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TRUCK AND BUS DRIVER TASK ANALYS S

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16. Abstract

This report describes the tasks involved in driving large trucks and buses. The task descriptions are an extension of the task description developed by Human Resources Research Organization (HumRRO) for passenger car drivers and deal with those unique tasks related to the safe and economic operation of large trucks and buses.

Tasks have been reviewed and evaluated by expert truck and bus drivers and have been rank ordered according to the criticality of a given task in context with operational situations.

NOTE: In those instances where there are no supplemental procedural details regarding the task statements appearing on the left-hand page, the corresponding right-hand page has been deliberately left blank.

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We appreciate the help given us by the experts who evaluated the criticality and wording of the task descriptions presented in this report. Their names are listed in Appendix A.

We also appreciate the help given us in identifying and locating appropriate experts by the following organizations:

Amalgamated Transit Union
American Trucking Associations, Inc.
Consolidated Freightways
Continental Trailways

Whatever merit the analysis has is due most to the efforts and contributions of these gentlemen:

Tom Day	Continental Trailways
Ruben Jokela	Consolidated Freightways
Jim Mercer	Continental Trailways
Fred Pacinelli	Navajo Freight Lines, Inc.
Gene Roza	Consolidated Freightways
Dick Williams	Navajo Freight Lines, Inc.

They spent many hours consulting with us, and they and their companies permitted us to spend many miles on the road with them making first-hand observations.

PREFACE

This report describes the tasks involved in driving large trucks and buses. This description was prepared by Human Factors Research, Incorporated, under subcontract to the Highway Safety Research Institute (HSRI). It is one part of HSRI's effort under National Highway Traffic Safety Administration (NHTSA) Contract NHTSA-FH-11-7616 entitled "Development of a National Item Bank for Tests of Driving Knowledge." The objective of the prime contract is the systematic development of a battery of candidate knowledge test items for use by driver licensing and educational agencies in developing examinations to test license applicants and students in their knowledge of driving principles, traffic laws, and traffic control devices. Separate item banks are being developed by HSRI for passenger car and light-truck drivers, for motorcycle operators, and for truck and bus drivers. A prerequisite to the development of those test items was the detailed analysis and description of the driver behaviors required for safe, efficient vehicle operation. The "Driver Education Task Analysis" prepared for NHTSA by Human Resources Research Organization (HumRRO) describes passenger car and light-truck driving. HSRI has prepared a rudimentary task description of motorcycle operation. And this report describes the truck and bus driver tasks.

The authors believe that this report may also be useful in the development of training, evaluation, and licensing programs for truck and bus drivers.

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SECTION I: METHODOLOGY

INTRODUCTION

The purpose of Section I of this report is to describe the development and evaluation of the truck and bus driver task descriptions[1] contained in Section II. The task descriptions are considered to be essentially an extension of the task descriptions developed by Human Resources Research Organization (HumRRO) for passenger car drivers (McKnight *et al.*, 1970). Consequently, an attempt was made to duplicate, so far as feasible, the methods and procedures used by HumRRO in developing and evaluating its driver task descriptions.

SOURCES OF INFORMATION

The primary sources of information used in preparing the task descriptions were the HumRRO report previously cited, the Item Writers' Guide for Truck Driving (McDole and Berger, 1971), interviews with professional drivers, and the HFR staff's extensive on-the-road experience on trucks and buses.

The following publications were also reviewed and used from time to time as aids in clarifying many task descriptions:

The Motor Carrier Safety Regulations
Department of Transportation

Driver Handbook for Private Motor Carriers
Truck Drivers Handbook
Facts for Drivers
American Trucking Associations, Inc.

Uniform Vehicle Code and Model Traffic Ordinance
National Committee on Uniform Traffic Laws and Ordinances

Reviews of additional documents did not seem warranted in light of the reviews done by HumRRO and the Highway Safety Research Institute and the many months of experience HFR staff members had had making on-the-road observations on trucks and buses.

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[1] The task descriptions are concerned primarily with intercity drivers.

CRITERIA FOR SELECTING TASKS

Several criteria were established for use in determining the tasks to be included among our descriptions.

The most significant criterion was that a task had to be either unique to truck or bus operations or particularly important in such operations. In essence, what this criterion meant was that tasks described in the HumRRO document were not included among our descriptions unless they had special implications for truck or bus driving. For example, negotiating hills is a task common to almost all types of driving but has special implications for truck and bus drivers because of the greater size and weight of their vehicles.

Another criterion was to include only tasks that require some overt behavior on the part of the driver. As a result of this criterion, nice-to-know advice, such as warnings and precautions, was not included among the task descriptions per se. Any such advisory comments that seemed particularly pertinent were reserved for amplifying comments and are recorded adjacent to the individual task descriptions in Section II.

Finally, it was stipulated that the tasks to be described in Section II had to be related to safe and efficient vehicle operation.

Implicit in these criteria was the exclusion of knowledge of rules and regulations. It was felt that anyone interested in obtaining information concerning vehicle codes and company or government regulations would be best advised to consult official documents directly.

DEVELOPMENT OF THE TASK DESCRIPTIONS

After a thorough review of the HumRRO reports (McKnight *et al.*, 1970) and the Item Writers' Guide (McDole and Berger, 1971), and informal discussions with several professional drivers, a preliminary outline of descriptions of tasks that met the criteria was prepared.

This preliminary outline was then analyzed in detail by the six highly qualified and very experienced professional drivers whose names are listed below.

TABLE 1

DRIVING EXPERTS*

Name	Company	Current Position	Professional Driving Experience (Years)
Tom Day	Continental Trailways	Superintendent	21
Ruben Jokela	Consolidated Freightways	Truck Driver	25
Jim Mercer	Continental Trailways	Bus Operator	8
Fred Pacinelli	Navajo Freight Lines, Inc.	Truck Driver	16
Gene Roza	Consolidated Freightways	Truck Driver	17
Dick Williams	Navajo Freight Lines, Inc.	Truck Driver	22

*The truck drivers have had experience in both sleepers and single operations. Currently, the Navajo drivers are running sleepers and the Consolidated drivers are running singles. Mr. Day has a total of 36 years of experience in the transportation industry.

The result of this analysis was a substantially new document.

Once the task descriptions had been reorganized and rewritten to reflect the comments of the professional driving experts, these same drivers reviewed them again to ensure that nothing had been left out or misinterpreted. They suggested a few minor additions and changes that were incorporated into the final task descriptions.

ORGANIZATION OF THE TASK DESCRIPTIONS

The task descriptions are divided into six sections. The first four sections--*Preoperative Procedures*, *Routine Driving Tasks*, *Special Driving Tasks*, and *Driving Emergencies*--are, for the most part, common to truck and bus driving. Section 5--*Hooking Up Doubles*--pertains to trucks exclusively. Section 6--*Carrying Passengers*--pertains primarily to bus drivers but also includes a brief section for truck drivers.

The organization of the task descriptions is essentially in chronological order. However, a cursory review will reveal that the sequencing of tasks is at times arbitrary.

An effort was made to employ terminology in common usage among truck and bus drivers, while at the same time avoiding unnecessary or potentially confusing jargon. For example, truck drivers refer to the fifth-wheel upper half as the "trailer skid plate" or simply "skid plate." Since these latter terms are the ones commonly used by truck drivers, we used them rather than the more formal "fifth-wheel upper half" in the task descriptions. We are not aware of any instances in which ambiguity has been introduced as a result of this procedure.

The format of the task descriptions is similar to the one used by HumRRO. The driving tasks and the results of the task criticality evaluation (which will be described in detail presently) are described on one page (the left-hand page) and amplifying information is presented on the facing page. The amplifying information consists of statements intended to explain a particular task, to place it in its proper context, or to present a meaningful

insight offered by one of our panel of experts. For the most part, the task statements on the left-hand page describe overt behaviors whereas the material on the right-hand page consists of knowledge factors. Occasional inconsistencies in the relative position of items on the left- and right-hand pages were introduced to enhance the flow of information or to avoid artificial fragmentation.

EVALUATION OF THE TASK DESCRIPTIONS

After the task descriptions were reorganized and rewritten, an effort was made to evaluate them. The method used was very similar to the one used by HumRRO.

The first task was to identify experts qualified to participate in the evaluation. Lists of such experts were obtained from the American Trucking Associations, Inc., Amalgamated Transit Union, Consolidated Freightways, and Continental Trailways.

The men on the list were contacted by mail and asked if they would agree to participate in the evaluation. Each letter contained a brief description of the project and a postcard to be used by the potential evaluator to indicate his willingness to participate.

The response to this initial canvassing was very good. In fact, more than the required number of men gave positive responses. Following the HumRRO procedure, it was agreed that a minimum of five judgments for each task description was required.

Section II contains about 650 descriptions of specific elements. However, some of these elements are not entirely comprehensible unless they are combined with other task elements. Therefore, for the purposes of the evaluation, many of the task elements were combined to yield a total of 420 task statements. Of these 420 statements, 253 are common to truck and bus driving, 135 pertain exclusively to truck driving, and 32 pertain exclusively to bus driving. For the common statements, it was decided to have at least five representatives of both the truck and bus industries judge each one. Those statements

pertaining exclusively to trucks or buses were to be judged by at least five truck and bus representatives, respectively. To obtain this number of judgments, the evaluation materials were mailed to 48 experts to judge the truck statements and to 32 experts to judge the bus statements. The materials were sent to more judges than were required since it was anticipated that some judges would be unable to complete the task. As it turned out, 37 truck experts and 24 bus experts returned completed evaluations.

The appendices to this report include a list of the participating judges (Appendix A), a complete set of the instructions given to each judge (Appendix B), and a copy of the covering letter (Appendix C). The instructions are nearly identical to the HumRRO instructions. The only significant difference was that we had the respondents divide the statements into three categories--high, medium, and low criticality, and then rank them in these categories; HumRRO had the respondents rank the statements and then divide them into two categories--high and low criticality.

Each judge evaluated 3 sets of 25 randomly selected task statements.

TASK DESCRIPTIONS AND EVALUATIONS

Pages 8 and 9, following, are left- and right-hand pages, respectively, from Section II of this report.

The left side of the left page contains the item number and the task description. The right side of the left page contains the criticality data. The right page contains additional information that is relevant to referenced items on the left page. Opposite each item is a table like the one shown in Table 2. The left-hand column contains the item number and a summary criticality index. The summary index, ranging from one X, least critical, to 5 X's, most critical, is based on approximately 20 percent intervals of the distribution of the mean item ranks.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
23-522	Approaches top of grade at slow speed	23-522		18.8		5	1	0
		xxxxx						
23-523	Keeps the rig strung out while going downhill	23-523		15.6		4	1	2
		xxxx						
23-524	Applies light (5 pounds) brake pressure continuously	23-524		11.1		2	2	3
		xx						
23-525	Selects a gear that will permit keeping engine speed at about half power	23-525	15.1	15.8		4	3	1
		xxxx			10.0	1	0	0
24	PASSING	24						
24-1	Determines Whether He Has Sufficient Speed and Distance to Pass in Relation to the Type of Vehicle to be Passed	24-1	21.8	22.2		5	0	0
		xxxxx			21.5	6	0	0
24-2	Makes Smooth Transition When Changing Lanes to Avoid Whipping the Trailer	24-2	17.2	15.8		4	1	0
		xxxx			18.1	6	2	0
24-3	Returning to Driving Lane	24-3	20.4	20.9		7	2	0
		xxxxx			19.6	4	1	0
24-31	Judges the distance, as seen through side-view mirror, to determine when to return to driving lane	24-31						
25	SURVEILLANCE AND SITUATION AWARENESS	25						

ITEM NUMBER

DIRECTIONAL CONTROL

23-522 The driver should not start down the grade any faster than he plans to go at any point on the hill.

23-523 The driver does this by power braking. Power braking is accomplished by depressing the brakes and the accelerator simultaneously. Since most of the braking power is applied to the trailer(s) this keeps the rig "strung out" and prevents the trailers from overtaking the tractor and "jackknifing."

23-524 Fanning of brakes (frequent momentary application of the brakes) causes overheating which may lead to crystallization and eventual failure of brakes. Fanning also causes loss of air pressure. The actual pressure to be applied may vary from one rig to another.

23-525 By having the engine at half speed, the driver has the power available if he needs it for power braking; and it also makes downshifting easier.

24-1 Driver should be aware when following trucks or buses closely that his vehicle is being "pulled" by the draft created by the vehicle in front. If the driver should attempt to pass, he may find that he has insufficient power to pass, safely or otherwise.

Driver should also note if the vehicle he plans to pass contains animals. The loud noise of the truck may frighten the animals causing them to shift or make other disquieting responses.

24-31 Returning to the driving lane involves different tasks in a truck or bus than it does in a passenger car. In a passenger car, it is usually safe to return to the driving lane wher the vehicle that has been passed appears in the rearview mirror. In a truck equipped with side view mirrors, the vehicle being passed can be seen *before* it is safe to return to the driving lane. When passing, the driver should be aware of the limitations of his mirrors, i.e., blind spots. A rather large blind spot is directly behind the trailer(s) and extends for a distance of about 50 or 60 feet beyond it. This blind spot extends only about 10-15 feet on buses since they have a rearview mirror. A second serious blind spot is on the right-hand side of the rig approximately even with the right-hand mirror and extending to some point about one-third of the way back on the bus or trailer. This blind spot can be partially eliminated with the use of a convex mirror. However, this type of mirror causes distortion by making objects appear farther away than they are (continued on page 79).

TABLE 2

EXAMPLE CRITICALITY DATA

ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
11-1	7.6	5.8		1	1	4
X			9.3	2	3	1

Table 3 shows the range of mean ranks represented by each summary criticality index and the percent of items in each category.

TABLE 3

SUMMARY CRITICALITY INDICES AND THE MEAN RANKS THEY REPRESENT

Summary Criticality Indices	Range of Mean Ranks*	Percent of Items in Category
XXXXX	17.6-25.0	19.3
XXXX	14.6-17.5	20.2
XXX	11.6-14.5	22.4
XX	8.6-11.5	20.2
X	1.0- 8.5	17.9

*In the data analyses, the number assigned a rank position was reversed. Thus, items ranked first were assigned the number 25, and items ranked last were assigned the number 1.

If the item was ranked by both truck and bus judges, the summary index is based on the mean of both groups combined, $\bar{X}_{TB}$. Otherwise, it is based on either $\bar{X}_T$, the mean rank assigned by truck judges, or $\bar{X}_B$, the mean assigned by bus judges.

The distribution of the mean ranks for all 420 task statements is given in Figure 1. The mean values were not normalized because the distribution of the mean ranks was very similar to a normal distribution.

Before ranking a random group of 25 task statements, the judges first divided them into three categories, and then they ranked the statements within categories. The categories were defined as follows:

Highly Critical: Place statements in this category that you think every driver *must do to ensure* the safety and efficiency of operations. (H)

Moderately Critical: Place statements in this category that every driver *ought to do to improve* the safety and efficiency of operations. (M)

Less Critical: Place statements in this category that a driver *may omit without seriously endangering* the safety and efficiency of operations. (L)

The columns in Table 2 labeled H, M, and L represent these categories. The numbers in the columns indicate the number of judges who placed the item in the category. The top row contains the truck judges; the bottom row the bus judges; and the sum of the numbers in the three columns for a given item is the total number of judges who ranked it.

The reliability of the judgments was estimated by comparing the variances between and within items for each of the truck, bus, and combined item pools. If there were significant agreement among the judges, the between-item variance would be significantly greater

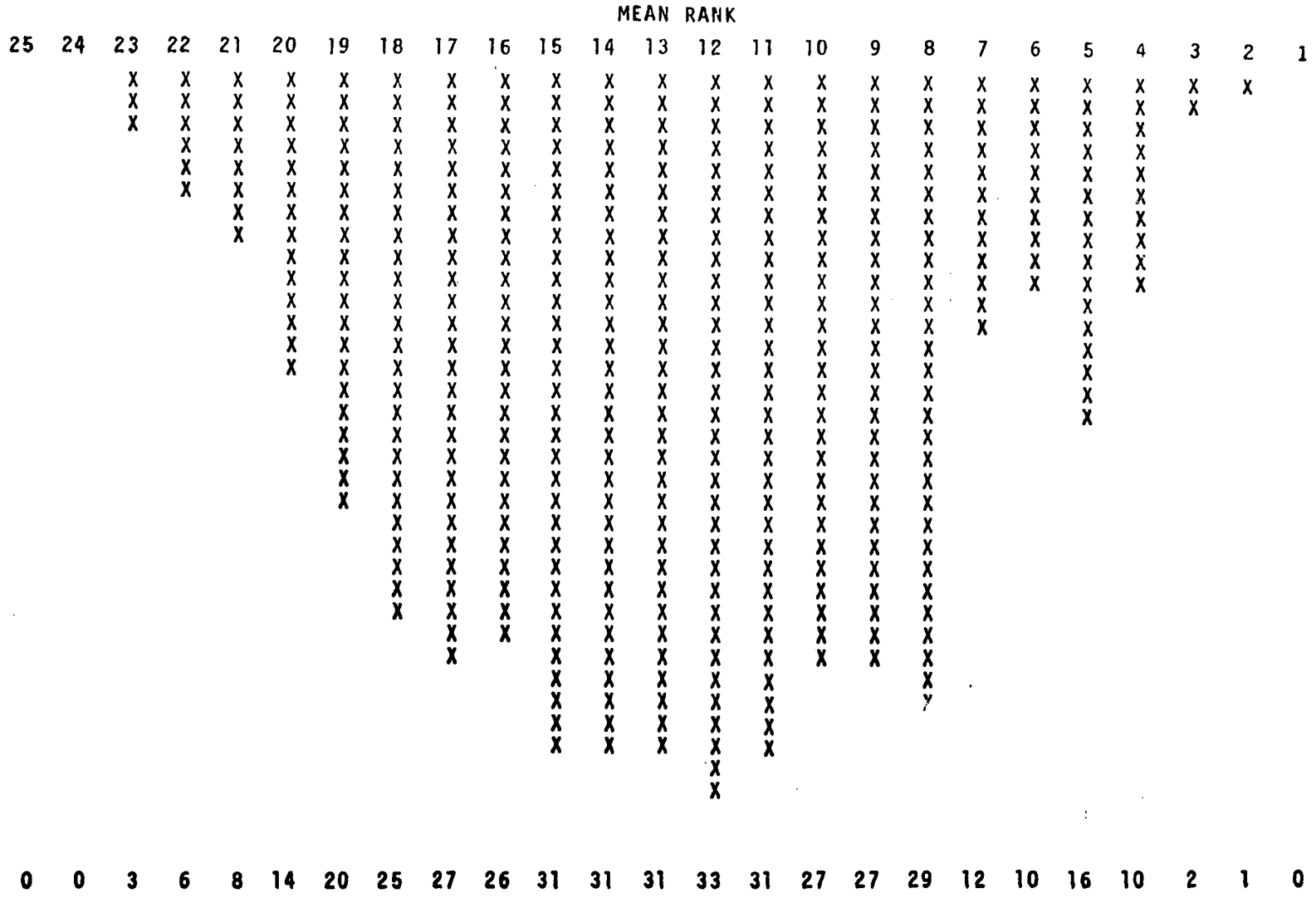

Figure 1. Frequency distribution of mean ranks, truck and bus judges combined.

than the within-item variance. The agreement among the judges on the rank position of the items was not high. The highest reliability coefficient obtained was .46, for the truck judges, indicating considerable disagreement on the rank position of given items. However, the agreement on the categorical judgments--highly, moderately, or less critical--of the items was substantially higher. Table 4 shows the analysis of variance and the reliability estimates for each group.

TABLE 4

RELIABILITY OF THE CATEGORICAL JUDGMENTS

Truck	*MS*	*df*	*F*	r_{tt}**
Between Items	1.630	386	3.872*	.74
Within Items	0.421	2229		
Bus				
Between Items	1.296	285	3.126*	.68
Within Items	0.414	1368		
Combined				
Between Items	2.108	419	4.991*	.80
Within Items	0.422	3856		

*$p < .01$

**Computed from the formula $r_{tt} = 1 - \frac{MS\ within}{MS\ between}$

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SECTION II: TASK DESCRIPTIONS AND EVALUATIONS

1. PREOPERATIVE PROCEDURES

ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
11 TRIP PLANNING						
11-1 Determines Destination	7.6	5.8		1	1	4
x			9.3	2	3	1
11-2 Determines Cargo Characteristics						
11-21 Hazardous/non-hazardous		18.1		5	3	0
xxxxx						
11-22 Bulk/packaged		3.7		0	1	5
x						
11-23 Liquid/dry		4.0		0	3	2
x						
11-24 Center of gravity		14.4		4	1	2
xxx						
11-3 Determines Route						
11-31 Selects route on the basis of:						
11-311 Vehicle characteristics	8.5	9.3		1	3	3
x			7.0	1	2	1

11-24 A load with a high center of gravity is less stable than one with a low center of gravity, increasing the probability of overturning a trailer in curves.

11-3 Much of this section does not apply to drivers on regularly scheduled runs; and, in some instances, the dispatcher may be responsible for informing the driver.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
11-312	Cargo characteristics	11-312		8.5		2	4	2
		x						
11-313	Vehicle type (number of trailers permitted)	11-313		11.5		1	4	1
		xx						
11-314	Vehicle (axle) weight	11-314	8.1	5.2		0	2	4
		x			11.6	1	2	2
11-315	Vehicle length	11-315	4.8	5.1		0	2	6
		x			4.4	0	2	3
11-316	Clearance requirements (height and width of truck)	11-316	14.5	17.4		4	2	1
		xxx			11.6	3	3	1
11-317	Grade of hills (avoids steep grades if an alternate route is available)	11-317	6.6	6.8		0	5	1
		x			6.3	0	1	3
11-318	Weather conditions along route selected	11-318	10.8	12.8		2	2	1
		xx			9.4	2	3	2
11-32	Consults regulations and special maps to determine roadway restrictions, if any, related to:	11-32						
11-321	Cargo type	11-321		10.7		2	3	2
		xx						
11-322	Vehicle type	11-322		14.6		4	3	1
		xxxx						

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		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
11-323	Vehicle size	11-323		13.4		2	3	2
		xxx						
11-324	Day/night routes	11-324		8.7		1	2	3
		xx						
11-33	Determines local delivery route on the basis of:	11-33						
11-331	Roadway restrictions if any	11-331		10.4		2	4	1
		xx						
11-332	Anticipated traffic volume	11-332		4.6		0	1	6
		x						
11-333	Receiving schedule at delivery point	11-333		8.0		1	3	3
		x						
11-334	Most direct route (least amount of backtracking)	11-334		6.9		0	3	4
		x						
11-335	Arrangement of load (for multiple deliveries)	11-335		5.8		0	2	6
		x						
11-336	Availability of unloading assistance (labor and equipment)	11-336		4.1		1	2	5
		x						
11-4	Obtains Route Approval from Dispatcher	11-4		5.4		0	4	3
		x						

11-324 Certain roads may not be used at night.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_T$	$\overline{X}_B$	H	M	L
12	VEHICLE INSPECTION	12						
12-1	Before Entering Truck	12-1						
12-11	Reports on duty, punches time clock	12-11	2.9	3.6		0	0	9
		x			2.1	0	1	7
12-12	Notes general condition of vehicle while approaching it	12-12	8.9	10.3		1	4	1
		xx			7.7	2	1	4
12-13	Checks exhaust stacks for black carbon particles (carbon particles indicate leaks)	12-13		9.1		2	2	4
		xx						
12-14	Checks for lean of the trailers (side of trailer should be perpendicular with ground)	12-14		13.7		4	2	0
		xxx						
12-15	Checks for any recent exterior damage, noting particularly the condition of the roof	12-15	5.6	7.5		0	2	4
		x			3.4	0	1	4
12-16	Checks for leakage of water, fuel, or lubricants under vehicle	12-16	13.3	15.7		5	1	0
		xxx			11.0	2	2	2
12-2	Preliminary Walk-Around Inspection	12-2						
12-21	Inspects wheels, tires, and brakes	12-21	17.3	15.4		5	1	1
		xxxx			19.1	5	1	1

ITEM
NUMBER

VEHICLE INSPECTION

12-11 This is important for insurance compensation if an accident should occur. Many insurance policies cover the worker only when he is on duty. The driver should at this point make an entry in his log book that he is on duty. Subsequent log entries that the driver makes are explained in detail on the cover of the log books.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H		L
12-211	Checks sight glass on front wheel oil reservoir	12-211		9.1		1	4	4
		xx						
12-212	Checks front wheel alignment	12-212	4.3	5.0		0	2	4
		x			3.7	0	2	5
12-213	Checks camber angle	12-213	5.2	4.0		0	1	4
		x			6.4	1	1	3
12-214	Checks the attachment of the steering mechanism to frame for tightness	12-214		7.6		1	3	1
		x						
12-22	Checks lug nuts	12-22	16.6	18.4		6	1	0
		xxxx			14.9	3	2	2
12-221	Checks for missing lug nuts	12-221						
12-222	Checks for cracks on wheel around lug nuts	12-222	15.3	17.5		3	1	0
		xxxx			13.8	3	2	1
12-223	Checks for space between lug nut and wheel (a space indicates nut is loose)	12-223	17.8	17.5		4	2	0
		xxxxx			18.2	3	1	1
12-23	Inspects general condition of tires	12-23	16.8	18.7		7	0	0
		xxxx			14.5	3	3	0
12-231	Checks tread wear	12-231	16.9	18.8		4	2	0
		xxxx			15.5	4	4	0

12-211 The front wheels are lubricated by the oil reservoir. The driver checks the sight glass to ensure that sufficient lubrication is present.

12-23 **Regulations setting minimum tread thicknesses on tires vary from state to state.**

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
12-232	Compares type and condition of drive wheel tires (should be matched)	12-232	13.8	16.3		3	3	1
		xxx			11.0	0	6	0
12-233	Determines whether tires are recaps	12-233	7.7	6.3		1	3	3
		x			8.9	1	3	4
12-2331	Checks bonding of recap to tire casing	12-2331	13.9	15.3		3	3	2
		xxx			12.0	1	4	1
12-234	Checks tires for proper inflation	12-234	17.0	17.2		6	1	2
		xxxx			16.7	5	1	1
12-2341	Strikes tire sidewall with tire iron (or other heavy object) and listens for a hollow sound	12-2341						
12-24	Checks brakes	12-24						
12-241	Checks slack adjuster travel	12-241		14.0		4	3	0
		xxx						
12-242	Checks brake lining	12-242		8.5		1	5	2
		x						
12-25	Inspects fifth wheel	12-25		19.8		6	2	0
		xxxxx						
12-251	Checks condition of fifth wheel from both left and right side of truck	12-251		19.3		6	2	0
		xxxxx						

ITEM NUMBER	VEHICLE INSPECTION
12-232	Drive wheel tires which are not matched in size will cause the tractor to pull to the side of the smaller tire. The difference in tread thickness of a new tire and a worn tire can cause steering difficulties.
12-233	Recaps generally turn hotter than non-bonded tires. Under very hot conditions, the bonds may be weakened sufficiently so that the recap will separate from the tire casing.
12-2341	The hollow sound is difficult to describe. With experience, a driver is able to recognize the proper sound. Tires should not be hit on the tread because properly inflated recaps will not give the right sound.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
12-252	Checks to ensure there is no space between fifth wheel and trailer skid plate	12-252		18.2		5	1	0
		xxxxx						
12-253	Checks trailer skid plate for bare metal scratches (presence of scratches indicates insufficient grease on fifth wheel)	12-253	13.1	14.6		3	2	2
		xxx			3.0	0	1	0
12-254	Checks fifth wheel for cracks	12-254		14.9		4	4	0
		xxxx						
12-255	Checks engagement of fifth wheel locking mechanism	12-255		19.7		6	0	0
		xxxxx						
12-26	Checks suspension springs	12-26						
12-261	Checks for cracked or broken spring leaves	12-261		15.2		4	2	0
		xxxx						
12-262	Checks for cracked or broken spring hangers	12-262		18.0		5	0	0
		xxxxx						
12-263	Checks for twisted spring hangers	12-263		5.6		0	4	3
		x						
12-27	Inspects landing gear assembly	12-27						
12-271	Checks to ensure landing gear is in full up position	12-271			13.9	4	3	1
		xxx						

ITEM NUMBER	VEHICLE INSPECTION
12-252	A space between the trailer skid plate and fifth wheel indicates warpage of plate or fifth wheel.
12-253	If there is insufficient grease on the fifth wheel, handling of the rig becomes very difficult. Checking for proper lubrication of fifth wheel is a critical task.

		ITEM NO.	$\bar{X}_{TE}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
12-272	Checks to ensure that crank handles are secured	12-272		7.8		1	2	2
		x						
12-28	Verifies vehicle and load identification	12-28						
12-281	Checks vehicle licenses							
12-2811	Ensures plates (or tabs) are fastened securely	12-2811	5.4	4.7		0	2	4
		x			6.5	0	2	2
12-2812	Ensures vehicle is licensed in each state along route	12-2812	8.1	8.3		1	2	6
		x			7.9	1	3	3
12-282	Compares vehicle numbers on vehicle with vehicle numbers listed on manifest	12-282	9.6	13.0		4	1	3
		xx			4.2	1	2	2
12-29	Inventories and inspects foul weather equipment	12-29	8.3	7.2		0	4	2
		x			9.3	2	5	0
12-291	Checks foul weather clothing	12-291	2.2	2.4		0	0	8
		x			1.8	0	0	5
12-292	Checks tire chains; checks tire chain mounting equipment, including tire mounting block	12-292	11.1	9.1		1	4	2
		xx			13.0	4	3	0
12-3	Inspects Engine Compartment	12-3						

12-29 On some tractors and buses this task may have to be done after the driver has entered the vehicle.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
12-31	General inspection	12-31						
12-311	Checks water and crankcase oil levels	12-311	16.5	15.7		4	1	1
		xxxx			17.3	4	2	0
12-312	Checks fan and compressor belts for cracks, excessive slack, or wear	12-312	13.3	16.3		4	2	1
		xxx			10.3	2	3	2
12-313	Checks fluid level in windshield washer	12-313	4.6	4.7		0	2	5
		x			4.4	0	2	3
12-314	Checks general condition of engine and accessories	12-314	10.3	10.5		2	2	2
		xx			10.2	1	5	0
12-32	Inspects auxiliary power unit if installed	12-32						
12-321	Checks pulleys for secure mounting	12-321						
		x			6.3	1	3	3
12-322	Checks belts for cracks, excessive wear, or slack	12-322						
		x			8.1	0	6	1
12-323	Checks oil level	12-323						
		x			7.6	0	5	2
12-4	Enters Vehicle	12-4						

ITEM
NUMBER

VEHICLE INSPECTION

12-313 Driver should also check the color of the fluid during cold weather to see if it contains antifreeze.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
12-41	Adjusts the seat	12-41	16.7	16.2		3	2	0
		xxxx			17.0	4	2	1
12-411	Checks condition of seat belts	12-411	6.0	9.0		2	4	1
		x			2.5	0	2	4
12-412	Checks spline engagement	12-412		5.2		0	4	1
		x						
12-42	Starting engine	12-42						
12-421	Sets parking brake	12-421	16.8	15.5		5	3	0
		xxxx			18.3	4	3	0
12-422	Checks clutch for free play at top and bottom	12-422	8.7	10.8		2	2	2
		xx			7.1	1	4	3
12-423	Turns key on	12-423	7.9	4.7		0	3	3
		x			10.7	3	0	4
12-424	Checks battery output voltage	12-424	6.3	3.2		0	1	5
		x			10.0	1	1	3
12-425	Starts engine with clutch disengaged and transmission is in neutral	12-425	11.5	11.8		1	4	0
		xx			11.2	1	4	1
12-426	Releases clutch slowly to verify that transmission is in neutral	12-426	11.1	11.7		2	3	1
		xx			10.0	0	3	0

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		ITEM NO.	$\bar{X}_{TE}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
12-427	Idles engine slowly until oil pressure stabilizes	12-427	11.4	11.4		1	4	0
		xx			11.3	2	1	3
12-428	Checks other gauges for normal reading	12-428						
12-4281	Temperature	12-4281	11.2	14.6		3	4	0
		xx			7.9	1	3	3
12-4282	Air pressure	12-4282	19.1	18.3		7	2	0
		xxxxx			20.3	6	0	0
12-4283	Voltmeter	12-4283	11.8	14.3		1	5	0
		xxx			9.6	2	4	1
12-43	Turns on heater and defroster (or air conditioner)	12-43						
12-431	Checks blowers in high and low speed (checks for heating [or cooling] after completing final walk-around inspection)	12-431	8.0	8.7		0	4	2
		x			7.6	1	5	3
12-44	Checks lights	12-44						
12-441	Turns on headlights	12-441	13.4	9.8		2	3	0
		xxx			16.0	4	2	1
12-4411	Checks dashboard lights	12-4411	13.1	14.5		3	3	0
		xxx			11.7	2	2	2

ITEM NUMBER

VEHICLE INSPECTION

12-4411 Some vehicles are equipped with a press-to-test switch which activates all panel lights.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_T$	$\overline{X}_B$	H	M	L
12-4412	Tests headlights, both high and low beam, to check dashboard high beam indicator light (leaves in high beam)	12-4412	9.5	10.6		3	2	2
		xx			8.2	0	4	2
12-442	Turns on turn signals and four-way flashers to check dashboard indicator lights	12-442	16.5	16.6		3	2	0
		xxxx			16.4	2	3	0
12-443	Turns on clearance and identification lights	12-443	14.6	15.7		4	2	1
		xxxx			13.0	3	2	0
12-444	Turns on windshield wipers and washers; checks windshield for signs of excessive streaking	12-444	15.9	13.2		1	5	0
		xxxx			21.3	3	0	0
12-45	Sets service brakes using tie-down lever lock (this action turns on brake lights)	12-45		12.8		3	1	2
		xxx						
12-451	Places tractor protection valve in normal position	12-451		19.3		6	1	1
		xxxxx						
12-46	Inspects fire extinguisher	12-[illegible]						
12-461	Checks gauge to verify charge	12-461	12.7	13.3		1	6	1
		xxx			12.0	2	3	1
12-462	Checks for broken seal	12-462	10.0	7.0		0	6	1
		xx			14.2	3	2	0
12-47	Inventories and inspects emergency flares, reflectors, and flags	12-47	13.3	15.8		3	3	0
		xxx			10.8	1	3	2

ITEM
UMBER

VEHICLE INSPECTION

2-444 Excessive streaking may indicate worn wiper blades.

-45 The tie-down lever lock is a device which simply holds down the service brake pedal without the driver being present.

451 This provides air pressure to the trailer brake system.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
12-5	Performs Walk-Around Inspection	12-5						
12-51	Inspects vehicle lights	12-51						
12-511	Headlights	12-511						
12-5111	Checks for burned out bulbs	12-5111	12.3	10.0		2	4	0
		xxx			14.3	3	3	1
12-5112	Checks alignment	12-5112	6.1	6.1		0	4	3
		x			6.0	0	4	3
12-512	Turn signals	12-512	15.0	15.5		4	2	0
		xxxx			14.4	2	3	0
12-513	Emergency flashers	12-513	19.1	18.6		5	0	0
		xxxxx			19.5	4	2	0
12-514	Clearance and identification lights	12-514	13.9	14.2		3	3	0
		xxx			13.7	4	2	1
12-515	Checks to ensure all reflectors are in place, unbroken, and clean	12-515	11.0	12.6		3	4	1
		xx			8.8	2	2	2
12-52	Inspects tractor to trailer auxiliary system connections	12-52						

ITEM NUMBER	VEHICLE INSPECTION
12-512	Driver should ensure that the electrical lines are not crossed and that the right and left turn signals are the same for tractor and trailer(s).

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
12-521	Checks air brake hoses	12-521		17.7		5	0	1
		xxxxx						
12-5211	Listens for air leaks	12-5211		19.0		7	0	0
		xxxxx						
12-5212	Checks hoses for cracking or other signs of deterioration	12-5212		18.1		5	2	0
		xxxxx						
12-5213	Checks air hose connections (glad hands) to ensure they are seated securely	12-5213		19.1		7	0	0
		xxxxx						
12-5214	Checks hose hangers to ensure they are positioned properly and in good condition	12-5214		18.6		4	1	0
		xxxxx						
12-522	Checks electrical cords	12-522						
				-				
12-5221	Checks for bare wires	12-5221		12.7		2	3	1
		xxy						
12-5222	Checks insulation for cracking or other signs of deterioration	12-5222		11.1		3	3	1
		xx						
12-5223	Checks to ensure connectors are locked securely	12-5223		13.5		3	3	0
		xxx						
12-5224	Checks cord hangers to ensure they are positioned properly and in good condition	12-5224		10.0		2	3	1
		xx						

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		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
12-53	Inspects inter-trailer auxiliary system connections	12-53						
12-531	Checks air hose and electrical cords as above	12-531		16.7		5	1	0
		xxxx						
12-532	Checks position of air brake valves	12-532		11.4		3	3	2
		xx						
12-533	Checks condition of dolly	12-533						
12-5331	Checks condition of the dolly eye and tongue	12-5331		16.6		7	1	1
		xxxx						
12-5332	Checks dolly fifth wheel as above	12-5332		16.2		4	1	0
		xxxx						
12-5333	Checks the air ram slack adjustment	12-5333		15.5		3	3	0
		xxxx						
12-5334	Checks the air ram assembly to ensure it is properly latched and locked	12-5334		21.4		4	1	0
		xxxxx						
12-534	Checks landing gear	12-534		11.7		2	2	2
		xxx						
12-54	Inspects fuel tanks	12-54						

ITEM NUMBER

VEHICLE INSPECTION

12-532 Valve positions between the two trailers should be as follows:

Valves at rear of lead trailer - OPEN
Valves at rear of rear trailer - CLOSED
Air tank or dolly - CLOSED

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
12-541	Checks condition of fuel tank guards	12-541		12.1		3	3	2
		xxx						
12-542	Checks fuel level	12-542		10.4		2	4	2
		xx						
12-543	Checks tank straps for cracking or other signs of deterioration	12-543		8.9		1	5	2
		xx						
12-55	Inspects cargo doors	12-55						
12-551	Ensures door seals are in place and unbroken	12-551		4.7		0	2	5
		x						
12-552	Ensures that both top and bottom door latches are tightly closed and locked	12-552		13.4		2	5	0
		xxx						
12-56	Inspects tarps	12-56						
12-561	Checks for tears and loose flaps	12-561		10.7		1	5	1
		xx						
12-562	Checks to ensure lashings are secure	12-562		11.9		3	4	1
		xxx						
12-57	Inspects air tanks	12-57						

ITEM NUMBER

VEHICLE INSPECTION

12-551 Seals are not to be broken unless authorization is given. Broken seals should be reported immediately to the dispatcher.

12-561 At freeway speeds, a relatively insignificant tear or loose flap can cause the tarp to tear along the whole length of the trailer.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
12-571	Listens for escaping air	12-571	16.4	18.9		6	2	0
		xxxx			11.5	1	3	0
12-572	Opens pet-cock valve to expel any accumulated moisture	12-572	10.0	12.1		3	4	1
		xx			7.6	0	6	1
12-58	Inspects tractor door latches and hinges	12-58						
12-581	Opens and closes doors to ensure doors swing freely and close tightly	12-581		4.1		0	4	3
		x						
12-59	Inspects windows	12-59						
12-591	Cleans windows	12-591	7.7	11.2		1	5	0
		x			3.6	0	0	5
12-592	Checks for cracks	12-592	7.7	6.7		1	1	5
		x			10.0	0	2	1
12-593	Checks tension on windshield wiper arms	12-593	9.8	11.1		2	5	1
		xx			7.6	0	3	2
12-510	Inspects mirrors	12-510						
12-510.1	Cleans mirrors	12-510.1	11.8	11.7		2	3	1
		xxx			12.0	2	2	1

12-572 This is particularly important during cold weather. The moisture may accumulate and freeze, blocking the air lines and resulting in a loss of braking power.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
12-510.2	Checks for cracks in glass	12-510.2	8.8	11.5		2	2	2
		xx			6.4	0	3	4
12-510.3	Checks mounting assembly for tightness	12-510.3	11.5	11.0		3	3	1
		xx			12.2	3	0	2
12-510.4	Checks tension of mirror swivel point	12-510.4	6.4	4.3		0	1	5
		x			8.1	1	4	2
12-510.5	Adjusts mirrors	12-510.5	12.5	10.8		1	3	1
		xxx			13.8	2	2	2
12-511	Checks cargo	12-511						
12-511.1	Verifies that cargo loaded on the vehicle is, in fact, the cargo listed on handling bill	12-511.1	8.8	10.3		1	2	3
		xx			7.4	1	3	3
12-511.2	Checks the condition of freight and notes that condition on handling bill	12-511.2	5.2	6.2		1	1	4
		x			4.3	0	4	3
12-511.3	Checks temperatures on air-conditioned trailers	12-511.3		7.7		1	4	2
		x						
12-511.31	Checks to determine whether system is on heating or cooling cycle	12-511.31		9.1		2	2	3
		xx						
12-6	Reenters Vehicle	12-6						

ITEM NUMBER	VEHICLE INSPECTION
12-511	This may not be possible for company drivers because the trailers are sealed.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
12-61	Fastens seat belt	12-61	11.3	10.9		2	4	1
		xx			11.8	4	1	1
12-62	Checks the braking system	12-62						
12-621	Shuts off engine	12-621						
12-622	Observes air pressure gauge (there should be no loss of air pressure)	12-622	16.7	16.8		6	2	0
		xxxx			16.7	3	4	0
12-623	Depresses brake pedal and holds for one minute (loss of air pressure should not exceed three pounds)	12-623	19.4	22.1		7	1	0
		xxxxx			15.0	3	1	1
12-624	Releases brakes	12-624						

12-625	Places tractor protection valve in the emergency position (brakes should apply automatically)	12-625		17.6		5	2	0
		xxxxx						
12-626	Returns tractor protection valve to normal position	12-626						
12-627	Pumps brakes until air pressure is reduced to 60 pounds (warning lights and emergency brakes should activate automatically when air pressure reaches 60 pounds)	12-627		19.3		5	1	0
		xxxxx						
12-628	Restarts engine							

ITEM NUMBER	VEHICLE INSPECTION
12-62	Multiple braking systems are present on a tractor-trailer combination. Depressing the footbrake pedal (service brake pedal) applies braking power to all units. In some rigs, there are auxiliary brakes for the trailers.
12-624	Exhausting air can be heard from rear of trailer(s) when brakes are released. Air heard within the cab indicates air hoses are improperly connected.

12-629	Allows air pressure to return to normal (120 pounds)
12-63	Testing the trailer hook-up
12-631	Backward movement check
12-6311	Places transmission in lowest reverse gear
12-6312	Speeds up engine and partially engages clutch to make power unit jerk backward about 6" (this procedure is known as hitting the pin)
12-6313	Disengages clutch
12-632	Forward movement check
12-6321	Tractor equipped with tractor protection valve
12-6322	Places tractor protection valve in set position
12-6323	Places regular transmission in lowest forward gear

ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
12-629		18.7		3	3	0
xxxxx						
12-63						
12-631						
12-6311						
12-6312		10.8		2	4	2
xx						
12-6313						
12-632	17.0	17.6		5	2	0
xxxx			13.0	0	1	0
12-6321						
12-6322						
12-6323						

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		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
12-6324	Speeds up engine and partially engages clutch to make power unit jerk forward about 6"	12-6324						
12-6325	Disengages clutch	12-6325						
12-6326	Determines whether tractor has separated from trailer	12-6326						
12-6327	Tractor not equipped with tractor protection valve	12-6327						
12-6328	Places regular transmission in lowest forward gear	12-6328						
12-6329	Speeds up engine and partially engages clutch to make tractor jerk forward about 6"	12-6329						
12-63210	Determines whether tractor has separated from trailer	12-63210						
13	THREE-MILE CHECK	13						
13-1	Engine and Power Train Performance	13-1						
13-11	Checks for proper engine and vehicle acceleration	13-11	8.5	8.1		0	5	2
		x			9.0	1	2	2

ITEM NUMBER

THREE-MILE CHECK

13 Prior to leaving the garage or terminal, the professional driver routinely makes a thorough *inspection* of his vehicle. During the first few minutes of driving, the driver conducts a deliberate test of all vehicle systems. The drivers refer to this as the three-mile check. By doing this, the driver is able to determine whether the truck is properly loaded and responding satisfactorily.

It is important to note that it is not unusual for professional drivers to return immediately to the terminal if they discover any significant discrepancies during the three-mile check. Bus drivers typically make this check between the garage and the terminal since returning to the terminal with a load of passengers is discouraged.

It should also be noted that professional drivers continue to make these same kinds of deliberate system checks throughout their runs. The three-mile check is different only in that it is more concentrated.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
13-12	Checks for proper operation of transmissions	13-12	11.4	12.0		1	7	0
		xx			10.5	1	3	2
13-2	Steering Mechanism	13-2						
13-21	Checks for excessive play in steering wheel	13-21	15.6	13.5		2	3	1
		xxxx			17.3	4	4	0
13-22	Checks for castering	13-22	8.4	5.8		0	3	3
		x			11.4	2	3	0
13-23	Checks for excessive steering resistance in both left and right turns	13-23	15.4	14.8		3	4	1
		xxxx			16.1	4	2	1
13-24	Checks front wheel alignment by removing hands from steering momentarily to determine if truck veers to left or right	13-24	10.2	8.0		0	4	3
		xx			12.8	3	3	0
13-3	Brakes	13-?						
13-31	Checks service braking system for normal operation	13-31	14.8	12.0		2	7	0
		xxxx			18.4	6	1	0
13-32	Checks emergency braking system for normal operation	13-32	13.5	12.1		3	5	1
		xxx			15.7	4	1	1
13-33	Checks to ensure that all brakes release properly	13-33	16.8	18.0		5	2	0
		xxxx			15.0	3	2	0

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		ITEM NO.	$\overline{\overline{X}}_{TB}$	$\overline{X}_T$	$\overline{X}_B$	H	M	L
13-34	Checks to determine if brakes pull to left or right	13-34	16.5	18.3		5	2	0
		xxxx			14.5	2	4	0
13-35	Checks for proper engine braking	13-35	12.6	11.8		3	2	3
		xxx			13.8	1	5	0
13-4	Vehicle Tracking	13-4						
13-41	Checks to ensure that trailer(s) are properly aligned behind the tractor when vehicle is traveling in a straight line	13-41		15.8		3	3	0
		xxxx						
13-42	Checks to ensure that trailers do not sway back and forth excessively after completing a turn	13-42		17.1		5	2	0
		xxxx						
13-43	Checks to ensure that individual units are not canted in either direction	13-43		14.5		5	3	0
		xxx						
13-44	Checks to ensure that trailers stay nearly vertical (perpendicular to roadway) during and just after turns	13-44		11.9		3	2	2
		xxx						

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2. ROUTINE DRIVING TASKS

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
21	ACCELERATING TO ROADWAY SPEED	21						
21-1	Accelerates to Maximum Speed in Each Gear (referred to as waiting-out-the-gear)	21-1	7.7	9.2		0	3	3
		x			6.4	1	3	3
21-11	Buses (equipped with governors and four-speed transmissions)	21-11						
21-111	Shifts from first to second gear when speed reaches about 18 miles per hour	21-111						
21-112	Shifts from second to third gear when speed reaches about 30 miles per hour	21-112						
21-113	Shifts from third to fourth gear when speed reaches about 50 miles per hour	21-113						
21-12	Trucks (and buses not equipped with governors)	21-12						
21-121	Accelerates engine to near maximum speed in each gear before shifting to next higher gear	21-121						
21-122	Observes color-coded speed ranges on speedometer and shifts to next higher gear when vehicle speed reaches upper limit of each colored area	21-122						
22	SHIFTING GEARS	22	12.2	8.1		1	2	4
		xxx			17.0	4	2	0

ITEM NUMBER

ACCELERATING TO ROADWAY SPEED

21-11 Individual buses will have different shift points and the speed at which the shift is made may vary a few miles per hour from bus to bus.

21-122 Some speedometer dials have shift points on them rather than a color coding.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{w}$	$\bar{X}_{B}$	H	M	L
22-1	Standard Transmission	22-1						
22-11	Double-clutching	22-11						
22-111	Selects low-range position for two-speed axle	22-111						
22-112	Pushes down on clutch pedal and releases accelerator (the clutch is disengaged slightly ahead of releasing accelerator)	22-112						
22-113	Moves gearshift level to neutral position while engine speed is dropping	22-113						
22-114	Engages clutch by releasing clutch pedal	22-114						
22-115	Disengages clutch quickly; moves gearshift lever to next higher gear	22-115						
22-116	Releases clutch pedal and increases engine speed at the same time	22-116						
22-117	Continues shifting up through gears until road speed is reached	22-117						
22-12	Downshifting	22-12	11.4	9.5		2	3	3
		xx			13.6	4	3	0

ITEM NUMBER	ACCELERATING TO ROADWAY SPEED
22-1	All movements should be coordinated and done as smoothly as possible. The transmission should never be forced into gear. If difficulty arises when shifting, put transmission into neutral, disengage clutch, engage clutch, and try to shift again.

ITEM NO.	$\bar{R}_{TB}$	$\bar{T}_T$	$\bar{T}_B$	L	M	H
22-121	—					
22-13	7.7	6.1		1	2	5
x			9.8	2	3	1
22-131						
23						
23-1						
23-11		11.9		1	6	0
xxx		—				
23-12	16.1	15.7		4	2	1
xxxx			16.6	5	1	1
23-13	14.5	16.4		4	4	0
xxx			11.6	2	2	1
23-2						
23-21						

22-121 Follows standard double-clutch procedure, except the driver accelerates the engine after the clutch is released and while the transmission is in neutral

22-13 Shifting without using clutch

22-131 Shifts gears at exactly the right speed; for example, shifts from second to third or third to second at exactly 30 miles per hour

23 DIRECTIONAL CONTROL

23-1 Steering - General

23-11 Checks trailer alignment using rearview mirrors to determine if trailer is tracking properly

23-12 Prevents weaving (fishtailing) by avoiding jerky steering corrections

23-13 Uses cues from distant field of vision to anticipate required steering responses and to avoid fishtailing

23-2 Turning

23-21 Right turns

ITEM NUMBER	DIRECTIONAL CONTROL

23-12 Swift movements are mechanically amplified at the rear of the last trailer. Jerky steering wheel movements may cause the second trailer to overturn.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
23-211	Approaches intersection in right-hand lane	23-211	16.5	18.3		4	2	0
		xxxx			14.4	3	0	2
23-212	Signals a right turn	23-212	16.2	14.6		3	1	1
		xxxx			18.3	4	0	0
23-213	Reduces speed to about 5 miles per hour	23-213	12.0	13.7		3	2	1
		xxx			10.0	2	2	1
23-214	Veers slightly to the *left*--keeps approach lane guarded or blocked to prevent following traffic from entering blind spot	23-214	17.8	19.6		7	0	0
		xxxxx			16.0	5	1	1
23-215	Checks traffic approaching from his left on cross street	23-215	17.0	18.1		5	1	1
		xxxx			15.0	1	3	0
23-216	Drives into intersection until front end of vehicle reaches the driving lane for oncoming traffic approaching from his right on the cross street	23-216	11.8	12.3		2	3	2
		xxx			11.0	1	3	0
23-217	Checks oncoming traffic	23-217						
23-218	Continues in original direction until vehicle's turning point reaches intersection	23-218	13.2	13.3		1	2	1
		xxx			13.2	1	3	1
23-219	Checks clearances in right and left rearview mirrors	23-219	15.8	16.5		4	2	0
		xxxx			15.3	4	3	0
23-21.10	Turns steering wheel smartly to the right	23-21.10						

23-214 By performing the right-hand turn in this manner, the driver is able to guard the right-hand lane and prevent smaller vehicles from cutting in. He is also able to observe and react to oncoming and cross traffic with minimum risk without unnecessarily retarding traffic.

The driver must be aware of the overhang that causes the rear of the vehicle to swing when making a turn. When the rear axles are moved forward, the trailer is easier to maneuver, but this causes more overhang and, hence, the back of the trailer will sing wider on curves. Also, when making a turn, the rear of the vehicle follows a shorter path than the front wheels. This is called off-track or "cheating." The greater the distance between the front and rear wheels and the sharper the turn, the greater the off-track.

Because of the nature of the left-hand turn on right-handed highway systems, the left-hand turn for trucks and buses is the same as it is for cars.

23-218 The turning point for a bus is its drive wheels; the turning point for a tractor trailer is the trailer's rear wheels.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
23-21.11	Enters driving lane for oncoming cross street traffic	23-21.11	11.3	10.8		1	4	1
		xx			11.7	3	3	1
23-21.12	Continues turn until he enters driving lane of cross street	23-21.12						
23-3	Curves	23-3						
23-31	Setting up the curve	23-31						
23-311	Slows to the speed limit posted for the curve	23-311	17.6	16.7		5	1	1
		xxxxx			18.8	5	0	0
23-312	Judges radius of curve	23-312	16.5	15.4		5	4	0
		xxxx			19.0	4	0	0
23-313	Selects a turning radius appropriate for the curve	23-313	13.6	16.7		5	2	0
		xxx			10.4	2	3	2
23-314	Steers to the outside portion of his lane	23-314	16.1	20.2		5	1	0
		xxxx			13.0	4	3	1
23-315	Checks the rearview mirror to ensure rear end of vehicle has not drifted into adjacent lane on outboard side of curve.	23-315	14.5	14.3		5	2	1
		xxx			15.0	3	0	1
23-316	Judges correctness of speed and steering control and makes adjustments as necessary	23-316	17.1	15.7		7	1	1
		xxxx			19.2	4	1	1

ITEM NUMBER

DIRECTIONAL CONTROL

23-311 The driver should believe the posted speed limits and compensate by slowing down when hazardous conditions arise.

23-313 The driver should avoid making steering corrections while negotiating the curve.

23-315 The driver does this by steering to the left side of the lane for a right-hand curve and to the right side of the lane for a left-hand curve. This procedure is known as "driving the curve high."

At freeway speeds, there is a tendency for the trailer(s) to "walk out" in the direction opposite the arc of the curve due to the inertia of the moving trailer.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
23-4	Upgrades	23-4						
23-41	Slows down to let other vehicles pass before reaching bottom of the grade	23-41	8.4	8.4		1	1	3
		x			8.4	0	4	3
23-42	Keeps well to the right (or in right-hand lane of multi-lane highway)	23-42	16.5	19.8		4	2	0
		xxxx			13.2	3	3	0
23-43	Pulls off to the side of the road to let traffic pass on long or steep hills if shoulder is satisfactory	23-43	11.0	9.4		1	3	3
		xx			13.2	1	4	0
23-44	Does not pull off if shoulder is soft, if it is covered with loose dirt which could cause a dust cloud, or if driving conditions are bad	23-44	17.5	16.6		6	1	1
		xxxx			18.7	6	0	0
23-45	Uses special truck (slow) lanes when available	23-45		11.2		1	2	2
		xx						
23-5	Downgrades	23-5						
23-51	Buses	23-51						
23-511	Slows down when approaching top of a long/hazardous downgrade to reduce momentum and to permit downshifting if necessary	23-511	20.5	20.4		6	1	0
		xxxxx			20.5	8	0	0
23-512	Selects gear to use on downgrade on the basis of thumb rule which states that the same gear should be used in going down a hill as the one that would be required to go up the hill	23-512	13.8	13.2		2	2	2
		xxx			14.8	3	1	0

ITEM NUMBER

DIRECTIONAL CONTROL

23-43 The driver should use courtesy within reason according to the road conditions.

23-5 Professional drivers consider downgrades as one of the most dangerous routine driving situations. It is the place where complications are most likely to occur, especially during weather changes.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
23-513	Uses engine resistance as the primary braking force while going downhill	23-513						
23-514	Uses brakes intermittently	23-514						
		xxxxx			18.8	4	1	0
23-5141	Applies firm pressure on brake until speed is reduced slightly below desired speed	23-5141						
23-5142	Removes foot from brake pedal	23-5142						
23-5143	Conserves air pressure in braking system by avoiding fanning of brakes	23-5143						
23-5144	Permits speed to build back up to desired speed	23-5144						
23-5145	Applies brakes again to bring speed down below desired speed	23-5145						
23-5146	Avoids long application of brakes	23-5146						
23-52	Trucks	23-52						
23-521	Stops and inspects braking system and tires before starting down long/hazardous hills	23-521		19.3		5	2	0
		xxxxx						

DIRECTIONAL CONTROL

-5146 The excessive heat produced may cause the brakes to fail or fade or start a fire in the brake drum. There is nothing a driver can do to completely stop the vehicle once the brakes have failed because of overheating.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
23-522	Approaches top of grade at slow speed	23-522		18.8		5	1	0
		xxxxx						
23-523	Keeps the rig strung out while going downhill	23-523		15.6		4	1	2
		xxxx						
23-524	Applies light (5 pounds) brake pressure continuously	23-524		11.1		2	2	3
		xx						
23-525	Selects a gear that will permit keeping engine speed at about half power	23-525	15.1	15.8		4	3	1
		xxxx			10.0	1	0	0
24	PASSING	24						
24-1	Determines Whether He Has Sufficient Speed and Distance to Pass in Relation to the Type of Vehicle to be Passed	24-1	21.8	22.2		5	0	0
		xxxxx			21.5	6	0	0
24-2	Makes Smooth Transition When Changing Lanes to Avoid Whipping the Trailer	24-2	17.2	15.8		4	1	0
		xxxx			18.1	6	2	0
24-3	Returning to Driving Lane	24-3	20.4	20.9		7	2	0
		xxxxx			19.6	4	1	0
24-31	Judges the distance, as seen through side-view mirror, to determine when to return to driving lane	24-31						
25	SURVEILLANCE AND SITUATION AWARENESS	25						

ITEM NUMBER

DIRECTIONAL CONTROL

23-522 The driver should not start down the grade any faster than he plans to go at any point on the hill.

23-523 The driver does this by power braking. Power braking is accomplished by depressing the brakes and the accelerator simultaneously. Since most of the braking power is applied to the trailer(s) this keeps the rig "strung out" and prevents the trailers from overtaking the tractor and "jackknifing."

23-524 Fanning of brakes (frequent momentary application of the brakes) causes overheating which may lead to crystallization and eventual failure of brakes. Fanning also causes loss of air pressure. The actual pressure to be applied may vary from one rig to another.

23-525 By having the engine at half speed, the driver has the power available if he needs it for power braking; and it also makes downshifting easier.

24-1 Driver should be aware when following trucks or buses closely that his vehicle is being "pulled" by the draft created by the vehicle in front. If the driver should attempt to pass, he may find that he has insufficient power to pass, safely or otherwise.

Driver should also note if the vehicle he plans to pass contains animals. The loud noise of the truck may frighten the animals causing them to shift or make other disquieting responses.

24-31 Returning to the driving lane involves different tasks in a truck or bus than it does in a passenger car. In a passenger car, it is usually safe to return to the driving lane when the vehicle that has been passed appears in the rearview mirror. In a truck equipped with side view mirrors, the vehicle being passed can be seen *before* it is safe to return to the driving lane. When passing, the driver should be aware of the limitations of his mirrors, i.e., blind spots. A rather large blind spot is directly behind the trailer(s) and extends for a distance of about 50 or 60 feet beyond it. This blind spot extends only about 10-15 feet on buses since they have a rearview mirror. A second serious blind spot is on the right-hand side of the rig approximately even with the right-hand mirror and extending to some point about one-third of the way back on the bus or trailer. This blind spot can be partially eliminated with the use of a convex mirror. However, this type of mirror causes distortion by making objects appear farther away than they are (continued on page 79).

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{I}$	$\bar{X}_{B}$	H	M	L
25-1	Roadway Obstructions	25-1						
25-11	Posted obstructions	25-11	17.6	16.7		5	2	0
		xxxxx			19.3	4	0	0
25-111	Bridges and tunnels	25-111	14.0	15.6		6	1	0
		xxx			11.3	2	1	1
25-1111	Checks posted load limit	25-1111						
25-1112	Checks posted overhead and side clearances	25-1112						
25-1113	Checks for bridge ramp or bump	25-1113	8.9	7.5		1	4	3
		xx			11.2	2	2	1
25-11131	Slows if ramp incline is significant	25-11131	15.2	12.7		2	5	0
		xxxx			18.0	6	0	0
25-1114	Drives as close as possible to center of roadway	25-1114	11.4	12.3		0	6	1
		xx			10.3	2	2	2
25-112	Drawbridge	25-112	9.5	7.3		1	2	4
		xx			11.4	3	4	1
25-1121	Stops before going onto bridge	25-1121						

ITEM NUMBER

DIRECTIONAL CONTROL

24-31 (Cont.) As a courtesy, when one professional driver is being passed by another, he *may* blink his headlights to indicate when it is safe for the passing vehicle to return to the right-hand or driving lane. This practice is accepted as being a contribution to highway safety by law enforcement officials in some states but is discouraged or prohibited in other states because it is believed to interfere with traffic regulations and to create a driving hazard. In any event, drivers should be aware that several courts have held that the driver giving the signal is liable should an accident result from his signal.

A driver may caution oncoming professional drivers of dangers on the roadway ahead by blinking his headlights. This serves to attract the other drivers' attention and to communicate a general caution warning. As the vehicles pass each other, a hand signal, which varies in different regions of the country, may be given to specify the nature and approximate distance of the danger. This practice is accepted in some states by law enforcement officials as long as it does not interfere with the safety of other vehicles. In any event, drivers should be aware that several courts have held that the driver giving the signal is liable should an accident result from his signal.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
25-113	Toll plazas	25-113	10.8	10.8		2	3	1
		xx			10.8	2	4	0
25-1131	Checks for special truck/bus toll gate	25-1131						
25-1132	Moves to truck/bus lane as soon as possible	25-1132	9.2	8.6		1	3	1
		xx			9.7	1	2	3
25-1133	Checks overhead and side clearances	25-1133	11.0	9.0		2	4	1
		xx			13.0	5	2	0
25-114	Weight station	25-114						
25-1141	Determines whether weight station is open or closed; that is, determines whether he is required to stop	25-1141		6.8		1	2	3
		x						
25-1142	Reduces speed to 3 miles per hour or less before arriving at scale	25-1142		3.9		0	1	6
		x						
25-1143	Avoids using brakes on scale	25-1143		3.5		0	2	4
		x						
25-1144	Stopping at weight station	25-1144						
25-11441	Remains with vehicle until it has been weighed	25-11441		5.4		0	2	3
		x						

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		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
25-11442	Parks on exit side of scale if he desires to make a convenience stop	25-11442		3.7		0	2	5
		x						
25-12	Unposted obstructions	25-12						
25-121	Bridges and tunnels	25-121						
25-1211	Checks bridge deck for recent repair work	25-1211	12.6	14.7		6	1	2
		xxx			9.9	1	4	2
25-1212	Checks also for built-up snow or ice	25-1212	13.2	10.7		3	3	1
		xxx			16.0	5	1	0
25-1213	Checks bridge for gussets	25-1213	12.5	11.7		2	2	3
		xxx			13.3	2	3	1
25-1214	Checks curvature of tunnel ceiling (or bridge cover)	25-1214	14.3	16.1		4	3	0
		xxx			11.8	1	4	0
25-122	Trees	25-122						
25-1221	Checks for overhanging branches	25-1221	12.4	13.6		6	1	0
		xxx			11.0	1	5	0
25-13	Roadway and roadside obstructions	25-13						

ITEM NUMBER

SURVEILLANCE AND SITUATION AWARENESS

25-1211 Additional layers of pavement may have been added, thus reducing overhead clearance to less than the posted clearance.

25-1213 On small bridges, corner gussets (strengthening members of a bridge) may not permit the passage of wide trailers even though there is sufficient vertical clearance in the middle of the bridge.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_T$	$\overline{X}_B$	H	M	L
25-131	Stalled vehicles on roadway	25-131						
25-1311	Removes foot from accelerator	25-1311						
25-1312	Turns on emergency flashers *or* pumps brakes to provide warning to following traffic	25-1312	12.8	10.9		1	4	2
		xxx			16.3	2	2	0
25-1313	Makes decision to stop or pass	25-1313						
25-13131	Passes cautiously if there is room to do so on roadway	25-13131	16.9	15.8		6	2	0
		xxxx			18.8	5	0	0
25-13132	Stops if there is not enough room to pass on roadway	25-13132	23.2	23.4		7	0	0
		xxxxx			22.8	5	0	0
25-132	Animals in roadway	25-132						
25-1321	Daytime	25-1321						
25-13211	Stops or slows to permit animal to cross roadway	25-13211	9.6	8.4		2	3	2
		xx			10.6	2	6	1
25-13212	Sounds horn to warn animal	25-13212	6.6	6.3		1	3	3
		x			7.0	0	3	4

ITEM NUMBER

SURVEILLANCE AND SITUATION AWARENESS

25-13132 After stopping, the driver may pass cautiously on the shoulder if one is available and able to bear the load without collapsing.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_T$	$\overline{X}_B$	H	M	L
25-1322	Nighttime	25-1322						
25-13221	Stops or slows to permit animal to cross roadway	25-13221	13.6	14.4		5	4	0
		xxx			12.6	2	5	0
25-13222	Switches headlights from high to low beams or turns them off momentarily if animal seems to be fixating on lights	25-13222	10.4	10.4		2	6	1
		xx			10.2	1	3	1
25-13223	Sounds horn to warn animal	25-13223	8.4	11.0		1	2	1
		x			6.4	0	3	2
25-133	Vehicles parked on roadside	25-133						
25-1331	Slows and moves to outer lane	25-1331	8.8	6.7		1	2	4
		xx			12.5	1	3	0
25-134	Pedestrians standing on roadside	25-134						
25-1341	Slows and moves to outer lane	25-1341	11.6	12.6		2	3	2
		xxx			10.5	2	4	0
25-135	Roadway characteristics	25-135						
25-1351	Shoulders	25-1351						

ITEM NUMBER

SURVEILLANCE AND SITUATION AWARENESS

25-133 Driver should particularly be alert for cars on jacks and slightly opened doors. Suction can cause the car to fall from the jack or severely damage the door.

25-1331 This is done to reduce the force of the suction effect.

25-1341 This is done to reduce the force of the suction effect.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
25-13511	Determines shoulder conditions	25-13511	14.6	12.0		2	1	1
		xxxx			16.1	5	2	0
25-13512	Tracks clear of shoulder hazards	25-13512	13.4	11.7		1	4	2
		xxx			15.3	4	1	1
25-14	Weather	25-14						
25-141	Hot weather	25-141						
25-1411	Reduces driving speed	25-1411	8.2	8.3		1	3	3
		x			8.2	0	4	2
25-1412	Makes frequent stops to check condition of tires	25-1412	16.1	18.6		5	2	0
		xxxx			13.2	2	3	1
25-14121	Checks lug nuts at each stop	25-14121	14.7	15.3		4	2	0
		xxxx			13.8	2	1	1
25-141211	Looks for running rust around lug nuts	25-141211	14.0	15.3		4	3	0
		xxx			12.5	3	1	2
25-142	Cold weather	25-142						
25-1421	Bleeds air and fuel tanks periodically	25-1421	15.2	15.7		6	0	1
		xxxx			14.5	3	3	0

ITEM NUMBER

SURVEILLANCE AND SITUATION AWARENESS

25-1411 Reduction of speed during hot weather reduces the likelihood of engine failure.

The driver should slow down approximately 10 mph from his normal driving speed when driving with recaps in hot weather.

25-141211 Running rust indicates loose nuts.

25-1421 This is done to remove condensate to prevent freezing.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_T$	$\overline{X}_B$	H	M	L
25-1422	Detects and compensates for black ice	25-1422	20.9	20.6		6	0	1
		xxxxx			21.3	8	0	0
25-1423	Monitors rear tires to see if snow is sticking	25-1423	8.5	7.1		3	1	4
		x			9.9	3	1	4
25-1424	Mounts a complete set of tire chains *before* entering hazardous driving conditions	25-1424	14.0	11.0		2	3	2
		xxx			17.0	6	0	1
25-143	Reduced visibility (falling snow, rain, fog, blowing sand, sun glare)	25-143						
25-1431	Cleans all reflectors	25-1431	10.3	9.4		2	1	5
		xx			12.3	1	3	0
25-1432	Cleans windows and mirrors	25-1432	17.1	16.7		4	3	0
		xxxx			17.6	3	2	0
25-1433	Turns on headlights	25-1433	16.9	15.3		5	1	1
		xxxx			18.6	7	0	0
25-14331	Attaches headlight masks for driving in fog to reduce diffusion	25-14331	7.4	5.0		0	1	6
		x			9.9	2	2	3
25-1434	Drives at a speed that will permit vehicle to be stopped within the prevailing visibility range	25-1434	22.0	21.8		5	1	0
		xxxxx			22.2	6	0	0
25-1435	Turns on windshield wipers before entering water or snow spray created by another vehicle	25-1435	17.5	16.7		3	3	0
		xxxx			18.3	4	1	1

ITEM NUMBER

SURVEILLANCE AND SITUATION AWARENESS

25-1422 Black ice is considered to be one of the most dangerous driving conditions. It is perfectly transparent ice on the road and very difficult to detect since it cannot be seen. To compensate for it, the driver must know the probable places where it will form. These places include underpasses, the lower sides of curves, dips, and in general any shady place where water might collect. The driver should also be aware that at night, when the temperature falls, places which were safe during the day may now be covered with a layer of black ice.

25-1423 If snow is sticking to the tires, it indicates that there is good traction. If the tires are not picking up snow and are black and shiny, it indicates slippery conditions.

25-1433 By turning on his headlights when the sun is at a low angle, the driver's vehicle can be seen more easily.

25-14331 By covering the upper half of the headlights with tape, back scatter is reduced. Using black tape is prohibited in some states. Masking tape is legal to use.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
25-144	Wind	25-144						
25-1441	Opens through vents on trailer	25-1441		5.4		1	1	5
		x						
25-1442	Reduces speed	25-1442	17.8	21.4		4	1	0
		xxxxx			14.8	4	1	1
25-1443	Monitors trailer for excessive tilt angle	25-1443		14.8		5	1	0
		xxxx						
25-1444	Observes roadside vegetation to determine direction and velocity of wind	25-1444	9.3	10.0		0	4	1
		xx			8.9	0	6	1
25-1445	Prepares to steer into wind when leaving the lee of a building, hill, or another vehicle	25-1445	12.9	12.3		2	5	0
		xxx			13.8	1	4	0
25-1446	Avoids following campers or house trailers (any vehicle with large sail area and small mass)	25-1446	10.6	9.1		1	5	2
		xx			13.5	3	1	0
25-15	Skid control	25-15						
25-151	Drives at reduced speed on slippery roads	25-151	23.2	24.5		6	0	0
		xxxxx			20.7	3	0	0
25-152	Makes small, smooth steering corrections rather than large, jerky ones when attempting to control skid	25-152	18.2	17.0		6	2	0
		xxxxx			20.2	5	0	0

25-1441 This is done to prevent a buildup of pressure in the trailer(s).

25-1446 Mobile homes, empty trailers, or other light-weight units with large sail area and high center of gravity are particularly unstable in high wind. Further, a steady wind may cause the trailer to lean slightly so that the rear wheels of the trailer do not track with the wheels of the tractor, and gusting winds may cause the rear of the trailer to whip.

25-152 One exception to this task occurs after the skid has been controlled and the driver is attempting to get back on the roadway from the shoulder. In this case, the driver should make an aggressive movement of the steering wheel to get back on the roadway.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
25-153	Keeps rig strung out	25-153		14.2		3	2	1
		xxx						
25-154	Steers in intended direction of travel	25-154	16.8	14.1		6	1	1
		xxxx			20.3	5	0	1
25-155	Avoids braking or downshifting	25-155	20.0	19.0		6	1	1
		xxxxx			21.3	6	0	0
25-156	Uses power braking if braking is necessary	25-156		13.8		5	2	1
		xxx						
25-157	Maintains maximum directional control	25-157	21.7	20.0		8	0	0
		xxxxx			24.4	5	0	0
25-16	Traffic	25-16						
25-161	Reads-the-road-high to detect potentially hazardous situations well in advance	25-161	20.5	22.0		5	1	0
		xxxxx			19.3	6	1	0
25-1611	Pays attention to the movements of all vehicles ahead, not just the one immediately ahead	25-1611	19.1	19.9		7	1	0
		xxxxx			17.5	3	1	0
25-1612	Slows immediately when farm equipment or other slow-moving vehicles are sighted on roadway	25-1612	18.3	16.8		2	4	0
		xxxxx			19.6	6	1	0
25-1613	Watches for vehicles entering his lane anywhere ahead	25-1613	20.2	20.0		6	1	0
		xxxxx			20.4	4	1	0

ITEM NUMBER

SURVEILLANCE AND SITUATION AWARENESS

25-155 This is done to maintain steady traction.

25-157 This is done by keeping the wheels turning; the driver does not lock the wheels.

25-1611 A vehicle entering a lane several vehicles ahead may cause intervening traffic to slow. The driver can take advantage of his elevated position to make an early response in such situations. Another situation that the driver can respond to because of his elevated position is the "funneling" of traffic from three lanes to two lanes.

ITEM NO.		$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
25-1614	Avoids tailgaters	9.8	10.5		1	3	2
xx				9.0	2	3	1
25-162	Pacing traffic lights						
25-1621	Times approach to traffic light to avoid stopping, if possible	9.3	8.3		2	2	3
xx				10.5	2	2	2
26	BRAKING AND STOPPING						
26-1	Technique and Procedures						
26-11	Ensures that all wheels are on the same type or condition of road surface before braking	8.2	8.5		2	1	3
x				8.0	0	4	3
26-12	Avoids sharp braking on turns or curves	21.4	21.6		7	0	0
xxxxx				21.2	5	1	0
26-13	Applies steady pressure on foot brake when initiating stop	14.5	15.1		3	4	1
xxx				13.7	4	2	1
26-14	Avoids locking wheels (keeps wheels turning) to maintain directional control of vehicle	20.0	19.4		5	2	1
xxxxx				21.0	4	1	0
26-15	Pumps brake pedal gently to dry wet brakes	14.9	13.1		3	4	0
xxxx				16.7	4	3	0

ITEM NUMBER

SURVEILLANCE AND SITUATION AWARENESS

25-1614 This can be done by blinking the warning lights, slowing down, or changing lanes, thereby allowing the tailgater to pass.

26 Driver should be aware that stopping distances are a function of speed, surface conditions, weight, condition of brakes, and driver reflex. For good surface conditions, a rule of thumb for following distance is one vehicle length per 10 miles per hour. During unfavorable weather conditions, the following distance should be increased.

26-11 This is done because of the multiple braking system of the tractor-trailer(s) combination. If, for instance, the tractor is on a firm surface and the trailer wheels are on ice, jackknifing of the units may occur.

26-12 With a multiple-braking system, sharp application of the brakes on a curve may cause the trailer(s) to whip the tractor. If there is more overall stopping power in the tractor than in the trailer(s), the rig will tend to jackknife. If there is more overall stopping power in the trailer(s), there will be a tendency for the trailer(s) to pull the tractor in line with itself.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
27	ON-THE-ROAD INSPECTIONS	27						
27-1	Routine Rest and Refueling Stops	27-1						
27-11	Checks fifth wheel	27-11		14.7		6	1	0
		xxxx						
27-12	Checks braking system	27-12	11.8	12.7		4	1	1
		xxx			11.0	1	4	1
27-13	Checks trailer connections	27-13		9.7		3	4	0
		xx						
27-14	Checks wheels	27-14	12.4	14.0		3	4	0
		xxx			10.9	2	4	1
27-141	In addition to checks listed in 12-23, checks for signs of running rust around lug nuts (indicates loose lug nuts)	27-141						
27-15	Checks tires	27-15	14.5	17.0		5	1	0
		xxx			10.8	1	2	1
27-16	Checks temperature of tire by placing hand on sidewall	27-16	12.5	14.1		2	5	0
		xxx			9.5	0	4	0
27-17	Checks bonding of tread to casing	27-17	7.1	8.3		1	4	1
		x			5.8	1	3	0

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3. *SPECIAL DRIVING TASKS*

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
31	TURNABOUTS	31						
31-1	Avoids Making U-Turns or Y-Turns	31-1	15.1	12.0		2	3	0
		xxxx			19.0	3	1	0
31-2	Reverses Direction by Driving Around the Block (makes three right turns followed by a left turn)	31-2	5.1	4.3		0	2	4
		x			6.3	0	2	2
32	BACKING UP	32						
32-1	Avoids Backing Whenever Possible	32-1	15.7	14.8		3	5	0
		xxxx			17.0	4	2	0
32-2	Backs to Left When Possible	32-2	13.7	12.9		2	5	1
		xxx			16.0	2	1	0
32-3	Gets Out and Makes a Visual Inspection of the Area to the Rear of the Vehicle	32-3	17.4	21.1		7	0	0
		xxxx			13.7	3	3	1
32-4	Stations Someone in the Rear of the Vehicle to Act as a Signalman	32-4	10.9	9.1		2	6	0
		xx			13.2	3	0	3
32-5	Signals Intention to Back	32-5	13.9	14.2		3	2	1
		xxx			13.6	2	3	0
32-51	Accelerates engine	32-51	5.1	3.7		1	0	6
		x			6.3	1	2	5

ITEM
NUMBER

BACKING UP

32-2 This is done because of the greater visibility on the left side (driver's side) of the vehicle.

32-4 The signalman should be in order of preference:

Another driver
A company employee
A passenger

32-5 All of these tasks are to alert people around the vehicle that it is about to back up.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
32-52	Sounds horn	32-52	14.4	11.8		2	2	1
		xxx			16.5	4	1	1
32-53	Turns on flashers	32-53	12.6	12.0		4	2	2
		xxx			13.5	4	1	1
32-54	Backs up one foot and stops	32-54	9.9	9.1		1	2	4
		xx			10.8	3	1	2
32-6	Backs Slowly, in Lowest Reverse Gear, Scanning All Mirrors Sequentially While Backing	32-6	19.2	20.0		6	0	0
		xxxxx			18.3	5	1	0
32-7	Backing a Trailer	32-7						
32-71	Steers a heading opposite the desired direction of travel until the trailer is moving in the desired direction of travel, then steers a heading the same as the desired direction of travel to line up the tractor	32-71		11.5		2	2	2
		xx						
33	PARKING	33						
33-1	Parking on Roadway	33-1						
33-11	Parks past driveways	33-11	9.2	8.7		1	7	1
		xx			10.2	0	4	1
33-12	Checks surface condition of parking space	33-12	9.8	9.1		2	3	2
		xx			10.7	2	4	0

ITEM NUMBER	BACKING UP

33-1 Parking on roadway is to be avoided if possible because of the large size of the vehicle.

33-11 This is done to prevent obstructing the view of oncoming traffic from the driver coming out of the driveway.

33-12 The surface should be free of debris and capable of supporting the vehicle.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
33-13	Checks to ensure parking space is clear of overhead obstructions	33-13	9.3	10.1		3	3	3
		xx			7.8	1	2	2
33-14	Ensures there is adequate clearance for tractor as well as trailer	33-14		15.8		3	2	0
		xxxx						
33-15	Turns front wheels into curb	33-15	11.7	8.4		1	2	2
		xxx			14.5	3	3	0
33-16	Turns off engine	33-16	7.7	9.2		1	1	4
		x			6.0	0	1	4
33-17	Places transmission in gear	33-17	15.1	14.3		4	2	1
		xxxx			16.2	3	1	1
33-18	Sets parking brakes	33-18	15.8	16.7		5	0	1
		xxxx			14.8	4	1	1
33-19	Blocks wheels	33-19	13.1	15.0		3	2	0
		xxx			11.2	1	3	1
33-1.10	Parallel parking	33-1.10	11.8	12.4		3	3	1
		xxx			11.0	3	2	1
33-1.101	Drives forward into parking space	33-1.101						
33-2	Additional Parking Precautions	33-2						

ITEM NUMBER	PARKING
33-14	This refers to horizontal clearance.
33-17	If the vehicle is facing downhill, the transmission should be in the lowest reverse gear. If the vehicle is facing uphill, the transmission should be in the lowest forward gear.
33-1.101	The location of the fifth wheel can cause overhang of the tractor. Because of this, it is possible for the trailer to be clear and the tractor to be obstructed.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
33-21	Selecting a parking place	33-21						
33-211	Parks inside terminal in cold weather if possible to prevent brakes from freezing	33-211	6.2	4.3		1	2	4
		x			9.5	1	2	1
33-212	Parks well clear of vehicles bearing hazardous materials placards	33-212	8.9	8.0		0	4	2
		xx			9.7	1	4	2
33-213	Does not block the exit of other vehicles	33-213	9.7	11.8		3	0	2
		xx			7.0	0	3	1
33-214	Ensures that his exit is not or will not be blocked when he desires to leave	33-214	8.8	9.4		1	2	2
		xx			8.3	0	5	2
33-22	Shuts off fuel supplies	33-22		4.4		0	2	5
		x						
33-23	Setting parking brake	33-23						
33-231	Applies full pressure on foot brake when setting parking brake	33-231	9.5	11.0		2	3	2
		xx			8.0	1	3	3
33-232	Ensures brakes and tires are cool before leaving rig	33-232	12.4	15.3		4	3	0
		xxx			9.6	2	1	4
34	DRIVING IN OFF-STREET AREAS (parking lots, loading areas, delivery areas, etc.)	34						

ITEM NUMBER

PARKING

33-22 This is particularly important on diesel engines since they can start on as little as a fraction of a revolution of the crankshaft. By cutting off the fuel, the engine is not likely to start.

33-231 This is done to provide maximum mechanical advantage in setting the parking brake.

33-232 In the winter time, hot tires will melt the surrounding snow and cause a loss of traction. Also, because of the different coefficient of expansion between metals, when the brakes and wheels cool there may not be sufficient braking power on the wheels.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
34-1	Uses Driveway, When Available	34-1	9.5	8.1		0	5	2
		xx			11.8	1	2	1
34-2	Crosses Inclined Driveway Slowly and at an Angle to Avoid Striking Undercarriage	34-2	12.3	12.5		3	5	0
		xxx			12.0	1	3	0
34-3	Drives Over Curbs Slowly	34-3	7.0	7.8		2	3	3
		x			5.8	0	3	2
34-4	Scans for Posted and Unposted Obstructions	34-4	13.2	13.9		8	0	0
		xxx			11.8	2	1	1

ITEM NUMBER	PARKING
34-3	The tops of the trailers will bump together if curbs are taken too rapidly. Reefers with the cooling units at the top of the trailer are the most susceptible.
34-4	Hotel and motel signs are common, unposted obstructions for buses.

41 BRAKE SYSTEM FAILURES

41-1 Loss of Air Pressure

41-11 Detects sound of escaping air from brake system, decelerating of vehicle, or activation of emergency braking warning system

41-111 Grasps steering wheel firmly

41-112 Presses brake pedal to activate brake lights

41-113 Turns on four-way flashers or sounds horn to attract attention of other drivers

41-114 Overpowers emergency braking system (accelerates) to avoid sudden stop in path of following traffic

41-115 Stops vehicle as soon as possible off roadway if possible

41-116 Inspects air brake system to determine cause of problem

41-117 Repairs system (or has it repaired) before resuming normal driving

ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
41						
41-1						
41-11						
41-111	17.6	17.0		5	3	0
xxxxx			18.3	4	1	1
41-112	15.3	16.3		3	4	0
xxxx			14.0	2	2	1
41-113	18.3	16.9		6	1	1
xxxxx			20.2	5	1	0
41-114	17.1	15.6		3	4	1
xxxx			18.6	7	1	0
41-115	18.8	18.0		6	1	0
xxxxx			20.3	4	0	0
41-116	15.3	16.5		6	2	0
xxxx			13.4	2	2	1
41-117	20.6	20.9		6	1	0
xxxxx			20.2	5	0	0

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		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
41-12	Uses parking brake to stop (in the event that all other braking systems fail)	41-12						
41-121	Removes foot from accelerator	41-121	11.8	11.6		6	1	2
		xxx			12.3	1	3	0
41-122	Downshifts if possible	41-122	21.2	19.8		4	2	0
		xxxxx			22.5	6	0	0
41-123	Sets parking brake firmly while maintaining firm grip on steering wheel with other hand	41-123	18.5	17.4		7	0	0
		xxxxx			20.5	4	0	0
41-124	Releases parking brake momentarily if vehicle begins to bounce or to veer in either direction	41-124	21.0	19.8		6	0	0
		xxxxx			22.2	6	0	0
41-125	Downshifts if possible	41-125						
41-126	Resets parking brake	41-126						
41-127	Repeats sequence until vehicle stops	41-127						
41-13	Stops vehicle as soon as possible off roadway	41-13	18.2	15.8		6	2	1
		xxxxx			21.3	7	0	0
41-14	Inspects brake system to determine cause of failure	41-14	15.3	12.7		4	2	1
		xxxx			17.5	6	2	0

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		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
41-15	Repairs system (or has it repaired) before resuming normal driving	41-15	20.2	19.2		6	0	0
		xxxxx			21.8	3	1	0
41-2	Emergency Quick Stop	41-2						
41-21	Uses full pressure on brake pedal	41-21	15.3	16.3		4	1	1
		xxxx			14.5	5	1	2
41-22	Uses power braking if time permits	41-22		14.4		4	2	1
		xxx						
42	ENGINE FAILURES	42						
42-1	Activation of Motorguard Device	42-1						
42-12	Stops vehicle as soon as possible, off roadway if possible	42-12						
		xxx			14.3	3	3	0
42-13	Activates overrule device to restart engine only if it is necessary to move vehicle from a hazardous location	42-13						
		xxx			11.8	2	3	1
42-14	Determines cause of low oil pressure or overheating	42-14						
		xx			8.6	1	2	2
42-15	Corrects problem (or has it corrected) before resuming normal driving	42-15						
		xxx			12.3	2	3	2

ITEM NUMBER

ENGINE FAILURE

42-1 Motorguard devices are designed to stop an engine if oil pressure drops below five pounds or if engine temperature exceeds 212°. These devices are fairly common on newer buses.

42-13 The overrule device is designed to be used for brief periods of time only. It is necessary to have the vehicle in low gear to activate the overrule device.

ITEM NO.						
	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
43 FIRES						
43-1 Fire Fighting						
43-11 Extinguishes fires or attempts to control them	16.4	14.6		5	1	1
xxxx			18.5	5	1	0
43-12 Summons fire department for assistance or, if possible, drives to fire department or source of water or other appropriate extinguishing agent	13.7	14.6		2	3	0
xxx			12.8	1	2	2
43-13 Tire fires						
43-131 Removes smoking tires	15.5	13.8		4	0	1
xxxx			16.7	6	1	0
43-132 Controls tire fires	17.6	16.4		4	1	0
xxxxx			18.4	5	3	0
43-133 Ensures tires are cool before stowing	15.3	16.6		5	2	0
xxxx			13.8	4	2	0
43-14 Cargo fires						
43-141 Scans cargo area periodically for smoke; informs fire department officials of the type of cargo loaded on the truck noting especially any hazardous materials as soon as fire fighting assistance arrives	9.8	7.1		0	6	1
xx			13.0	3	3	0

ITEM NUMBER

ENGINE FAILURE

43-11 Driver should familiarize himself with the operation of the fire extinguisher before the need arises. Extinguishing agent should be aimed at base of flames beginning at edge of fire and working inward and back and forth across the burning area. Reflash is a serious hazard with burning petroleum products. When fighting fire under the hood, the hood should be opened as little as possible to minimize the danger of a flare-up from air reaching the fire. Instead, inject extinguishing agent through hood louvers, radiator, or up under engine.

In the case of an electrical fire, battery cables should be disconnected to prevent re-ignition. Water should never be used on an electrical fire. Water should not be used on burning petroleum products.

Tire fires are more likely to occur on buses than on trucks because of the recessed wheel wells and consequent poor cooling ventilation.

43-13 Water is the best agent for extinguishing tire fires because of its cooling power due to its high heat absorption capacity. The extinguisher carried on the truck will not put out a burning tire, but can be used to control the flames for a short period. When fighting fires, use the extinguisher intermittently to conserve the extinguishing agent. Dirt or snow shoveled on a burning tire can be used to control flames.

ITEM NUMBER

VEHICLE EMERGENCIES

43-131 The driver should avoid approaching a smoking tire if it is not flat. The overpressure caused by the heat may cause the tire to explode. Even if the smoking tire is flat and in no danger of exploding, the tire next to it is probably hot and capable of exploding.

43-133 A tire should never be left on the unit to cool because continued buildup of heat will eventually cause the tire to burst into flame.

Instead, he should continue to drive at a reduced speed. This reduces the heat buildup due to friction. By stopping completely, he can remove all frictional heat, but sacrifices the correctional cooling effect of air rushing past the tires when the vehicle is moving.

ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
43-142	14.3	15.4		3	2	0
xxx			13.3	2	3	1
43-143	20.5	20.6		7	0	0
xxxxx			20.5	4	0	0
43-1431	20.8	22.3		8	0	0
xxxxx			18.8	5	1	0
43-1432	19.1	18.2		4	2	0
xxxxx			20.0	5	1	0
44						
44-1	21.7	20.8		8	0	0
xxxxx			23.5	4	0	0
44-2	21.1	20.2		6	0	0
xxxxx			22.0	6	0	0
44-3	14.1	12.7		4	1	2
xxx			15.6	4	3	0
44-4	15.4	15.2		2	4	0
xxxx			15.6	5	2	0
44-5	10.9	12.1		4	1	2
xx			8.8	2	1	1

43-142 Alerts fire department of special cargoes when evidence of fire is observed and assistance is required

43-143 Assumes responsibility for protecting public from danger created by hazardous cargoes

43-1431 Drives truck to uninhabited area if possible

43-1432 Sets up roadblocks to prevent on-lookers from approaching truck

44 BLOWOUTS

44-1 Grasps Steering Wheel Tightly and Attempts to Keep Vehicle Straight

44-2 Lifts Foot Off Accelerator and Allows Engine to Decelerate the Vehicle (does not apply brakes)

44-3 Looks for Suitable Place to Park

44-4 Pulls Off to Side of Road

44-5 Changes Tire or Calls for Assistance

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44-6 Performs a Complete On-the-Road Vehicle Inspection

ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
44-6	11.6	11.0		3	1	3
xxx			12.3	3	3	1

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5. *HOOKING UP AND UNCOUPLING*

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
51	HOOKING UP	51						
51-1	Hooking Up Singles	51-1						
51-11	Greases fifth wheel	51-11		9.2		2	1	3
		xx						
51-12	Opens fifth wheel jaws	51-12		11.0		2	2	2
		xx						
51-13	Tilts fifth wheel back	51-13		7.1		0	5	2
		x						
51-14	Sets brakes and blocks trailer wheels	51-14		16.7		5	0	1
		xxxx						
51-15	Checks brake hoses and light cords for proper stowage	51-15		9.6		2	0	3
		xx						
51-16	Checks height of trailer skid plate in relation to tractor fifth wheel	51-16		15.9		7	1	0
		xxxx						
51-17	Checks alignment of kingpin in relation to the fifth wheel jaws	51-17		16.6		3	3	1
		xxxx						
51-18	Backs tractor into position just in front of trailer	51-18		10.3		2	2	2
		xx						

ITEM NUMBER	HOOKING UP

51-14 There are different types of braking systems associated with different trailers. The driver should consult the operating manual as to what kind of system he is using and how to operate it.

51-15 Brake hoses and light cords should be stowed in the special hangers provided to prevent them from getting caught between the tractor and trailer.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
51-19	Connects air brake hoses	51-19		22.3		8	0	0
		xxxxx						
51-1.10	Charges brake system	51-1.10						
51-1.11	Applies trailer brakes	51-1.11						
51-1.12	Backs tractor slowly under the trailer until contact is made and jaws lock around kingpin	51-1.12		19.6		3	2	0
		xxxxx						
51-1.13	Places tractor in lowest forward gear and gives a slight pull forward to ensure kingpin engagement	51-1.13		19.7		5	1	0
		xxxxx						
51-1.14	Applies tractor parking brake	51-1.14		13.4		3	4	1
		xxx						
51-1.15	Places tractor protection valve in normal position to supply air pressure to trailer brake system	51-1.15		17.4		3	2	0
		xxxx						
51-1.16	Checks air pressure gauge to ensure air pressure returns to normal	51-1.16		22.7		6	0	0
		xxxxx						
1-1.17	Activates trailer lights	51-1.17		18.3		4	2	0
		xxxxx						
1-1.18	Rechecks tractor air hose and electrical connections	51-1.18		20.2		5	0	0
		xxxxx						

ITEM NUMBER	HOOKING UP

51-1.13 This is done to check if there is a positive coupling between the fifth wheel and the trailer kingpin.

		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
51-1.19	Inspects hook-up making certain that:	51-1.19		22.0		7	0	0
		xxxxx						
51-1.191	Tractor fifth wheel release lever is in its locked position	51-1.191						
51-1.192	No gap exists between the tractor fifth wheel and trailer skid plate	51-1.192						
51-1.193	Ensures tractor fifth wheel jaws are locked around trailer kingpin	51-1.193						
51-1.20	Removes trailer blocks	51-1.20		6.9		1	2	4
		x						
51-1.21	Raises landing gear assembly to its full-up position	51-1.21		16.1		5	2	0
		xxxx						
51-1.211	Secures landing gear crank handles	51-1.211		5.9		0	5	3
		x						
51-1.22	Checks trailer lights to ensure they are in place, connected, and operating properly	51-1.22		18.8		8	0	0
		xxxxx						
51-2	Hooking Up Doubles	51-2						
51-21	Hooking up to dolly	51-21		15.9		4	3	1
		xxxx						

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		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
51-211	Hooks up tractor and first trailer as described above	51-211						
51-212	Positions tractor and first trailer in front of dolly so that the pintle hook of trailer is as close as possible to pintle eye of dolly	51-212						
51-213	Completes hook-up manually	51-213						
51-214	Locks pintle hook	51-214						
51-215	Secures dolly support in raised position	51-215						
51-216	Hooks up the brake lines, light cords, and safety chains	51-216						
51-22	Hooking up the second trailer	51-22						
51-221	Positions tractor and first trailer, with dolly attached, as close as possible to the second trailer	51-221	9.8	9.6		2	2	3
		xx			11.0	0	1	0
51-222	Lowers dolly support	51-222	13.5	14.1		5	1	1
		xxx			9.0	0	1	0
51-223	Unhooks dolly	51-223						

ITEM NUMBER

HOOKING UP

51-211 For safe handling on the road, the more heavily loaded trailer should be in the first position.

51-224	Raises dolly support
51-225	Wheels dolly into position in front of second trailer, in line with the kingpin
51-226	Lowers dolly support
51-227	Backs tractor and first trailer into position so that pintle hook is lined up as closely as possible with pintle eye of dolly
51-228	Hooks up dolly to first trailer
51-229	Ensures dolly's fifth wheel jaws are open
51-2.10	Secures dolly support (landing gear) in raised position
51-2.11	Sets brakes and blocks wheels on second trailer
51-2.12	Checks brake hoses and light cords for proper stowage
51-2.13	Releases dolly brakes

ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
51-224						
51-225		10.0		1	4	1
xx						
51-226		12.3		2	4	1
xxx						
51-227		10.5		2	3	1
xx						
51-228		17.7		4	0	2
xxxxx						
51-229		12.7		3	3	1
xxx						
51-2.10						
51-2.11		15.4		5	2	1
xxxx						
51-2.12		18.0		5	2	0
xxxxx						
51-2.13		10.6		2	2	1
xx						

ITEM NUMBER	HOOKING UP
51-225	Driver may be able to back dolly into position without unhooking it.

		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
51-2.14	Backs combination (tractor, first trailer, and dolly) slowly under second trailer until contact is made and jaws lock around kingpin	51-2.14		18.8		5	0	1
		xxxxx						
51-2.15	Inspects hook-up making certain that:	51-2.15		19.3		6	1	0
		xxxxx						
51-2.151	Tractor fifth wheel release lever is in its locked position	51-2.151						
51-2.152	No gap exists between top of tractor fifth wheel and trailer skid plate	51-2.152						
51-2.153	Ensures tractor fifth wheel jaws are locked around trailer kingpin	51-2.153						
51-2.16	Connects air lines and light cords between first trailer and second trailer to complete hook-up	51-2.16						
51-2.17	Ensures that all shut-offs on the air brake system are open except those at the rear of the second trailer	51-2.17						
51-2.18	Places tractor in lowest forward gear and gives a slight pull forward to ensure that the dolly fifth wheel jaws are locked around kingpin of second trailer	51-2.18		13.2		4	1	1
		xxx						
52	UNCOUPLING	52						
52-1	Uncoupling Singles	52-1						

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		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
52-11	Positions trailer(s) and tractor in straight line	52-11		7.4		1	0	6
		x						
52-12	Checks surface conditions	52-12		12.0		3	3	1
		xxx						
52-13	Lowers landing gear (on plank if necessary)	52-13		11.2		2	2	2
		xx						
52-14	Sets tractor parking brakes	52-14		12.3		3	4	1
		xxx						
52-15	Places tractor protection valve in emergency position	52-15		13.5		2	4	0
		xxx						
52-16	Unhooks cables and hoses	52-16		14.7		2	4	0
		xxxx						
52-161	Makes sure they are clear	52-161						
52-17	Releases fifth wheel locking device	52-17						
52-18	Drives tractor slowly out from under trailer	52-18						
52-19	Secures air hose connectors and light cord sockets to dummy couplings	52-19						

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		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
52-1.10	Places wheel blocks under front and rear wheels of trailer	52-1.10						
52-1.11	Releases tractor parking brake	52-1.11						
52-1.12	Drives forward to separate tractor from trailer	52-1.12						
52-2	Uncoupling Doubles	52-2						
52-21	Blocks wheels of second trailer	52-21		12.4		5	2	1
		xxx						
52-22	Lowers landing gear of second trailer	52-22		13.1		4	2	1
		xxx						
52-23	Closes air shut-offs at rear of first trailer or on dolly (if equipped)	52-23		15.3		5	2	0
		xxxx						
52-24	Secures the lines	52-24						
52-25	Hooks glad-hands together or fastens to dummies to keep out dirt and water	52-25						
52-26	Releases dolly fifth wheel latch	52-26						

ITEM NUMBER	HOOKING UP
52-2	Second trailer should not be dropped with dolly attached unless the dolly has landing gear.

52-27	Releases dolly brakes
52-28	Pulls tractor, first trailer, and dolly slowly out from under second trailer
52-29	Unhooking dolly
52-291	Lowers dolly landing gear
52-292	Disconnects brake lines, light cord, and safety chains from first trailer
52-293	Ensures air shut-offs at rear of first trailer are tightly closed
52-294	Blocks dolly wheels
52-295	Releases pintle hook of first trailer
52-296	Pulls tractor and first trailer clear of dolly slowly

ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
52-27						
52-28						
52-29						
52-291						
52-292						
52-293						
52-294						
52-295						
52-296						

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61 TRUCKS

61-1 Picking Up and Discharging Passengers

61-11 Does not pick up hitchhikers

61-12 Does not allow passengers in his truck except as follows:

61-121 Employees assigned to a vehicle

61-122 Livestock attendants

61-123 Other persons with written authorization from company

61-124 Persons being transported in an emergency

61-1241 Takes emergency passenger directly to closest aid station and discharges him

61-1242 Makes an entry in the log book listing the passenger's name, address, phone number, and the license number of his car

ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
61						
61-1						
x			5.4	1	3	3
61-11	10.3	11.1		4	0	4
xx			9.4	2	3	2
61-12		9.6		1	2	2
xx						
61-121						
61-122						
61-123						
61-124						
61-1241	11.6	8.0		2	3	2
xxx			15.1	3	2	2
61-1242	3.9	5.0		1	3	4
x			2.3	0	1	5

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61-1243	Files a written report to the company describing the emergency conditions that necessitated picking up the passenger	ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_T$	$\bar{X}_B$	H	M	L
		61-1243	3.6	1.8		0	0	6
		x			6.3	1	1	2
61-2	Prohibits Any Person Other than an Authorized Driver from Driving his Vehicle, Except in an Emergency	61-2	16.1	15.0		5	0	2
		xxxx			17.1	6	1	1
62	COMMERCIAL BUSES	62						
62-1	Loading Luggage	62-1						
62-11	Ensures that each piece of luggage bears a securely fastened luggage tag	62-11						
62-12	Checks manifest for proper destination of luggage	62-12						
		xx			8.8	0	4	1
62-13	Ensures that through-passengers' luggage is placed in through-passenger luggage compartment	62-13						
		x			6.8	1	1	3
62-2	Loading Passengers at the Start of a Trip	62-2						
62-21	Ensures parking brake is set securely	62-21						
		xxxxx			18.5	6	0	0
62-22	Positions self on ground adjacent to bus entrance	62-22						
		xx			9.0	1	3	2

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		ITEM NO.	$\overline{X}_{TB}$	$\overline{X}_{T}$	$\overline{X}_{B}$	H	M	L
62-23	Cautions all passengers to exercise care in mounting step	62-23						
		x			5.4	0	3	2
62-24	Assists all passengers to board bus	62-24						
		x			8.3	1	3	3
62-25	Prevents crowding on steps by controlling the flow of passengers onto bus	62-25						
		x			7.2	0	4	1
62-3	Enters Bus	62-3						
62-31	Checks aisle to ensure it is free of luggage or other obstructions	62-31						
		xxxxx			18.2	4	2	0
62-32	Checks overhead luggage rack to ensure that it is free of:	62-32						
		xxxx			16.8	4	1	1
62-321	Stacked articles (e.g., books or suitcases placed on top of one another)	62-321						
62-322	Sharp objects (e.g., skates or ski poles)	62-322						
62-323	Extra heavy objects (e.g., bowling balls or portable typewriter)	62-323						
62-33	Checks to ensure restraining strap is properly in place	62-33						
		xxxx			14.8	3	2	0

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		ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
62-34	Makes coach (pre-departure) announcement	62-34						
		x			4.8	0	1	5
62-341	States name	62-341						
62-342	States final destination of bus and intermediate stops	62-342						
62-343	Reminds passengers that it is safer for them to remain seated while the bus is moving	62-343						
		xx			9.8	1	4	1
62-344	Requests passengers to remain seated when bus is driving in congested areas	62-344						
		xxx			13.2	2	3	0
62-345	Informs passengers that bus will remain at intermediate stops long enough to give departing passengers plenty of time to get off; therefore, they can remain seated until bus has come to a complete stop	62-345						
		xxxx			14.8	3	3	0
62-35	Makes sure all passengers are seated before moving the bus	62-35						
		xx			10.4	1	2	2
62-351	If there are more passengers than seats, insists that standing passengers remain behind white line	62-351						
		xxx			12.3	4	1	1
62-36	Picking up or discharging passengers enroute	62-36						
62-361	Activates turn signals and brake lights well in advance of stop	62-361						
		xxxxx			19.7	6	1	0

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62-362 Requests all passengers to remain seated until bus has come to a complete stop

62-363 Brings bus to a smooth stop

62-364 Stops the bus off the roadway if possible

62-365 Opens exit doors only after bus has come to a complete stop

62-366 Gets out of bus to assist exiting and boarding passengers

62-367 After reentering bus, checks to ensure that all pedestrians are clear of the bus before proceeding

ITEM NO.	$\bar{X}_{TB}$	$\bar{X}_{T}$	$\bar{X}_{B}$	H	M	L
62-362						
xxx			12.8	2	3	0
62-363						
xxx			13.6	2	3	0
62-364						
xxxxx			18.4	6	1	0
62-365						
xxxx			16.5	4	2	0
62-366						
xx			8.7	1	4	1
62-367						
xxxxx			17.6	3	2	0

REFERENCES

McDole, T. L., & Berger, W. G. Appendix C - Item writers' guide for truck driving: A preliminary outline. Highway Safety Research Institute, the University of Michigan, Ann Arbor, Michigan, August 1971.

McKnight, A. J., *et al.* Driver education task analysis. Volume I. Task descriptions. Human Resources Research Organization, Alexandria, Virginia, November 1970.

McKnight, A. J., *et al.* Driver education task analysis. Volume II. Task analysis methods. Human Resources Research Organization, Alexandria, Virginia, November 1970.

APPENDIX A

LIST OF JUDGES

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TRUCK DRIVING EXPERTS

1.	Robert Bailey	IML Freight, Inc.	Driver, Administrator
2.	Joseph Barbogallo	Universal Manufacturing Corporation	Fleet Manager
3.	Martel Beam	Carolina Freight Carriers Corporation	Administrator
4.	Robert Begeman	Transport Insurance Company of Dallas	Corporate Officer
5.	John Belanger	Consolidated Freightways	Safety Supervisor
6.	Elmer D. Belcher	Arkansas Best Freight System, Inc.	Safety Supervisor
7.	William K. Blood	Lee Way Motor Freight, Inc.	Safety Supervisor, Administrator
8.	Fred L. Bonser	Consolidated Freightways	Driver, Manager of Operations
9.	Clayton Calkins	Pacific Motor Trucking Company	Administrator
10.	Al Cota	Smith's Transfer Corporation	Driver
11.	Mahlon C. Cross	Roadway Express	Safety Supervisor
12.	Wesley A. Crowther	Smith's Transfer Corporation	Driver, Safety Supervisor
13.	Ambrose M. Cullen	Transport Service Company	Safety Supervisor
14.	Neill Darmstadter	American Trucking Associations, Inc.	Driver, Safety Supervisor
15.	Kenneth Feathers	Food Transport, Inc.	Administrator
16.	C. D. Fortune	Burlington Industries	Safety Director
17.	Harry Garver*		Safety Supervisor
18.	Mike Gorno	Holland Motor Express	Safety Supervisor, Administrator
19.	Ray Harrill	Akers Motor Lines, Inc.	Safety Supervisor

*This gentleman performed the evaluation task for another man who was on our mailing list. We learned he was a Safety Supervisor for a trucking firm, but we were not given the company name.

20.	James Jauch	North American Van Lines, Inc.	Safety Supervisor, Administrator
21.	Dave Jones	Motor Transport Company	Driver, Safety Supervisor, Administrator
22.	Forrest E. Jones	Allegheny Freight Lines, Inc.	Administrator
23.	Joseph N. Kavanagh	Chemical Leaman Tank Lines, Inc.	Safety Supervisor
24.	Willard McCue	Warren Transport, Inc.	Driver, Safety Supervisor, Administrator
25.	Gerald McCully	Steuart Petroleum Company	Safety Supervisor
26.	Carl D. Nelson	Jenney Freight Line, Inc.	Driver, Safety Supervisor
27.	Edward Olson	Brady Motorfrate, Inc.	Safety Supervisor, Administrator
28.	J. R. Osterman	Wellington F. Roemer Insurance, Inc.	Insurance Company Fleet Safety Engineer
29.	Michael Potochney	Hall's Motor Transit Company	Driver, Safety Supervisor, Administrator
30.	Arthur Seise	The Trash Men, Inc.	Driver, Safety Supervisor, Administrator
31.	Dean Sellers	Graves Truck Lines, Inc.	Administrator
32.	F. J. Sweeney, Jr.	Associated Transport, Inc.	Safety Supervisor, Administrator
33.	C. E. (Tim) Tyler	All-American Transport, Inc.	Driver, Safety Supervisor
34.	Leonard Waring	Rio Grande Motor Way, Inc.	Safety Supervisor
35.	Paul Watkins	Chippewa/McClain	Driver, Safety Supervisor, Administrator
36.	Joseph F. Weller	Bekins Van Lines	Safety Supervisor
37.	Marcus Woods	Garrett Freightlines, Inc.	Driver, Safety Supervisor, Administrator

BUS DRIVING EXPERTS

1.	Jack C. Adams	Greyhound Bus Lines	Driver
2.	Howard D. Allred	Greyhound Bus Lines	Driver
3.	Clair W. Bensinger	Greyhound Bus Lines	Driver
4.	John B. Bowen	Greyhound Bus Lines	Driver
5.	Richard E. Bryson	Greyhound Bus Lines	Driver
6.	George F. Bush	Greyhound Bus Lines	Driver
7.	Edward G. Garland	Greyhound Bus Lines	Driver
8.	Ervin E. Habeck	Greyhound Bus Lines	Driver
9.	Lige C. Hoskins	Greyhound Bus Lines	Driver
10.	Robert L. Hossler	Continental Trailways	Driver, Safety Supervisor
11.	Merritt Houk	Greyhound Bus Lines	Driver
12.	Frank C. Hubbard	Continental Trailways	Driver
13.	Fred W. Kegler	Greyhound Bus Lines	Driver
14.	Edward J. Lund	Greyhound Bus Lines	Driver
15.	Fergus Moriarty	Greyhound Bus Lines	Driver
16.	R. L. Nidever	Continental Trailways	Driver
17.	Malon Randall	Continental Trailways	Driver
18.	Harold P. Richards	Greyhound Bus Lines	Driver
19.	J. A. Roberts	Continental Trailways	Safety Supervisor
20.	Forrest M. Sickler	Continental Trailways	Driver
21.	Ray A. Smith	Greyhound Bus Lines	Driver
22.	William J. Snyder	Continental Trailways	Driver
23.	Frank E. Taylor	Greyhound Bus Lines	Driver
24.	E. A. Walters	Greyhound Bus Lines	Driver

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APPENDIX B

INSTRUCTIONS TO JUDGES

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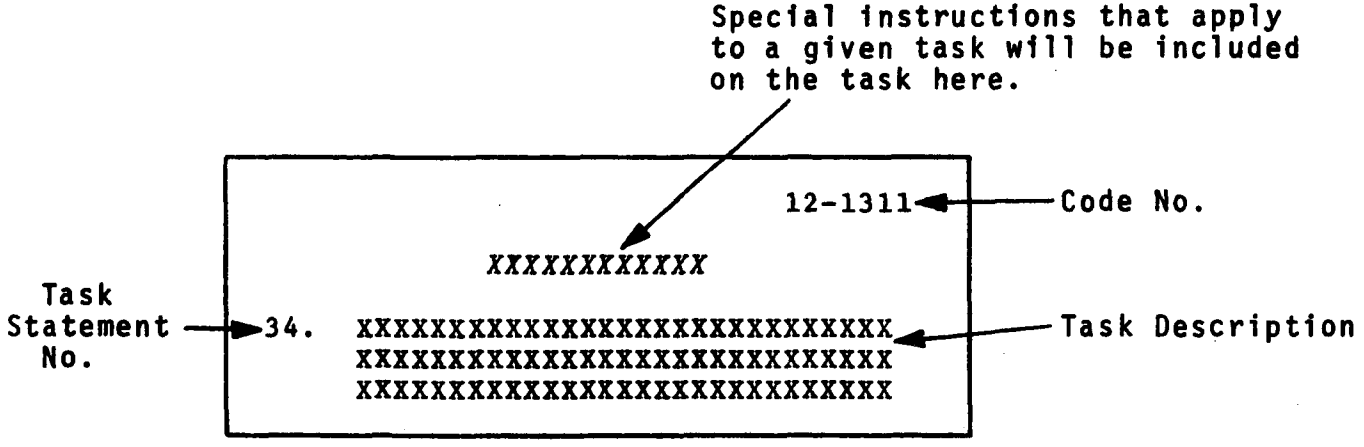
INSTRUCTIONS

In the package of information we have forwarded, you have a manual describing the unique aspects of the Professional Driver's Task, three envelopes each containing 25 slips of paper with descriptions of driving tasks printed on them, a Critical Categories Sheet, and a Summary Sheet.

You will notice that each slip of paper has on it a task statement number located just to the left of the statement, and a code number in the upper right-hand corner of the slips (see the figure below). A few of your slips of paper may have special instructions printed above the task statement.



Task Statement

You will use the task statement number in recording your judgments of the tasks on the Summary Sheet. The code number may be used to locate the driving task in the manual describing the Professional Driver's Task. For example, code number 12-6326 can be found on page 9 of the manual. (The task and code numbers for the statements in your envelope

are not in any particular order. The 25 task statements in any envelope were picked at random from among 600 task statements listed in the Truck and Bus Driver Task Analysis.)

We want you to judge how critical each of the tasks is in maintaining a safe and efficient flow of passengers and materials through our transportation system. Please go through the following steps in making your judgments about each set of 25 task statements:

1. Read through all 25 task statements to become familiar with them. Perhaps you will make some tentative judgments about how critical given tasks are.

2. Read each of the 25 task statements carefully and decide which one of the Critical Categories it belongs in (see the enclosed Critical Categories Sheet):

   Highly Critical--tasks a driver *must* do.
   Moderately Critical--tasks a driver *ought* to do.
   Less Critical--tasks a driver *may omit.*

   You may have as many or as few task statements in each category as you think belong there. The number of statements in each category depends entirely on your judgment of how critical they are to safe and efficient operations.

3. When you have completed sorting the task statements into the Critical Categories to your satisfaction:

   a. Consider only the statements in the Highly Critical Category and *rank* them, within the category, from *most* to *least* critical--the most critical task statement will be in the top position, the least critical in the bottom position.

   b. Repeat the above procedure for the task statements in the Moderately Critical Category, and for those in the Less Critical Category.

4. When you have completed ranking the task statements within each category to your satisfaction:

   a. Record the task statement numbers on the Summary Sheet for a given set in the order you have ranked them--the *most* critical statement in the Highly Critical Category will be recorded in Rank Position 1; the *least* critical statement in the Less Critical Category will be recorded in Rank Position 25.

   b. Draw a line between the last task statement in the Highly Critical Category and the first statement in the Moderately Critical category; and draw a line after the last statement in the Moderately Critical Category.

See the attached example Summary Sheet for how your recordings might look after all three sets of task statements have been judged and recorded. Note that the lines divide the Critical Categories and that the rank positions continue through the successive categories. In the example for Set 1, there are four statements in the Highly Critical Category; therefore, the most critical statement in the Moderately Critical Category is recorded in Rank Position 5, and so on. Note, also, that in Set 2, the judges thought that none of the 25 task statements belonged in the Less Critical Category; therefore, only the top two Critical Categories are used--this is acceptable if it reflects your judgment about the task statements.

Remember to fill in your age and commercial driving experience in years, and check the box that best describes your present job as shown on the example Summary Sheet.

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APPENDIX C

COVERING LETTER TO JUDGES

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Thank you for your willingness to participate in our project. Since you are a professional, your assistance will be invaluable in the preparation of these materials.

For you to get a better feeling for what the objectives of this study are, we have prepared the following guidelines for evaluating the task descriptions.

The goal of the transportation system is to facilitate the flow of personnel and materials in a way that is both safe and efficient in keeping with the needs of the individual users. The system is composed of all those things you can think of that relate to the movement of people and materials from place to place. We are not just speaking about vehicles and the people who drive them. We are speaking of such elements as freeways, freeway on-ramps and off-ramps, traffic lights, traffic laws, and the like. Everything an individual does from the time he leaves his home to undertake a driving job until the time he returns home has some implications with regard to the transportation system. Each task a driver is required to perform will have some effect (good or bad) on the orderly flow of traffic or on safety within the system depending upon the task and how well the task is performed by the driver.

We would like you to think in terms of the effect a particular task has upon the likelihood of an accident occurring. Some tasks, if incorrectly performed, are either highly likely to result in an accident or could produce a situation that would impede the orderly flow of traffic in the transportation system. These tasks would be judged as more critical than, say, those tasks where incorrect performance would only cause inconvenience to the driver; for instance, misreading a road sign and taking the wrong road.

We would like you to consider what effect the incorrect performance of a task would have upon the general flow of traffic; a task that if incorrectly performed would be likely to result in a serious tie-up would be more critical than one which would have little or no effect upon traffic.

We would also like you to consider what the goals of the individual are in using the transportation system and evaluate what effect a given task might have upon the ability of the individual driver to realize his goal of getting from one place to another safely and efficiently. A task which if incorrectly performed could delay completion of the trip, result in extreme waste, or produce severe discomfort would be more critical than one which was not likely to result in one of these.

Also in evaluating the tasks in terms of how critical they are, we would like you to consider the relative frequency of occurrence of different tasks. If given tasks are

judged to have about the same importance in the safety and efficiency of operations, the tasks occurring more often should be ranked as more critical.

The above statements are intended as guides to help you in thinking about the tasks. But they are intended only as guides. It is your opinion about how critical the tasks are for safe and efficient operations that we are after, and we would like you to keep this in mind. To inform you of all the things we are considering with regard to driving tasks, we have enclosed a copy of the complete task analysis we have produced. We think it would be very helpful for you to refer to those sections in the task analysis that relate to the task you are evaluating.

We would appreciate any comments you have with regard to any of the task statements. Just write the comment you wish to make on the same sheet of paper as the task statement. However, rank the statement on the basis of the language we have used; do not rank it on the basis of your suggested modification.

Enclosed also is an invoice we want you to submit to us for your services. (This is necessary for our records.) On receipt of it and the materials you have worked with, we will forward you a check. It is extremely important for us to get this material back as soon as possible after you receive it. Our deadline for accepting responses is September 1. If your evaluations are not completed and postmarked by that date they will not reach us in time to be useful and, therefore, we will be unable to pay for any material arriving later. A prepaid, self-addressed mailing envelope is included for your convenience.

Sincerely yours,

Donald N Buckner

Donald N. Buckner, Ph.D.
Executive Vice President

DNB/la
Enclosures

C-4