

Transit Bus Pre-Run Inspection Procedures

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16. Abstract This report describes bus pre-run inspection programs currently in use at various transit systems within the United States. The information was obtained through mail questionnaire and phone interview surveys. The initial mailout survey solicited general information on bus pre-run inspections. One hundred nineteen questionnaires were mailed and 66 were returned, a 56% response rate. Fifty-seven of the 66 agencies that responded to the mail questionnaires were subsequently interviewed by phone to obtain more specific information regarding the design and operation of pre-run bus inspections. These interviews lasted approximately 20 to 30 minutes. The results of the 2 surveys indicate that there is a great deal of variety in how transit properties have designed and used their pre-run inspection programs. For instance, some agencies have very formal procedures which utilize detailed checklists and a constant level of supervision while other agencies do not have any programs at all. Successful programs have visible support from management; if an agency's management believes in the efficacy of the program, it is much more likely that the inspection program will be undertaken and properly completed. The 2 greatest hindrances to utilizing a pre-run inspection program were found to be a lack of funds to pay for additional personnel time, principally supervisory time, and lack of knowledge about how to operate and enforce inspection programs. The benefits of using pre-run inspection programs include improved vehicle reliability, safer vehicles, and improved maintenance efficiency. It is recommended that transit agencies develop and use pre-run inspection programs in order to improve vehicle reliability and possibly lower overall maintenance costs. If an agency does develop a program, however, it is necessary that management visibly support the program or else inspections are unlikely to be performed properly.					
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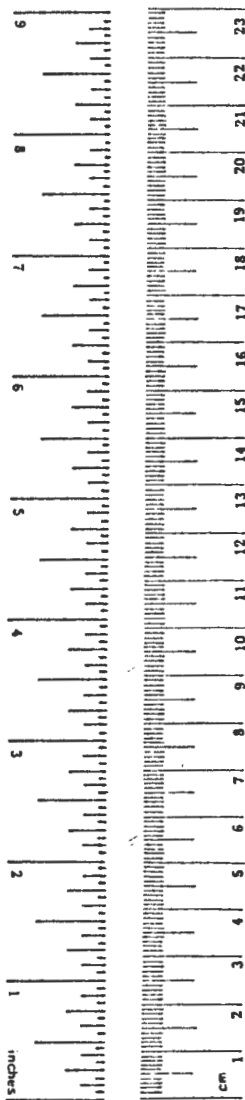
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in. = 2.54 exactly. For other exact conversions and more detailed tables, see NBS Misc. Publ. 250, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10-28p.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³

TEMPERATURE (exact)

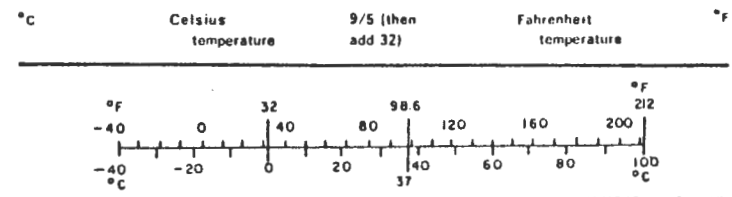


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Executive Summary

This report describes bus pre-run inspection programs currently in use at various transit systems within the United States. The information was obtained through mail questionnaire and phone interview surveys. The initial mailout survey solicited general information on bus pre-run inspections. One hundred nineteen questionnaires were mailed and 66 were returned, a 56% response rate. Fifty-seven of the 66 agencies that responded to the mail questionnaires were subsequently interviewed by phone to obtain more specific information regarding the design and operation of pre-run bus inspections. These interviews lasted approximately 20 to 30 minutes.

The results of the two surveys indicate that there is a great deal of variety in how transit properties have designed and used their pre-run inspection programs. For instance, some agencies have very formal procedures which utilize detailed checklists and a constant level of supervision while other agencies do not have any programs at all. Successful programs have visible support from management; if an agency's management believed in the efficacy of the program, it was much more likely that the inspection program would be undertaken and properly completed. The two greatest hindrances to utilizing a pre-run inspection program were found to be a lack of funds to pay for additional personnel time, principally supervisory time, and lack of knowledge about how to operate and enforce inspection programs.

The benefits of using pre-run inspection programs include improved vehicle reliability, safer vehicles, and improved maintenance efficiency. It is recommended that transit agencies develop and use pre-run inspection programs in order to improve vehicle reliability and possibly lower overall maintenance costs. If an agency does develop a program, however, it is necessary that management visibly support the program or else inspections are unlikely to be performed properly.

Introduction

Pre-run inspection procedures are often cited as a key element of vehicle reliability programs, but little has been written on the subject. This report presents the results of 2 surveys of transit bus systems within the United States. The report's goal is to document the range of practices and the extensiveness of bus pre-run inspections for transit management. Methods in current use are described to provide a review of various ways pre-run inspections may be undertaken. This information will permit transit managers to compare locally used procedures with those of other agencies.

Before reading further, the reader may want to fill in the following chart to assess and create a description of his own pre-run inspection program.

1. Is a pre-run inspection program currently in use? Yes No

2. Are inspections performed by drivers or mechanics? Drivers Mechanics

3. Is use of a pre-run inspection checklist required? Yes No

4. Do drivers view inspection as an important task or
do they perform superficial inspections? Important Superficial

5. How frequently are inspection activities
monitored? Daily Occasionally Rarely

6. Is the existing system satisfactory? Yes No

The remainder of this report, which is divided into 9 parts, will allow you to compare your own pre-run policies with those of other transit systems. Part one, Survey Procedures, summarizes how the data for this report was collected. The second part, Overview of Current Procedures, describes the objectives of pre-run inspection programs and the general methods for conducting them. The third part of the report, System Characteristics, describes the transit properties that took part in this study. Parts 4 and 5, Responses to Postcard Questionnaire and Responses to Telephone Interviews, summarize the responses to the surveys which served as the primary data for this report. The following two sections, Driver Attitudes and Pre-run Inspections, and Methods Used to Conduct Pre-run Inspections, provide detailed discussions on driver attitudes regarding pre-run inspections and the most commonly used procedures for performing the task. The last two sections provide a summary of findings and recommendations for transit agencies contemplating improvements to existing pre-run inspection programs or for implementing such programs. Copies of pre-run inspection checklists are included in Appendix 1 of the report.

Study Procedures

The study was conducted in two separate phases. Phase 1 included the mailing of questionnaires to 119 systems seeking general information on pre-run inspections. Phase 2 consisted of telephone interviews which sought more specific information on inspection procedures. Material used in the performance of pre-run inspections, such as checklists, run cards and company memoranda were requested during each of the 57 phase 2 interviews.

The transit agencies consulted in this study were selected to represent medium sized systems (45 to 1,000 vehicles). Initial contact was made with the systems' transit managers via letters stating the project's research goals and requesting participation in the project. Included with each letter was a short questionnaire, printed on the back of a postcard, which was to be completed and returned by the transit managers. Of the 119 letters/questionnaires mailed, 66 systems or 56% replied.

The information obtained from the postcard questionnaires was used to categorize the systems according to whether or not an agency had an inspection program. Questions were also asked about the level of driver acceptance of the task (as perceived by the transit managers) and the use of pre-run inspection forms. The mail-back questionnaire is shown in Appendix 2.

Phase 2 of the study consisted of a series of telephone interviews which sought more specific information on pre-run inspections. During this phase of the study, 57 transit managers from the 66 agencies that responded to the postcard questionnaire were interviewed by telephone over a 6 week period. (The remaining 9 systems could not be contacted and were dropped from further analysis) An open-ended questionnaire (shown in Appendix 3) was constructed for use in the phone interviews. Each of the questionnaires was modified before use to reflect the responses to the mail-back survey. Most interviews lasted between 20 and 35 minutes.

Overview of Current Inspection Programs

Pre-run vehicle inspections are conducted by most of the transit systems that responded to our survey. The general reasons for conducting the inspections are that they:

- contribute to the safety of operators and passengers.
- help maintain vehicle performance and reduce the number of roadcalls.
- increase the efficiency of bus operations.
- improve the documentation of body damage and, as a consequence, upgrade driver accountably.

In California and New York, pre-run inspections are conducted to comply with state legal codes that require vehicles to be maintained at a specified operating level.

The method of conducting pre-run inspections varies greatly from system to system. Some systems utilize a formal, checklist which must be completed and signed by drivers on a daily basis. Others merely provide drivers with verbal instructions on pre-run inspections during initial training and orientation sessions. Techniques for ensuring that drivers comply with pre-run inspection procedures also vary from system to system, as do supervisory and disciplinary approaches.

The checklists used in the inspection programs also vary from system to system. Some system's checklists cover well over 25 items while others focus on only 10 or fewer items. All checklists typically require that the following items be inspected: brakes, tires, lights, steering, doors, horn, and general vehicle condition.

Characteristics of the Systems Contacted

Table 1 presents the revenue vehicle fleet sizes of the systems that were contacted and those that responded to the questionnaires. The sizes of the revenue fleets for the systems participating in the study ranged from a high of 997 to a low of 47 vehicles. Table 1 also describes the system fleet sizes for the 57 systems taking part in the phone interviews. The largest group of responses is from systems with fleets of fewer than 100 revenue vehicles. While the data appears to imply that smaller systems were more willing to take part in the study, this is not the case since smaller systems made up a majority of the 119 transit systems originally contacted. The data in Table 1 actually shows that the systems responded to the postcard questionnaire and telephone interviews in proportion to their representation within the original sample.

Responses to Postcard Questionnaire (Phase 1)

The results of the responses to the postcard survey are summarized in Tables 2 through 6. Table 2 separates the systems based on whether or not pre-run inspections were mandatory, optional or not required at all. As the data from Table 2 suggest, the majority (47) stated that pre-run inspections are mandatory duties expected of either the drivers or mechanics. However, during the later follow-up phone interview sessions with transit managers it was found that although pre-run inspections are considered mandatory, little, if any, direct enforcement of the procedure is employed by most systems. The various justifications offered for the apparent lack of enforcement and are described in a later section of this report.

The transit managers' perceptions of the thoroughness of inspections conducted by drivers are presented in Table 3. Generally, most systems conduct superficial inspections. It was also reported that some drivers do not believe the task should be part of their work requirements. Furthermore, 28 of the respondents mentioned that most inspections that are performed by the drivers are superficial; similar responses were later obtained in the phone interviews.

The data in Table 4 describe the documentation methods used by the various transit properties for reporting the conditions of the vehicles. The majority (28) of the respondents stated that their drivers are required to sign off on a report even if no defects are detected. While the systems expected the drivers to comply with this policy, enforcing inspection procedures is a problem for most agencies.

TABLE 1

Number and Size of Systems Surveyed

System Size (Vehicles)	Number of Sytems Contacted	Number of Systems Responding*
<100	56	23
101-150	17	9
151-200	6	5
201-400	22	10
401-600	5	4
> 601	5	6
Data Not Available	8	0
Total	119	57

Note: * These systems responded to the Postcard Questionnaire and took part in the Phone Interviews.

TABLE 2

Type of Pre-run Inspection Program

System Size (Vehicles)	Mandatory	Optional	None	No Answer
< 100	18	3	1	1
101-150	8	0	1	0
151-200	4	1	0	0
201-400	9	1	0	0
401-600	3	1	1	0
> 601	5	0	0	0
Total	47	6	3	1

TABLE 3

Thoroughness of Driver Pre-run Inspections

System Size (Vehicles)	Thorough	Superficial	None	No Answer
< 100	10	11	1*	1
101-150	5	3	1	0
151-200	1	3	1	0
201-400	2	8	0	0
401-600	3	0	2	0
> 601	1	3	1	0
Total	22	28	6	1

* Inspections performed by mechanics.

TABLE 4

Required Documentation for Inspections

System Size (Vehicles)	Must Always Sign-off	Sign-off Defects Only	No Sign-off Required	No Answer
< 100	10	9	3	1
101-150	6	1	2	0
151-200	0	1	4	0
201-400	8	1	1	0
401-600	3	1	1	0
> 601	2	2	1	0
Total	29	15	12	1

The use of post-run inspections were also investigated in this part of the study. The responses to this question are shown in Table 5. Twenty-three systems reported that their drivers are required to perform post-run driver inspections while the other systems either did not perform post-run inspections or did not respond to the question.

Responses to Phone Interviews (Phase 2)

While the information obtained from the postcard survey indicated that the majority of the 57 systems utilized pre-run inspection programs, some systems reported that these procedures were more successful than others. This section describes the objectives sought by the transit agencies through the use of pre-run inspections and the procedures used to work toward these objectives.

The telephone interviews indicated considerable variation among the transit agencies in terms of who performed the inspections, whether a checklist was used, the degree of supervision, etc. Table 6 presents a typology of agency approaches. The results of the telephone survey are summarized in Tables 7 through 11.

Fifty-five systems reported having a pre-run inspection program in place. By far, most agencies have drivers perform the inspections (see Table 7), but only about half of the systems issue daily checklists for the inspection (see Table 8). Transit managers stated the following reasons for issuing a daily pre-run inspection forms:

- To require the assigned personnel to perform the inspection and serve as an efficient enforcement tool.
- To document the operating condition of the vehicles for safety purposes.
- To assist in the identification of damage.
- To contribute to the effectiveness of fleet maintenance.
- To serve as guides for the inspection of key items prior to pull-out. (This is especially useful in those systems with different types of buses in the fleets.)
- To keep operators informed of any minor defects detected by previous drivers of the same vehicle.

TABLE 5

Post-run Inspections Requirements

System Size (Vehicles)	Required	Not Required	No Answer
< 100	10	12*	1
101-150	5	3	1
151-200	3	2	0
201-400	3	7	0
401-600	2	3	0
> 601	0	5	0
Total	23	32	2

* Performed by mechanics at one system.

TABLE 6

Approaches to Pre-run Inspection Programs

	Approaches						
	1	2	3	4	5	6	7
Program in Use	Yes	Yes	Yes	Yes	Yes	Yes	No
Performed by	D	D	D	D	D	M	NA
Checklist Used	Yes	Yes	Yes	No	No	Y-1 N-2	NA
Degree of Supervision	C	0	None	0	None	None	NA
Number of Systems	8	11	6	13	14	3	2

NA = Not Applicable

D = Drivers

M = Mechanics

C = Constant

0 = Occasional

TABLE 7

Personnel Performing Pre-run Inspections

System Size (Vehicles)	Drivers	Mechanics	None Performed
< 100	20	3	0
101-150	8	0	1
151-200	5	0	0
201-400	10	0	0
401-600	4	0	1
> 601	5	0	0
Total	52	3	2

TABLE 8

Agencies Using Checklists During Pre-run Inspections

System Size (Vehicles)	Checklist Used	Checklist Not Used
< 100	15	8
101-150	4	4
151-200	1	4
201-400	3	7
401-600	1	3
> 601	2	3
Total	26	29

Note: Only 55 transit agencies have pre-run inspection programs.

The 29 agencies which reported that daily checklists are not issued to the personnel involved in the pre-run inspection procedure stated several reasons for not adopting this practice. Some of these reasons are:

- A lack of knowledge of other systems' successful use of checklists for their operations.
- A low priority placed on the pre-run inspection program.
- The personnel involved in the inspection were accustomed to performing it on their own volition.
- Checklists were unnecessary because the personnel involved in the inspections had been informed of the key items to inspect in rule books that were given to them during their initial training periods.
- Enforcement of the pre-run inspection task based on the fear of disciplinary action.
- Excessive time requirements for issuing daily checklists.
- Inability to process paperwork associated with the checklists.
- Lack of funds for printing daily checklists.

The most interesting responses obtained in the survey are related to the degree of supervision employed by the systems for the pre-run inspections. Table 9 describes supervisory differences. The responses indicate that only 9 of the 57 systems employ constant supervision to ensure the proper performance of the inspection by the operators or mechanics. The reasons stated for the use of constant supervision by the 9 agencies were:

- To ensure that the pre-run inspections were being properly conducted.
- To inform the maintenance department about defects found during pull-outs and to help assure efficient pull-outs.

Forty-seven systems reported that a minimum amount of supervision was employed or that they eliminated supervision entirely from their programs. Reasons for this included:

- The pre-run inspection procedure was not regarded as an important element in a company's preventative maintenance program.
- Follow-up discipline for superficial performance of the inspection was sufficient to ensure its proper completion.

TABLE 9

Degree of Supervision During Pre-run Inspections

System Size (Vehicles)	Constant	Occasional	None
< 100	4	10	9
101-150	3	4	2
151-200	0	1	3
201-400	2	3	5
401-600	0	2	2
> 601	0	4	1
Total	9	24	22

Note: Only 55 transit agencies have pre-run inspection programs.

- Personnel engaged in completing pre-run inspections accepted the task; therefore, the need for supervision was eliminated.
- Limited funds prohibited the use of supervisors for the task.
- New York and California legal codes requiring the operation of a properly maintained vehicle was considered a sufficient inducement for operators to perform a good pre-run inspection, since failure to do so could result in losing their operator's license.
- Some agencies occasionally had state highway patrol crews monitor the inspection (California).

Table 10 illustrates the varying degrees of supervision in the pre-run inspection procedure compared with the issuance of daily checklists used to document the process.

During the course of the interviews, the experiences of each of the 55 systems with pre-run inspections were classified as "successful" and "non-successful". Cases of success include those transit systems that consider their pre-run inspection programs successful regardless of the issuing of daily checklists, supervision of the task, and using follow-up discipline for faulty performance of the inspection. Systems categorized as "non-successful" do not believe that their programs are successful (regardless of the procedures employed). Table 11 describes the distribution of systems according to this experience.

Thirty-four transit agencies stated that they had successful pre-run inspection programs. These agencies expected to achieve the following objectives:

- To help maintain a high degree of safety for the operators and passengers.
- To minimize the amount of roadcalls resulting from minor defects, judged to be preventable by pre-run inspections.
- To lessen any further damage of faulty equipment.
- To reduce equipment failure attributed to operating conditions.
- To aid in the pinpointing of damage to the vehicles.
- For systems operating in New York and California, to assist with the compliance of state laws requiring vehicles be maintained at a prescribed operating level.

TABLE 10

Comparison of the Use of Checklists
and the Degree of Supervision

System Size (Vehicles)		Degree of Supervision		
		Constant	Occasional	None
< 100	Checklist	4	5	6
	No Checklist	0	5	3
101-150	Checklist	3	1	0
	No Checklist	0	2	2
151-200	Checklist	0	1	0
	No Checklist	0	1	3
201-400	Checklist	2	1	0
	No Checklist	0	2	5
401-600	Checklist	0	1	0
	No Checklist	0	1	2
> 601	Checklist	0	2	0
	No Checklist	0	1	2

TABLE 11

Success of Inspection Program

System Size (Vehicles)	Successful	Not Successful
< 100	13*	11
101-150	5	2
151-200	3	2
201-400	6	4
401-600	2	2
> 601	5	0
Total	34	21

*Performed by mechanics at three systems.

The remaining 22 systems attributed several factors to the cause for their low evaluation of the inspection process. These factors include:

- A general disregard of pre-run inspections due to customary non-enforcement.
- A low level of awareness of the usefulness of inspection programs.
- Insufficient funds to pay for daily checklists, supervision and enforcement.
- Lack of knowledge regarding the proper enforcement of a inspection program.
- Union contract constraints which reduced the degree of contribution that the drivers could make to pre-run inspections thereby limiting the inspection's effectiveness. The most common restraints are: work rules that confine mechanical tasks to the mechanics and limits on the time available for pull-outs.

Driver Attitudes Regarding Pre-run Inspections

Fifty-two transit agencies utilized drivers in the pre-run inspection program. Driver attitudes and degree of cooperation, however, varied considerably among the 52 systems. This section describes the main reasons for the variability in driver attitudes and cooperation.

Generally, driver attitudes regarding the completion of pre-run inspections are dependent upon several factors. These factors include: the importance placed on inspections by management, the supervision of inspections, use of daily checklists to document inspections and use of follow-up disciplinary measures for faulty performance.

Driver attitudes toward pre-run inspections and their performance of the task were also found to be related to the amount of importance management places on the activity. If management enforces the program, the drivers complete it; and if management does not enforce the program, drivers do not complete it. As previously mentioned, many systems do little to actively enforce a pre-run inspection program. For example, fourteen systems do not issue daily checklists and lack formal enforcement procedures because management regards pre-run inspections as a low priority.

Only two systems indicated that they do not enforce their programs because of possible union conflicts. These conflicts involve work rules limiting an operator's duties solely to driving, and since checklists are untraceable, the possibility of disciplining an innocent operator.

Four systems reported good driver cooperation with pre-run inspections even though management does not have an active enforcement process. The reasons for the high cooperation include:

- The pre-run inspections are not very involved, consisting of "walk-around" inspections.
- The drivers are assigned to the same buses on a daily basis, which results in more attention being paid to the vehicles.
- The drivers prefer to locate defects prior to pull-outs so as not to be forced to change buses during their runs.
- Inspections are the drivers' opportunity to inspect their buses and avoid being blamed for another's damage.

Five of the 9 systems that issue daily checklists to their drivers and employ a constant degree of supervision over the task reported positive driver cooperation at their agencies while the remaining 3 did not. Positive cooperation is attributed to a variety of reasons:

- The drivers want to operate safe equipment; therefore, they perform the inspections.
- Good performance of pre-run inspections occurs when the driver believed that identifying defects will result in proper maintenance.
- At one system, a Driver of the Year Award program is used as an incentive for the operators to diligently perform all duties properly.

In addition, the agencies reinforce the drivers' attitudes by emphasizing the importance of performing the task. The 3 systems that reported poor driver cooperation had to adopt strong enforcement measures such as issuing daily checklists accompanied by constant supervision in order to improve driver performance.

Eleven systems were found to issue daily checklists to drivers and use spot supervision as an enforcement measure. These systems reported that the majority of their operators accept the task. Further, the managers of these systems believe that the level of performance they have achieved is due to the

inspection procedure being an established part of driver job requirements. However, while the task is usually well accepted by the drivers, it is not performed as diligently as thought possible by transit managers.

Although several agencies mentioned that the fear of disciplinary actions for poor or unsatisfactory performance of the inspection led drivers to fulfill the responsibility, others maintained that disciplinary actions are not strong enough to ensure compliance. For this reason, assessments of the need for supervision varied among the transit agencies according to the amount necessary to obtain properly performed inspections.

Six systems reported that while daily checklists are issued to their drivers for pre-run inspections, no supervision is provided. Representatives of these systems stated that their drivers regarded pre-run inspections as being useful. However, they reported that drivers usually do not perform them. These agencies said that they do not supervise the activity because they do not believe it is worth the effort. Therefore, it is not surprising that the drivers have a good opinion of the procedure but rarely do it.

Fourteen systems said that they do not issue daily checklists, do not use any method of supervision and leave the inspection solely to the driver. The few agencies in this category that never-the-less mandate pre-run inspections rely on strictly enforced disciplinary measures to ensure that the inspection is completed. For example, one disciplinary measure took the form of maintaining lists of road-calls for 30 days in order to identify the drivers that accumulated the most road-calls. Three road-calls within 30 days lead to an operator's suspension.

Another form of discipline is initiated by a driver who performs the inspection and finds some damage or a defect on the bus. After reporting the problem, the vehicle's previous operator is questioned about the problem. If the previous driver reported the problem the case is dropped; however, if the problem was not previously reported the driver is charged with the damage/defect and other appropriate actions are taken.

Methods of Conducting Pre-run Inspections

The decisions involved in setting up a pre-run inspection routine involve the determination of:

- whether or not pre-run inspections were required at each system.
- the personnel classification responsible for the inspections.

- the degree of formality that the inspections had assumed at the system as measured by their documentation of the procedure.
- the degree of supervision used by the agencies.

As Table 6 has illustrated, transit systems have approached their pre-run inspection methods in different ways. This report will only discuss four procedural approaches (illustrated as 1, 5, 6, and 7). Of the 4 categories chosen for discussion, 2 are driver-oriented, 1 is mechanic oriented, and 1 does not use any form of pre-run inspections. The approaches can be described as follows:

- Drivers perform pre-run inspections using daily checklists to document the procedure in conjunction with a constant level of supervision.
- Drivers perform pre-run inspections without the use of daily checklists or any supervision.
- Mechanics perform pre-run inspections.
- No pre-run inspections are performed.

Approach 1: Daily Checklists and Constant Supervision

The eight systems which typify this approach stated that inspections are important components of their overall preventative maintenance programs. In order to ensure driver compliance and inspection dependability the 9 systems issue daily checklists to their operators as incentives for the performance and documentation of inspections. Additionally, the systems monitored driver performance via a constant degree of supervision.

Seven of the systems also reported that operators having unnecessary roadcalls resulting from superficial pre-run inspections are subject to disciplinary measures. The disciplinary measures consists of a 3 step process:

1. An informal memorandum is given to the driver notifying him that his failure to properly inspect his vehicle had resulted in a roadcall and that this had been noticed by the agency.
2. A second occurrence results in having the unnecessary roadcall recorded on the operator's record.
3. For the third occurrence within a year, the driver is suspended for several days.

These same 8 systems, however, noted that they rarely ever suspended a driver for roadcalls due to superficial inspections because the drivers either never caused more than 2 unnecessary roadcalls within a year or because the disciplinary option was never actually used. One system within the group reported that they never discipline drivers for unnecessary roadcalls because it believes that such actions would be detrimental to the working relationship between drivers and management.

To better illustrate how the Daily Checklist-Constant Supervision approach works, the experience of one system is described in more detail below.

The agency in question has had a pre-run inspection program since it began its operations 8 years ago. Three reasons were stated by the agency's manager for using the program: 1) to maintain the working conditions of the older buses which made up a majority of the fleet, 2) to comply with state regulations requiring periodic inspections of all buses, and 3) to obtain longer service lives of all vehicles. As the agency gradually modernized its fleet the pre-run inspection program's emphasis shifted from a trouble-shooting tool to a way of maintaining safety since the vehicles no longer had as many mechanical problems.

The drivers are issued checklists by dispatchers as they are assigned their buses. The checklist, which was developed by the transit manager in conjunction with maintenance personnel, consists of 25 items which the drivers are to inspect and indicate whether they were found to be in proper working condition. The items selected for inspection were based on what they thought most important. The checklist focuses on mechanical operability, safety and cleanliness.

Ten minutes is allotted for each driver to perform the inspection. The agency reported that it had conducted time and motion studies of the entire inspection procedure and found that the actual time needed to complete the task was approximately 6 minutes. The drivers' union, however, would not accept this time frame because they considered it too short. Consequently, a 10 minute inspection period was agreed upon by both management and the union.

The completed inspection checklist is turned in to the dispatcher prior to pull-outs. The checklist is kept on file for a period of approximately 90 days in order to satisfy state legal requirements. Periodic reviews of the checklist's accuracy and currency is conducted by the state highway patrol.

If an item is found to be defective during the inspection the driver notes it on the checklist and informs the dispatcher of the problem. The dispatcher in turn notifies the maintenance shop. At this point, if the defective item is thought to be able to be repaired in time for the scheduled pull-out, a service crew is dispatched to the bus. According to the system's operating policy and union rules, drivers are not allowed to repair defective items no matter how minor they might appear to be.

The transit manager reported that even during inclement weather and with the vehicles parked outside the drivers inspect the vehicles without complaint. Positive driver response was attributed to the Driver of the Year Award program which the system uses as an incentive for the drivers to perform all duties as diligently and professionally as possible. The manager also noted that a supervisor is assigned to walk the yard while the inspections are performed in order to determine whether the drivers are properly performing their inspections as well as to ensure that the buses pull-out on time.

According to the transit manager, the procedure for conducting pre-run inspections and the checklist used to record the inspections are working satisfactorily. He stated that no changes to the inspection program or checklists are envisioned.

Approach 5: No Checklist and No Supervision

Fourteen systems in the survey reported that pre-run inspections did not involve daily checklists and that no one supervised the task. These systems relied on either the drivers' self-motivation to perform the task or follow-up discipline. Some of these agencies wished to change this present policy of low enforcement but stated that insufficient funds are responsible for their inability to do so. These systems stated that if additional funds are allocated, they could pay for the time operators would require to properly perform the inspections. One transit manager stated that his pre-run inspections are not actively enforced because he could not afford to have daily checklists printed. It was also reported that additional funds are needed so that more supervisory personnel could be hired to ensure that the drivers performed the inspection properly and/or to assist them in the task.

Four systems using this approach simply issued aids to drivers to help them memorize items requiring inspection or to merely inform them of the inspection procedure.

Many of the systems which have adopted this approach use special enforcement measures. For instance, 6 of the 14 systems in this category cited follow-up disciplinary measures for drivers causing "unnecessary" roadcalls resulting from superficial pre-run inspections or for not informing management of body damage. The actual disciplinary measures are similar to those described above; in addition, actual suspensions also rarely occur.

Several variations of enforcement procedures were reported. One agency left supervision enforcement responsibilities to the state patrol because state laws specified that public vehicles must be properly maintained; drivers operating unsafe buses risk being ticketed by the state patrol for operating a potentially unsafe vehicle if they did not perform their pre-run inspections and are caught with a faulty vehicle. Another property assigned the maintenance department to perform the inspections because the operators there would not execute their inspections properly without supervision. Lastly, one firm used individuals who could not be assigned to their regular duties because of minor injuries to complete inspections.

Seven systems of the 14 in this group reported contract or union issues associated with their pre-run inspection procedures. The other systems reported union involvement revolving around the issue of whether or not an operator can or can not repair minor problems or whether or not there is a sufficient amount of time allocated to inspections.

One system that requires drivers to perform inspections provides further details about how agencies adopting the No Checklist-No Supervision approach operate their pre-run inspection program. This system has required drivers to perform the inspections for approximately 20 years. This system attributes the success of its program to management's attitude regarding pre-run inspections. The system's drivers perform inspections after receiving their daily bus assignments. They are not issued checklists since they are expected to have memorized the items requiring inspection. There is no supervision of the inspections. Because the inspections are not supervised, drivers who do not perform the inspection can only be disciplined if their bus requires a roadcall for an item that should have been identified during the pre-run inspection. The disciplinary procedure consists of a "counseling memorandum" for a first time occurrence followed by a "written reprimand" for a second occurrence. Disciplining of drivers does not occur very often because of the positive driver attitudes regarding the inspections and because minor defects are automatically charged to the driver.

Drivers are not allowed to fix any defect they find, no matter how trivial it might appear, due to the union contract. If a driver finds a defect he drives the vehicle to a special site on the property where it is inspected by maintenance personnel. The manager estimated that 3 or 4 out of the property's 200 buses are held back each day due to defects or damage identified during the pre-run inspections, although not all buses with defects are held back. For instance, if the defect is not safety related and the bus is needed for peak hour service the dispatcher has the authority to place the bus in service. In most cases, these buses are used as trippers and the defect is fixed during non-peak periods.

This agency also requires the drivers to note defects or damage that might have occurred during a run on a special defect card. After the driver ends a run he completes the defect card and leaves it on the bus. These cards are then checked by service crews who notify the maintenance department of items needing attention. In addition, the information is included in the vehicles' history files for later use by the maintenance department in tracing chronic defects.

Approach 6: Inspections Performed by Mechanics

Three systems among the 57 surveyed had mechanics perform pre-run inspections. Each of these systems has different reasons for using mechanics. Management at one system does not believe that their drivers wanted to perform pre-run inspections so mechanics are used in their place. Another system finds it more efficient to have their mechanics perform the inspection since they are better able to repair defects. One agency found that when drivers are assigned to the same bus on a daily basis minor defects are not reported because drivers do not want their bus to be sidelined. Therefore, mechanics must perform the inspections to ensure that they are properly completed.

All 3 systems stated that their drivers are informed during the initial training period of the items that the mechanics will check during the pre-run inspections. While the agencies require the mechanics to perform the task, they do allow their drivers the option of performing a second, more casual inspection.

Two of the 3 systems within this group issue daily checklists to the mechanics to document the inspections. The system that does not issue checklists have them available for use but does not require them to be turned in. In addition, the mechanics are not supervised at the 3 systems while performing the task.

The one system which best typifies the the mechanic-oriented approach was chosen to illustrate how a mechanic-oriented pre-run inspection program operates.

The property in question was described by the operations manager as small, with less than 100 revenue vehicles. The system views pre-run inspections as important contributions to the maintenance of the coaches, and the inspections are considered by the manager to be working satisfactorily. The mechanics who perform the pre-run inspections are part of the regular maintenance staff. They receive no formal inspection training because the transit agency does not consider this function to be overly complex.

The system's mechanics arrive approximately 1-1.5 hours prior to the pull-out time in order to complete their inspections. To aid them in this task, the mechanics are issued checklists which describe the items to inspect on the different buses within the system's fleet. The manager noted that due to the limited work area available in the bus storage yard it is too difficult for the drivers to perform the task and would probably result in inefficient pull-outs.

The inspection procedure at this property requires the inspection of only those items which can be easily checked, such as mirrors, windshield wipers and horns. The mechanics are allowed 10 minutes per bus to perform the inspection. If a defect is found, it is the mechanics who decide whether the problem is serious enough to sideline the bus or if it can be corrected in time for its scheduled pull-out. There is no supervision of the mechanics when they perform the inspection. Upon completion of the inspections, the buses are moved to a pull-out area for the drivers to board. At this time drivers have the option of performing a second pre-run inspection if they feel the need to do so. This option is left entirely up to the drivers though the agency would prefer that they do it.

Approach 7: No Pre-Run Inspections Performed

Pre-run inspections were not performed at 2 agencies contacted during the study. Moreover, the transit managers at these properties were uncertain if such inspections had ever been used.

The manager of 1 system attributed his current situation to the drivers' union contract which does not allow the drivers to perform any task other than driving their assigned vehicles. The union's view regarding the inspections is that it is a task strictly for the maintenance department to perform. However, the agency's mechanics do not perform pre-run inspections either, because of a manpower shortage within the maintenance department that existed at the time of this survey.

The manager is in favor of instituting a pre-run inspection program because they are currently experiencing an excessive amount of roadcalls due to minor farebox and door defects associated with a particular type of bus within the fleet. He stated that most of the defects can be identified prior to the bus leaving the garage. Hence, if the agency had a pre-run inspection program it is believed that maintenance costs would be lowered.

The manager for the other system indicated that the union contract is the principal obstacle to implementing such a program. His system's union contract does not stipulate that drivers can not conduct pre-run inspections; however, the contract does specify that drivers must be allowed 5 minutes in which to leave their assembly area and receive their bus assignments. Therefore, pre-run inspections cannot be completed because of the limited amount of time available for the inspection. A second factor that keeps this system from implementing an inspection program is the shortage of funds needed to pay the drivers for the additional amount of time that the inspection would take. The agency does not want to renegotiate the contract in order to include the inspection provisions. As a consequence, the manager believe that the only way a pre-run inspection program can be implemented is if it can be proven that the inspection program will pay for itself by reducing overall maintenance costs.

In place of pre-run inspections the mechanics start the buses prior to pull-outs and drive them for a short distance. Any obvious problems are recorded by the mechanics. In addition, the drivers are issued defect cards which are used to inform the maintenance department of problems encountered during their runs.

Comparison of Inspection Programs and System Performance

From data collected in previous studies, the four approaches described above (Checklists and Supervision, No Checklist-No Supervision, No Inspections Performed, and Inspections Performed by Mechanics) were compared on two dimensions of vehicle performance. The specific measures that have been used in this comparison are mechanical failures per revenue mile and the number of labor hours per revenue mile. The results are presented in Table 12. As can be seen, the number of labor hours per revenue mile increases as the inspection process becomes less formal or structured; i.e., the agencies having the lowest labor utilization use checklists and a constant degree of supervision while agencies with the highest labor utilization do not have any inspection programs at all.

The second measure chosen for comparison is the number of mechanical failures per mile. Surprisingly the agencies with the best performance in this area do not use checklists nor do they utilize a constant degree of supervision within their inspection programs. This finding may be due to locational characteristics since many of the agencies in the No Checklist-No Supervision group are located in the southern United States. It might also reflect the fact that some systems do not have roadcall problems, and therefore, see no reason to institute inspections. The other 3 groups have indicators closer to what one would expect, that is, the No Inspection Performed category had the highest number of failures per mile and the other two categories have lower mechanical failures per mile. It therefore appears that formal per-run inspection programs increase vehicle reliability and reduce mechanic labor hours.

Conclusion

The majority of the systems in this study believe that pre-run inspections are beneficial to maintaining vehicle safety and improving the buses' operating efficiency. However, not all systems are able to perform this procedure as effectively as they thought possible. This situation is primarily due to customary practices that do not actively emphasize the inspection procedure; in addition to a lack of knowledge of how to ably enforce such a procedure.

Systems that emphasized pre-run inspections use several approaches to ensure that the task is completed. They encourage its performance, adopt formal procedures and/or use varying degrees of follow-up discipline for faulty performance of the task. The benefits of pre-run inspection are reduced roadcalls due to minor defects, a more complete history of the bus maintenance data, and improved communications between drivers and maintenance staffs.

TABLE 12

Comparison of Program Type and System Performance

Category	Average Mechanical Failures per Thousand Revenue Miles	Average Labor Hours per Thousand Revenue Miles
Checklist & Supervision	0.5360	19.927 (N=8)
Inspection Performed by Mechanics	0.5312	23.488 (N=3)
No Checklist or Supervision	0.4124	27.854 (N=14)
No Inspection Performed	0.9449	35.432 (N=1)

Promoting the inspections during initial orientation periods and expecting compliance were found to be very important to proper performance of the task. Several systems formalized the procedure via the checklist documentation and supervision; this has resulted in improved inspections. Follow-up discipline for faulty inspections, although often not severe, demonstrates to the personnel that the inspections are part of their duties and therefore considered important.

Systems which do not actively enforce inspections justify their actions by stating that the procedure could not be effectively performed due to limited funding and the lack of knowledge regarding enforcement methods. It is questionable however, that the former is truly the reason because systems performing the inspections most likely work within similar budgetary constraints. In addition, data suggests that pre-run inspections reduce maintenance labor requirements which would probably save more money than the inspections would cost.

Union contracts were not found to be deterrents to the pre-run inspection programs for the vast majority of the systems interviewed. In most cases the only restriction is that drivers can not correct defects found during inspections.

Recommendations

Pre-run inspections are a necessary aid in the overall preventative maintenance programs of transit agencies. Various forms of this procedure were evident among the systems reporting to use it in this study. The methods available to implement it at some agencies may not be possible at others due to different constraints such as time, funding and union contracts. If possible, however, transit agencies should implement pre-run inspection programs as a cost constraint and reliability improvement measure. The following recommendations are primarily directed at those systems which do not actively enforce inspection programs:

1. The task's importance to the system's overall maintenance program should be made explicitly known to the personnel chosen to perform pre-run inspection programs.
2. Detailed checklists should be used on a daily basis within a well defined inspection program.
3. The items selected for inspection should not overburden the personnel involved in the inspection process. They should be limited to those items that are most important to the operating reliability, efficiency and safety of the bus fleet.

4. Checklists should be handed in by drivers prior to pull-outs to aid in enforcement of the inspection procedures as well as to develop a data bank for other maintenance purposes (e.g., identifying recurring failures).
5. Managers should not allow pre-run inspections to be performed in a superficial manner. Management should take an active role in the entire pre-run inspection process and provide appropriate supervision.
6. Disciplinary consequences for failing to comply with inspection procedures should be made explicit, and applied uniformly.
7. Communication channels for reporting problems or defects identified during the inspections should be known to all transit personnel; they should not be overly complicated.
8. Quick follow-up procedures for fixing minor defects found during the inspections should be developed.
9. Incentives for the personnel involved in the inspections, should be explored in order to encourage good performance and to improve overall esprit de corp within the agency.

Appendix 1

Sample Pre-Run Inspection Checklists

DRIVERS DAILY
STATUS REPORT

VEHICLE NO. _____ DATE _____

PRE OPERATION CHECK

1. General Condition (Leaks, water, oil, fuel, body damage, cleanliness.)
2. Brakes (Test stop before leaving yard.)
3. Windshield Wipers
4. Horn
5. Mirrors
6. Tires
7. Lights - head, tail, clearance, turn signals.
8. Steering (Excessive play.)
9. Door operation
10. Wheelchair Lift Operation (Paratransit)
11. Farebox (Cash Vault?)
12. Radio Check

Defects:

DEFECTS		VEHICLE IS IN SATISFACTORY CONDITION EXCEPT AS CHECKED <input type="checkbox"/> OR NOTED BELOW	DEFECTS
STEER	WHEEL		SLACK
	WHEELS		UNEVEN
	STEERING		SOPHOMOR
DOORS	SLACK		TIGHT
	HANG		NOISY
	LOOSE		NO POWER
BODY	BUZZER		HEATS
	W/S WIPERS		DIES
	HEAT		CUTS OUT
	HORN		RACES
MISCELLANEOUS	LIGHTS		KNOCKS
	WINDOWS		FUMES
	SEATS		WATER
	STEPS		GRASS
	MIRRORS		SLEEPS
	TIRES		SHEDDING
MISCELLANEOUS	THE LIGHTS		NO O O
	Cameras		ST = O O
	STARTER		
	SPRINGS		
	H BRASS		AIR CON
			RADIO

DEFECT REPORTED BY _____

DATE _____ TIME _____ AM - PM BUS # _____

(Engine is running - water & oil have been checked by the Maintenance Department)
Please indicate with a circle the specific items that are defective.

	OK	DEFECTIVE
1. DRIVER'S SEAT, SEAT BELT	<input type="checkbox"/>	<input type="checkbox"/>
2. TELL TALE PANEL LIGHTS	<input type="checkbox"/>	<input type="checkbox"/>
3. STEERING MECHANISM (2 inches free-play)	<input type="checkbox"/>	<input type="checkbox"/>
4. HORN	<input type="checkbox"/>	<input type="checkbox"/>
5. NEUTRAL START SAFETY SWITCH	<input type="checkbox"/>	<input type="checkbox"/>
6. MIRRORS, LEFT, RIGHT, (INSIDE)	<input type="checkbox"/>	<input type="checkbox"/>
7. FAREBOX NO. _____ VAULT NO. _____	<input type="checkbox"/>	<input type="checkbox"/>
8. DOOR CONTROL (Operation)	<input type="checkbox"/>	<input type="checkbox"/>
9. HEAD SIGN TEST	<input type="checkbox"/>	<input type="checkbox"/>
10. INTERIOR LIGHTS (driver, passengers, standwell)	<input type="checkbox"/>	<input type="checkbox"/>
11. PASSENGER SIGNAL (left or right side)	<input type="checkbox"/>	<input type="checkbox"/>
12. PASSENGER SEATS (front or back)	<input type="checkbox"/>	<input type="checkbox"/>
13. REAR DOOR OPERATION, WARNING LIGHTS, STEP WELL LIGHTS -	<input type="checkbox"/>	<input type="checkbox"/>
14. WHEELCHAIR LIFT, platform or mechanism	<input type="checkbox"/>	<input type="checkbox"/>
15. EXTERIOR LIGHTING & REFLECTORS/HEAD SIGN LIGHT	<input type="checkbox"/>	<input type="checkbox"/>
16. TURN SIGNALS, front, side, back	<input type="checkbox"/>	<input type="checkbox"/>
17. HEAD LIGHTS, left or right out	<input type="checkbox"/>	<input type="checkbox"/>
18. BRAKE LIGHTS, left or right out	<input type="checkbox"/>	<input type="checkbox"/>
19. WINDOWS/WINDSHIELDS & WIPERS	<input type="checkbox"/>	<input type="checkbox"/>
20. HEATER-DEFROSTER/CLIMATE CONTROL, hot, warm, cool, cold	<input type="checkbox"/>	<input type="checkbox"/>
21. BODY CONDITION, front, side, back (top or bottom)	<input type="checkbox"/>	<input type="checkbox"/>
22. TIRE CONDITION, flat, low air, worn channels, lug nuts req.	<input type="checkbox"/>	<input type="checkbox"/>
23. BRAKES		
A. (Static) Air Pressure Loss	<input type="checkbox"/>	<input type="checkbox"/>
B. (Applied) Air Pressure Loss	<input type="checkbox"/>	<input type="checkbox"/>
C. Parking Brake	<input type="checkbox"/>	<input type="checkbox"/>
D. Interlocks	<input type="checkbox"/>	<input type="checkbox"/>
24. EMERGENCY EQUIPMENT, fire extinguisher, flares, CEP-temperature absorbent	<input type="checkbox"/>	<input type="checkbox"/>
25. RADIO CHECK, sounds, received, static	<input type="checkbox"/>	<input type="checkbox"/>

EXPLAIN DEFECTS NOTED: _____

Operator certifies by his/her signature that the safety inspection has been completed as required and that any defective conditions have been reported.

OPERATOR SIGNATURE: _____

THIS BUS CARRIES OUR LITTLE - TAKE CARE OF IT
REMEMBER - SAFETY FIRST

PRE OPERATION CHECK

Use for Ok and X for Defect

1. General Condition (Leaks, water, oil, fuel, body damage.)
2. Brakes (Test stop before leaving yard.)
3. Windshield Wipers
4. Horn
5. Mirrors
6. Tires
7. Lights - head, tail, clearance, turn signals
8. Steering (Excessive play)
9. Door Operation
10. Seats and Steps

DRIVER REPORT DEFECTS HERE

DATE _____

SIGNATURE

DATE _____

SIGNATURE

DATE _____

SIGNATURE

OPERATORS TROUBLE REPORT

Bus Number _____ Date _____

PRE-TRIP INSPECTION

(Driver to (x) each item as inspected)

Drivers are to remark on unsatisfactory items

- | | |
|--|--|
| <input type="checkbox"/> tires/lug nut | <input type="checkbox"/> horn |
| <input type="checkbox"/> lights/reflectors | <input type="checkbox"/> wipers |
| <input type="checkbox"/> glass | <input type="checkbox"/> air pressure |
| <input type="checkbox"/> other | <input type="checkbox"/> parking/emergency brake clean |

Drivers Remarks: _____

TRIP REPORT

Bus OK _____ Date _____

Drivers to (x) each item not satisfactory and provide brief explanation.

Brakes	Lights	Noise Location	Miscellaneous
<input type="checkbox"/> soft	<input type="checkbox"/> head lamps	<input type="checkbox"/> lt. front	<input type="checkbox"/> buzzer or light
<input type="checkbox"/> noisy	<input type="checkbox"/> turn indicators	<input type="checkbox"/> rt. front	<input type="checkbox"/> radio or PA
<input type="checkbox"/> grab	<input type="checkbox"/> interior	<input type="checkbox"/> lt. rear	<input type="checkbox"/> emergency equipment
<input type="checkbox"/> air pressure	<input type="checkbox"/> dash	<input type="checkbox"/> rt. rear	<input type="checkbox"/> body damage
	<input type="checkbox"/> step well	<input type="checkbox"/> engine	<input type="checkbox"/> transmission
		<input type="checkbox"/> other (explain)	

Engine

- | | | | |
|------------------------------------|------------------------------------|--|------------------------------------|
| <input type="checkbox"/> no power | <input type="checkbox"/> hard | <input type="checkbox"/> doors | <input type="checkbox"/> defroster |
| <input type="checkbox"/> stalls | <input type="checkbox"/> shimmy | <input type="checkbox"/> heating | <input type="checkbox"/> wipers |
| <input type="checkbox"/> vibration | <input type="checkbox"/> free play | <input type="checkbox"/> air condition | <input type="checkbox"/> seats |
| | | <input type="checkbox"/> glass | <input type="checkbox"/> over heat |

Drivers Remarks (Print Only) _____

Operators Name _____ Supervisors Initial: _____

Distribution: white - maintenance; pink - transportation; yellow - driver

WO Number _____

BUS OPERATIONS PRE-OPERATION CHECKLIST

1. GENERAL CONDITION:
 - A. Note all leaks on defect cards: water, oil, fuel, transmission.
 - B. Excessive leaks are to be reported immediately to Dispatch and Maintenance.
2. BRAKES:
 - A. Check emergency brake for proper operation.
 - B. Test-stop regular brakes before leaving yard.
 - C. Note any defects on defect cards, report to Dispatch and Maintenance immediately.
3. RADIO:
 - A. Check radio for sending and receiving.
 - B. Note any defects on defect cards, report immediately to Dispatch.
4. LIGHTS: HEAD, TAIL, CLEARANCE, TURN SIGNALS, EMERGENCY FLASHERS:
 - A. Note all minor defects on defect cards.
 - B. All safety and inoperational items are to be reported immediately to Dispatch and Maintenance.
5. STEERING:
 - A. Check steering for proper operation.
 - B. Note defects on defect cards, report immediately to Dispatch and Maintenance.
6. DOOR OPERATION AND BRAKE:
 - A. Check operation of door and rear door brake.
 - B. List defects on defect cards, report inoperational and safety items to Dispatch and Maintenance immediately.
7. HORN:
 - A. Note defects on defect cards, report immediately to Dispatch and Maintenance.
8. WINDSHIELD WIPERS AND DEFROSTERS/HEATERS:
 - A. Note minor defects on defect cards.
 - B. Note inoperational defects to Dispatch and Maintenance immediately.
9. BODY DAMAGE:
 - A. Note any new body damage not reported on body-damage-sheet.
 - B. Report any excessive damage immediately to Dispatch and Maintenance.
10. MIRRORS:
 - A. Note any minor defects on defect cards.
 - B. Broken mirrors and safety items are to be reported immediately to Dispatch and Maintenance.
11. TIRES:
 - A. Report any tire damage to Dispatch and Maintenance immediately.
 - B. "Bald tires" should be reported immediately.
(NOTE: Michigan law defines bald tires on busses as any tire in rear of bus with less than 2/32 tread, any tire on front with less than 4/32 tread).
12. WHEELCHAIR LIFT:
 - A. List all minor defects on defect cards.
 - B. Report inoperational items to Dispatch and Maintenance immediately.
13. SIGN ROLLS:
 - A. Check for correct operation.
 - B. Report any defects on defect cards, notify Dispatch and Maintenance immed.
14. TRANSFER CUTTER, FARE BOX:
 - A. Check for correct operation.
 - B. Report any defects on defect cards, notify Dispatch and Maintenance immed.
15. SEAT ADJUSTMENTS:
 - A. Report minor defects on defect cards.
 - B. Report major items to Dispatch and Maintenance immediately.

OPERATOR'S VEHICLE CONDITION REPORT

VEN NO _____ RT. & BLK _____

DAY	DATE		
AC/Heat	Excess Heat	Jammed	Hard
	No AC	Loose	Loose
	No cab heat	Heat registering	Showy
	No defroster		Air Leak
Chassis	Emergency	Air	Backs
	Motor	Oil	Drifts
	Pulls 1/2	Temperature	Damaged
	Shock/Tight	Worn	Low
Wheels		Steering	Worn
		Head	Lug Nuts
		Inside	
		Marker/Tag	None
Tires	Tire Fast	Tire Valve	No paper
	Tire Slow	Tire Signal	No reverse
	No Inflation	Dashboard	Worn 1 shift
	Worn 1 Close	Inside front	Door glass
Interior	Worn 1 Open	Inside center	Operator's
	None	Operator	Passenger's
	Overhead	Back	Windshield
	Runs badly	Destination	Broken
Engine	Smokes	Route	Not secure
	Hard Start	Side	Worn 1 close
	None	Operator	Worn 1 open
	Not operable	Passenger	
Used			

OTHER ITEMS

Accelerator	Fuse blown	Signposts
Body damage	No	Step-in/ent
Chime/buzzer	No spare	Steps/cant
Compartment doors	None	No view
Dirty Inside	Right shape	Vandalism
Rear	No triangles	Wipers

Additional Information _____

OK

OPERATOR'S NAME _____

Bus _____

Date _____

OPERATOR'S DAILY EQUIPMENT REPORT

OPERATOR AM _____

OPERATOR PM _____

ROUTE # AM _____ PM _____

MILEAGE _____ Indicate Defective Items Box (✓)

	Pre-Trip	AM	PM
Air Cond.			
Heat			
Defroster			
Air Ride			
Body			
Brake - Front			
Emergency			
Dist. Sign			
Door - Front			
Rear			
Fare Box			
Horn			
Lights - Int.			
Clearance			
Turn Signals			
Flasher			
Headlights			
Mirrors - Left			
Right			
Interior			
Door Buzzer			
Floor & Steps			
Grab Rails			
Radio			
Steering - To Hard			
Wander			
Trans - Slipping			
Reverse ?			
Shifting			
Tires & Wheels			
Wipers			
Speedometer			
Engine			
Air Pressure			
New Damage			
Dirty Seats			
Dirty Steering Wheel			

Were you involved in an Accident? Yes AM No AM Yes PM No PM

REMARKS _____

BUS # _____

DATE _____

Daily Bus Inspection and Defect Report

	Operator #1		Operator #2		Operator #3	
	O.K.	DEFECT	O.K.	DEFECT	O.K.	DEFECT
AIR EQUIPMENT						
Door Operation						
Windshield Wipers						
Air Ride - Springs						
Leans						
BRAKES						
Drag - Pull						
Squeal - Soft						
Parking Brake						
BODY						
Body Damage (New)						
Steps - Flooring						
Driver's Seat						
Passenger Seats & Cushions						
Mirrors						
Windows						
Stanchions						
W.C. Ltr.						
INTERIOR						
Clean - Dirty						
INTERIOR EQUIPMENT						
Fire Extinguisher						
Flare Kit						
Two-way Radio						
Farebox						
Climate Control						
Transfer Mach.						
ENGINE						
Hot Engine - Oil Leaks						
Water Leaks - Oil Press						
ELECTRICAL						
Batteries - Starter						
Generator - Horn						
All Lights						
Passenger Buzzer						
Destination Signs						
TRANSMISSION						
Shifting						
Leans						
FRONT END						
Steering						
CONDITION OF TIRES & WHEELS						
Front						
Rear						
Lugnuts						
SIGNATURE OF OPERATOR #1	_____					
SIGNATURE OF OPERATOR #2	_____					
SIGNATURE OF OPERATOR #3	_____					

HUB READING _____

DESCRIPTION OF DEFECT(S) _____

SIGNATURE OF OPERATOR #1 _____

HUB READING _____

DESCRIPTION OF DEFECT(S) _____

SIGNATURE OF OPERATOR #2 _____

HUB READING _____

DESCRIPTION OF DEFECT(S) _____

SIGNATURE OF OPERATOR #3 _____

DEFECTS RECORDED ON WORK ORDER # _____

DEFECT CARD REVIEWED BY _____
(Chief Mechanic)

Pre-Trip Inspection Checklist

Directions: Enter bus and set parking (emergency) brake.
Start engine.
Activate Master Switch to Run.
Turn Master Switch to Night Position.
Set low beams and right directional.
Starting at front door begin the inspection as follows:

First Walk-Around

_____ Low Beams
_____ Right Directionals (front & rear)
_____ Floor
_____ Column
_____ Overhead Body Lights
Leftside _____ Left Front Tire
_____ Side Marker Lights and Reflectors
_____ Left Rear Dual Tires
Back _____ Rear Overhead Clearance Lights
_____ Tail Lights
_____ Rear Reflectors
_____ License Plate and Light
_____ Brake Light (check by opening back door)
Rightside _____ Side Marker Lights and Reflectors
_____ Right Dual Tires
_____ Right Front Tire

Second Walk-Around

_____ High Beams
_____ Left Directionals (front & rear)
_____ Floor
_____ Column

Third Walk-Around

4-Way Flasher
_____ Toggle
_____ Column
Then, enter bus and inspect:
_____ Air Gauges (2)
_____ Oil Gauge
_____ Horn
_____ Windshield Wipers
_____ Fire Extinguisher
_____ Reflectors
_____ Emergency Exits
_____ Set, Check, and Re-check Mirrors

Vehicle # _____

Date _____

Check List	CK	BO	Pre Trip Defects	Post Trip Defects
Steering				
Interior Lights				
Mirrors				
Exterior Lights				
Flashers				
Windows				
Tires and Lugs				
Body (Damages etc)				
Wipers				
Horn				
Brakes				
Fire Extinguisher				
Other				

RUN NO. _____ DRIVER #1 Post Trip Signature _____

Relief Drivers: List all defects that occur during your work shift, if none sign after your work shift is completed.

RUN NO. _____ DRIVER #2 Post Trip Signature _____

RUN NO. _____ DRIVER #3 Post Trip Signature _____

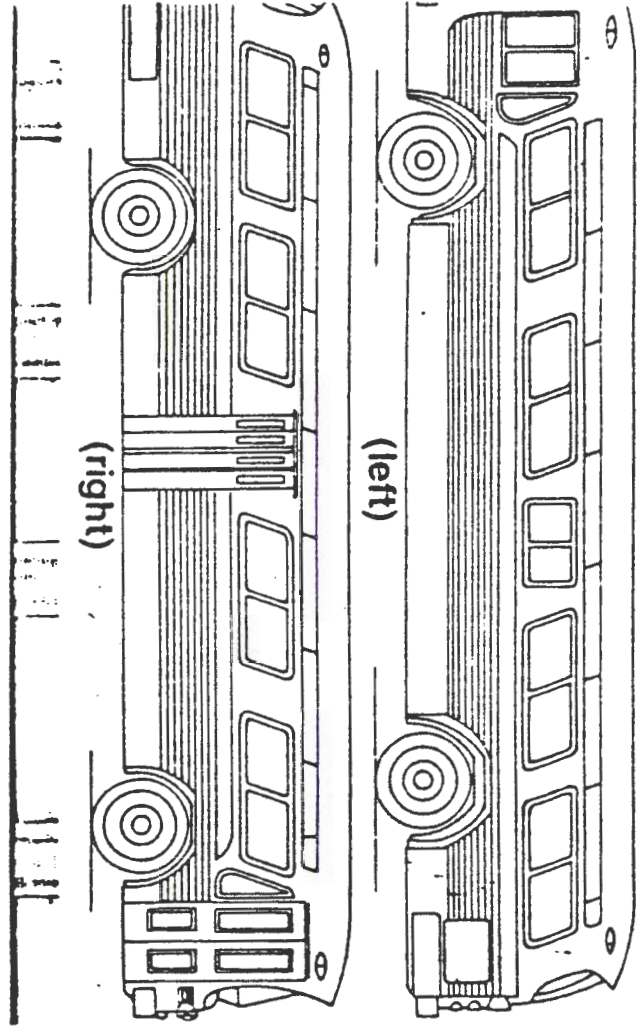
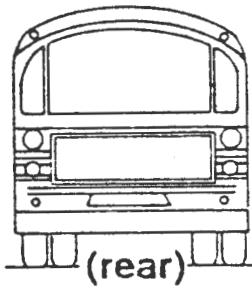
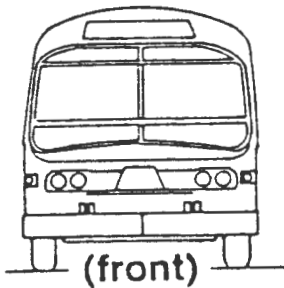
BUS NO _____ DATE _____

Defects Noted During Run _____

Signature _____

Before moving bus check off following list, mark all body damage on diagrams

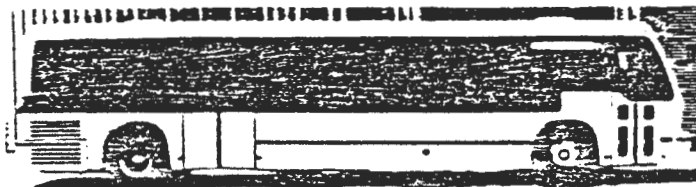
CHECK OFF, TIME CHECKED _____	O K	
	YES	NO
Fire Extinguisher _____		
Wheel Chock _____		
Snow Scraper _____		
Wrecking Bar Or Hatchet _____		
Reflectors _____		
Mirrors _____		
Interior Lights _____		
Exterior Lights _____		
Tires _____		
Windshield Wipers _____		
Window Glass _____		
Seats _____		
Door Operations _____		
Horn _____		



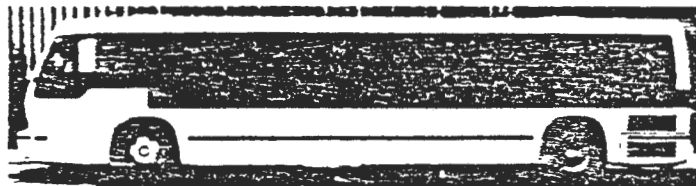
S.C.R.T.D. LIBRARY

Damage Report

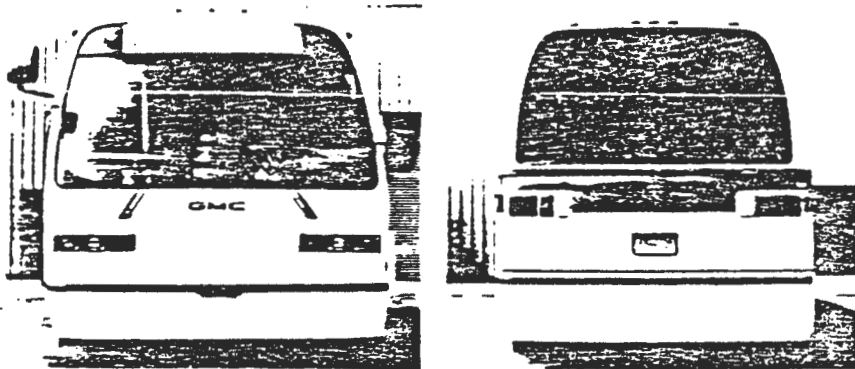
Employee Signature _____ Bus No _____
(circle damage on bus) Date _____



Explain _____



Explain _____



Explain _____

Use Reverse Side for Additional Information

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Directions:

- Enter bus and set Parking (emergency) brake
- Activate Master Switch to Day and start bus
- Turn Master Switch to Night Position
- Set low beams and 4-way flashers
- Starting at front door begin the inspection
- Place a check beside each item as you inspect it. (✓)
- If mechanical attention is needed, make a note in the comments column.
- Turn in checklist with daycard.

First Walk-Around

Comments

- _____ Low beams.....
- _____ 4-way flashers - front & rear.....
- _____ Overhead body lights.....
- _____ Left front tire and lugs.....
- _____ (Truck Section) - left marker lights and reflectors.....
- _____ Left rear dual tires and lugs - (Truck Section).....
- _____ (Trailer Section) - left marker lights and reflectors.....
- _____ Check bellows (outside).....
- _____ Left rear tire and lugs - (Trailer Section).....
- _____ Rear overhead clearance lights.....
- _____ Tail lights.....
- _____ Rear reflectors.....
- _____ License plate and lights.....
- _____ Brake lights (Check by opening back door).....
- _____ Rear 4-way flashers.....
- _____ Right rear tire and lugs - (Trailer Section).....
- _____ Right marker lights and reflectors - (Trailer Section).....
- _____ Right rear dual tires and lugs - (Truck Section).....
- _____ Right marker lights and reflectors - (Truck Section).....
- _____ Right front tire and lugs - (Truck Section).....

Second Walk-Around

- _____ High Beams.....
- _____ Check carefully for any body damage and under bus for leaks....

Check out items. Inspect and test, if appropriate:

- _____ Interior Lights.....
- _____ Air Gauges (axle A and B/axle C).....
- _____ Oil Gauges.....
- _____ Voltmeter.....
- _____ Indicator light test button.....
- _____ Horn.....
- _____ Windshield Wipers.....
- _____ Fire Extinguisher (check for full charge).....
- _____ Reflectors.....
- _____ Emergency exits.....
- _____ Check bellows (inside).....
- _____ Kneeling Device Switch.....
- _____ Set, Check, and recheck Mirrors.....
- _____ Door operation (all 5 positions).....

REMEMBER: Turn this in every day with your daycard!

Appendix 2
Post Card Questionnaire

Please fill out and Mail by October 19.

Transit System: _____

1. Pre-run inspections are Mandatory
 Optional
 Not used here
2. Our drivers Always do a thorough inspection of their vehicles before leaving the garage
 Generally perform superficial inspections
 Do not usually inspect their vehicles
3. Our drivers Are required to sign off on their bus even if no defects are reported
 Only sign if they are reporting defects
 Are not required to sign pre-run inspection forms
4. We Do require post-run driver inspections
 Do not require post-run driver inspections
5. We would be a good source of information about How to institute a pre-run inspection program
 how to run a good driver inspection program
 Union contract and work rule provisions which are barriers to driver inspections

For further information, contact _____ (name)
_____ (phone)

Appendix 3
Telephone Questionnaires

Questionnaire for Systems Using Drivers to Perform Pre-Run Inspections.

1. How long has your system used a pre-run inspection program?
2. Are you aware of any reason(s) why your system uses a pre-run inspection program?
3. Do you know who began/developed the pre-run inspection program for your system?
4. Are there any goals/objectives for your system's pre-run inspection program?

If Yes: How were these goals/objectives established?

How are they communicated to the personnel performing the pre-run inspections?

How are these goals measured?

Do you think that you have attained the goals of your pre-run inspection program?

5. Have the drivers always performed the pre-run inspections for your system?

If Yes: Why?

If No: Who else was/is involved?

When was there a change?

Why was there a change?

6. At your system, are your drivers issued the same buses daily?

If Yes: What is/are the reason(s)?

If No: How are the buses assigned?

7. Is there any training of the drivers for the pre-run inspections?

If Yes: How is it conducted?

8. Is there any training to improve driving methods?

9. How detailed are the instructions to the drivers for performing the pre-run inspections?

10. How much time are the drivers allowed in which to perform the pre-run inspections?

11. Where are the pre-run inspections performed?

12. How are the pre-run inspections performed?
13. Does your system issue any special forms for pre-run inspections?
- If Yes: Who prepared the forms?
- How is the form used by the drivers?
- How were the items on the forms selected?
- Do you consider the form to be complete?
- How is the information from the form used later, if it is turned in daily?
- If No: Has your system ever used any forms?
- If Yes: Why has the practice been discontinued?
- How are the drivers informed of the items to inspect during the pre-run inspection?
14. Is there any supervision of the drivers while they are performing the pre-run inspections?
- If Yes: How long has this been in use?
- How does it work?
- Why is this the practice?
- If No: Has supervision ever been used?
- How did this procedure work?
- Why was this practice dropped?
15. Does your agency use any methods or programs to ensure that the drivers comply with the proper pre-run inspection procedures?
- If Yes: How does this procedure work?
- How long has it been in use?
- How clear would it be to pin-point the person responsible for a roadcall due to a superficial pre-run inspection?
- What are the follow-up disciplinary actions?
- If No: Have you ever used any enforcement/disciplinary procedure?

What is/are the reason(s) for not having such a method?

16. Generally, what do you think are the drivers' attitudes regarding the requirement to perform pre-run inspections?
 - To what do you attribute this attitude to?
17. If a defect is found during the pre-run inspections:
 - What are the communication channels involved in reporting the problem?
 - Will the defect get fast remedial action?
 - Are the drivers allowed to correct any defects that are found during the inspection?
 - Why/Why not?
 - Who decides if a bus with a minor defect can pull-out?
 - How often does this occur?
18. How many buses do not pull-out due to a defect found during pre-run inspections on a daily or weekly basis?
19. Besides safety items, are there any items that must be in working order before a bus can pull-out?
20. Are there any special problem areas on your buses that are inspected more closely during pre-run inspections?

If Yes: What do you attribute this problem to?
21. Is the pre-run inspection procedure ever skipped?

If Yes: What are the circumstances?
How often does this happen?
22. Who can make changes in the pre-run inspection program?
 - What changes, if any, have been made in the past?
 - Why were these changes made?
23. Have pre-run inspections ever caused any problems with your bus operations?

If Yes: When did it/they occur?
What were the circumstances?

24. Do any evaluations of pre-run inspection procedures take place?
- If Yes: How often?
- Who evaluates the procedures?
- How is the procedure evaluated?
25. Has your system compared its procedures with methods used by other systems?
- If Yes: How many other systems were compared?
- Which systems were they?
- Which methods were used by them?
- How would you compare your pre-run inspection program to others?
26. Are you aware of any unique features in your system's pre-run inspection procedures?
- If Yes: What are they?
- Why do you consider them unique?
27. Is there anything that you would like to change about your present pre-run inspection program?
- If Yes: What is/are it/they?
- Why?
28. Is there any union involvement in your pre-run inspection program?
- If Yes: What is the extent of the involvement?
- Who is/are the union(s)?
29. Are you aware of any complaints regarding the pre-run inspection procedure made by the drivers?
- If Yes: What type of complaints are made?
- How did your system handle these complaints?
30. Is there a regular exchange of ideas among drivers and those in charge of the pre-run inspection program regarding policy of methods?
- If Yes: How does the exchange occur?

Are you aware of any benefits that have resulted from this exchange? If so what are they?

31. Are there any additional comments that you want to make regarding your pre-run inspection program?

Questionnaire for Systems Using Mechanics to Perform Pre-Run Inspections.

1. How long has your system used a pre-run inspection program?
2. Do you know of any reason(s) why your system started the using the pre-run inspection program?
3. Do you have any goals for this program?
4. What are the reasons for having mechanics perform the pre-run inspections?
5. Have other personnel ever performed this task?
If Yes: Why does your agency now use mechanics?
6. Does your system issue any special forms for use during the pre-run inspections?
If Yes: Who prepared the forms?
How were the items on the form selected?
How is the form used?
Do you consider the form complete?
Is the form used for any other purposes besides pre-run inspections?
7. Is there any special pre-run inspection training for the mechanics?
If No: How do the mechanics know what to inspect?
8. Are the mechanics who perform the inspections part of the regular maintenance staff?
9. How do they perform the pre-run inspections?
10. Do mechanics perform the inspections during each shift?
11. If a defect is found during the inspection how is the problem handled?
-- Does the defect get quick remedial attention?
12. Is there any supervision of the mechanics when they are performing pre-run inspections?
13. If a roadcall is needed due to minor defect not found during the pre-run inspection, are the mechancis subject to any disciplinary measures?

If Yes: What are they?

14. Who decides whether or not a vehicle with a defect may pull-out?
15. Is there any union involvement in your system's pre-run inspection program?
16. Generally, is your maintenance crew overstaffed, understaffed or just right?
17. Are the drivers involved in any preventative maintenance procedures at your system?

If Yes: What is their involvement?

18. Do you have any additional comments that you would like to make regarding pre-run inspections?

Questionnaire for Systems Without Pre-Run Inspection Programs.

1. Has your system ever used a pre-run inspection program?
If Yes: How was it performed?
When was it stopped?
Why was it stopped?
2. If the program was dropped; how did this affect your preventative maintenance program?
3. Are there any barriers which prevent your system from adopting a pre-run inspection program?
4. Are there any changes in your present preventative maintenance methods that you would like to make?
5. What does your system do in place of a pre-run inspections?
6. Are you familiar with other systems' pre-run inspection programs?
7. Under what circumstances would your system consider initiating a pre-run inspection program?
8. Is your system planning to implement a pre-run inspection program in the future?
If Yes: How are you planning for it?
9. Do you have any additional comments that you would like to make regarding pre-run inspections?

