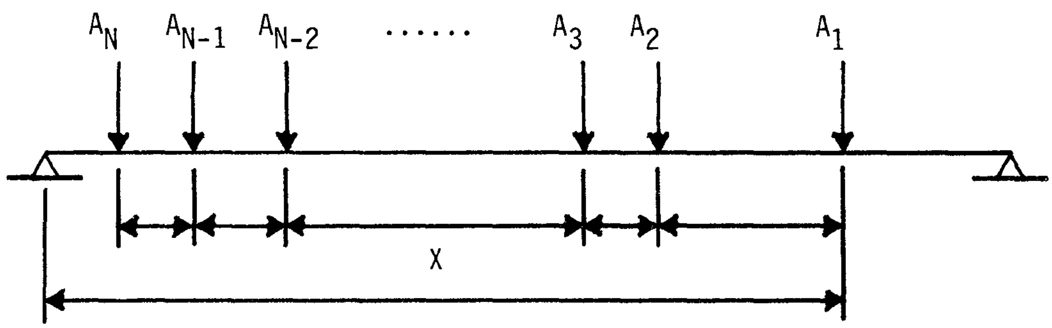

Figure 5: Location of N Axle Truck on Bridge

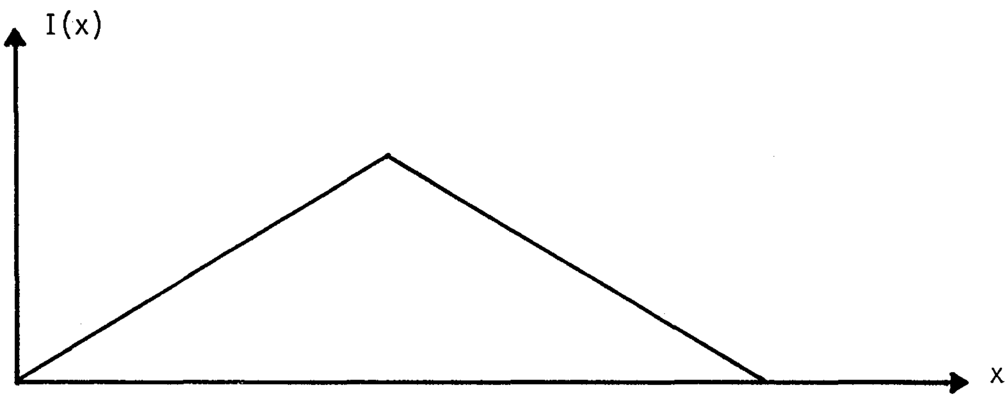

Figure 6: Influence Line, I(x), of Center Span Moment for Simple Span Bridge

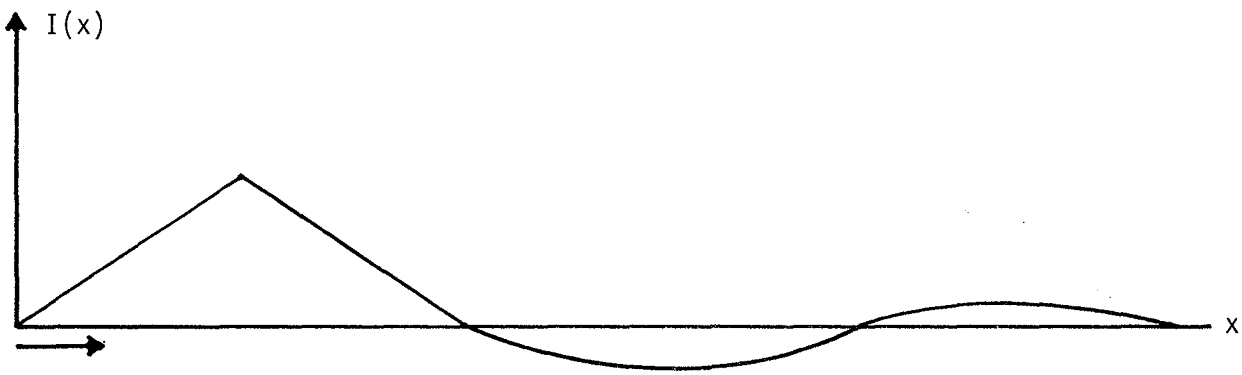

Figure 7: Influence Line, I(x), of 1st Span Center Moment for Three Span Continuous Bridge

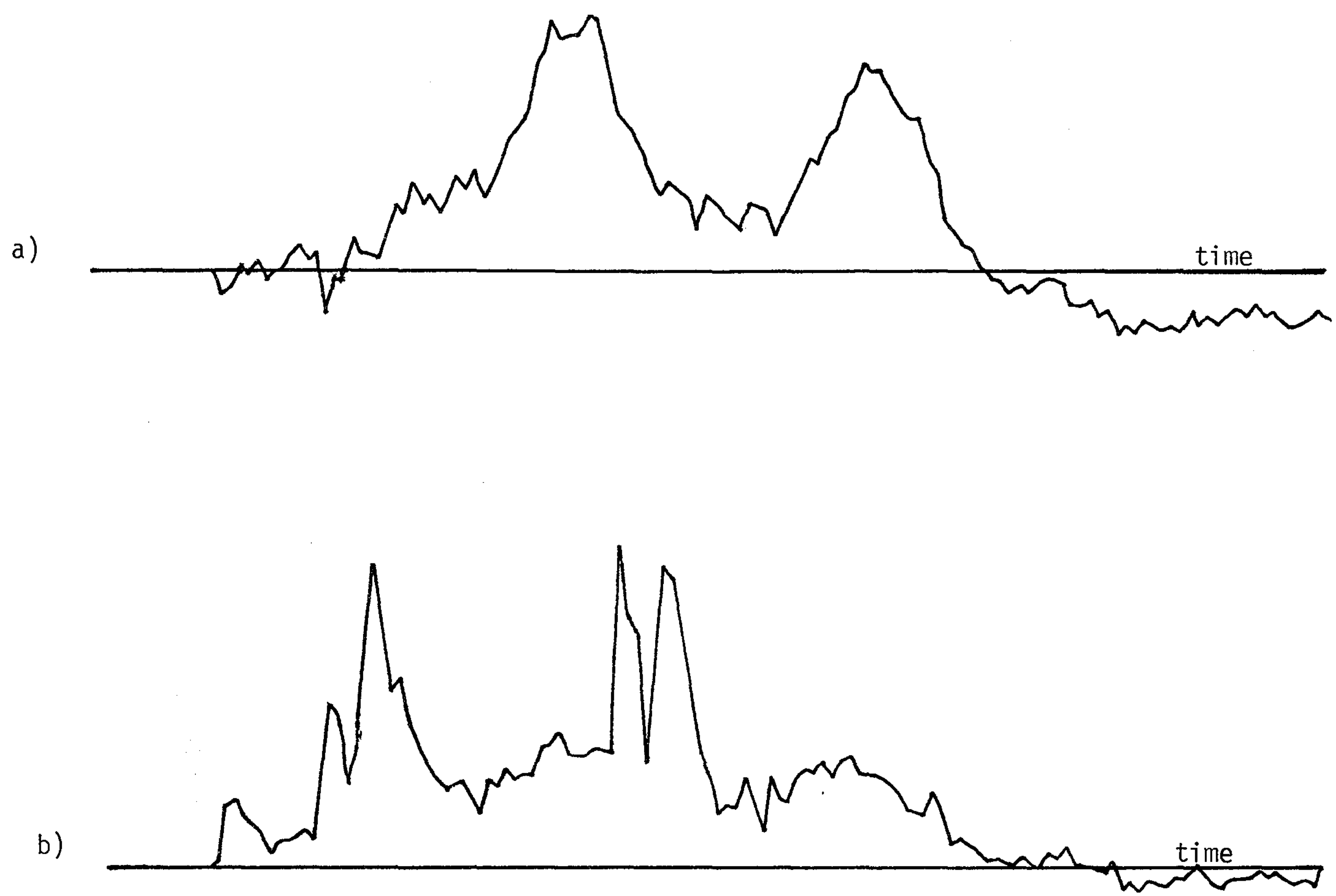

Figure 8 - Strain Records of a 3S-2 vehicle
a) at Center of Span
b) at Reaction

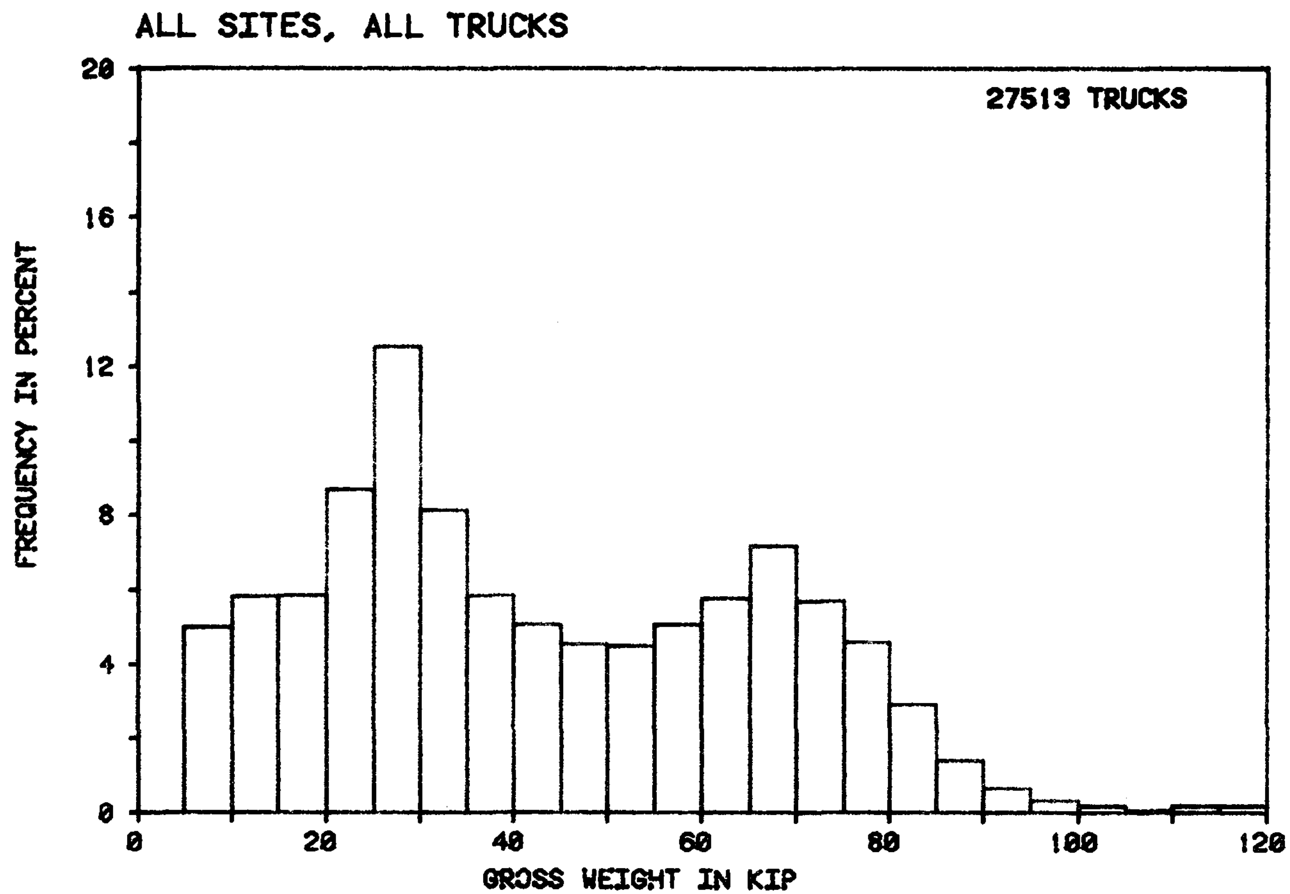

Figure 9: Gross Weight Histogram - all sites, all trucks

1 kip = 454 kilograms

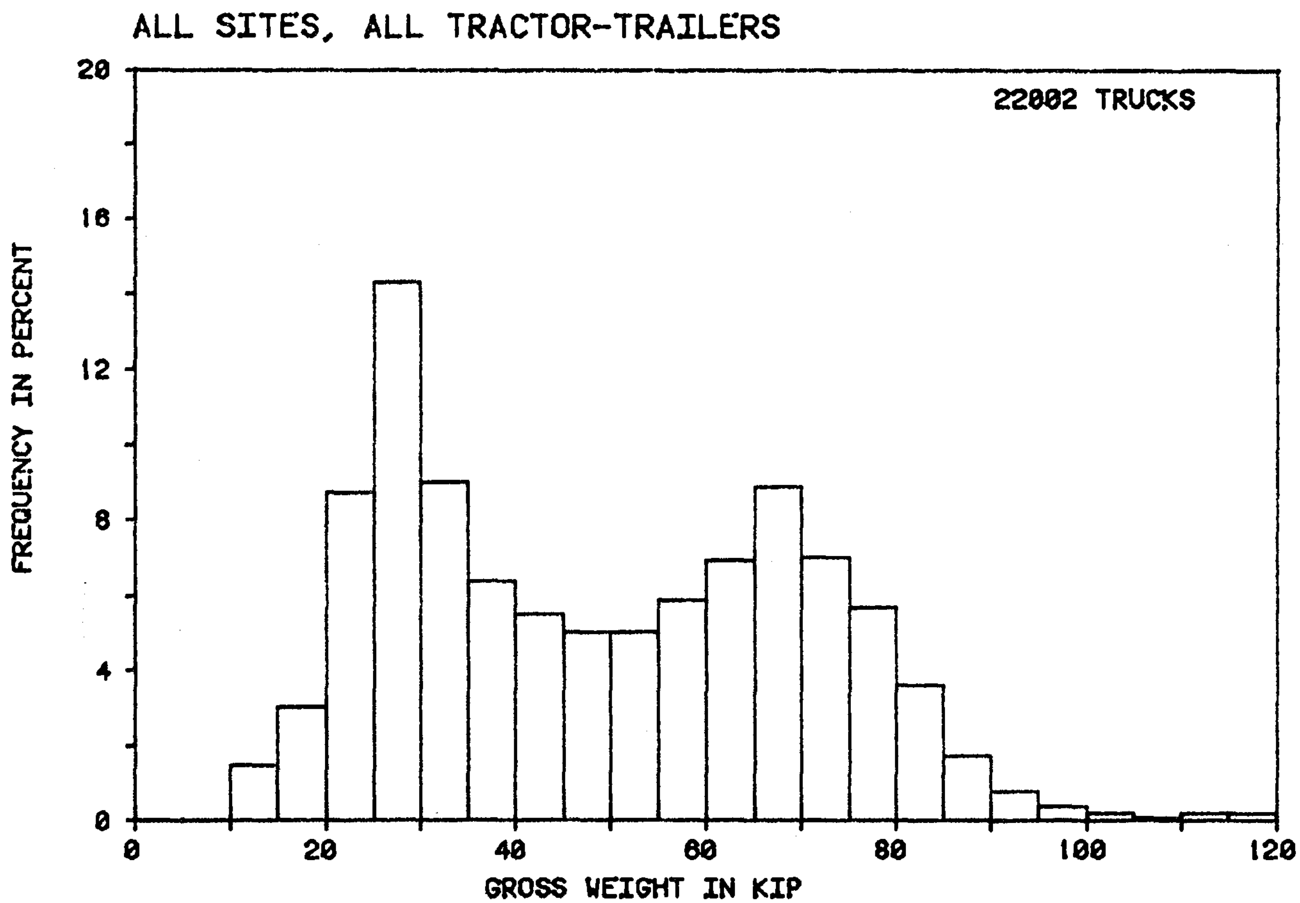

Figure 10: Gross Weight Histogram - All sites, all tractor-trailers
1 kip = 454 kilograms

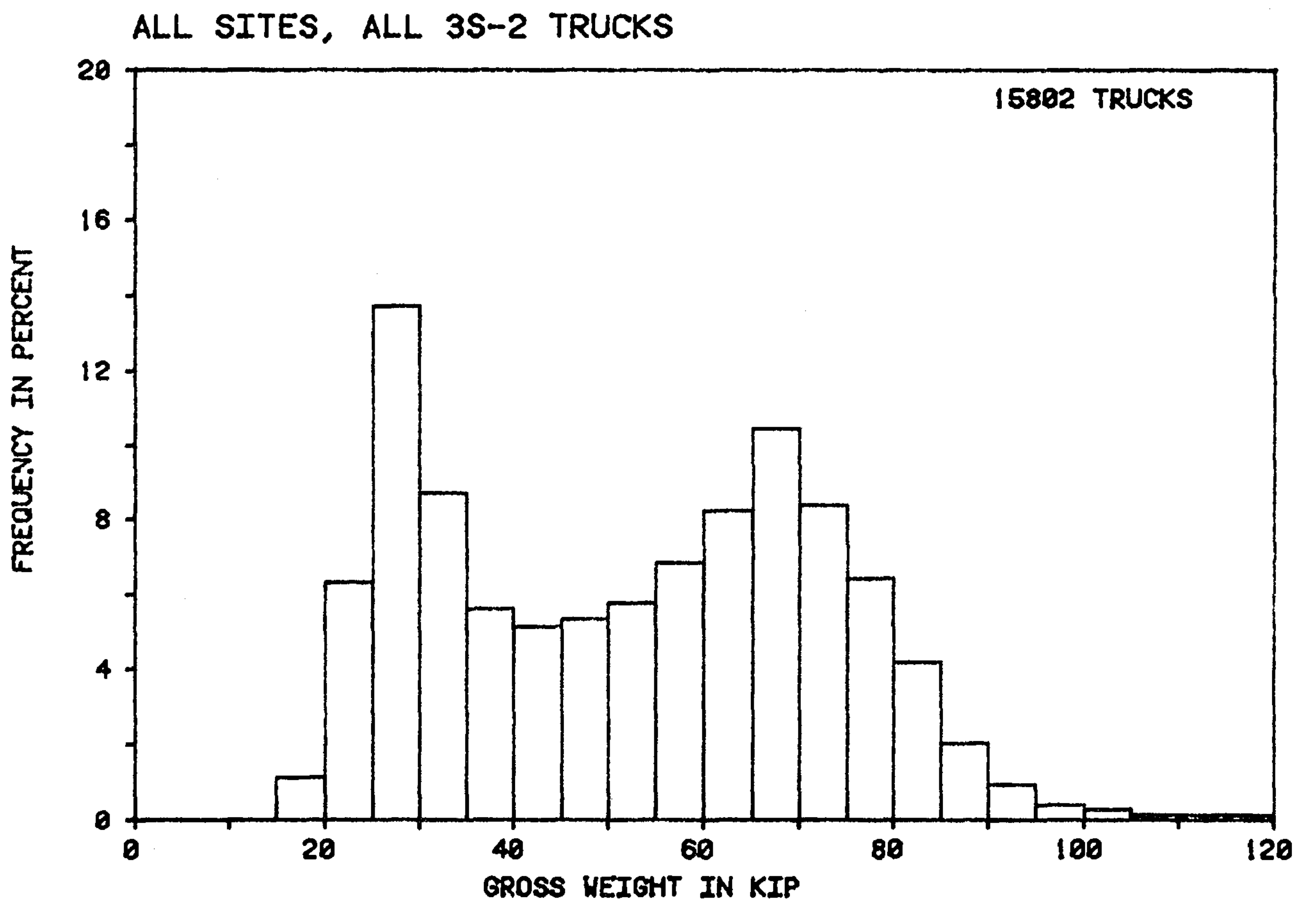

Figure 11: Gross Weight Histogram - All sites, all 3S-2 trucks
1 kip = 454 kilograms

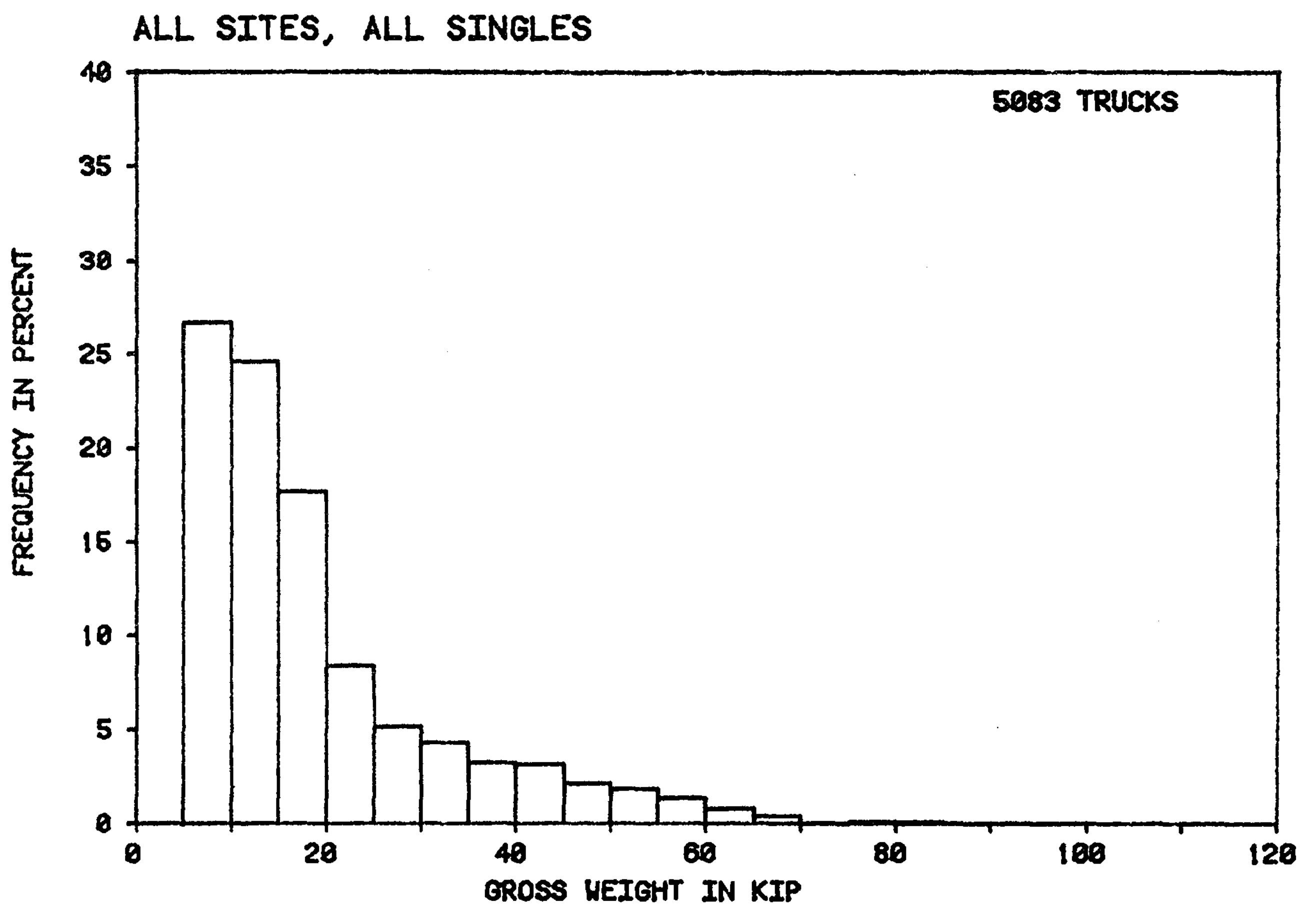

Figure 12: Gross Weight Histogram - All sites, all single trucks
1 kip = 454 kilograms

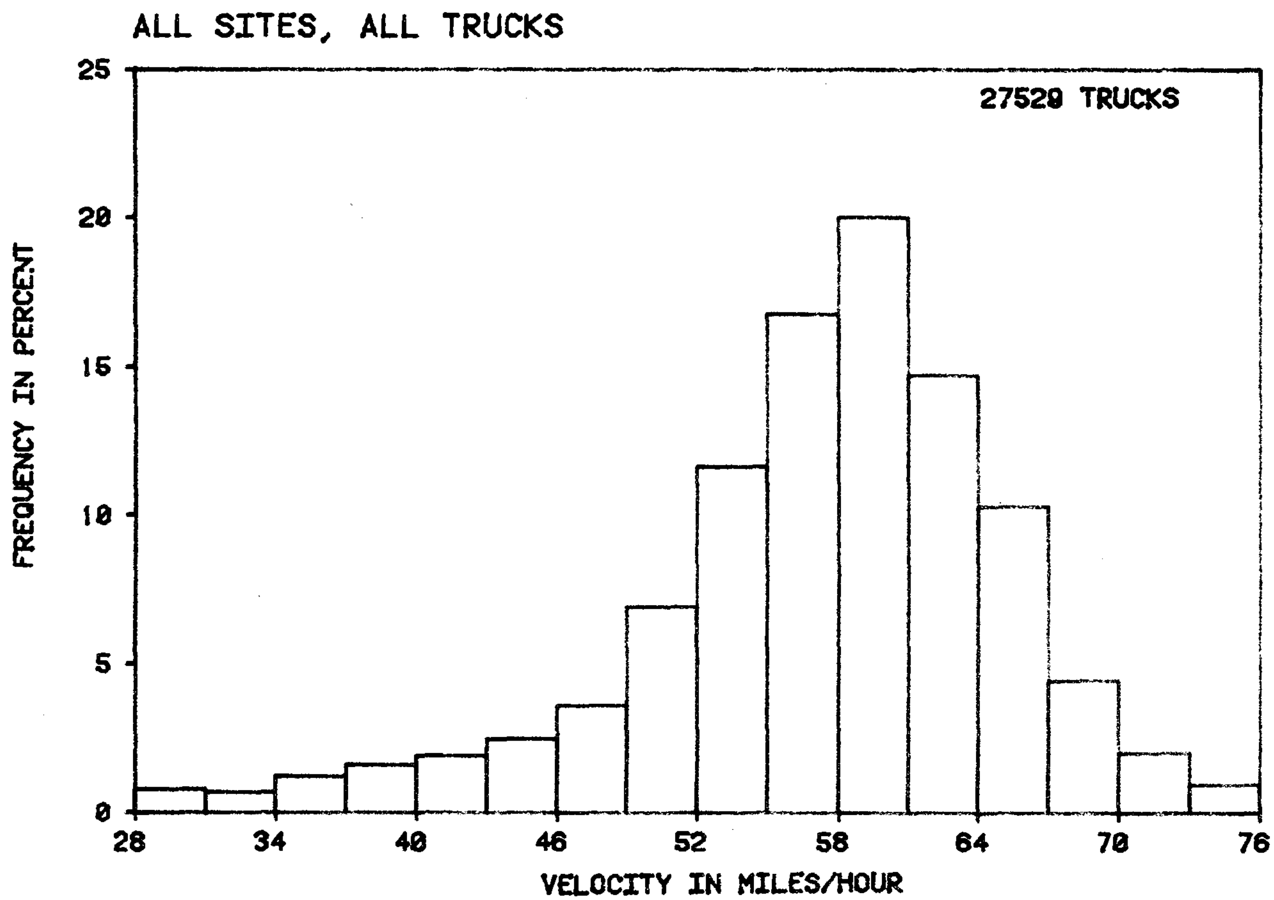

Figure 13: Velocity Histogram - All sites, all trucks
1 mph = 1.6 kph

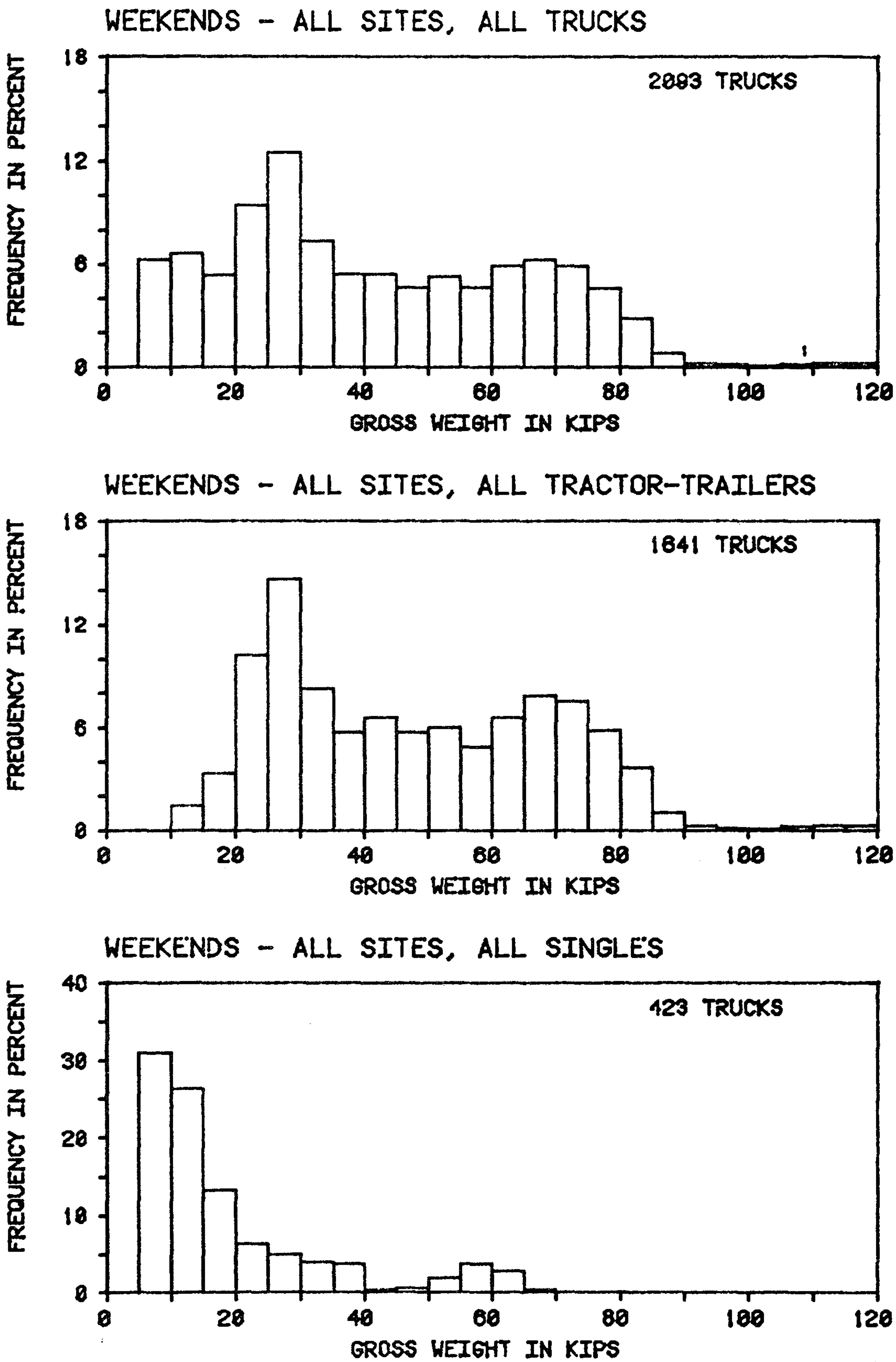

Figure 14: Gross Weight Histogram - Weekends: all sites
1 kip = 454 kilograms

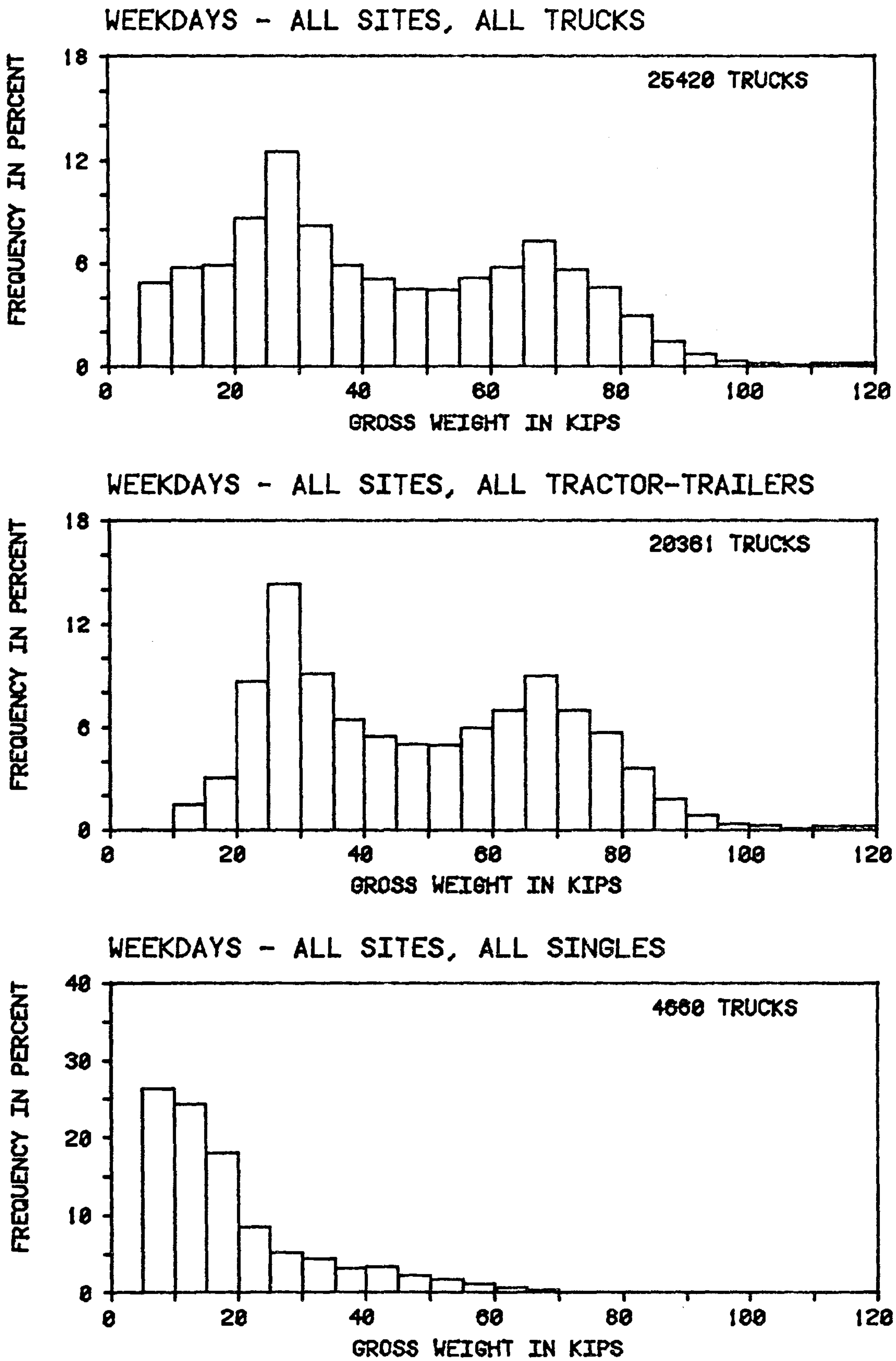

Figure 15: Gross Weight Histogram - Weekdays, all sites
1 kip = 454 kilograms

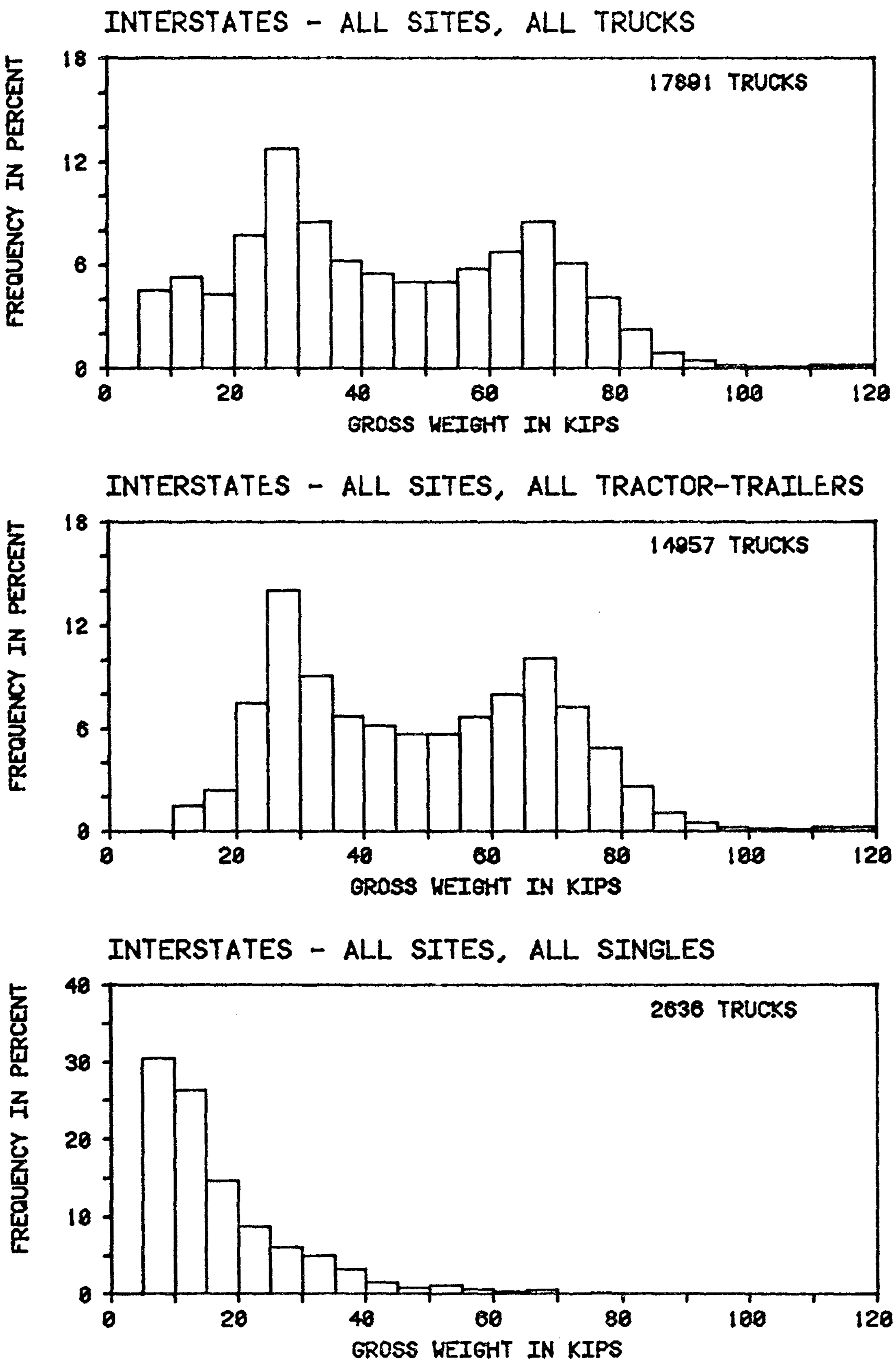

Figure 16: Gross Weight Histogram - Interstates, all sites
1 kip = 454 kilograms

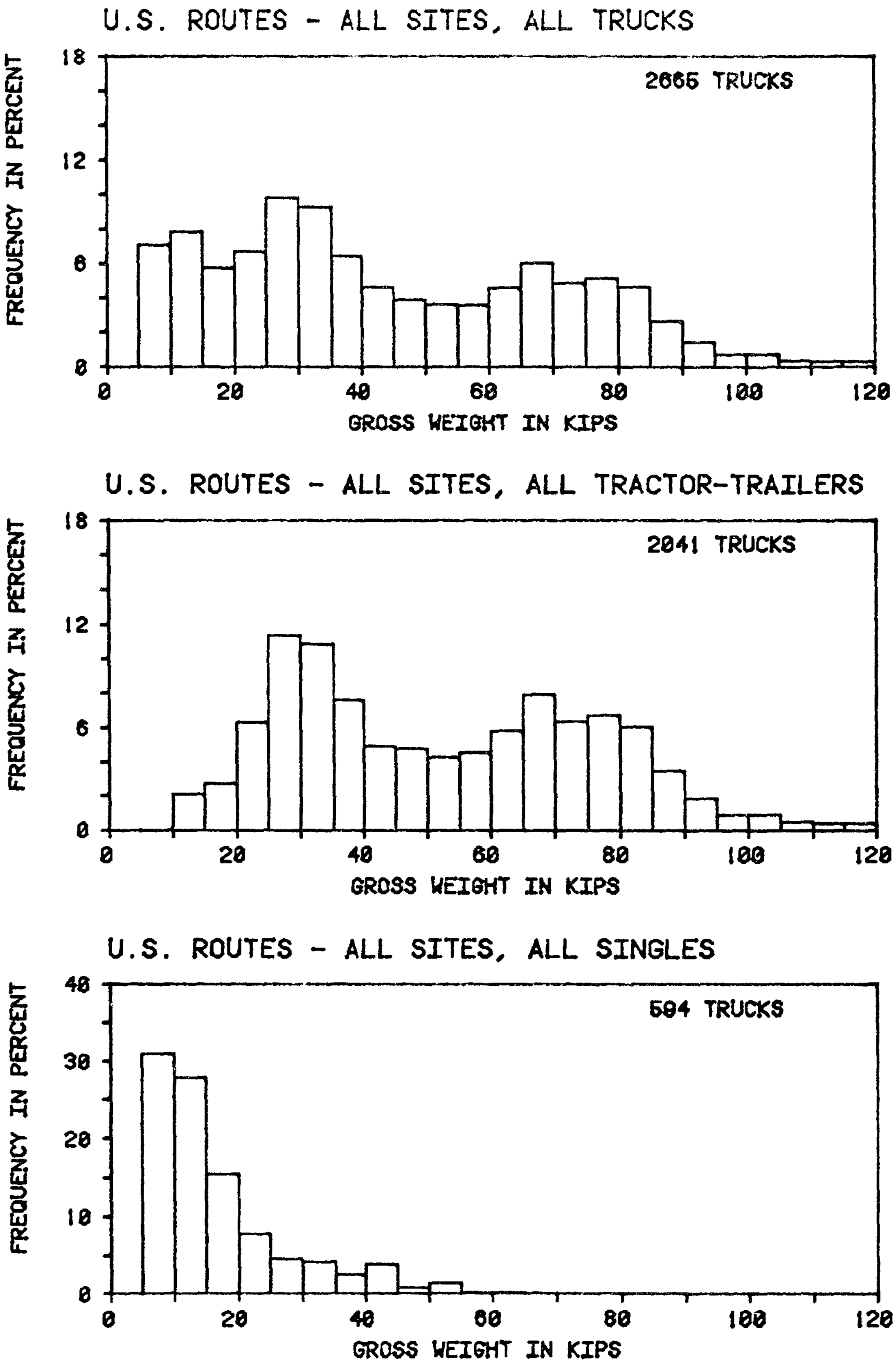

Figure 17: Gross Weight Histogram - U.S. Routes, all sites, all trucks
1 kip = 454 kilograms

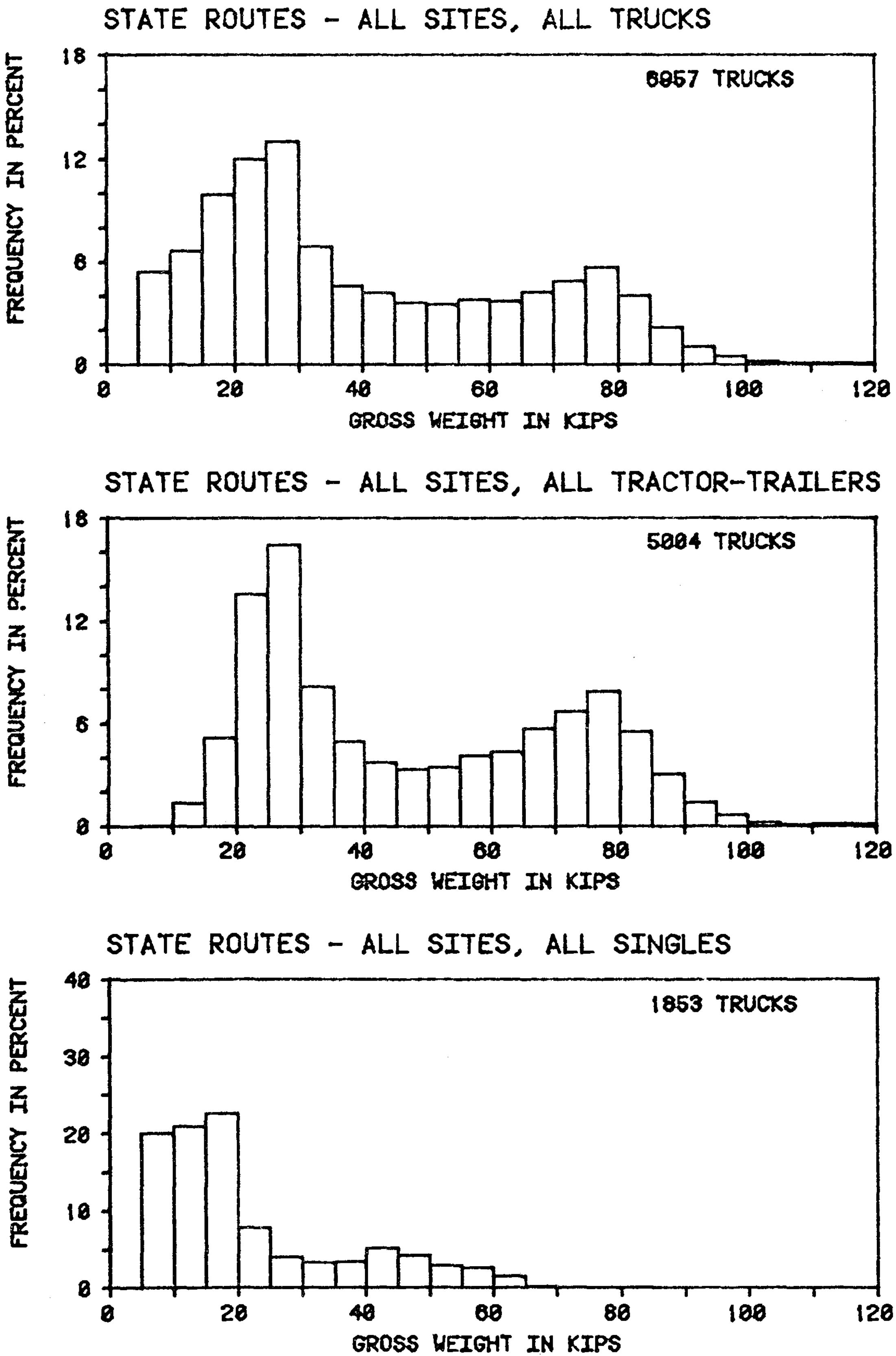

Figure 18: Gross Weight Histogram - State Routes, all sites, all trucks
1 kip = 454 kilograms

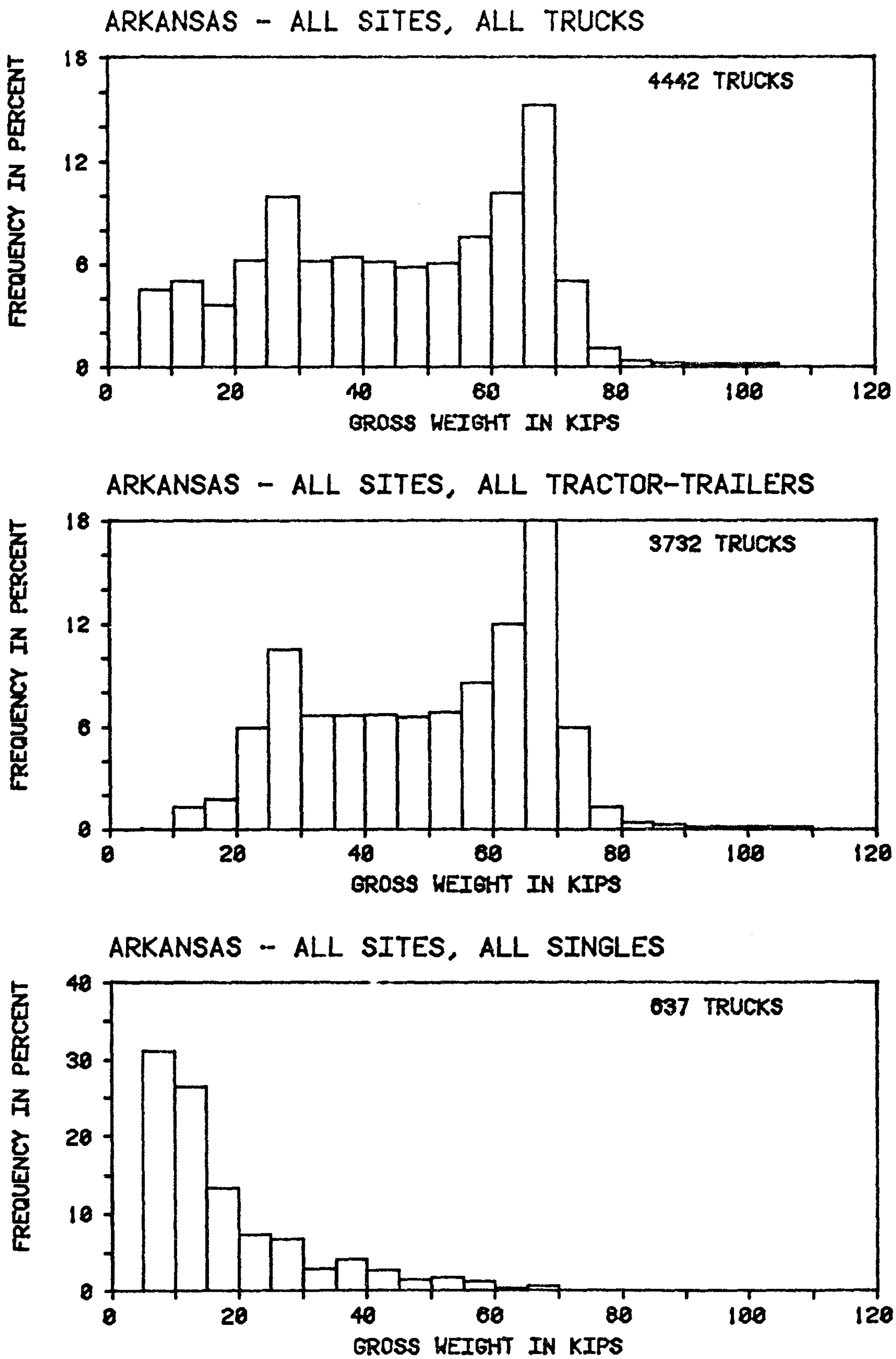

Figure 19: Gross Weight Histogram - Arkansas, all sites, all trucks
1 kip = 454 kilograms

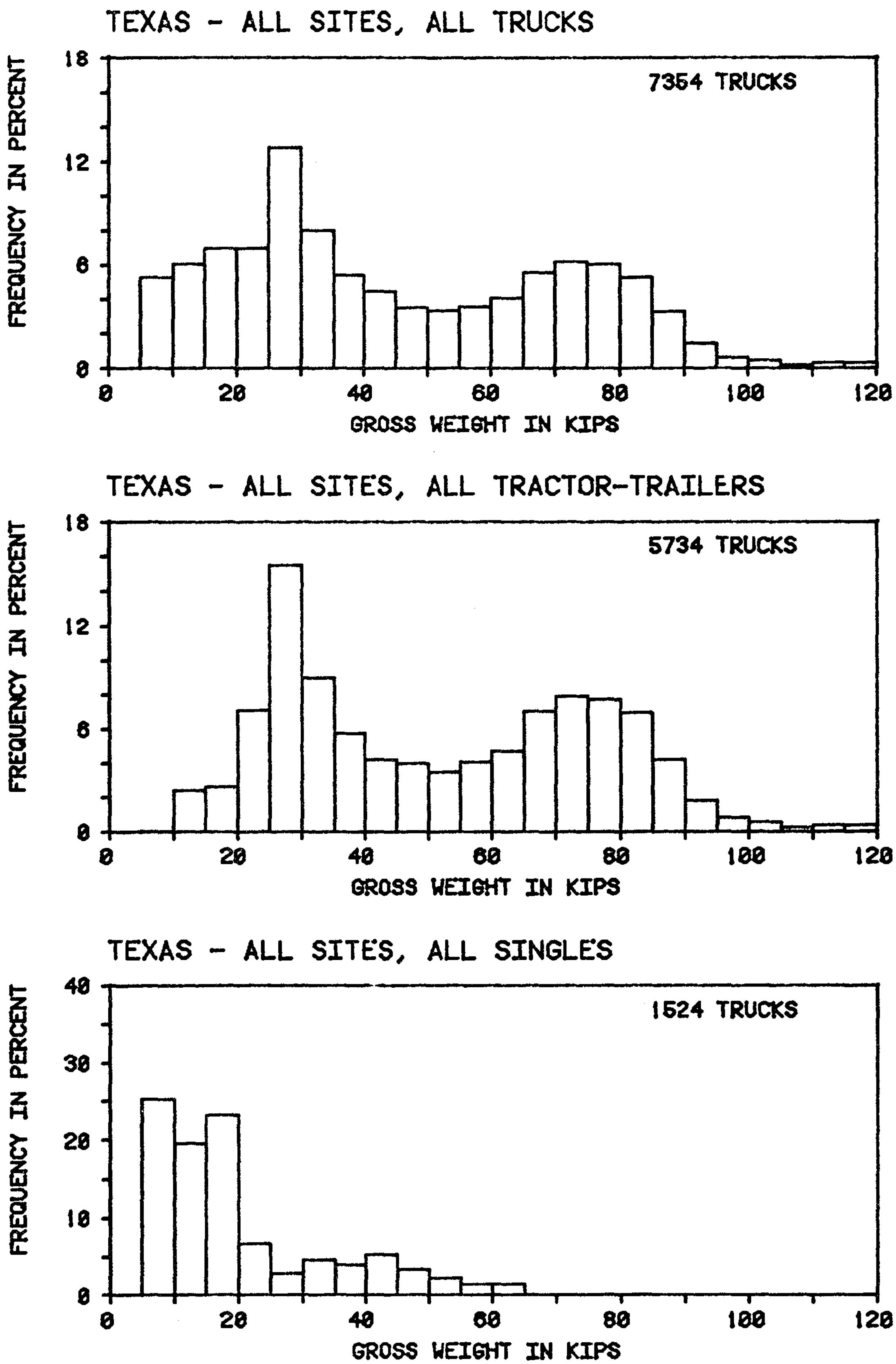

Figure 20: Gross Weight Histogram - Texas, all sites, all trucks
1 kip = 454 kilograms

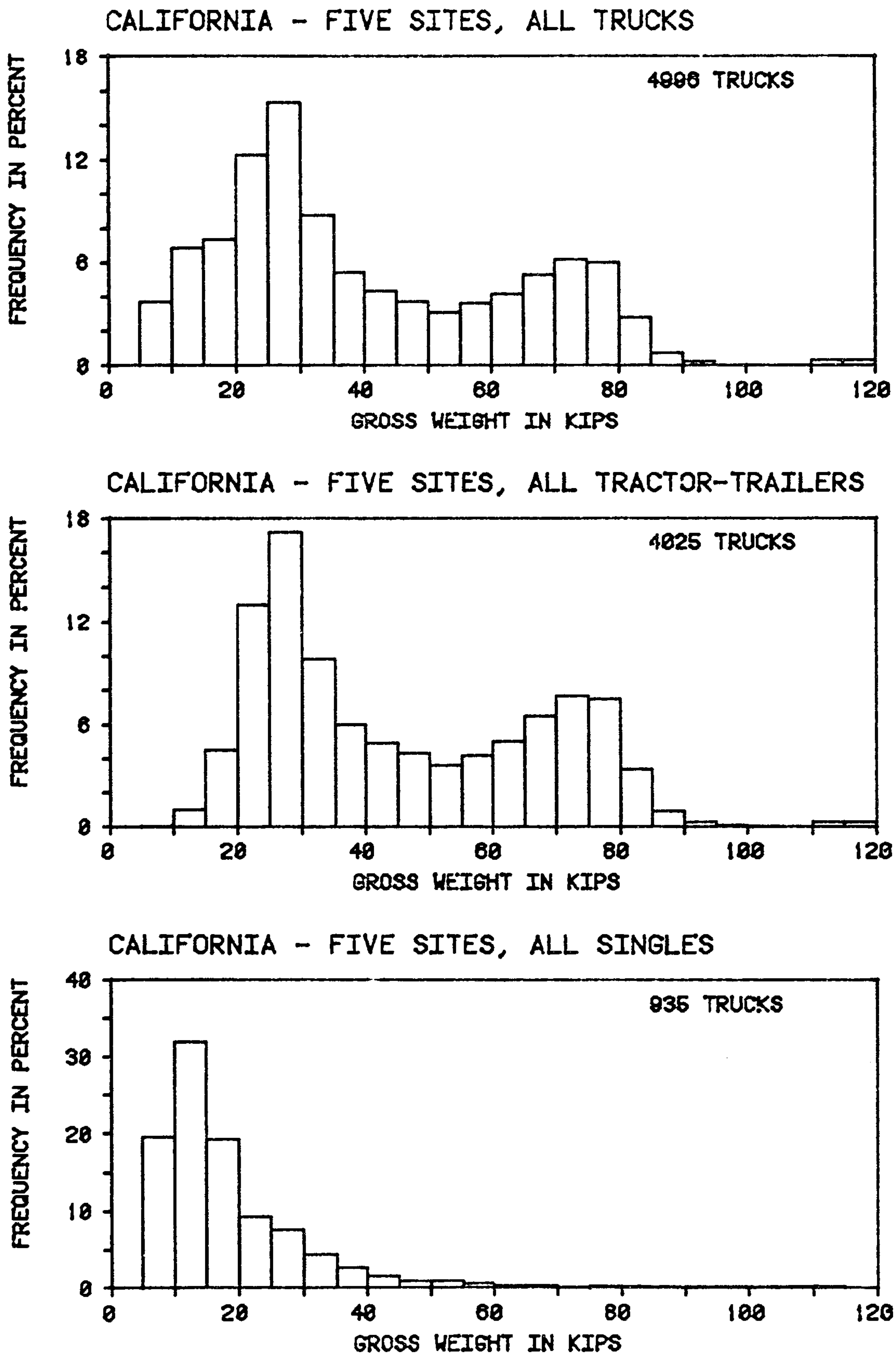

Figure 21: Gross Weight Histogram - California, five sites, all trucks
1 kip = 454 kilograms

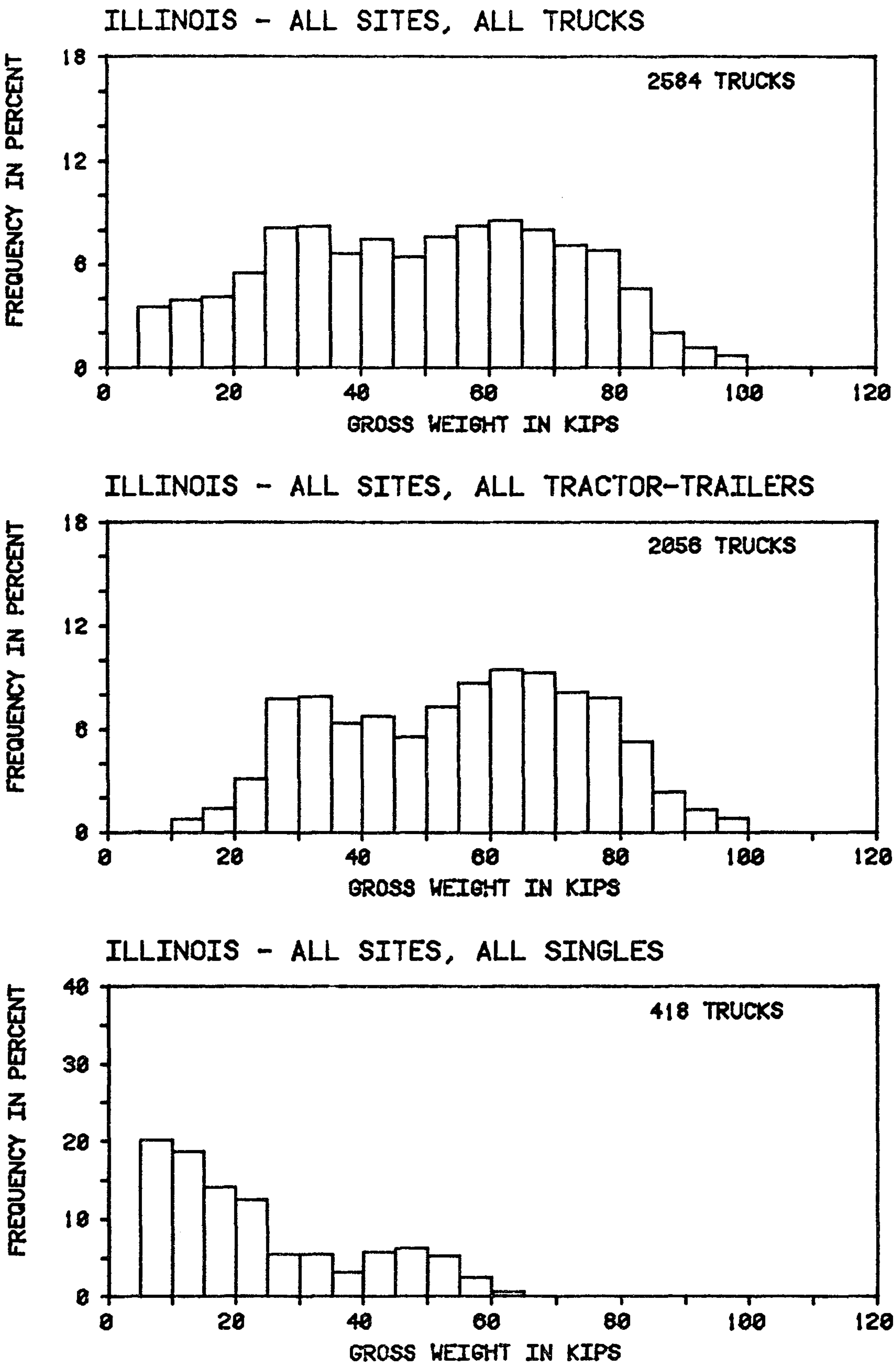

Figure 22: Gross Weight Histogram - Illinois, all sites, all trucks
1 kip = 454 kilograms

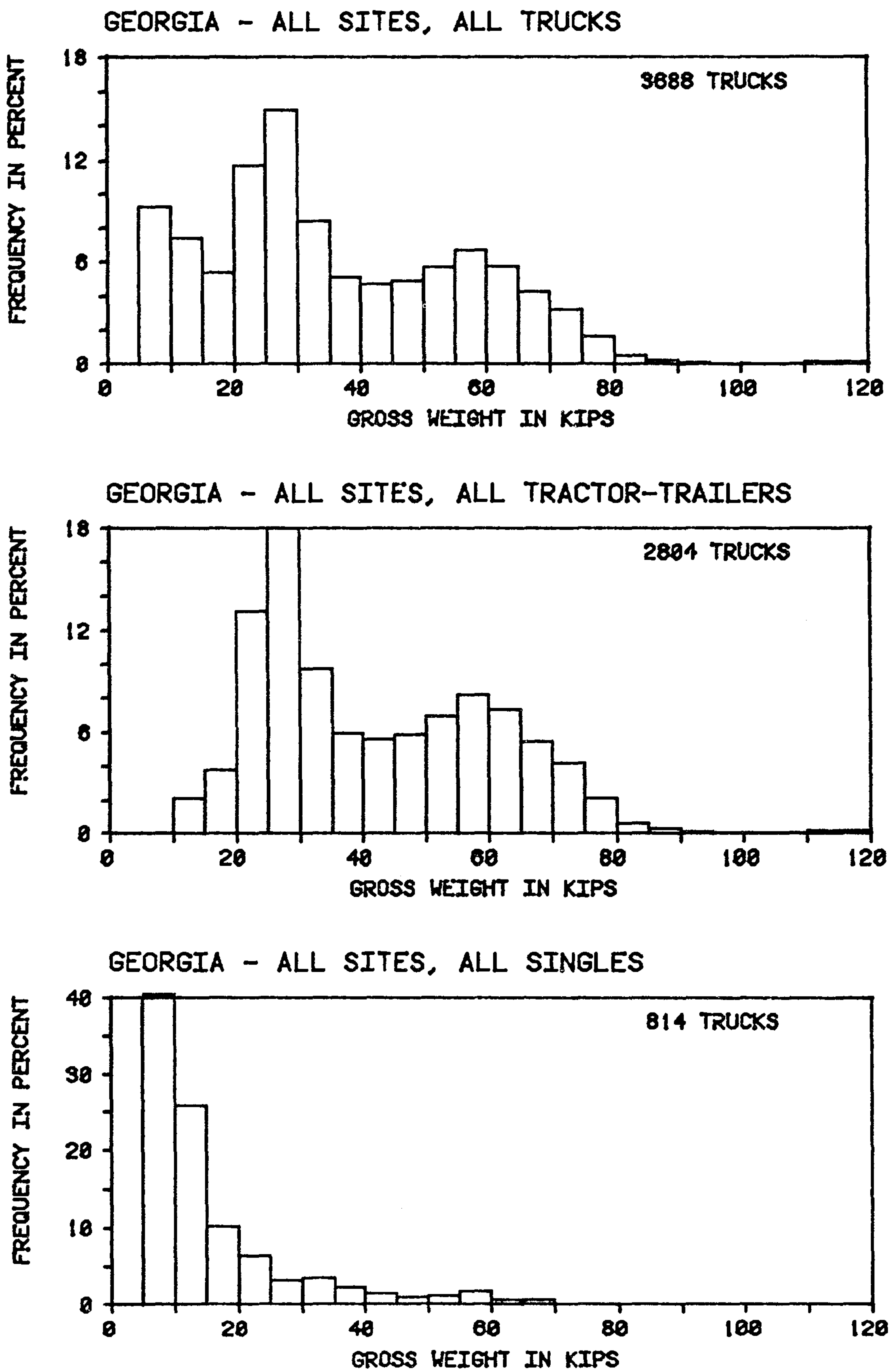

Figure 23: Gross Weight Histogram - Georgia, all sites, all trucks
1 kip = 454 kilograms

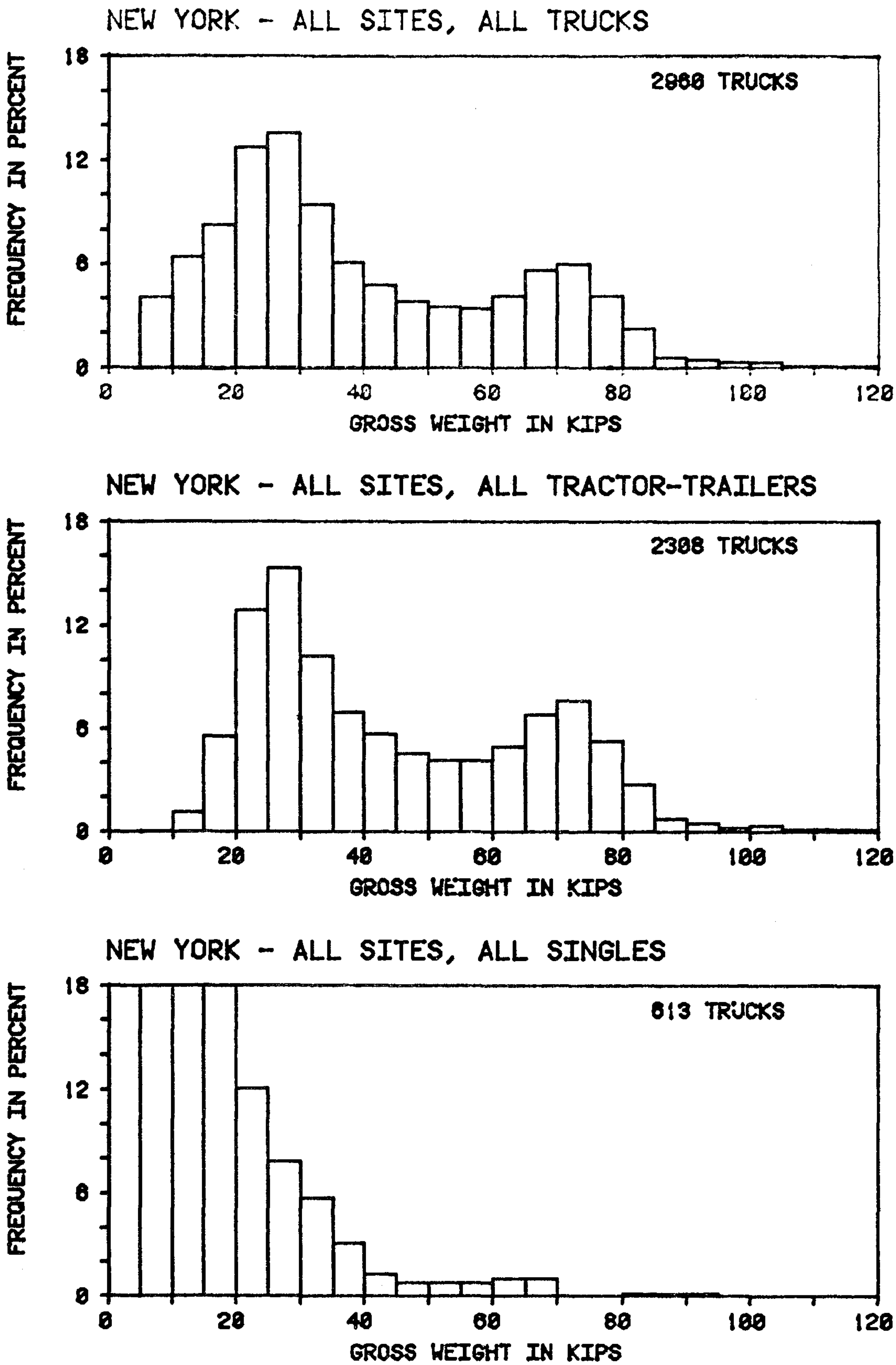

Figure 24: Gross Weight Histogram - New York, all sites, all trucks
1 kip = 454 kilograms

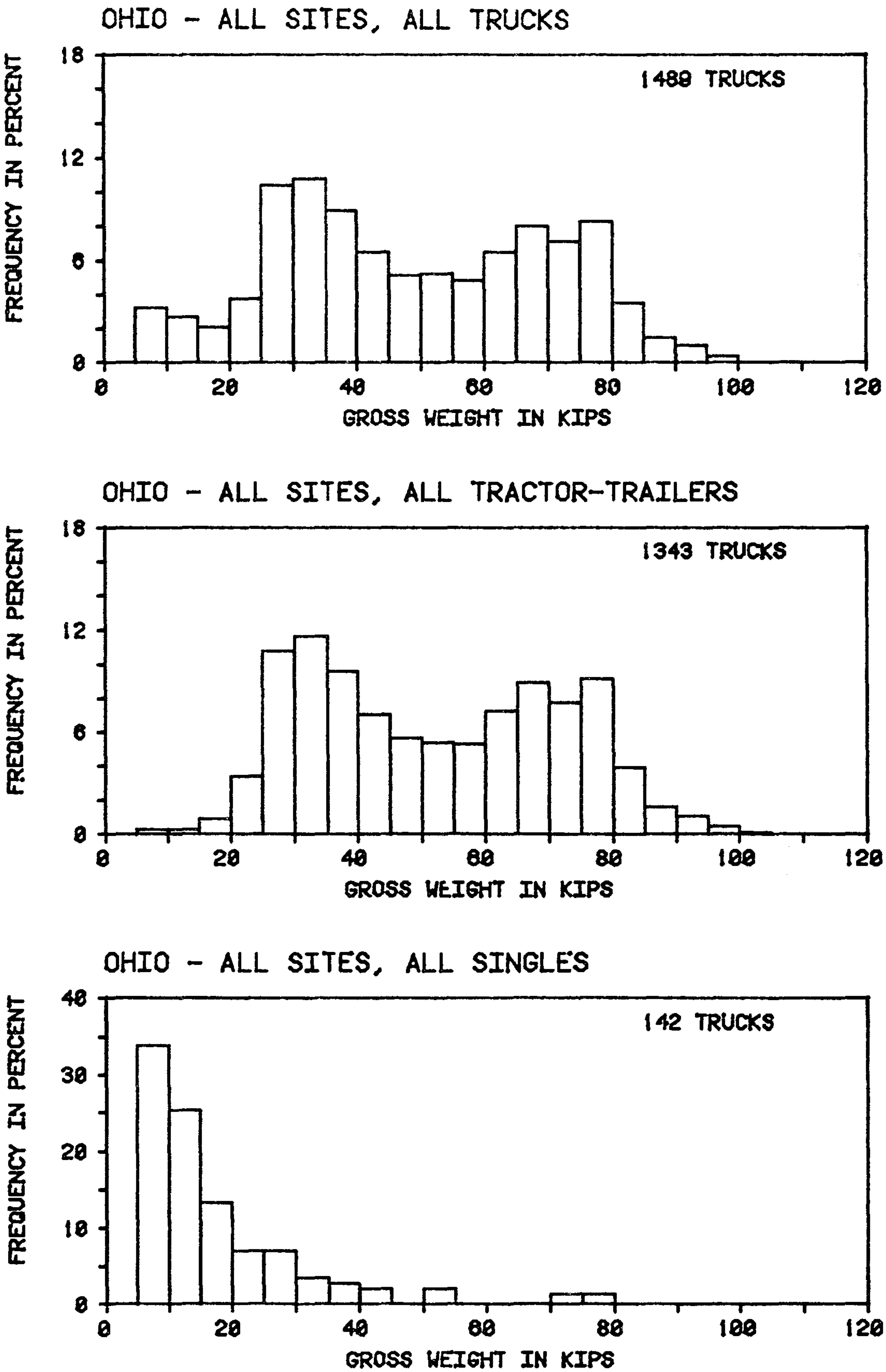

Figure 25: Gross Weight Histogram - Ohio, all sites, all trucks
1 kip = 454 kilograms

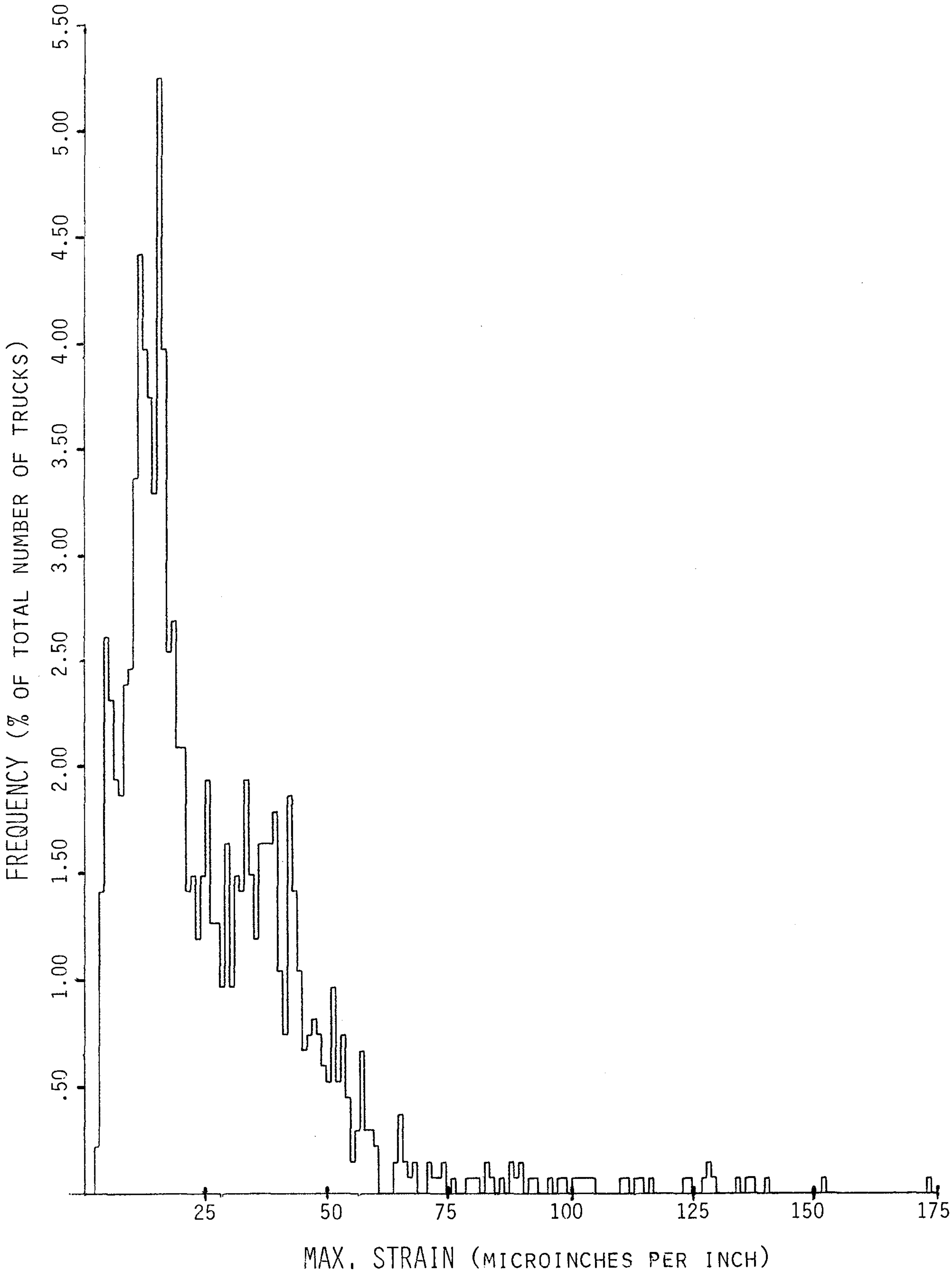

Figure 26: Maximum Strain Histogram, Caldwell-Girder 1

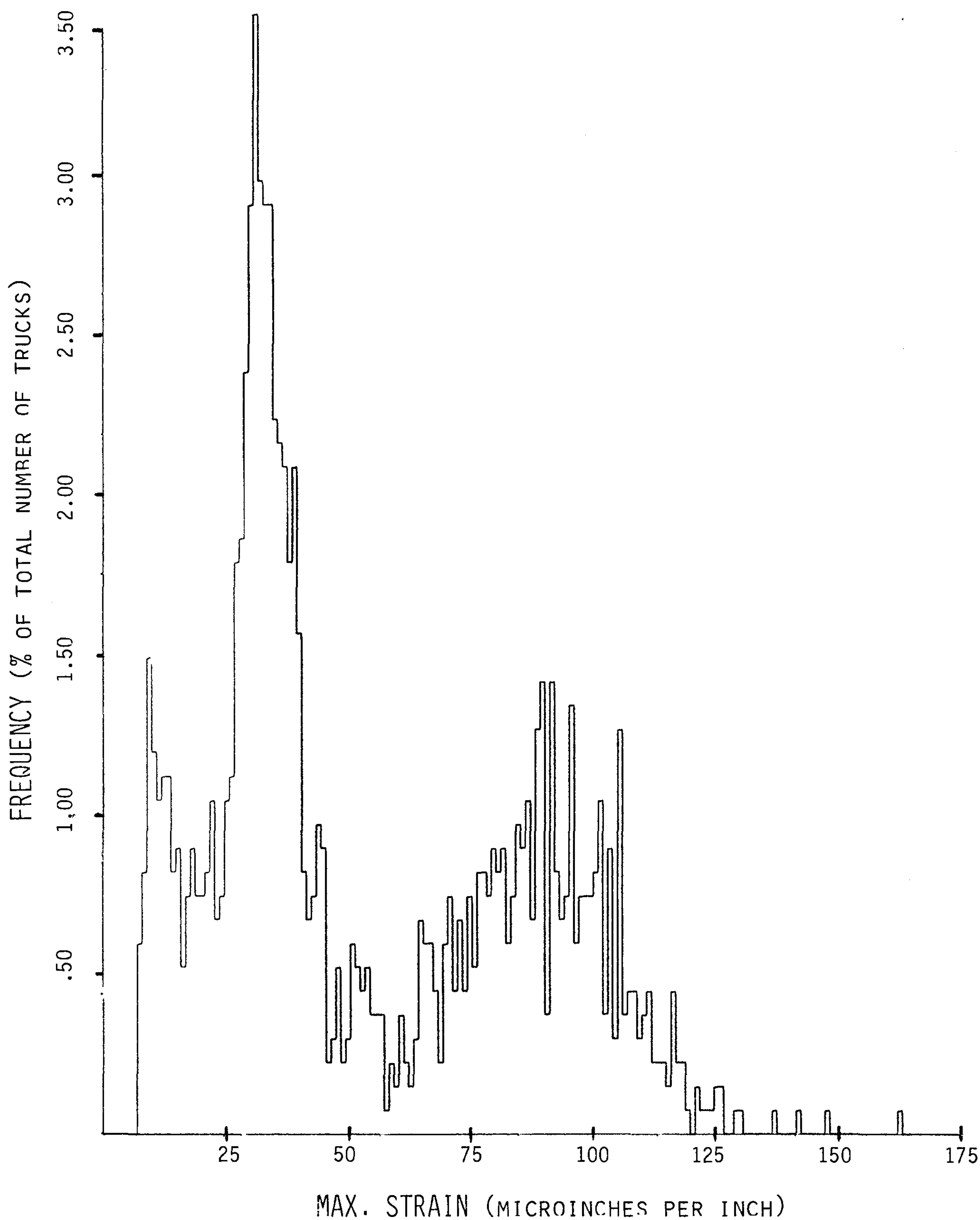

Figure 27: Maximum Strain Histogram, Caldwell-Girder 2

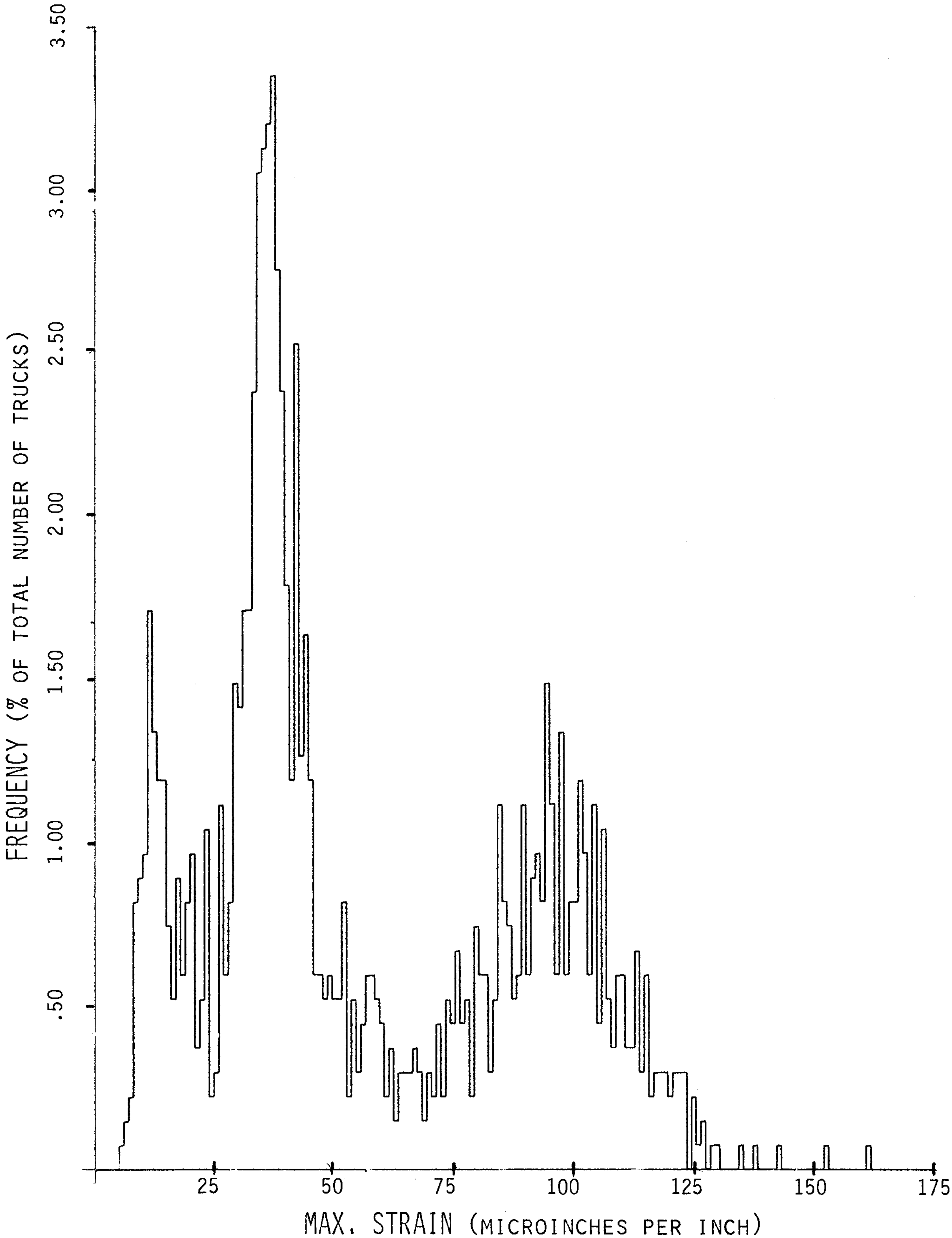

Figure 28: Maximum Strain Histogram, Caldwell-Girder 3

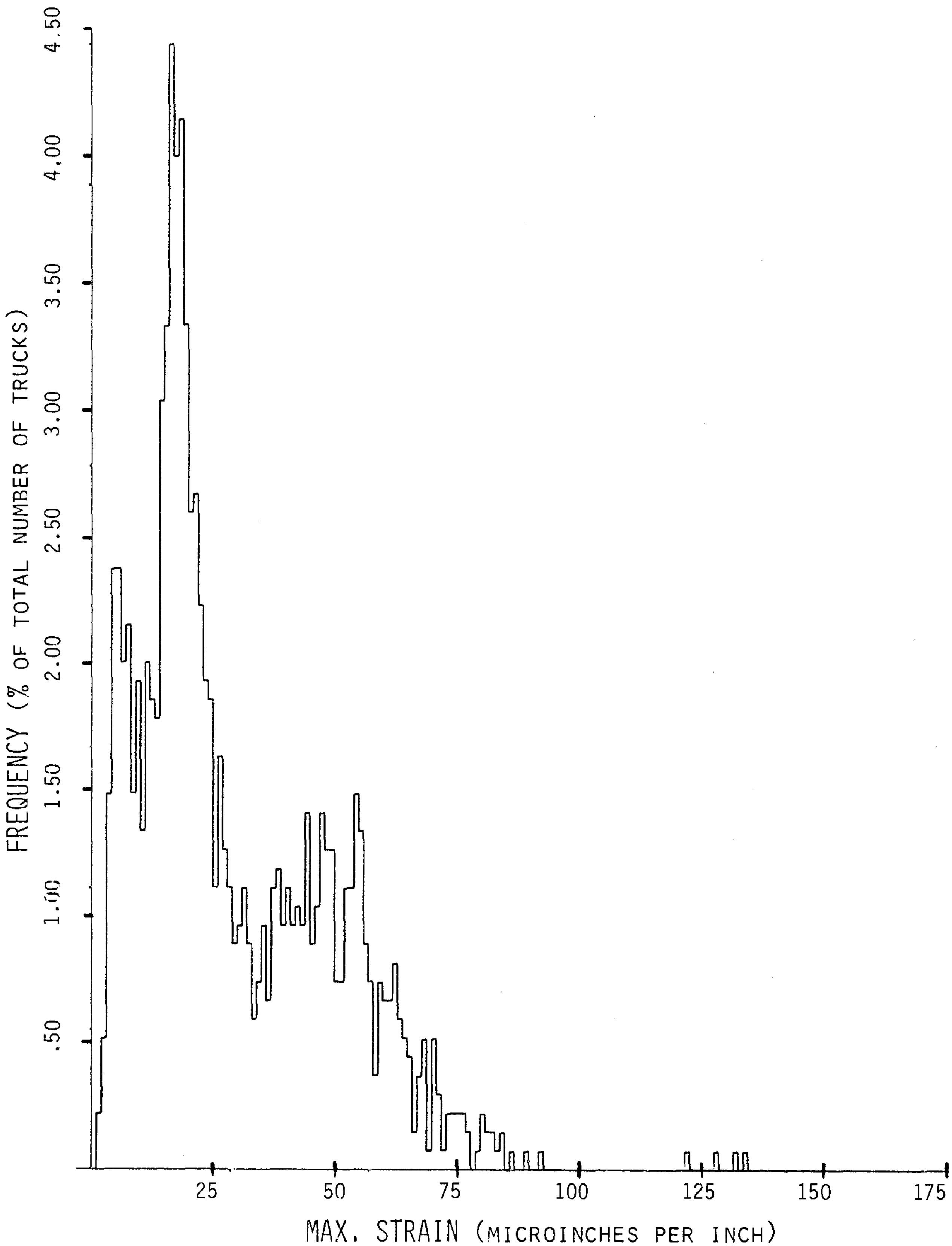

Figure 29: Maximum Strain Histogram, Caldwell-Girder 4

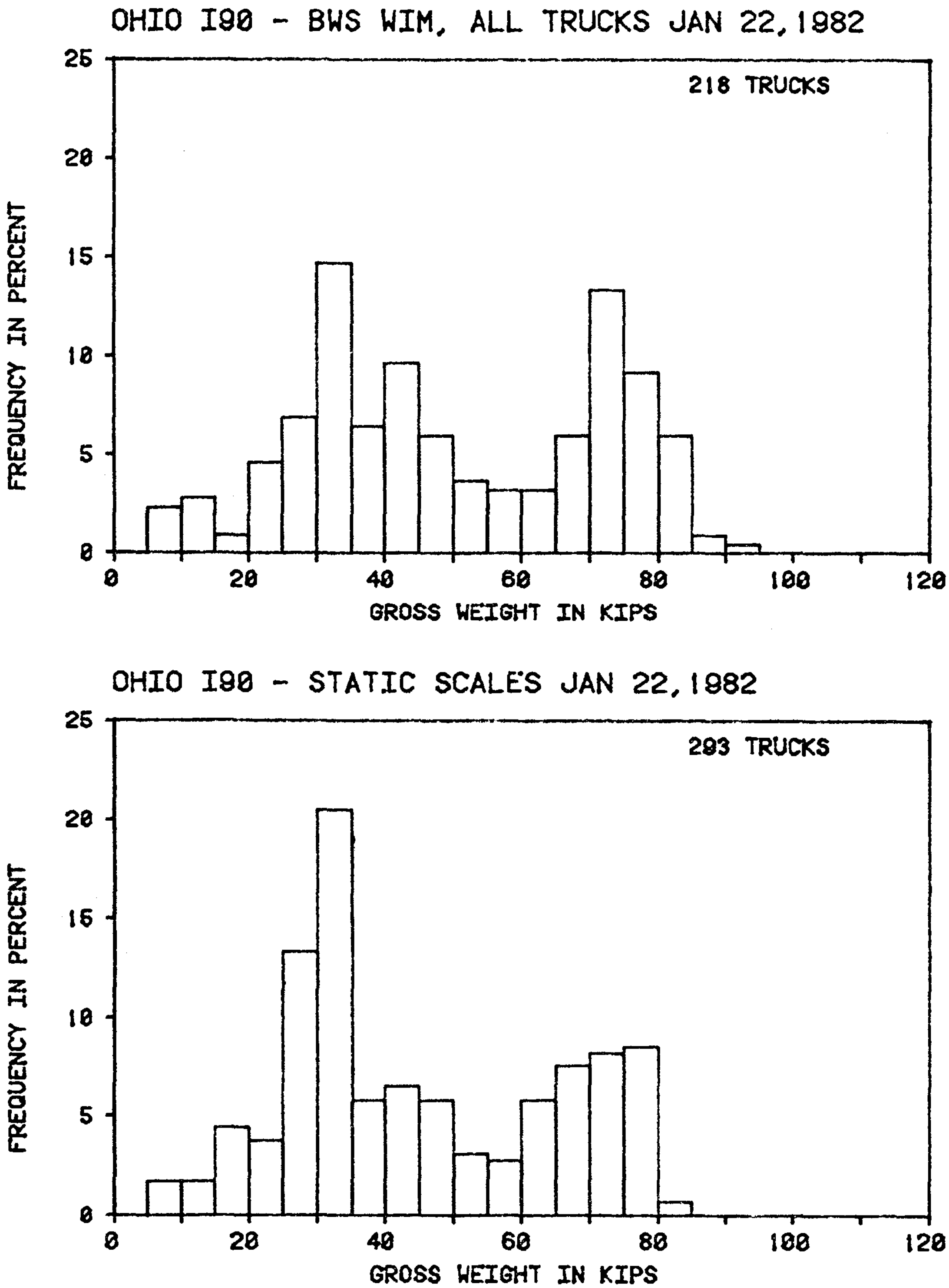

Figure 30: Gross Weight Histogram - Ohio I90, WIM versus Static Scale
1 kip = 454 kilograms

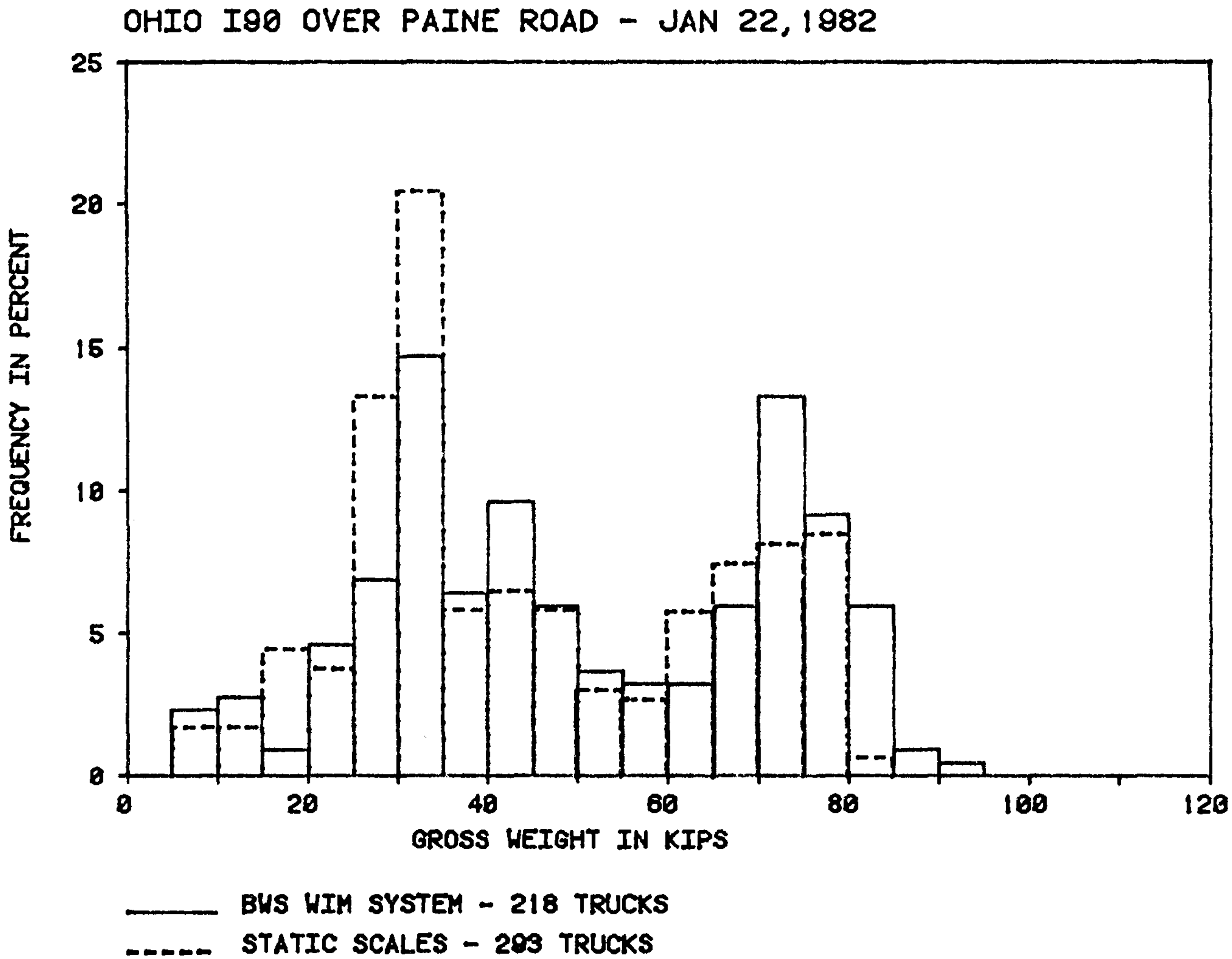

Figure 31: Gross Weight Histogram - Ohio I90 over Paine Road
Bridge WIM System versus Static Scales - Superimposed
1 kip = 454 kilograms

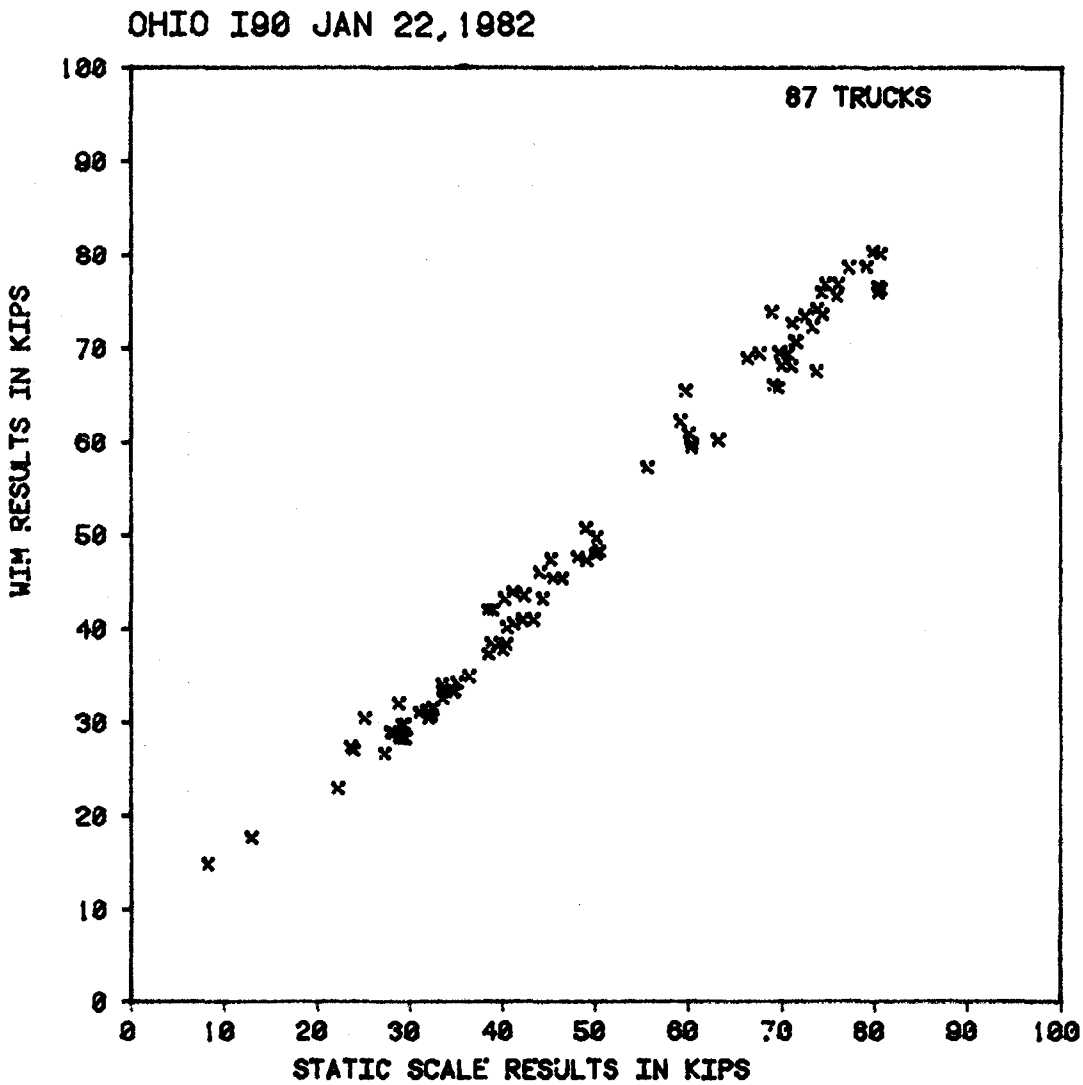

Figure 32 : WIM Correlation with Static Scale
1 kip = 454 kilograms

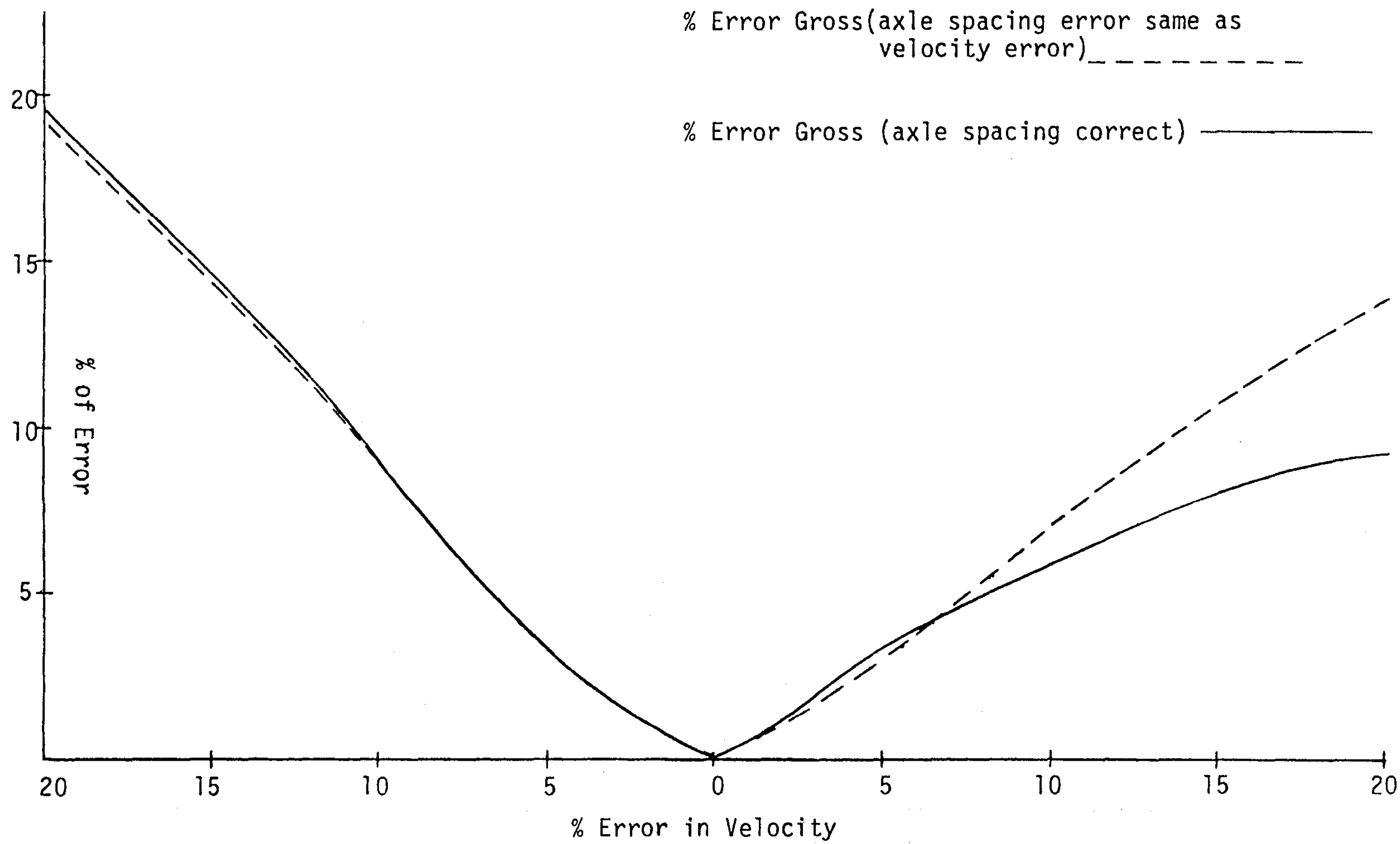

Figure 33: Gross Weight Error Versus Velocity Error

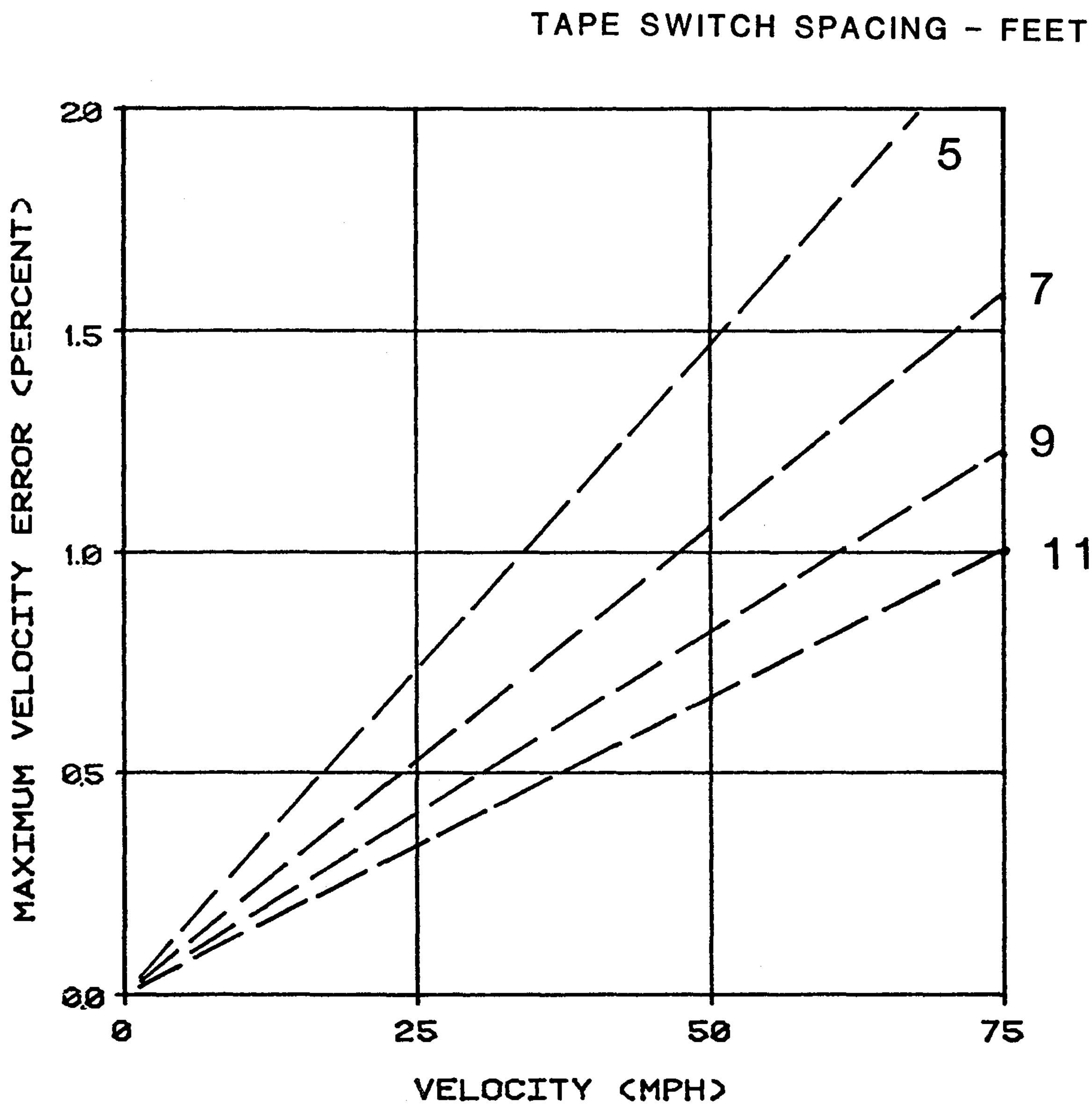

Figure 34: Maximum Velocity Error
Resulting from 1ms Clock Rate
1 mph = 1.6 kph
1 ft = .305m

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FEDERALLY COORDINATED PROGRAM (FCP) OF HIGHWAY RESEARCH AND DEVELOPMENT

The Offices of Research and Development (R&D) of the Federal Highway Administration (FHWA) are responsible for a broad program of staff and contract research and development and a Federal-aid program, conducted by or through the State highway transportation agencies, that includes the Highway Planning and Research (HP&R) program and the National Cooperative Highway Research Program (NCHRP) managed by the Transportation Research Board. The FCP is a carefully selected group of projects that uses research and development resources to obtain timely solutions to urgent national highway engineering problems.*

The diagonal double stripe on the cover of this report represents a highway and is color-coded to identify the FCP category that the report falls under. A red stripe is used for category 1, dark blue for category 2, light blue for category 3, brown for category 4, gray for category 5, green for categories 6 and 7, and an orange stripe identifies category 0.

FCP Category Descriptions

1. Improved Highway Design and Operation for Safety

Safety R&D addresses problems associated with the responsibilities of the FHWA under the Highway Safety Act and includes investigation of appropriate design standards, roadside hardware, signing, and physical and scientific data for the formulation of improved safety regulations.

2. Reduction of Traffic Congestion, and Improved Operational Efficiency

Traffic R&D is concerned with increasing the operational efficiency of existing highways by advancing technology, by improving designs for existing as well as new facilities, and by balancing the demand-capacity relationship through traffic management techniques such as bus and carpool preferential treatment, motorist information, and rerouting of traffic.

3. Environmental Considerations in Highway Design, Location, Construction, and Operation

Environmental R&D is directed toward identifying and evaluating highway elements that affect the quality of the human environment. The goals are reduction of adverse highway and traffic impacts, and protection and enhancement of the environment.

4. Improved Materials Utilization and Durability

Materials R&D is concerned with expanding the knowledge and technology of materials properties, using available natural materials, improving structural foundation materials, recycling highway materials, converting industrial wastes into useful highway products, developing extender or substitute materials for those in short supply, and developing more rapid and reliable testing procedures. The goals are lower highway construction costs and extended maintenance-free operation.

5. Improved Design to Reduce Costs, Extend Life Expectancy, and Insure Structural Safety

Structural R&D is concerned with furthering the latest technological advances in structural and hydraulic designs, fabrication processes, and construction techniques to provide safe, efficient highways at reasonable costs.

6. Improved Technology for Highway Construction

This category is concerned with the research, development, and implementation of highway construction technology to increase productivity, reduce energy consumption, conserve dwindling resources, and reduce costs while improving the quality and methods of construction.

7. Improved Technology for Highway Maintenance

This category addresses problems in preserving the Nation's highways and includes activities in physical maintenance, traffic services, management, and equipment. The goal is to maximize operational efficiency and safety to the traveling public while conserving resources.

0. Other New Studies

This category, not included in the seven-volume official statement of the FCP, is concerned with HP&R and NCHRP studies not specifically related to FCP projects. These studies involve R&D support of other FHWA program office research.

* The complete seven-volume official statement of the FCP is available from the National Technical Information Service, Springfield, Va. 22161. Single copies of the introductory volume are available without charge from Program Analysis (HRD-3), Offices of Research and Development, Federal Highway Administration, Washington, D.C. 20590.

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