

## Final Report

A MANAGEMENT SYSTEM FOR EVALUATING TRAILER/MOTORCYCLE,  
AUTO/TRUCK, AND REJECTION RECEIPTS IN THE  
VIRGINIA PERIODIC MOTOR VEHICLE INSPECTION PROGRAM

by

Jerry L. Korf, Research Engineer  
Deborah A. Mitchell, Research Analyst  
and  
Philip S. Harris, Computer Programmer

Prepared by the Virginia Highway and Transportation Research  
Council Under the Sponsorship of the  
Department of Transportation Safety

(The opinions, findings, and conclusions expressed in this  
report are those of the authors and not necessarily those of  
the sponsoring agencies.)

Virginia Highway & Transportation Research Council  
(A Cooperative Organization Sponsored Jointly by the Virginia  
Department of Highways & Transportation and  
the University of Virginia)

Charlottesville, Virginia

May 1979  
VHTRC 79-R47

## SAFETY RESEARCH ADVISORY COMMITTEE

- MR. R. W. DUVAL, Chairman, Deputy Director,  
Virginia Department of Transportation Safety
- MR. FRANK ALTOBELLI, Regional Administrator,  
National Highway Traffic Safety Administration
- MAJOR C. M. BOLDIN, Investigation and Planning Supervisor,  
Virginia Department of State Police
- MR. WALTER E. DOUGLAS, Assistant Director,  
Virginia Department of Transportation Safety
- MR. WAYNE S. FERGUSON, Assistant Head,  
Virginia Highway and Transportation  
Research Council
- MR. J. L. HAZELWOOD, JR., Driver Services Administrator,  
Virginia Division of Motor Vehicles
- MR. C. P. HEITZLER, JR., Program Manager, Division of Management  
Analysis and Systems Development
- MR. JULIAN K. HICKMAN, VASAP Evaluator,  
Virginia Department of Transportation Safety
- MR. BILLY G. JOHNSON, Supervisor, Driver Education,  
State Department of Education
- MR. HIRAM R. JOHNSON, Management Information Systems Director,  
Office of Secretary of Transportation
- MR. DAVID O. MCALLISTER, Traffic Engineer,  
Virginia Department of Transportation Safety
- MR. R. F. MCCARTY, Safety Program Coordinator,  
Federal Highway Administration
- MR. R. M. MCDONALD, Project Director, Highway Safety Training Center,  
Administration of Justice and Public Safety
- MR. A. L. THOMAS, Assistant Traffic and Safety Engineer,  
Virginia Department of Highways & Transportation
- MR. AMBROSE WOODROOF, Assistant Attorney General,  
Division of Motor Vehicles

## ABSTRACT

In 1974, at the request of the Department of State Police, the Research Council developed a system for management evaluation of inspection approval receipts issued under the state's periodic motor vehicle inspection program (PMVI). Implementation of this procedure permitted the State Police to sample fewer receipts than in previous evaluations and allowed for more suitable statewide inferences concerning the PMVI program. In addition to approval receipts, the Virginia inspection program also issues trailer/motorcycle and rejection receipts. This report describes an enhanced version of the original management system for approval receipts<sup>(1)</sup> as well as an evaluation system for trailer/motorcycle and rejection receipts. In addition, a procedure is outlined and software provided to implement an evaluation of stations suspected of improper inspection practices. This new management system provides for evaluation of the Virginia PMVI program at a lower cost and with greater accuracy than was previously possible.



## SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Conclusions

A management system for evaluating trailer/motorcycle and rejection receipts in the Virginia PMVI program was developed based on sample sizes of 600 and 2,500 receipts, respectively, and stratified random sampling. Use of these procedures will allow the Department of State Police to sample fewer receipts than were sampled in previous evaluations and this method should also provide for more useful statewide inferences concerning Virginia's inspection program. The management system for trailer/motorcycle and rejection receipts described in this report, when combined with that for approval receipts (outlined in previous reports and further refined in this one), will provide for a comprehensive, less costly, more accurate evaluation of the Virginia PMVI program than was previously possible.

Recommendations

The management system developed for the Virginia PMVI program could be enhanced by the -

1. implementation of a method to positively identify the mechanic performing a given inspection;
2. development of an improved method for determining true vehicle mileage;
3. use of a different rejection receipt configuration for trailer/motorcycle receipts; and
4. modification of the present filing system with consideration being given to some combination of a microfiche recording system for archival storage and retrieval of receipts, an enhanced manual filing system, and dynamic data entry editing of sampled receipts.



## TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT-----	iii
SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS-----	v
INTRODUCTION-----	1
PURPOSE AND SCOPE-----	3
VIRGINIA'S MOTOR VEHICLE INSPECTION PROGRAM-----	3
OVERVIEW OF SYSTEM-----	4
Inspection Receipt Sampling-----	4
Auto/Truck Receipts-----	6
Trailer/Motorcycle Receipts-----	7
Rejection Receipts-----	8
System Operation-----	8
COMPONENTS OF DATA COLLECTION AND ANALYSIS SYSTEM-----	13
Sampling List Program-----	13
Volume Worksheet Program-----	16
Edit Program-----	16
Sample Tabulation Program-----	20
Source Document Error Program-----	24
Auto/Truck Analysis Program-----	24
Trailer/Motorcycle Analysis Program-----	24
Station Outlier Program-----	24
INTERPRETATION OF PMVI ANALYSIS REPORTS-----	26
Auto/Truck Analysis Report-----	26
Trailer/Motorcycle Analysis Report-----	32
STATION EVALUATION PROCEDURE-----	32
CONCLUSIONS AND RECOMMENDATIONS-----	38
ACKNOWLEDGMENTS-----	41
REFERENCES-----	43

## TABLE OF CONTENTS (cont.)

	<u>Page</u>
APPENDICES	
APPENDIX A CODING AND KEYING MANUAL-----	A-1
APPENDIX B PMVI SYSTEM RUN BOOK FOR UNIVAC 1100-----	B-1
APPENDIX C SAMPLE LISTING PROGRAM-----	C-1
APPENDIX D VOLUME WORKSHEET PROGRAM-----	D-1
APPENDIX E EDIT PROGRAM-----	E-1
APPENDIX F TABULATION PROGRAM-----	F-1
APPENDIX G SOURCE DOCUMENT ERROR PROGRAM-----	G-1
APPENDIX H AUTO/TRUCK ANALYSIS PROGRAM-----	H-1
APPENDIX I TRAILER/MOTORCYCLE ANALYSIS PROGRAM-----	I-1
APPENDIX J OUTLIER PROGRAM-----	J-1



## Final Report

A MANAGEMENT SYSTEM FOR EVALUATING TRAILER/MOTORCYCLE,  
AUTO/TRUCK, AND REJECTION RECEIPTS IN THE  
VIRGINIA PERIODIC MOTOR VEHICLE INSPECTION PROGRAM

by

Jerry L. Korf, Research Engineer  
Deborah A. Mitchell, Research Analyst  
and  
Philip S. Harris, Computer Programmer

## INTRODUCTION

Periodic motor vehicle inspection (PMVI) has been performed in several European countries since the early 1920's and in the United States since the late 1920's. Virginia, one of the first states to implement a PMVI program, initiated a semiannual program in 1932. Under the administration and supervision of the Virginia Department of State Police, the program has expanded to the extent of conducting over 6.4 million inspections of vehicles each year at approximately 3,000 inspection stations employing more than 11,000 certified mechanics.

Over the years the Department has continually endeavored to upgrade the system. The resulting refinements include a station appointment procedure, a training program to certify inspectors, and a quality control program to determine if inspections are being performed properly. In 1971 a procedure of systematic sampling of inspection receipts\* was begun to determine state averages for such items as (1) the overall rate at which vehicles had one or more defective components, and (2) the failure rate \*\* for vehicles based upon the various types of possible defects, (e.g., the percentage of vehicles requiring repair or replacement of defective brakes or worn tires prior to receiving an approval receipt). These averages, or "norms", may be used to increase the effectiveness of quality control efforts by enabling the Department to compare an individual station's inspection information to that for the state as a whole. Should the individual station differ radically from the average, then a visit may be made to

---

\*A copy of each inspection receipt issued is filed at State Police Headquarters in Richmond.

\*\*It should be noted that "failure rate" does not necessarily refer to a vehicle that received a rejection receipt. In the case of an approval receipt, a failure refers to an item checked "adjust" or "install", which implies the vehicle needed to be repaired before being issued an approval receipt.

determine if there is a reasonable explanation for the deviation or if there are indeed infractions of State Police rules which could require official action.

Initially, the sampling technique used by the Department in its quality control efforts involved selecting inspection stations for a yearly sample on a systematic basis in which receipts for every  $n^{\text{th}}$  station were made a part of the sample. Stations were selected monthly and all inspection receipts for each station selected were included in the sample for the month for which the station was selected.

In 1974, the Department of State Police requested assistance from the Virginia Highway and Transportation Research Council in determining the appropriate sample size for use in its sampling procedure. This request evolved into the development of a random sampling plan and a management system for evaluating inspection approval (auto/truck) receipts and into a management system for auto/truck, trailer/motorcycle, and rejection receipts. The management system developed is based on a calculated sample size and a random sampling procedure which stratifies the sample according to type of inspection station and volume of receipts issued by stations. The details of the sampling plan for these receipts are presented in this report. Use of this procedure allows for a somewhat smaller sample size than used in previous evaluation efforts while ensuring greater accuracy and allowing for more suitable statewide inferences concerning Virginia's PMVI program. In order to implement the random sampling plan, to develop structured data gathering procedures, and to provide comprehensive and useful information from the sample, a system of programs was written which was described in a previous report.(2) These programs were modified and new analysis programs were added to provide a complete management system to guide the data collection effort, detect and correct errors in data gathering, ensure appropriate sampling and sample sizes for the various receipts, detect stations that deviate from the established norms, and provide information on the quality of reporting itself.

This report describes a management system for evaluating trailer/motorcycle, rejection, and auto/truck approval receipts. In addition, it provides the tools for evaluating stations suspected of improper inspection practices. It details a sampling procedure and a method for analyzing the trailer/motorcycle and rejection receipts sampled which, when combined with that for auto/truck approval receipts, should provide for a comprehensive evaluation of the Virginia periodic motor vehicle inspection program.

## PURPOSE AND SCOPE

The purpose of this project was to design a system for sampling and evaluating trailer/motorcycle receipts and rejection receipts issued by Virginia's inspection program, and to design a method of identifying stations suspected of improper inspection practices. This report describes the procedures developed for calculating the appropriate sample sizes and providing a method of sampling which may be used to determine a statewide failure rate for each item inspected and for vehicles of different type, age, and mileage categories. Also described is a method for comparing failure rates for individual stations to the statewide norms so as to identify those stations that vary significantly from the statewide average. Included are the computer programs and implementation procedures used in the system developed for evaluating Virginia's PMVI program.

## VIRGINIA'S MOTOR VEHICLE INSPECTION PROGRAM

The Virginia PMVI program uses privately owned stations authorized and supervised by the Department of State Police to conduct inspections. Inspections are conducted throughout the year, and vehicle owners are required to have their vehicles inspected twice a year, with a period of no more than 6 months between inspections. Under recent legislation however, purchasers of new motor vehicles are permitted to receive an inspection sticker valid for a 12-month period upon initial inspection, after which inspections are conducted at 6-month intervals. Under Virginia law it is a misdemeanor "to make an improper inspection, to misuse inspection materials, or to operate without a valid inspection sticker."<sup>(3)</sup> The Virginia PMVI program is additionally controlled by the authority of the Superintendent of State Police to suspend inspection privileges of stations or individual mechanics.<sup>(3)</sup>

Inspection stations are classified according to the type of vehicle they inspect and fall into the following categories: (1) unlimited - stations qualified to inspect all vehicles presented; (2) small exemption - stations limited to inspecting vehicles not exceeding 10 feet in height or 35 feet in length; (3) large exemption - stations limited to inspecting vehicles exceeding 10 feet in height and/or 35 feet in length; (4) private - stations permitted to inspect only private or company-owned vehicles; (5) motorcycle - stations qualified to inspect only motorcycles; and (6) trailer - stations qualified to inspect only trailers.<sup>(4)</sup>

The three types of inspection receipts used in evaluating Virginia's PMVI program are (1) semiannual auto/truck approval receipts, (2) semiannual trailer/motorcycle receipts, and (3) rejection receipts. The approval receipts are shown in Figure 1; and the rejection receipt is shown in Figure 2. The semiannual auto/truck approval receipt lists 18 equipment components which are inspected and checked "OK", "ADJUST", or "INSTALL". The trailer/motorcycle receipt contains 17 such items. Eighteen items are listed on the rejection receipt and the component(s) responsible for the vehicle's failure to meet inspection requirements is checked. In the case of each receipt, a record is maintained showing the date of inspection, the station number, the vehicle's make, type, mileage, year built, the vehicle components that were defective, and the cost for inspection. A copy of each inspection receipt is filed at State Police Headquarters in Richmond.

## OVERVIEW OF THE SYSTEM

### Inspection Receipt Sampling

The method of sampling which seems most likely to produce results suitable for use in drawing inferences about Virginia's PMVI program involves the monthly random sampling of stations according to their relative volumes and station classifications.

For receipt sampling, inspection stations are grouped into 15 categories based on the type of inspection and the number of inspections performed per month. Table 1 shows the station categories. The station classifications include private, small exemption, unlimited, motorcycle, and trailer, while the volumes of inspections are divided into low, medium, and high based on the average number of receipts issued per active month. For sampling trailer/motorcycle receipts, a low volume station is one that issues less than 10 receipts per month, a medium volume station issues 10 to 40 receipts per month, and a high volume station more than 40 per month. For sampling auto/truck receipts, a low volume station is one that issues less than 100 receipts per month, a medium issues 100 to 299, and a high one more than 299.

In determining the appropriate sample distribution it was suspected that stations from different categories would have different failure rates, so it was decided that the sample would be pulled proportionately from each category. The sample for a given year is based on the number of receipts issued in the previous year. For each category, the proportion of the sample pulled from that strata is the same as the proportion of receipts issued by stations from that strata in the previous year.

INSPECTION CERTIFICATION  
**VIRGINIA STATE POLICE** F 713401

Equipment Inspected	O K	Adjust	Install	
BRAKES				DATE
HEADLIGHTS				LIC
OTHER LIGHTS				NO
SIGNAL LIGHTS				MAKE
HORN				BODY
STEERING				TYPE
MIRROR				YEAR
WINDSHIELD				BUILT
OTHER GLASS				ODOMETER
WINDSHIELD WIPER				READING
TAG MOUNTING				INSPECTION RELATED
EXHAUST SYSTEM				CHARGES \$
TIRES				
SEAT BELTS				
HOOD LATCH				
FUEL SYSTEM				
DOORS				
EMISSION CONTROL				

IDENTIFICATION NO. \_\_\_\_\_  
 Eqp. REMOVED \_\_\_\_\_ STA. NO. \_\_\_\_\_  
 STATION NAME \_\_\_\_\_  
 INSPECTOR \_\_\_\_\_

**THIS STICKER EXPIRES AUGUST 31** (Over)

Semiannual Auto/Truck receipt

INSPECTION CERTIFICATION  
**VIRGINIA STATE POLICE** T/M 338901

S.P. 131A

Equipment Inspected	O K	Adjust	Install	
STEERING and SUSPENSION				DATE
BRAKES				LIC
HEADLIGHTS				NO
STOP LIGHTS				MAKE
TAIL LIGHTS				BODY
LICENSE LIGHTS				TYPE
SIGNAL LIGHTS				YEAR
OTHER LIGHTS				BUILT
REFLECTORS				ODOMETER
MIRROR				READING
HORN				INSPECTION RELATED
TAG MOUNTING				CHARGES
EXHAUST SYSTEM				
TIRES				
WHEELS				
GLAZING				
FUEL SYSTEM				

IDENTIFICATION No. \_\_\_\_\_  
 Eqp. Removed \_\_\_\_\_ Sta. No. \_\_\_\_\_  
 Station Name \_\_\_\_\_  
 INSPECTOR \_\_\_\_\_

**THIS DECAL EXPIRES OCTOBER 31.** (over)

Semiannual Trailer/Motorcycle receipt

Figure 1. Approval receipts analyzed in PMVI.

**REJECTION** E 720009

LIC. NO. \_\_\_\_\_ DATE \_\_\_\_\_

IDENTIFICATION NO. \_\_\_\_\_

MAKE \_\_\_\_\_ ODOMETER READING \_\_\_\_\_

STA. NAME \_\_\_\_\_ STA. NO. \_\_\_\_\_

INSPECTOR \_\_\_\_\_

REJECTED FOR	
BRAKES	
HEADLIGHTS	
OTHER LIGHTS	
SIGNAL LIGHTS	
HORN	
STEERING	
MIRROR	
WINDSHIELD	
OTHER GLASS	
WINDSHIELD WIPER	
TAG MOUNTING	
EXHAUST SYSTEM	
TIRES	
SEAT BELTS	
HOOD LATCH	
FUEL SYSTEM	
DOORS	
EMISSION CONTROL	

**READ CAREFULLY!**

THIS VEHICLE MUST BE REINSPECTED AND APPROVED WITHIN (7) DAYS.

ANY OPERATION OF THE VEHICLE WILL BE AT THE OPERATORS RISK AND MUST BE IN ACCORDANCE WITH LAW.

VIRGINIA STATE POLICE

S.P. 133

Rejection receipt

Figure 2. Rejection receipt analyzed in PMVI.

Table 1

## Stratification of Inspection Stations

Station Vol.	Station Classification				
	Unlimited	Private	Small Exemption	Motorcycle	Trailer
Low					
Medium					
High					

Note: Large exemption stations were not included since they represent only 0.3% of the total number of receipts issued each year.

---

Auto/Truck Receipts

The appropriate annual sample size necessary to enable detection of a 10.0% change and 1.5% failure rate was determined to be 35,540 inspection receipts. This was based on the formula

$$N = \frac{2t^2 \times pq}{d^2},$$

where

N = annual sample size,

p = probability of a defective item = .015,

q = (1-p) = .985,

t = statistical precision as a standard normal interval value = 1.645, and

d = expected change (in percentage points) = .0015.

The auto/truck sample size is calculated as

$$N = \frac{2(1.645)^2 \times (.015) (.985)}{(.0015)^2} = 35,539.$$

For a given confidence interval, there are only two variables in this sample size formula: (p) the probability of a defective item, and (d) the expected change to be detected. Since these two variables will change only slightly from year to year, the sampling program is designed to use a constant sample size of 36,000 inspection receipts. If changes occur in any of the factors influencing the sample size, the sample listing program should be modified (comments within the program explain how this modification can be accomplished) to use the newly calculated sample size.

This sample size was calculated for a confidence level of 95% of predicting the value (i.e., percentage defective), and the failure rate of 1.5% was based on the most recent (1975) tabulation of inspection approval receipt data by the Virginia State Police.

#### Trailer/Motorcycle Receipts

The sample size for trailer/motorcycle receipts was calculated based on the formula

$$N = \frac{2t^2 \times pq}{d^2},$$

where

N = annual sample size,

p = probability of a defective item,

q = (1-p),

t = statistical precision as a standard normal interval value, and

d = expected change (in percentage points).

The appropriate annual sample size necessary to enable detection of a change of 10.0% and a failure rate of 1.0% was determined to be 600 receipts. This was based on

$$N = \frac{2(1.645)^2 \times (.01) (.99)}{(.01)^2} = 536.$$

This sample size was calculated for a confidence level of 95% of predicting the value (i.e., percentage defective). Prior to the development of this management system for Virginia's inspection program, the Department of State Police had employed a systematic sampling procedure in evaluating inspection receipts. The failure rate of 1.0% was based on the most recent (1976) tabulation of inspection receipt data by the Virginia State Police.

### Rejection Receipts

The sample size for rejection receipts was calculated as

$$N = \frac{2t^2 \times pq}{d^2},$$

where

N = annual sample size,

p = probability of a defective item,

q = (1-p),

t = statistical precision as a standard normal interval value, and

d = expected change (in percentage points).

The appropriate annual sample size necessary to detect a 10.0% change and 9.8% failure rate was determined to be 5,000 receipts. The calculations were

$$N = \frac{2 (1.645)^2 \times (.098) (.9020)}{(.0098)^2} = 4981.$$

This sample size was calculated for a confidence level of 95% of predicting the value (i.e., percentage defective), and the failure rate of 9.8% was based on the most recent (1976) tabulation of inspection receipt data by the Virginia State Police.

### System Operation

The PMVI management evaluation system is designed to yield information concerning the inspection program for one calendar year, with data being collected and refined continuously. Figures 3 and 4 outline the various analytical procedures for this annual process.



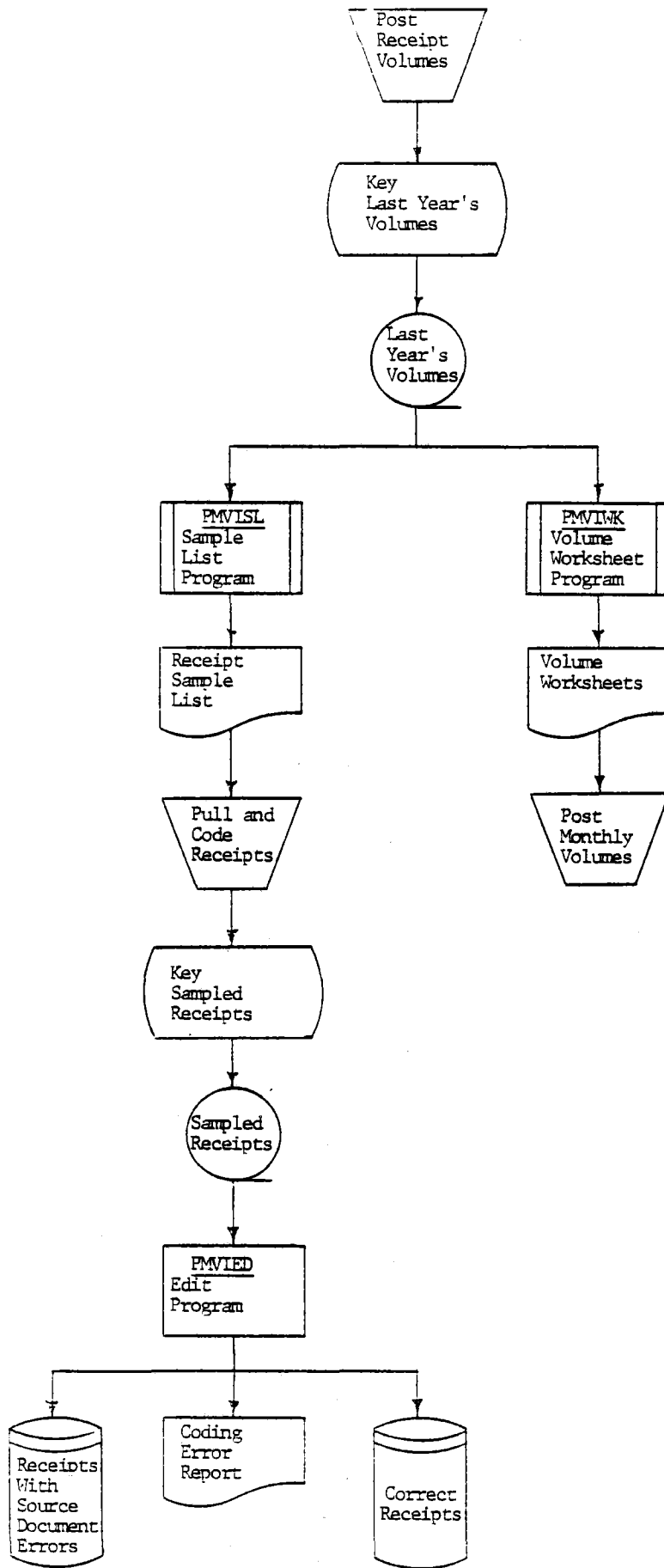


Figure 3. Volume worksheets and monthly sampling procedure.

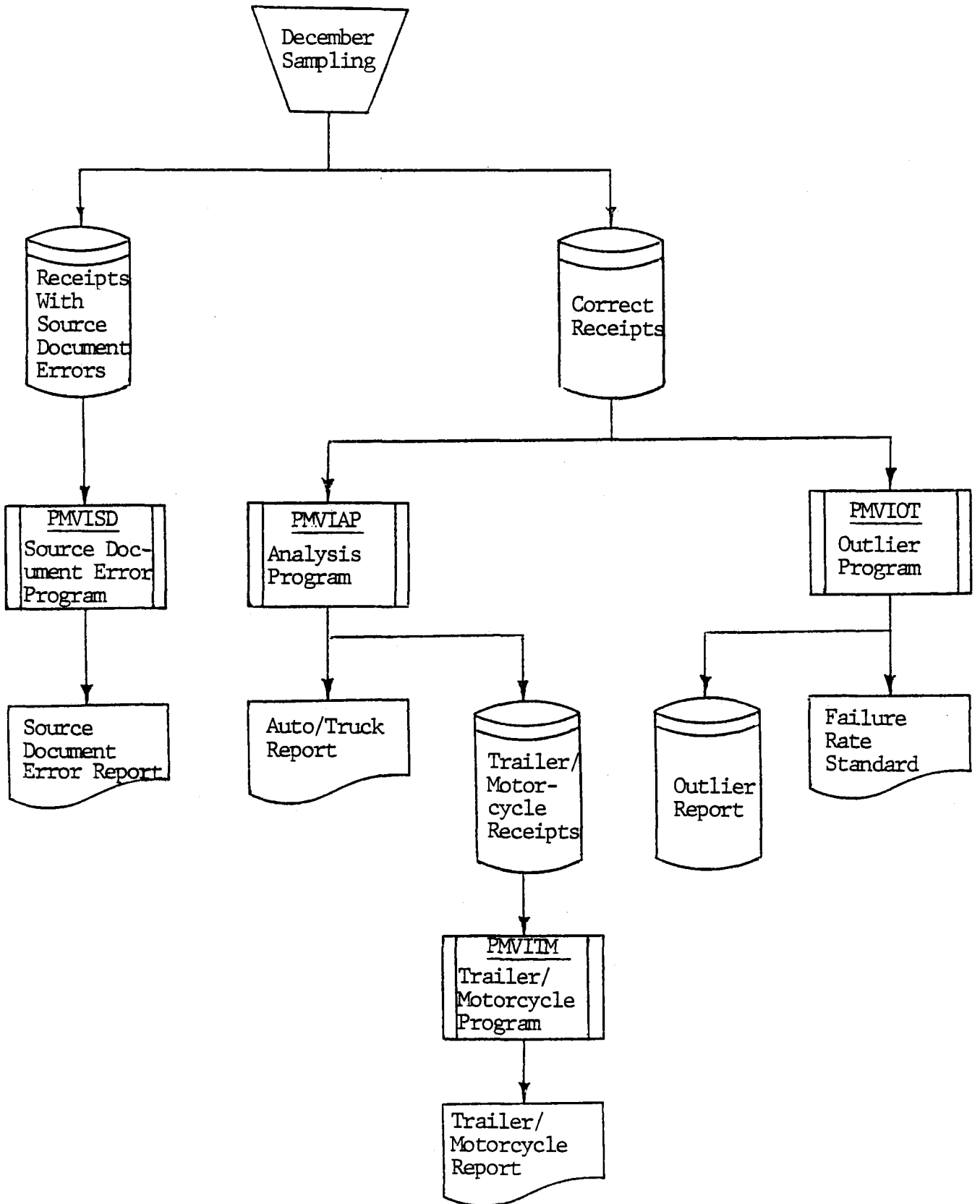


Figure 4. Annual analysis procedure.

Before the collection of data for a given year is started, the previous year's inspection volume information must be used to determine the composition of the sample. This information has been entered for each inspection station during the previous year on the volume worksheets generated by the worksheet program (PMVIWK). (This and other programs mentioned in this section will be discussed in greater detail in a later section of this report.) The station volume data for the previous year should be complete by February of the current year, and at that time becomes the input for the sampling list program (PMVISL). This program determines the distribution of the sample among the 15 station categories. The program then assigns all eligible\* inspection stations to their appropriate categories, randomly selects the stations to be sampled, and determines the number of receipts to be sampled monthly from each category. Finally, the program prints brief instructions to the coders along with the lists of stations to be sampled.

The sampling process for a given month cannot begin until 2 or 3 weeks into the following month because receipts must be mailed to the Department of State Police and filed. After the receipts are filed, those to be sampled are pulled from the files according to the instructions on the sampling list. Information to be keyed from the receipt includes type of receipt, date of inspection, vehicle make and body type, year built, odometer reading, inspection related charges, station number, an indication of "OK", "ADJUST", or "INSTALL", for each of the inspection items and whether or not this receipt has been previously edited.

It is the responsibility of those persons pulling the sample to translate vehicle make and type into appropriate codes as well as to indicate whether or not the receipt has been edited, while the data entry personnel are responsible for the determination of receipt type. (Refer to Appendix A for details relative to assigning codes and data entry.)

To reduce data entry errors and detect errors in the coding of the receipts by inspectors, the PMVI system edits the sampled receipts and produces a listing of those receipts with errors. This listing is sent to the persons pulling the sample and those receipts listed are then pulled from the files and reentered. Reentered receipts with errors will not appear on the edit listing

---

\*Stations that are currently active and have been in operation for the last 5 months of the year previous to the year being analyzed.

(unless the items are clearly coding or entry errors, e.g., month 13) as these errors are attributed to the inspector rather than to the coders or the data entry personnel. This procedure begins in late February or early March and continues monthly through January of the next year.

The sampled receipts are input to the edit program (PMVIED) to produce a file of sampled receipts that have successfully passed the edit tests, a file of receipts with source document errors (missing or incorrect information on the inspection receipt), and a report listing the receipts with errors. The edit program detects missing information, charges that are inappropriate for the defects indicated, and contradictions among receipt type, vehicle type, and vehicle make.

The file of source document errors (created by program PMVIED) is used as data for the source document error analysis program (PMVISD). This program produces a report showing types of errors and their frequency for all stations, while printing reports on specific stations that have greater than ten source document errors of any one type. This report can be used by State Police administrators to check the quality of inspection receipt recording.

The file of corrected and edited receipts (created by program PMVIED) is used as data for the auto/truck analysis program (PMVIAP). This analysis program produces a report showing the distribution of the auto/truck sample among the station categories, average charges for inspection and repair, and failure rates for inspection items for vehicles of different age and mileage categories. The analysis program (PMVIAP) also writes the trailer/motorcycle receipts to a file to be processed by the trailer/motorcycle analysis program (PMVITM). This report shows average charges and failure rates for the 15 categories of stations inspecting trailers and motorcycles. Interpretation for the various analysis reports will be discussed in a later section entitled "interpretation of PMVI Analysis Reports".

The file of corrected and edited receipts is also input for the outlier program (PMVIOT). The outlier program establishes average charges, average rates for defective vehicles, and average failure rates for each of the inspection items for each of the categories of stations issuing trailer/motorcycle receipts and for each of the categories of stations issuing regular receipts. Then the rates for each station in the sample are compared to the average for that station's category. A report is produced showing those stations that deviate greatly from the average for all stations of the same station category.

A description of how this system may be run on the Univac 1100 computer presently utilized by the Department of State Police

is provided in Appendix B. This appendix is designed to conform to the Department's operations standards and should closely approximate an operational runbook.

## COMPONENTS OF DATA COLLECTION AND ANALYSIS SYSTEM

The PMVI data collection and analysis system consists of manual procedures for sampling receipts and entering data along with computerized procedures for identifying, editing, and analyzing samples. The manual procedures are detailed in Appendix A. The computerized procedures, which include eight programs, are discussed below in the order of program usage. Source listings for these programs appear in Appendix C.

### Sampling List Program

The PMVI sampling list program (PMVISL) reads volume data from the previous calendar year (number of receipts issued monthly by each station) and produces instructions for sampling receipts in the form of a list of stations with the number of receipts to be sampled from each.

For example, the volume data from calendar year 1978 would be used to produce the list and instructions to be used for sampling receipts issued in 1979. Volume data for each station includes the station number, the station classification (see Table 1), the number of trailer/motorcycle approval receipts for each month, and the number of auto/truck approval receipts issued by that station each month. The program determines each station's average number of receipts issued per month (ignoring those months in which no receipts were issued). Separate averages are calculated for trailer/motorcycle receipts and for auto/truck receipts. These averages along with the station classification are used to assign the station to one of 9 categories for sampling auto/truck receipts and to 1 of 15 categories for sampling trailer/motorcycle receipts. A station in the private, small exemption, or unlimited classifications may issue auto/truck receipts and trailer/motorcycle receipts, while a station in the motorcycle or trailer classification may issue only trailer/motorcycle receipts.

Since the volume averages for trailer/motorcycle receipts and auto/truck receipts are calculated separately, a station could be assigned to different categories for sampling the two types of receipts.

The PMVISL program produces lists of the station numbers from each category in random order and instructions stating the number of receipts to be sampled monthly from each category. When a category contains more than 199 stations, only 199 are listed. When a category contains fewer than 24 stations, the list of numbers is repeated until at least 24 numbers are shown.

The numbers of approval and rejection receipts to be sampled from each category are determined by making the distribution of the sample the same as the distribution of the receipt volumes for the previous year. The sample size for a given strata is spread evenly throughout the 12 months.

This procedure is applied independently to both auto/truck and trailer/motorcycle receipt volumes. The rejection receipt sample distribution is determined by combining the volumes for auto/truck and trailer/motorcycle approval receipts and then applying a procedure similar to that used for approval receipt sampling. No rejection receipts are sampled from private stations since such stations do not issue rejection receipts.

For example, suppose that 36,000 approval receipts should be sampled statewide. If small exemption-low volume stations have accounted for 5.3% of the auto/truck receipts issued in the state during the previous year, then 5.3% of this year's 36,000 sampled receipts should come from small exemption-low volume stations. Therefore, 1,908 receipts (159 per month) should be sampled from these stations. The sampling list program then randomly selects stations that fall into the small exemption-low volume station category and prints a list of their station numbers with instructions for sampling 159 approval receipts each month. Similarly auto/truck and trailer/motorcycle volumes indicate that 5.5% of the rejection receipts sampled should come from the small exemption-low volume category. Thus, 23 rejection receipts are to be selected from this category each month. Figure 5 illustrates the sampling list for this example. It should be noted that this report provides space to enter the month and the number of receipts sampled. Details regarding the use of this form are provided in Appendix A.

This program also provides station category information to other system components through two reference files. A file containing all station numbers and classifications is used to produce volume worksheets for the current year. A second file containing category and type of receipts to be sampled for stations appearing on the sampling list is produced for use during the editing procedure.

INSTRUCTIONS: SAMPLE 159 APPROVAL RECEIPTS AND SAMPLE 23 REJECTION RECEIPTS FROM THIS LIST OF STATIONS FOR EACH MONTH IN THE ORDER LISTED.

ORDER	STATION NUMBER	APPROVAL SAMPLE MONTH	NUMBER OF RECEIPTS SAMPLED	REJECTION SAMPLE MONTH	NUMBER OF RECEIPTS SAMPLED
1	448				
2	2187				
3	3348				
4	1937				
5	3074				
6	3258				
7	1486				
8	1118				
9	3730				
10	3470				
11	2499				
12	3463				
13	3526				
14	1435				
15	1898				
16	2030				
17	2465				
18	918				
19	1962				
20	510				
21	2135				
22	3510				
23	2373				
24	702				

Figure 5. Example of sample listing.

### Volume Worksheet Program

The PMVI volume worksheet program (PMVIWK) reads the file of station numbers and classifications output by the sample list program and produces volume worksheets (Figure 6) for posting station volumes for the current year. Two sets of volume worksheets are printed; one for entering auto/truck approval receipt volumes and one for entering trailer/motorcycle approval receipt volumes. Each worksheet shows station numbers 1 through 5000 with the classification of each. Space is provided to enter the number of receipts issued monthly by each station.

### Edit Program

The PMVI edit program (PMVIED) checks the sampled inspection receipts for invalid data. Inspection receipts with no errors are written on a disk file of correct receipts while receipts with errors are listed on the Inspection Receipt Edit Report.

The program has 5 inputs as shown in Figure 7: the file of receipts to be edited; the file of previously edited receipts; the file of previously accumulated source document errors; the file of inspection station identification numbers and type; and a date card with the year sampled. Outputs of the program include a file with all receipts which have passed the edit (these are appended to the file of correct receipts from previous edit runs), a file with all source document errors (also appended to those from previous runs), and a listing of receipts with errors for use by the coding staff.

Receipts on this listing are pulled from the files again and resubmitted to the edit program. Resubmitted receipts with no errors are written on the disk file of edited receipts, while resubmitted receipts with errors or missing data are written on a disk file of Source Document Errors. If these errors are only in reference to mileage, year built, or charges, then the receipt data will be written to the disk file of correct edited receipts for use in the analysis and written to the disk file of source document error receipts. Errors in relation to the charges are resolved by applying standard charges while mileage and year built errors are resolved by setting these fields to zero. Errors in type of inspection receipt, inspection items, or codes for make, or type, or month, can only be coding or data entry errors. Records with these errors are written only on the Inspection Receipt Edit Report.



APPROVAL RECEIPT VOLUME WORKSHEET

VERMONT STATE POLICE

STATION NUMBER	TYPE	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	UNLIMITED												
2	PRIVATE												
3	UNLIMITED												
4	UNLIMITED												
5	UNLIMITED												
6													
7	UNLIMITED												
8	SMALL EXEMPT												
9	SMALL EXEMPT												
10													
11	UNLIMITED												
12	UNLIMITED												
13	PRIVATE												
14	UNLIMITED												
15	UNLIMITED												
16	SMALL EXEMPT												
17	UNLIMITED												
18	SMALL EXEMPT												
19	UNLIMITED												
20	UNLIMITED												
21	UNLIMITED												
22	SMALL EXEMPT												
23	SMALL EXEMPT												
24	SEE T/M LIST												
25	SMALL EXEMPT												
26	SEE T/M LIST												
27													

Figure 6. Example of inspection station volume worksheet.

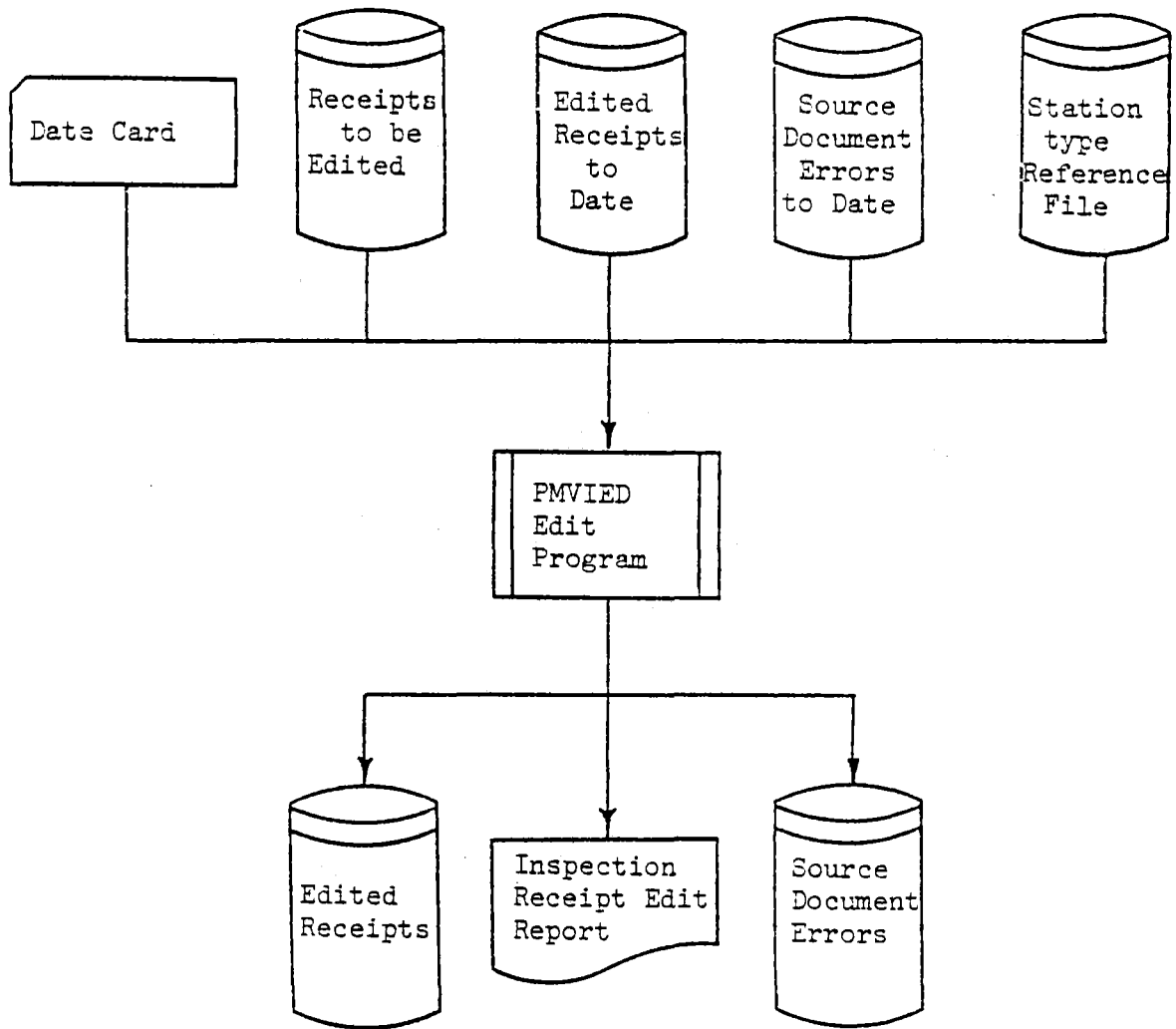


Figure 7. Edit program system flowchart.

## Receipt Edit Report

The edit program appends four fields to each receipt record written to the disk files. These fields are marked to indicate (1) the inspection station category, (2) defective or nondefective vehicle, (3) foreign or domestic vehicle, and (4) types of source document errors.

The inspection receipt data are edited as follows:

Type of Receipt (col. 1, Make (cols.9,10), and Body Type (cols. 11,12) - These three fields are compared to ensure that they do not have conflicting information. First, each of the three fields is checked to make sure it has a valid code. If any one field is in error, then all three are flagged as errors on the report. If all have valid codes, then receipt type and body type are checked. If receipt type is trailer/motorcycle, then body type must be a trailer or a motorcycle. If body type is trailer, any make is valid. Motorcycles, passenger cars, trucks and buses are checked for plausible make codes. For example, a GMC motorcycle would not be a plausible combination of body type and make and would be flagged as an error in all three fields.

Recoded (col. 2) - Any input for the recoded field is valid. Zero or blank will be interpreted as a receipt being edited for the first time. Any other input indicates a receipt being edited for the second time.

Date (col. 3-8) - Month must be from 1 to 12.

Year Built (cols. 13, 14) - Year built must be greater than 9 and less than or equal to the year on the date card plus 1. For example, for the 1975 sample, year built must be from 10 to 76.

Odometer Reading (cols. 15-19) - The odometer reading must be greater than zero.

Charges (cols. 20-24) - For a nondefective vehicle, or a rejected vehicle, charges must equal the standard charge for inspection. For a defective vehicle, charges must be greater than the standard charge.

Station Number (cols. 25-28) - The station number must have a corresponding entry in the reference file of station numbers. Station number and receipt type are flagged as errors if the type of receipt does not agree with the allowable vehicle types as noted on the reference file of station numbers (e.g., a trailer/motorcycle receipt from a station that appears only on the auto/truck sampling list).

Inspection Items (cols. 29-46) — Each item entered as zero or blank is interpreted as nondefective. Items entered with a value greater than zero are deemed "defective". A receipt record with one or more defective items is marked defective. A rejection receipt having no defective inspection items will appear on the edit listing with the receipt type and inspection item fields flagged. Inappropriate defective items for trailers (i.e., headlights, mirror, horn, exhaust system, glazing, fuel system) are considered to be in error.

The Inspection Receipt Edit Report shows the following fields for each record with errors as shown in Figure 8: date, make, type, year built, odometer reading, charges, station number, station type, receipt type, recoded, and inspection items. An asterisk appears above those fields in error. The edit program also produces a summary line with each set of data indicating the number of records read, the number of records with source document errors, the number of records with no errors, the number of records with standard charge inserted or with mileage zero filled, and the number of records with errors on the Inspection Receipt Edit Report.

After all the coded receipts have been edited, the source document error file is used as input to the source document error program and the file of edited receipts is used as input to the PMVI analysis programs.

#### Sample Tabulation Program

The PMVI sample tabulation program (PMVITB) provides a method of monitoring the sample distribution by strata (Figure 9) and, by including a data card with the word station in the first 7 columns, a listing of the number of receipts sampled (auto/truck and trailer/motorcycle approvals and rejections) from each station and the date of the receipts (Figure 10). This optional station listing is valuable for quality control verification of the sampling procedure. This program is provided for the convenience of the program evaluation administration and should be run whenever deemed necessary.

DATE	MAKE	YEAR BUILT	ODOMETER READING	CHARGES	STATION NUMBER	STATION TYPE	RECEIPT TYPE	RECORDED	INSPECTION ITEMS
08/22/78	62	74	7784	4.00	0998	02	REGULAR	NO	000000000000000000
08/22/78	62	71	71243	4.00	1017	03	REGULAR	NO	000000000000000000
14/27/78	62	70	68491	51.80	1021	05	TRL/MC	NO	102000010000000000
12/06/78	62	76	09982	9.25	1021	05	TRL/MC	NO	000000000000000000
12/ /78	35	79	9X423	4.00	1078	00	REGULAR	NO	000000000000001000
06/17/77	33	80	00010	4.00	1149	06	REGULAR	NO	000000000000000000
01/11/78	32	00	00000	4.00	1149	06	REJECT	NO	000000000000000000
02/11/78	11	61	98286	0.00	1871	08	REGULAR	NO	000000000000000000
06/17/78	54	72	60024	223.27	2221	06	REGULAR	NO	110110000000000000
06/17/78	26	74	49807	4.26	2221	06	6	YES	000100111000000000
07/28/78	26	73	58729	4.00	2316	00	REGULAR	NO	000000000000000000
08/24/78	71	78	00182	4.00	2316	00	REGULAR	NO	000000000000000000
08/29/78	62	78	00993	4.00	2333	00	TRL/MC	NO	000000000000000000
10/17/78	62	70	22881	4.00	2334	00	TRL/MC	NO	000000000000000000
11/11/78	62	69	12068	4.00	2376	00	TRL/MC	NO	000000000000000000
11/11/78	62	69	12068	4.00	2376	00	TRL/MC	NO	000000000000000000
12/30/78	62	77	00000	4.00	2411	00	REGULAR	NO	000000000000000000
12/30/78	62	77	00000	4.00	2411	00	REGULAR	NO	000000000000000000
12/30/78	23	14	02123	4.00	2506	00	REGULAR	NO	000000000000000000
12/30/78	14	05	21326	4.00	2506	00	REGULAR	NO	000000000000000000
12/30/78	23	14	02123	4.00	2506	00	REGULAR	NO	000000000000000000
12/30/78	14	05	21326	4.00	2506	00	REGULAR	NO	000000000000000000
06/29/78	58	32	68912	4.00	2510	00	REGULAR	NO	000000000000000000
06/29/78	58	32	68912	4.00	2510	00	REGULAR	NO	000000000000000000
04/29/78	29	01	21312	4.00	2618	00	REJECT	NO	000000000100000000
04/29/78	29	01	21312	4.00	2618	00	REJECT	NO	000000000100000000

Figure 8. Inspection receipt edit report.

	AUTO/TRUCK RECEIPTS		TRAILER/MOTORCYCLE RECEIPTS	
	APPROVALS	REJECTIONS	APPROVALS	REJECTIONS
PRIVATE - LOW	80	0	48	0
PRIVATE - MEDIUM	60	0	42	0
PRIVATE - HIGH	60	0	48	0
SMALL EXEMPT - LOW	80	50	36	9
SMALL EXEMPT - MEDIUM	80	56	42	8
SMALL EXEMPT - HIGH	80	41	0	0
UNLIMITED - LOW	80	38	48	5
UNLIMITED - MEDIUM	80	44	42	9
UNLIMITED - HIGH	80	50	42	9
MOTORCYCLE - LOW	0	0	42	6
MOTORCYCLE - MEDIUM	0	0	36	9
MOTORCYCLE - HIGH	0	0	36	2
TRAILER - LOW	0	0	42	2
TRAILER - MEDIUM	0	0	30	6
TRAILER - HIGH	0	0	12	6
TOTAL	680	279	546	71

Figure 9. Sample distribution by strata report.

STATION NUMBER	STATION TYPE	RECEIPT TYPE	MONTH	APPROVALS	REJECTIONS
81	PRIVATE - LOW	AUTO/TRUCK	FEBRUARY	5	0
81	PRIVATE - MEDIUM	TRAILER/MOTORCYCLE	FEBRUARY	7	0
81	PRIVATE - LOW	AUTO/TRUCK	APRIL	10	0
81	PRIVATE - LOW	AUTO/TRUCK	SEPTEMBER	5	0
81	PRIVATE - MEDIUM	TRAILER/MOTORCYCLE	SEPTEMBER	7	0
97	SMALL EXEMPT - MEDIUM	AUTO/TRUCK	APRIL	5	3
97	SMALL EXEMPT - MEDIUM	AUTO/TRUCK	JUNE	10	6
97	SMALL EXEMPT - MEDIUM	AUTO/TRUCK	NOVEMBER	5	3
101	PRIVATE - MEDIUM	AUTO/TRUCK	MARCH	5	0
101	PRIVATE - LOW	TRAILER/MOTORCYCLE	MARCH	8	0
101	PRIVATE - MEDIUM	AUTO/TRUCK	MAY	10	0
101	PRIVATE - MEDIUM	AUTO/TRUCK	OCTOBER	5	0
101	PRIVATE - LOW	TRAILER/MOTORCYCLE	OCTOBER	8	0
115	PRIVATE - LOW	AUTO/TRUCK	FEBRUARY	5	0
115	PRIVATE - LOW	AUTO/TRUCK	APRIL	10	0
115	PRIVATE - LOW	AUTO/TRUCK	SEPTEMBER	5	0
121	SMALL EXEMPT - LOW	AUTO/TRUCK	JANUARY	5	2
121	SMALL EXEMPT - LOW	AUTO/TRUCK	MARCH	10	6
121	SMALL EXEMPT - LOW	AUTO/TRUCK	AUGUST	5	2
131	SMALL EXEMPT - MEDIUM	AUTO/TRUCK	APRIL	5	3
131	SMALL EXEMPT - MEDIUM	AUTO/TRUCK	JUNE	10	6
131	SMALL EXEMPT - MEDIUM	AUTO/TRUCK	NOVEMBER	5	3
156	PRIVATE - MEDIUM	AUTO/TRUCK	MARCH	5	0
156	PRIVATE - LOW	TRAILER/MOTORCYCLE	MARCH	8	0
156	PRIVATE - MEDIUM	AUTO/TRUCK	MAY	10	0
156	PRIVATE - MEDIUM	AUTO/TRUCK	OCTOBER	5	0
156	PRIVATE - LOW	TRAILER/MOTORCYCLE	OCTOBER	8	0

Figure 10. An example of sample distribution by station number and date report.

2025

### Source Document Error Program

The PMVI source document error program (PMVISD) reads the file of source document errors and produces a report showing for each station the number of receipts with errors in date, make/type, mileage, year built, charges on nondefective vehicles, charges on defective vehicles, and the total number of receipts with errors. An example of this report appears in Figure 11. If make and type do not match, the error cannot be attributed to just make or just type. Because of this close relationship, make and type are combined as one category for the report. For practical purposes only those stations with 10 or more errors in one of the categories are included in this report.

### Auto/Truck Analysis Program

The PMVI auto/truck analysis program (PMVIAP) reads the file of edited receipts and produces the final report for auto/truck receipts and a file containing only the trailer/motorcycle receipts for input to the trailer/motorcycle analysis program. Each auto/truck receipt is analyzed by incrementing those table entries appropriate for the values contained on the receipt. This process continues until all receipts have been read. After all the receipts have been processed, tables are produced which report such items as (1) total number of vehicles sampled and percent defective by type of vehicle and by station category; (2) percentage of each type of defect and the average cost of inspection and repair, again by vehicle type and station category; and (3) similar information by the age of the vehicle, the mileage at the time of inspection, and the model type. These reports will be discussed in detail in the next section of this document.

### Trailer/Motorcycle Analysis Program

The trailer/motorcycle analysis program (PMVITM) reads the file of trailer/motorcycle receipts and produces a summary report. The report outlines the types of defects detected and average cost of inspection and repair for trailers, motorcycles, and trailers and motorcycles combined. These data are provided for the whole state and for each of the 15 station categories which issue trailer/motorcycle receipts.

### Station Outlier Program

The PMVI station outlier program (PMVIOT) reads the file of edited receipts, establishes evaluation standards, and compares individual station performance to these standards. The section of this report entitled "Station Evaluation Procedure" provides a detailed explanation of the use of this program.



1978 SOURCE DOCUMENT ERROR REPORT

NOTE: NUMBER OF RECEIPTS WITH ERRORS IN THESE CATEGORIES FOR STATIONS WITH 10 OR MORE ERRORS IN ANY ONE CATEGORY

STATION NUMBER	DATE	MAKE/TYPE	MILEAGE	YEAR BUILT	NONDEFECTIVE VEHICLE CHARGES	DEFECTIVE VEHICLE CHARGES	NUMBER OF RECEIPTS WITH ERRORS
701	2	1	17	4	4	2	17
750	4	3	4	1	2	16	16
784	3	3	19	5	2	5	19
814	2	2	3	2	10	1	10
863	2	18	3	3	3	4	18
893	1	1	10	2	3	1	10
931	18	4	1	2	7	2	18
947	1	2	3	3	14	4	14
993	1	1	19	3	3	6	19
1009	3	2	15	4	1	4	15
1012	1	0	3	3	1	12	12
1015	2	12	3	1	1	2	12
1018	1	1	3	13	3	3	13
1063	3	3	2	4	2	17	17
1066	2	15	2	2	4	2	15
1080	2	1	3	0	12	4	12
1097	6	16	1	2	1	5	16
1137	3	0	2	3	10	1	10
1158	3	3	3	15	4	1	15
1168	2	3	15	0	7	1	15
ALL STATIONS	160	231	237	172	245	213	703

Figure 11. Source document error report.

## INTERPRETATION OF PMVI ANALYSIS REPORTS

While all of the programs written for inclusion in the management evaluation system are essential to the operation of the system, the final analysis reports provide the most useful management data. For this reason, a guide to the exact interpretation of each part of these reports is provided below. The examples in Figures 12 — 20 are taken from fictitious data and are presented only to illustrate the form of the reports.

Auto/Truck Analysis Report

- Part 1: The first ten pages of this analysis program output show the outcome of inspection for each of the 9 inspection station categories (based on volume and type of inspection performed) and for the state as a whole. When a vehicle is inspected, there are three possible outcomes: (1) the vehicle passes inspection with no defects, (2) the vehicle is found to be defective but is repaired and thus passes inspection, or (3) the vehicle is found to be defective, is not immediately repaired, and is rejected. As shown in Figure 12, the first part of the PMVI analysis report outlines the number of vehicles sampled in each vehicle type, the number defective (where "defective" includes both vehicles repaired and those rejected), and the percentage of that vehicle type which was defective. For instance, as seen in the first line of Figure 12, a total of 98 domestic passenger car inspections were included in the sample; of those, 28, or 28.6%, were found to be defective in some way. Ten of these tables appear in this section of the report; one covering statewide totals as shown in Figure 12, and one for each station type.
- Part 2: The next ten pages of the report outline the types of defects detected for each of the five vehicle types (passenger vehicles, trucks, school buses, commercial buses, and all vehicles) and each of the 9 station types as shown in Figure 13. For each vehicle type, the report supplies the total number sampled, the number rejected, the number and percentage defective, and the cost per vehicle inspected and cost per defective vehicle repaired. For instance, as seen in column 1 of Figure 13, 353 passenger vehicle inspections were included in the sample, and 138, or 39.1% of these were found to be defective in some way. The average cost of an inspection (plus any needed repairs) was \$4.14 per vehicle and \$6.58 per repaired vehicle. Experience suggests that charges are not accurately recorded and consequently average cost figures are of limited value.

STATEWIDE SAMPLE DISTRIBUTION BY VEHICLE TYPE

VEHICLE TYPE	NUMBER SAMPLED	NUMBER DEFECTIVE	PERCENT DEFECTIVE
PASSENGER CARS			
DOMESTIC	98	28	28.57
FOREIGN	255	110	43.13
TOTAL	353	138	39.09
TRUCKS			
PICKUP, VAN, PANEL	363	150	41.32
TRACTOR TRUCKS	48	18	37.50
OTHER	0	0	0.00
TOTAL	411	168	40.87
BUSES			
SCHOOL	119	83	69.74
COMMERCIAL	76	8	10.52
TRAILERS	299	77	25.75
MOTORCYCLES	318	134	42.13
ALL VEHICLES	1,576	608	38.57

Figure 12. An example of the final analysis report for a statewide sample distribution.

2929

2330

STATEWIDE PERCENTAGE DEFECTS BY VEHICLE TYPE

	PASSENGER VEHICLES	TRUCKS	SCHOOL BUSES	COMMERCIAL BUSES	ALL VEHICLES
NUMBER SAMPLED	353	411	119	76	959
NUMBER REJECTED	118	88	73	0	279
NUMBER DEFECTIVE	138	168	83	8	397
PERCENT DEFECTIVE	39.09	40.87	69.74	10.52	41.39
COST PER VEHICLE INSPECTED	\$4.14	\$4.57	\$4.14	\$4.20	\$4.33
COST PER VEHICLE REPAIRED	\$6.58	\$6.92	\$5.68	\$5.93	\$6.69
-----					
DEFECT					
BRAKES	2.89	2.97	2.40	0.00	2.77
HEADLIGHTS	0.72	0.59	0.00	0.00	0.50
OTHER LIGHTS	3.62	3.57	2.40	0.00	3.27
SIGNAL LIGHTS	18.11	19.64	25.30	25.00	20.40
HORN	16.66	19.04	14.45	25.00	17.38
STEERING	18.11	19.64	16.86	50.00	19.14
MIRROR	16.66	22.02	15.66	12.50	18.63
WINDSHIELD	16.66	23.21	16.86	37.50	19.89
OTHER GLASS	16.66	20.23	30.12	0.00	20.65
WINDSHIELD WIPER	1.44	2.38	4.81	0.00	2.51
TAG MOUNTING	2.17	0.00	0.00	0.00	0.75
EXHAUST SYSTEM	3.62	0.00	9.63	0.00	3.27
TIRES	4.34	2.97	2.40	0.00	3.27
SEAT BELTS	7.24	4.16	0.00	0.00	4.28
HOOD LATCH	2.17	0.00	0.00	0.00	0.75
FUEL SYSTEM	2.89	0.00	4.81	0.00	2.01
DOORS	2.17	2.97	0.00	0.00	2.01
EMISSION CONTROL	2.89	3.57	0.00	0.00	2.51

Figure 13. An example of percentage defects by vehicle type reports.

On the lower portion of the page, the percentages of vehicles by defect type are noted. For instance, 2.9% of all passenger vehicles failing inspection were judged to have defective brakes. Also, about 0.7% of the defective passenger vehicles had defective headlights. It should be noted that since it is possible to fail inspection due to more than one defect, a particular vehicle inspection may appear in this lower table more than once. Ten of these tables are presented in this section; one for statewide totals (Figure 13) and one for each of the 9 station types.

Part 3: The next eight pages of the report describe the types of defects detected for each of the 5 vehicle types and for each of eight model year categories (Figure 14). The format of these tables is identical to those presented in part 2 of the report, with information on the percentage and cost of defects being in the upper portion of the table and a breakdown of the types of defects detected in the lower portion of the table. For instance, the first column of Figure 14 indicates that of the 25 1976 model passenger vehicles inspected, 8, or 32.0%, were defective. The average cost per vehicle was \$4.12, while the cost per defective vehicle repaired was \$7.12. Of the 1976 model passenger cars inspected, 0.0% were found to have defective brakes, and 25.0% were found to have defective signal lights. There are eight of these tables in this section. For the 1975 sample there would be one each for vehicles built in 1976, 1975, 1974, 1973, 1971-72, 1967-70, 1963-66, and 1900-62. Receipts with year built missing will not be included in this report.

Part 4: As seen in Figure 15, the next seven pages of the report describe the type of defects detected for each vehicle type and for each mileage category. Again, the format of the table is identical to the formats in parts 2 and 3. For instance, as shown in column 1 of Figure 15, of the 25 passenger vehicles inspected with 20,000 to 29,999 miles on the odometer, 7, or 28.0%, were defective. The average cost of inspection per passenger vehicle was \$4.04 and the cost per defective passenger vehicle was \$5.06. Of all of these passenger vehicles failing inspection, 14.3% were judged to have defective brakes, 0.0% were judged to have defective headlights, and so forth. Receipts with zero mileage will not be included in the mileage report.

2022

STATEWIDE PERCENTAGE DEFECTS FOR VEHICLES  
BUILT IN 1976

	PASSENGER VEHICLES	TRUCKS	SCHOOL BUSES	COMMERCIAL BUSES	ALL VEHICLES
NUMBER SAMPLED	25	34	0	3	62
NUMBER REJECTED	7	0	0	0	7
NUMBER DEFECTIVE	8	16	0	0	24
PERCENT DEFECTIVE	32.00	47.05	0.00	0.00	38.70
COST PER VEHICLE INSPECTED	\$4.12	\$5.17	\$0.00	\$4.00	\$4.69
COST PER VEHICLE REPAIRED	\$7.12	\$6.49	\$0.00	\$0.00	\$6.52
DEFECT					
BRAKES	0.00	0.00	0.00	0.00	0.00
HEADLIGHTS	0.00	0.00	0.00	0.00	0.00
OTHER LIGHTS	0.00	0.00	0.00	0.00	0.00
SIGNAL LIGHTS	25.00	37.50	0.00	0.00	33.33
HORN	37.50	18.75	0.00	0.00	25.00
STEERING	0.00	37.50	0.00	0.00	25.00
MIRROR	12.50	31.25	0.00	0.00	25.00
WINDSHIELD	0.00	12.50	0.00	0.00	8.33
OTHER GLASS	0.00	12.50	0.00	0.00	8.33
WINDSHIELD WIPER	12.50	0.00	0.00	0.00	4.16
TAG MOUNTING	0.00	0.00	0.00	0.00	0.00
EXHAUST SYSTEM	0.00	0.00	0.00	0.00	0.00
TIRES	25.00	0.00	0.00	0.00	8.33
SEAT BELTS	0.00	12.50	0.00	0.00	8.33
HOOD LATCH	12.50	0.00	0.00	0.00	4.16
FUEL SYSTEM	0.00	0.00	0.00	0.00	0.00
DOORS	0.00	0.00	0.00	0.00	0.00
EMISSION CONTROL	12.50	0.00	0.00	0.00	4.16

Figure 14. An example of percentage defects by vehicle type and year built reports.

STATEWIDE PERCENTAGE DEFECTS FOR VEHICLES  
WITH MILEAGE FROM 20,000 TO 29,999

	PASSENGER VEHICLES -----	TRUCKS -----	SCHOOL BUSES -----	COMMERCIAL BUSES -----	ALL VEHICLES -----
NUMBER SAMPLED	25	50	26	14	115
NUMBER REJECTED	6	15	18	0	39
NUMBER DEFECTIVE	7	24	22	4	57
PERCENT DEFECTIVE	28.00	48.00	84.61	28.57	49.56
COST PER VEHICLE INSPECTED	\$4.04	\$4.61	\$4.27	\$4.55	\$4.40
COST PER VEHICLE REPAIRED	\$5.06	\$7.39	\$5.76	\$5.93	\$6.57
DEFECT					
BRAKES	14.28	4.16	0.00	0.00	3.50
HEADLIGHTS	0.00	4.16	0.00	0.00	1.75
OTHER LIGHTS	0.00	8.33	0.00	0.00	3.50
SIGNAL LIGHTS	14.28	8.33	45.45	25.00	24.56
HORN	0.00	25.00	36.36	0.00	24.56
STEERING	0.00	29.16	9.09	75.00	21.05
MIRROR	14.28	8.33	4.54	25.00	8.77
WINDSHIELD	42.85	20.83	9.09	0.00	17.54
OTHER GLASS	0.00	33.33	31.81	0.00	26.31
WINDSHIELD WIPER	0.00	0.00	0.00	0.00	0.00
TAG MOUNTING	0.00	0.00	0.00	0.00	0.00
EXHAUST SYSTEM	0.00	0.00	9.09	0.00	3.50
TIRES	0.00	0.00	0.00	0.00	0.00
SEAT BELTS	14.28	4.16	0.00	0.00	3.50
HOOD LATCH	0.00	0.00	0.00	0.00	0.00
FUEL SYSTEM	0.00	0.00	4.54	0.00	1.75
DOORS	0.00	0.00	0.00	0.00	0.00
EMISSION CONTROL	14.28	0.00	0.00	0.00	1.75

Figure 15. An example of percentage defects by vehicle type-mileage reports.

2033

Part 5: The last section of the report deals with the type of defects detected during inspection of foreign and domestic built vehicles. As shown in Figure 16, the format is identical to that used in previous sections. For instance, Figure 16 shows that 28, or 28.6%, of the 98 domestic passenger vehicles sampled were defective, the cost was \$4.12 per domestic passenger vehicle and \$7.12 per defective vehicle. About 7.1% of the domestic passenger vehicles failing inspection were found to have defective signal lights, and 17.8% were found to have a defective windshield. A similar table appears in the section dealing with foreign vehicles.

### Trailer/Motorcycle Analysis Report

This report outlines the types of defects detected and average inspection/repair costs for trailers, motorcycles, and trailers and motorcycles combined, for the whole state and for each of the 15 station categories which issue trailer/motorcycle receipts. Figure 17 shows the statewide report. For each vehicle type, the report shows the total number sampled, the number rejected, the number and percentage defective, the cost per vehicle inspected, and the cost per vehicle repaired. For instance, in Figure 17, 299 trailers were included in the sample, and 77, or 25.8%, of these were found to be defective. The average cost for all trailers inspected is \$4.61. The average cost for defective trailers that were repaired is \$6.70. Of the 77 defective trailers, 5.19% had defective brakes.

### STATION EVALUATION PROCEDURE

An important objective of the PMVI management evaluation system is to provide a method for identifying inspection stations that tend to be consistently either too severe or too lenient in the performance of the inspection procedure. These outlier stations are identified by establishing the inspection item failure rates for all stations sampled from a given station category and receipt type and comparing these values to those of individual stations in that category. The outlier program (PMVIOT) establishes the category failure rates and performs the individual station comparisons. The outlier program reads the file of correct receipts to establish station category failure rate standards and compares these standards to individual station failure rates. When a station is suspected of improper inspection procedures, a special sample can be pulled and the outlier program run in a second mode. In this mode the station or stations in question are compared to the previously established category standards and outliers are noted.



YEAR ENDING DECEMBER 31, 1978

STATEWIDE PERCENTAGE DEFECTS FOR DOMESTIC VEHICLES

	PASSENGER VEHICLES	TRUCKS	SCHOOL BUSES	COMMERCIAL BUSES	ALL VEHICLES
NUMBER SAMPLED	98	194	119	76	487
NUMBER REJECTED	24	50	73	0	147
NUMBER DEFECTIVE	28	87	83	8	206
PERCENT DEFECTIVE	28.57	44.84	69.74	10.52	42.29
COST PER VEHICLE INSPECTED	\$4.12	\$4.56	\$4.14	\$4.20	\$4.31
COST PER VEHICLE REPAIRED	\$7.12	\$6.94	\$5.68	\$5.93	\$6.60
DEFECT					
BRAKES	0.00	2.29	2.40	0.00	1.94
HEADLIGHTS	0.00	0.00	0.00	0.00	0.00
OTHER LIGHTS	0.00	4.59	2.40	0.00	2.91
SIGNAL LIGHTS	7.14	22.98	25.30	25.00	21.84
HORN	7.14	20.68	14.45	25.00	16.50
STEERING	7.14	13.79	16.86	50.00	15.53
MIRROR	21.42	27.58	15.66	12.50	21.35
WINDSHIELD	17.85	17.24	16.86	37.50	17.96
OTHER GLASS	10.71	22.98	30.12	0.00	23.30
WINDSHIELD WIPER	0.00	2.29	4.81	0.00	2.91
TAG MOUNTING	0.00	0.00	0.00	0.00	0.00
EXHAUST SYSTEM	0.00	0.00	9.63	0.00	3.88
TIRES	7.14	4.59	2.40	0.00	3.88
SEAT BELTS	21.42	4.59	0.00	0.00	4.85
HOOD LATCH	7.14	0.00	0.00	0.00	0.97
FUEL SYSTEM	0.00	0.00	4.81	0.00	1.94
DOORS	7.14	2.29	0.00	0.00	1.94
EMISSION CONTROL	7.14	2.29	0.00	0.00	1.94

Figure 16. An example of percentage defects by vehicle type and origin report.

2026

STATEWIDE PERCENTAGE DEFECTS BY VEHICLE TYPE

	TRAILERS	MOTORCYCLES	ALL VEHICLES
NUMBER SAMPLED	299	318	617
NUMBER REJECTED	9	62	71
NUMBER DEFECTIVE	77	134	211
PERCENT DEFECTIVE	25.75	42.13	34.19
COST PER VEHICLE INSPECTED	\$4.61	\$4.57	\$4.59
COST PER VEHICLE REPAIRED	\$6.70	\$6.54	\$6.62
DEFECT			
STEERING & SUSPENSION	5.19	4.47	4.73
BRAKES	5.19	4.47	4.73
HEADLIGHTS	0.00	2.98	1.89
STOP LIGHTS	15.58	9.70	11.84
TAIL LIGHTS	18.18	5.22	9.95
LICENSE LIGHTS	12.98	5.22	8.05
SIGNAL LIGHTS	19.48	21.64	20.85
OTHER LIGHTS	12.98	17.91	16.11
REFLECTORS	15.58	6.71	9.95
MIRROR	0.00	9.70	6.16
HORN	0.00	8.95	5.68
TAG MOUNTING	2.59	4.47	3.79
EXHAUST SYSTEM	0.00	1.49	0.94
TIRES	7.79	5.97	6.63
WHEELS	5.19	1.49	2.84
GLAZING	0.00	7.46	4.73
FUEL SYSTEM	0.00	4.47	2.84

Figure 17. An example of percentage defects reports for trailer/motorcycle receipts.

The category failure rate standard for each inspection item is the percentage of all receipts from that category with the item marked defective. These rates are also determined by station within each category. The station failure rates determine the standard deviation of the failure rates for inspection items. For each inspection item the lower and upper bounds are determined by subtracting and adding the standard deviation\* for that inspection item to the average rate for the station category. When the standards are determined, a report is produced showing the average, standard deviation, and upper and lower bounds for each inspection item and cost. Figure 18 illustrates this report for auto/truck receipts issued by small exemption-medium volume stations. Figure 18 shows that 62.5% of all auto/truck receipts represented defective vehicles. The standard deviation of percentages of defective vehicles for all small exemption-medium volume stations is 5.31, which results in a lower bound of 57.1% and an upper bound of 67.8%. Similarly, 13.9% of autos and trucks inspected by small exemption-medium volume stations had defective signal lights, and the average cost was \$4.52.

An additional function of the outlier program is to evaluate each station included in the sample by comparing the failure rates for each station to the standard.

The average rates and costs for each station are compared to the upper and lower bounds for that station's category. If all the rates for a station fall between the upper and lower bounds, then that station is considered to be similar to other stations in its category. If any rate for a station exceeds the upper bound or falls short of the lower bound, then that station may be suspect in its treatment of that inspection item. A report is produced showing that station's failure rates compared to the standard rates for all stations from the same category.

Figure 19 shows this report for small exemption-medium volume station number 163. The upper and lower bounds columns in Figure 19 are the bounds from the standards of Figure 18.

---

\*Assuming a normal distribution of failure rates, these bounds include 68.3% of the stations sampled. This restrictive bound may result in an excessive number of stations being cited for review. Experience may dictate relaxing these bounds by using 1.5 standard deviations (86.6%) or 2.0 standard deviations (95.4%).

## DEFECT ANALYSIS:

	LOWER BOUND	FAILURE RATE	UPPER BOUND	STANDARD DEVIATION
DEFECTIVE VEHICLE	57.1	62.5	67.8	5.31
BRAKES	0.0	0.7	1.9	1.24
HEADLIGHTS	0.0	0.0	0.0	0.00
OTHER LIGHTS	0.0	0.7	1.9	1.24
SIGNAL LIGHTS	6.6	13.9	21.2	7.31
HORN	7.4	14.7	21.9	7.23
STEERING	2.5	15.4	28.2	12.85
MIRROR	1.6	11.0	20.3	9.33
WINDSHIELD	1.1	15.4	29.7	14.29
OTHER GLASS	4.0	10.2	16.5	6.25
WINDSHIELD WIPER	0.0	0.0	0.0	0.00
TAG MOUNTING	0.0	0.7	1.9	1.24
EXHAUST LINE	0.0	4.4	11.9	7.50
TIRES	0.0	4.4	11.9	7.50
SEAT BELTS	0.0	2.2	5.9	3.74
HOOD LATCH	0.0	0.0	0.0	0.00
FUEL SYSTEM	0.0	0.0	0.0	0.00
DOORS	0.0	0.0	0.0	0.00
EMISSION CONTROL	0.0	0.7	1.9	1.24

## COST ANALYSIS:

	LOWER BOUND	AVERAGE COST	UPPER BOUND	STANDARD DEVIATION
DEFECTIVE	4.73	4.83	4.93	0.10
NONDEFECTIVE	4.00	4.00	4.00	0.00
ALL VEHICLES	4.52	4.52	4.52	0.00

Figure 18. An example of the failure rate report.

STATION NUMBER 163  
 RECEIPTS SAMPLED 40

SMALL EXEMPTION MEDIUM VOLUME

1978 SAMPLE  
 REGULAR RECEIPTS

DEFECT ANALYSIS:

	LOWER BOUND	FAILURE RATE	UPPER BOUND	DEVIATION
DEFECTIVE VEHICLE	57.1	70.0	67.8	+ 2.19
BRAKES	0.0	2.5	1.9	+ .53
HEADLIGHTS	0.0	0.0	0.0	
OTHER LIGHTS	0.0	2.5	1.9	+ .53
SIGNAL LIGHTS	6.6	10.0	21.2	
HORN	7.4	10.0	21.9	
STEERING	2.5	0.0	28.2	- 2.59
MIRROR	1.6	0.0	20.3	- 1.69
WINDSHIELD	1.1	0.0	29.7	- 1.15
OTHER GLASS	4.0	2.5	16.5	- 1.54
WINDSHIELD WIPER	0.0	0.0	0.0	
TAG MOUNTING	0.0	2.5	1.9	+ .53
EXHAUST LINE	0.0	15.0	11.9	+ 3.09
TIRES	0.0	15.0	11.9	+ 3.09
SEAT BELTS	0.0	7.5	5.9	+ 1.56
HOOD LATCH	0.0	0.0	0.0	
FUEL SYSTEM	0.0	0.0	0.0	
DOORS	0.0	0.0	0.0	
EMISSION CONTROL	0.0	2.5	1.9	+ .53

COST ANALYSIS:

	LOWER BOUND	AVERAGE COST	UPPER BOUND	DEVIATION
DEFECTIVE	4.73	4.67	4.93	- .06
NONDEFECTIVE	4.00	4.00	4.00	
ALL VEHICLES	4.52	4.47	4.52	- .05

2239

Figure 19. An example of the outlier station report.

If the failure rate for an inspection item lies outside the bounds established for that item, the magnitude of the deviation from its bound is noted under the column headed "DEVIATION". Additionally, "AVERAGE COST" is the average cost for vehicles inspected at station number 163. Upper and lower bounds for inspection costs are established in a manner similar to that used for failure rates.

The number of receipts used to determine the failure rates for a station is printed (Figure 19) since not all stations are equally represented. Administrators should use caution in making judgements concerning suspect stations that are underrepresented. In general, those stations that greatly exceed the bounds and are strongly represented (large number of receipts) warrant further investigation. For these stations, additional receipts, representing several months, should be pulled, edited, and input to the outlier program run in the second mode. If the bounds continue to be exceeded, it can be concluded that these stations are not inspecting the items noted in a manner consistent with stations of the same category.

#### CONCLUSIONS AND RECOMMENDATIONS

The PMVI evaluation system described in this report provides not only a great deal of the information needed to generate the required annual National Highway Traffic Safety Administration (NHTSA) report on motor vehicle inspection, it provides a method for applying an adjustable criterion for identifying stations that have a high probability of practicing improper inspection procedures. The auto/truck and trailer/motorcycle analysis reports to a great extent fulfill the data requirements of the NHTSA reports, while the station outlier report provides a method of analyzing the performance of an individual station.

The present system could be further enhanced through implementation of a method to positively identify the mechanic performing the inspection. The receipts presently used (Figures 1 and 2) have provisions for an inspector's name which, due to poor penmanship, has proved to be of little use for identifying the inspector. A more reliable identification technique involves an inspector authorization number that can be cross-referenced to the mechanic's name. The combination of inspector number and signature provides both positive identification of the inspector and legal responsibility for the inspection.

The inspector number lends itself readily to machine processing and could be added to the list of data items presently being coded from the sampled receipts. As part of the PMVI evaluation system, the inspector number could be used to establish the inspector's authorization to inspect at the station\* indicated; to determine whether a particular inspector is consistently improperly preparing the receipts; and if the inspector is finding an abnormally high or low number of defective items.

The implementation of the use of the inspector number has been initiated by assigning numbers to the inspectors and instructing them to enter this number along with their signature on the inspector line of the receipts. This new data item will not be available to the system until the 1979 receipts are to be analyzed. For this reason, the system described in this report does not reflect the program changes necessary to benefit from these data. Only minor changes to each of the programs are needed to accept the longer record and only slight modifications to the logic of the PMVIED, PMVISD, and PMVIOT programs are needed to provide the aforementioned inspector related benefits.

All major classes of stations (Table 1), except for large exemption, are represented in the PMVI evaluation system. Large exemption stations are not included since they represent only 0.3% of the total number of receipts issued each year. Due to this small volume, it would be difficult to make a statistically meaningful statement regarding station performance. It would be more appropriate to manually examine these stations on a periodic basis.

Presently, many vehicles registered in Virginia have exceeded the 100,000-mile capacity of the standard odometer. Although laws governing automobile sales guarantee an accurate historical record of vehicle miles traveled, this information is not readily available to the inspector. As a result, inspectors seldom record an odometer reading greater than 99,999 miles. Since vehicle mileage, not odometer reading, is the data item of interest, this should be emphasized to the inspector and a method should be devised to provide this information for the inspector.

Presently, similar rejection receipts are used for both auto/truck and trailer/motorcycle rejections. Exclusive use of this style receipt poses several problems. The absence of both vehicle type and year built in the data entry area of the receipt

---

\*This implies the inspector history records are computerized.

severely limits the usefulness of these receipts for computer analysis. Although the inspectors have been trained to provide this information, it is doubtful that these data will be entered reliably until the form is modified. When used for trailer/motorcycle purposes, the rejection item list is incomplete and inappropriate. An additional trailer/motorcycle related issue is that the rejection sticker is designed for front adhesion, while the trailer/motorcycle stickers use back adhesion. These trailer/motorcycle incompatibilities suggest that two different rejection receipt configurations would be desirable.

Consideration should be given to requesting document-handling systems analysis of the PMVI receipt disbursement and filing areas. The present operation was devised several years ago when receipt volumes were small enough to make a manual system practical. Current annual receipt volumes, exceeding 6 million, have resulted in an unmanageable amount of manual document processing. The PMVI clerical group is responsible for distributing the many kinds of receipts to the over 3,000 inspection stations on an as-needed basis, maintaining complete files of all Virginia inspections made over the past 3 years, searching these files for individual receipts at the request of field personnel (troopers), maintaining records as to number and type of receipts used by each station each month, and providing a random sample of receipts to be used as input to the evaluation system described in this report. The combination of a microfiche recording system for archival storage and retrieval, an enhanced manual filing system, and dynamic editing of sampled receipts as recommended in the report by Korf and Harris may provide the necessary relief.(2)



## ACKNOWLEDGMENTS

The authors express appreciation to the Virginia Department of State Police, in particular to Lieutenant Bernie Chisholm, Jack Williams, Marie Morano, and Tom O'Steen for cooperation and assistance in the development and implementation of the PMVI management system presented in this report. Thanks are also expressed to Jan Kennedy and Toni Thompson for typing the draft reports, and to Harry Craft, Jean Vanderberry, and Jerry Garrison for their respective roles of editing, typing, and duplicating the final manuscript.



## REFERENCES

1. Mitchell, Deborah, "A Management System for Evaluating the Virginia Periodic Motor Vehicle Inspection Program," Virginia Highway and Transportation Research Council, Charlottesville, Virginia, October 1977.
2. Korf, J. L., and Philip S. Harris, "A Management System for Evaluating the Virginia Periodic Motor Vehicle Inspection Program: Software Manual and Implementation Procedures," Virginia Highway and Transportation Research Council, Charlottesville, Virginia, May 1978.
3. Terry, R. M., Notes on Virginia's Official Motor Vehicle Inspection Program, Virginia State Police, Richmond, Virginia.
4. Motor Vehicle Inspection Program Activity Report — 1975. Commonwealth of Virginia, Department of State Police, Richmond, Virginia, February 19, 1976.



APPENDIX A  
CODING AND KEYING MANUAL

## APPENDIX A

## CODING AND KEYING MANUAL

The purpose of the manual is to show the coder how to select and code information from inspection receipts, as well as to serve as a guide for the data processing personnel in keying the information into the computer.

Coding and keying involve the following tasks: (1) selection of the proper inspection receipts, as indicated by the inspection sampling list; (2) coding of the information from selected receipts; and (3) typing the information into a key-disk machine for eventual processing by a computer.

Selection of Inspection Receipts

To assist the coders in selecting or "sampling" receipts, they will be given copies of an inspection sampling list. Lists will be provided for both trailer/motorcycle and auto/truck receipts. For example, the one shown on the next page is for auto/truck receipts. (The form they receive will not be filled in as this one is; they will have to fill it in as they go along.) This list shows how many auto/truck approval receipts to sample (in this case 16), how many rejection receipts to sample (in this case 3) and the identifying number of the station to be sampled. This example sampling list was a result of the following activities of a coder. The coder started by going to the file for the first station listed, Station Number 39, and took the first 16 receipts for January and coded them. Then the coder went to the file for Station Number 438 and took the first 16 receipts for February. For March, the coder took the first 16 receipts from the file for Station 2296. Then, the coder encountered a problem; Station 1260, the station for April, had a total of only 10 receipts. In order to obtain the other 6 April receipts needed to make a total of 16, the coder took 6 from the file for the next station, number 1371. Thus, for any given month, the coder may use as many stations as needed to obtain the desired number of receipts.

Similarly for the rejection receipts, the coder went to the January section of the file for the hundreds group (1-100) that includes Station 39, and took the first 3 receipts encountered for that station. Then the coder went to the file containing the February rejection receipts for Station 438 and found only 2. The remaining February rejection receipt was selected from station number 2296. This process continued until each of the 12 months were represented by 3 rejection receipts.

Trailer/motorcycle receipts are chosen using a sample listing and methodology similar to that shown for auto/truck receipts.

INSTRUCTIONS: SAMPLE 16 APPROVAL RECEIPTS AND SAMPLE 3 REJECTION RECEIPTS FROM THIS LIST OF STATIONS FOR EACH MONTH IN THE ORDER LISTED.

ORDER	STATION NUMBER	APPROVAL SAMPLE MONTH	NUMBER OF RECEIPTS SAMPLED	REJECTION SAMPLE MONTH	NUMBER OF RECEIPTS SAMPLED
1	39	JANUARY	16	JANUARY	3
2	438	FEBRUARY	16	FEBRUARY	2
3	2296	MARCH	16	FEBRUARY	1
4	1260	APRIL	10	MARCH	3
5	1371	APRIL	6	APRIL	3
6	2082	MAY	16	MAY	3
7	2824	JUNE	16	JUNE	3
8	1239	JULY	2	JULY	1
9	2821	JULY	3	JULY	2
10	1145	JULY	11	AUGUST	3
11	168	AUGUST	16	SEPTEMBER	3
12	1764	SEPTEMBER	8	OCTOBER	3
13	88	SEPTEMBER	8	NOVEMBER	3
14	112	OCTOBER	16	DECEMBER	3
15	1462	NOVEMBER	16		
16	1443	DECEMBER	16		
17	2012				
18	2335				
19	915				
20	2668				
21	465				
22	91				
23	861				
24	206				

Coding of Inspection Receipts

Once the receipts to be sampled have been selected, several items have to be coded directly onto the receipt to simplify the work of the data entry personnel. For two of these items, vehicle make and body type, the coder will need to refer to the codes on the next page to determine appropriate numbers to be written to the right of the make and body type entries. For the auto/truck receipt example below the coder found "Dodge" in the left column of the coding sheet area titled "Make of Vehicle" and then wrote "20", the code for "Dodge", on the receipt. The coder then found "Pickup" in the right column of the coding sheet area titled "Type of Vehicle" and then wrote "14", the code for pickup, on the receipt. This receipt is now ready for the data processing personnel.

Although rejection receipts do not show areas titled "Body Type" and "Year Built", the inspectors are required to enter this information. Body Type is entered to the right of the identification number while the year the vehicle was built is entered to the right of the vehicle make. As is done with the regular receipts and trailer/motorcycle receipts, the coders will need to assign the appropriate numerical codes to "Body Type" and "Make" as shown in the example on page A-6.

INSPECTION CERTIFICATION			FORM S.P. 131
VIRGINIA STATE POLICE			F 713401
Equipment Inspected	O.K.	Adjust	Insure
BRAKES			
HEADLIGHTS	✓		
OTHER LIGHTS	✓		
SIGNAL LIGHTS	✓		
HORN	✓		
STEERING	✓		
MIRROR			✓
WINDSHIELD	✓		
OTHER GLASS	✓		
WINDSHIELD WIPER	✓		
TAG MOUNTING	✓		
EXHAUST SYSTEM	✓		
TYPES	✓		
SEAT BELTS	✓		
HOOD LATCH	✓		
FUEL SYSTEM	✓		
DOORS	✓		
EMISSION CONTROL	✓		
DATE			FEBRUARY 11/4/77
LIC NO			225-679
MAKE			DODGE <sup>20</sup>
BODY TYPE			PICKUP <sup>14</sup>
YEAR BUILT			1976
ODOMETER READING			2,473
INSPECTION RELATED CHARGES \$			27.65
IDENTIFICATION NO. 2787MN1385			
EQP. REMOVED STA. NO. 32			
STATION NAME JOE'S SERVICE			
INSPECTOR Joe Smart			
THIS STICKER EXPIRES AUGUST 31 (Over)			

— Vehicle Make  
 — Type of Vehicle



MAKE OF VEHICLE

<u>Code</u>	<u>Make</u>	<u>Code</u>	<u>Make</u>
01	Other Domestic Make	32	Kawasaki
02	Other Foreign Make	33	Kenworth
03	AMC	34	Lincoln
04	Audi	35	Mack
05	Austin/Austin Healy	36	Mazda
06	Auto Car	37	Mercedes
07	Bluebird	38	Mercury
08	BMW	39	M.G.
09	Brockway	40	Norton
10	B.S.A.	41	Oldsmobile
11	Buick	42	Opel
12	Cadillac	43	Peterbilt
13	Capri	44	Peugeot
14	Chevrolet	45	Plymouth
15	Chrysler	46	Porsche
16	Colt	47	Pontiac
17	Datsun	48	Renault
18	Diamond Reo	49	Rolls Royce
19	Diamond T	50	Saab
20	Dodge	51	Simca
21	Fiat	52	Studebaker
22	Fiesta	53	Subaru
23	Ford	54	Suzuki
24	Freightliner	55	Toyota
25	FWD	56	Triumph
26	G.M.C.	57	Vauxhall
27	Harley-Davidson	58	Volkswagen
28	Hillman	59	Volvo
29	Honda	60	White
30	International	61	Willys Jeep
31	Jaguar	62	Yamaha

TYPE OF VEHICLE

<u>Code</u>	<u>Passenger Vehicle Type</u>	<u>Code</u>	<u>Truck and Bus Type</u>
00	Other Passenger Vehicle	10	Other Truck or Bus
01	Sedan	11	Dump
02	Convertible	12	Flatbed
03	Station Wagon	13	Panel
04	Ambulance	14	Pickup
05	Police Car	15	Van
06	Taxicab	16	Wrecker or Tow
		17	Fire
		18	Tractor-Truck
		19	School Bus
		20	Commercial Bus

<u>Code</u>	<u>Trailer and Motorcycle Type</u>
30	Other Trailer
31	Motorcycle
32	Camping Trailer
33	Utility Trailer
34	Boat Trailer
35	Semi-Van
36	Semi-Flatbed

REJECTION		E 720009
LIC. NO.	<u>225-697</u>	DATE <u>5/3/78</u>
IDENTIFICATION NO.	<u>2787MN1385</u>	<u>2 dr.</u>
MAKE	<u>Honda</u>	1977 ODOMETER READING <u>34,568</u>
STA. NAME	<u>Joe's Service</u>	STA. NO. <u>385</u>
REJECTED FOR:	INSPECTOR <u>Joe Smedley</u>	
BRAKES	<input type="checkbox"/>	<p style="font-weight: bold; font-size: 18pt;">READ CAREFULLY!</p> <p>THIS VEHICLE MUST BE REINSPECTED AND APPROVED WITHIN (7) DAYS.</p> <p>ANY OPERATION OF THE VEHICLE WILL BE AT THE OPERATORS RISK AND MUST BE IN ACCORDANCE WITH LAW.</p> <p>VIRGINIA STATE POLICE</p>
HEADLIGHTS	<input type="checkbox"/>	
OTHER LIGHTS	<input type="checkbox"/>	
SIGNAL LIGHTS	<input type="checkbox"/>	
HORN	<input type="checkbox"/>	
STEERING	<input type="checkbox"/>	
MIRROR	<input type="checkbox"/>	
WINDSHIELD	<input type="checkbox"/>	
OTHER GLASS	<input type="checkbox"/>	
WINDSHIELD WIPER	<input type="checkbox"/>	
TAG MOUNTING	<input type="checkbox"/>	
EXHAUST SYSTEM	<input checked="" type="checkbox"/>	
TIRES	<input type="checkbox"/>	
SEAT BELTS	<input type="checkbox"/>	
HOOD LATCH	<input type="checkbox"/>	
FUEL SYSTEM	<input type="checkbox"/>	
DOORS	<input type="checkbox"/>	
EMISSION CONTROL	<input type="checkbox"/>	
S.P. 133		

After the receipts have been coded by the PMVI clerical group and keyed into computer compatible form by the data processing group, they are returned to the clerical group along with the PMVIED report (Figure 7). Those receipts listed on this report should be reexamined for the errors indicated and if coded improperly the codes should be corrected. In some cases the error cannot be corrected because of the manner in which the inspector prepared the receipt. In either event an "R" should be written in the upper right corner of the receipt and the receipt should be returned to data processing for keying. The receipts with the "R" will not appear on any future error listings, unless they contain an obvious coding or keying error.

Keying of the Inspection Receipts

The data processing personnel will receive the sampled and coded receipts from the PMVI clerical group and will be responsible for the translation of the receipts into machine readable form. This task requires that the data processing personnel distinguish among the three different basic types of receipts and recognize whether or not the receipt replaced an annual receipt.

The type of receipt (regular auto/truck approval, trailer/motorcycle approval or rejection) is apparent from its form as seen in the examples on the following pages. The table below indicates the code to be used for each of the six possible combinations of receipt type and replacement situation. When a sticker replaces an annual receipt the inspector enters an "A" with a circle around it (A) next to year built.

Receipt Type	Normal Codes	Codes for Receipts Replacing Annual Receipts
Auto/Truck approval	0	1
Rejection	2	3
Trailer/Motorcycle approval	4	5

The receipt type code is entered in column one of the data record. Examples of each of the three basic receipt types with the position in the record for each of the data items coded are shown on the following pages. The record layout associated with each receipt type follows each receipt's illustration.

Receipts listed on the edit program error list are reentered and are marked with an "R" in the upper right corner. For these receipts a 1 (rather than 0) will be keyed in the recoded field (col. 2). Errors found on recoded receipts will generally be classified as inspector errors and the receipt will not be included on the edit error listing. With this procedure, a receipt will be keyed a maximum of two times unless the error is clearly a result of improper coding or keying.

The date information is keyed in as three 2-digit pairs using leading zeroes. Make and Body Type are entered as coded by the PMVI clerical group. Only the last two digits of the year built are entered. The odometer reading is entered right justified with leading zeroes. The inspection related charges are entered as cents (i.e., no decimal point) right justified and zero filled. The station number is also right justified and zero filled. The inspection list is coded as blank or zero if the item is "OK" and is coded one if either "ADJUST" or "INSTALL" has been checked. After the data have been keyed into machine readable form, the receipts are returned to the files.

LAYOUT OF REGULAR INSPECTION RECEIPT

FORM S.P. 131 Col. 2 R\*

## INSPECTION CERTIFICATION

# VIRGINIA STATE POLICE F 713401

	Equipment Inspected	O. K.	Adjust	Install	
29	BRAKES				<b>FEBRUARY</b>
30	HEADLIGHTS				
31	OTHER LIGHTS				DATE Col. 3,4/5,6/7,8
32	SIGNAL LIGHTS				LIC. NO.
33	HORN				
34	STEERING				MAKE Col. 9,10
35	MIRROR				
36	WINDSHIELD				BODY TYPE Col. 11,12
37	OTHER GLASS				
38	WINDSHIELD WIPER				YEAR BUILT Col. 13,14 (A)**
39	TAG MOUNTING				
40	EXHAUST SYSTEM				ODOMETER READING Col. 15-19
41	TIRES				
42	SEAT BELTS				INSPECTION RELATED CHARGES \$ Col. 20-24
43	HOOD LATCH				
44	FUEL SYSTEM				
45	DOORS				
46	EMISSION CONTROL				

IDENTIFICATION NO. \_\_\_\_\_

EQP. REMOVED \_\_\_\_\_ STA. NO. Col. 25-28 \_\_\_\_\_

STATION NAME \_\_\_\_\_

INSPECTOR \_\_\_\_\_

**THIS STICKER EXPIRES AUGUST 31** (Over)

\*Column 2 is coded 0 unless an R appears upper right; then column 2 is coded 1.

\*\*Regular receipts are coded with a 0 in column 1 unless the symbol (A) appears as shown; then it should be coded with a 1 in column 1.

\*\*\*The items in this list are coded 0 if "OK" is checked and 1 if either "Adjust" or "Install" is checked.



LAYOUT OF REJECTION RECEIPT

<h1 style="margin: 0;">REJECTION</h1>		Col. 2 <i>R</i> * <b>E 720009</b>
LIC. NO. _____		DATE Col. 3,4/5,6/7,8 _____
IDENTIFICATION NO. _____		Vehicle Type; Col. 11,12 <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">A</span> **
MAKE Col. 9,10 _____	Year Built; Col. 13,14 _____	ODOMETER READING Col. 15-19 _____
STA. NAME _____		STA. NO. Col. 25-28 _____
29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46	REJECTED FOR: BRAKES HEADLIGHTS OTHER LIGHTS SIGNAL LIGHTS HORN STEERING MIRROR WINDSHIELD OTHER GLASS WINDSHIELD WIPER TAG MOUNTING EXHAUST SYSTEM TIRES SEAT BELTS HOOD LATCH FUEL SYSTEM DOORS EMISSION CONTROL	INSPECTOR _____  <h2 style="text-align: center; text-decoration: underline;">READ CAREFULLY!</h2>  THIS VEHICLE MUST BE REINSPECTED AND APPROVED WITHIN (7) DAYS.  ANY OPERATION OF THE VEHICLE WILL BE AT THE OPERATORS RISK AND MUST BE IN ACCORDANCE WITH LAW.  <div style="text-align: right;">VIRGINIA STATE POLICE</div>

\*Column 2 is coded 0 unless an *R* appears upper right; then column 2 is coded 1.

\*\*Rejection receipts are coded with a 2 in column 1 unless the symbol A appears as shown; then it should be coded with a 3 in column 1.

\*\*\*The items in this list are coded 0 if they are not checked and 1 if they are.



LAYOUT OF TRAILER/MOTORCYCLE RECEIPT

INSPECTION CERTIFICATION				S.P. 131A REVISED 6 1 77	Col. 2 R*
<b>VIRGINIA STATE POLICE</b>				T/M	<b>338901</b>
***Col.	Equipment Inspected	O.K	Adjust	Install	<b>APRIL</b>
29	STEERING and SUSPENSION				DATE Col. 3,4/5,6/7,8
30	BRAKES				LIC.
31	HEAD LIGHTS				NO.
32	STOP LIGHTS				MAKE
33	TAIL LIGHTS				Col. 9,10
34	LICENSE LIGHTS				BODY
35	SIGNAL LIGHTS				TYPE Col. 11,12
36	OTHER LIGHTS				YEAR
37	REFLECTORS				BUILT Col. 13,14 (A)**
38	MIRROR				ODOMETER
39	HORN				READING Col. 15-19
40	TAG MOUNTING				INSPECTION RELATED
41	EXHAUST SYSTEM				CHARGES Col. 20-24
42	TIRES				
43	WHEELS				
44	GLAZING				
45	FUEL SYSTEM				
Identification No. _____					
Eq. Removed _____ Sta. No. Col. 25-28					
Station Name _____					
INSPECTOR _____					
THIS DECAL EXPIRES OCTOBER 31. (over)					

\*Column 2 is coded 0 unless an R appears upper right; then column 2 is coded 1.

\*\*Trailer/Motorcycle receipts are coded with a 4 in column 1 unless the symbol (A) appears as shown; then it should be coded with a 5 in column 1.

\*\*\*The items in this list are coded 0 if "OK" is checked and 1 if either "Adjust" or "Install" is checked.





Once a year, usually in February or March, the completed volume worksheets (Figure 6) are to be keyed for input to the sample listing program. The volume worksheets consist of a listing of all station numbers from 1 through 5000, the station type (private - 1, small exemption - 2, unlimited - 3, motorcycle - 4, trailer - 5) and the number of receipts issued each month. Two such lists are provided; one for auto/truck receipts (code - 0) and one for trailer/motorcycle receipts (code - 1).

The record layout for volume worksheets is shown on the following page. Station numbers that have no associated receipt volumes need not be keyed. Months with no receipts can be left blank. Both station numbers and monthly receipt volumes should be right justified.





APPENDIX B

PMVI SYSTEM RUN BOOK FOR UNIVAC 1100



```
"RUN,M/NS PMVISL,ACCT-ID/USER-ID,PMVI,45
"ASG,A PMVISL,F,SP0086
"USE SYST01,STAVOLUMES
"ASG,JH STAVOLUMES,T
"USE SYSD01,WORKSHEETFIL
"ASG,C WORKSHEETFIL,F/5,SP0086
"USE SYSD02,STATIONFILE
"ASG,C STATIONFILE,F/10,SP0086
"ASG,T SYSD03,F/10,S00086
"ASG,T SYSD04,F/10,SP0086
"ASG,T DM01,F/10,SP0086
"XQT PMVISL
1978
"EOF
"FIN
```





```
"RUN,M/NS PMVIWK,ACCT-ID/USER-ID, PMVI, 30
"ASG,A PMVIWK,F,SP0086
"USE SYSD02,WORKSHEETFIL
"ASG,A WORKSHEETFIL,F,SP0086
"ASG,T SYSD01,F/10,SP0086
"ASG,T SYSD03,F/10,SP0086
"ASG,T DM01,F/10,SP0086
"XQT PMVIWK
"FIN
```

2868

JOB NAME: PMVIED

SUBMITTED BY: \_\_\_\_\_ CORE REQUIREMENTS: \_\_\_\_\_

DATE SUBMITTED: \_\_\_\_\_ TIME SUBMITTED: \_\_\_\_\_

FORMS: SPECIAL \_\_\_\_\_ 1 PT  2 PT \_\_\_\_\_ 3 PT \_\_\_\_\_

CARRIAGE TAPE: STANDARD \_\_\_\_\_  SPECIAL \_\_\_\_\_

FREQUENCY: MONTHLY

DISK	I/O STEP	TAPES	I/O STEP	CARDS	STEP	PRINTOUT	STEP	DISPOSITION
Station reference	I	data to edit	I	date card		edit report		Marie Morano
Correct receipts	I/O							
Source errors	I/O							

SPECIAL INSTRUCTIONS

Include a date card with the year in columns 1-4, such as "1978".

OPERATOR NOTES

```
"RUN,M/NS PMVIED, ACCT-ID/USER-ID,PMVI, 30
"ASG,A PMVIED,F,SP0086
"USE SYSD01,EDITEDSAMPLE(0)
"ASG,A EDITEDSAMPLE(0),F,SP0086
"USE SYSD02,SRCERRORS(0)
"ASG,A SRCERRORS(0),F,SP0086
"USE SYSD05,EDITEDSAMPLE(+1)
"ASG,C EDITEDSAMPLE(+1),F/20,SP0086
"USE SYSD06,SRCERRORS(+1)
"ASG,C SRCERRORS(+1),F/20,SP0086
"USE SYSD03,STATIONFILE
"ASG,A STATIONFILE,F,SP0086
"USE SYST01,DATATOEDIT
"ASG,JH DATATOEDIT,T
"ASG,T SYSD04,F/20,SP0086
"ASG,T DM01,F/20,SP0086
"XQT PMVIED
1978
"EOF
"FIN
```



```
"RUN,M/NS PMVITB, ACCT-ID/USER-ID, PMVI,20
"ASG,A PMVITB,F,SP0086
"USE SYSD01,EDITEDSAMPLE
"ASG,A EDITEDSAMPLE,F,SP0086
"ASG,T SYSD02,F/20,SP0086
"ASG,T DM01,F/20,SP0086
"XQT PMVITB
STATIONS
"EOF
"FIN
```

2872

JOB NAME: PMVUSD

SUBMITTED BY: \_\_\_\_\_ CORE REQUIREMENTS: \_\_\_\_\_

DATE SUBMITTED: \_\_\_\_\_ TIME SUBMITTED: \_\_\_\_\_

FORMS: SPECIAL \_\_\_\_\_ 1 PT X \_\_\_\_\_ 2 PT \_\_\_\_\_ 3 PT \_\_\_\_\_

CARRIAGE TAPE: STANDARD \_\_\_\_\_ X \_\_\_\_\_ SPECIAL \_\_\_\_\_

FREQUENCY: YEARLY

DISK	I/O STEP	TAPES	I/O STEP	CARDS	STEP	PRINTOUT	STEP	DISPOSITION
Source errors	I			date card		Source error report		Lt. Chisolm

SPECIAL INSTRUCTIONS

Include a date card with the year in columns 1-4, such as "1978"

OPERATOR NOTES

```
"RUN,M/NS PMVISED, ACCT-ID/USER-ID, PMVI, 30
"ASG,A PMVISED,F,SP0086
"USE SYSD01, SRCERRORS
"ASG,A SRCERRORS,F,SP0086
"ASG,T SYSD02,F/20,SP0086
"ASG,T DM01,F/20,SP0086
"XQT PMVISED
1978
"EOF
"FIN
```

2874

JOB NAME: PMVIAP

SUBMITTED BY: \_\_\_\_\_ CORE REQUIREMENTS: \_\_\_\_\_

DATE SUBMITTED: \_\_\_\_\_ TIME SUBMITTED: \_\_\_\_\_

FORMS: SPECIAL \_\_\_\_\_ 1 PT X 2 PT \_\_\_\_\_ 3 PT \_\_\_\_\_

CARRIAGE TAPE: STANDARD \_\_\_\_\_ X SPECIAL \_\_\_\_\_

FREQUENCY: YEARLY

DISK	I/O STEP	TAPES	I/O STEP	CARDS	STEP	PRINTOUT	STEP	DISPOSITION
Correct receipts	I			date card		auto/truck report		Lt. Chisolm
T/M receipts	0							

SPECIAL INSTRUCTIONS

Include a date card with the year of the sample in columns 1-4, such as "1978".

OPERATOR NOTES



```
"RUN,M/NS PMVIAP, ACCT-ID/USER-ID, PMVI, 45
"ASG,A PMVIAP,F,SP0086
"USE SYSD01,EDITEDSAMPLE
"ASG,A EDITEDSAMPLE,F,SP0086
"USE SYSD02,TMRECEIPTS
"ASG,C TMRECEIPTS,F/20,SP0086
"XQT PMVIAP
1978
"EOF
"FIN
```

2876

JOB NAME: PMVIM

SUBMITTED BY: \_\_\_\_\_ CORE REQUIREMENTS: \_\_\_\_\_

DATE SUBMITTED: \_\_\_\_\_ TIME SUBMITTED: \_\_\_\_\_

FORMS: SPECIAL \_\_\_\_\_ 1 PT X 2 PT \_\_\_\_\_ 3 PT \_\_\_\_\_

CARRIAGE TAPE: STANDARD \_\_\_\_\_ X \_\_\_\_\_ SPECIAL \_\_\_\_\_

FREQUENCY: YEARLY

DISK	I/O STEP	TAPES	I/O STEP	CARDS	STEP	PRINTOUT	STEP	DISPOSITION
T/M receipts	I			date card		Trailer/motor- cycle report		Lt. Chisolm

SPECIAL INSTRUCTIONS

Include a date card with the year of the sample in columns 1-4, such as "1978".

OPERATOR NOTES

```
"RUN,M/NS PMVITM, ACCT-ID/USER-ID, PMVI. 20
"ASG,A    PMVITM,F,SP0086
"USE     SYD01, TMRECEIPTS
"ASG,A    TMRECEIPT,F,SP0086
"XQT     PMVITM
1978
"EOF
"FIN
```



```
"RUN,M/NS PMVOT1, ACCT-ID/USER-ID, PMVI, 30
"ASG,A    PMVIOT,F,SP0086
"USE      SYSD01,EDITEDSAMPLE
"ASG,A    EDITEDSAMPLE,F,SP0086
"USE      SYSD02,STANDARDS
"ASG,C    STANDARDS,F/20,SP0086
"ASG,T    SYSD03,F/20,SP0086
"ASG,T    SYSD04,F/20,SP0086
"ASG,T    SYSD05,F/20,SP0086
"XQT      PMVIOT
1978
"EOF
"FIN
```



APPENDIX C  
SAMPLE LISTING PROGRAM

IDENTIFICATION DIVISION.  
 PROGRAM-ID. PMVISL.  
 DATE-WRITTEN. MAY 1977.  
 DATE-COMPILED.  
 REMARKS.

- \*  
 \* THIS PROGRAM READS MONTHLY VOLUMES OF APPROVAL AUTO/TRUCK AND  
 \* TRAILER/MOTORCYCLE RECEIPTS. BASED ON THESE VOLUMES, EACH  
 \* STATION IS CLASSIFIED INTO ONE OF NINE (9) STRATA FOR SAMPLING  
 \* AUTO/TRUCK RECEIPTS AND INTO ONE OF FIFTEEN (15)  
 \* STRATA FOR SAMPLING TRAILER/MOTORCYCLE RECEIPTS. OUTPUT IS A  
 \* REPORT AND TWO DISK FILES. THE REPORT STATES THE NUMBER OF  
 \* APPROVAL RECEIPTS AND REJECTION RECEIPTS  
 \* TO SAMPLE EACH MONTH FROM EACH STRATA, AND PROVIDES  
 \* A RANDOM LIST OF THE STATIONS FROM WHICH THE RECEIPTS SHOULD BE  
 \* SAMPLED. ONE DISK FILE HAS RECORDS WITH STATION NUMBER AND TYPE  
 \* TO BE USED BY THE VOLUME WORKSHEETS PROGRAM. THE OTHER FILE,  
 \* WITH STATION NUMBERS APPEARING ON THE SAMPLING LISTS, IS USED  
 \* BY THE EDIT PROGRAM.  
 \*  
 \* -NOTE-  
 \* THERE ARE TWO LISTS: ONE WITH A LIST OF STATION NUMBERS AND  
 \* INSTRUCTIONS FOR SAMPLING AUTO/TRUCK APPROVALS AND REJECTIONS.  
 \* THIS LIST IS BASED ON AUTO/TRUCK APPROVAL VOLUMES.  
 \*  
 \* AND A SECOND LIST OF STATION NUMBERS AND INSTRUCTIONS FOR  
 \* SAMPLING TRAILER/MOTORCYCLE APPROVALS AND REJECTIONS.  
 \* THIS LIST IS BASED ON TRAILER/MOTORCYCLE APPROVAL VOLUMES.  
 \*

ENVIRONMENT DIVISION.  
 CONFIGURATION SECTION.  
 SOURCE-COMPUTER. UNIVAC-1100.  
 OBJECT-COMPUTER. UNIVAC-1100.  
 SPECIAL-NAMES.  
 PAGE IS NEW-PAGE.  
 INPUT-OUTPUT SECTION.  
 FILE-CONTROL.

SELECT STATION-VOLUMES ASSIGN TO UNISERVO SYST01.  
 SELECT WORKSHEET-FILE ASSIGN TO DISC SYSD01.  
 SELECT CLASSIFIED-STATIONS ASSIGN TO DISC SYSD02.  
 SELECT SORTED-STATIONS ASSIGN TO DISC SYSD03.  
 SELECT CLASSIFIED-MT ASSIGN TO DISC SYSD04.  
 SELECT SORT-FILE ASSIGN TO DISC DM01.  
 SELECT CARD ASSIGN TO CARD-READER.  
 SELECT PRINT ASSIGN TO PRINTER.

DATA DIVISION.  
 FILE SECTION.  
 FD WORKSHEET-FILE  
 LABEL RECORDS ARE STANDARD



RECORD CONTAINS 5 CHARACTERS  
 DATA RECORD IS WORK-REC.

01 WORK-REC.  
 03 WSTATION PICTURE 9999.  
 03 WCLASS PICTURE 9.

FD STATION-VOLUMES  
 LABEL RECORDS ARE OMITTED  
 DATA RECORD IS VOLUME-REC.

01 VOLUME-REC.  
 03 REC-TYPE PICTURE 9.  
 88 VALID-REC-TYPE VALUE IS 0, 1.  
 03 STATION-NUMBER PICTURE XXXX.  
 03 STATION-CLASS PICTURE 9.  
 03 ST-CLS REDEFINES STATION-CLASS PICTURE X.  
 03 FILLER PICTURE XX.  
 03 MONTHVOL OCCURS 12 TIMES PICTURE X(5).  
 03 FILLER PICTURE X(12).

FD CLASSIFIED-MT  
 LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 10 CHARACTERS  
 DATA RECORD IS CLASS-MT.

01 CLASS-MT.  
 03 CMT-NO PICTURE 9999.  
 03 FILLER PICTURE XX.  
 03 CMT-INDX PICTURE 99.  
 03 FILLER PICTURE XX.

FD CLASSIFIED-STATIONS  
 LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 10 CHARACTERS  
 DATA RECORD IS CLASSIFIED-STATION.

01 CLASSIFIED-STATION.  
 03 CS-NO PICTURE 9999.  
 03 CS-RINDX PICTURE 99.  
 03 CS-MTINDX PICTURE 99.  
 03 FILLER PICTURE XX.

FD SORTED-STATIONS  
 LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 10 CHARACTERS  
 DATA RECORD IS SORTED-STATION.

01 SORTED-STATION.  
 03 SS-NO PICTURE 9999.  
 03 SS-RINDX PICTURE 99.  
 03 SS-MTINDX PICTURE 99.  
 03 FILLER PICTURE XX.

FD CARD  
 LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 80 CHARACTERS  
 DATA RECORD IS CARD-REC.

01 CARD-REC.  
 03 YEAR-IN PICTURE XXXX.  
 03 FILLER PICTURE X(76).

FD PRINT

LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 132 CHARACTERS  
 DATA RECORD IS PRINT-LINE.

01 PRINT-LINE PICTURE X(132).

SD SORT-FILE

RECORD CONTAINS 10 CHARACTERS  
 DATA RECORD IS SORT-REC.

01 SORT-REC.

03 STATION-NO PICTURE 9999.  
 03 SRINDX PICTURE 99.  
 03 SMTINDX PICTURE 99.  
 03 FILLER PICTURE XX.

WORKING-STORAGE SECTION.

77 VOL PICTURE 9.  
 77 LO PICTURE 999.  
 77 HI PICTURE 999.  
 77 RT PICTURE 9.  
 77 INDX PICTURE 99.  
 77 PAGE-NUM PICTURE 999.  
 77 LINE-COUNT PICTURE 99.  
 77 LINE-LIMIT PICTURE 99.  
 77 I PICTURE 9999.  
 77 II PICTURE 9999.  
 77 J PICTURE 9999.  
 77 HALF PICTURE 9V9 VALUE IS 0.5.  
 77 COUNT PICTURE 9999.  
 77 NONZEROMONTHS PICTURE 99.  
 77 YEARTOTAL PICTURE 9(5).  
 77 VOLTEMP PICTURE 9(5).  
 77 MONTHLYAVRG PICTURE 9(5)V999.  
 77 STATEYEARTOTAL PICTURE 9(10).  
 77 REJ-TOT PICTURE 9(10).  
 77 SAMPLE-SIZE PICTURE 9(6).  
 77 REJ-SAMPLE-SIZE PICTURE 9(6).  
 77 PROPORTION PICTURE 9V999999.  
 77 LAST-STRATA PICTURE 99.  
 77 HOLD PICTURE X(10).  
 77 TEMP PICTURE 9(10)V999.  
 77 RANDOMX USAGE IS COMP PICTURE 9(12) VALUE IS 229806161.  
 77 M USAGE IS COMP PICTURE 9(12) VALUE IS 123046875.  
 77 A USAGE IS COMP PICTURE 999 VALUE IS 106.  
 77 C USAGE IS COMP PICTURE 9 VALUE IS 4.  
 77 QUOTIENT USAGE IS COMP PICTURE 9(12).  
 77 TEMP2 USAGE IS COMP PICTURE 9(12).  
 77 TEMP3 USAGE IS COMP PICTURE 9(12).

01 ERROR-LINE.

03 FILLER PICTURE X(5) VALUE IS SPACES.  
 03 FILLER PICTURE X(14) VALUE IS  
 "RECORD NUMBER".  
 03 COUNT-OUT PICTURE Z,ZZ9.

	03	FILLER	PICTURE X(13)	VALUE IS
		" IN ERROR - ".		
	03	REC-OUT	PICTURE X(80).	
01		STATION-REC.		
	03	STATION-NUM	PICTURE 9999.	
	03	RINDX	PICTURE 99.	
	03	MTINDX	PICTURE 99.	
	03	RMT-TYP	PICTURE 9.	
	03	FILLER	PICTURE X.	
01		PAGE-HEAD.		
	03	FILLER	PICTURE X(16)	VALUE IS
		" CATEGORY: ".		
	03	STRATA-LABEL	PICTURE X(39).	
	03	YEAR-OUT	PICTURE XXXX.	
	03	PHEAD	PICTURE X(20)	VALUE IS
		" AUTO/TRUCK".		
	03	FILLER	PICTURE X(25)	VALUE IS
		"SAMPLE".		
	03	FILLER	PICTURE X(5)	VALUE IS "PAGE ".
	03	PAGE-NO	PICTURE ZZ9.	
01		INSTRUCTION1.		
	03	FILLER	PICTURE X(27)	VALUE IS
		" INSTRUCTIONS: SAMPLE ".		
	03	INSTRUCT1.		
	05	SAMPLE-NUM	PICTURE ZZ9.	
	05	FILLER	PICTURE X(32)	VALUE IS
		" APPROVAL RECEIPTS AND SAMPLE".		
	05	REJ-SAMP	PICTURE ZZ9.	
	05	FILLER	PICTURE X(19)	VALUE IS
		" REJECTION RECEIPTS".		
01		INSTRUCTION2.		
	03	FILLER	PICTURE X(20)	VALUE IS SPACES.
	03	FILLER	PICTURE X(26)	VALUE IS
		"FROM THIS LIST OF STATIONS".		
	03	FILLER	PICTURE X(40)	VALUE IS
		" FOR EACH MONTH IN THE ORDER LISTED. ".		
01		HEAD1.		
	03	FILLER	PICTURE X(39)	VALUE IS SPACES.
	03	FILLER	PICTURE X(20)	VALUE IS
		"APPROVAL".		
	03	FILLER	PICTURE X(73)	VALUE IS
		"NUMBER OF REJECTION		NUMBER OF".
01		HEAD2.		
	03	FILLER	PICTURE X(5)	VALUE IS SPACES.
	03	FILLER	PICTURE X(51)	VALUE IS
		"ORDER STATION NUMBER SAMPLE MONTH ".		
	03	FILLER	PICTURE X(22)	VALUE IS

```

"RECEIPTS SAMPLED".
03 MT-HEAD2          PICTURE X(34)  VALUE IS
   "SAMPLE MONTH    RECEIPTS SAMPLED".

01 UNDERLINE.
03 FILLER           PICTURE X(5)   VALUE IS SPACES.
03 FILLER           PICTURE X(51)  VALUE IS
   "-----"
03 FILLER           PICTURE X(22)  VALUE IS
   "-----"
03 MT-ULINE         PICTURE X(34)  VALUE IS
   "-----"

01 OUTLINE.
03 FILLER           PICTURE X(5)   VALUE IS SPACES.
03 ORDER-0         PICTURE ZZZ9B(12).
03 STATION-NUM-0   PICTURE ZZZ9.

01 SUM-HEADING.
03 FILLER           PICTURE X(41)  VALUE IS SPACES.
03 SUM-YEAR        PICTURE 9999.
03 RT-HEAD         PICTURE X(20)  VALUE IS
   "          AUTO/TRUCK".
03 FILLER           PICTURE X(30)  VALUE IS
   " APPROVAL RECEIPT VOLUMES".

01 SUM-HEAD.
03 FILLER           PICTURE X(49)  VALUE IS SPACES.
03 FILLER           PICTURE X(40)  VALUE IS
   "STRATA          STATIONS    RECEIPTS".

01 SUM-UNDERLINE.
03 FILLER           PICTURE X(42)  VALUE IS SPACES.
03 FILLER           PICTURE X(47)  VALUE IS
   "-----"

01 SUM-LINE.
03 FILLER           PICTURE X(42)  VALUE IS SPACES.
03 SUM-STRA-LAB    PICTURE X(27).
03 SUM-STA         PICTURE Z,ZZ9B(6).
03 SUM-RECS        PICTURE Z,ZZZ,ZZ9.

01 STRATA-LABEL-TABLE.
03 FILLER PICTURE X(21) VALUE IS "PRIVATE - LOW".
03 FILLER PICTURE X(21) VALUE IS "PRIVATE - MEDIUM".
03 FILLER PICTURE X(21) VALUE IS "PRIVATE - HIGH".
03 FILLER PICTURE X(21) VALUE IS "SMALL EXEMPT - LOW".
03 FILLER PICTURE X(21) VALUE IS "SMALL EXEMPT - MEDIUM".
03 FILLER PICTURE X(21) VALUE IS "SMALL EXEMPT - HIGH".
03 FILLER PICTURE X(21) VALUE IS "UNLIMITED - LOW".
03 FILLER PICTURE X(21) VALUE IS "UNLIMITED - MEDIUM".
03 FILLER PICTURE X(21) VALUE IS "UNLIMITED - HIGH".
03 FILLER PICTURE X(21) VALUE IS "MOTORCYCLE - LOW".
03 FILLER PICTURE X(21) VALUE IS "MOTORCYCLE - MEDIUM".
03 FILLER PICTURE X(21) VALUE IS "MOTORCYCLE - HIGH".
03 FILLER PICTURE X(21) VALUE IS "TRAILER - LOW".
03 FILLER PICTURE X(21) VALUE IS "TRAILER - MEDIUM".
03 FILLER PICTURE X(21) VALUE IS "TRAILER - HIGH".

```

01 STRATA-LABELS REDEFINES STRATA-LABEL-TABLE.  
03 STRATA-LABEL-ENT OCCURS 15 TIMES PICTURE X(21).  
01 STRATATOTALTABLE.  
03 STA-TYP OCCURS 2 TIMES.  
05 STRATA OCCURS 15 TIMES PICTURE 9(7).  
  
01 STATION-TABLE.  
03 STATION-ENT OCCURS 500 TIMES PICTURE X(10).  
  
01 STATION-COUNTS.  
03 STA-TYP OCCURS 2 TIMES.  
05 STA-COUNT OCCURS 15 TIMES PICTURE 9999.  
  
01 REJ-LIMITS.  
03 RLIMIT OCCURS 2 TIMES PICTURE 99.

## PROCEDURE DIVISION.

```

*
* THE FIRST PART OF THE PROGRAM, BEGIN1 THROUGH CLOSE1, READS
* THE STATION VOLUMES FROM FILE STATION-VOLUMES. THE FIRST
* CHARACTER OF EACH VOLUME RECORD INDICATES APPROVAL OR M/T
* VOLUMES (0 OR 1 RESPECTIVELY). EACH STATION IS PUT INTO ONE
* STRATA BASED ON ITS TYPE AND AVERAGE MONTHLY VOLUME FOR EACH
* TYPE OF RECEIPT. A STATION COULD GO INTO ONE STRATA FOR
* APPROVAL RECEIPTS AND A DIFFERENT STRATA FOR M/T RECEIPTS.
* RECORDS WITH STATION NUMBER AND ASSIGNED APPROVAL RECEIPT
* STRATA ARE WRITTEN TO FILE CLASSIFIED-STATIONS. STATION NUMBER
* AND ASSIGNED M/T RECEIPT STRATA ARE WRITTEN TO FILE
* CLASSIFIED-MT.
*

```

## BEGIN1.

```

MOVE 3 TO RLIMIT (1).
MOVE 9 TO RLIMIT (2).
OPEN OUTPUT PRINT.
MOVE SPACES TO PRINT-LINE.
WRITE PRINT-LINE AFTER ADVANCING NEW-PAGE.
OPEN INPUT CARD.
READ CARD AT END
      DISPLAY "   DATE CARD MISSING "
      CLOSE CARD
      GO TO FINAL-END.
EXAMINE YEAR-IN REPLACING ALL SPACES BY ZEROS.
MOVE YEAR-IN TO YEAR-OUT I.
SUBTRACT 1 FROM I.
MOVE I TO SUM-YEAR.
CLOSE CARD.
OPEN INPUT STATION-VOLUMES.
OPEN OUTPUT CLASSIFIED-STATIONS WORKSHEET-FILE
      CLASSIFIED-MT.
MOVE ZEROS TO YEARTOTAL NONZEROMONTHS STRATATOTALTABLE
      STATEYEARTOTAL COUNT STATION-COUNTS REJ-TOT.
GO TO READ-VOLUME.
VOL-REC-ERROR.
MOVE COUNT TO COUNT-OUT.
MOVE VOLUME-REC TO REC-OUT.
WRITE PRINT-LINE FROM ERROR-LINE AFTER ADVANCING 2 LINES.

```

## READ-VOLUME.

```

ADD 1 TO COUNT
READ STATION-VOLUMES AT END GO TO CLOSE1.
EXAMINE STATION-NUMBER REPLACING LEADING SPACES BY ZEROS.
EXAMINE ST-CLS REPLACING ALL SPACES BY ZEROS.
*
* CODES FOR STATION CLASS ARE
*
* 1 - PRIVATE
* 2 - SMALL EXEMPT
* 3 - UNLIMITED

```

\* 4 - LARGE EXEMPT  
 \* 5 - MOTORCYCLE  
 \* 6 - TRAILER  
 \*

MOVE 0 TO II.  
 IF NOT VALID-REC-TYPE GO TO VOL-REC-ERROR.  
 ADD 1 TO REC-TYPE.  
 IF STATION-CLASS IS GREATER THAN 6 MOVE 1 TO II.  
 IF REC-TYPE IS EQUAL TO 1 AND  
 STATION-CLASS IS GREATER THAN 4 MOVE 1 TO II.  
 IF II IS EQUAL TO 1 GO TO VOL-REC-ERROR.  
 MOVE STATION-NUMBER TO WSTATION.  
 MOVE STATION-CLASS TO WCLASS.  
 WRITE WORK-REC.  
 IF STATION-CLASS IS EQUAL TO 4 GO TO READ-VOLUME.  
 IF STATION-CLASS IS GREATER THAN 4  
 SUBTRACT 1 FROM STATION-CLASS.  
 MOVE 0 TO YEARTOTAL NONZEROMONTHS TEMP2.  
 MOVE 1 TO I.

MONTH-LOOP.

EXAMINE MONTHVOL (I) REPLACING LEADING SPACES BY ZEROS.  
 IF MONTHVOL (I) IS NOT NUMERIC  
 GO TO VOL-REC-ERROR.  
 MOVE MONTHVOL (I) TO VOLTEMP  
 IF VOLTEMP IS GREATER THAN 0  
 ADD VOLTEMP TO YEARTOTAL  
 ADD 1 TO NONZEROMONTHS  
 IF I IS LESS THAN 8  
 ADD VOLTEMP TO TEMP2.

ADD 1 TO I  
 IF I IS LESS THAN 13 GO TO MONTH-LOOP.  
 IF YEARTOTAL IS EQUAL TO 0  
 GO TO READ-VOLUME.  
 IF TEMP2 IS LESS THAN 1 GO TO READ-VOLUME.  
 DIVIDE YEARTOTAL BY NONZEROMONTHS GIVING MONTHLYAVRG  
 ADD HALF MONTHLYAVRG GIVING VOLTEMP  
 MOVE 2 TO VOL  
 MOVE 100 TO LO.  
 MOVE 299 TO HI.  
 IF REC-TYPE IS EQUAL TO 2 MOVE 10 TO LO  
 MOVE 40 TO HI.  
 IF VOLTEMP IS LESS THAN LO MOVE 1 TO VOL.  
 IF VOLTEMP IS GREATER THAN HI MOVE 3 TO VOL.  
 MOVE STATION-NUMBER TO STATION-NUM.  
 SUBTRACT 1 FROM STATION-CLASS GIVING I  
 MULTIPLY 3 BY I  
 ADD VOL TO I  
 MOVE I TO RINDX MTINDX.  
 IF REC-TYPE IS EQUAL TO 2  
 THEN WRITE CLASS-MT FROM STATION-REC  
 ELSE WRITE CLASSIFIED-STATION FROM STATION-REC.  
 ADD YEARTOTAL TO STRATA (REC-TYPE, I)

IF I IS GREATER THAN 3  
 ADD YEARTOTAL TO REJ-TOT.  
 ADD 1 TO STA-COUNT (REC-TYPE, I).  
 GO TO READ-VOLUME.

CLOSE1.

CLOSE WORKSHEET-FILE STATION-VOLUMES CLASSIFIED-STATIONS  
 CLASSIFIED-MT.  
 MOVE 1 TO RT.

\*  
 \* THE SECOND PART OF THE PROGRAM, BEGIN2 THROUGH END2, PROCESS  
 \* THE CLASSIFIED-STATIONS FILE FIRST AND THEN THE CLASSIFIED-MT  
 \* FILE. THE FILE IS SORTED BY STRATA. THEN THE NUMBER OF  
 \* RECEIPTS TO SAMPLE EACH MONTH FROM EACH STRATA IS CALCULATED.  
 \* A RANDOM LIST OF STATIONS TO BE SAMPLED AND INSTRUCTIONS FOR  
 \* SAMPLING APPROVAL RECEIPTS AND REJECTIONS FROM THE LISTED  
 \* STATIONS IS PROVIDED FOR EACH STRATA. IF A STRATA HAS MORE  
 \* THAN 199 STATIONS, THEN 199 STATIONS ARE SELECTED TO GO ON THE  
 \* LIST. IF A STRATA HAS LESS THAN 24 STATIONS, THEN THE STATIONS  
 \* WILL BE LISTED MORE THAN ONCE TO PROVIDE AT LEAST 24 ENTRIES  
 \* ON THE LIST. THE STATIONS ON THE LIST ARE WRITTEN TO FILE  
 \* CLASSIFIED-STATIONS ALONG WITH THE STATIONS STRATA AND A CODE  
 \* INDICATING APPROVAL LIST OR M/T LIST (1 OR 2 RESPECTIVELY).  
 \*  
 \* THEN THE FILE OF M/T STATIONS, CLASSIFIED-MT, IS SORTED IN  
 \* STRATA ORDER AND PROCESSED BY THE SECOND PART OF THE PROGRAM  
 \* PRODUCING THE M/T SAMPLING LIST.  
 \*

SORT-CLASSIFIED-STATIONS.

SORT SORT-FILE ON ASCENDING KEY SRINDEX  
 USING CLASSIFIED-STATIONS  
 GIVING SORTED-STATIONS.  
 OPEN OUTPUT CLASSIFIED-STATIONS.

BEGIN2.

OPEN INPUT SORTED-STATIONS.

\*  
 \* SAMPLE SIZE IS DETERMINED AS SHOWN IN A MANAGEMENT  
 \* SYSTEM FOR EVALUATING THE VIRGINIA PERIODIC MOTOR  
 \* VEHICLE INSPECTION PROGRAM BY DEBORAH MITCHELL  
 \* (OCTOBER 1977, VHTRC 78-R19). THE APPROPRIATE  
 \* ANNUAL SAMPLE SIZE NECESSARY TO ENABLE DETECTION OF A  
 \* 10.0 % CHANGE BASED ON 1.5% FAILURE RATE WAS DETERMINED  
 \* TO BE 35,591. TO ACCOUNT FOR LOSS IN THE SAMPLING  
 \* PROCEDURE A SAMPLE SIZE OF 36000 IS USED.

MOVE 36000 TO SAMPLE-SIZE.

\*  
 \* REJECTION SAMPLE SIZE AND MOTORCYCLE/TRAILER SAMPLE SIZE  
 \* WERE DETERMINED USING THE SAME TECHNIQUE DESCRIBED IN  
 \* THE REPORT REFERENCED ABOVE.  
 \*

MOVE 5000 TO REJ-SAMPLE-SIZE.



```

MOVE 10 TO HI.
IF RT IS EQUAL TO 2
    MOVE 16 TO HI
    MOVE " MOTORCYCLE/TRAILER" TO RT-HEAD PHEAD
    MOVE 600 TO SAMPLE-SIZE.
MOVE SPACES TO PRINT-LINE.
WRITE PRINT-LINE AFTER ADVANCING NEW-PAGE.
WRITE PRINT-LINE FROM SUM-HEADING AFTER ADVANCING 5 LINES.
WRITE PRINT-LINE FROM SUM-HEAD AFTER ADVANCING 2 LINES.
WRITE PRINT-LINE FROM SUM-UNDERLINE AFTER ADVANCING 1 LINES.
MOVE 1 TO I.
MOVE 0 TO YEARTOTAL STATEYEARTOTAL.
SUMLOOP.
MOVE STRATA-LABEL-ENT (I) TO SUM-STRA-LAB.
MOVE STA-COUNT (RT, I) TO SUM-STA.
MOVE STRATA (RT, I) TO SUM-RECS.
ADD STRATA (RT, I) TO STATEYEARTOTAL.
ADD STA-COUNT (RT, I) TO YEARTOTAL.
WRITE PRINT-LINE FROM SUM-LINE AFTER ADVANCING 2 LINES.
ADD 1 TO I.
IF I IS LESS THAN HI GO TO SUMLOOP.
MOVE "TOTAL" TO SUM-STRA-LAB.
MOVE YEARTOTAL TO SUM-STA.
MOVE STATEYEARTOTAL TO SUM-RECS.
WRITE PRINT-LINE FROM SUM-LINE AFTER ADVANCING 3 LINES.
MOVE 0 TO I
MOVE 1 TO LAST-STRATA.
READ-STRATA-INTO-TABLE.
READ SORTED-STATIONS AT END
                        PERFORM RANDOMIZE-LIST THROUGH RLX
                        GO TO END2.
MOVE SORTED-STATION TO STATION-REC.
IF RINDX IS NOT EQUAL TO LAST-STRATA
    PERFORM RANDOMIZE-LIST THROUGH RLX.
ADD 1 TO I.
IF I IS GREATER THAN 500
    PERFORM OVERFLO THROUGH OFX.
MOVE STATION-REC TO STATION-ENT (I).
GO TO READ-STRATA-INTO-TABLE.
RANDOMIZE-LIST.
IF I IS EQUAL TO 0 GO TO NEXT-STRATA.
MOVE I TO COUNT.
IF I IS GREATER THAN 199 MOVE 199 TO COUNT.
MOVE LAST-STRATA TO II.
MOVE STRATA-LABEL-ENT (II) TO STRATA-LABEL
DIVIDE STRATA (RT, II) BY STATEYEARTOTAL GIVING PROPORTION
MULTIPLY SAMPLE-SIZE BY PROPORTION GIVING TEMP
DIVIDE 12 INTO TEMP
ADD HALF TEMP GIVING SAMPLE-NUM.
IF TEMP IS LESS THAN HALF MOVE 1 TO SAMPLE-NUM.
ADD STRATA (1, II) STRATA (2, II) GIVING TEMP.
DIVIDE TEMP BY REJ-TOT GIVING PROPORTION.

```

```

MULTIPLY REJ-SAMPLE-SIZE BY PROPORTION GIVING TEMP.
DIVIDE 12 INTO TEMP.
ADD HALF TEMP GIVING REJ-SAMP.
IF TEMP IS LESS THAN HALF MOVE 1 TO REJ-SAMP.
IF II IS NOT GREATER THAN RLIMIT (RT) MOVE 0 TO REJ-SAMP.
RAND-LOOP.
PERFORM NEXT-RANDOM-NUMBER
MOVE RANDOMX TO TEMP2
DIVIDE TEMP2 BY I GIVING TEMP3
MULTIPLY I BY TEMP3
SUBTRACT TEMP3 FROM TEMP2 GIVING J
ADD 1 TO J
MOVE STATION-ENT (I) TO HOLD
MOVE STATION-ENT (J) TO STATION-ENT (I)
MOVE HOLD TO STATION-ENT (J)
SUBTRACT 1 FROM I
IF I IS GREATER THAN 1 GO TO RAND-LOOP.
MOVE 1 TO I J.
MOVE 0 TO PAGE-NUM
PERFORM PRINT-HEADING.

PRINT-SAMPLE-LIST.
MOVE STATION-ENT (I) TO STATION-REC
MOVE J TO ORDER-0
MOVE STATION-NUM TO STATION-NUM-0
IF LINE-COUNT IS GREATER THAN LINE-LIMIT
    PERFORM PRINT-HEADING.
WRITE PRINT-LINE FROM OUTLINE AFTER ADVANCING 2 LINES.
MOVE RT TO RMT-TYP.
IF I IS EQUAL TO J
    WRITE CLASSIFIED-STATION FROM STATION-REC.
ADD 1 TO LINE-COUNT I J.
IF I IS NOT GREATER THAN COUNT GO TO PRINT-SAMPLE-LIST.
IF J IS LESS THAN 25
    MOVE 1 TO I
    GO TO PRINT-SAMPLE-LIST.
MOVE SORTED-STATION TO STATION-REC.
NEXT-STRATA.
MOVE RINDX TO LAST-STRATA.
MOVE 0 TO I.
GO TO RLX.

PRINT-HEADING.
MOVE 0 TO LINE-COUNT
MOVE 24 TO LINE-LIMIT
ADD 1 TO PAGE-NUM
MOVE PAGE-NUM TO PAGE-NO.
WRITE PRINT-LINE FROM PAGE-HEAD AFTER ADVANCING NEW-PAGE.
IF PAGE-NUM EQUALS 1
    MOVE 23 TO LINE-LIMIT
    WRITE PRINT-LINE FROM INSTRUCTION1
    AFTER ADVANCING 3 LINES

```

WRITE PRINT-LINE FROM INSTRUCTION2  
 AFTER ADVANCING 1 LINES.  
 WRITE PRINT-LINE FROM HEAD1 AFTER ADVANCING 2 LINES.  
 WRITE PRINT-LINE FROM HEAD2 AFTER ADVANCING 1 LINES.  
 WRITE PRINT-LINE FROM UNDERLINE AFTER ADVANCING 1 LINES.

NEXT-RANDOM-NUMBER.  
 MULTIPLY A BY RANDOMX  
 ADD C TO RANDOMX  
 DIVIDE RANDOMX BY M GIVING QUOTIENT  
 MULTIPLY M BY QUOTIENT GIVING TEMP2  
 SUBTRACT TEMP2 FROM RANDOMX.

RLX.

EXIT.

OVERFLO.

MOVE 500 TO I.  
 PERFORM NEXT-RANDOM-NUMBER.  
 MOVE RANDOMX TO TEMP2.  
 DIVIDE TEMP2 BY 501 GIVING TEMP3.  
 MULTIPLY 501 BY TEMP3.  
 SUBTRACT TEMP3 FROM TEMP2 GIVING J.  
 IF J IS GREATER THAN 0  
     MOVE STATION-REC TO STATION-ENT (J).  
 READ SORTED-STATIONS AT END  
     PERFORM RANDOMIZE-LIST THROUGH RLX  
     GO TO END2.  
 MOVE SORTED-STATION TO STATION-REC.  
 IF RINDX IS EQUAL TO LAST-STRATA  
     GO TO OVERFLO.  
 PERFORM RANDOMIZE-LIST THROUGH RLX.  
 MOVE 1 TO I.

OFX.

EXIT.

END2.

IF RT IS EQUAL TO 2 GO TO BEGIN3.  
 MOVE 2 TO RT.  
 CLOSE SORTED-STATIONS.  
 SORT SORT-FILE ON ASCENDING KEY SMTINDX  
     USING CLASSIFIED-MT  
     GIVING SORTED-STATIONS.  
 GO TO BEGIN2.

\*  
 \* THE THIRD PART OF THE PROGRAM IS BEGIN3 THROUGH FINAL-END.  
 \* THE SAMPLING LISTS FOR APPROVAL AND M/T RECEIPTS HAVE BEEN  
 \* PRODUCED AND FILE CLASSIFIED-STATIONS HAS THE STATIONS  
 \* APPEARING ON THE LISTS. THERE MAY BE SOME STATIONS APPEARING  
 \* ON THE APPROVAL SAMPLING LIST AND ON THE M/T SAMPLING LIST.  
 \* THIS PART OF THE PROGRAM COMBINES THE RECORDS FOR EACH  
 \* STATION NUMBER PRODUCING A FILE WITH STATION NUMBER, STRATA  
 \* FOR APPROVAL RECEIPTS, STRATA FOR M/T RECEIPTS AND A CODE  
 \* WITH THIS MEANING:

```

*
* 1 - ONLY APPROVAL AND REJECTION RECEIPTS MAY BE SAMPLED
*     FROM THIS STATION
* 2 - APPROVAL, REJECTION, AND M/T RECEIPTS MAY BE SAMPLED
*     FROM THIS STATION
* 3 - ONLY MOTORCYCLE/TRAILER RECEIPTS MAY BE SAMPLED FROM
*     THIS STATION.
*
* THE EDIT PROGRAM USES THIS FILE TO MONITOR THE STATIONS
* SAMPLED AND TO OBTAIN THE STRATA FOR EACH SAMPLED RECEIPT.
*

```

```

BEGIN3.

```

```

  CLOSE CLASSIFIED-STATIONS PRINT SORTED-STATIONS.
  SORT SORT-FILE ON ASCENDING KEY STATION-NO
  USING CLASSIFIED-STATIONS
  GIVING SORTED-STATIONS.
  OPEN INPUT SORTED-STATIONS.
  OPEN OUTPUT CLASSIFIED-STATIONS.

```

```

READ-TWO.

```

```

  READ SORTED-STATIONS AT END GO TO FINAL-END.

```

```

MOVE-IT.

```

```

  MOVE SORTED-STATION TO STATION-REC.
  IF RMT-TYP IS EQUAL TO 2
    MOVE 3 TO RMT-TYP.

```

```

LOOP.

```

```

  READ SORTED-STATIONS AT END
  WRITE CLASSIFIED-STATION FROM STATION-REC
  GO TO FINAL-END.
  IF SS-NO IS EQUAL TO STATION-NUM
    PERFORM MATCH
    GO TO READ-TWO.
  WRITE CLASSIFIED-STATION FROM STATION-REC.
  GO TO MOVE-IT.

```

```

MATCH.

```

```

  IF RMT-TYP IS EQUAL TO 3
    THEN MOVE SS-RINDX TO RINDX
    ELSE MOVE SS-MTINDX TO MTINDX.

```

```

  MOVE 2 TO RMT-TYP.

```

```

  WRITE CLASSIFIED-STATION FROM STATION-REC.

```

```

FINAL-END.

```

```

  CLOSE SORTED-STATIONS CLASSIFIED-STATIONS.
  STOP RUN.

```

APPENDIX D

VOLUME WORKSHEET PROGRAM

IDENTIFICATION DIVISION.  
 PROGRAM-ID. PMVIWK.  
 INSTALLATION. VIRGINIA STATE POLICE.  
 DATE-WRITTEN. FEBRUARY 1977.  
 DATE-COMPILED.  
 REMARKS.

\*  
 \* THIS PROGRAM PRODUCES THE VOLUME WORKSHEETS USED  
 \* TO POST MONTHLY VOLUMES FOR EACH INSPECTION STATION.  
 \* INPUT TO THE PROGRAM IS THE FILE OF CLASSIFIED  
 \* STATIONS OUTPUT BY THE SAMPLE LIST PROGRAM.  
 \*

ENVIRONMENT DIVISION.  
 CONFIGURATION SECTION.  
 SOURCE-COMPUTER. UNIVAC-1100.  
 OBJECT-COMPUTER. UNIVAC-1100.  
 SPECIAL-NAMES.

PAGE IS NEW-PAGE.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT STATIONFILE ASSIGN TO DISC SYSD01.

SELECT S-IN ASSIGN TO DISC SYSD02.

SELECT SORT-FILE ASSIGN TO DISC DM01.

SELECT PRINT ASSIGN TO PRINTER.

DATA DIVISION.

FILE SECTION.

FD S-IN

LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 5 CHARACTERS  
 DATA RECORD IS SI-REC.

01 SI-REC.

03 SI-STA

PICTURE 9999.

03 SI-TYP

PICTURE 9.

SD SORT-FILE

RECORD CONTAINS 5 CHARACTERS  
 DATA RECORD IS SORT-REC.

01 SORT-REC.

03 S-STA

PICTURE 9999.

03 S-TYP

PICTURE 9.

FD STATIONFILE

LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 5 CHARACTERS  
 DATA RECORD IS INREC.

01 INREC

PICTURE X(5).

FD PRINT

LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 132 CHARACTERS  
 DATA RECORD IS PRINT-LINE.

01 PRINT-LINE

PICTURE X(132).

WORKING-STORAGE SECTION.

77 FLAG

PICTURE X.

77	STATION-NO-IN		PICTURE 9999.
77	LAST-STA		PICTURE 9999.
77	STATION-MAX		PICTURE 9999 VALUE IS 4000.
77	STATION-TYPE-IN		PICTURE 9.
77	PAGE-COUNT		PICTURE 999.
77	LINE-COUNT		PICTURE 99.
77	I		PICTURE 9.
77	MT-MESSAGE		PICTURE X(12) VALUE IS
	"SEE T/M LIST".		
01	HEADER-APP.		
	03 FILLER		PICTURE X(49) VALUE IS
	" VIRGINIA STATE POLICE".		
	03 FILLER		PICTURE X(74) VALUE IS
	"APPROVAL RECEIPT VOLUME WORKSHEET".		
	03 FILLER		PICTURE X(5) VALUE IS "PAGE".
	03 PAGE-NO-AP		PICTURE ZZ9.
01	HEADER-MT.		
	03 FILLER		PICTURE X(44) VALUE IS
	" VIRGINIA STATE POLICE".		
	03 FILLER		PICTURE X(79) VALUE IS
	"TRAILER/MOTORCYCLE RECEIPT VOLUME WORKSHEET".		
	03 FILLER		PICTURE X(5) VALUE IS "PAGE".
	03 PAGE-NO-MT		PICTURE ZZ9.
01	HEADER-1.		
	03 FILLER		PICTURE X VALUE IS SPACES.
	03 FILLER		PICTURE X(23)
	VALUE IS "I	STATION	I".
	03 FILLER		PICTURE X(27)
	VALUE IS " I	I	I".
	03 FILLER		PICTURE X(27)
	VALUE IS " I	I	I".
	03 FILLER		PICTURE X(27)
	VALUE IS " I	I	I".
	03 FILLER		PICTURE X(27)
	VALUE IS " I	I	I".
01	HEADER-2.		
	03 FILLER		PICTURE X VALUE IS SPACES.
	03 FILLER		PICTURE X(23)
	VALUE IS "I NUMBER I	TYPE	I".
	03 FILLER		PICTURE X(27)
	VALUE IS " JAN. I FEB. I MARCH I".		
	03 FILLER		PICTURE X(27)
	VALUE IS " APRIL I MAY I JUNE I".		
	03 FILLER		PICTURE X(27)
	VALUE IS " JULY I AUG. I SEPT. I".		
	03 FILLER		PICTURE X(27)
	VALUE IS " OCT. I NOV. I DEC. I".		
01	EDGE-LINE.		
	03 FILLER		PICTURE X(5) VALUE IS " ---".
	03 FILLER		PICTURE X(44)
	VALUE IS "-----".		
	03 FILLER		PICTURE X(44)

```

      VALUE IS "-----".
03  FILLER                                PICTURE X(39)
      VALUE IS "-----".
01  HORIZONTAL-LINE.
03  FILLER                                PICTURE X      VALUE IS SPACES.
03  FILLER                                PICTURE X(15)
      VALUE IS "I-----I-----".
03  TYP                                  PICTURE Z.
03  FILLER                                PICTURE X(7)  VALUE IS
      "-----I".
03  FILLER                                PICTURE X(27)
      VALUE IS "-----I-----I-----I".
03  FILLER                                PICTURE X(27)
      VALUE IS "-----I-----I-----I".
03  FILLER                                PICTURE X(27)
      VALUE IS "-----I-----I-----I".
03  FILLER                                PICTURE X(27)
      VALUE IS "-----I-----I-----I".
01  VERTICLE-LINE.
03  FILLER                                PICTURE X      VALUE IS SPACES.
03  FILLER                                PICTURE X(17)
      VALUE IS "I          I          ".
03  FILLER                                PICTURE X(6) VALUE IS "          I".
03  FILLER                                PICTURE X(27)
      VALUE IS "          I          I          I".
03  FILLER                                PICTURE X(27)
      VALUE IS "          I          I          I".
03  FILLER                                PICTURE X(27)
      VALUE IS "          I          I          I".
03  FILLER                                PICTURE X(27)
      VALUE IS "          I          I          I".
01  INPUT-REC.
03  STATION-NO                            PICTURE 9999.
03  STATION-NO-REDEF REDEFINES STATION-NO PICTURE XXXX.
03  STATION-TYPE                            PICTURE 9.
03  STATION-TYPE-REDEF REDEFINES STATION-TYPE PICTURE X.
01  OUTLINE.
03  FILLER                                PICTURE X      VALUE IS SPACES.
03  FILLER                                PICTURE XXX  VALUE IS "I ".
03  STATION-NO-OUT                          PICTURE ZZZ9.
03  FILLER                                PICTURE XXX  VALUE IS " I".
03  STATION-TYPE-OUT                        PICTURE X(12).
03  FILLER                                PICTURE X      VALUE IS "I".
03  FILLER                                PICTURE X(27)
      VALUE IS "          I          I          I".
03  FILLER                                PICTURE X(27)
      VALUE IS "          I          I          I".
03  FILLER                                PICTURE X(27)
      VALUE IS "          I          I          I".
03  FILLER                                PICTURE X(27)
      VALUE IS "          I          I          I".
01  BREAKS-TABLE.

```



```

03 BRK1          PICTURE 9999 VALUE IS 448.
03 BRK2          PICTURE 9999 VALUE IS 866.
03 BRK3          PICTURE 9999 VALUE IS 1238.
03 BRK4          PICTURE 9999 VALUE IS 1737.
03 BRK5          PICTURE 9999 VALUE IS 2160.
03 BRK6          PICTURE 9999 VALUE IS 2682.
03 BRK7          PICTURE 9999 VALUE IS 3200.
03 BRK8          PICTURE 9999 VALUE IS 9999.
01 BRKSTABLE REDEFINES BREAKS-TABLE.
03 BRK OCCURS 8 TIMES    PICTURE 9999.
01 STRATA-LABEL-TABLE.
03 SL1          PICTURE X(12) VALUE IS " PRIVATE ".
03 SL2          PICTURE X(12) VALUE IS "SMALL EXEMPT".
03 SL3          PICTURE X(12) VALUE IS " UNLIMITED ".
03 SL4          PICTURE X(12) VALUE IS "LARGE EXEMPT".
03 SL5          PICTURE X(12) VALUE IS " MOTORCYCLE".
03 SL6          PICTURE X(12) VALUE IS " TRAILER".
03 SL7          PICTURE X(12) VALUE IS SPACES.
01 STRATA-LABELS-REDEF REDEFINES STRATA-LABEL-TABLE.
03 STRATA-LABEL OCCURS 7 TIMES    PICTURE X(12).

```

```

PROCEDURE DIVISION.
SORTEM.
    SORT SORT-FILE ON ASCENDING KEY S-STA
        USING S-IN GIVING STATIONFILE.
    MOVE ZERO TO FLAG.
    OPEN OUTPUT PRINT.
OPEN-FILES-INITIALIZE.
    OPEN INPUT STATIONFILE.
    MOVE 1 TO I
    MOVE 0 TO LAST-STA.
    MOVE 0 TO LINE-COUNT PAGE-COUNT STATION-NO-IN.
PRINT-HEADING.
    MOVE 0 TO LINE-COUNT
    ADD 1 TO PAGE-COUNT
    MOVE PAGE-COUNT TO PAGE-NO-AP PAGE-NO-MT.
    IF FLAG IS EQUAL TO ZERO
        THEN
            WRITE PRINT-LINE FROM HEADER-APP AFTER ADVANCING NEW-PAGE
            ELSE
                WRITE PRINT-LINE FROM HEADER-MT AFTER ADVANCING NEW-PAGE.
                WRITE PRINT-LINE FROM EDGE-LINE AFTER ADVANCING 2 LINES.
                WRITE PRINT-LINE FROM HEADER-1 AFTER ADVANCING 1 LINES.
                WRITE PRINT-LINE FROM HEADER-2 AFTER ADVANCING 1 LINES.
READ-A-RECORD-AND-PRINT.
    READ STATIONFILE INTO INPUT-REC AT END GO TO END-OF-JOB.
    IF STATION-NO IS NOT GREATER THAN LAST-STA
        GO TO READ-A-RECORD-AND-PRINT.
    MOVE STATION-NO TO LAST-STA.
CHECK-FOR-MISSING-NUMBERS.
    ADD 1 TO STATION-NO-IN
    IF STATION-NO-IN IS NOT EQUAL TO STATION-NO
        MOVE 7 TO STATION-TYPE-IN
        PERFORM PRINT-A-LINE
        GO TO CHECK-FOR-MISSING-NUMBERS.
    MOVE STATION-TYPE TO STATION-TYPE-IN.
PRINT-A-LINE.
    IF STATION-NO-IN IS NOT LESS THAN BRK (I)
        ADD 1 TO I
        PERFORM PRINT-BLANK-LINES
        PERFORM PRINT-HEADING.
    IF STATION-TYPE-IN IS LESS THAN 1 OR GREATER THAN 7
        MOVE 7 TO STATION-TYPE-IN.
    MOVE STATION-NO-IN TO STATION-NO-OUT
    IF STATION-TYPE-IN IS EQUAL TO 7
        THEN MOVE 0 TO TYP
        ELSE MOVE STATION-TYPE-IN TO TYP.
    MOVE STRATA-LABEL (STATION-TYPE-IN) TO STATION-TYPE-OUT.
    IF FLAG IS EQUAL TO ZERO AND
        (STATION-TYPE-IN IS EQUAL TO 5 OR
        STATION-TYPE-IN IS EQUAL TO 6)
        MOVE 0 TO TYP
        MOVE MT-MESSAGE TO STATION-TYPE-OUT.

```

```
WRITE PRINT-LINE FROM HORIZONTAL-LINE AFTER ADVANCING 1 LINES
WRITE PRINT-LINE FROM OUTLINE AFTER ADVANCING 1 LINES.
ADD 1 TO LINE-COUNT
IF LINE-COUNT IS GREATER THAN 26
    WRITE PRINT-LINE FROM EDGE-LINE
    AFTER ADVANCING 1 LINES
    PERFORM PRINT-HEADING.
GO-TO-READ-REC.
GO TO READ-A-RECORD-AND-PRINT.
PRINT-BLANK-LINES.
MOVE 0 TO TYP.
WRITE PRINT-LINE FROM HORIZONTAL-LINE AFTER ADVANCING 1 LINES
WRITE PRINT-LINE FROM VERTICLE-LINE AFTER ADVANCING 1 LINES.
WRITE PRINT-LINE FROM HORIZONTAL-LINE AFTER ADVANCING 1 LINES
WRITE PRINT-LINE FROM VERTICLE-LINE AFTER ADVANCING 1 LINES.
WRITE PRINT-LINE FROM EDGE-LINE AFTER ADVANCING 1 LINES.
END-OF-JOB.
MOVE 7 TO STATION-TYPE-IN.
END-LOOP.
IF STATION-NO-IN IS LESS THAN STATION-MAX
    ADD 1 TO STATION-NO-IN
    PERFORM PRINT-A-LINE
    GO TO END-LOOP.
PERFORM PRINT-BLANK-LINES
CLOSE STATIONFILE.
IF FLAG IS EQUAL TO ZERO
    MOVE "X" TO FLAG
    GO TO OPEN-FILES-INITIALIZE.
CLOSE PRINT.
STOP RUN.
```



APPENDIX E

EDIT PROGRAM

IDENTIFICATION DIVISION.  
 PROGRAM-ID. PMVIED.  
 INSTALLATION. VIRGINIA STATE POLICE.  
 DATE-WRITTEN. MAY 1977.  
 DATE-COMPILED.  
 REMARKS.

\*  
 \* THIS PROGRAM EDITS SAMPLED VEHICLE INSPECTION  
 \* RECEIPTS TO DETECT INVALID DATA. THE PROGRAM PRODUCES  
 \* A REPORT SHOWING ALL RECORDS WITH INVALID DATA DUE  
 \* TO CODING ERRORS, A FILE OF RECORDS WITH VALID  
 \* DATA AND A FILE OF RECORDS WITH INVALID DATA DUE TO  
 \* ERRORS ON THE SOURCE DOCUMENT (INSPECTION RECEIPT).  
 \*  
 \* \* NOTE \*  
 \* THREE FIELDS IN WORKING-STORAGE MAY NEED TO BE CHANGED.  
 \*  
 \* STATION-NO-UPPER-LIMIT - THE CURRENT VALUE OF 5000  
 \* IS ALREADY LARGER THAN THE HIGHEST STATION NUMBER,  
 \* BUT IN THE FUTURE IF A STATION IS ASSIGNED A NUMBER  
 \* HIGHER THAN 5000, STATION-NO-UPPER-LIMIT MUST  
 \* BE INCREASED.  
 \*  
 \* STANDARD-CHARGE - THIS IS THE CHARGE FOR INSPECTION  
 \* OF A VEHICLE. THIS VALUE NEEDS TO BE CHANGED WHEN  
 \* THE CHARGE FOR INSPECTION IS CHANGED. ALSO JACK WILLIAMS  
 \* SHOULD BE INFORMED OF ANY CHANGE, BECAUSE SANDARD CHARGE T  
 \* MUST BE ENTERED FOR EACH REJECTION RECEIPT.  
 \*  
 \* MAX-MAKE - IS THE NUMBER OF ALLOWED MAKE CODES, THE NUMBER  
 \* OF ENTRIES IN THE MAKE-TYPE-TABLE. WHEN ENTRIES ARE ADDED TO  
 \* THE TABLE, MAX-MAKE MUST BE INCREASED.  
 \*

ENVIRONMENT DIVISION.  
 CONFIGURATION SECTION.  
 SOURCE-COMPUTER. UNIVAC-1100.  
 OBJECT-COMPUTER. UNIVAC-1100.  
 SPECIAL-NAMES.

PAGE IS NEW-PAGE.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT UNSORTED-SAMPLES ASSIGN TO UNISERVO SYST01.  
 SELECT OLDSAMPLES ASSIGN TO DISC SYSD01.  
 SELECT OLDSRCERRORS ASSIGN TO DISC SYSD02.  
 SELECT STATION-CLASS-TABLE ASSIGN TO DISC SYSD03.  
 SELECT SORTED-SAMPLES ASSIGN TO DISC SYSD04.  
 SELECT EDITEDSAMPLES ASSIGN TO DISC SYSD05.  
 SELECT SOURCEERRORS ASSIGN TO DISC SYSD06.  
 SELECT SORT-FILE ASSIGN TO DISC DM01.  
 SELECT CARD ASSIGN TO CARD-READER.  
 SELECT PRINT ASSIGN TO PRINTER.

DATA DIVISION.

FILE SECTION.

FD STATION-CLASS-TABLE

LABEL RECORDS ARE STANDARD  
RECORD CONTAINS 10 CHARACTERS  
DATA RECORD IS CLASSIFIED-STATION.

01 CLASSIFIED-STATION.

03 STATION-NUMBER PICTURE 9999.  
03 AT-INDX PICTURE 99.  
03 MT-INDX PICTURE 99.  
03 ALLOWED-TYPE PICTURE 9.  
88 ONLY-AT VALUE IS 1.  
88 ONLY-MT VALUE IS 3.  
03 FILLER PICTURE X.

SD SORT-FILE

RECORD CONTAINS 46 CHARACTERS  
DATA RECORD IS SORT-REC.

01 SORT-REC.

03 FILLER PICTURE X(24).  
03 STA-NUM PICTURE XXXX.  
03 FILLER PICTURE X(18).

FD UNSORTED-SAMPLES

LABEL RECORDS ARE STANDARD  
RECORD CONTAINS 46 CHARACTERS  
DATA RECORD IS UNSORTED-REC.

01 UNSORTED-REC.

03 FILLER PICTURE X(24).  
03 STA-NO PICTURE XXXX.  
03 FILLER PICTURE X(18).

FD SORTED-SAMPLES

LABEL RECORDS ARE STANDARD  
RECORD CONTAINS 46 CHARACTERS  
DATA RECORD IS INPUT-REC.

01 INPUT-REC

PICTURE X(46).

FD CARD

LABEL RECORDS ARE OMITTED  
RECORD CONTAINS 80 CHARACTERS  
DATA RECORD IS CARD-REC.

01 CARD-REC.

03 YEAR-OF-SAMPLE.

05 FILLER PICTURE 99.

05 SAMPLE-YEAR PICTURE 99.

03 FILLER PICTURE X(76).

FD OLDSAMPLES

LABEL RECORDS ARE STANDARD  
RECORD CONTAINS 58 CHARACTERS  
DATA RECORD IS RECIN.

01 RECIN

PICTURE X(58).

FD EDITEDSAMPLES

LABEL RECORDS ARE STANDARD  
RECORD CONTAINS 58 CHARACTERS  
DATA RECORD IS OUTREC.

```

01 OUTREC                                PICTURE X(58).
FD OLDSRCERRORS
  LABEL RECORDS ARE STANDARD
  RECORD CONTAINS 58 CHARACTERS
  DATA RECORD IS BADIN.
01 BADIN                                  PICTURE X(58).
FD SOURCEERRORS
  LABEL RECORDS ARE STANDARD
  RECORD CONTAINS 58 CHARACTERS
  DATA RECORD IS BADOUT.
01 BADOUT                                  PICTURE X(58).
FD PRINT
  LABEL RECORDS ARE OMITTED
  RECORD CONTAINS 132 CHARACTERS
  DATA RECORD IS PRINT-LINE.
01 PRINT-LINE                             PICTURE X(132).
WORKING-STORAGE SECTION.
77 LAST-ST-TABLE                          PICTURE 9999.
77 YR                                       PICTURE XX.
77 ONE                                       PICTURE X VALUE IS "1".
77 STAR                                       PICTURE X VALUE IS "*".
77 STANDARD-CHARGE                          PICTURE X(5) VALUE IS "00400".
77 STATION-NO-UPPER-LIMIT                  PICTURE XXXX VALUE IS "5000".
77 I                                         PICTURE 99.
77 J                                         PICTURE 99.
77 HIGHESTYR                               PICTURE XX.
77 FATAL-ERROR                             PICTURE 9.
77 CODE-ERROR-FLAG                         PICTURE 9.
77 PAGE-NUM                                PICTURE 999.
77 LINE-COUNT                              PICTURE 99.
77 TEMPCH                                   PICTURE 999999V99.
77 READ-COUNT                              PICTURE 9(5) VALUE IS ZEROS.
77 SE-COUNT                                PICTURE 9(5) VALUE IS ZEROS.
77 EDITED-COUNT                            PICTURE 9(5) VALUE IS ZEROS.
77 NONDEF-COUNT                            PICTURE 9(5) VALUE IS ZEROS.
77 DEF-COUNT                               PICTURE 9(5) VALUE IS ZEROS.
77 ZER-MIL-COUNT                           PICTURE 9(5) VALUE IS ZEROS.
77 ERLST-COUNT                             PICTURE 9(5) VALUE IS ZEROS.
77 MAX-MAKE                                PICTURE XX VALUE IS "62".
77 NMAKE                                    PICTURE 99.

01 SAMPLE-REC.
  03 RECEIPT.
    05 STICKER                              PICTURE X.
      88 VALID-STICKER                      VALUE "0" "1" "2" "3" "4" "5".
      88 ANNUAL-REC                         VALUE IS "0" "4".
      88 REGULAR                             VALUE "0" "1".
      88 REJECTION                           VALUE "2" "3".
      88 TRLMTC                              VALUE "4" "5".
    05 SECOND-EDIT-MARK                     PICTURE X.
      88 FIRST-EDIT                          VALUE IS ZERO.
    05 MONTH                                PICTURE XX.

```



```

05 DA PICTURE XX.
05 YEAR PICTURE XX.
05 MAKE PICTURE XX.
05 VEHICLE-TYPE PICTURE XX.
88 PASS-TYPE VALUE "00" "01" "02" "03"
"04" "05" "06".
88 TRUCK-TYPE VALUE "10" "11" "12" "13" "14" "15"
"16" "17" "18" "19" "20".
88 TM-TYPE VALUE "30" "31" "32" "33"
"34" "35" "36".
05 YR-BUILT PICTURE XX.
05 SPEEDOM PICTURE X(5).
05 CHARGES PICTURE X(5).
05 STATION PICTURE XXXX.
05 DEFECTS.
07 DEFECT-ENT OCCURS 18 TIMES PICTURE X.
03 ADD-BY-EDIT.
05 STA-TYP-INDX PICTURE 99.
05 DEFECT PICTURE 9.
05 FOR-DOM PICTURE 99.
05 SOURCE-ERROR-FLAGS.
07 DATE-F PICTURE X.
07 MAKE-TYPE-F PICTURE X.
07 MILEAGE-F PICTURE X.
07 YR-BUILT-F PICTURE X.
07 CHARGES-NONDEF PICTURE X.
07 CHARGES-DEF PICTURE X.
07 MC-TRL-DEFECTS PICTURE X.
01 TEMP-DEFS.
03 TD OCCURS 18 TIMES PICTURE 9.
01 DEFECTS-MAP.
03 FILLER PICTURE 99 VALUE IS 2.
03 FILLER PICTURE 99 VALUE IS 3.
03 FILLER PICTURE 99 VALUE IS 8.
03 FILLER PICTURE 99 VALUE IS 7.
03 FILLER PICTURE 99 VALUE IS 11.
03 FILLER PICTURE 99 VALUE IS 1.
03 FILLER PICTURE 99 VALUE IS 10.
03 FILLER PICTURE 99 VALUE IS 16.
03 FILLER PICTURE 99 VALUE IS 18.
03 FILLER PICTURE 99 VALUE IS 18.
03 FILLER PICTURE 99 VALUE IS 12.
03 FILLER PICTURE 99 VALUE IS 13.
03 FILLER PICTURE 99 VALUE IS 14.
03 FILLER PICTURE 99 VALUE IS 18.
03 FILLER PICTURE 99 VALUE IS 18.
03 FILLER PICTURE 99 VALUE IS 17.
03 FILLER PICTURE 99 VALUE IS 18.
03 FILLER PICTURE 99 VALUE IS 18.
01 D-MAP REDEFINES DEFECTS-MAP.

```

03 DEF-MAP OCCURS 18 TIMES PICTURE 99.

\*  
 \* THE MAKE-TYPE-TABLE GIVES THE ALLOWED VEHICLE TYPES FOR EACH  
 \* MAKE AND WHETHER EACH MAKE IS DOMESTIC OR FOREIGN.  
 \* THE FIRST DIGIT IS ZERO FOR DOMESTIC OR 1 FOR FOREIGN. THE SEC  
 \* DIGIT IS ALLOWED VEHICLE TYPE. THE FOLLOWING CODES ARE USED:  
 \* 0 FOR OTHER WHICH CAN BE AUTO TRUCK OR MOTORCYCLE  
 \* 1 FOR TRUCK ONLY  
 \* 2 FOR TRUCK OR AUTO  
 \* 3 FOR AUTO ONLY  
 \* 4 FOR AUTO OR MOTORCYCLE  
 \* 5 FOR MOTORCYCLE ONLY  
 \*

01 MAKE-TYPE-TABLE.

03	MAKE01	PICTURE 99	VALUE IS 00.
03	MAKE02	PICTURE 99	VALUE IS 10.
03	MAKE03	PICTURE 99	VALUE IS 02.
03	MAKE04	PICTURE 99	VALUE IS 13.
03	MAKE05	PICTURE 99	VALUE IS 13.
03	MAKE06	PICTURE 99	VALUE IS 01.
03	MAKE07	PICTURE 99	VALUE IS 01.
03	MAKE08	PICTURE 99	VALUE IS 14.
03	MAKE09	PICTURE 99	VALUE IS 01.
03	MAKE10	PICTURE 99	VALUE IS 15.
03	MAKE11	PICTURE 99	VALUE IS 03.
03	MAKE12	PICTURE 99	VALUE IS 03.
03	MAKE13	PICTURE 99	VALUE IS 13.
03	MAKE14	PICTURE 99	VALUE IS 02.
03	MAKE15	PICTURE 99	VALUE IS 03.
03	MAKE16	PICTURE 99	VALUE IS 13.
03	MAKE17	PICTURE 99	VALUE IS 12.
03	MAKE18	PICTURE 99	VALUE IS 01.
03	MAKE19	PICTURE 99	VALUE IS 01.
03	MAKE20	PICTURE 99	VALUE IS 02.
03	MAKE21	PICTURE 99	VALUE IS 13.
03	MAKE22	PICTURE 99	VALUE IS 13.
03	MAKE23	PICTURE 99	VALUE IS 02.
03	MAKE24	PICTURE 99	VALUE IS 01.
03	MAKE25	PICTURE 99	VALUE IS 01.
03	MAKE26	PICTURE 99	VALUE IS 02.
03	MAKE27	PICTURE 99	VALUE IS 05.
03	MAKE28	PICTURE 99	VALUE IS 12.
03	MAKE29	PICTURE 99	VALUE IS 14.
03	MAKE30	PICTURE 99	VALUE IS 02.
03	MAKE31	PICTURE 99	VALUE IS 13.
03	MAKE32	PICTURE 99	VALUE IS 15.
03	MAKE33	PICTURE 99	VALUE IS 01.
03	MAKE34	PICTURE 99	VALUE IS 03.
03	MAKE35	PICTURE 99	VALUE IS 01.
03	MAKE36	PICTURE 99	VALUE IS 12.
03	MAKE37	PICTURE 99	VALUE IS 12.

```

03 MAKE38 PICTURE 99 VALUE IS 03.
03 MAKE39 PICTURE 99 VALUE IS 13.
03 MAKE40 PICTURE 99 VALUE IS 15.
03 MAKE41 PICTURE 99 VALUE IS 03.
03 MAKE42 PICTURE 99 VALUE IS 13.
03 MAKE43 PICTURE 99 VALUE IS 01.
03 MAKE44 PICTURE 99 VALUE IS 12.
03 MAKE45 PICTURE 99 VALUE IS 02.
03 MAKE46 PICTURE 99 VALUE IS 13.
03 MAKE47 PICTURE 99 VALUE IS 03.
03 MAKE48 PICTURE 99 VALUE IS 13.
03 MAKE49 PICTURE 99 VALUE IS 13.
03 MAKE50 PICTURE 99 VALUE IS 13.
03 MAKE51 PICTURE 99 VALUE IS 13.
03 MAKE52 PICTURE 99 VALUE IS 02.
03 MAKE53 PICTURE 99 VALUE IS 12.
03 MAKE54 PICTURE 99 VALUE IS 15.
03 MAKE55 PICTURE 99 VALUE IS 12.
03 MAKE56 PICTURE 99 VALUE IS 14.
03 MAKE57 PICTURE 99 VALUE IS 12.
03 MAKE58 PICTURE 99 VALUE IS 12.
03 MAKE59 PICTURE 99 VALUE IS 13.
03 MAKE60 PICTURE 99 VALUE IS 01.
03 MAKE61 PICTURE 99 VALUE IS 02.
03 MAKE62 PICTURE 99 VALUE IS 15.
01 M-T-TAB REDEFINES MAKE-TYPE-TABLE.
03 V-T OCCURS 62 TIMES PICTURE 99.

01 VEH-TYP.
03 FILLER PICTURE 9.
03 V-TYPE PICTURE 9.
88 AUTO-MAKE VALUE IS 0, 2, 3, 4.
88 TRUCK-MAKE VALUE IS 0, 1, 2.
88 MOTORCYCLE-MAKE VALUE IS 0, 4, 5.

01 HEADER.
03 FILLER PICTURE X(5) VALUE IS SPACES.
03 FILLER PICTURE X(39)
VALUE IS "VIRGINIA STATE POLICE ".
03 FILLER PICTURE X(40)
VALUE IS "INSPECTION RECEIPT EDIT FOR SAMPLE YEAR".
03 YEAR-OUT PICTURE 9999.
03 FILLER PICTURE X(30) VALUE IS SPACES.
03 FILLER PICTURE X(5) VALUE IS "PAGE ".
03 PAGE-NO PICTURE ZZ9.

01 HEAD1.
03 FILLER PICTURE X(33) VALUE IS SPACES.
03 FILLER PICTURE X(46)
VALUE IS "YEAR ODOMETER STATION".
03 FILLER PICTURE X(20)
VALUE IS "STATION RECEIPT".

01 HEAD2.

```

```

03 FILLER PICTURE X(5) VALUE IS SPACES.
03 FILLER PICTURE X(39)
VALUE IS " DATE MAKE TYPE BUILT ".
03 FILLER PICTURE X(46)
VALUE IS "READING CHARGES NUMBER TYPE ".
03 FILLER PICTURE X(40)
VALUE IS " TYPE RECODED INSPECTION ITEMS".
01 UNDERLINE.
03 FILLER PICTURE X(5) VALUE IS SPACES.
03 FILLER PICTURE X(37) VALUE IS
"-----"
03 FILLER PICTURE X(48) VALUE IS
"-----"
03 FILLER PICTURE X(42) VALUE IS
"-----".
01 OUTLINE.
03 FILLER PICTURE X(5) VALUE IS SPACES.
03 MMO PICTURE XX.
03 FILLER PICTURE X VALUE IS "/".
03 DDO PICTURE XX.
03 FILLER PICTURE X VALUE IS "/".
03 YYO PICTURE XX.
03 FILLER PICTURE X(5) VALUE IS SPACES.
03 MAKEO PICTURE X(8).
03 VEHICLE-TYPEO PICTURE X(9).
03 YR-BUILTO PICTURE X(10).
03 SPEEDOMO PICTURE X(13).
03 CHARGESO PICTURE ZZ9.99.
03 FILLER PICTURE X(6) VALUE IS SPACES.
03 STATIONO PICTURE X(11).
03 STATION-TYPEO PICTURE X(9).
03 STICKERO PICTURE X(13).
03 RECODEDO PICTURE X(7).
03 DEFECTSO PICTURE X(18).
01 ERROR-IND.
03 FILLER PICTURE X(5) VALUE IS SPACES.
03 MMR PICTURE XX.
03 DDER PICTURE XXX.
03 YYER PICTURE X(7).
03 MKER PICTURE X(8).
03 TPER PICTURE X(9).
03 YRER PICTURE X(10).
03 SPER PICTURE X(15).
03 CHER PICTURE X(10).
03 STNER PICTURE X(11).
03 STPER PICTURE X(9).
03 STCER PICTURE X(13).
03 RECER PICTURE X(7).
03 DFER PICTURE XXX.
01 SUMHEAD1.
03 FILLER PICTURE X(60) VALUE IS SPACES.
03 FILLER PICTURE X(12) VALUE IS

```

```

"EDIT SUMMARY".
01 SUMHEAD2.
03 FILLER PICTURE X(11) VALUE IS SPACES.
03 FILLER PICTURE X(50) VALUE IS
"RECORDS RECORDS WITH EDITED ".
03 FILLER PICTURE X(51) VALUE IS
"STANDARD CHARGE INSERTED MILEAGE ".
03 FILLER PICTURE X(10) VALUE IS
"NUMBER ON ".
01 SUMHEAD3.
03 FILLER PICTURE X(13) VALUE IS SPACES.
03 FILLER PICTURE X(46) VALUE IS
"READ SOURCE ERRORS RECORDS".
03 FILLER PICTURE X(35) VALUE IS
"NONDEFECTIVE DEFECTIVE ".
03 FILLER PICTURE X(38) VALUE IS
"ZERO FILLED ERROR LISTING ".
01 SUMUNDERLINE.
03 FILLER PICTURE X(11) VALUE IS SPACES.
03 FILLER PICTURE X(48) VALUE IS
"-----".
03 FILLER PICTURE X(35) VALUE IS
"-----".
03 FILLER PICTURE X(38) VALUE IS
"-----".
01 SUMMARYLINE.
03 FILLER PICTURE X(11) VALUE IS SPACES.
03 READ-COUNTO PICTURE ZZ,ZZ9B(11).
03 SE-COUNTO PICTURE ZZ,ZZ9B(11).
03 EDITED-COUNTO PICTURE ZZ,ZZ9B(11).
03 NONDEF-COUNTO PICTURE ZZ,ZZ9B(11).
03 DEF-COUNTO PICTURE ZZ,ZZ9B(11).
03 ZER-MIL-COUNTO PICTURE ZZ,ZZ9B(11).
03 ERLST-COUNTO PICTURE ZZ,ZZ9B(11).

```

```

PROCEDURE DIVISION.
SORT-DATA.
    SORT SORT-FILE ON ASCENDING KEY STA-NUM
        USING UNSORTED-SAMPLES
        GIVING SORTED-SAMPLES.
BEGIN.
    OPEN INPUT STATION-CLASS-TABLE SORTED-SAMPLES.
    OPEN OUTPUT PRINT EDITEDSAMPLES SOURCEERRORS.
    READ STATION-CLASS-TABLE AT END
        DISPLAY " STATION CLASSIFICATION TABLE EMPTY"
        GO TO EOJ.
    MOVE STATION-NUMBER TO LAST-ST-TABLE
    MOVE 0 TO PAGE-NO LINE-COUNT PAGE-NUM
    MOVE SPACES TO ERROR-IND.
    OPEN INPUT CARD.
    READ CARD AT END DISPLAY " "
        DISPLAY " NO DATE CARD "
        CLOSE CARD
        GO TO EOJ.

    CLOSE CARD.
    MOVE YEAR-OF-SAMPLE TO YEAR-OUT
    MOVE SAMPLE-YEAR TO YR.
    ADD 1 TO SAMPLE-YEAR.
    MOVE SAMPLE-YEAR TO HIGHESTYR.
HEADING-OUT.
    MOVE 0 TO LINE-COUNT
    ADD 1 TO PAGE-NUM
    MOVE PAGE-NUM TO PAGE-NO
    WRITE PRINT-LINE FROM HEADER AFTER ADVANCING NEW-PAGE.
    WRITE PRINT-LINE FROM HEAD1 AFTER ADVANCING 3 LINES.
    WRITE PRINT-LINE FROM HEAD2 AFTER ADVANCING 1 LINES.
    WRITE PRINT-LINE FROM UNDERLINE AFTER ADVANCING 1 LINES.
OPEN-OLDSAMPLES.
    OPEN INPUT OLDSAMPLES.
ACCUMULATE-PREVIOUS-DATA.
    READ OLDSAMPLES AT END GO TO CLOSE-OLDSAMPLES.
    WRITE OUTREC FROM RECIN.
    GO TO ACCUMULATE-PREVIOUS-DATA.
CLOSE-OLDSAMPLES.
    CLOSE OLDSAMPLES.
    OPEN INPUT OLDSRCERRORS.
ACCUMULATE-SRC-ERRORS.
    READ OLDSRCERRORS AT END GO TO CLOSE-OLDSRCERRORS.
    WRITE BADOUT FROM BADIN.
    GO TO ACCUMULATE-SRC-ERRORS.
CLOSE-OLDSRCERRORS.
    CLOSE OLDSRCERRORS.
READ-REC.
    READ SORTED-SAMPLES AT END GO TO EOJ.
    MOVE INPUT-REC TO RECEIPT.
    MOVE ZEROES TO FATAL-ERROR CODE-ERROR-FLAG ADD-BY-EDIT.
    MOVE SPACES TO ERROR-IND SOURCE-ERROR-FLAGS.

```

ADD 1 TO READ-COUNT.  
 EXAMINE CHARGES REPLACING ALL SPACES BY ZEROS.  
 EXAMINE DEFECTS REPLACING ALL SPACES BY ZEROS.  
 IF SECOND-EDIT-MARK IS EQUAL TO SPACE  
     MOVE ZERO TO SECOND-EDIT-MARK.  
 MOVE VEHICLE-TYPE TO VEHICLE-TYPE0.  
 MOVE SPEEDOM TO SPEEDOM0.  
 MOVE YR-BUILT TO YR-BUILTO.  
 DATE-EDIT.  
     IF MONTH IS NOT NUMERIC OR MONTH IS LESS THAN "01" OR  
         MONTH IS GREATER THAN "12"  
             MOVE ONE TO DATE-F  
             MOVE STAR TO MMR  
             MOVE 1 TO CODE-ERROR-FLAG.  
 STICKER-EDIT.  
     IF NOT VALID-STICKER  
         MOVE 1 TO CODE-ERROR-FLAG  
         GO TO STICKER-TYPE-MAKE-ERROR.  
 MAKE-EDIT.  
     IF MAKE IS NOT NUMERIC OR MAKE IS LESS THAN "01" OR  
         MAKE IS GREATER THAN MAX-MAKE  
             MOVE 1 TO CODE-ERROR-FLAG  
             GO TO STICKER-TYPE-MAKE-ERROR.  
     MOVE MAKE TO NMAKE.  
     MOVE V-T (NMAKE) TO FOR-DOM VEH-TYP.  
     IF NOT REJECTION GO TO TYPE-EDIT.  
     IF YR-BUILT IS EQUAL TO SPACES  
         MOVE ZEROES TO YR-BUILT.  
     IF VEHICLE-TYPE IS EQUAL TO SPACES  
         MOVE "99" TO VEHICLE-TYPE  
         GO TO YR-BUILT-EDIT.  
 TYPE-EDIT.  
     IF NOT PASS-TYPE AND NOT TRUCK-TYPE AND NOT TM-TYPE  
         MOVE 1 TO CODE-ERROR-FLAG  
         GO TO STICKER-TYPE-MAKE-ERROR.  
 STICKER-TYPE-MAKE-EDIT.  
     IF REGULAR AND TM-TYPE GO TO STICKER-TYPE-MAKE-ERROR.  
     IF (NOT TM-TYPE) AND (TRLMTC) GO TO STICKER-TYPE-MAKE-ERROR.  
     IF TM-TYPE GO TO MOTORCYCLE-TRAILER-STICKER.  
     IF AUTO-MAKE AND PASS-TYPE  
         GO TO YR-BUILT-EDIT.  
     IF TRUCK-MAKE AND TRUCK-TYPE  
         GO TO YR-BUILT-EDIT.  
     GO TO STICKER-TYPE-MAKE-ERROR.  
 MOTORCYCLE-TRAILER-STICKER.  
     IF VEHICLE-TYPE IS NOT EQUAL TO "31"  
         EXAMINE SPEEDOM REPLACING ALL SPACES BY ZEROS  
         GO TO YR-BUILT-EDIT.  
     IF MOTORCYCLE-MAKE  
         GO TO YR-BUILT-EDIT.  
 STICKER-TYPE-MAKE-ERROR.  
     MOVE 1 TO FATAL-ERROR

MOVE ONE TO MAKE-TYPE-F.  
 MOVE STAR TO TPER MKER STCER.  
 YR-BUILT-EDIT.  
   IF YR-BUILT IS EQUAL TO ZEROES AND REJECTION  
     GO TO MILEAGE-EDIT.  
   IF YR-BUILT IS NOT NUMERIC OR  
     YR-BUILT IS GREATER THAN HIGHESTYR OR  
     YR-BUILT IS LESS THAN "10"  
     MOVE ZEROES TO YR-BUILT  
     MOVE ONE TO YR-BUILT-F  
     MOVE STAR TO YRER.  
 MILEAGE-EDIT.  
   IF SPEEDOM IS NOT NUMERIC OR SPEEDOM IS EQUAL TO ZEROES  
     MOVE ONE TO MILEAGE-F  
     MOVE ZEROES TO SPEEDOM  
     MOVE STAR TO SPER.  
 STATION-EDIT.  
   IF STATION IS NOT NUMERIC OR STATION IS LESS THAN "0001" OR  
     STATION IS GREATER THAN STATION-NO-UPPER-LIMIT  
     MOVE 1 TO FATAL-ERROR CODE-ERROR-FLAG  
     MOVE STAR TO STNER STPER.  
   IF NOT TM-TYPE GO TO CHECK-FOR-DEFECTIVE.  
   IF REJECTION PERFORM REJ-TM-MAP THROUGH RMX.  
   MOVE ZERO TO DEFECT-ENT (18).  
   IF VEHICLE-TYPE IS EQUAL TO "31" GO TO CHECK-FOR-DEFECTIVE.  
   IF DEFECT-ENT (3) IS NOT EQUAL TO ZERO OR  
     DEFECT-ENT (10) IS NOT EQUAL TO ZERO OR  
     DEFECT-ENT (11) IS NOT EQUAL TO ZERO OR  
     DEFECT-ENT (13) IS NOT EQUAL TO ZERO OR  
     DEFECT-ENT (16) IS NOT EQUAL TO ZERO OR  
     DEFECT-ENT (17) IS NOT EQUAL TO ZERO  
     MOVE 1 TO FATAL-ERROR  
     MOVE ONE TO MC-TRL-DEFECTS  
     MOVE STAR TO DFER.  
 CHECK-FOR-DEFECTIVE.  
   MOVE 1 TO I.  
   MOVE 0 TO DEFECT.  
 DEF-LOOP.  
   IF DEFECT-ENT (I) IS NOT EQUAL TO ZERO  
     MOVE 1 TO DEFECT  
     GO TO CHARGES-EDIT.  
   ADD 1 TO I.  
   IF I IS LESS THAN 19 GO TO DEF-LOOP.  
 CHARGES-EDIT.  
   IF REJECTION PERFORM REJECT-EDIT  
     GO TO FIND-STATION.  
   IF DEFECT IS EQUAL TO 0 AND CHARGES IS NOT EQUAL TO  
     STANDARD-CHARGE  
     MOVE ONE TO CHARGES-NONDEF  
     MOVE STAR TO CHER.  
   IF DEFECT IS EQUAL TO 1 AND CHARGES IS NOT GREATER THAN  
     STANDARD-CHARGE



```

        MOVE ONE TO CHARGES-DEF
        MOVE STAR TO CHER.
FIND-STATION.
    MOVE ZEROES TO STA-TYP-INDX.
    IF STNER IS EQUAL TO STAR
        GO TO LIST-INVALID-REC.
ASSIGN-STATION-CLASSIFICATION.
    IF STATION IS GREATER THAN STATION-NUMBER
        PERFORM NEXT-STATION
        GO TO ASSIGN-STATION-CLASSIFICATION.
    IF STATION IS NOT EQUAL TO STATION-NUMBER
        MOVE STAR TO STNER STPER
        GO TO LIST-INVALID-REC.
MOVE AT-INDX TO STA-TYP-INDX.
IF TM-TYPE MOVE MT-INDX TO STA-TYP-INDX.
IF NOT VALID-STICKER GO TO LIST-INVALID-REC.
IF REJECTION AND STA-TYP-INDX IS LESS THAN 4
    MOVE STAR TO STPER STCER
    GO TO LIST-INVALID-REC.
IF (TM-TYPE AND ONLY-AT AND NOT REJECTION) OR
    (NOT TM-TYPE AND ONLY-MT)
    MOVE STAR TO STNER STPER STCER
    GO TO LIST-INVALID-REC.
CHECK-ERRORS.
    IF ERROR-IND IS EQUAL TO SPACES
        WRITE OUTREC FROM SAMPLE-REC
        ADD 1 TO EDITED-COUNT
        GO TO READ-REC.
    IF CODE-ERROR-FLAG IS NOT EQUAL TO 0
        GO TO LIST-INVALID-REC.
    IF FATAL-ERROR IS EQUAL TO 1 AND FIRST-EDIT
        GO TO LIST-INVALID-REC.
    WRITE BADOUT FROM SAMPLE-REC.
    ADD 1 TO SE-COUNT.
    IF FATAL-ERROR IS EQUAL TO 1
        GO TO READ-REC.
    IF SPER IS EQUAL TO STAR
        ADD 1 TO ZER-MIL-COUNT
        IF YR-BUILT IS NOT LESS THAN YR AND ANNUAL-REC
            MOVE "00010" TO SPEEDOM.
    IF CHARGES-NONDEF IS EQUAL TO ONE
        MOVE STANDARD-CHARGE TO CHARGES
        ADD 1 TO NONDEF-COUNT.
    IF CHARGES-DEF IS EQUAL TO ONE
        MOVE STANDARD-CHARGE TO CHARGES
        ADD 1 TO DEF-COUNT.
    WRITE OUTREC FROM SAMPLE-REC.
    ADD 1 TO EDITED-COUNT
    GO TO READ-REC.
LIST-INVALID-REC.
    ADD 1 TO ERLST-COUNT
    MOVE MONTH TO MMO.

```

```

MOVE DA TO DDO.
MOVE YEAR TO YYO.
MOVE MAKE TO MAKEO
MOVE CHARGES TO TEMPCH
DIVIDE TEMPCH BY 100 GIVING CHARGESO
MOVE STATION TO STATIONO
MOVE STA-TYP-INDX TO STATION-TYPEO.
MOVE STICKER TO STICKERO
MOVE SECOND-EDIT-MARK TO RECODEDO
MOVE DEFECTS TO DEFECTSO
IF REGULAR          MOVE "REGULAR" TO STICKERO.
IF REJECTION        MOVE "REJECT" TO STICKERO.
IF TRLMTC           MOVE "TRL/MC" TO STICKERO.
MOVE "YES" TO RECODEDO.
IF FIRST-EDIT MOVE "NO" TO RECODEDO.
IF LINE-COUNT IS GREATER THAN 25 PERFORM HEADING-OUT.
WRITE PRINT-LINE FROM ERROR-IND AFTER ADVANCING 2 LINES.
WRITE PRINT-LINE FROM OUTLINE AFTER ADVANCING 0 LINES.
ADD 1 TO LINE-COUNT
GO TO READ-REC.
REJ-TM-MAP.
MOVE ZEROS TO TEMP-DEFS.
MOVE 1 TO I.
RTM-LOOP.
MOVE DEF-MAP (I) TO J.
MOVE DEFECT-ENT (I) TO TD (J).
ADD 1 TO I.
IF I IS LESS THAN 19 GO TO RTM-LOOP.
MOVE TEMP-DEFS TO DEFECTS.
RMX.
EXIT.
REJECT-EDIT.
MOVE STANDARD-CHARGE TO CHARGES.
IF DEFECT IS EQUAL TO 0
    MOVE STAR TO DFER STCER
    MOVE 1 TO FATAL-ERROR.
NEXT-STATION.
READ STATION-CLASS-TABLE AT END
    MOVE 9999 TO STATION-NUMBER.
IF STATION-NUMBER IS LESS THAN LAST-ST-TABLE
    DISPLAY " STATION CLASSIFICATION TABLE NOT "
    DISPLAY " IN ORDER. SORT AND RERUN. "
    GO TO EOJ.
MOVE STATION-NUMBER TO LAST-ST-TABLE.
EOJ.
MOVE READ-COUNT TO READ-COUNTO
MOVE SE-COUNT TO SE-COUNTO
MOVE EDITED-COUNT TO EDITED-COUNTO
MOVE NONDEF-COUNT TO NONDEF-COUNTO
MOVE DEF-COUNT TO DEF-COUNTO
MOVE ZER-MIL-COUNT TO ZER-MIL-COUNTO
MOVE ERLST-COUNT TO ERLST-COUNTO

```

WRITE PRINT-LINE FROM SUMHEAD1 AFTER ADVANCING NEW-PAGE.  
WRITE PRINT-LINE FROM SUMHEAD2 AFTER ADVANCING 2 LINES.  
WRITE PRINT-LINE FROM SUMHEAD3 AFTER ADVANCING 1 LINES.  
WRITE PRINT-LINE FROM SUMUNDERLINE AFTER ADVANCING 1 LINES.  
WRITE PRINT-LINE FROM SUMMARYLINE AFTER ADVANCING 2 LINES.  
CLOSE SORTED-SAMPLES EDITEDSAMPLES SOURCEERRORS PRINT  
STATION-CLASS-TABLE.  
STOP RUN.



APPENDIX F  
TABULATION PROGRAM

IDENTIFICATION DIVISION.  
 PROGRAM-ID. PMVITB.  
 DATE-WRITTEN. JUNE 1977.  
 DATE-COMPILED.  
 REMARKS.

\*  
 \* THIS PROGRAM READS A FILE OF EDITED RECEIPTS AND LISTS  
 \* THE NUMBER OF RECEIPTS (APPROVAL AND REJECTION, AUTO/TRUCK  
 \* AND TRAILER/MOTORCYCLE) IN EACH OF THE FIFTEEN STATION  
 \* STRATA. IF A PARAMETER CARD IS INCLUDED WITH "STATIONS"  
 \* IN COLUMNS 1-8, THEN THE NUMBER OF RECEIPTS PER MONTH  
 \* FOR EACH STATION WILL BE LISTED.  
 \*

ENVIRONMENT DIVISION.  
 CONFIGURATION SECTION.  
 SOURCE-COMPUTER. UNIVAC-1100.  
 OBJECT-COMPUTER. UNIVAC-1100.  
 SPECIAL-NAMES.

PAGE IS NEW-PAGE.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT UNSORTED-SAMPLES ASSIGN TO DISC SYSD01.

SELECT SAMPLES ASSIGN TO DISC SYSD02.

SELECT SORT-FILE ASSIGN TO DISC DM01.

SELECT CARD ASSIGN TO CARD-READER.

SELECT PRINT ASSIGN TO PRINTER.

DATA DIVISION.

FILE SECTION.

FD SAMPLES

LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS SAMPLE-REC.

01 SAMPLE-REC.

03	RECEIPT	PICTURE 9.
88	REJECTION	VALUE IS 2,3.
88	TRAILER-MOTORCYCLE	VALUE IS 4,5.
03	FILLER	PICTURE X.
03	MONTH	PICTURE 99.
03	FILLER	PICTURE X(6).
03	VEH-TYPE	PICTURE 99.
03	FILLER	PICTURE X(12).
03	STATION	PICTURE 9999.
03	FILLER	PICTURE X(18).
03	STATION-TYPE	PICTURE 99.
03	FILLER	PICTURE X(10).

SD SORT-FILE

RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS SORT-REC.

01 SORT-REC.

03	FILLER	PICTURE XX.
----	--------	-------------

	03	SMONTH	PICTURE	99.	
	03	FILLER	PICTURE	X(20).	
	03	SSTATION	PICTURE	9999.	
	03	FILLER	PICTURE	X(30).	
FD		UNSORTED-SAMPLES			
		LABEL RECORDS ARE STANDARD			
		RECORD CONTAINS 58 CHARACTERS			
		DATA RECORD IS UNSORTED-REC.			
01		UNSORTED-REC.			
	03	FILLER	PICTURE	XX.	
	03	UMONTH	PICTURE	99.	
	03	FILLER	PICTURE	X(20).	
	03	USTATION	PICTURE	9999.	
	03	FILLER	PICTURE	X(30).	
FD		CARD			
		LABEL RECORDS ARE OMITTED			
		RECORD CONTAINS 80 CHARACTERS			
		DATA RECORD IS PARM-CARD-REC.			
01		PARM-CARD-REC.			
	03	LIST-STATIONS	PICTURE	X(7).	
	03	FILLER	PICTURE	X(73).	
FD		PRINT			
		LABEL RECORDS ARE OMITTED			
		RECORD CONTAINS 132 CHARACTERS			
		DATA RECORD IS PRINT-LINE.			
01		PRINT-LINE	PICTURE	X(132).	
		WORKING-STORAGE SECTION.			
	77	S-FLAG	PICTURE	9	VALUE IS ZERO.
	77	ST	PICTURE	9.	
	77	PAGE-COUNT	PICTURE	99.	
	77	THIS-STATION	PICTURE	9999.	
	77	THIS-MONTH	PICTURE	99.	
	77	LINE-COUNT	PICTURE	99.	
	77	TEMP	PICTURE	9(5).	
	77	PERTEMP	PICTURE	9(5)V9999.	
	77	I	PICTURE	99.	
	77	J	PICTURE	99.	
	77	K	PICTURE	99.	
01		STRATA-TABLE.			
	03	STRATA OCCURS 16 TIMES.			
	05	AT-OR-TM OCCURS 2 TIMES.			
	07	COUNT OCCURS 2 TIMES	PICTURE	9(6).	
01		STA-TYPES-TABLE.			
	03	STA-TYP OCCURS 2 TIMES	PICTURE	99.	
01		STATION-TABLE.			
	03	STATION-TYPS OCCURS 2 TIMES.			
	05	RECEIPT-TYPS OCCURS 2 TIMES.			
	07	AP-REJ OCCURS 2 TIMES	PICTURE	9(6).	
01		PAGE-HEAD.			
	03	FILLER	PICTURE	X(49)	VALUE IS
		"	VIRGINIA STATE POLICE "		
	03	FILLER	PICTURE	X(66)	VALUE IS

		"PERIODIC MOTOR VEHICLE INSPECTION ".		
	03	FILLER	PICTURE X(5)	VALUE IS "PAGE ".
	03	PAGE-NO	PICTURE ZZ9.	
	03	FILLER	PICTURE X(11)	VALUE IS SPACES.
01		HEADER.		
	03	FILLER	PICTURE X(56)	VALUE IS SPACES.
	03	FILLER	PICTURE X(76)	VALUE IS
		"SAMPLE DISTRIBUTION ".		
01		HEAD1.		
	03	FILLER	PICTURE X(51)	VALUE IS SPACES.
	03	FILLER	PICTURE X(31)	VALUE IS
		"AUTO/TRUCK RECEIPTS".		
	03	FILLER	PICTURE X(27)	VALUE IS
		"TRAILER/MOTORCYCLE RECEIPTS".		
01		HEAD1-LINE.		
	03	FILLER	PICTURE X(47)	VALUE IS SPACES.
	03	FILLER	PICTURE X(35)	VALUE IS
		"-----".		
	03	FILLER	PICTURE X(27)	VALUE IS
		"-----".		
01		HEAD2.		
	03	FILLER	PICTURE X(47)	VALUE IS SPACES.
	03	FILLER	PICTURE X(35)	VALUE IS
		"APPROVALS REJECTIONS ".		
	03	FILLER	PICTURE X(28)	VALUE IS
		"APPROVALS REJECTIONS ".		
01		HEAD2-LINE.		
	03	FILLER	PICTURE X(47)	VALUE IS SPACES.
	03	FILLER	PICTURE X(35)	VALUE IS
		"-----".		
	03	FILLER	PICTURE X(28)	VALUE IS
		"-----".		
01		REPORT-LINE.		
	03	FILLER	PICTURE X(24)	VALUE IS SPACES.
	03	STRATA-OUT	PICTURE X(24).	
	03	AT-APP	PICTURE ZZ,ZZ9B(11).	
	03	AT-REJ	PICTURE ZZ,ZZ9B(12).	
	03	TM-APP	PICTURE ZZ,ZZ9B(11).	
	03	TM-REJ	PICTURE ZZ,ZZ9.	
01		SHEAD1.		
	03	FILLER	PICTURE X(9)	VALUE IS SPACES.
	03	FILLER	PICTURE X(7)	VALUE IS
		"STATION".		
01		SHEAD2.		
	03	FILLER	PICTURE X(9)	VALUE IS SPACES.
	03	FILLER	PICTURE X(47)	VALUE IS
		"NUMBER STATION TYPE ".		
	03	FILLER	PICTURE X(40)	VALUE IS
		"RECEIPT TYPE MONTH ".		
	03	FILLER	PICTURE X(28)	VALUE IS
		"APPROVALS REJECTIONS".		



```

01 SHEAD2-LINE.
03 FILLER          PICTURE X(9)    VALUE IS SPACES.
03 FILLER          PICTURE X(44)   VALUE IS
   "-----"
03 FILLER          PICTURE X(60)   VALUE IS
   "-----"
03 FILLER          PICTURE X(10)   VALUE IS
   "-----".

01 STATION-LINE.
03 FILLER          PICTURE X(10)   VALUE IS SPACES.
03 S-NUM           PICTURE ZZ9B(10).
03 S-STRATA        PICTURE X(29).
03 S-REC-TYPE      PICTURE X(26).
03 S-MONTH         PICTURE X(19).
03 S-APP           PICTURE Z,ZZ9B(12).
03 S-REJ           PICTURE Z,ZZ9.

01 MONTH-TABLE.
03 FILLER PICTURE X(9) VALUE IS " JANUARY".
03 FILLER PICTURE X(9) VALUE IS "FEBRUARY".
03 FILLER PICTURE X(9) VALUE IS " MARCH".
03 FILLER PICTURE X(9) VALUE IS " APRIL".
03 FILLER PICTURE X(9) VALUE IS " MAY".
03 FILLER PICTURE X(9) VALUE IS " JUNE".
03 FILLER PICTURE X(9) VALUE IS " JULY".
03 FILLER PICTURE X(9) VALUE IS " AUGUST".
03 FILLER PICTURE X(9) VALUE IS "SEPTEMBER".
03 FILLER PICTURE X(9) VALUE IS " OCTOBER".
03 FILLER PICTURE X(9) VALUE IS "NOVEMBER".
03 FILLER PICTURE X(9) VALUE IS "DECEMBER".

01 M-LABS REDEFINES MONTH-TABLE.
03 MONTH-LAB OCCURS 12 TIMES PICTURE X(9).

01 STRATA-LABELS.
03 FILLER PICTURE X(21) VALUE IS "PRIVATE - LOW".
03 FILLER PICTURE X(21) VALUE IS "PRIVATE - MEDIUM".
03 FILLER PICTURE X(21) VALUE IS "PRIVATE - HIGH".
03 FILLER PICTURE X(21) VALUE IS "SMALL EXEMPT - LOW".
03 FILLER PICTURE X(21) VALUE IS "SMALL EXEMPT - MEDIUM".
03 FILLER PICTURE X(21) VALUE IS "SMALL EXEMPT - HIGH".
03 FILLER PICTURE X(21) VALUE IS "UNLIMITED - LOW".
03 FILLER PICTURE X(21) VALUE IS "UNLIMITED - MEDIUM".
03 FILLER PICTURE X(21) VALUE IS "UNLIMITED - HIGH".
03 FILLER PICTURE X(21) VALUE IS "MOTORCYCLE - LOW".
03 FILLER PICTURE X(21) VALUE IS "MOTORCYCLE - MEDIUM".
03 FILLER PICTURE X(21) VALUE IS "MOTORCYCLE - HIGH".
03 FILLER PICTURE X(21) VALUE IS "TRAILER - LOW".
03 FILLER PICTURE X(21) VALUE IS "TRAILER - MEDIUM".
03 FILLER PICTURE X(21) VALUE IS "TRAILER - HIGH".
03 FILLER PICTURE X(21) VALUE IS "TOTAL".

01 STRATA-L REDEFINES STRATA-LABELS.
03 STRATA-LAB OCCURS 16 TIMES PICTURE X(21).

01 RECEIPT-LABELS.
03 FILLER PICTURE X(18) VALUE IS " AUTO/TRUCK".

```

2924

03 FILLER PICTURE X(18) VALUE IS "TRAILER/MOTORCYCLE".  
01 RECEIPT-L REDEFINES RECEIPT-LABELS.  
03 RT-LAB OCCURS 2 TIMES PICTURE X(18).

```

PROCEDURE DIVISION.
BEGIN.
  OPEN INPUT CARD.
  OPEN OUTPUT PRINT.
  MOVE ZEROES TO S-FLAG PAGE-COUNT STRATA-TABLE STA-TYPES-TABLE
    STATION-TABLE.
  READ CARD AT END GO TO FIRST-READ.
  IF LIST-STATIONS IS EQUAL TO "STATION"
    THEN MOVE 1 TO S-FLAG
      SORT SORT-FILE ON ASCENDING KEY SSTATION SMONTH
      USING UNSORTED-SAMPLES
      GIVING SAMPLES
      OPEN INPUT SAMPLES
    ELSE OPEN INPUT UNSORTED-SAMPLES.
FIRST-READ.
  IF S-FLAG IS EQUAL TO 1
    THEN PERFORM READ-SORTED
    ELSE PERFORM READ-UNSORTED.
  MOVE STATION TO THIS-STATION.
  MOVE MONTH TO THIS-MONTH.
  MOVE STATION-TYPE TO STA-TYP (1).
  MOVE 1 TO ST.
  GO TO ADD-TO-STRATA.
READ-SORTED.
  READ SAMPLES AT END GO TO PRINT-STRATA-TABLE.
READ-UNSORTED.
  READ UNSORTED-SAMPLES AT END GO TO PRINT-STRATA-TABLE.
  MOVE UNSORTED-REC TO SAMPLE-REC.
NEXT-RECEIPT.
  IF S-FLAG IS EQUAL TO 1
    THEN PERFORM READ-SORTED
    ELSE PERFORM READ-UNSORTED.
ADD-TO-STRATA.
  MOVE 1 TO J K.
  IF REJECTION MOVE 2 TO K.
  IF TRAILER-MOTORCYCLE OR VEH-TYPE IS GREATER THAN 29
    MOVE 2 TO J.
  ADD 1 TO COUNT (STATION-TYPE, J, K)
    COUNT (16, J, K).
  IF S-FLAG IS EQUAL TO 0 GO TO NEXT-RECEIPT.
  IF STATION IS NOT EQUAL TO THIS-STATION OR
    MONTH IS NOT EQUAL TO THIS-MONTH
    PERFORM PRINT-STATION THROUGH PSX.
  MOVE 1 TO ST.
FIND-STATION-TYPE.
  IF STATION-TYPE IS EQUAL TO STA-TYP (ST)
    PERFORM ADD-TO-STATION THROUGH ASX
    GO TO NEXT-RECEIPT.
  IF ST IS EQUAL TO 1
    MOVE 2 TO ST
    GO TO FIND-STATION-TYPE.
  IF STA-TYP (ST) IS EQUAL TO 0

```

```

        MOVE STATION-TYPE TO STA-TYP (ST)
        PERFORM ADD-TO-STATION THROUGH ASX
        GO TO NEXT-RECEIPT.
    DISPLAY " STATION WITH MORE THAN TWO TYPES - ", SAMPLE-REC.
    GO TO NEXT-RECEIPT.
ADD-TO-STATION.
    MOVE 1 TO J.
    IF TRAILER-MOTORCYCLE OR VEH-TYPE IS GREATER THAN 29
        MOVE 2 TO J.
    MOVE 1 TO K.
    IF REJECTION MOVE 2 TO K.
    ADD 1 TO AP-REJ (ST, J, K).
    MOVE 1 TO ST.
ASX.
    EXIT.
PRINT-STATION.
    MOVE THIS-STATION TO S-NUM.
    MOVE MONTH-LAB (THIS-MONTH) TO S-MONTH.
    PERFORM PRINT-IT THROUGH P-X
        VARYING K FROM 1 BY 1 UNTIL K IS GREATER THAN 2
        AFTER J FROM 1 BY 1 UNTIL J IS GREATER THAN 2.
    MOVE ZEROS TO STATION-TABLE STA-TYPES-TABLE.
    MOVE STATION TO THIS-STATION.
    MOVE MONTH TO THIS-MONTH.
    MOVE STATION-TYPE TO STA-TYP (1).
    GO TO PSX.
PRINT-IT.
    IF AP-REJ (J, K, 1) IS EQUAL TO 0 AND
        AP-REJ (J, K, 2) IS EQUAL TO 0 GO TO P-X.
    MOVE STA-TYP (J) TO I.
    MOVE STRATA-LAB (I) TO S-STRATA.
    MOVE RT-LAB (K) TO S-REC-TYPE.
    MOVE AP-REJ (J, K, 1) TO S-APP.
    MOVE AP-REJ (J, K, 2) TO S-REJ.
    IF LINE-COUNT IS GREATER THAN 26
        PERFORM STATION-PAGE-HEAD.
    WRITE PRINT-LINE FROM STATION-LINE AFTER ADVANCING 2 LINES.
    ADD 1 TO LINE-COUNT.
P-X.
    EXIT.
STATION-PAGE-HEAD.
    MOVE 0 TO LINE-COUNT.
    ADD 1 TO PAGE-COUNT.
    MOVE PAGE-COUNT TO PAGE-NO.
    WRITE PRINT-LINE FROM PAGE-HEAD AFTER ADVANCING NEW-PAGE.
    WRITE PRINT-LINE FROM HEADER AFTER ADVANCING 1 LINES.
    WRITE PRINT-LINE FROM SHEAD1 AFTER ADVANCING 3 LINES.
    WRITE PRINT-LINE FROM SHEAD2 AFTER ADVANCING 1 LINES.
    WRITE PRINT-LINE FROM SHEAD2-LINE AFTER ADVANCING 1 LINES.
PSX.
    EXIT.
PRINT-STRATA-TABLE.

```

```
IF S-FLAG IS EQUAL TO 1
    PERFORM PRINT-STATION THROUGH PSX.
WRITE PRINT-LINE FROM PAGE-HEAD AFTER ADVANCING NEW-PAGE.
WRITE PRINT-LINE FROM HEADER    AFTER ADVANCING 1 LINES.
WRITE PRINT-LINE FROM HEAD1     AFTER ADVANCING 5 LINES.
WRITE PRINT-LINE FROM HEAD1-LINE AFTER ADVANCING 1 LINES.
WRITE PRINT-LINE FROM HEAD2     AFTER ADVANCING 2 LINES.
WRITE PRINT-LINE FROM HEAD2-LINE AFTER ADVANCING 1 LINES.
MOVE 1 TO I.
LOOP.
MOVE STRATA-LAB (I) TO STRATA-OUT.
MOVE COUNT (I, 1, 1) TO AT-APP.
MOVE COUNT (I, 1, 2) TO AT-REJ.
MOVE COUNT (I, 2, 1) TO TM-APP.
MOVE COUNT (I, 2, 2) TO TM-REJ.
WRITE PRINT-LINE FROM REPORT-LINE AFTER ADVANCING 2 LINES.
ADD 1 TO I.
IF I IS LESS THAN 17 GO TO LOOP.
CLOSE-FILES.
CLOSE CARD PRINT.
IF S-FLAG IS EQUAL TO 1
    THEN CLOSE SAMPLES
    ELSE CLOSE UNSORTED-SAMPLES.
STOP RUN.
```



APPENDIX G

SOURCE DOCUMENT ERROR PROGRAM

IDENTIFICATION DIVISION.  
 PROGRAM-ID. PMVISD.  
 DATE-WRITTEN. MAY 1977.  
 DATE-COMPILED.  
 REMARKS.

\*  
 \* THIS PROGRAM READS THE FILE OF SOURCE DOCUMENT ERRORS  
 \* (OUTPUT BY THE PMVI EDIT PROGRAM) AND PRODUCES A REPORT  
 \* SHOWING THOSE STATIONS WITH 10 OR MORE ERRORS IN ONE  
 \* OR MORE OF THESE SIX ITEMS:  
 \* MAKE OR TYPE, MILEAGE, YEAR BUILT, NONDEFECTIVE  
 \* VEHICLES WITH INCORRECT CHARGES, OR DEFECTIVE VEHICLES  
 \* WITH INCORRECT CHARGES.  
 \* THE PROGRAM DOES NOT EDIT THE DATA TO FIND ERRORS,  
 \* IT CHECKS FLAGS WHICH ARE SET BY THE PMVI EDIT PROGRAM.  
 \*

ENVIRONMENT DIVISION.  
 CONFIGURATION SECTION.  
 SOURCE-COMPUTER. UNIVAC-1100.  
 OBJECT-COMPUTER. UNIVAC-1100.  
 SPECIAL-NAMES.

PAGE IS NEW-PAGE.

INPUT-OUTPUT SECTION.  
 FILE-CONTROL .

SELECT SOURCE-ERRORS ASSIGN TO DISC SYSD01.  
 SELECT SOURCE-DOCUMENT-ERROR-FILE ASSIGN TO DISC SYSD02.  
 SELECT SORT-FILE ASSIGN TO DISC DM01.  
 SELECT CARD ASSIGN TO CARD-READER.  
 SELECT PRINT ASSIGN TO PRINTER.

DATA DIVISION.  
 FILE SECTION.

FD SOURCE-DOCUMENT-ERROR-FILE  
 LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS ERROR-REC.

01	ERROR-REC.	
03	FILLER	PICTURE X(24).
03	STATION	PICTURE 9999.
03	FILLER	PICTURE X(23).
03	DATE-F	PICTURE X.
03	MAKE-TYPE	PICTURE X.
03	MILEAGE	PICTURE X.
03	YR-BUILT	PICTURE X.
03	CHARGES-NONDEF	PICTURE X.
03	CHARGES-DEF	PICTURE X.
03	TRL-MC	PICTURE X.



SD SORT-FILE  
 RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS SORT-REC.

01 SORT-REC.  
 03 FILLER PICTURE X(24).  
 03 STATION-NO PICTURE 9999.  
 03 FILLER PICTURE X(30).

FD SOURCE-ERRORS  
 LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS SOURCE-ERROR-REC.

01 SOURCE-ERROR-REC.  
 03 FILLER PICTURE X(24).  
 03 STATION-NUMBER PICTURE 9999.  
 03 FILLER PICTURE X(30).

FD CARD  
 LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 80 CHARACTERS  
 DATA RECORD IS CARD-REC.

01 CARD-REC.  
 03 YEAR-OF-SAMPLE.  
 05 FILLER PICTURE XX.  
 05 SAMPLE-YEAR PICTURE 99.  
 03 FILLER PICTURE X(76).

FD PRINT  
 LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 132 CHARACTERS  
 DATA RECORD IS PRINT-LINE.

01 PRINT-LINE PICTURE X(132).

## WORKING-STORAGE SECTION.

77 PAGE-NUM PICTURE 999.  
 77 LINE-COUNT PICTURE 99.  
 77 LAST-STATION PICTURE 9999.  
 77 ERROR-FLAG PICTURE 9.

01 STATION-TOTALS.  
 03 MAKE-TYPE-ST PICTURE 9999.  
 03 MILEAGE-ST PICTURE 9999.  
 03 YR-BUILT-ST PICTURE 9999.  
 03 CHARGES-NONDEF-ST PICTURE 9999.  
 03 CHARGES-DEF-ST PICTURE 9999.  
 03 ERROR-RECS-ST PICTURE 9999.

01 GRAND-TOTALS.  
 03 MAKE-TYPE-G PICTURE 9999.  
 03 MILEAGE-G PICTURE 9999.  
 03 YR-BUILT-G PICTURE 9999.  
 03 CHARGES-NONDEF-G PICTURE 9999.  
 03 CHARGES-DEF-G PICTURE 9999.  
 03 ERROR-RECS-G PICTURE 9999.

01 PAGE-HEADING.  
03 FILLER PICTURE X(49) VALUE IS  
" VIRGINIA STATE POLICE ".  
03 FILLER PICTURE X(66) VALUE IS  
" MOTOR VEHICLE INSPECTION TABULATION ".  
03 FILLER PICTURE X(5) VALUE IS "PAGE ".  
03 PAGE-NO PICTURE ZZ9B(5).

01 HEAD1.  
03 FILLER PICTURE X(50) VALUE IS SPACES.  
03 YEAR-OUT PICTURE X(5).  
03 FILLER PICTURE X(77) VALUE IS  
"SOURCE DOCUMENT ERROR REPORT ".

01 HEAD2.  
03 FILLER PICTURE X(34) VALUE IS SPACES.  
03 FILLER PICTURE X(47) VALUE IS  
"NOTE: NUMBER OF RECEIPTS WITH ERRORS IN THESE ".  
03 FILLER PICTURE X(51) VALUE IS  
"CATEGORIES FOR ".

01 HEAD3.  
03 FILLER PICTURE X(41) VALUE IS SPACES.  
03 FILLER PICTURE X(14) VALUE IS  
"STATIONS WITH ".  
03 ERROR-LIMIT PICTURE 99 VALUE IS 10.  
03 FILLER PICTURE X(75) VALUE IS  
" OR MORE ERRORS IN ANY ONE CATEGORY ".

01 HEAD4.  
03 FILLER PICTURE X(67) VALUE IS SPACES.  
03 FILLER PICTURE X(61) VALUE IS  
"NONDEFECTIVE DEFECTIVE NUMBER OF ".

01 HEAD5.  
03 FILLER PICTURE X(9) VALUE IS SPACES.  
03 FILLER PICTURE X(42) VALUE IS  
"STATION NUMBER MAKE/TYPE MILEAGE ".  
03 FILLER PICTURE X(52) VALUE IS  
"YEAR BUILT VEHICLE CHARGES VEHICLE CHARGES ".  
03 FILLER PICTURE X(25) VALUE IS  
"RECEIPTS WITH ERRORS ".

01 UNDERLINE.  
03 FILLER PICTURE X(9) VALUE IS SPACES.  
03 FILLER PICTURE X(42) VALUE IS  
"-----".  
03 FILLER PICTURE X(52) VALUE IS  
"-----".  
03 FILLER PICTURE X(25) VALUE IS  
"-----".

01 OUTLINE.  
03 FILLER PICTURE X(10) VALUE IS SPACES.  
03 LABELA PICTURE XXXX VALUE IS SPACES.  
03 STATION-NUM PICTURE ZZ9.  
03 STATION-LABEL REDEFINES STATION-NUM PICTURE XXXX.

03	LABELB	PICTURE	X(10)	VALUE IS SPACES.
03	MAKE-TYPE-0	PICTURE	Z,ZZ9B(6).	
03	MILE	PICTURE	Z,ZZ9B(8).	
03	YEAR-BUILT	PICTURE	Z,ZZ9B(12).	
03	NONDEFCHARGE	PICTURE	Z,ZZ9B(14).	
03	DEFCHARGE	PICTURE	Z,ZZ9B(16).	
03	ERROR-RECS	PICTURE	Z,ZZ9B(14).	

PROCEDURE DIVISION.

SORT-SOURCE-DOCUMENT-ERRORS.

    SORT SORT-FILE ON ASCENDING KEY STATION-NO  
     USING SOURCE-ERRORS  
     GIVING SOURCE-DOCUMENT-ERROR-FILE.

BEGIN.

    OPEN INPUT SOURCE-DOCUMENT-ERROR-FILE  
     CARD.

    OPEN OUTPUT PRINT.

    READ CARD AT END GO TO NO-DATE-CARD.

    MOVE YEAR-OF-SAMPLE TO YEAR-OUT

    CLOSE CARD.

    MOVE ZEROS TO PAGE-NUM LINE-COUNT STATION-TOTALS GRAND-TOTALS

    READ SOURCE-DOCUMENT-ERROR-FILE  
     AT END PERFORM FINISHED-STATION  
     GO TO END-OF-JOB.

    MOVE STATION TO LAST-STATION

    MOVE 0 TO ERROR-FLAG

    PERFORM PRINT-PAGE-HEAD.

    PERFORM CHECK-FOR-ERRORS.

READ-REC.

    READ SOURCE-DOCUMENT-ERROR-FILE  
     AT END PERFORM FINISHED-STATION  
     GO TO END-OF-JOB.

    IF STATION IS NOT EQUAL TO LAST-STATION  
     PERFORM FINISHED-STATION.

    PERFORM CHECK-FOR-ERRORS

    GO TO READ-REC.

CHECK-FOR-ERRORS.

    IF MAKE-TYPE IS NOT EQUAL TO SPACE

        ADD 1 TO MAKE-TYPE-ST MAKE-TYPE-G ERROR-FLAG.

    IF MILEAGE IS NOT EQUAL TO SPACE

        ADD 1 TO MILEAGE-ST MILEAGE-G ERROR-FLAG.

    IF YR-BUILT IS NOT EQUAL TO SPACE

        ADD 1 TO YR-BUILT-ST YR-BUILT-G ERROR-FLAG.

    IF CHARGES-NONDEF IS NOT EQUAL TO SPACE

        ADD 1 TO CHARGES-NONDEF-ST  
         CHARGES-NONDEF-G  
         ERROR-FLAG.

    IF CHARGES-DEF IS NOT EQUAL TO SPACE

        ADD 1 TO CHARGES-DEF-ST CHARGES-DEF-G  
         ERROR-FLAG.

    IF TRL-MC IS NOT EQUAL TO SPACE

        ADD 1 TO ERROR-FLAG.

    IF ERROR-FLAG IS NOT EQUAL TO 0

        ADD 1 TO ERROR-RECS-ST ERROR-RECS-G  
         MOVE 0 TO ERROR-FLAG.

## FINISHED-STATION.

IF MILEAGE-ST IS NOT LESS THAN ERROR-LIMIT OR  
 YR-BUILT-ST IS NOT LESS THAN ERROR-LIMIT OR  
 CHARGES-NONDEF-ST IS NOT LESS THAN ERROR-LIMIT OR  
 CHARGES-DEF-ST IS NOT LESS THAN ERROR-LIMIT OR  
 MAKE-TYPE-ST IS NOT LESS THAN ERROR-LIMIT  
 PERFORM PRINT-STATION.  
 MOVE ZEROS TO STATION-TOTALS  
 MOVE STATION TO LAST-STATION.

## PRINT-STATION.

MOVE LAST-STATION TO STATION-NUM  
 MOVE MAKE-TYPE-ST TO MAKE-TYPE-O  
 MOVE MILEAGE-ST TO MILE  
 MOVE YR-BUILT-ST TO YEAR-BUILT  
 MOVE CHARGES-NONDEF-ST TO NONDEFCHARGE  
 MOVE CHARGES-DEF-ST TO DEFCHARGE  
 MOVE ERROR-RECS-ST TO ERROR-RECS  
 IF LINE-COUNT IS GREATER THAN 24  
 PERFORM PRINT-PAGE-HEAD.  
 WRITE PRINT-LINE FROM OUTLINE AFTER ADVANCING 2 LINES.  
 ADD 1 TO LINE-COUNT.

## PRINT-PAGE-HEAD.

ADD 1 TO PAGE-NUM  
 MOVE PAGE-NUM TO PAGE-NO  
 MOVE 0 TO LINE-COUNT  
 WRITE PRINT-LINE FROM PAGE-HEADING AFTER ADVANCING NEW-PAGE.  
 WRITE PRINT-LINE FROM HEAD1 AFTER ADVANCING 2 LINES.  
 WRITE PRINT-LINE FROM HEAD2 AFTER ADVANCING 3 LINES.  
 WRITE PRINT-LINE FROM HEAD3 AFTER ADVANCING 1 LINES.  
 WRITE PRINT-LINE FROM HEAD4 AFTER ADVANCING 2 LINES.  
 WRITE PRINT-LINE FROM HEAD5 AFTER ADVANCING 1 LINES.  
 WRITE PRINT-LINE FROM UNDERLINE AFTER ADVANCING 1 LINES.

## NO-DATE-CARD.

MOVE " NO DATE CARD" TO PRINT-LINE  
 WRITE PRINT-LINE AFTER ADVANCING NEW-PAGE.  
 CLOSE CARD  
 GO TO CLOSE-FILES.

## END-OF-JOB.

IF LINE-COUNT IS GREATER THAN 23  
 PERFORM PRINT-PAGE-HEAD.  
 MOVE SPACES TO PRINT-LINE  
 WRITE PRINT-LINE AFTER ADVANCING 2 LINES  
 MOVE "ALL " TO LABELA  
 MOVE "STAT" TO STATION-LABEL  
 MOVE "IONS" TO LABELB  
 MOVE MAKE-TYPE-G TO MAKE-TYPE-O  
 MOVE MILEAGE-G TO MILE  
 MOVE YR-BUILT-G TO YEAR-BUILT

MOVE CHARGES-NONDEF-G TO NONDEFCHARGE  
MOVE CHARGES-DEF-G TO DEFCHARGE  
MOVE ERROR-RECS-G TO ERROR-RECS  
WRITE PRINT-LINE FROM OUTLINE AFTER ADVANCING 2 LINES.

CLOSE-FILES.  
CLOSE SOURCE-DOCUMENT-ERROR-FILE  
PRINT  
STOP RUN.

APPENDIX H

AUTO/TRUCK ANALYSIS PROGRAM

IDENTIFICATION DIVISION.  
 PROGRAM-ID. PMVIAP.  
 REMARKS.

\*  
 \* THIS PROGRAM READS THE FILE OF EDITED RECEIPTS AND  
 \* PRODUCES A REPORT SHOWING THE DISTRIBUTION OF THE  
 \* SAMPLE BY VEHICLE TYPE AND STATION TYPE, AND  
 \* PERCENTAGE OCCURRENCE OF DEFECTS BY TYPE OF DEFECT  
 \* FOR EACH STATION TYPE AND FOR YEAR BUILT, MILEAGE,  
 \* AND MAKE CATEGORIES.  
 \*  
 \* THIS REPORT INCLUDES ONLY AUTO/TRUCK RECEIPTS.  
 \* TRAILER/MOTORCYCLES ARE WRITTEN TO A FILE (SYSD02) FOR  
 \* PROCESSING BY THE TRAILER/MOTORCYCLE REPORT PROGRAM.  
 \*

ENVIRONMENT DIVISION.  
 CONFIGURATION SECTION.

SOURCE-COMPUTER. UNIVAC-1100.  
 OBJECT-COMPUTER. UNIVAC-1100.

SPECIAL-NAMES.

PAGE IS NEW-PAGE.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT SAMPLES ASSIGN TO DISC SYSD01.  
 SELECT TM-RECEIPTS ASSIGN TO DISC SYSD02.  
 SELECT CARD ASSIGN TO CARD-READER.  
 SELECT PRINT ASSIGN TO PRINTER.

DATA DIVISION.

FILE SECTION.

FD CARD

LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 80 CHARACTERS  
 DATA RECORD IS CARD-REC.

01 CARD-REC.

03 FILLER PICTURE XX.  
 03 YR-OF-SAMPLE PICTURE 99.  
 03 FILLER PICTURE X(76).

FD PRINT

LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 132 CHARACTERS  
 DATA RECORD IS PRINT-LINE.

01 PRINT-LINE PICTURE X(132).

FD SAMPLES

LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS SAMPLE-REC.

01 SAMPLE-REC.

03 STICKER PICTURE 9.



	88	REGULAR	VALUE IS	0, 1.
	88	REJECTION	VALUE IS	2, 3.
	88	TRLMTC	VALUE IS	4, 5.
03		FILLER		PICTURE X(7).
03		MAKE		PICTURE 99.
03		VEHICLE-TYPE		PICTURE 99.
03		YR-BUILT		PICTURE 99.
03		MILEAGE		PICTURE 9(5).
03		COST		PICTURE 999V99.
03		FILLER		PICTURE XXXX.
03		DEFECTIN OCCURS 18 TIMES		PICTURE 9.
03		STA-TYPE		PICTURE 99.
03		DEFECTIVE		PICTURE 9.
03		FOR-DOM		PICTURE 9.
03		FILLER		PICTURE X(8).
FD		TM-RECEIPTS		
		LABEL RECORDS ARE STANDARD		
		RECORD CONTAINS 58 CHARACTERS		
		DATA RECORD IS TM-REC.		
01		TM-REC		PICTURE X(58).
		WORKING-STORAGE SECTION.		
77		PAGE-COUNT		PICTURE 99.
77		TEMP		PICTURE 9(6)V99.
77		PER-TEMP		PICTURE 999V99999.
77		CLASSUB		PICTURE 99.
77		MAJTYP		PICTURE 99.
77		TYPSUB		PICTURE 99.
77		YRSUB		PICTURE 99.
77		MILESUB		PICTURE 99.
77		MAKESUB		PICTURE 99.
77		I		PICTURE 99.
77		J		PICTURE 99.
77		K		PICTURE 99.
77		ALL-VEH-SAMP		PICTURE 9(5).
77		ALL-VEH-REJ		PICTURE 9(5).
77		ALL-VEH-DEF		PICTURE 9(5).
01		PAGEHEAD1.		
03		FILLER		PICTURE X(18) VALUE IS SPACES.
03		FILLER		PICTURE X(30) VALUE IS
		"VIRGINIA STATE POLICE".		
03		FILLER		PICTURE X(64) VALUE IS
		"MOTOR VEHICLE INSPECTION TABULATION ".		
03		FILLER		PICTURE X(5) VALUE IS "PAGE ".
03		PAGE-NUM		PICTURE ZZ9.
03		FILLER		PICTURE X(12) VALUE IS SPACES.
01		PAGEHEAD.		
03		FILLER		PICTURE X(13) VALUE IS SPACES.
03		FILLER		PICTURE X(35) VALUE IS
		"VIRGINIA STATE POLICE".		
03		FILLER		PICTURE X(64) VALUE IS

```

          "MOTOR VEHICLE INSPECTION TABULATION".
03  FILLER                PICTURE X(5) VALUE IS "PAGE ".
03  PAGE-NO               PICTURE ZZ9.
03  FILLER                PICTURE X(12) VALUE IS SPACES.

01  YEARHEAD.
    03  FILLER                PICTURE X(51) VALUE IS SPACES.
    03  FILLER                PICTURE X(27) VALUE IS
          "YEAR ENDING DECEMBER 31, 19".
    03  HEAD-DATE-YEAR      PICTURE 99.

01  MONTHHEAD.
    03  FILLER                PICTURE X(59) VALUE IS SPACES.
    03  HEAD-DATE-MONTH    PICTURE X(73).

01  SAMPLEHEAD.
    03  FILLER                PICTURE X(26) VALUE IS SPACES.
    03  SAMPLE-LABEL        PICTURE X(26).
    03  FILLER                PICTURE X(80) VALUE IS
          " SAMPLE DISTRIBUTION BY VEHICLE TYPE ".

01  DEFECTHEAD.
    03  FILLER                PICTURE X(26) VALUE IS SPACES.
    03  DEFECT-LABEL        PICTURE X(26).
    03  FILLER                PICTURE X(80) VALUE IS
          " PERCENTAGE DEFECTS BY VEHICLE TYPE ".

01  SECONDHEAD.
    03  FILLER                PICTURE X(44) VALUE IS SPACES.
    03  FILLER                PICTURE X(88) VALUE IS
          "STATEWIDE PERCENTAGE DEFECTS FOR VEHICLES ".

01  MODELHEADSINGLE.
    03  FILLER                PICTURE X(59) VALUE IS SPACES.
    03  FILLER                PICTURE X(11) VALUE IS
          "BUILT IN 19".
    03  SINGLE-YR           PICTURE 99.

01  MODELHEAD.
    03  FILLER                PICTURE X(54) VALUE IS SPACES.
    03  FILLER                PICTURE X(13) VALUE IS
          "BUILT FROM 19".
    03  BEGIN-YR            PICTURE 99.
    03  FILLER                PICTURE X(6) VALUE IS " TO 19".
    03  END-YR              PICTURE 99.

01  MILEAGEHEAD.
    03  FILLER                PICTURE X(49) VALUE IS SPACES.
    03  FILLER                PICTURE X(18) VALUE IS
          "WITH MILEAGE FROM ".
    03  BEGIN-MILE          PICTURE ZZ,ZZ9.
    03  FILLER                PICTURE XXXX VALUE IS " TO ".
    03  END-MILE            PICTURE ZZ,ZZ9.

```

01 MAKEHEAD.  
03 FILLER PICTURE X(41) VALUE IS SPACES.  
03 FILLER PICTURE X(33) VALUE IS  
"STATEWIDE PERCENTAGE DEFECTS FOR".  
03 MAKE-HEAD PICTURE X(9).  
03 FILLER PICTURE X(8) VALUE IS  
"VEHICLES".

01 SAMPLEHEAD2.  
03 FILLER PICTURE X(54) VALUE IS  
" VEHICLE TYPE".  
03 FILLER PICTURE X(24) VALUE IS  
"NUMBER SAMPLED".  
03 FILLER PICTURE X(25) VALUE IS  
"NUMBER DEFECTIVE".  
03 FILLER PICTURE X(29) VALUE IS  
"PERCENT DEFECTIVE".

01 SAMPLEHEAD3.  
03 FILLER PICTURE X(18) VALUE IS SPACES.  
03 VEH-TYPE PICTURE X(40).

01 SAMPLEUNDERLINE.  
03 FILLER PICTURE X(54) VALUE IS  
" -----".  
03 FILLER PICTURE X(24) VALUE IS  
"-----".  
03 FILLER PICTURE X(25) VALUE IS  
"-----".  
03 FILLER PICTURE X(29) VALUE IS  
"-----".

01 SAMPLELINE.  
03 FILLER PICTURE X(18) VALUE IS SPACES.  
03 MAJOR-VEH-TYPE.  
05 FILLER PICTURE XXX VALUE IS SPACES.  
05 SUB-VEH-TYPE PICTURE X(37).  
03 NUMBER-SAMPLED PICTURE ZZ,ZZ9.  
03 FILLER PICTURE X(19) VALUE IS SPACES.  
03 NUMBER-DEFECTIVE PICTURE ZZ,ZZ9.  
03 FILLER PICTURE X(19) VALUE IS SPACES.  
03 PERCENT-DEFECTIVE PICTURE ZZ9.99.  
03 FILLER PICTURE X(18) VALUE IS SPACES.

01 DEFHEAD1.  
03 FILLER PICTURE X(40) VALUE IS SPACES.  
03 FILLER PICTURE X(37) VALUE IS  
"PASSENGER".  
03 FILLER PICTURE X(55) VALUE IS  
" SCHOOL COMMERCIAL ALL".

```

01 DEFHEAD2.
03 FILLER          PICTURE X(40) VALUE IS SPACES.
03 FILLER          PICTURE X(37) VALUE IS
   "VEHICLES      TRUCKS".
03 FILLER          PICTURE X(55) VALUE IS
   "BUSES        BUSES          VEHICLES".

01 DEFUNDERLINE.
03 FILLER          PICTURE X(40) VALUE IS SPACES.
03 FILLER          PICTURE X(37) VALUE IS
   "-----"      "-----".
03 FILLER          PICTURE X(55) VALUE IS
   "-----"      "-----".

01 DEFHEAD3.
03 FILLER          PICTURE X(18) VALUE IS SPACES.
03 FILLER          PICTURE X(6) VALUE IS
   "DEFECT".

01 DEFHEAD3LINE.
03 FILLER          PICTURE X(13) VALUE IS SPACES.
03 FILLER          PICTURE X(16) VALUE IS
   "-----".

01 DEFECTLINE.
03 FILLER          PICTURE X(13) VALUE IS SPACES.
03 DEFECT-OUT     PICTURE X(28).
03 PER-ENT.
05 PER-VAL OCCURS 4 TIMES PICTURE ZZ9.99B(12).
03 NO-ENT REDEFINES PER-ENT.
05 NO-VAL OCCURS 4 TIMES PICTURE ZZ,ZZ9B(12).
03 ALLVEH-PER     PICTURE ZZ9.99.
03 ALLVEH-NO REDEFINES ALLVEH-PER
   PICTURE ZZ,ZZ9.
03 FILLER          PICTURE X(13) VALUE IS SPACES.

01 COSTLINE1.
03 FILLER          PICTURE X(13) VALUE IS SPACES.
03 FILLER          PICTURE X(119) VALUE IS
   "AVERAGE COST PER".

01 COSTLINE2.
03 FILLER          PICTURE X(13) VALUE IS SPACES.
03 COST-HEAD      PICTURE X(27).
03 COST-VAL OCCURS 4 TIMES PICTURE $$$9.99B(11).
03 ALLVEH-COST    PICTURE $$$9.99.
03 FILLER          PICTURE X(13) VALUE IS SPACES.

```

```

*
* SAMPLE-TABLE STORES NUMBER SAMPLED AND NUMBER DEFECTIVE
* BY STATION TYPE.

```

\*  
 01 SAMPLE-TABLE.  
   03 STATION-CLASS-S OCCURS 10 TIMES.  
   05 VEHICLE-TYPE-S OCCURS 10 TIMES.  
   07 NUMB OCCURS 2 TIMES PICTURE 9(5).

\*  
 \* DEFECTS-TABLE STORES OCCURRENCES OF EACH TYPE OF DEFECT  
 \* BY STATION TYPE.  
 \*

01 DEFECTS-TABLE.  
   03 STATION-CLASS-D OCCURS 10 TIMES.  
   05 NUMBERS OCCURS 21 TIMES.  
   07 VEH-TYPE-D OCCURS 4 TIMES PICTURE 9(5).

\*  
 \* DEFECTS-CROSSTAB-TABLE STORES OCCURRENCES OF EACH TYPE OF DEFE  
 \* BY YEAR, MILEAGE, AND MAKE CATEGORIES.  
 \*

01 DEFECTS-CROSSTAB-TABLE.  
   03 YEAR-MILE-MAKE OCCURS 18 TIMES.  
   05 NUMBERS OCCURS 21 TIMES.  
   07 VEH-TYPE-C OCCURS 4 TIMES PICTURE 9(5).

\*  
 \* STATEWIDE-COST-TABLE STORES COSTS FOR ALL VEHICLES AND VEHICLE  
 \* REPAIRED BY STATION TYPE.  
 \*

01 STATEWIDE-COST-TABLE.  
   03 STATION-CLASS-COST OCCURS 10 TIMES.  
   05 COST-TYPE-S OCCURS 2 TIMES.  
   07 COST-S OCCURS 4 TIMES PICTURE 9(6)V99.

\*  
 \* CROSSTAB-COST-TABLE STORES COSTS FOR ALL VEHICLES AND VEHICLES  
 \* REPAIRED BY YEAR, MILEAGE, AND MAKE CATEGORIES.  
 \*

01 CROSSTAB-COST-TABLE.  
   03 YEAR-MILE-MAKE OCCURS 18 TIMES.  
   05 COST-TYPE-C OCCURS 2 TIMES.  
   07 COST-C OCCURS 4 TIMES PICTURE 9(6)V99.

01 TRAILER-MOTORCYCLE-TABLE.  
   03 T-OR-M OCCURS 2 TIMES.  
   05 TM-NUMB OCCURS 2 TIMES PICTURE 9(5).

01 PAGEIII-HEAD-TABLE.  
   03 YEAR-MILE OCCURS 15 TIMES.  
   05 HEAD-ENT OCCURS 2 TIMES PICTURE 9(5).

01 DEFECT-TABLE.  
   03 DEF19 PICTURE X(16) VALUE IS

```

    "NUMBER SAMPLED".
03  DEF20          PICTURE X(16) VALUE IS
    "NUMBER REJECTED".
03  DEF21          PICTURE X(16) VALUE IS
    "NUMBER DEFECTIVE".
03  DEF1           PICTURE X(16) VALUE IS
    "BRAKES".
03  DEF2          PICTURE X(16) VALUE IS
    "HEADLIGHTS".
03  DEF3          PICTURE X(16) VALUE IS
    "OTHER LIGHTS".
03  DEF4          PICTURE X(16) VALUE IS
    "SIGNAL LIGHTS".
03  DEF5          PICTURE X(16) VALUE IS
    "HORN".
03  DEF6          PICTURE X(16) VALUE IS
    "STEERING".
03  DEF7          PICTURE X(16) VALUE IS
    "MIRROR".
03  DEF8          PICTURE X(16) VALUE IS
    "WINDSHIELD".
03  DEF9          PICTURE X(16) VALUE IS
    "OTHER GLASS".
03  DEF10         PICTURE X(16) VALUE IS
    "WINDSHIELD WIPER".
03  DEF11         PICTURE X(16) VALUE IS
    "TAG MOUNTING".
03  DEF12         PICTURE X(16) VALUE IS
    "EXHAUST SYSTEM".
03  DEF13         PICTURE X(16) VALUE IS
    "TIRES".
03  DEF14         PICTURE X(16) VALUE IS
    "SEAT BELTS".
03  DEF15         PICTURE X(16) VALUE IS
    "HOOD LATCH".
03  DEF16         PICTURE X(16) VALUE IS
    "FUEL SYSTEM".
03  DEF17         PICTURE X(16) VALUE IS
    "DOORS".
03  DEF18         PICTURE X(16) VALUE IS
    "EMISSION CONTROL".
01  DEFECT-TABLE-REDEF REDEFINES DEFECT-TABLE.
    03  DEFECT-ENT OCCURS 21 TIMES PICTURE X(16).

01  SAMPLE-LABEL-TABLE.
    03  SL1        PICTURE X(22) VALUE IS "    DOMESTIC".
    03  SL2        PICTURE X(22) VALUE IS "    FOREIGN".
    03  SL3        PICTURE X(22) VALUE IS "    TOTAL".
    03  SL4        PICTURE X(22) VALUE IS "    PICKUP, VAN, PANEL".
    03  SL5        PICTURE X(22) VALUE IS "    TRACTOR TRUCKS".
    03  SL6        PICTURE X(22) VALUE IS "    OTHER".
    03  SL7        PICTURE X(22) VALUE IS "    TOTAL".

```

```
03 SL8      PICTURE X(22) VALUE IS "   SCHOOL".
03 SL9      PICTURE X(22) VALUE IS "   COMMERCIAL".
03 SL10     PICTURE X(22) VALUE IS "ALL VEHICLES".
01 SAMPLE-LABEL-REDEF REDEFINES SAMPLE-LABEL-TABLE.
03 SAMP-LABEL OCCURS 10 TIMES PICTURE X(22).

01 SAMPLE-HEAD-LABEL-TABLE.
03 SH1 PICTURE X(26) VALUE IS "          PRIVATE LOW VOLUME".
03 SH2 PICTURE X(26) VALUE IS "          PRIVATE MEDIUM VOLUME".
03 SH3 PICTURE X(26) VALUE IS "          PRIVATE HIGH VOLUME".
03 SH4 PICTURE X(26) VALUE IS "    SMALL EXEMPT LOW VOLUME".
03 SH5 PICTURE X(26) VALUE IS "SMALL EXEMPT MEDIUM VOLUME".
03 SH6 PICTURE X(26) VALUE IS "    SMALL EXEMPT HIGH VOLUME".
03 SH7 PICTURE X(26) VALUE IS "          UNLIMITED LOW VOLUME".
03 SH8 PICTURE X(26) VALUE IS "          UNLIMITED MEDIUM VOLUME".
03 SH9 PICTURE X(26) VALUE IS "          UNLIMITED HIGH VOLUME".
03 SH0 PICTURE X(26) VALUE IS "          STATEWIDE".
01 HEAD-LABLE-REDEF REDEFINES SAMPLE-HEAD-LABEL-TABLE.
03 HEAD-LABEL OCCURS 10 TIMES PICTURE X(26).
```

## PROCEDURE DIVISION.

## OPEN-FILES-INITIALIZE.

```

OPEN INPUT SAMPLES CARD.
OPEN OUTPUT PRINT TM-RECEIPTS.
READ CARD AT END GO TO NO-DATE-CARD.
MOVE YR-OF-SAMPLE TO HEAD-DATE-YEAR.
MOVE 0 TO HEAD-ENT (1, 1) HEAD-ENT (2, 1) HEAD-ENT (3, 1)
      HEAD-ENT (4, 1) HEAD-ENT (8, 1) HEAD-ENT (9, 1).
SUBTRACT 13 FROM YR-OF-SAMPLE GIVING HEAD-ENT (8, 2).
ADD 1 HEAD-ENT (8, 2) GIVING HEAD-ENT (7, 1).
ADD 3 HEAD-ENT (7, 1) GIVING HEAD-ENT (7, 2).
ADD 1 HEAD-ENT (7, 2) GIVING HEAD-ENT (6, 1).
ADD 3 HEAD-ENT (6, 1) GIVING HEAD-ENT (6, 2).
ADD 1 HEAD-ENT (6, 2) GIVING HEAD-ENT (5, 1).
ADD 1 HEAD-ENT (5, 1) GIVING HEAD-ENT (5, 2).
ADD 1 HEAD-ENT (5, 2) GIVING HEAD-ENT (4, 2).
ADD 1 HEAD-ENT (4, 2) GIVING HEAD-ENT (3, 2).
ADD 1 HEAD-ENT (3, 2) GIVING HEAD-ENT (2, 2).
ADD 1 HEAD-ENT (2, 2) GIVING HEAD-ENT (1, 2).
MOVE 9999 TO HEAD-ENT (9, 2).
MOVE 10000 TO HEAD-ENT (10, 1).
MOVE 19999 TO HEAD-ENT (10, 2).
MOVE 20000 TO HEAD-ENT (11, 1).
MOVE 29999 TO HEAD-ENT (11, 2).
MOVE 30000 TO HEAD-ENT (12, 1).
MOVE 39999 TO HEAD-ENT (12, 2).
MOVE 40000 TO HEAD-ENT (13, 1).
MOVE 59999 TO HEAD-ENT (13, 2).
MOVE 60000 TO HEAD-ENT (14, 1).
MOVE 79999 TO HEAD-ENT (14, 2).
MOVE 80000 TO HEAD-ENT (15, 1).
MOVE 99999 TO HEAD-ENT (15, 2).
MOVE ZEROES TO SAMPLE-TABLE DEFECTS-TABLE
      DEFECTS-CROSSTAB-TABLE STATEWIDE-COST-TABLE
      CROSSTAB-COST-TABLE TRAILER-MOTORCYCLE-TABLE.

```

## READ-A-SAMPLE.

```

READ SAMPLES AT END GO TO GET-TOTALS.
IF VEHICLE-TYPE IS EQUAL TO 99
      GO TO READ-A-SAMPLE.
IF VEHICLE-TYPE IS GREATER THAN 29
      PERFORM FOUND-TM THROUGH FTMX
      GO TO READ-A-SAMPLE.
MOVE STA-TYPE TO CLASSUB.
MOVE 2 TO MAJTYP.
IF VEHICLE-TYPE IS LESS THAN 10
      MOVE 1 TO MAJTYP TYP SUB
      ADD FOR-DOM TO TYP SUB.
IF VEHICLE-TYPE EQUALS 19
      MOVE 3 TO MAJTYP
      MOVE 8 TO TYP SUB.

```



```

IF VEHICLE-TYPE EQUALS 20
    MOVE 4 TO MAJTYP
    MOVE 9 TO TYPSUB.
IF MAJTYP IS NOT EQUAL TO 2 GO TO DETERMINE-YR-GROUP.
MOVE 6 TO TYPSUB
IF VEHICLE-TYPE EQUALS 18 MOVE 5 TO TYPSUB.
IF VEHICLE-TYPE EQUALS 13 OR VEHICLE-TYPE EQUALS 14
    OR VEHICLE-TYPE EQUALS 15 MOVE 4 TO TYPSUB.

DETERMINE-YR-GROUP.
IF YR-BUILT IS EQUAL TO 0
    MOVE 18 TO YRSUB
    GO TO DETERMINE-MILE.
MOVE 1 TO YRSUB
MOVE 8 TO I.

YR-BUILT-LOOP.
IF YR-BUILT IS NOT GREATER THAN HEAD-ENT (I, 2)
    MOVE I TO YRSUB
    GO TO DETERMINE-MILE.
SUBTRACT 1 FROM I
IF I IS GREATER THAN 1 GO TO YR-BUILT-LOOP.

DETERMINE-MILE.
IF MILEAGE IS EQUAL TO 0
    MOVE 18 TO MILESUB
    GO TO DETERMINE-MAKE.
DIVIDE MILEAGE BY 20000 GIVING MILESUB
IF MILESUB IS GREATER THAN 1
    ADD 11 TO MILESUB.
IF MILESUB IS LESS THAN 2
    MULTIPLY 2 BY MILESUB
    ADD 10 TO MILESUB
IF MILEAGE IS LESS THAN HEAD-ENT (MILESUB, 1)
    SUBTRACT 1 FROM MILESUB.

DETERMINE-MAKE.
MOVE 16 TO MAKESUB
IF FOR-DOM IS EQUAL TO 1
    MOVE 17 TO MAKESUB.
ADD 1 TO NUMB (CLASSUB, TYPSUB, 1) NUMB (10, TYPSUB, 1)
    VEH-TYPE-D (CLASSUB, 1, MAJTYP)
    VEH-TYPE-D (10, 1, MAJTYP)
    VEH-TYPE-C (YRSUB, 1, MAJTYP)
    VEH-TYPE-C (MILESUB, 1, MAJTYP)
    VEH-TYPE-C (MAKESUB, 1, MAJTYP)
ADD COST TO COST-C (YRSUB, 1, MAJTYP)
    COST-S (CLASSUB, 1, MAJTYP)
    COST-C (MILESUB, 1, MAJTYP)
    COST-S (10, 1, MAJTYP)
    COST-C (MAKESUB, 1, MAJTYP)
IF DEFECTIVE EQUALS 1 PERFORM DEFECT-VEH THROUGH DEFECT-LOOP.
GO TO READ-A-SAMPLE.

```

```

DEFECT-VEH.
  IF NOT REJECTION
    ADD COST TO COST-C (YRSUB, 2, MAJTYP)
      COST-S (CLASSUB, 2, MAJTYP)
      COST-C (MILESUB, 2, MAJTYP)
      COST-S (10, 2, MAJTYP)
      COST-C (MAKESUB, 2, MAJTYP).
  ADD 1 TO NUMB (CLASSUB, TYPSUB, 2) NUMB (10, TYPSUB, 2)
    VEH-TYPE-D (CLASSUB, 3, MAJTYP)
    VEH-TYPE-D (10, 3, MAJTYP)
    VEH-TYPE-C (YRSUB, 3, MAJTYP)
    VEH-TYPE-C (MILESUB, 3, MAJTYP)
    VEH-TYPE-C (MAKESUB, 3, MAJTYP)
  IF REJECTION ADD 1 TO
    VEH-TYPE-D (CLASSUB, 2, MAJTYP)
    VEH-TYPE-D (10, 2, MAJTYP)
    VEH-TYPE-C (YRSUB, 2, MAJTYP)
    VEH-TYPE-C (MILESUB, 2, MAJTYP)
    VEH-TYPE-C (MAKESUB, 2, MAJTYP).
  MOVE 1 TO I.

```

```

DEFECT-LOOP.
  IF DEFECTIN (I) IS NOT EQUAL TO 0
    ADD 3 I GIVING J
      ADD 1 TO VEH-TYPE-D (CLASSUB, J, MAJTYP)
      VEH-TYPE-D (10, J, MAJTYP)
      VEH-TYPE-C (YRSUB, J, MAJTYP)
      VEH-TYPE-C (MILESUB, J, MAJTYP)
      VEH-TYPE-C (MAKESUB, J, MAJTYP).
  ADD 1 TO I
  IF I IS LESS THAN 19 GO TO DEFECT-LOOP.

```

```

FOUND-TM.
  MOVE 1 TO I.
  IF VEHICLE-TYPE IS EQUAL TO 31
    MOVE 2 TO I.
  ADD 1 TO TM-NUMB (I, 1).
  IF DEFECTIVE IS EQUAL TO 1
    ADD 1 TO TM-NUMB (I, 2).
  WRITE TM-REC FROM SAMPLE-REC.

```

```

FTMX.
  EXIT.

```

```

TM-ALSO.
  MOVE 1 TO K.
  MOVE "TRAILERS" TO MAJOR-VEH-TYPE.

```

```

TM-A-LOOP.
  MOVE TM-NUMB (K, 1) TO NUMBER-SAMPLED.
  MOVE TM-NUMB (K, 2) TO NUMBER-DEFECTIVE.
  MOVE 0 TO PER-TEMP.

```

```

IF TM-NUMB (K, 1) NOT = 0
    DIVIDE TM-NUMB (K, 2) BY TM-NUMB (K, 1) GIVING PER-TEMP.
MULTIPLY 100 BY PER-TEMP GIVING PERCENT-DEFECTIVE.
WRITE PRINT-LINE FROM SAMPLELINE AFTER ADVANCING 2 LINES.
ADD TM-NUMB (K, 1) TO NUMB (10, 10, 1).
ADD TM-NUMB (K, 2) TO NUMB (10, 10, 2).
MOVE "MOTORCYCLES" TO MAJOR-VEH-TYPE.
ADD 1 TO K.
IF K IS LESS THAN 3 GO TO TM-A-LOOP.

```

TMAX.

EXIT.

GET-TOTALS.

MOVE 1 TO I.

TOTALS-LOOP.

```

ADD NUMB (I, 1, 1) NUMB (I, 2, 1) GIVING NUMB (I, 3, 1).
ADD NUMB (I, 1, 2) NUMB (I, 2, 2) GIVING NUMB (I, 3, 2).
ADD NUMB (I, 4, 1) NUMB (I, 5, 1) NUMB (I, 6, 1)
GIVING NUMB (I, 7, 1).
ADD NUMB (I, 4, 2) NUMB (I, 5, 2) NUMB (I, 6, 2)
GIVING NUMB (I, 7, 2).
ADD NUMB (I, 3, 1) NUMB (I, 7, 1) NUMB (I, 8, 1)
NUMB (I, 9, 1) GIVING NUMB (I, 10, 1).
ADD NUMB (I, 3, 2) NUMB (I, 7, 2) NUMB (I, 8, 2)
NUMB (I, 9, 2) GIVING NUMB (I, 10, 2).
ADD 1 TO I.
IF I IS LESS THAN 11 GO TO TOTALS-LOOP.

```

\*

\* PAGE-TYPE-I SHOWS THE DISTRIBUTION OF THE SAMPLE BY STATION TY  
 \* INFORMATION IS FROM SAMPLE-TABLE.

\*

PRINT-PAGE-TYPE-I.

MOVE 1 TO PAGE-COUNT

MOVE 10 TO I.

OUTPUT-PAGEI.

MOVE PAGE-COUNT TO PAGE-NUM

WRITE PRINT-LINE FROM PAGEHEAD1 AFTER ADVANCING NEW-PAGE.

WRITE PRINT-LINE FROM YEARHEAD AFTER ADVANCING 1 LINES.

MOVE HEAD-LABEL (I) TO SAMPLE-LABEL

WRITE PRINT-LINE FROM SAMPLEHEAD AFTER ADVANCING 3 LINES.

WRITE PRINT-LINE FROM SAMPLEHEAD2 AFTER ADVANCING 3 LINES.

WRITE PRINT-LINE FROM SAMPLEUNDERLINE

AFTER ADVANCING 1 LINES.

MOVE "PASSENGER CARS" TO VEH-TYPE

WRITE PRINT-LINE FROM SAMPLEHEAD3 AFTER ADVANCING 2 LINES.

MOVE 1 TO J.

VEH-TYPE-LOOP.

IF J EQUALS 4 MOVE "TRUCKS" TO VEH-TYPE

```

        WRITE PRINT-LINE FROM SAMPLEHEAD3
        AFTER ADVANCING 2 LINES.
    IF J EQUALS 8 MOVE "BUSES" TO VEH-TYPE
        WRITE PRINT-LINE FROM SAMPLEHEAD3
        AFTER ADVANCING 2 LINES.
    IF I IS EQUAL TO 10 AND J IS EQUAL TO 10
        PERFORM TM-ALSO THROUGH TMAX.
    MOVE SAMP-LABEL (J) TO MAJOR-VEH-TYPE
    MOVE NUMB (I, J, 1) TO NUMBER-SAMPLED
    MOVE NUMB (I, J, 2) TO NUMBER-DEFECTIVE
    MOVE 0 TO PER-TEMP.
    IF NUMB (I, J, 1) NOT = 0
    DIVIDE NUMB (I, J, 2) BY NUMB (I, J, 1) GIVING PER-TEMP.
    MULTIPLY 100 BY PER-TEMP GIVING PERCENT-DEFECTIVE
    WRITE PRINT-LINE FROM SAMPLELINE AFTER ADVANCING 2 LINES.
    ADD 1 TO J
    IF J IS LESS THAN 11 GO TO VEH-TYPE-LOOP.

PRINT-PAGEI-FOR-CLASSES.
    MOVE 1 TO I.

CLASS-LOOP.
    ADD 1 TO PAGE-COUNT
    PERFORM OUTPUT-PAGEI THROUGH VEH-TYPE-LOOP.
    ADD 1 TO I
    IF I IS LESS THAN 10 GO TO CLASS-LOOP.

*
* PAGE-TYPE-II SHOWS PERCENTAGE OCCURRENCE OF EACH TYPE OF DEFEC
* AND COST PER INSPECTED VEHICLE AND COST PER REPAIRED VEHICLE.
* INFORMATION IS FROM DEFECTS-TABLE AND STATEWIDE-COST-TABLE.
*

PRINT-PAGE-TYPE-II.
    ADD 1 TO PAGE-COUNT
    MOVE 10 TO I.

OUTPUT-PAGEII.
    MOVE PAGE-COUNT TO PAGE-NO
    WRITE PRINT-LINE FROM PAGEHEAD AFTER ADVANCING NEW-PAGE.
    WRITE PRINT-LINE FROM YEARHEAD AFTER ADVANCING 1 LINES.
    MOVE HEAD-LABEL (I) TO DEFECT-LABEL
    WRITE PRINT-LINE FROM DEFECTHEAD AFTER ADVANCING 3 LINES.
    WRITE PRINT-LINE FROM DEFHEAD1 AFTER ADVANCING 2 LINES.
    WRITE PRINT-LINE FROM DEFHEAD2 AFTER ADVANCING 1 LINES.
    WRITE PRINT-LINE FROM DEFUNDERLINE AFTER ADVANCING 1 LINES.
    ADD VEH-TYPE-D (I, 1, 1) VEH-TYPE-D (I, 1, 2)
    VEH-TYPE-D (I, 1, 3) VEH-TYPE-D (I, 1, 4) GIVING ALL-VEH-SAMP
    ADD VEH-TYPE-D (I, 2, 1) VEH-TYPE-D (I, 2, 2)
    VEH-TYPE-D (I, 2, 3) VEH-TYPE-D (I, 2, 4) GIVING ALL-VEH-REJ
    ADD VEH-TYPE-D (I, 3, 1) VEH-TYPE-D (I, 3, 2)
    VEH-TYPE-D (I, 3, 3) VEH-TYPE-D (I, 3, 4) GIVING ALL-VEH-DEF
    MOVE 1 TO J

```

MOVE ALL-VEH-SAMP TO ALLVEH-NO.

PRINT-NUMBER-LINE.

MOVE DEFECT-ENT (J) TO DEFECT-OUT  
 MOVE VEH-TYPE-D (I, J, 1) TO NO-VAL (1)  
 MOVE VEH-TYPE-D (I, J, 2) TO NO-VAL (2)  
 MOVE VEH-TYPE-D (I, J, 3) TO NO-VAL (3)  
 MOVE VEH-TYPE-D (I, J, 4) TO NO-VAL (4)  
 WRITE PRINT-LINE FROM DEFECTLINE AFTER ADVANCING 2 LINES.

PERCENT-DEFECTIVE-LINE.

MOVE 2 TO J  
 MOVE ALL-VEH-REJ TO ALLVEH-NO  
 PERFORM PRINT-NUMBER-LINE  
 MOVE 3 TO J  
 MOVE ALL-VEH-DEF TO ALLVEH-NO  
 PERFORM PRINT-NUMBER-LINE  
 MOVE "PERCENT DEFECTIVE" TO DEFECT-OUT  
 MOVE 0 TO PER-TEMP.  
 IF ALL-VEH-SAMP NOT = 0  
 DIVIDE ALL-VEH-DEF BY ALL-VEH-SAMP GIVING PER-TEMP.  
 MULTIPLY 100 BY PER-TEMP GIVING ALLVEH-PER  
 MOVE 1 TO K.

PERCENT-DEFECTIVE-LOOP.

MOVE 0 TO PER-TEMP.  
 IF VEH-TYPE-D (I, 1, K) NOT = 0  
 DIVIDE VEH-TYPE-D (I, 3, K) BY VEH-TYPE-D (I, 1, K)  
 GIVING PER-TEMP.  
 MULTIPLY 100 BY PER-TEMP GIVING PER-VAL (K)  
 MOVE 0 TO COST-VAL (K).  
 IF VEH-TYPE-D (I, 1, K) NOT = 0  
 DIVIDE COST-S (I, 1, K) BY VEH-TYPE-D (I, 1, K)  
 GIVING COST-VAL (K).  
 ADD 1 TO K  
 IF K IS LESS THAN 5 GO TO PERCENT-DEFECTIVE-LOOP.  
 WRITE PRINT-LINE FROM DEFECTLINE AFTER ADVANCING 2 LINES.  
 ADD COST-S (I, 1, 1) COST-S (I, 1, 2) COST-S (I, 1, 3)  
 COST-S (I, 1, 4) GIVING TEMP  
 MOVE 0 TO ALLVEH-COST.  
 IF ALL-VEH-SAMP NOT = 0  
 DIVIDE TEMP BY ALL-VEH-SAMP GIVING ALLVEH-COST.  
 MOVE "COST PER VEHICLE INSPECTED" TO COST-HEAD.  
 WRITE PRINT-LINE FROM COSTLINE2 AFTER ADVANCING 2 LINES.  
 MOVE 1 TO K.

COST-LOOP.

SUBTRACT VEH-TYPE-D (I, 2, K) FROM VEH-TYPE-D (I, 3, K)  
 GIVING TEMP  
 MOVE 0 TO COST-VAL (K).  
 IF TEMP NOT = 0  
 DIVIDE COST-S (I, 2, K) BY TEMP GIVING COST-VAL (K).

```

ADD 1 TO K
IF K IS LESS THAN 5 GO TO COST-LOOP.
ADD COST-S (I, 2, 1) COST-S (I, 2, 2) COST-S (I, 2, 3)
    COST-S (I, 2, 4) GIVING TEMP

```

```

*
* NOTE: COST PER VEHICLE REPAIRED DOES NOT INCLUDE REJECTED
* VEHICLES.
*

```

```

SUBTRACT ALL-VEH-REJ FROM ALL-VEH-DEF
MOVE 0 TO ALLVEH-COST.
IF ALL-VEH-DEF NOT = 0
DIVIDE TEMP BY ALL-VEH-DEF GIVING ALLVEH-COST.
ADD ALL-VEH-REJ TO ALL-VEH-DEF
MOVE "COST PER VEHICLE REPAIRED" TO COST-HEAD.
WRITE PRINT-LINE FROM COSTLINE2 AFTER ADVANCING 2 LINES.
WRITE PRINT-LINE FROM DEFHEAD3 AFTER ADVANCING 3 LINES.
WRITE PRINT-LINE FROM DEFHEAD3LINE AFTER ADVANCING 1 LINES.
MOVE 4 TO J.

```

```

DEFECT-LOOP-II.
MOVE 1 TO K
MOVE 0 TO TEMP.

```

```

VEH-TYPE-LOOP-II.
MOVE 0 TO PER-TEMP.
IF VEH-TYPE-D (I, 3, K) NOT = 0
DIVIDE VEH-TYPE-D (I, J, K) BY VEH-TYPE-D (I, 3, K)
GIVING PER-TEMP.
MULTIPLY 100 BY PER-TEMP GIVING PER-VAL (K)
ADD VEH-TYPE-D (I, J, K) TO TEMP
ADD 1 TO K
IF K IS LESS THAN 5 GO TO VEH-TYPE-LOOP-II.
MOVE 0 TO PER-TEMP.
IF ALL-VEH-DEF NOT = 0
DIVIDE TEMP BY ALL-VEH-DEF GIVING PER-TEMP.
MULTIPLY 100 BY PER-TEMP GIVING ALLVEH-PER
MOVE DEFECT-ENT (J) TO DEFECT-OUT
WRITE PRINT-LINE FROM DEFECTLINE AFTER ADVANCING 2 LINES.
ADD 1 TO J
IF J IS LESS THAN 22 GO TO DEFECT-LOOP-II.

```

```

PRINT-PAGEII-FOR-CLASSES.
MOVE 1 TO I.

```

```

CLASS-LOOP-II.
ADD 1 TO PAGE-COUNT
PERFORM OUTPUT-PAGEII THROUGH VEH-TYPE-LOOP-II.
ADD 1 TO I
IF I IS LESS THAN 10 GO TO CLASS-LOOP-II.
GO TO PRINT-PAGE-TYPE-III.

```

```

HEAD-FOR-PAGE-TYPE-III.

```

```

WRITE PRINT-LINE FROM SECONDHEAD AFTER ADVANCING 2 LINES.
IF I IS LESS THAN 5
    MOVE HEAD-ENT (I, 2) TO SINGLE-YR
    WRITE PRINT-LINE FROM MODELHEADSINGLE
    AFTER ADVANCING 1 LINES.
IF I IS GREATER THAN 4 AND I IS LESS THAN 9
    MOVE HEAD-ENT (I, 1) TO BEGIN-YR
    MOVE HEAD-ENT (I, 2) TO END-YR
    WRITE PRINT-LINE FROM MODELHEAD
    AFTER ADVANCING 1 LINES.
IF I IS GREATER THAN 8 AND I IS LESS THAN 16
    MOVE HEAD-ENT (I, 1) TO BEGIN-MILE
    MOVE HEAD-ENT (I, 2) TO END-MILE
    WRITE PRINT-LINE FROM MILEAGEHEAD
    AFTER ADVANCING 1 LINES.

```

```

*
* PAGE-TYPE-III SHOWS PERCENTAGE OCCURRENCE OF EACH TYPE OF DEFE
* AND COST PER INSPECTED VEHICLE AND COST PER REPAIRED VEHICLE B
* YEAR, MILEAGE, AND MAKE CATEGORIES. INFORMATION IS FROM
* DEFECTS-CROSSTAB-TABLE AND CROSSTAB-COST-TABLE.
*

```

```

PRINT-PAGE-TYPE-III.
    MOVE 1 TO I
    ADD 1 TO PAGE-COUNT.

```

```

OUTPUT-PAGEIII.
    MOVE PAGE-COUNT TO PAGE-NO
    WRITE PRINT-LINE FROM PAGEHEAD AFTER ADVANCING NEW-PAGE.
    WRITE PRINT-LINE FROM YEARHEAD AFTER ADVANCING 1 LINES.
    IF I IS LESS THAN 16 PERFORM HEAD-FOR-PAGE-TYPE-III.
    IF I EQUALS 16 MOVE "DOMESTIC " TO MAKE-HEAD
        WRITE PRINT-LINE FROM MAKEHEAD
        AFTER ADVANCING 3 LINES.
    IF I EQUALS 17 MOVE "FOREIGN " TO MAKE-HEAD
        WRITE PRINT-LINE FROM MAKEHEAD
        AFTER ADVANCING 3 LINES.
    WRITE PRINT-LINE FROM DEFHEAD1 AFTER ADVANCING 2 LINES.
    WRITE PRINT-LINE FROM DEFHEAD2 AFTER ADVANCING 1 LINES.
    WRITE PRINT-LINE FROM DEFUNDERLINE AFTER ADVANCING 1 LINES.
    ADD VEH-TYPE-C (I, 1, 1) VEH-TYPE-C (I, 1, 2)
    VEH-TYPE-C (I, 1, 3) VEH-TYPE-C (I, 1, 4) GIVING ALL-VEH-SAMP
    ADD VEH-TYPE-C (I, 2, 1) VEH-TYPE-C (I, 2, 2)
    VEH-TYPE-C (I, 2, 3) VEH-TYPE-C (I, 2, 4) GIVING ALL-VEH-REJ
    ADD VEH-TYPE-C (I, 3, 1) VEH-TYPE-C (I, 3, 2)
    VEH-TYPE-C (I, 3, 3) VEH-TYPE-C (I, 3, 4) GIVING ALL-VEH-DEF
    MOVE 1 TO J
    MOVE ALL-VEH-SAMP TO ALLVEH-NO.

```

```

PRINT-NUMBER-LINE-III.
    MOVE DEFECT-ENT (J) TO DEFECT-OUT
    MOVE VEH-TYPE-C (I, J, 1) TO NO-VAL (1)

```

MOVE VEH-TYPE-C (I, J, 2) TO NO-VAL (2)  
 MOVE VEH-TYPE-C (I, J, 3) TO NO-VAL (3)  
 MOVE VEH-TYPE-C (I, J, 4) TO NO-VAL (4)  
 WRITE PRINT-LINE FROM DEFECTLINE AFTER ADVANCING 2 LINES.

PERCENT-DEF-LINE-PAGE-TYPE-III.

MOVE 2 TO J  
 MOVE ALL-VEH-REJ TO ALLVEH-NO  
 PERFORM PRINT-NUMBER-LINE-III.  
 MOVE 3 TO J  
 MOVE ALL-VEH-DEF TO ALLVEH-NO  
 PERFORM PRINT-NUMBER-LINE-III  
 MOVE "PERCENT DEFECTIVE" TO DEFECT-OUT  
 MOVE 0 TO PER-TEMP.  
 IF ALL-VEH-SAMP NOT = 0  
 DIVIDE ALL-VEH-DEF BY ALL-VEH-SAMP GIVING PER-TEMP.  
 MULTIPLY 100 BY PER-TEMP GIVING ALLVEH-PER  
 MOVE 1 TO K.

PERCENT-DEFECTIVE-LOOP-III.

MOVE 0 TO PER-TEMP.  
 IF VEH-TYPE-C (I, 1, K) NOT = 0  
 DIVIDE VEH-TYPE-C (I, 3, K) BY VEH-TYPE-C (I, 1, K)  
 GIVING PER-TEMP.  
 MULTIPLY 100 BY PER-TEMP GIVING PER-VAL (K)  
 MOVE 0 TO COST-VAL (K).  
 IF VEH-TYPE-C (I, 1, K) NOT = 0  
 DIVIDE COST-C (I, 1, K) BY VEH-TYPE-C (I, 1, K)  
 GIVING COST-VAL (K).  
 ADD 1 TO K  
 IF K IS LESS THAN 5 GO TO PERCENT-DEFECTIVE-LOOP-III.  
 WRITE PRINT-LINE FROM DEFECTLINE AFTER ADVANCING 2 LINES.  
 ADD COST-C (I, 1, 1) COST-C (I, 1, 2) COST-C (I, 1, 3)  
 COST-C (I, 1, 4) GIVING TEMP  
 MOVE 0 TO ALLVEH-COST.  
 IF ALL-VEH-SAMP NOT = 0  
 DIVIDE TEMP BY ALL-VEH-SAMP GIVING ALLVEH-COST.  
 MOVE "COST PER VEHICLE INSPECTED" TO COST-HEAD.  
 WRITE PRINT-LINE FROM COSTLINE2 AFTER ADVANCING 2 LINES.  
 MOVE 1 TO K.

COST-LOOP-PAGE-TYPE-III.

SUBTRACT VEH-TYPE-C (I, 2, K) FROM VEH-TYPE-C (I, 3, K)  
 GIVING TEMP  
 MOVE 0 TO COST-VAL (K).  
 IF TEMP NOT = 0  
 DIVIDE COST-C (I, 2, K) BY TEMP GIVING COST-VAL (K).  
 ADD 1 TO K  
 IF K IS LESS THAN 5 GO TO COST-LOOP-PAGE-TYPE-III.  
 ADD COST-C (I, 2, 1) COST-C (I, 2, 2) COST-C (I, 2, 3)  
 COST-C (I, 2, 4) GIVING TEMP



\* NOTE: COST PER VEHICLE REPAIRED DOES NOT INCLUDE REJECTED  
 \* VEHICLES.  
 \*

SUBTRACT ALL-VEH-REJ FROM ALL-VEH-DEF  
 MOVE 0 TO ALLVEH-COST.  
 IF ALL-VEH-DEF NOT = 0  
 DIVIDE TEMP BY ALL-VEH-DEF GIVING ALLVEH-COST.  
 ADD ALL-VEH-REJ TO ALL-VEH-DEF  
 MOVE "COST PER VEHICLE REPAIRED" TO COST-HEAD.  
 WRITE PRINT-LINE FROM COSTLINE2 AFTER ADVANCING 2 LINES.  
 WRITE PRINT-LINE FROM DEFHEAD3 AFTER ADVANCING 3 LINES.  
 WRITE PRINT-LINE FROM DEFHEAD3LINE AFTER ADVANCING 1 LINES.  
 MOVE 4 TO J.

DEFECT-LOOP-III.

MOVE 1 TO K  
 MOVE 0 TO TEMP.

VEH-TYPE-LOOP-III.

MOVE 0 TO PER-TEMP.  
 IF VEH-TYPE-C (I, 3, K) NOT = 0  
 DIVIDE VEH-TYPE-C (I, J, K) BY VEH-TYPE-C (I, 3, K)  
 GIVING PER-TEMP.  
 MULTIPLY 100 BY PER-TEMP GIVING PER-VAL (K)  
 ADD VEH-TYPE-C (I, J, K) TO TEMP  
 ADD 1 TO K  
 IF K IS LESS THAN 5 GO TO VEH-TYPE-LOOP-III.  
 MOVE 0 TO PER-TEMP.  
 IF ALL-VEH-DEF NOT = 0  
 DIVIDE TEMP BY ALL-VEH-DEF GIVING PER-TEMP.  
 MULTIPLY 100 BY PER-TEMP GIVING ALLVEH-PER  
 MOVE DEFECT-ENT (J) TO DEFECT-OUT  
 WRITE PRINT-LINE FROM DEFECTLINE AFTER ADVANCING 2 LINES.  
 ADD 1 TO J  
 IF J IS LESS THAN 22 GO TO DEFECT-LOOP-III.  
 ADD 1 TO I PAGE-COUNT  
 IF I IS LESS THAN 18 GO TO OUTPUT-PAGEIII.  
 GO TO CLOSE-FILES.

NO-DATE-CARD.

MOVE " DATE CARD MISSING" TO PRINT-LINE  
 WRITE PRINT-LINE AFTER ADVANCING NEW-PAGE.

CLOSE-FILES.

CLOSE SAMPLES PRINT CARD TM-RECEIPTS.  
 STOP RUN.



APPENDIX I

TRAILER/MOTORCYCLE ANALYSIS PROGRAM

IDENTIFICATION DIVISION.  
 PROGRAM-ID. PMVITM.  
 REMARKS.

\*  
 \* THIS PROGRAM PRODUCES THE REPORT FOR TRAILER/MOTORCYCLE  
 \* RECEIPTS. IT READS THE FILE OUTPUT BY THE PMVIAP PROGRAM  
 \* AND PRODUCES A REPORT SHOWING PERCENTAGES OF DEFECTIVE ITEMS  
 \* FOR EACH TRAILER/MOTORCYCLE STATION TYPE.  
 \*

ENVIRONMENT DIVISION.  
 CONFIGURATION SECTION.  
 SOURCE-COMPUTER. UNIVAC-1100.  
 OBJECT-COMPUTER. UNIVAC-1100.  
 SPECIAL-NAMES.

PAGE IS NEW-PAGE.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT SAMPLES ASSIGN TO DISC SYSD01.

SELECT CARD ASSIGN TO CARD-READER.

SELECT PRINT ASSIGN TO PRINTER.

DATA DIVISION.

FILE SECTION.

FD CARD

LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 80 CHARACTERS  
 DATA RECORD IS CARD-REC.

01 CARD-REC.

03 FILLER	PICTURE XX.
03 YR-OF-SAMPLE	PICTURE 99.
03 FILLER	PICTURE X(76).

FD PRINT

LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 132 CHARACTERS  
 DATA RECORD IS PRINT-LINE.

01 PRINT-LINE

PICTURE X(132).

FD SAMPLES

LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS SAMPLE-REC.

01 SAMPLE-REC.

03 STICKER	PICTURE 9.
88 REGULAR	VALUE IS 0, 1.
88 REJECTION	VALUE IS 2, 3.
88 TRLMTC	VALUE IS 4, 5.
03 FILLER	PICTURE X(7).
03 MAKE	PICTURE 99.
03 VEHICLE-TYPE	PICTURE 99.
03 YR-BUILT	PICTURE 99.
03 MILEAGE	PICTURE 9(5).

03	COST	PICTURE 999V99.
03	FILLER	PICTURE XXXX.
03	DEFECTS-LIST.	
	05 DEFECTIN OCCURS 18 TIMES	PICTURE 9.
03	STA-TYPE	PICTURE 99.
03	DEFECTIVE	PICTURE 9.
03	FOR-DOM	PICTURE 9.
03	FILLER	PICTURE X(8).
WORKING-STORAGE SECTION.		
77	PAGE-COUNT	PICTURE 99.
77	TEMP	PICTURE 9(6)V99.
77	PER-TEMP	PICTURE 999V99999.
77	CLASSUB	PICTURE 99.
77	MAJTYP	PICTURE 99.
77	I	PICTURE 99.
77	J	PICTURE 99.
77	K	PICTURE 99.
77	ALL-VEH-SAMP	PICTURE 9(5).
77	ALL-VEH-REJ	PICTURE 9(5).
77	ALL-VEH-DEF	PICTURE 9(5).
01 PAGEHEAD.		
03	FILLER	PICTURE X(29) VALUE IS SPACES.
03	FILLER	PICTURE X(24) VALUE IS
	"VIRGINIA STATE POLICE "	
03	FILLER	PICTURE X(48) VALUE IS
	"TRAILER/MOTORCYCLE INSPECTION TABULATION PAGE "	
03	PAGE-NO	PICTURE ZZ9.
01 YEARHEAD.		
03	FILLER	PICTURE X(58) VALUE IS SPACES.
03	FILLER	PICTURE X(27) VALUE IS
	"YEAR ENDING DECEMBER 31, 19"	
03	HEAD-DATE-YEAR	PICTURE 99.
01 DEFHEAD1.		
03	FILLER	PICTURE X(97) VALUE IS SPACES.
03	FILLER	PICTURE XXX VALUE IS "ALL".
01 DEFHEAD2.		
03	FILLER	PICTURE X(56) VALUE IS SPACES.
03	FILLER	PICTURE X(49) VALUE IS
	"TRAILERS	MOTORCYCLES
		VEHICLES".
01 DEFUNDERLINE.		
03	FILLER	PICTURE X(56) VALUE IS SPACES.
03	FILLER	PICTURE X(49) VALUE IS
	"-----	-----"
01 DEFECTHEAD.		
03	FILLER	PICTURE X(36) VALUE IS SPACES.
03	DEFECT-LABEL	PICTURE X(26).

03 FILLER PICTURE X(40) VALUE IS  
" PERCENTAGE DEFECTS BY VEHICLE TYPE ".

01 DEFHEAD3.  
03 FILLER PICTURE X(36) VALUE IS SPACES.  
03 FILLER PICTURE X(6) VALUE IS  
"DEFECT".

01 DEFHEAD3LINE.  
03 FILLER PICTURE X(29) VALUE IS SPACES.  
03 FILLER PICTURE X(21) VALUE IS  
"-----".

01 DEFECTLINE.  
03 FILLER PICTURE X(29) VALUE IS SPACES.  
03 DEFECT-OUT PICTURE X(28).  
03 PER-ENT.  
05 PER-VAL OCCURS 2 TIMES PICTURE ZZ9.99B(14).  
03 NO-ENT REDEFINES PER-ENT.  
05 NO-VAL OCCURS 2 TIMES PICTURE ZZ,ZZ9B(14).  
03 ALLVEH-PER PICTURE ZZ9.99.  
03 ALLVEH-NO REDEFINES ALLVEH-PER  
PICTURE ZZ,ZZ9.

01 COSTLINE2.  
03 FILLER PICTURE X(29) VALUE IS SPACES.  
03 COST-HEAD PICTURE X(27).  
03 COST-VAL OCCURS 2 TIMES PICTURE \$\$\$9.99B(13).  
03 ALLVEH-COST PICTURE \$\$\$9.99.

\*  
\* DEFECTS-TABLE STORES OCCURRENCES OF EACH TYPE OF DEFECT  
\* BY STATION TYPE.  
\*

01 DEFECTS-TABLE.  
03 STATION-CLASS-D OCCURS 16 TIMES.  
05 NUMBERS OCCURS 21 TIMES.  
07 VEH-TYPE-D OCCURS 2 TIMES PICTURE 9(5).

\*  
\* STATEWIDE-COST-TABLE STORES COSTS FOR ALL VEHICLES AND VEHICLE  
\* REPAIRED BY STATION TYPE.  
\*

01 STATEWIDE-COST-TABLE.  
03 STATION-CLASS-COST OCCURS 16 TIMES.  
05 COST-TYPE-S OCCURS 2 TIMES.  
07 COST-S OCCURS 2 TIMES PICTURE 9(6)V99.

01 DEFECT-TABLE.  
03 DEF19 PICTURE X(21) VALUE IS  
"NUMBER SAMPLED".  
03 DEF20 PICTURE X(21) VALUE IS  
"NUMBER REJECTED".  
03 DEF21 PICTURE X(21) VALUE IS

```

"NUMBER DEFECTIVE".
03 DEF1 PICTURE X(21) VALUE IS
"STEERING @ SUSPENSION".
03 DEF2 PICTURE X(21) VALUE IS
"BRAKES".
03 DEF3 PICTURE X(21) VALUE IS
"HEADLIGHTS".
03 DEF4 PICTURE X(21) VALUE IS
"STOP LIGHTS".
03 DEF5 PICTURE X(21) VALUE IS
"TAIL LIGHTS".
03 DEF6 PICTURE X(21) VALUE IS
"LICENSE LIGHTS".
03 DEF7 PICTURE X(21) VALUE IS
"SIGNAL LIGHTS".
03 DEF8 PICTURE X(21) VALUE IS
"OTHER LIGHTS".
03 DEF9 PICTURE X(21) VALUE IS
"REFLECTORS".
03 DEF10 PICTURE X(21) VALUE IS
"MIRROR".
03 DEF11 PICTURE X(21) VALUE IS
"HORN".
03 DEF12 PICTURE X(21) VALUE IS
"TAG MOUNTING".
03 DEF13 PICTURE X(21) VALUE IS
"EXHAUST SYSTEM".
03 DEF14 PICTURE X(21) VALUE IS
"TIRES".
03 DEF15 PICTURE X(21) VALUE IS
"WHEELS".
03 DEF16 PICTURE X(21) VALUE IS
"GLAZING".
03 DEF17 PICTURE X(21) VALUE IS
"FUEL SYSTEM".
03 DEF18 PICTURE X(21) VALUE IS SPACES.
01 DEFECT-TABLE-REDEF REDEFINES DEFECT-TABLE.
03 DEFECT-ENT OCCURS 21 TIMES PICTURE X(21).

01 SAMPLE-HEAD-LABEL-TABLE.
03 SH1 PICTURE X(26) VALUE IS " PRIVATE LOW VOLUME".
03 SH2 PICTURE X(26) VALUE IS " PRIVATE MEDIUM VOLUME".
03 SH3 PICTURE X(26) VALUE IS " PRIVATE HIGH VOLUME".
03 SH4 PICTURE X(26) VALUE IS " SMALL EXEMPT LOW VOLUME".
03 SH5 PICTURE X(26) VALUE IS "SMALL EXEMPT MEDIUM VOLUME".
03 SH6 PICTURE X(26) VALUE IS " SMALL EXEMPT HIGH VOLUME".
03 SH7 PICTURE X(26) VALUE IS " UNLIMITED LOW VOLUME".
03 SH8 PICTURE X(26) VALUE IS " UNLIMITED MEDIUM VOLUME".
03 SH9 PICTURE X(26) VALUE IS " UNLIMITED HIGH VOLUME".
03 SHA PICTURE X(26) VALUE IS " MOTORCYCLE LOW VOLUME".
03 SHB PICTURE X(26) VALUE IS " MOTORCYCLE MEDIUM VOLUME".
03 SHC PICTURE X(26) VALUE IS " MOTORCYCLE HIGH VOLUME".

```

```
03 SHD PICTURE X(26) VALUE IS "          TRAILER LOW VOLUME".
03 SHE PICTURE X(26) VALUE IS "          TRAILER MEDIUM VOLUME".
03 SHF PICTURE X(26) VALUE IS "          TRAILER HIGH VOLUME".
03 SH0 PICTURE X(26) VALUE IS "          STATEWIDE".
01 HEAD-LABLE-REDEF REDEFINES SAMPLE-HEAD-LABEL-TABLE.
03 HEAD-LABEL OCCURS 16 TIMES PICTURE X(26).
```



PROCEDURE DIVISION.

OPEN-FILES-INITIALIZE.

OPEN INPUT SAMPLES CARD.  
 OPEN OUTPUT PRINT.  
 READ CARD AT END GO TO NO-DATE-CARD.  
 MOVE YR-OF-SAMPLE TO HEAD-DATE-YEAR.  
 MOVE ZEROS TO DEFECTS-TABLE STATEWIDE-COST-TABLE.

READ-A-SAMPLE.

READ SAMPLES AT END GO TO PRINT-PAGE-TYPE-II.  
 MOVE STA-TYPE TO CLASSUB.  
 MOVE 2 TO MAJTYP.  
 IF VEHICLE-TYPE IS NOT EQUAL TO 31  
   MOVE 1 TO MAJTYP.  
 ADD 1 TO VEH-TYPE-D (CLASSUB, 1, MAJTYP)  
   VEH-TYPE-D (16, 1, MAJTYP).  
 ADD COST TO COST-S (CLASSUB, 1, MAJTYP)  
   COST-S (16, 1, MAJTYP).  
 IF DEFECTIVE IS EQUAL TO 1  
   PERFORM DEFECTIVE-VEH THROUGH DEFECT-X.  
 GO TO READ-A-SAMPLE.

DEFECTIVE-VEH.

ADD 1 TO VEH-TYPE-D (CLASSUB, 3, MAJTYP)  
   VEH-TYPE-D (16, 3, MAJTYP).  
 IF NOT REJECTION  
   ADD COST TO COST-S (CLASSUB, 2, MAJTYP)  
     COST-S (16, 2, MAJTYP).  
 IF REJECTION  
   ADD 1 TO VEH-TYPE-D (CLASSUB, 2, MAJTYP)  
     VEH-TYPE-D (16, 2, MAJTYP).  
 MOVE 1 TO I.

DEFECT-LOOP.

IF DEFECTIN (I) IS NOT EQUAL TO 0  
   ADD 3 I GIVING J  
   ADD 1 TO VEH-TYPE-D (CLASSUB, J, MAJTYP)  
     VEH-TYPE-D (16, J, MAJTYP).  
 ADD 1 TO I.  
 IF I IS LESS THAN 18 GO TO DEFECT-LOOP.  
 GO TO DEFECT-X.

DEFECT-X.

EXIT.

\*  
 \* PAGE-TYPE-II SHOWS PERCENTAGE OCCURRENCE OF EACH TYPE OF DEFEC  
 \* AND COST PER INSPECTED VEHICLE AND COST PER REPAIRED VEHICLE.  
 \* INFORMATION IS FROM DEFECTS-TABLE AND STATEWIDE-COST-TABLE.  
 \*

PRINT-PAGE-TYPE-II.

MOVE 1 TO PAGE-COUNT.  
 MOVE 16 TO I.

## OUTPUT-PAGEII.

```

MOVE PAGE-COUNT TO PAGE-NO
WRITE PRINT-LINE FROM PAGEHEAD AFTER ADVANCING NEW-PAGE.
WRITE PRINT-LINE FROM YEARHEAD AFTER ADVANCING 1 LINES.
MOVE HEAD-LABEL (I) TO DEFECT-LABEL
WRITE PRINT-LINE FROM DEFECTHEAD AFTER ADVANCING 3 LINES.
WRITE PRINT-LINE FROM DEFHEAD1 AFTER ADVANCING 2 LINES.
WRITE PRINT-LINE FROM DEFHEAD2 AFTER ADVANCING 1 LINES.
WRITE PRINT-LINE FROM DEFUNDERLINE AFTER ADVANCING 1 LINES.
ADD VEH-TYPE-D (I, 1, 1) VEH-TYPE-D (I, 1, 2)
                                                    GIVING ALL-VEH-SAMP.
ADD VEH-TYPE-D (I, 2, 1) VEH-TYPE-D (I, 2, 2)
                                                    GIVING ALL-VEH-REJ.
ADD VEH-TYPE-D (I, 3, 1) VEH-TYPE-D (I, 3, 2)
                                                    GIVING ALL-VEH-DEF.

MOVE 1 TO J.
MOVE ALL-VEH-SAMP TO ALLVEH-NO.

```

## PRINT-NUMBER-LINE.

```

MOVE DEFECT-ENT (J) TO DEFECT-OUT
MOVE VEH-TYPE-D (I, J, 1) TO NO-VAL (1)
MOVE VEH-TYPE-D (I, J, 2) TO NO-VAL (2)
WRITE PRINT-LINE FROM DEFECTLINE AFTER ADVANCING 2 LINES.

```

## PERCENT-DEFECTIVE-LINE.

```

MOVE 2 TO J
MOVE ALL-VEH-REJ TO ALLVEH-NO
PERFORM PRINT-NUMBER-LINE
MOVE 3 TO J
MOVE ALL-VEH-DEF TO ALLVEH-NO
PERFORM PRINT-NUMBER-LINE
MOVE "PERCENT DEFECTIVE" TO DEFECT-OUT
MOVE 0 TO PER-TEMP.
IF ALL-VEH-SAMP NOT = 0
DIVIDE ALL-VEH-DEF BY ALL-VEH-SAMP GIVING PER-TEMP.
MULTIPLY 100 BY PER-TEMP GIVING ALLVEH-PER
MOVE 1 TO K.

```

## PERCENT-DEFECTIVE-LOOP.

```

MOVE 0 TO PER-TEMP.
IF VEH-TYPE-D (I, 1, K) NOT = 0
DIVIDE VEH-TYPE-D (I, 3, K) BY VEH-TYPE-D (I, 1, K)
GIVING PER-TEMP.
MULTIPLY 100 BY PER-TEMP GIVING PER-VAL (K)
MOVE 0 TO COST-VAL (K).
IF VEH-TYPE-D (I, 1, K) NOT = 0
DIVIDE COST-S (I, 1, K) BY VEH-TYPE-D (I, 1, K)
GIVING COST-VAL (K).
ADD 1 TO K
IF K IS LESS THAN 3 GO TO PERCENT-DEFECTIVE-LOOP.
WRITE PRINT-LINE FROM DEFECTLINE AFTER ADVANCING 2 LINES.

```

ADD COST-S (I, 1, 1) COST-S (I, 1, 2) GIVING TEMP.  
 MOVE 0 TO ALLVEH-COST.  
 IF ALL-VEH-SAMP NOT = 0  
 DIVIDE TEMP BY ALL-VEH-SAMP GIVING ALLVEH-COST.  
 MOVE "COST PER VEHICLE INSPECTED" TO COST-HEAD.  
 WRITE PRINT-LINE FROM COSTLINE2 AFTER ADVANCING 2 LINES.  
 MOVE 1 TO K.

## COST-LOOP.

SUBTRACT VEH-TYPE-D (I, 2, K) FROM VEH-TYPE-D (I, 3, K)  
 GIVING TEMP  
 MOVE 0 TO COST-VAL (K).  
 IF TEMP NOT = 0  
 DIVIDE COST-S (I, 2, K) BY TEMP GIVING COST-VAL (K).  
 ADD 1 TO K  
 IF K IS LESS THAN 3 GO TO COST-LOOP.  
 ADD COST-S (I, 2, 1) COST-S (I, 2, 2) GIVING TEMP.

\*  
 \* NOTE: COST PER VEHICLE REPAIRED DOES NOT INCLUDE REJECTED  
 \* VEHICLES.  
 \*

SUBTRACT ALL-VEH-REJ FROM ALL-VEH-DEF  
 MOVE 0 TO ALLVEH-COST.  
 IF ALL-VEH-DEF NOT = 0  
 DIVIDE TEMP BY ALL-VEH-DEF GIVING ALLVEH-COST.  
 ADD ALL-VEH-REJ TO ALL-VEH-DEF  
 MOVE "COST PER VEHICLE REPAIRED" TO COST-HEAD.  
 WRITE PRINT-LINE FROM COSTLINE2 AFTER ADVANCING 2 LINES.  
 WRITE PRINT-LINE FROM DEFHEAD3 AFTER ADVANCING 3 LINES.  
 WRITE PRINT-LINE FROM DEFHEAD3LINE AFTER ADVANCING 1 LINES.  
 MOVE 4 TO J.

## DEFECT-LOOP-II.

MOVE 1 TO K  
 MOVE 0 TO TEMP.

## VEH-TYPE-LOOP-II.

MOVE 0 TO PER-TEMP.  
 IF VEH-TYPE-D (I, 3, K) NOT = 0  
 DIVIDE VEH-TYPE-D (I, J, K) BY VEH-TYPE-D (I, 3, K)  
 GIVING PER-TEMP.  
 MULTIPLY 100 BY PER-TEMP GIVING PER-VAL (K)  
 ADD VEH-TYPE-D (I, J, K) TO TEMP  
 ADD 1 TO K  
 IF K IS LESS THAN 3 GO TO VEH-TYPE-LOOP-II.  
 MOVE 0 TO PER-TEMP.  
 IF ALL-VEH-DEF NOT = 0  
 DIVIDE TEMP BY ALL-VEH-DEF GIVING PER-TEMP.  
 MULTIPLY 100 BY PER-TEMP GIVING ALLVEH-PER  
 MOVE DEFECT-ENT (J) TO DEFECT-OUT  
 WRITE PRINT-LINE FROM DEFECTLINE AFTER ADVANCING 2 LINES.  
 ADD 1 TO J

```
IF J IS LESS THAN 21 GO TO DEFECT-LOOP-II.

PRINT-PAGEII-FOR-CLASSES.
  MOVE 1 TO I.

CLASS-LOOP-II.
  ADD 1 TO PAGE-COUNT
  PERFORM OUTPUT-PAGEII THROUGH VEH-TYPE-LOOP-II.
  ADD 1 TO I
  IF I IS LESS THAN 16 GO TO CLASS-LOOP-II.
  GO TO CLOSE-FILES.

NO-DATE-CARD.
  MOVE " DATE CARD MISSING" TO PRINT-LINE
  WRITE PRINT-LINE AFTER ADVANCING NEW-PAGE.
CLOSE-FILES.
  CLOSE SAMPLES PRINT CARD.
  STOP RUN.
```

APPENDIX J  
OUTLIER PROGRAM

IDENTIFICATION DIVISION.  
 PROGRAM-ID. PMVIOT.  
 INSTALLATION. VIRGINIA STATE POLICE.  
 DATE-WRITTEN. JULY 1978.  
 DATE-COMPILED.  
 REMARKS.

\*  
 \* THE PMVI OUTLIER PROGRAM READS THE FILE OF CORRECT EDITED  
 \* RECEIPTS (SYSD01, SAMPLE) AND PRODUCES FAILURE RATES FOR EACH  
 \* INSPECTION ITEM AND AVERAGE COST OF INSPECTION FOR EACH STATION  
 \* CATEGORY. THESE STANDARD RATES ARE WRITTEN TO THE DISC FILE  
 \* STANDARDS AND TO A PRINTED REPORT. THE PROGRAM ALSO COMPARES  
 \* THE RATES FOR EACH INDIVIDUAL STATION (FROM THE FILE OF CORRECT  
 \* EDITED RECEIPTS) WITH THE STANDARDS, PRODUCING A REPORT FOR  
 \* EACH STATION THAT EXCEEDS THE STANDARDS. THE FILES STATIONS AND  
 \* STORE-FILE ARE TEMPORARY WORK FILES USED TO STORE THE RATES FOR  
 \* INDIVIDUAL STATIONS AND TO HOLD TRAILER/MOTORCYCLE RECEIPTS.  
 \*  
 \* THE PROGRAM MAY BE RUN IN A SECOND MODE, INDICATED BY A  
 \* NONBLANK CHARACTER IN COLUMN 6 OF THE DATE CARD. IN THE SECOND  
 \* MODE STANDARD FAILURE RATES ARE NOT CALCULATED. EACH STATION'S  
 \* FAILURE RATES ARE COMPARED TO THE STANDARDS ESTABLISHED BY A  
 \* PREVIOUS RUN OF THIS PROGRAM.  
 \*

ENVIRONMENT DIVISION.  
 CONFIGURATION SECTION.  
 SOURCE-COMPUTER. UNIVAC-1100.  
 OBJECT-COMPUTER. UNIVAC-1100.  
 SPECIAL-NAMES.

PAGE IS NEW-PAGE.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT SAMPLES	ASSIGN TO DISC SYSD01.
SELECT STANDARDS	ASSIGN TO DISC SYSD02.
SELECT SORTED-SAMPLES	ASSIGN TO DISC SYSD03.
SELECT STATIONS	ASSIGN TO DISC SYSD04.
SELECT STORE-FILE	ASSIGN TO DISC SYSD05.
SELECT SORTFILE	ASSIGN TO DISC DM01.
SELECT CARD	ASSIGN TO CARD-READER.
SELECT PRINT	ASSIGN TO PRINTER.

DATA DIVISION.

FILE SECTION.

FD CARD

LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 80 CHARACTERS  
 DATA RECORD IS DATE-CARD.

01 DATE-CARD.

03 YEAR-IN	PICTURE XXXX.
03 FILLER	PICTURE X.
03 FLAG	PICTURE X.
03 FILLER	PICTURE X(74).

FD PRINT  
 LABEL RECORDS ARE OMITTED  
 RECORD CONTAINS 133 CHARACTERS  
 DATA RECORD IS PRINTER.  
 01 PRINTER PICTURE X(133).  
 FD STORE-FILE  
 LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS STORE-REC.  
 01 STORE-REC PICTURE X(58).  
 FD SAMPLES  
 LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS SAMP.  
 01 SAMP.  
 03 FILLER PICTURE X(24).  
 03 SAMP-STA PICTURE 9999.  
 03 FILLER PICTURE X(18).  
 03 SAMP-TYPE PICTURE 99.  
 03 FILLER PICTURE X(10).  
 SD SORTFILE  
 RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS SORT-REC.  
 01 SORT-REC.  
 03 FILLER PICTURE X(24).  
 03 S-STA PICTURE 9999.  
 03 FILLER PICTURE X(18).  
 03 S-TYPE PICTURE 99.  
 03 FILLER PICTURE X(10).  
 FD SORTED-SAMPLES  
 LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 58 CHARACTERS  
 DATA RECORD IS SAMPLE.  
 01 SAMPLE.  
 03 FILLER PICTURE X(10).  
 03 VEH-TYPE PICTURE 99.  
 03 FILLER PICTURE X(7).  
 03 CHARGE PICTURE 999V99.  
 03 STATION PICTURE 9999.  
 03 DEFECT-LIST.  
 05 ITEM OCCURS 18 TIMES PICTURE X.  
 03 STATION-TYPE PICTURE 99.  
 03 DEFECTIVE PICTURE 9.  
 03 FILLER PICTURE X(9).  
 FD STANDARDS  
 LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 223 CHARACTERS  
 DATA RECORD IS TYPE-STANDARD.  
 01 TYPE-STANDARD.  
 03 STAN-TYPE PICTURE 99.  
 03 STAN-REC-TYPE PICTURE 9.  
 03 ITEM-STANDARDS.

05 INSPECT-ITEM OCCURS 19 TIMES.  
 07 ITEM-STAND OCCURS 2 TIMES PICTURE 999V99.  
 03 COST-STANDARDS.  
 05 COST-TYPE OCCURS 3 TIMES.  
 07 COST-STAND OCCURS 2 TIMES PICTURE 999V99.  
 FD STATIONS  
 LABEL RECORDS ARE STANDARD  
 RECORD CONTAINS 122 CHARACTERS  
 DATA RECORD IS STATION-REC.  
 01 STATION-REC.  
 03 STATION-NUMBER PICTURE 9999.  
 03 STATIONTYPE PICTURE 99.  
 03 STA-REC-TYPE PICTURE 9.  
 03 ITEM-VAL OCCURS 19 TIMES PICTURE 999V99.  
 03 COST-VAL OCCURS 3 TIMES PICTURE 999V99.  
 03 NUMBER-SAMPLED PICTURE 9(5).  
 WORKING-STORAGE SECTION.  
 77 DEF-HEAD1 PICTURE X(26) VALUE IS  
 " DEFECT ANALYSIS:".  
 77 COST-HEAD1 PICTURE X(24) VALUE IS  
 " COST ANALYSIS:".  
 77 REG-LAB PICTURE X(27) VALUE IS  
 " REGULAR RECEIPTS".  
 77 MT-LAB PICTURE X(27) VALUE IS  
 "TRAILER/MOTORCYCLE RECEIPTS".  
 77 SREC PICTURE 9(5).  
 77 TREC PICTURE 9(5).  
 77 TSTA PICTURE 9(5).  
 77 ENDI PICTURE 99.  
 77 RT PICTURE 9.  
 77 EOF PICTURE 9.  
 77 STANDARD-CHARGE PICTURE 999V99 VALUE IS 4.0.  
 77 THIS-STATION PICTURE 9999.  
 77 THIS-TYPE PICTURE 99.  
 77 EOF-MESSAGE PICTURE X(34) VALUE IS  
 "IMMEDIATE END OF FILE ENCOUNTERED".  
 77 STA-SD-HEAD PICTURE X(13) VALUE IS  
 " DEVIATION".  
 77 I PICTURE 99.  
 77 J PICTURE 99.  
 77 TEMP PICTURE 9(8)V9(5).  
 77 NONDEF PICTURE 9(5) VALUE IS 0.  
 77 Y PICTURE 9(4)V9(4).  
 77 A PICTURE 99V9(6).  
 77 INCR PICTURE 99V9(6).  
 77 ASQR PICTURE 9(4)V9(4).  
 77 DIF PICTURE 9(4)V9(4).  
 77 BOUND-MULT PICTURE 9V99 VALUE IS 1.0.  
 01 TYPE-COUNTS.  
 03 ITEM-LIST OCCURS 19 TIMES.  
 05 TYP-ITEM OCCURS 3 TIMES PICTURE 9(5)V999.  
 01 TYPE-COST-COUNTS.



	03	COST-LIST OCCURS 3 TIMES.		
		05 TYP-COST OCCURS 3 TIMES	PICTURE 9(5)V999.	
01		STATION-COUNTS.		
	03	STA-COUNT OCCURS 19 TIMES	PICTURE 9999.	
01		STATION-COST-COUNTS.		
	03	STA-COST OCCURS 3 TIMES	PICTURE 9(5)V999.	
01		ITEM-DIFFERENCES.		
	03	I-DIF OCCURS 19 TIMES	PICTURE 999V99.	
01		COST-DIFFERENCES.		
	03	C-DIF OCCURS 3 TIMES	PICTURE 999V99.	
01		ITEM-SIGNS.		
	03	I-SIGN OCCURS 19 TIMES	PICTURE X.	
01		COST-SIGNS.		
	03	C-SIGN OCCURS 3 TIMES	PICTURE X.	
01		PAGE-HEAD-TYPE.		
	03	FILLER	PICTURE X(10)	VALUE IS SPACES.
	03	YEAR-OUT-T	PICTURE X(5).	
	03	FILLER	PICTURE X(35)	VALUE IS
		"SAMPLE".		
	03	TYPE-OUT	PICTURE X(22).	
	03	FILLER	PICTURE X(23)	VALUE IS
		" VOLUME STATIONS".		
	03	REC-TYPE	PICTURE X(27).	
01		HEAD2.		
	03	FILLER	PICTURE X(10)	VALUE IS SPACES.
	03	FILLER	PICTURE X(16)	VALUE IS
		"RECEIPTS SAMPLED".		
	03	SAMPLE-SIZE	PICTURE Z,ZZ9.	
	03	FILLER	PICTURE X(64)	VALUE IS SPACES.
	03	REC-STATION	PICTURE X(27).	
01		PAGE-HEAD-STATION.		
	03	FILLER	PICTURE X(27)	VALUE IS
		" STATION NUMBER "		
	03	STATION-OUT	PICTURE ZZZ9.	
	03	FILLER	PICTURE X(19)	VALUE IS SPACES.
	03	ST-TYPE-OUT	PICTURE X(22).	
	03	FILLER	PICTURE X(39)	VALUE IS
		" VOLUME "		
	03	YEAR-OUT-S	PICTURE X(5).	
	03	FILLER	PICTURE X(6)	VALUE IS
		"SAMPLE".		
01		DEF-HEAD2.		
	03	FILLER	PICTURE X(40)	VALUE IS SPACES.
	03	FILLER	PICTURE X(64)	VALUE IS
		"LOWER BOUND FAILURE RATE UPPER BOUND".		
	03	SD-HEAD1	PICTURE X(18)	VALUE IS
		"STANDARD DEVIATION".		
01		COST-HEAD2.		
	03	FILLER	PICTURE X(40)	VALUE IS SPACES.
	03	FILLER	PICTURE X(64)	VALUE IS
		"LOWER BOUND AVERAGE COST UPPER BOUND".		
	03	SD-HEAD2	PICTURE X(18)	VALUE IS

```

"STANDARD DEVIATION".
01 UNDERLINE.
03 FILLER PICTURE X(40) VALUE IS SPACES.
03 FILLER PICTURE X(64) VALUE IS
"-----"
03 FILLER PICTURE X(18) VALUE IS -----".
"-----".
01 DEF-LINE.
03 FILLER PICTURE X(13) VALUE IS SPACES.
03 ITEM-OUT PICTURE X(29).
03 DEF-LB PICTURE ZZ9.9B(17).
03 DEF-VAL PICTURE ZZ9.9B(16).
03 DEF-UB PICTURE ZZ9.9B(20).
03 DEF-SD PICTURE ZZ9.99.
01 COST-LINE.
03 FILLER PICTURE X(13) VALUE IS SPACES.
03 CLAB-OUT PICTURE X(29).
03 COST-LB PICTURE ZZ9.99B(16).
03 COST-VALUE PICTURE ZZ9.99B(15).
03 COST-UB PICTURE ZZ9.99B(19).
03 COST-SD PICTURE ZZ9.99.
01 STATION-DEF-LINE.
03 FILLER PICTURE X(13) VALUE IS SPACES.
03 S-DEF-ITEM PICTURE X(29).
03 S-DEF-LB PICTURE ZZ9.9B(17).
03 S-DEF-VAL PICTURE ZZ9.9B(16).
03 S-DEF-UB PICTURE ZZ9.9B(18).
03 S-DEF-FLAG PICTURE XX.
03 S-DEF-DIF PICTURE ZZZ.ZZ.
01 STATION-COST-LINE.
03 FILLER PICTURE X(13) VALUE IS SPACES.
03 S-CLAB PICTURE X(29).
03 S-COST-LB PICTURE ZZ9.99B(16).
03 S-COST-VALUE PICTURE ZZ9.99B(15).
03 S-COST-UB PICTURE ZZ9.99B(17).
03 S-COST-FLAG PICTURE XX.
03 S-COST-DIF PICTURE ZZZ.ZZ.
01 REG-LABEL-TABLE.
03 FILLER PICTURE X(21) VALUE IS "BRAKES ".
03 FILLER PICTURE X(21) VALUE IS "HEADLIGHTS ".
03 FILLER PICTURE X(21) VALUE IS "OTHER LIGHTS ".
03 FILLER PICTURE X(21) VALUE IS "SIGNAL LIGHTS ".
03 FILLER PICTURE X(21) VALUE IS "HORN ".
03 FILLER PICTURE X(21) VALUE IS "STEERING ".
03 FILLER PICTURE X(21) VALUE IS "MIRROR ".
03 FILLER PICTURE X(21) VALUE IS "WINDSHIELD ".
03 FILLER PICTURE X(21) VALUE IS "OTHER GLASS ".
03 FILLER PICTURE X(21) VALUE IS "WINDSHIELD WIPER ".
03 FILLER PICTURE X(21) VALUE IS "TAG MOUNTING ".
03 FILLER PICTURE X(21) VALUE IS "EXHAUST LINE ".
03 FILLER PICTURE X(21) VALUE IS "TIRES ".
03 FILLER PICTURE X(21) VALUE IS "SEAT BELTS ".

```

```

03 FILLER PICTURE X(21) VALUE IS "HOOD LATCH      ".
03 FILLER PICTURE X(21) VALUE IS "FUEL SYSTEM    ".
03 FILLER PICTURE X(21) VALUE IS "DOORS        ".
03 FILLER PICTURE X(21) VALUE IS "EMISSION CONTROL ".
03 FILLER PICTURE X(21) VALUE IS "DEFECTIVE VEHICLE".
01 MT-LABEL-TABLE.
03 FILLER PICTURE X(21) VALUE IS "STEERING @ SUSPENSION".
03 FILLER PICTURE X(21) VALUE IS "BRAKES".
03 FILLER PICTURE X(21) VALUE IS "HEADLIGHTS".
03 FILLER PICTURE X(21) VALUE IS "STOP LIGHTS".
03 FILLER PICTURE X(21) VALUE IS "TAIL LIGHTS".
03 FILLER PICTURE X(21) VALUE IS "LICENSE LIGHTS".
03 FILLER PICTURE X(21) VALUE IS "SIGNAL LIGHTS".
03 FILLER PICTURE X(21) VALUE IS "OTHER LIGHTS".
03 FILLER PICTURE X(21) VALUE IS "REFLECTORS".
03 FILLER PICTURE X(21) VALUE IS "MIRROR".
03 FILLER PICTURE X(21) VALUE IS "HORN".
03 FILLER PICTURE X(21) VALUE IS "TAG MOUNTING".
03 FILLER PICTURE X(21) VALUE IS "EXHAUST SYSTEM".
03 FILLER PICTURE X(21) VALUE IS "TIRES".
03 FILLER PICTURE X(21) VALUE IS "WHEELS".
03 FILLER PICTURE X(21) VALUE IS "GLAZING".
03 FILLER PICTURE X(21) VALUE IS "FUEL SYSTEM".
03 FILLER PICTURE X(21) VALUE IS SPACES.
03 FILLER PICTURE X(21) VALUE IS "DEFECTIVE VEHICLE".
01 ITEMS.
03 ITEM-LAB OCCURS 19 TIMES PICTURE X(21).
01 COST-LABEL-TABLE.
03 FILLER PICTURE X(12) VALUE IS "DEFECTIVE  ".
03 FILLER PICTURE X(12) VALUE IS "NONDEFECTIVE".
03 FILLER PICTURE X(12) VALUE IS "ALL VEHICLES".
01 CLABS REDEFINES COST-LABEL-TABLE.
03 CLAB OCCURS 3 TIMES PICTURE X(12).
01 STATION-TYPE-LABEL-TABLE.
03 FILLER PICTURE X(22) VALUE IS " PRIVATE LOW".
03 FILLER PICTURE X(22) VALUE IS " PRIVATE MEDIUM".
03 FILLER PICTURE X(22) VALUE IS " PRIVATE HIGH".
03 FILLER PICTURE X(22) VALUE IS " SMALL EXEMPTION LOW".
03 FILLER PICTURE X(22) VALUE IS "SMALL EXEMPTION MEDIUM".
03 FILLER PICTURE X(22) VALUE IS " SMALL EXEMPTION HIGH".
03 FILLER PICTURE X(22) VALUE IS " UNLIMITED LOW".
03 FILLER PICTURE X(22) VALUE IS " UNLIMITED MEDIUM".
03 FILLER PICTURE X(22) VALUE IS " UNLIMITED HIGH".
03 FILLER PICTURE X(22) VALUE IS " MOTORCYCLE LOW".
03 FILLER PICTURE X(22) VALUE IS " MOTORCYCLE MEDIUM".
03 FILLER PICTURE X(22) VALUE IS " MOTORCYCLE HIGH".
03 FILLER PICTURE X(22) VALUE IS " TRAILER LOW".
03 FILLER PICTURE X(22) VALUE IS " TRAILER MEDIUM".
03 FILLER PICTURE X(22) VALUE IS " TRAILER HIGH".
01 TYPES REDEFINES STATION-TYPE-LABEL-TABLE.
03 TYPE-LAB OCCURS 15 TIMES PICTURE X(22).

```

PROCEDURE DIVISION.

SORT-SAMPLES.

    SORT SORTFILE ON ASCENDING KEY S-TYPE S-STA  
         USING SAMPLES  
         GIVING SORTED-SAMPLES.

OPEN-FILES.

    OPEN INPUT CARD.  
     READ CARD AT END DISPLAY " DATE CARD MISSING"  
                         CLOSE CARD  
                         GO TO END-OF-JOB.

    MOVE YEAR-IN TO YEAR-OUT-T YEAR-OUT-S.

    CLOSE CARD.

    MOVE 19 TO ENDI.

    MOVE 0 TO EOF RT.

    IF FLAG IS EQUAL TO SPACE OPEN OUTPUT STANDARDS.

    MOVE REG-LAB TO REC-TYPE.

    MOVE REG-LABEL-TABLE TO ITEMS.

    OPEN INPUT SORTED-SAMPLES.

    OPEN OUTPUT STATIONS PRINT STORE-FILE.

INITIALIZE.

    PERFORM READ-SAMPLE THROUGH RSX.

    IF EOF IS EQUAL TO 1 DISPLAY EOF-MESSAGE  
                         GO TO END-OF-JOB.

    MOVE STATION-TYPE TO THIS-TYPE.

    MOVE STATION TO THIS-STATION.

    MOVE ZEROS TO SREC TREC TSTA TYPE-COUNTS TYPE-COST-COUNTS  
                         STATION-COUNTS STATION-COST-COUNTS NONDEF.

    PERFORM ADD-IN THROUGH AIX.

NEXT-SAMPLE.

    PERFORM READ-SAMPLE THROUGH RSX.

    IF EOF IS EQUAL TO 1 PERFORM NEW-STATION THROUGH NSX  
                         PERFORM NEW-TYPE THROUGH NTX  
                         GO TO END-OF-FILE.

    IF STATION IS EQUAL TO THIS-STATION

        PERFORM ADD-IN THROUGH AIX

        GO TO NEXT-SAMPLE.

    PERFORM NEW-STATION THROUGH NSX.

    IF STATION-TYPE IS NOT EQUAL TO THIS-TYPE  
         PERFORM NEW-TYPE THROUGH NTX.

    PERFORM ADD-IN THROUGH AIX.

    GO TO NEXT-SAMPLE.

END-OF-FILE.

    MOVE 0 TO EOF.

    IF RT IS EQUAL TO 1 GO TO CHECK-STATIONS.

    MOVE 1 TO RT.

    MOVE 18 TO ENDI.

    MOVE MT-LAB TO REC-TYPE.

    MOVE MT-LABEL-TABLE TO ITEMS.

    CLOSE SORTED-SAMPLES STORE-FILE.

    OPEN INPUT STORE-FILE.

    OPEN OUTPUT SORTED-SAMPLES.

LOOP.

```

READ STORE-FILE AT END CLOSE STORE-FILE SORTED-SAMPLES
OPEN INPUT SORTED-SAMPLES
GO TO INITIALIZE.
WRITE SAMPLE FROM STORE-REC.
GO TO LOOP.
END-OF-JOB.
CLOSE SORTED-SAMPLES STANDARDS STATIONS PRINT.
STOP RUN.
READ-SAMPLE.
READ SORTED-SAMPLES AT END MOVE 1 TO EOF
GO TO RSX.
IF RT IS EQUAL TO 1 GO TO RSX.
IF VEH-TYPE IS GREATER THAN 36 GO TO READ-SAMPLE.
IF VEH-TYPE IS GREATER THAN 29 WRITE STORE-REC FROM SAMPLE
GO TO READ-SAMPLE.
RSX.
EXIT.
ADD-IN.
ADD 1 TO SREC.
MOVE 1 TO J.
IF DEFECTIVE IS EQUAL TO ZERO
MOVE 2 TO J
ADD 1 NONDEF
GO TO ADD-COST.
ADD 1 TO TYP-ITEM (19, 3) STA-COUNT (19).
MOVE 1 TO I.
ITEM-LOOP.
IF ITEM (I) IS NOT EQUAL TO ZERO
ADD 1 TO TYP-ITEM (I, 3) STA-COUNT (I).
ADD 1 TO I.
IF I IS LESS THAN 19 GO TO ITEM-LOOP.
ADD-COST.
ADD CHARGE TO STA-COST (J) STA-COST (3)
TYP-COST (J, 3) TYP-COST (3, 3).
AIX.
EXIT.
NEW-STATION.
ADD 1 TO TSTA.
ADD SREC TO TREC.
MOVE THIS-STATION TO STATION-NUMBER.
MOVE THIS-TYPE TO STATIONTYPE.
MOVE SREC TO NUMBER-SAMPLED.
MOVE RT TO STA-REC-TYPE.
MOVE 1 TO I.
NS-ITEM-LOOP.
DIVIDE STA-COUNT (I) BY SREC GIVING TEMP
MULTIPLY 100.0 BY TEMP.
MOVE TEMP TO ITEM-VAL (I).
ADD TEMP TO TYP-ITEM (I, 1).
MULTIPLY TEMP BY TEMP.
ADD TEMP TO TYP-ITEM (I, 2).
ADD 1 TO I.

```

```

IF I IS LESS THAN 20 GO TO NS-ITEM-LOOP.
DIVIDE SREC INTO STA-COST (3).
IF STA-COUNT (19) IS GREATER THAN 0
    THEN DIVIDE STA-COUNT (19) INTO STA-COST (1)
    ELSE MOVE STANDARD-CHARGE TO STA-COST (1).
SUBTRACT STA-COUNT (19) FROM SREC.
IF SREC IS NOT EQUAL TO ZERO
    THEN DIVIDE SREC INTO STA-COST (2)
    ELSE MOVE STANDARD-CHARGE TO STA-COST (2).
MOVE 1 TO I.
NS-COST-LOOP.
MOVE STA-COST (I) TO COST-VAL (I).
ADD STA-COST (I) TO TYP-COST (I, 1).
MULTIPLY STA-COST (I) BY STA-COST (I).
ADD STA-COST (I) TYP-COST (I, 2).
ADD 1 TO I
IF I IS LESS THAN 4 GO TO NS-COST-LOOP.
WRITE STATION-REC.
MOVE STATION TO THIS-STATION.
MOVE ZEROES TO SREC STATION-COUNTS STATION-COST-COUNTS.
NSX.
EXIT.
NEW-TYPE.
IF FLAG IS NOT EQUAL TO SPACE
    GO TO NEXT-TYPE.
MOVE TYPE-LAB (THIS-TYPE) TO TYPE-OUT.
WRITE PRINTER FROM PAGE-HEAD-TYPE AFTER ADVANCING NEW-PAGE.
WRITE PRINTER FROM DEF-HEAD1 AFTER ADVANCING 3 LINES.
WRITE PRINTER FROM DEF-HEAD2 AFTER ADVANCING 2 LINES.
WRITE PRINTER FROM UNDERLINE AFTER ADVANCING 1 LINES.
MOVE 19 TO I.
PERFORM INSPECTION-ITEM.
MOVE 1 TO I.
NT-ITEM-LOOP.
PERFORM INSPECTION-ITEM.
ADD 1 TO I.
IF I IS LESS THAN ENDI
    GO TO NT-ITEM-LOOP.
WRITE PRINTER FROM COST-HEAD1 AFTER ADVANCING 3 LINES.
WRITE PRINTER FROM COST-HEAD2 AFTER ADVANCING 2 LINES.
WRITE PRINTER FROM UNDERLINE AFTER ADVANCING 1 LINES.
MOVE 1 TO I.
MOVE ZEROES TO COST-STANDARDS.
MOVE TYP-ITEM (19, 3) TO TEMP.
NT-COST-LOOP.
IF TEMP IS GREATER THAN 0
    DIVIDE TEMP INTO TYP-COST (I, 3) GIVING COST-STAND (I, 1).
    MULTIPLY TYP-COST (I, 1) BY TYP-COST (I, 1) GIVING TEMP.
    DIVIDE TSTA INTO TEMP.
    SUBTRACT TEMP FROM TYP-COST (I, 2).
    SUBTRACT 1 FROM TSTA.
    IF TSTA IS GREATER THAN 0

```

```

        THEN DIVIDE TSTA INTO TYP-COST (I, 2)
        ELSE MOVE 0 TO TYP-COST (I, 2).
    ADD 1 TO TSTA.
    MOVE TYP-COST (I, 2) TO Y.
    PERFORM SQUARE-ROOT THROUGH SQRX
    MOVE A TO COST-STAND (I, 2).
    MOVE CLAB (I) TO CLAB-OUT.
    MOVE COST-STAND (I, 1) TO COST-VALUE.
    MOVE COST-STAND (I, 2) TO COST-SD.
    ADD COST-STAND (I, 2) COST-STAND (I, 1) GIVING COST-UB.
    MOVE 0 TO TEMP.
    IF COST-STAND (I, 2) IS LESS THAN COST-STAND (I, 1)
        SUBTRACT COST-STAND (I, 2) FROM COST-STAND (I, 1)
        GIVING TEMP.
    MOVE TEMP TO COST-LB.
    IF TEMP IS LESS THAN STANDARD-CHARGE
        MOVE STANDARD-CHARGE TO COST-LB.
    WRITE PRINTER FROM COST-LINE AFTER ADVANCING 2 LINES.
    ADD 1 TO I.
    IF I IS EQUAL TO 2
        MOVE NONDEF TO TEMP
        GO TO NT-COST-LOOP.
    IF I IS EQUAL TO 3
        MOVE TREC TO TEMP
        GO TO NT-COST-LOOP.
    MOVE RT TO STAN-REC-TYPE.
    MOVE THIS-TYPE TO STAN-TYPE.
    WRITE TYPE-STANDARD.
NEXT-TYPE.
    MOVE STATION-TYPE TO THIS-TYPE.
    MOVE ZEROES TO TYPE-COUNTS TYPE-COST-COUNTS NONDEF TREC TSTA.
    GO TO NTX.
INSPECTION-ITEM.
    DIVIDE TREC INTO TYP-ITEM (I, 3) GIVING TEMP.
    MULTIPLY 100.0 BY TEMP GIVING ITEM-STAND (I, 1).
    MULTIPLY TYP-ITEM (I, 1) BY TYP-ITEM (I, 1) GIVING TEMP.
    DIVIDE TSTA INTO TEMP.
    SUBTRACT TEMP FROM TYP-ITEM (I, 2).
    SUBTRACT 1 FROM TSTA.
    DIVIDE TSTA INTO TYP-ITEM (I, 2).
    ADD 1 TSTA.
    MOVE TYP-ITEM (I, 2) TO Y.
    PERFORM SQUARE-ROOT THROUGH SQRX.
    MOVE A TO ITEM-STAND (I, 2).
    MOVE ITEM-LAB (I) TO ITEM-OUT.
    MOVE ITEM-STAND (I, 1) TO DEF-VAL.
    MOVE ITEM-STAND (I, 2) TO DEF-SD.
    MOVE 0.0 TO DEF-LB.
    MOVE 100.0 TO DEF-UB.
    IF ITEM-STAND (I, 2) IS LESS THAN ITEM-STAND (I, 1)
        SUBTRACT ITEM-STAND (I, 2) FROM ITEM-STAND (I, 1)
        GIVING DEF-LB.

```

```

ADD ITEM-STAND (I, 2) ITEM-STAND (I, 1) GIVING TEMP.
IF TEMP IS LESS THAN 100.0
  MOVE TEMP TO DEF-UB.
WRITE PRINTER FROM DEF-LINE AFTER ADVANCING 2 LINES.
SQUARE-ROOT.
*
* ROUTINE TO TAKE SQUARE ROOT OF VALUE IN Y , PUT THAT SQUARE
* ROOT IN A. Y MUST BE GREATER THAN OR EQUAL TO ZERO AND LESS THAN
* OR EQUAL TO 2500. A BINARY SEARCH IS USED.
*
  IF Y IS EQUAL TO 0
    MOVE 0 TO A
    GO TO SQRX.
  MOVE 50.0 TO A INCR.
SQR-LOOP.
  MULTIPLY A BY A GIVING ASQR.
  IF ASQR IS EQUAL TO Y GO TO SQRX.
  IF ASQR IS LESS THAN Y
    THEN PERFORM LESS-THAN
    ELSE PERFORM GREATER-THAN.
  IF DIF IS LESS THAN 0.002 GO TO SQRX.
*
* ROUTINES LESS-THAN AND GREATER-THAN PLACE THE NEXT VALUE OF
* A TO BE TRIED IN TEMP.
*
  MOVE TEMP TO A.
  GO TO SQR-LOOP.
LESS-THAN.
  SUBTRACT ASQR FROM Y GIVING DIF.
  DIVIDE 2.0 INTO INCR.
  ADD INCR A GIVING TEMP.
GREATER-THAN.
  SUBTRACT Y FROM ASQR GIVING DIF.
  DIVIDE 2.0 INTO INCR.
  SUBTRACT INCR FROM A GIVING TEMP.
SQRX.
  EXIT.
NTX.
  EXIT.
CHECK-STATIONS.
  MOVE STA-SD-HEAD TO SD-HEAD1 SD-HEAD2.
  IF FLAG IS EQUAL TO SPACE CLOSE STANDARDS.
  CLOSE STATIONS.
  MOVE 19 TO ENDI.
  MOVE REG-LAB TO REC-STATION.
  MOVE REG-LABEL-TABLE TO ITEMS.
  OPEN INPUT STATIONS STANDARDS.
  MOVE 9 TO STAN-REC-TYPE.
NEXT-STATION.
  READ STATIONS AT END GO TO END-OF-JOB.
  IF STAN-REC-TYPE IS NOT EQUAL TO STA-REC-TYPE
    PERFORM FIND-STANDARD THROUGH FSX.

```



```

IF STAN-TYPE IS NOT EQUAL TO STATIONTYPE
  PERFORM FIND-STANDARD THROUGH FSX.
IF STA-REC-TYPE IS EQUAL TO 1  MOVE MT-LABEL-TABLE TO ITEMS
                                MOVE 18 TO ENDI
                                MOVE MT-LAB TO REC-STATION.
MOVE ZEROES TO ITEM-DIFFERENCES COST-DIFFERENCES.
MOVE SPACES TO ITEM-SIGNS COST-SIGNS.
MOVE 1 TO I.
ITEM-TEST-LOOP.
  IF ITEM-VAL (I) IS GREATER THAN ITEM-STAND (I, 2)
    MOVE "+" TO I-SIGN (I)
    SUBTRACT ITEM-STAND (I, 2) FROM ITEM-VAL (I) GIVING
    I-DIF (I).
  IF ITEM-VAL (I) IS LESS THAN ITEM-STAND (I, 1)
    MOVE "-" TO I-SIGN (I)
    SUBTRACT ITEM-VAL (I) FROM ITEM-STAND (I, 1) GIVING
    I-DIF (I).
  ADD 1 TO I.
  IF I IS LESS THAN 20  GO TO ITEM-TEST-LOOP.
  MOVE 1 TO I.
COST-TEST-LOOP.
  IF COST-VAL (I) IS GREATER THAN COST-STAND (I, 2)
    MOVE "+" TO C-SIGN (I)
    SUBTRACT COST-STAND (I, 2) FROM COST-VAL (I) GIVING
    C-DIF (I).
  IF COST-VAL (I) IS LESS THAN COST-STAND (I, 1)
    MOVE "-" TO C-SIGN (I)
    SUBTRACT COST-VAL (I) FROM COST-STAND (I, 1) GIVING
    C-DIF (I).
  ADD 1 TO I.
  IF I IS LESS THAN 4  GO TO COST-TEST-LOOP.
  IF ITEM-SIGNS IS EQUAL TO SPACES AND
    COST-SIGNS IS EQUAL TO SPACES
    GO TO NEXT-STATION.
  MOVE STATION-NUMBER TO STATION-OUT.
  MOVE TYPE-LAB (STATIONTYPE) TO ST-TYPE-OUT.
  MOVE NUMBER-SAMPLED TO SAMPLE-SIZE.
  WRITE PRINTER FROM PAGE-HEAD-STATION
                                AFTER ADVANCING NEW-PAGE.
  WRITE PRINTER FROM HEAD2      AFTER ADVANCING 1 LINES.
  WRITE PRINTER FROM DEF-HEAD1 AFTER ADVANCING 2 LINES.
  WRITE PRINTER FROM DEF-HEAD2 AFTER ADVANCING 2 LINES.
  WRITE PRINTER FROM UNDERLINE AFTER ADVANCING 1 LINES.
  MOVE 19 TO I.
  PERFORM PRINT-ITEM.
  MOVE 1 TO I.
PRINT-ITEM.
  MOVE ITEM-LAB (I) TO S-DEF-ITEM.
  MOVE ITEM-STAND (I, 1) TO S-DEF-LB.
  MOVE ITEM-VAL (I) TO S-DEF-VAL.
  MOVE ITEM-STAND (I, 2) TO S-DEF-UB.
  MOVE I-SIGN (I) TO S-DEF-FLAG.

```

```

MOVE I-DIF (I) TO S-DEF-DIF.
WRITE PRINTER FROM STATION-DEF-LINE AFTER ADVANCING 2 LINES.
NEXT-ITEM.
  ADD 1 TO I.
  IF I IS LESS THAN ENDI GO TO PRINT-ITEM.
  WRITE PRINTER FROM COST-HEAD1 AFTER ADVANCING 3 LINES.
  WRITE PRINTER FROM COST-HEAD2 AFTER ADVANCING 2 LINES.
  WRITE PRINTER FROM UNDERLINE AFTER ADVANCING 1 LINES.
  MOVE 1 TO I.
COST-OUT.
  MOVE CLAB (I) TO S-CLAB.
  MOVE COST-STAND (I, 1) TO S-COST-LB.
  MOVE COST-VAL (I) TO S-COST-VALUE.
  MOVE COST-STAND (I, 2) TO S-COST-UB.
  MOVE C-SIGN (I) TO S-COST-FLAG.
  MOVE C-DIF (I) TO S-COST-DIF.
  WRITE PRINTER FROM STATION-COST-LINE AFTER ADVANCING 2 LINES.
  ADD 1 TO I.
  IF I IS LESS THAN 4 GO TO COST-OUT.
  GO TO NEXT-STATION.
FIND-STANDARD.
  READ STANDARDS AT END DISPLAY " END OF STANDARDS FILE"
  GO TO END-OF-JOB.
  IF STAN-REC-TYPE IS NOT EQUAL TO STA-REC-TYPE
    GO TO FIND-STANDARD.
  IF STAN-TYPE IS NOT EQUAL TO STATIONTYPE
    GO TO FIND-STANDARD.
  MOVE 1 TO I.

```

```

*
* UPPER AND LOWER BOUND DETERMINATION
*
* THE PARAGRAPHS STANDARD-LOOP AND COST-STANDARD-LOOP DETERMINE
* THE LOWER AND UPPER BOUNDS FOR EACH INSPECTION ITEM FAILURE
* RATE AND COST BY SUBTRACTING AND ADDING SOME MULTIPLE OF THE
* STANDARD DEVIATION OF THE RATES FOR ALL STATIONS TO THE AVERAGE
* RATE. THE AVERAGE IS READ INTO ITEM-STAND(I, 1) AND THE
* STANDARD DEVIATION INTO ITEM-STAND(I, 2). AFTER LOOPING THROUGH
* THE STANDARD-LOOP PARAGRAPH, ITEM-STAND(I, 1) AND (I, 2) WILL
* CONTAIN THE LOWER AND UPPER BOUNDS RESPECTIVELY. THE VARIABLE
* BOUND-MULT IS THE NUMBER OF STANDARD DEVIATIONS USED TO
* DETERMINE THE LOWER AND UPPER BOUNDS. IF BOUND-MULT EQUALS
* 1.0 THEN THE BOUNDS WILL BE 1.0 STANDARD DEVIATION BELOW AND
* ABOVE THE MEAN. IF BOUND-MULT EQUALS 1.5 THEN 1.5 STANDARD
* DEVIATIONS, ETC..
*

```

```

STANDARD-LOOP.
  MULTIPLY BOUND-MULT BY ITEM-STAND (I, 2).
  ADD ITEM-STAND (I, 1) ITEM-STAND (I, 2) GIVING TEMP.
  IF TEMP IS GREATER THAN 100.0 MOVE 100.0 TO TEMP.
  IF ITEM-STAND (I, 2) IS GREATER THAN ITEM-STAND (I, 1)
    THEN MOVE 0.0 TO ITEM-STAND (I, 1)
    ELSE SUBTRACT ITEM-STAND (I, 2) FROM ITEM-STAND (I, 1).

```

MOVE TEMP TO ITEM-STAND (I, 2).  
ADD 1 TO I.  
IF I IS LESS THAN 20 GO TO STANDARD-LOOP.  
MOVE 1 TO I.

COST-STANDARD-LOOP.

MULTIPLY BOUND-MULT BY COST-STAND (I, 2).  
ADD COST-STAND (I, 1) COST-STAND (I, 2) GIVING TEMP.  
IF COST-STAND (I, 2) IS GREATER THAN COST-STAND (I, 1)  
THEN MOVE 0 TO COST-STAND (I, 1)  
ELSE SUBTRACT COST-STAND (I, 2) FROM COST-STAND (I, 1).  
IF COST-STAND (I, 1) IS LESS THAN STANDARD-CHARGE  
MOVE STANDARD-CHARGE TO COST-STAND (I, 1).  
MOVE TEMP TO COST-STAND (I, 2).  
ADD 1 TO I.  
IF I IS LESS THAN 4 GO TO COST-STANDARD-LOOP.

FSX.

EXIT.

