FINAL REPORT

A MANAGEMENT SYSTEM FOR EVALUATING THE VIRGINIA PERIODIC MOTOR VEHICLE INSPECTION PROGRAM:

Software Manual and Implementation Procedures

by

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and

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A report prepared by the Virginia Highway & Transportation Research Council under the sponsorship of the Highway Safety Division of Virginia.

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PREFACE

This report deals with the Periodic Motor Vehicle Inspection Management Evaluation System software documentation and implementation procedures. A companion report entitled "A Management System for Evaluating the Virginia Periodic Motor Vehicle Inspection Program" by Deborah Mitchell gives the genesis of this project, describes the development of the sampling procedure, and explains the results of the pilot study used to test the system. It should be noted that the authors designed this present document expressly for the use of the Department of State Police and not for general distribution. The report is thus appropriately narrow in scope and would be of limited value outside the Department.

ABSTRACT

The Virginia Department of State Police has been administering a program for the biannual inspection of motor vehicles since 1932. This administrative task has grown as increases in population, personal income, and the popularity of the automobile have led to over 6 million vehicles currently being registered in Virginia.

Over the years, the Department has needed to apply innovations in management to maintain control over the large number of privately owned inspection stations. Improvements that include a station licensing procedure, a training program to certify inspectors, and a quality control program to determine if inspections are being performed properly have made Virginia's inspection program one of the nation's finest. This report describes yet another improvement to this periodic motor vehicle inspection system. Specifically, the computer software which provides for a sampling of inspection receipts and a procedure for analyzing the effectiveness of the program at a lower cost and with greater accuracy than is now the case are described along with instructions for their use.

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INTRODUCTION

In 1932, Virginia became one of the first states to begin a voluntary program of biannual motor vehicle inspection. The task of establishing and administering the program was undertaken by the Virginia Department of State Police. During its 33 years of operation, (began in 1932 and ceased operations between January 1944 and July 1947[1]) the system has grown to mammouth proportions; over 6.4 million vehicles of all types are inspected annually in over 3,000 inspection stations employing over 11,000 certified mechanics. Over the years the Department of State Police has refined the inspection system, introducing a training and certification procedure for mechanics, a licensing procedure for qualifying stations, and a quality control procedure to ensure the highest standard of inspection.[2] At first these quality checks involved only regular visitation of stations and investigation of complaints received by the Department. (This procedure is still in effect and results in over 1,500 administrative actions against stations or mechanics each year.) In 1971, however, 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 are rejected, and (2) the failure rate for vehicles based upon the various types of possible defects, e.g., the percentage of vehicles failing inspection because of defective brakes or worn tires. These averages or "norms" are 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 is made to determine if there was a reasonable explanation for the deviation or if there were indeed infractions of state police rules which could require official action.

In 1974, the Department of State Police requested assistance from the Virginia Highway and Transportation Research Council to determine the necessary sample size for use in their current quality control system. This initial request later developed into a working relationship between the Department of State Police and the Council in refining the sampling system. The initial sampling technique used involved systematic sampling in which every n th receipt was made a part of the sample. While this is a perfectly valid technique, random sampling (selecting receipts for inclusion in the sample completely at random) allows for a somewhat smaller sample size while ensuring greater accuracy. The Research Council prepared a sampling plan including the principles of random sampling for use by the Department of State Police.(3)

In order to implement the refined sampling plan and in order to develop structured data gathering procedures and provide comprehensive and useful information from the sample, a system of programs was written. These programs were designed to guide the data collection effort, detect and correct errors in data gathering, ensure appropriate sampling and sample sizes, provide information on the quality of reporting itself, and produce a comprehensive report on the inspection system as a whole for use by the Department of State Police. This report outlines the workings of the system as a whole, provides detailed descriptions of system components, and provides detailed instruction for use of this management evaluation system.

PURPOSE AND SCOPE

The purpose of this report is to outline a system of computer programs and manual procedures developed to evaluate the state's periodic motor vehicle inspection (PMVI) program. This system was designed to determine, using sampled inspection receipts, a statewide failure rate for each item inspected and for vehicles of different type, age, and mileage categories, and a statewide average cost per inspection (charges for the inspection and for any needed repairs). Then, failure rates and charges for individual stations can be compared to the statewide norms to identify those stations that vary significantly from the statewide average.

This report describes a system capable of processing both regular approval receipts and regular rejection receipts, but presently there is no methodology for selecting a sample of regular rejection receipts. This system does establish statewide failure rates and average cost of repairs, but does not identify any individual stations that deviate from the statewide norms.

OVERVIEW OF SYSTEM

Virginia's Inspection Program

Until 1977, the law required that all vehicles registered or operated in Virginia be inspected every 6 months to ensure that they were in safe mechanical condition. Recent legislation has amended this system to allow new motor vehicles to be inspected initially and to receive an inspection sticker valid for a 12-month period. All other vehicles are still inspected at 6-month intervals. Inspections are performed by privately owned stations licensed by the state and supervised by the State Police.

Inspection stations are classified by the type of vehicle they inspect and fall into five groups: (1) private stations — stations "limited to inspecting private or company-owned vehicles"; (2) unlimited — stations qualified to "inspect all vehicles presented"; (3) small exemption — stations "limited to inspection of vehicles that do not exceed 35 feet in length or 10 feet in height"; (4) large exemption — stations "limited to inspecting vehicles that exceed 35 feet in length and 10 feet in height"; and (5) motorcycle — stations limited to inspecting motorcycles only.(3)

While there are five types of stations, for inspection purposes there are only two basic types of vehicle receipts — (1) trailers/motorcycles, and (2) regular (all others) — each of which indicates a unique set of items to be inspected. Figure 1 shows these two inspection receipts. When a vehicle is inspected, either a pass sticker is issued and a receipt like those in Figure 1 is sent to the Department of State Police or the vehicle is rejected and a rejection receipt (see Figure 2) is sent to the Department. In either case, a record is maintained showing the vehicle's type, make, mileage, year built, charges for inspection, date of inspection, and the items that were defective.

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INSPECTION CERTIFICATION S.P. 131A

VIRGINIA STATE POLICE T/M 338901

Equipment Inspected	O K	Adjust	Install
STEERING and SUSPENSION			
BRAKES			
HEAD LIGHTS			
STOP LIGHTS			
TAIL LIGHTS			
LICENSE LIGHTS			
SIGNAL LIGHTS			
OTHER LIGHTS			
REFLECTORS			
MIRROR			
HORN			
TAG MOUNTING			
EXHAUST SYSTEM			
TIRES			
WHEELS			
GLAZING			
FUEL SYSTEM			

APRIL

DATE

LIC NO

MAKE

BODY TYPE

YEAR BUILT

ODOMETER READING

INSPECTION RELATED CHARGES

Identification No. _____

Eqp Removed _____ Sta. No. _____

Station Name _____

INSPECTOR _____

THIS DECAL EXPIRES OCTOBER 31. (over)

INSPECTION CERTIFICATION FORM S.P. 131

VIRGINIA STATE POLICE F 713401

Equipment Inspected	O. K.	Adjust	Install
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			

FEBRUARY

DATE

LIC. NO

MAKE

BODY TYPE

YEAR BUILT

ODOMETER READING

INSPECTION RELATED CHARGES $

IDENTIFICATION NO. _____

EQP REMOVED _____ STA. NO _____

STATION NAME _____

INSPECTOR _____

THIS STICKER EXPIRES AUGUST 31 (Over)

Figure 1. Types of inspection receipts.

REJECTION E 347851

LIC. NO. _____ DATE _____

IDENTIFICATION NO. _____

MAKE _____ MILEAGE _____

STA. NAME _____ STA. NO. _____

REJECTED FOR:

BRAKES	
HEADLIGHTS	
OTHER LIGHTS	
SIGNAL LIGHTS	
HORN	
STEERING	
MIRROR	
WINDSHIELD	
OTHER GLASS	
WINDSHIELD WIPER	
TAG MOUNTING	
EXHAUST LINE	
TIRES	
SEAT BELTS	
HOOD LATCH	

INSPECTOR _____

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

Figure 2. Rejection receipt.

Sampling

Inspection stations are grouped into nine categories based on station type and volume of inspections. Table 1 illustrates these categories with their associated volumes of receipts for 1975. The station types include private, small exemption and unlimited, while the volumes of inspections are divided into low, medium, and high volumes based upon the number of receipts per month. It was suspected that stations from different categories would have different failure rates, so the sample was 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. The size of the sample for a given year is also based on the previous year's data and is determined by use of the algorithm in Appendix A.(3)

Table 1

Number and Percentage of Approval Receipts Issued During 1975

Station Volume	Station Classification		
	Private	Small Exemption	Unlimited
Low	64,000 (1.20%)	259,696 (4.89%)	230,857 (4.34%)
Medium	37,680 (0.70%)	1,347,503 (25.38%)	1,092,050 (20.57%)
High	17,744 (0.33%)	1,278,174 (24.08%)	980,236 (18.46%)

Source: Reference 3.

Use of the System

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. Figure 3 illustrates this process for a one-year period. The figure outlines the various analytical procedures and indicates in which months these tasks are to be performed.

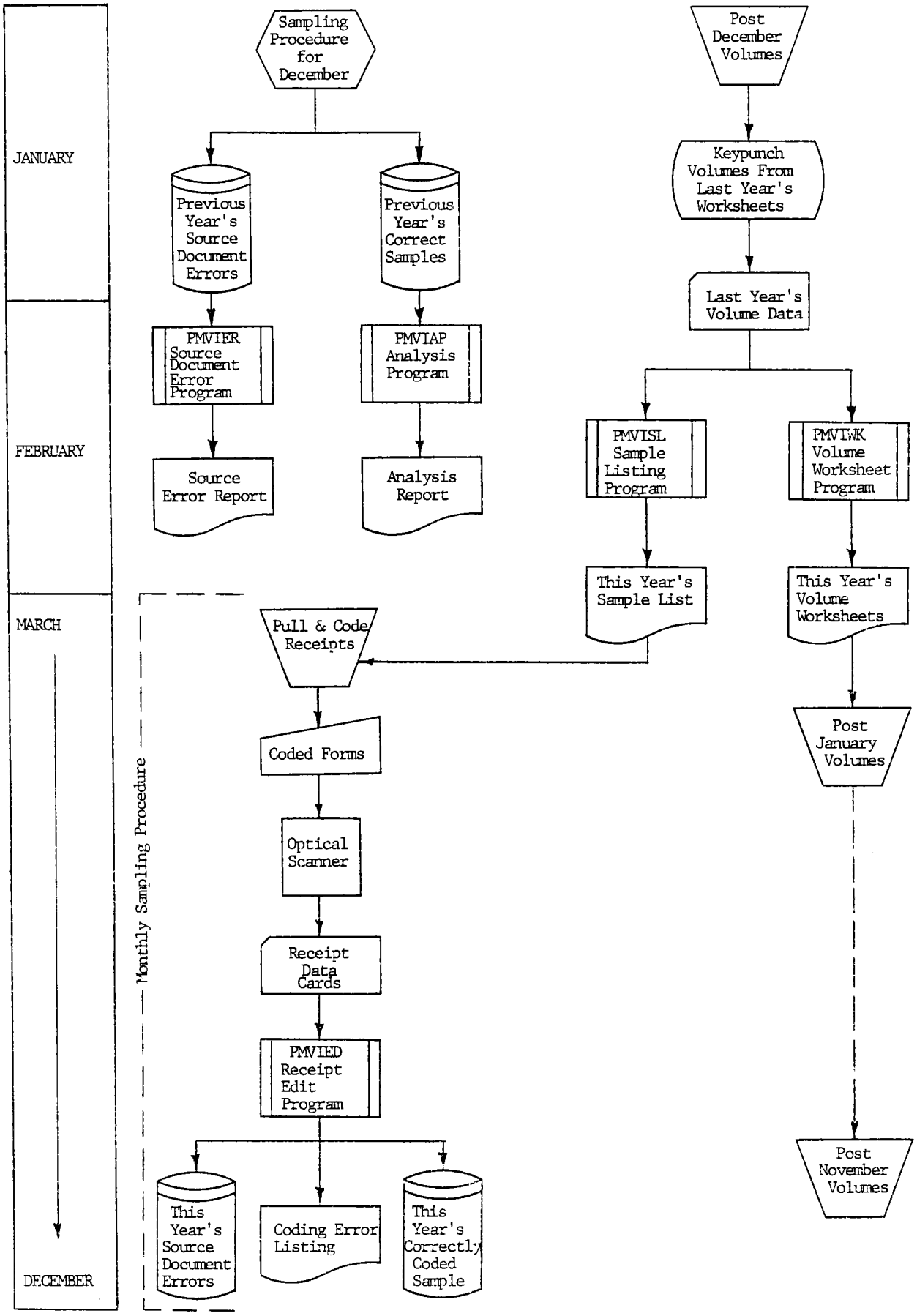

FIGURE 3. SYSTEM FLOW CHART.

Before the collection of data for a given year is started, the previous year's inspection volume information must be used to calculate the sample size and the composition of the sample. This information has been entered continuously for each inspection station during the previous year on the volume worksheets generated by the worksheet program "PMVIWK". (Each of these programs 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 calculates the sample size necessary to accurately estimate current inspection norms and determines the distribution of the sample among the nine categories previously mentioned. 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 coded from each station. Finally, the program prints brief instructions to the coders along with the lists of stations to be sampled.

The sample 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 which are to be sampled are pulled from the files according to the instructions on the sampling list. (Additional coding information appears in Appendix B in the form of a training manual for coders.) Information from the receipts is coded on mark-sense forms (Figure 4). These forms are read by an optical scanner producing punched cards which are input to the edit program (PMVIED). The optical scanner detects errors such as duplicate marks and poor erasures. Mark-sense forms with these errors are returned to the coders to be corrected. This coding procedure begins in late February or early March and continues monthly through January of the next year.

The edit program (PMVIED) reads the cards and produces a file of sampled receipts that 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 vehicle make and vehicle type that are contradictory. The edit listing is sent to the coders, and the receipts with errors are pulled from the file and coded again. These samples are marked as recoded, and when they are resubmitted to the edit program if there are errors or missing information the errors are attributed to the source document (that is the error or missing information is attributable to the inspection station) and that record with errors goes into the source document error file. At the end of the year, a source document error report is prepared outlining the types of errors made

VIRGINIA STATE POLICE INSPECTION TABULATION

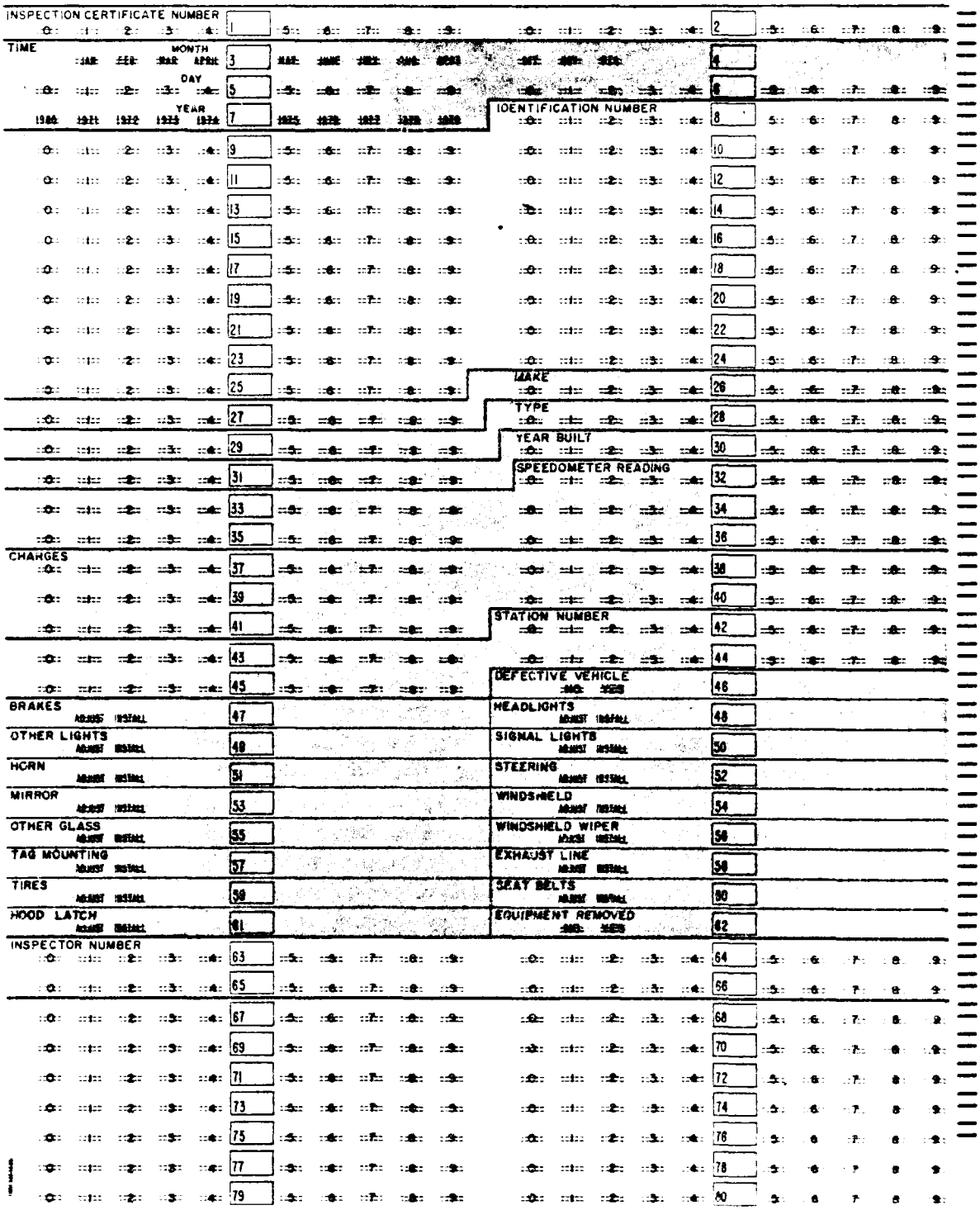

Figure 4. Mark-sense coding form.

and the stations making ten or more errors. This report can be used by State Police Administrators to check the quality of inspection receipt recording. Since it is easier to correct errors as they occur, the sampled receipts should not be accumulated and edited at the end of the year. When the sample for each month is completed, the data should be edited so that correction of coding errors will proceed throughout the year.

In March of the following year, the sampling and editing of data should be completed. The file of corrected and edited receipts (created by Program PMVIED) is used as data for the analysis program (PMVIAP). This analysis program produces a report showing the distribution of the sample among the station categories, average charges for inspection and repair, and failure rates for inspection items and vehicles of different age and mileage categories. Interpretation for the various reports by this analysis will be discussed in a later section of this report.

The file of source document errors (also created by Program PMVIED) is used as data for the source document error analysis program (PMVIER). This program produces a report showing type of error and its frequency for all stations while printing reports on specific stations that have greater than ten source document errors of any one type.

A detailed description of how this system might be run on the Univac computer presently utilized by the Department of State Police is provided in Appendix C. This appendix is designed to conform to the Department's operations standards so it can be used as an operational runbook.

COMPONENTS OF DATA COLLECTION AND ANALYSIS SYSTEM

The PMVI data collection and analysis system consists of five computer programs and a manual procedure for sampling and coding information from inspection receipts. Each of these system components will now be discussed in the order of their usage. Source listings for these programs appear in Appendix D.

Volume Worksheet Program (PMVIWK)

The PMVI volume worksheet program reads a reference deck of station volumes and type developed the previous year and prints a form (Figure 5) showing all possible station numbers (1-4000) and their type. Station numbers that were not assigned the previous year will not have one of the four possible types assigned. These

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

FIGURE 5. EXAMPLE OF INSPECTION STATION VOLUME WORKSHEET.

forms are to be used to post monthly station inspection receipt volumes. At the end of the year, these monthly volume data are keypunched and serve as input to the sample listing program (PMUISL).

Sampling List Program (PMUISL)

The PMVI sampling list program classifies all inspection stations represented on the volume worksheets into the nine strata (private low volume, private medium volume, private high volume, small-exemption low volume, etc.) The program then determines the sample size and prints a list of stations to be sampled along with brief instructions of how to take the sample. The distribution of the sample among the nine station strata is the same as the distribution of volumes for the previous year among the nine station strata, with the sample size from a given strata being spread evenly throughout the 12 months. For example, the sample size algorithm may determine that 36,000 inspection receipts should be sampled. If private low volume stations accounted for 3.33% of the inspections in the state during the previous year, then 3.33% of this year's 36,000 sampled receipts should come from private low volume stations. Therefore, 1,200 receipts (100 per month) should be sampled from private low volume stations. The sampling list program then randomly selects stations that fall into the low volume private station category and prints a list of their station numbers with instructions for sampling, as shown in Figure 6.

The coder would pull the receipts for the first station and code 100 receipts from January. If there are fewer than 100 receipts from the first station for January, then the January receipts from the second, third, and other stations should be used. When the 100 receipts for January are coded, then a new station, the next on the list, should be used for coding 100 receipts for February. Space is provided on the sampling list to enter the month sampled and the number of receipts sampled for each station.

The sampled receipts are coded on mark-sense forms (see Figure 4). These mark-sense forms are read by an optical scanner to produce punched cards which are input to the edit program.

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CATEGORY: PRIVATE - LOW 1975 SAMPLE PAGE 1

INSTRUCTIONS: SAMPLE 100 RECEIPTS FROM THIS LIST OF STATIONS FOR EACH MONTH IN THE ORDER LISTED.

ORDER	STATION NUMBER	SAMPLE MONTH	NUMBER OF RECEIPTS SAMPLED
1	810		
2	411		
3	674		
4	3068		
5	2249		
6	129		
7	3388		
8	1619		
9	1043		
10	432		
11	1317		
12	577		
13	656		
14	2773		
15	422		
16	177		
17	3046		
18	3457		
19	1131		
20	2825		
21	3329		
22	140		
23	470		
24	2371		

Figure 6. Example of sample listing.

Edit Program (PMVIED)

The PMVI edit program checks the inspection receipt samples for invalid data. An inspection receipt coded with no errors will pass the edit and will be written on a disk file of correct and edited receipts. The edit program adds two fields to receipts which pass the edit. First, each vehicle is marked either defective (one or more defects 'adjusted' or 'installed') or non-defective (no defects) as indicated by the coded receipt. Also, the edit program determines which of the nine sampling categories (private low volume, private medium, etc.) each receipt comes from by referencing a file of station numbers and category types and inserts this information in the second field. When an inspection receipt with coding errors or missing data is encountered, it is listed on the Inspection Receipt Edit Report that is returned to the coders. The receipts indicated on this report are recoded in their entirety to correct the errors. On this second coding, the recoded field (column 65) is marked "yes" and the recoded receipt is again checked for errors by the edit program. If there are no errors, the receipt is written on the disk file of edited receipts. If there are still errors or missing data, the receipt, with errors, is written on a disk file of Source Document Errors. If the errors are only in reference to mileage (and if the far left digit of mileage is present), then the non-numeric characters in mileage will be replaced by zeros and the receipt will be written to the disc file of correct edited receipts for use in the analysis and to the source document error file for quality control. Errors in relation to the charges only are resolved by applying standard charges and are treated in a similar fashion. Errors in type of inspection sticker, defects, the rejected field, and the recoded field, or invalid codes for make or type can only be coding errors; so if any of these errors occur, the record will be written only on the Inspection Receipt Edit Report.

The PMVI edit 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 stations and the type for each station; and a date card with the year sampled. (If Trailer/Motorcycle receipts are being edited the date card must have an "M" in column 80.) Output of the program is a file with all receipts which passed the edit (those from the previously edited file plus those from the file of receipts to edit which passed the edit), a file with all source document errors (previously accumulated plus newly found errors), and a listing of receipts with errors for use by the coding staff.

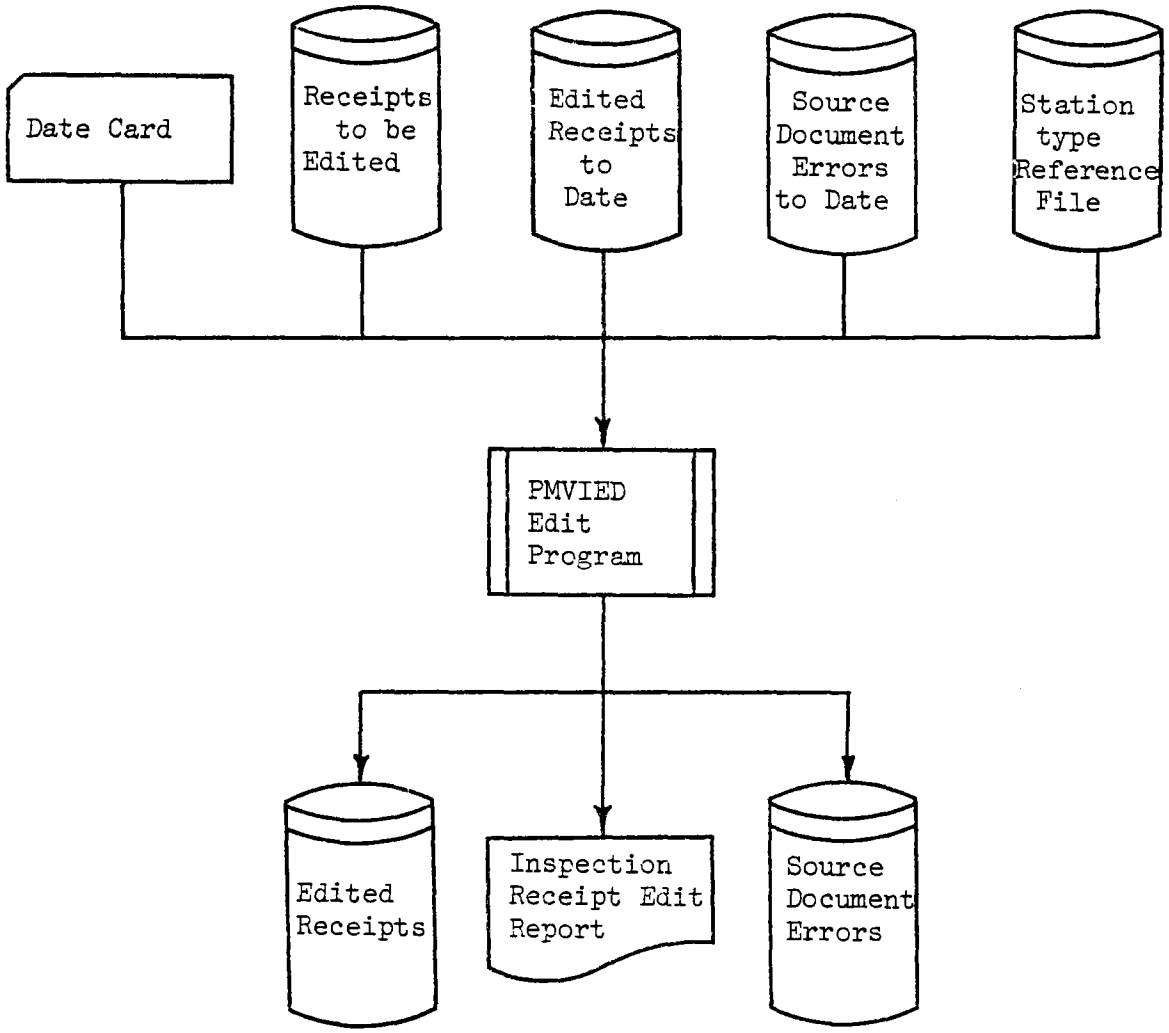

Figure 7. Edit program system flowchart.

The information from the inspection receipt is edited as follows:

Date (cols. 3-7) — Only one month may be specified. Day of the month must be greater than 0 and less than 32. The leading zero for days 1-9 must be coded. The year must correspond to the year on the date card.

Type of Sticker (col. 25), Make (cols. 26-27) and Vehicle Type (Cols. 28-29) — 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 from the code manual. If any one field is in error, then all three are flagged as errors on the report. If all have valid codes, then sticker type and vehicle type are checked next. If sticker type is trailer/motorcycle, then vehicle type must be a trailer or a motorcycle. If vehicle 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 vehicle type and make and would be flagged as an error in all three fields.

Year Built (cols. 30-31) — Year built must be greater than 09 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.

Speedometer (odometer) reading (cols. 32-36) — The speedometer reading must be greater than zero. If the receipt is recoded (col. 65 equals 1) and there are digits missing (other than the initial digit) and there are no other errors, except charges, then the receipt is written to the document error file. The missing digits in the speedometer (odometer) reading are then set to zero, and the receipt is written to the file of edited receipts. Since the analysis program puts each vehicle into mileage categories in increments of 10,000 miles, a vehicle with mileage treated this way will be classified properly regardless of the value of the last 4 digits of the speedometer (odometer) reading.

Charges (cols. 37-41) — 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. If a recoded receipt has errors only in charges and speedometer reading the receipt with errors is

written to the source document error file, speedometer reading is corrected as noted above, the standard charge for inspection is inserted for charges, and the receipt is written to the file of edited receipts.

Station Number (cols. 42-45) — The station number must be greater than 0 and less than 4000 and must have a corresponding entry in the file of station numbers.

Defects (cols. 47-61) — Each defect must be blank or coded "adjust" or "install". For motorcycles, clearance lights and reflectors must be blank, and for trailers, headlights, horn, and mirror must be blank.

Recoded (col. 63) — Recoded must be coded "0" for no or "1" for yes. The Inspection Receipt Edit Report shows these fields for each record with errors as shown in Figure 8: date, make, type, year built, speedometer reading, charges, station number, station type, receipt type, recoded, and defects. If the data in one of these fields are in error, an asterisk appears above the field 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 as noted above, 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 program.

Sample Tabulation Program (PMVITB)

The PMVI sample tabulation program 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 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 evaluation program administration and should be run whenever deemed necessary.

DATE	MAKE	TYPE	YEAR BUILT	SPEEDOMETER READING	CHARGES	STATION NUMBER	STATION TYPE	STICKER TYPE	RECODED	DEFECTS
1/ /75	19	01	72	35322	3.00	0002	11	REGULAR	NO	
12/01/75	19	01	72	35322	3.00	0002	11	REGULAR	NO	
1/01/75	05	01	72	35322	3.00	0002	11	REGULAR	NO	
1/01/75	19	01	72	35322	3.00	0002	11	MC/TRL	NO	
1/01/75	29	01	72	35322	3.00	0002	11	REGULAR	NO	
1/01/75	58	31	72	35322	3.00	0002	11	MC/TRL	NO	
1/01/75	19	01	72	35322	3.00	0002	11	REJECT	NO	
1/01/75	19	01	72	35322	3.00	0002	11	REGULAR	NO	112
1/01/75	19	01	72	35322	3.00	0002	11	REGULAR	NO	1 422
1/01/75	19	01	72	35322	3.00	0002	11	REGULAR	2	
1/01/75	19	01	72	35322	33.00	0002	11	REGULAR	NO	
1/01/75	19	01	72	3 322	3.00	0002	11	REGULAR	NO	
1/01/75	19	01		35322	3.00	0002	11	REGULAR	NO	
1/01/75	19	12	72	35322	3.00	0002	11	REGULAR	NO	
1/01/75	19	01	72	35322	3.00	0014		REGULAR	NO	
1/01/75	19	01	72	35322	3.00	0014		REGULAR	YES	

FIGURE 8. INSPECTION RECEIPT EDIT REPORT.

VIRGINIA STATE POLICE — PERIODIC MOTOR VEHICLE INSPECTION — PAGE 10

SAMPLE DISTRIBUTION

CLASS	VOLUME: LOW	MEDIUM	HIGH	TOTAL
PRIVATE	253 (7.05%)	141 (3.93%)	10 (0.27%)	404 (11.27%)
SMALL-EXEMPT	123 (3.43%)	728 (20.31%)	1,023 (28.54%)	1,874 (52.28%)
UNLIMITED	135 (3.76%)	442 (12.33%)	729 (20.34%)	1,306 (36.43%)
TOTAL	511 (14.25%)	1,311 (36.57%)	1,762 (49.16%)	3,584 (100.00%)

FIGURE 9. AN EXAMPLE OF SAMPLE DISTRIBUTION BY STRATA REPORT.

SAMPLE DISTRIBUTION

STATION NUMBER	STATION TYPE	MONTH	SAMPLED	MONTH	SAMPLED	MONTH	SAMPLED	TOTAL
0423	SMALL-EXEMPT MED	APR.	21					21
0446	PRIVATE HIGH	DEC.	1	MAR.	1	SEPT	6	8
0462	SMALL-EXEMPT MED	DEC.	7					7
0484	SMALL-EXEMPT HI	APR.	61					61
0487	UNLIMITED HIGH	DEC.	80					80
0505	UNLIMITED MEDIUM	MAY	2					2
0517	SMALL-EXEMPT MED	APR.	48					48
0545	UNLIMITED MEDIUM	JAN.	4					4
0551	PRIVATE LOW	SEPT	13					13
0559	PRIVATE LOW	FEB.	1					1
0586	SMALL-EXEMPT MED	MAY	23					23
0587	UNLIMITED MEDIUM	DEC.	14					14
0589	UNLIMITED LOW	FEB.	3					3
0606	SMALL-EXEMPT MED	JUNE	20					20
0621	UNLIMITED MEDIUM	JAN.	7					7
0624	SMALL-EXEMPT HI	MAR.	11					11
0625	PRIVATE LOW	OCT.	6					6
0640	PRIVATE LOW	JAN.	9					9
0697	PRIVATE LOW	NOV.	4	FEB.	10	AUG.	7	21
0747	UNLIMITED LOW	JUNE	6					6
0751	UNLIMITED MEDIUM	OCT.	37					37
0752	UNLIMITED MEDIUM	AUG.	4					4
0768	PRIVATE MEDIUM	AUG.	18					18
0769	PRIVATE MEDIUM	DEC.	16					16
0795	PRIVATE MEDIUM	OCT.	12					12
0798	SMALL-EXEMPT LOW	DEC.	10					10
0803	UNLIMITED MEDIUM	SEPT	3					3

FIFURE 10. AN EXAMPLE OF SAMPLE DISTRIBUTION BY STATION NUMBER AND DATE REPORT.

Source Document Error Program (PMVIER)

The PMVI source document error program 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 the close relationship, make and type are combined as one category for this report. Also, because a list with all station numbers would be too long to include, only those stations with 10 or more errors in one of the categories are included in this report.

Analysis Program (PMVIAP)

The PMVI analysis program reads the file of edited inspection receipts and produces the final report on the sample. Each 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 volume and type; (2) percentage of each type of defect and the costs of inspection and repair of each, again by vehicle type and station type; 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.

1975 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
2445	0	0	1	1	13	20	34
2495	0	0	0	0	1	11	12
2527	0	1	0	0	0	16	17
2549	0	0	0	1	16	11	27
2682	0	0	0	0	4	44	48
2683	0	0	0	0	20	15	35
2685	0	0	1	0	18	25	44
2720	0	0	1	0	278	14	292
2771	0	0	0	0	19	0	19
2808	0	0	1	0	14	3	18
2866	0	0	1	0	68	2	71
2931	0	0	0	2	27	14	43
2967	0	0	0	0	20	0	20
3023	0	0	1	0	0	40	40
3031	0	0	0	0	10	0	10
3068	0	0	0	0	10	0	10
3080	0	0	2	0	67	3	72
3140	0	0	0	0	19	0	19
3216	0	0	1	1	33	12	47
3271	0	0	1	0	22	0	23
3340	0	0	0	1	3	13	17
3345	0	0	0	1	17	6	23
3378	0	0	0	0	3	22	25
3408	0	0	1	2	3	32	38
3420	0	0	0	0	0	27	27

FIGURE 11. SOURCE DOCUMENT ERROR REPORT.

INTERPRETATION OF PMVI ANALYSIS REPORT

While all of the programs written for inclusion in the management evaluation system are essential to the operation of the system, the final analysis report provides the most useful management data. For this reason, a guide to the exact interpretation of each part of this report is provided below.

Part 1: The first ten pages of this report show the outcome of inspection for each of the nine inspection station types (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, and (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 which were repaired and those which were 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 24,953 domestic passenger car inspections were included in the sample; of those, 5,444, or 21.8%, were found to be defective in some way. A total of 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 nine station types as shown in Figure 13. For each vehicle type, the report supplies the total number sampled, the number rejected (in this case zero, since rejection receipts were not sampled), the number and percentage defective, and the cost per vehicle and cost per defective vehicle of the sample. For instance, as seen in column 1 of Figure 13, 28,635 passenger vehicle inspections were included in the sample, 6,177, or 21.6%, of which were found to be defective in some way. The average cost of the

VIRGINIA STATE POLICE MOTOR VEHICLE INSPECTION TABULATION PAGE 1
YEAR ENDING DECEMBER 31, 1975

STATEWIDE SAMPLE DISTRIBUTION BY VEHICLE TYPE

VEHICLE TYPE	NUMBER SAMPLED	NUMBER DEFECTIVE	PERCENT DEFECTIVE
PASSENGER CARS			
DOMESTIC	24,953	5,444	21.81
FOREIGN	3,682	733	19.90
TOTAL	28,635	6,177	21.57
TRUCKS			
PICKUP, VAN, PANEL	3,754	957	25.49
TRACTOR TRUCKS	98	20	20.40
OTHER	2,354	691	29.35
TOTAL	6,206	1,668	26.87
BUSES			
SCHOOL	52	14	26.92
COMMERCIAL	123	65	52.84
ALL VEHICLES	35,016	7,924	22.62

FIGURE 12. FINAL ANALYSIS REPORT STATEWIDE SAMPLE DISTRIBUTION.

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STATEWIDE PERCENTAGE DEFECTS BY VEHICLE TYPE

	PASSENGER VEHICLES	TRUCKS	SCHOOL BUSES	COMMERCIAL BUSES	ALL VEHICLES
NUMBER SAMPLED	28,635	6,206	52	123	35,016
NUMBER REJECTED	0	0	0	0	0
NUMBER DEFECTIVE	6,177	1,668	14	65	7,924
PERCENT DEFECTIVE	21.57	26.87	26.92	52.84	22.62
AVERAGE COST PER VEHICLE INSPECTED	$5.95	$6.42	$13.44	$6.12	$6.05
AVERAGE COST PER VEHICLE REPAIRED	$16.71	$15.75	$41.80	$8.91	$16.49
DEFECT					
BRAKES	18.08	19.54	57.14	63.07	18.82
HEADLIGHTS	33.18	29.61	50.00	30.76	32.44
OTHER LIGHTS	33.07	52.51	78.57	36.92	37.27
SIGNAL LIGHTS	10.68	18.82	0.00	13.84	12.40
HORN	1.68	3.53	0.00	3.07	2.08
STEERING	6.11	6.29	14.28	18.46	6.27
MIRROR	0.25	1.25	0.00	1.53	0.47
WINDSHIELD	0.59	1.37	7.14	1.53	0.78
OTHER GLASS	0.33	1.43	0.00	3.07	0.59
WINDSHIELD WIPER	9.35	8.21	0.00	3.07	9.04
TAG MOUNTING	1.23	2.33	0.00	0.00	1.45
EXHAUST LINE	13.85	12.58	21.42	16.92	13.62
TIRES	12.36	7.85	50.00	12.30	11.48
SEAT BELTS	0.11	0.17	0.00	0.00	0.12
HOOD LATCH	0.09	0.17	0.00	0.00	0.11

FIGURE 13. AN EXAMPLE OF PERCENTAGE DEFECTS BY VEHICLE TYPE REPORTS.

inspection (plus any needed repairs) averaged out to $5.95 per vehicle and to $16.71 per vehicle when only defective vehicles were considered. On the lower half of the page, the percentage of vehicles which incurred each defect type is noted. For instance, 18.1% of all passenger vehicles failing inspection were judged to have defective brakes. Also, about 33% 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. There are ten of these tables presented in this section, one for statewide totals and one for each of the nine station types.

Part 3: The next eight pages of the report describes the types of defects detected for each of the five vehicle types and for each of eight model year categories (see Figure 14). The format of these tables is identical to that of those presented in part 2 of the report, with information on the percentage and cost of defects in the upper half of the table and a breakdown of the types of defects detected in the lower half of the table. For instance, the first column of Figure 14 indicates that of the 389 1976 model passenger vehicles inspected, 21, or 5.4%, were defective. The average cost per vehicle was $3.03, while the cost per defective vehicle was $3.62. Of the 1976 model passenger cars inspected, 4.8% were found to have defective brakes, 90.5% were found to have defective headlights, and so forth. There are a total of eight of these tables in this section, one each for vehicles built in 1976, 1975, 1974, 1973, 1971-72, 1967-70, 1963-66, and 1900-62.

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 4,482 passenger vehicles inspected with low mileage (0 to 9,999 miles on the odometer), 610, or 13.6%, were defective. The average cost of inspection per low mileage passenger vehicle was $4.23 and the cost per defective low mileage passenger vehicle was $12.06. Of all the low

STATEWIDE PERCENTAGE DEFECTS FOR VEHICLES
BUILT IN 1976

	PASSENGER VEHICLES	TRUCKS	SCHOOL BUSES	COMMERCIAL BUSES	ALL VEHICLES
NUMBER SAMPLED	389	106	0	2	497
NUMBER REJECTED	0	0	0	0	0
NUMBER DEFECTIVE	21	9	0	0	30
PERCENT DEFECTIVE	5.39	8.49	0.00	0.00	6.03
AVERAGE COST PER VEHICLE INSPECTED	$3.03	$3.33	$0.00	$3.00	$3.09
AVERAGE COST PER VEHICLE REPAIRED	$3.62	$6.88	$0.00	$0.00	$4.60
DEFECT					
BRAKES	4.76	11.11	0.00	0.00	6.66
HEADLIGHTS	90.47	77.77	0.00	0.00	86.66
OTHER LIGHTS	9.52	22.22	0.00	0.00	13.33
SIGNAL LIGHTS	4.76	11.11	0.00	0.00	6.66
HORN	0.00	0.00	0.00	0.00	0.00
STEERING	0.00	0.00	0.00	0.00	0.00
MIRROR	0.00	11.11	0.00	0.00	3.33
WINDSHIELD	0.00	0.00	0.00	0.00	0.00
OTHER GLASS	0.00	0.00	0.00	0.00	0.00
WINDSHIELD WIPER	0.00	0.00	0.00	0.00	0.00
TAG MOUNTING	0.00	11.11	0.00	0.00	3.33
EXHAUST LINE	0.00	0.00	0.00	0.00	0.00
TIRES	0.00	0.00	0.00	0.00	0.00
SEAT BELTS	0.00	0.00	0.00	0.00	0.00
HOOD LATCH	0.00	11.11	0.00	0.00	3.33

FIGURE 14. AN EXAMPLE OF PERCENTAGE DEFECTS BY VEHICLE TYPE AND YEAR BUILT REPORTS.

STATEWIDE PERCENTAGE DEFECTS FOR VEHICLES
WITH MILEAGE FROM 0 TO 9,999

	PASSENGER VEHICLES	TRUCKS	SCHOOL BUSES	COMMERCIAL BUSES	ALL VEHICLES
NUMBER SAMPLED	4,482	982	9	22	5,495
NUMBER REJECTED	0	0	0	0	0
NUMBER DEFECTIVE	610	171	3	9	793
PERCENT DEFECTIVE	13.60	17.41	33.33	40.90	14.43
AVERAGE COST PER VEHICLE INSPECTED	$4.23	$5.32	$10.55	$5.61	$4.44
AVERAGE COST PER VEHICLE REPAIRED	$12.06	$16.36	$25.66	$9.38	$13.01
DEFECT					
BRAKES	13.11	17.54	33.33	55.55	14.62
HEADLIGHTS	50.98	35.08	33.33	55.55	47.54
OTHER LIGHTS	24.09	47.95	100.00	22.22	29.50
SIGNAL LIGHTS	10.00	16.37	0.00	22.22	11.47
HORN	0.98	2.92	0.00	11.11	1.51
STEERING	5.24	5.26	0.00	22.22	5.42
MIRROR	0.49	1.16	0.00	0.00	0.63
WINDSHIELD	0.32	1.75	0.00	0.00	0.63
OTHER GLASS	0.00	1.75	0.00	11.11	0.50
WINDSHIELD WIPER	6.55	5.84	0.00	0.00	6.30
TAG MOUNTING	0.98	1.75	0.00	0.00	1.13
EXHAUST LINE	12.45	9.35	0.00	22.22	11.85
TIRES	7.70	7.01	33.33	11.11	7.69
SEAT BELTS	0.00	0.00	0.00	0.00	0.00
HOOD LATCH	0.16	1.16	0.00	0.00	0.37

FIGURE 15. AN EXAMPLE OF PERCENTAGE DEFECTS BY VEHICLE TYPE — MILEAGE REPORTS.

mileage passenger vehicles failing inspection, 13.1% were judged to have defective brakes, 51.0% were judged to have defective headlights, and so forth. There are seven of these tables presented in this section, one for each mileage category.

Part 5: The last section of the report deals with the type of defects detected during inspection for foreign and domestic built vehicles. Again, as shown in Figure 16, the format is identical to that used in previous sections. For instance, Figure 16 shows that 5,444, or 21.8%, of the 24,953 domestic passenger vehicles were defective, the cost was $5.96 per domestic passenger vehicle and $16.61 for similar defective vehicles. About 18.2% of the domestic passenger vehicles failing inspection were found to have defective brakes, 32.3% were found to have defective headlights, and so on. A similar table appears in the section dealing with foreign vehicles.

STATEWIDE PERCENTAGE DEFECTS FOR DOMESTIC VEHICLES

	PASSENGER VEHICLES	TRUCKS	SCHOOL BUSES	COMMERCIAL BUSES	ALL VEHICLES
NUMBER SAMPLED	24,953	6,206	52	123	31,334
NUMBER REJECTED	0	0	0	0	0
NUMBER DEFECTIVE	5,444	1,668	14	65	7,191
PERCENT DEFECTIVE	21.81	26.87	26.92	52.84	22.94
AVERAGE COST PER VEHICLE INSPECTED	$5.96	$6.42	$13.44	$6.12	$6.07
AVERAGE COST PER VEHICLE REPAIRED	$16.61	$15.75	$41.80	$8.91	$16.39
DEFECT					
BRAKES	18.24	19.54	57.14	63.07	19.02
HEADLIGHTS	32.31	29.61	50.00	30.76	31.70
OTHER LIGHTS	33.00	52.51	78.57	36.92	37.65
SIGNAL LIGHTS	10.81	18.82	0.00	13.84	12.68
HORN	1.30	3.53	0.00	3.07	1.83
STEERING	6.33	6.29	14.28	18.46	6.45
MIRROR	0.25	1.25	0.00	1.53	0.50
WINDSHIELD	0.55	1.37	7.14	1.53	0.76
OTHER GLASS	0.33	1.43	0.00	3.07	0.61
WINDSHIELD WIPER	8.74	8.21	0.00	3.07	8.55
TAG MOUNTING	1.10	2.33	0.00	0.00	1.37
EXHAUST LINE	13.99	12.58	21.42	16.92	13.71
TIRES	12.58	7.85	50.00	12.30	11.55
SEAT BELTS	0.11	0.17	0.00	0.00	0.12
HOOD LATCH	0.05	0.17	0.00	0.00	0.08

FIGURE 16. AN EXAMPLE OF PERCENTAGE DEFECTS BY VEHICLE TYPE AND ORIGIN REPORT.

CONCLUSIONS AND RECOMMENDATIONS

A computer based management system for evaluating Virginia's periodic motor vehicle inspection program was developed. The system utilizes a random sampling technique to establish, on an annual basis, statewide norms for several important characteristics of the required inspections. The norms are statistically correct with 95% confidence. This high accuracy is achieved with a sample size significantly less than 1% of the total number of receipts; thus a reduction in the present sampling cost can be realized.

Although the establishing of statewide norms is a necessary first step to meeting the objectives of the Department of State Police's evaluation of the PMVI program, it is recommended that a program be written to produce means, standard deviations, upper bounds, and lower bounds for normal station values by strata in order to provide reference data for judging suspect outlier stations. This program would be designed to produce these data for an individual station as well as for statewide samples. For the statewide sample, the proposed output is as shown in Table 2. The proposed format for the output for an individual station would be similar (Table 3) with the statewide upper bounds and lower bounds for the appropriate strata being printed along with an indicator to draw attention to those bounds exceeded. Thus, the Department will be able to make statistically sound decisions without the requirement of special training in statistics.

A second recommendation concerns the method presently used to enter the PMVI receipt information into the computer system. Receipt data are coded onto mark-sense forms which are then scanned by a machine that transcribes these data onto computer compatible, punched cards. If data errors are detected during the computer editing of these cards, the receipt used to code the erroneous data has to be relocated and a new mark-sense sheet coded.

Savings of both man-hours and materials are possible by either of two methods. The most attractive method would require a special version of the present data editing program that would allow the information from the receipts to be entered directly into the computer. The unique benefit of this data entry scheme is that the receipt data are edited immediately (dynamically) and coding errors can be corrected and/or source document errors verified before the receipt is refiled. The alternative entry method would involve keying the data to a diskette. The diskette would then be copied to a computer compatible magnetic tape which would then be processed by the edit program described in this report.

TABLE 2

SMALL EXEMPTION STATIONS

Defect Analysis:

	Lower Bound	Mean	Upper Bound	Standard Deviation
Brakes	XX.X	XX.X	XX.X	X.XX
Headlights	XX.X	XX.X	XX.X	X.XX
Other Lights	XX.X	XX.X	XX.X	X.XX
Signal Lights	XX.X	XX.X	XX.X	X.XX
Horn	XX.X	XX.X	XX.X	X.XX
Steering	XX.X	XX.X	XX.X	X.XX
Mirror	XX.X	XX.X	XX.X	X.XX
Windshield	XX.X	XX.X	XX.X	X.XX
Other Glass	XX.X	XX.X	XX.X	X.XX
Windshield Wiper	XX.X	XX.X	XX.X	X.XX
Tag Mounting	XX.X	XX.X	XX.X	X.XX
Exhaust Line	XX.X	XX.X	XX.X	X.XX
Tires	XX.X	XX.X	XX.X	X.XX
Seat Belts	XX.X	XX.X	XX.X	X.XX
Hood Latch	XX.X	XX.X	XX.X	X.XX
Fuel System	XX.X	XX.X	XX.X	X.XX
Doors	XX.X	XX.X	XX.X	X.XX
Emission Control	XX.X	XX.X	XX.X	X.XX

Cost Analysis:

Defective	XX.XX	XX.XX	XX.XX	X.XX
Nondefective	XX.XX	XX.XX	XX.XX	X.XX
All Vehicles	XX.XX	XX.XX	XX.XX	X.XX

TABLE 3

STATION #XXXX—SMALL EXEMPTION

Defect Analysis:

	Lower Bound	Mean	Upper Bound	Standard Deviation
Brakes	XX.X	XX.X	XX.X	X.XX
Headlights	XX.X	XX.X	XX.X	X.XX
Other Lights	XX.X	XX.X	XX.X	X.XX
Signal Lights	XX.X	XX.X	XX.X	X.XX
Horn	XX.X	XX.X	XX.X	X.XX
Steering	XX.X	XX.X	XX.X	X.XX
Mirror	XX.X	XX.X	XX.X	X.XX
Windshield	XX.X	XX.X	XX.X	X.XX
Other Glass	XX.X	XX.X	XX.X	X.XX
Windshield Wiper	XX.X	XX.X	XX.X	X.XX
Tag Mounting	XX.X	XX.X	XX.X	X.XX
Exhaust Line	XX.X	XX.X	XX.X	X.XX
Tires	XX.X	XX.X	XX.X	X.XX
Seat Belts	XX.X	XX.X	XX.X	X.XX
Hood Latch	XX.X	XX.X	XX.X	X.XX
Fuel System	XX.X	XX.X	XX.X	X.XX
Doors	XX.X	XX.X	XX.X	X.XX
Emission Control	XX.X	XX.X	XX.X	X.XX

Cost Analysis:

Defective	XX.XX	XX.XX	XX.XX	X.XX
Nondefective	XX.XX	XX.XX	XX.XX	X.XX
All Vehicles	XX.XX	XX.XX	XX.XX	X.XX

Both of these methods eliminate the materials cost of the mark-sense forms and the computer cards subsequently punched. Additional equipment may not be required since several of these entry devices are presently in operation at the Department. Manpower saving may be realized by the elimination of the mark-sense coding and subsequent handling necessary to convert the coded forms to punched cards.

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APPENDIX A

SAMPLE DETERMINATION ALGORITHM

The method of sampling which seems most likely to produce results suitable for use in drawing inferences about Virginia's periodic motor vehicle inspection program involves sampling stations monthly at random, according to their relative volumes and according to station classification.

The Department of State Police analyzed approximately 60,000 inspection receipts in 1971 and 1972, 24,000 in 1973, and almost 50,000 in 1975. From these analyses it was found that most inspection items have a failure rate of about 5.0%, with the minimum rate for most items being about 1.5%.

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.

It should be noted that these figures apply only to one type of inspection receipt; namely, the approval receipt that is used for passenger vehicles, trucks, and buses. Rejection receipts and trailer/motorcycle decals are not included in this sample and should be sampled and analyzed in separate studies.

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.

APPENDIX B

CODING MANUAL FOR INSPECTION RECEIPTS

The purpose of the manual is, first, to show you, the coder, how to select and code information from inspection receipts, and second to serve as a reference so that you can use it to answer questions later. Your job involves two very important tasks: (1) selection of the proper inspection receipts, as indicated by the inspection sampling list, and (2) coding of the information from selected receipts in such a way that it can be read by a machine and eventually processed by a computer.

Selection of Inspection Receipts

To assist you in selecting or "sampling" receipts, you will be given copies of the inspection sampling list shown on the next page. (The form you receive will not be filled in as this one is. You will have to fill it in as you go along.) This list tells you how many receipts to sample (in this case 16) and what stations to sample (the station numbers). For instance, on the list shown, 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 to make a total of 16, the coder took the other 6 from the file for the next station, number 1371. Thus, for any given month, you may use as many stations as you need to obtain the desired number of receipts. In some months, the station chosen will have enough receipts and that is the only station you need to sample. But in other months, where the station chosen does not have enough receipts, you may have to take receipts from more than one station.

CATEGORY: UNLIMITED — LOW 1975 SAMPLE

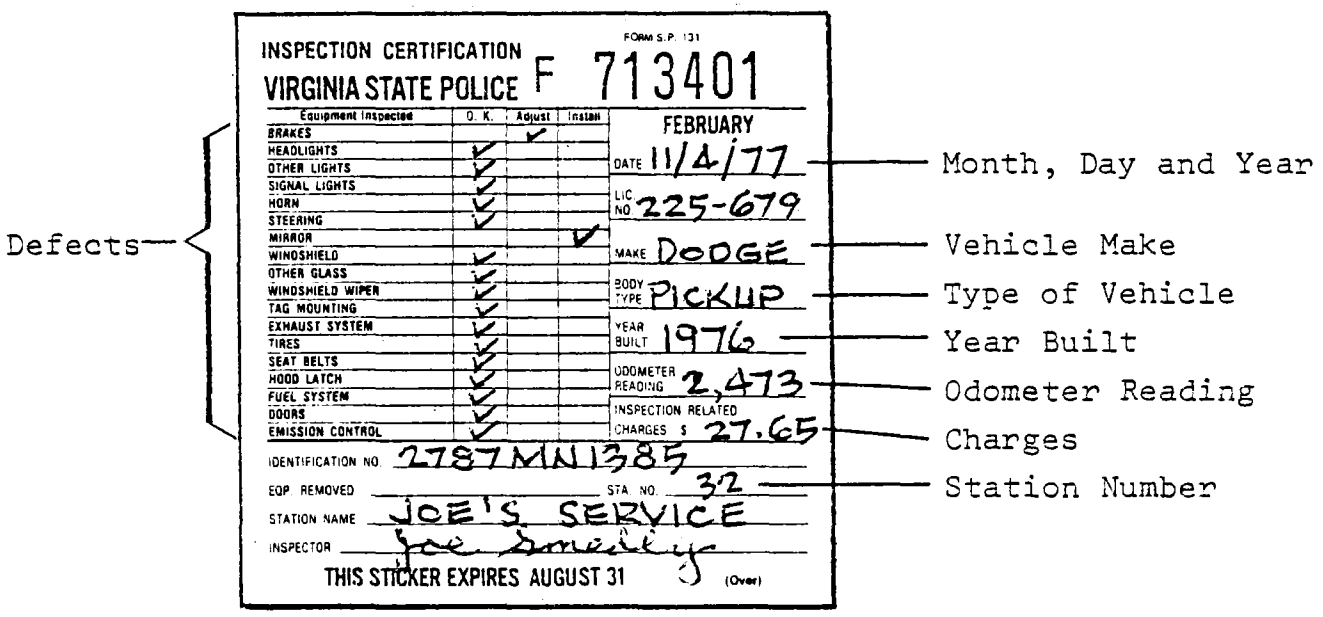
INSTRUCTIONS: SAMPLE 16 RECEIPTS FROM THIS LIST OF STATIONS FOR EACH MONTH IN THE ORDER LISTED.

ORDER	STATION NUMBER	SAMPLE MONTH	NUMBER OF RECEIPTS SAMPLED
1	39	January	16
2	438	February	16
3	2296	March	16
4	1260	April	10
5	1371	April	6
6	2082	May	16
7	2824	June	16
8	1239	July	2
9	2821	July	3
10	1145	July	11
11	168	August	16
12	1764	September	8
13	88	September	8
14	112	October	16
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 you have pulled those receipts to be sampled, you will have to code the information onto the "Tabulation Form" shown on the next page. The tabulation form is organized in rows. The odd numbered rows (1,3,5,7, etc.) are on the left-hand side of the page, with the row number indicated by the number in the box. The even numbered rows are on the right-hand side of the page, again with the row number in the box. Each particular item of information has its own special place on this form so you must be careful that you put the information in the proper row. This part of the manual will show you what information goes in each of the rows and will also show you how to mark the form so a machine can read the information.

You will be coding the information or "data" shown in the example "regular" receipt below.



INSPECTION CERTIFICATION
FORM S.P. 131
VIRGINIA STATE POLICE F 713401

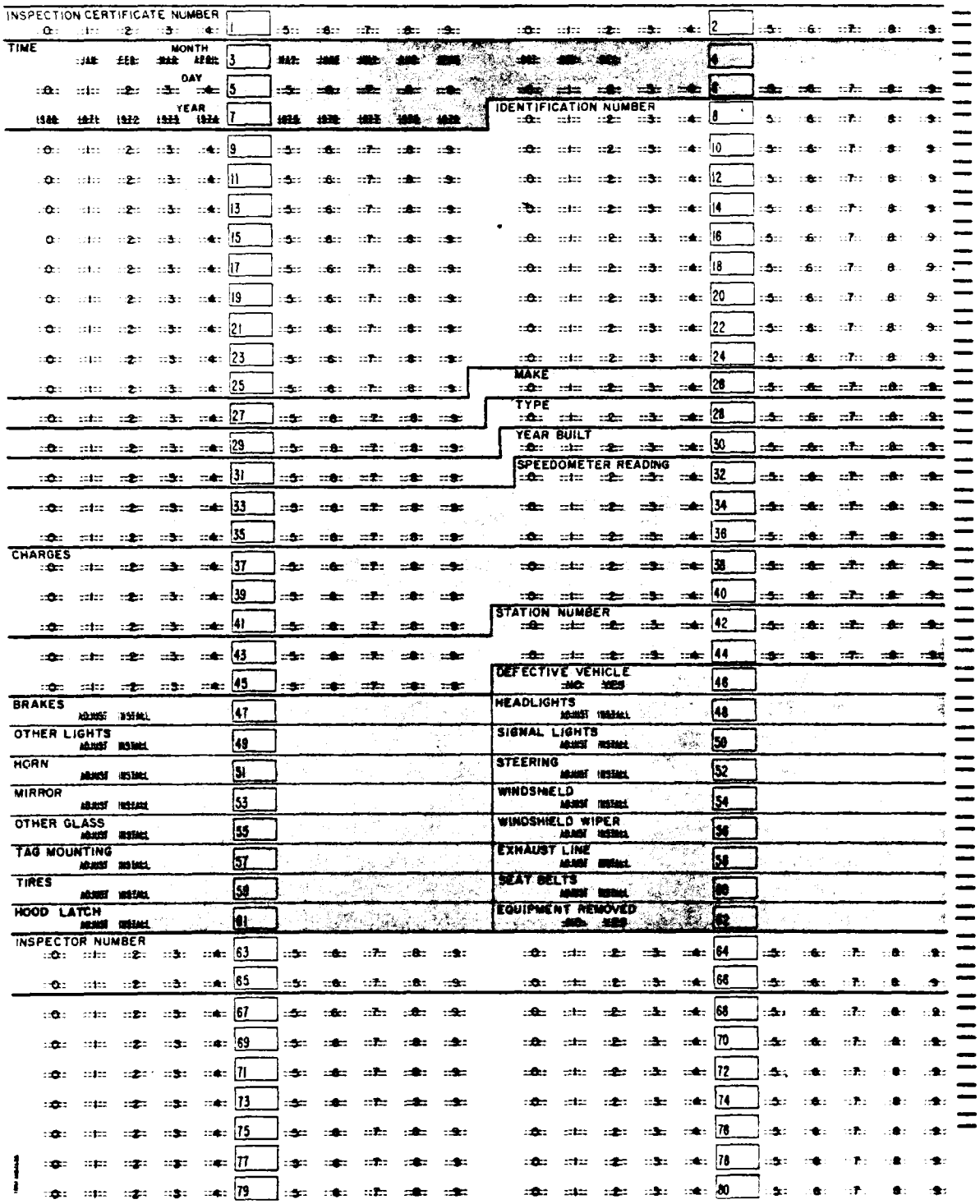
Equipment Inspected	O. K.	Adjust	Instal
BRAKES		✓	
HEADLIGHTS	✓		
OTHER LIGHTS	✓		
SIGNAL LIGHTS	✓		
HORN	✓		
STEERING	✓		
MIRROR			✓
WINDSHIELD	✓		
OTHER GLASS	✓		
WINDSHIELD WIPER	✓		
TAG MOUNTING	✓		
EXHAUST SYSTEM	✓		
TIRES	✓		
SEAT BELTS	✓		
HOOD LATCH	✓		
FUEL SYSTEM	✓		
DOORS	✓		
EMISSION CONTROL	✓		

FEBRUARY
DATE 11/4/77 — Month, Day and Year
LIC. NO. 225-679
MAKE DODGE — Vehicle Make
BODY TYPE PICKUP — Type of Vehicle
YEAR BUILT 1976 — Year Built
ODOMETER READING 2,473 — Odometer Reading
INSPECTION RELATED CHARGES $ 27.65 — Charges
IDENTIFICATION NO. 2787MN1385
EQP. REMOVED
STA. NO. 32 — Station Number
STATION NAME JOE'S SERVICE
INSPECTOR Joe Smeltz
THIS STICKER EXPIRES AUGUST 31
(Over)

Defects

Type of Receipt (Example shown is a "regular" receipt)

VIRGINIA STATE POLICE INSPECTION TABULATION

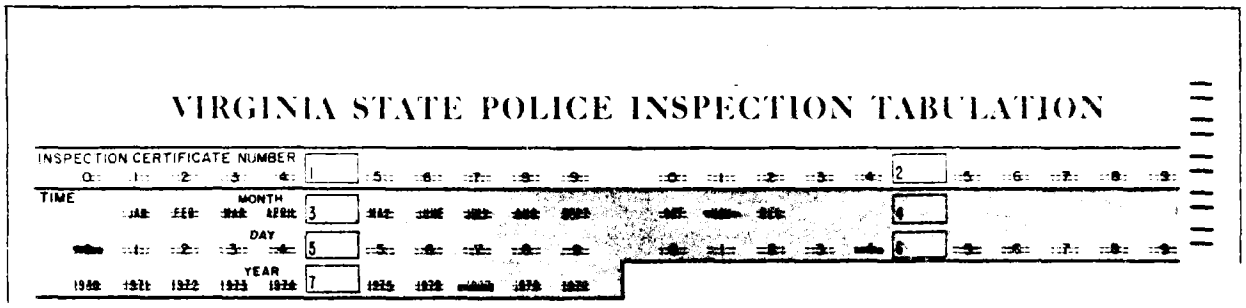


2438(1) Month, Day and Year of Inspection — This information appears in the upper right-hand corner of the receipt. It is coded as follows:

Month: Information concerning the month during which the inspection was done goes in row number 3 (this section of the coding form is shown below for your information). You will note that the months of the year are written across row 3. To indicate the month of inspection, you would blacken in the space between the two dashed lines (and over the name of the appropriate month) with a No. 2 pencil. Our example inspection occurred in November, so you would blacken in November's space as we have done below. Remember to blacken in the space completely, but not to go beyond the dashed lines, so that a machine can correctly read the information.

Day: Information concerning the day of the month goes in rows 5 and 6. The day of inspection ranges from 01 (the first day of the month) to either 30 or 31 (the last day of the month). All days between 1 and 9 will be preceded by a zero (01, 02, 03, ... 09). The first digit of the day goes in row 5 and the second digit in row 6. Following our example receipt, the inspection was done on November 4, so you would blacken in the "0" in row 5 and the "4" in row 6, as we have done below.

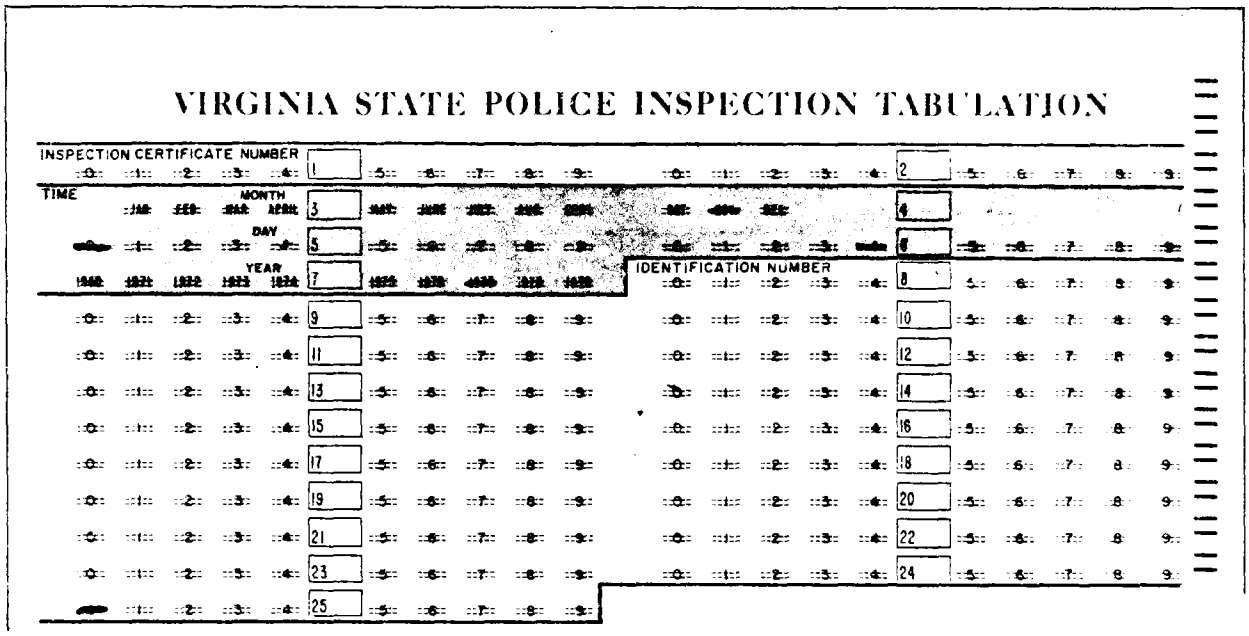
Year: Information concerning the year of inspection goes in row 7. You would simply blacken in the space corresponding with the year. Since this is a 1977 receipt, you would blacken in 1977 as we have done below.



(2) Type of inspection receipt — There are four types of receipts as follows:

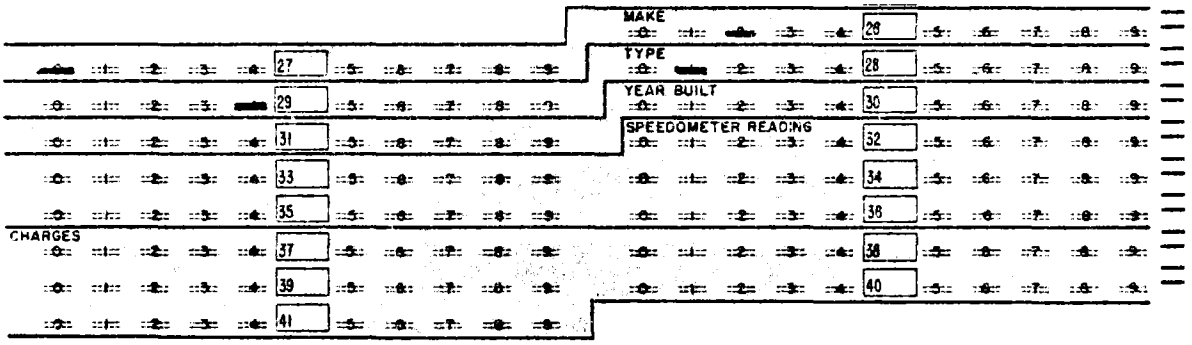
Code	Type of Receipt
0	Regular 6-month receipt
1	Annual receipt
2	Receipt for 6-month replacing annual
3	Trailer/Motorcycle receipt
4	Rejection receipt

The regular 6-month receipt is like the one we are coding. The issue date (at the top of the receipt) is 6 months from the expiration date (at the bottom of the receipt). The annual receipts are just like the 6-month receipts, only the issue and expiration dates are 1 year apart. A 6-month sticker replacing an annual one is denoted by an "A" with a circle around it ((A)) next to the year built category on the right side of the receipt. Trailer/Motorcycle receipts are denoted by a "T/M" preceding the inspection number and rejection receipts have "Rejection" printed in large letters across the top. You will code this information in row 25 by blackening in a 0, 1, 2, 3, or 4, depending upon the type of receipt. (Remember, no information is coded in rows 8 through 25.) For our example, we have a regular 6-month receipt; therefore, you would blacken in the "0" in row 25 as we have done in our example.



(3) Make of Vehicle — The make of the vehicle is written on the right side of the inspection receipt by the word "make". The codes for the various vehicle makes, both domestic and foreign, are listed on the next page. The code for the make of vehicle goes in rows 26 and 27, with the first digit of the code blackened in row 26 and the second in 27. In our example, the vehicle inspected was a Dodge truck, and would be coded 20, with a "2" blackened in row 26 and a "0" blackened in row 27, as shown. NOTE: A Dodge automobile would also be coded as 20.

(4) Type of Vehicle — The type of vehicle is written on the right side of the receipt by the words "Body Type".* The vehicle types are listed on the next page for your information. You will note that codes 00 through 06 apply to passenger vehicles, codes 10 through 20 to trucks and buses and codes 30 through 36 to trailers and motorcycles. These codes go in rows 28 and 29. In our example, the vehicle inspected was a pickup (code 14), and you would blacken a "1" in row 28 and a "4" in row 29, as we have done.



*On rejection receipts, type of vehicle should be on the Identification Number line. If vehicle type is not on the receipt, leave columns 28 and 29 blank.

MAKE OF VEHICLE

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

TYPE OF VEHICLE

Code	Passenger Vehicle Type
00	Other Passenger Vehicle
01	Sedan
02	Convertible
03	Station Wagon
04	Ambulance
05	Police Car
06	Taxicab

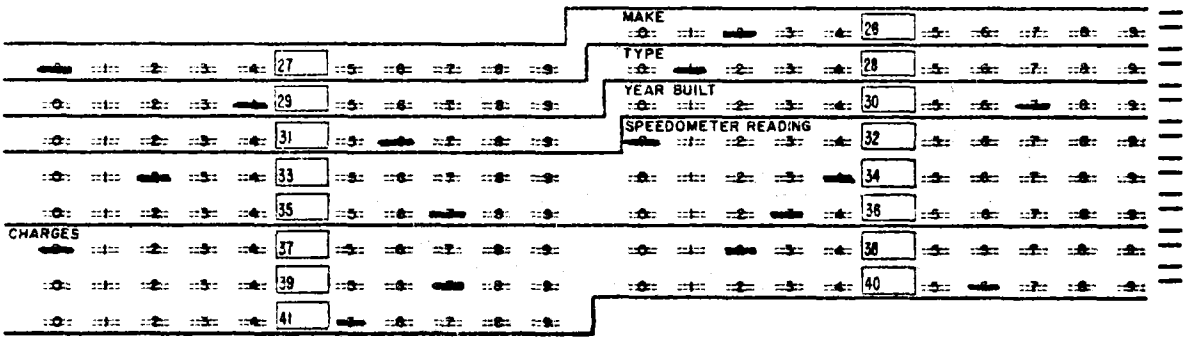
Code	Truck and Bus Type
10	Other Truck or Bus
11	Dump
12	Flatbed
13	Panel
14	Pickup
15	Van
16	Wrecker or Tow
17	Fire
18	Tractor-Truck
19	School Bus
20	Commercial Bus

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

(5) Year Built — Information on the model year of the vehicle is on the right side of the receipt by "year built". The last two digits of the year built are coded into rows 30 and 31. Our example Dodge pickup is a 1976 model; therefore, you would blacken in the "7" in row 30 and the "6" in row 31, as shown.

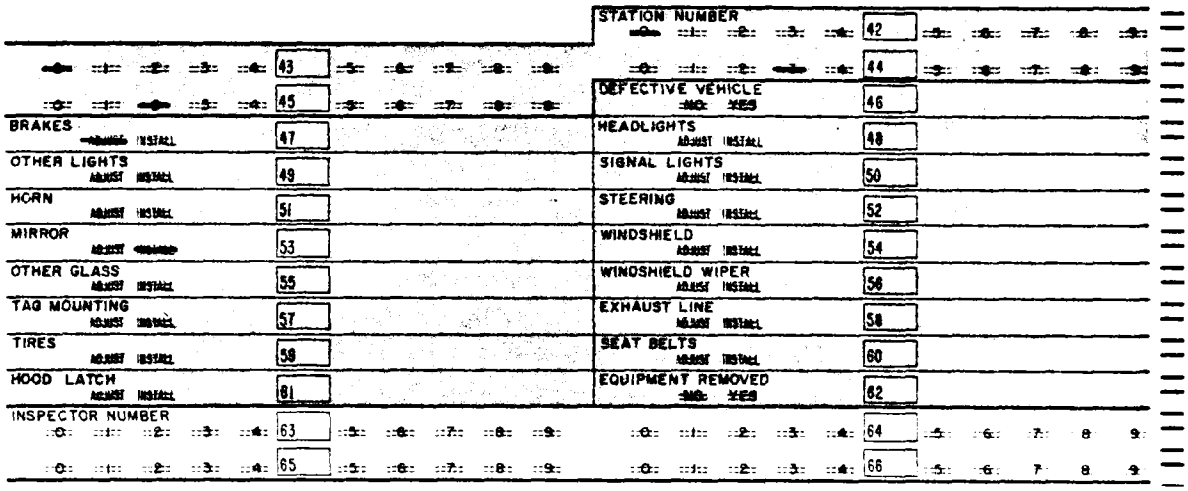
(6) Speedometer (odometer) reading — This information is also on the right side of the receipt. You will code all 5 digits of the odometer reading, one each in rows 32 through 36. Note that something must be coded in each space, even if it's only a zero. Our example vehicle's odometer reads 2,473 miles; hence, it would be coded 02473, with "0" in row 32, a "2" in 33, a "4" in 34, a "7" in 35, and a "3" in row 36, as shown.

(7) Charges — Again, the charges or cost of the inspection and accompanying repairs appear on the right side of the receipt by the word "charges". These charges are coded in rows 37 through 41. Dollars are coded into rows 37, 38, and 39, and cents are coded into rows 40 and 41. Again, something must be entered for each of the 5 rows, even if it's only a zero. In our example, the charges for inspection were $27.65; they would be coded as "02765", with the "0" blackened in in row 37, the "2" in row 38, the "7" in row 39, the "6" in row 40 and the "5" in row 41, as shown below.



(8) Inspection Station Number — This information is located in the lower right-hand corner of the receipt under "station number" and is coded into rows 42 through 45. Our example receipt was prepared by station number 32 and would be coded "0032" with "0" in rows 42 and 43, a "3" in 44 and a "2" in 45. 2443

(9) Defects — On the left side of the inspection receipt there is a list of possible equipment problems which could cause a vehicle to fail inspection. Corresponding with each of these equipment problems are the designations "OK" (no problem), "adjust" (make repairs on existing equipment), and "install" (replace existing equipment). There is a similar listing on the tabulation form (rows 47 through 61). For instance, in row 47 is the word BRAKES, with adjust and install as coding options. The receipt indicates that the brakes needed adjusting; therefore, we blacken in the "adjust" space. Also the receipt is marked "install" next to the item MIRROR; therefore, we blacken in the "install" space under MIRROR. "OK" is checked by HEADLIGHTS on the receipt; thus we leave the tabulation form blank by HEADLIGHTS (and all other items marked "OK"). A similar procedure should be followed for each of the 18 possible vehicle problems. (While there are no rows specifically marked for the last 3 defect types, FUEL SYSTEM, DOORS, EMISSION CONTROL, these items have rows 63, 64, and 65 assigned to them. A blank in each of these rows indicate the item was "OK", a mark of "1" indicates the receipt was marked "adjust" and a "2" indicates the receipt was marked "install".) The correctly marked form is below.



(10) Recoded — This designation in row 67 indicates whether the receipt has been coded before. Occasionally, the computer will detect an error in coding and ask that the receipt be recoded. If you are recoding the information, code a "1" in row 67. If this is the first coding, blacken in a "0" in row 67.

REVIEW

By way of review (and for you to use while coding) the following is a list of coded information, where it appears on the inspection receipt, and where it is coded on the tabulation form.

Information	Place on Receipt	Place on Tabulation Form
Month, day, and year of inspection	Upper right	Rows 3-7
Type of inspection sticker	Upper middle	Row 25
Make of vehicle	Right, under "make"	Rows 26-27
Type of Vehicle	Right, under "body type"	Rows 28-29
Year Built	Right, under "year built"	Rows 30-31
Speedometer (odometer) reading	Right, under "odometer reading"	Rows 32-36
Charges	Right, under "Charges"	Rows 37-41
Inspection Station Number	Lower right	Rows 42-45
Defects	Left-hand column	Rows 47-65
Recode	(from coding error list)	Row 67

Also, remember the following coding rules.

1. Always use a No. 2 lead pencil — The machine will not be able to read your coding if you use any other kind of pencil or pen.

2. Do Not Erase — There is usually enough of a mark left to fool the machine into thinking that you meant to code something in that space. It is better to start over with a clean tabulation form.

3. Make Sure Your Marks Are Neat — and that they extend only between the dashed lines. Also, make sure they are dark. 2115

4. Blacken in only one space per row — The machine will not accept any form with two marks in a single row.

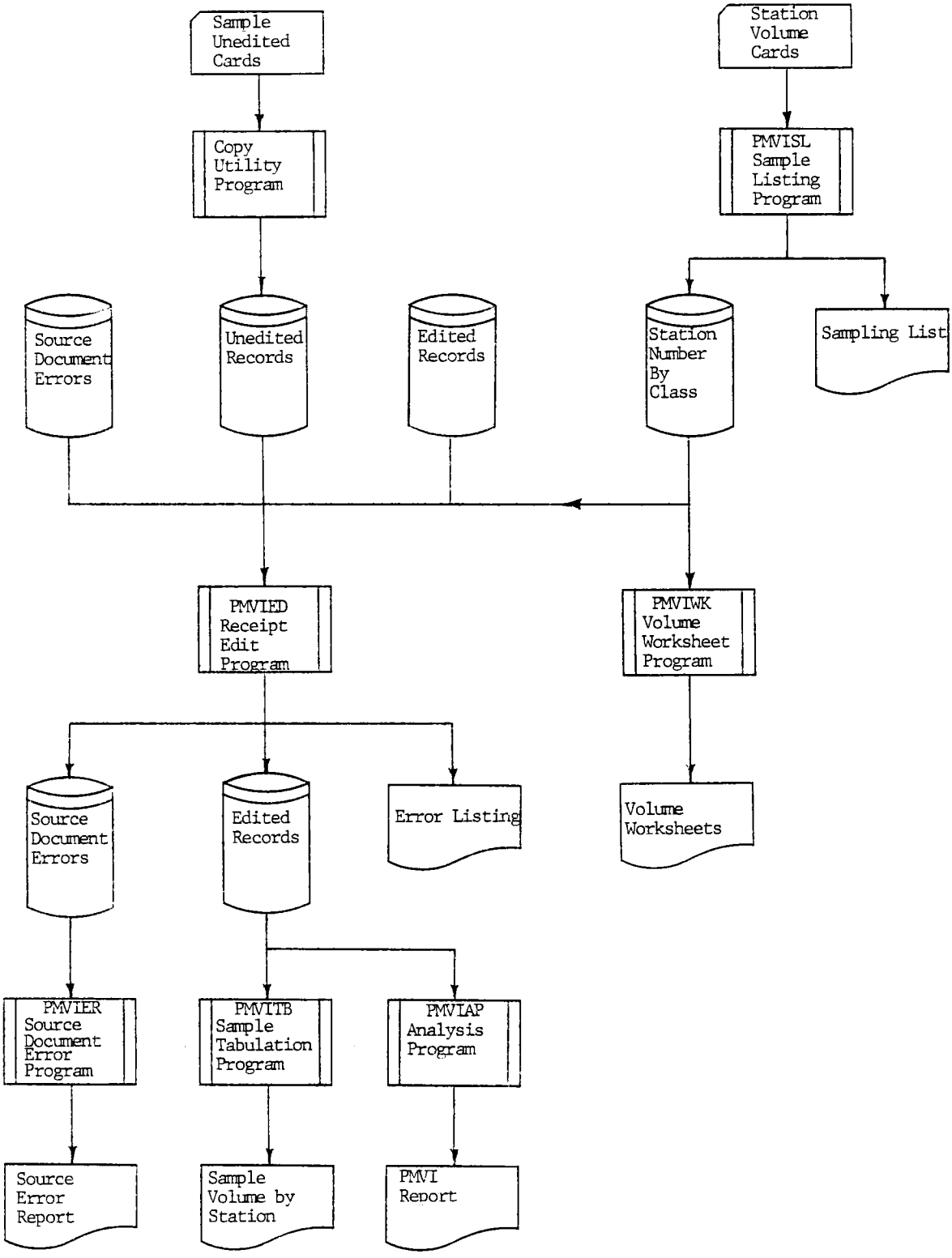
5. Any item that is missing on the inspection receipt should be left blank on the tabulation form.

6. Always code zeros as you would other numbers, no matter where they appear in the coding — If there are 4 spaces allotted and the answer is 32, then code 0032. On the other hand, if the answer is 3200, code 3200.

APPENDIX C

SYSTEM RUNBOOK

SYSTEM FLOWCHART ILLUSTRATING THE
RELATIONSHIP AMONG THE PROGRAMS



, 9-1-75

2449

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF STATE POLICE
COMPUTER OPERATIONS INSTRUCTIONS

JOB NAME: STATIONVOLUMES SUBMITTED BY: _____

ESTIMATED RUN TIME: _____ CORE REQUIREMENTS: _____

TYPE OF RUN: [X] PRODUCTION [ ] TEST [ ] COMPILE [ ] LINK [ ] _____

DATE SUBMITTED: _____ TIME SUBMITTED: _____

DEVICE ASSIGNED	I/O	T/D C/P	VOLUME SER. NO.	FILE LABEL	SOURCE	DISPOSITION OF OUTPUT	ACTUAL ASSIGNMENT
1	I	C					
22	O	D	SP0086	STAVOL			

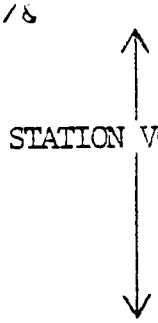
SPECIAL INSTRUCTIONS:

OPERATOR NOTES:

INITIALS:

2450

```
// JOB STATIONVOLUMES
// OPTION NODUMP
// DVC 1 // LFD PMVIDATA
// DVC 22 // VOL SP0086 // EXT C,,CYL,3
// LBL STAVOL.SP0086
// LFD SYSD01,SQ,1,NEW
// EXEC PMVICD,TESTLOAD,,REL
// DELETE
/&
```



STATION VOLUME DATA

```
/*
```

, 9-1-75

2451

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF STATE POLICE
COMPUTER OPERATIONS INSTRUCTIONS

JOB NAME: SAMPLEDRECEIPTS SUBMITTED BY: _____

ESTIMATED RUN TIME: _____ CORE REQUIREMENTS: _____

TYPE OF RUN: [X] PRODUCTION [ ] TEST [ ] COMPILE [ ] LINK [ ] _____

DATE SUBMITTED: _____ TIME SUBMITTED: _____

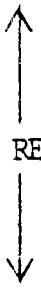
DEVICE ASSIGNED	I/O	T/D C/P	VOLUME SER. NO.	FILE LABEL	SOURCE	DISPOSITION OF OUTPUT	ACTUAL ASSIGNMENT
1	I	C					
22	O	D	SP0086	DATATE			

SPECIAL INSTRUCTIONS:

OPERATOR NOTES:

INITIALS:

```
// JOB SAMPLEDRECEIPTS
// OPTION NODUMP
// DVC 1 // LFD PMVIDATA
// DVC 22 // VOL SP0086 // EXT C,,CYL,3
// LBL DATATE,SP0086
// LFD SYSD01,SQ,1,NEW
// EXEC PMVICD,TESTLOAD,,REL
// DELETE
/&
```



SAMPLED RECEIPT DATA


```
/*
```

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF STATE POLICE
COMPUTER OPERATIONS INSTRUCTIONS

JOB NAME: SAMPLINGLIST SUBMITTED BY: _____

ESTIMATED RUN TIME: _____ CORE REQUIREMENTS: _____

TYPE OF RUN: [X] PRODUCTION [ ] TEST [ ] COMPILE [ ] LINK [ ] _____

DATE SUBMITTED: _____ TIME SUBMITTED: _____

DEVICE ASSIGNED	I/O	T/D C/P	VOLUME SER. NO.	FILE LABEL	SOURCE	DISPOSITION OF OUTPUT	ACTUAL ASSIGNMENT
1	I	C					
21	I	D	SP0086	STAVOL			
21	O	D	SP0086	STAFIL			
3	O	P					

SPECIAL INSTRUCTIONS:

Date card must have the year to be sampled in columns 1-4. Such as '1975'.

OPERATOR NOTES:

INITIALS:

```
2454 // JOB SAMPLINGLIST
 // OPTION NODUMP
 // DVC 1 // LFD CARD
 // DVC 3,SYM // LFD PRINT
 // DVC 21 // VOL SP0086
 // LBL STAVOL,SP0086
 // LFD SYSD01
 // DVC 21 // VOL SP0086 // EXT C,,CYL,3
 // LBL WORKFL,SP0086
 // LFD SYSD02,SQ,1,NEW
 // DVC 21 // VOL SP0086 // EXT C,,CYL,3
 // LBL STAFIL,SP0086
 // LFD SYSD03,SQ,1,NEW
 // DVC 21 // VOL SP0086 // LFD DM01
 // EXEC PMVIRL,TESTLOAD,,REL
 // DELETE
 /&



 1975
 /*
```

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF STATE POLICE
COMPUTER OPERATIONS INSTRUCTIONS

JOB NAME: VOLUMEWORKSHEETS SUBMITTED BY: _____

ESTIMATED RUN TIME: _____ CORE REQUIREMENTS: _____

TYPE OF RUN: [X] PRODUCTION [ ] TEST [ ] COMPILE [ ] LINK [ ] _____

DATE SUBMITTED: _____ TIME SUBMITTED: _____

DEVICE ASSIGNED	I/O	T/D C/P	VOLUME SER. NO.	FILE LABEL	SOURCE	DISPOSITION OF OUTPUT	ACTUAL ASSIGNMENT
3	O	P					
20	I	D	SP0086	STAFIL			

SPECIAL INSTRUCTIONS:

OPERATOR NOTES:

INITIALS:

```
// JOB VOLUMEWORKSHEETS
// OPTION NODUMP
// DVC 3,SYM // LFD PRINT
// DVC 20 // VOL SP0086
// LBL STAFIL,SP0086
// LFD SYSD01
// EXEC PMVIWK,TESTLOAD,,REL
// DELETE
/&
```

2157

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF STATE POLICE
COMPUTER OPERATIONS INSTRUCTIONS

JOB NAME: EDITRECEIPTS SUBMITTED BY: _____

ESTIMATED RUN TIME: _____ CORE REQUIREMENTS: _____

TYPE OF RUN: [X] PRODUCTION [ ] TEST [ ] COMPILE [ ] LINK [ ] _____

DATE SUBMITTED: _____ TIME SUBMITTED: _____

DEVICE ASSIGNED	I/O	T/D C/P	VOLUME SER. NO.	FILE LABEL	SOURCE	DISPOSITION OF OUTPUT	ACTUAL ASSIGNMENT
1	I	C					
20	I	D	SP0086	OLDEDT			
20	I	D	SP0086	OLDSRC			
20	I	D	SP0086	STAFIL			
20	I	D	SP0086	DATATE			
20	O	D	SP0086	EDTSNP			
20	O	D	SP0086	SRCERS			
3	O	P					

SPECIAL INSTRUCTIONS:

Date card must have the year of the sample in columns 1-4. Such as '1975'.

OPERATOR NOTES:

INITIALS:

2458

```
// JOB EDITRECEIPTS
// OPTION NODUMP
// DVC 1 // LFD CARD
// DVC 3,SYM // LFD PRINT
// DVC 20 // VOL SP0086
// LBL OLDEDT,SP0086
// LFD SYSD01
// DVC 20 // VOL SP0086
// LBL OLDSRC,SP0086
// LFD SYSD02
// DVC 20 // VOL SP0086
// LBL STAFIL,SP0086
// LFD SYSD03
// DVC 20 // VOL SP0086
// LBL DATATE,SP0086
// LFD SYSD04
// DVC 20 // VOL SP0086 // EXT C,,CYL,3
// LBL EDTSMP,SP0086
// LFD SYSD05,SQ,1,NEW
// DVC 20 // VOL SP0086 // EXT C,,CYL,3
// LBL SRCERS,SP0086
// LFD SYSD06,SQ,1,NEW
// DVC 20 // VOL SP0086
// LBL WORKFL,SP0086
// LFD SYSD07
// DVC 20 // VOL SP0086 // LFD DM01
// EXEC PMVIED,TESTLOAD,,REL
// DELETE
/&
```

1975

```
/*
```

2459

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF STATE POLICE
COMPUTER OPERATIONS INSTRUCTIONS

JOB NAME: SAMPLETAB SUBMITTED BY: _____

ESTIMATED RUN TIME: _____ CORE REQUIREMENTS: _____

TYPE OF RUN: [X] PRODUCTION [ ] TEST [ ] COMPILE [ ] LINK [ ] _____

DATE SUBMITTED: _____ TIME SUBMITTED: _____

DEVICE ASSIGNED	I/O	T/D C/P	VOLUME SER. NO.	FILE LABEL	SOURCE	DISPOSITION OF OUTPUT	ACTUAL ASSIGNMENT
1	I	C					
21	I	D	SP0086	EDTSMP			
3	O	P					

SPECIAL INSTRUCTIONS:
This report shows the number of receipts sampled from each station category. If a parameter card is read with "STATION" in columns 1-7, then each station and the number of receipts sampled per month are also printed.

OPERATOR NOTES:

INITIALS:

2400

```
// JOB SAMPLETAB
// OPTION NODUMP
// DVC 1 // LFD CARD
// DVC 3,SYM // LFD PRINT
// DVC 21 // VOL SP0086
// LBL EDTSMP,SP0086
// LFD SYSD01
// DVC 21 // VOL SP0086
// LBL WORKFL,SP0086
// LFD SYSD02
// DVC 21 // VOL SP0086 // LFD DM01
// EXEC PMVITB,TESTLOAD,,REL
// PARAM DISC=4
// DELETE
/&



STATIONS
/*
```

7, 9-1-75

2161

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF STATE POLICE
COMPUTER OPERATIONS INSTRUCTIONS

JOB NAME: ERRORREPORT SUBMITTED BY: _____

ESTIMATED RUN TIME: _____ CORE REQUIREMENTS: _____

TYPE OF RUN: [X] PRODUCTION [ ] TEST [ ] COMPILE [ ] LINK [ ] _____

DATE SUBMITTED: _____ TIME SUBMITTED: _____

DEVICE ASSIGNED	I/O	T/D C/P	VOLUME SER. NO.	FILE LABEL	SOURCE	DISPOSITION OF OUTPUT	ACTUAL ASSIGNMENT
1	I	C					
21	I	D	SP0086	SRCERS			
3	O	P					

SPECIAL INSTRUCTIONS:
Date card must have the year of the sample in columns 1-4. Such as '1975'.

OPERATOR NOTES:

INITIALS:

2162

```
// JOB ERRORREPORT
// OPTION NODUMP
// DVC 1 // LFD CARD
// DVC 3,SYM // LFD PRINT
// DVC 21 // VOL SP0086
// LBL SRCERS.SP0086
// LFD SYSD01
// DVC 21 // VOL SP0086
// LBL WORKFL,SP0086
// LFD SYSD03
// DVC 21 // VOL SP0086 // LFD DM01
// EXEC PMVISD,TESTLOAD,,REL
// DELETE
/&
```

1975

```
/*
```

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF STATE POLICE
COMPUTER OPERATIONS INSTRUCTIONS

2163

JOB NAME: PMVIREPORT SUBMITTED BY: _____

ESTIMATED RUN TIME: _____ CORE REQUIREMENTS: _____

TYPE OF RUN: [X] PRODUCTION [ ] TEST [ ] COMPILE [ ] LINK [ ] _____

DATE SUBMITTED: _____ TIME SUBMITTED: _____

DEVICE ASSIGNED	I/O	T/D C/P	VOLUME SER. NO.	FILE LABEL	SOURCE	DISPOSITION OF OUTPUT	ACTUAL ASSIGNMENT
1	I	C					
20	I	D	SP0086	EDISMP			
3	O	P					

SPECIAL INSTRUCTIONS:

Date card must have the year of the sample in columns 1-4. Such as '1975'.

OPERATOR NOTES:

INITIALS:

2164
```
// JOB PMVIREPORT
// OPTION NODUMP
// DVC 1 // LFD CARD
// DVC 3,SYM // LFD PRINT
// DVC 20 // VOL SP0086
// LBL EDTSMP,SP0086
// LFD SYSD01
// EXEC PMVILS,TESTLOAD,,REL
// DELETE
/&
```

1975
```
/*
```

APPENDIX D

VOLUME WORKSHEET PROGRAM

```
 IDENTIFICATION DIVISION.
 PROGRAM-ID.  PMVIWK.
 AUTHOR. PHILIP HARRIS.
 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-9000.
 OBJECT-COMPUTER.  UNIVAC-9000.
 SPECIAL-NAMES.
     SYSCHAN-15 IS NEW-PAGE.
 INPUT-OUTPUT SECTION.
 FILE-CONTROL.
     SELECT STATIONFILE ASSIGN TO SYSD01 DISC-8425.
     SELECT PRINT ASSIGN TO PRINTER.
 DATA DIVISION.
 FILE SECTION.
 FD  STATIONFILE
     LABEL RECORDS ARE STANDARD
     RECORD CONTAINS 10 CHARACTERS
     DATA RECORD IS INREC.
 01  INREC                          PICTURE X(10).
 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  STATION-NO-IN                  PICTURE 9999.
 77  STATION-TYPE-IN                PICTURE 9.
 77  PAGE-COUNT                     PICTURE 999.
 77  LINE-COUNT                     PICTURE 99.
 77  I                              PICTURE 9.
 01  HEADER.
     03  FILLER                     PICTURE XX    VALUE IS SPACES.
     03  FILLER                     PICTURE X(47)
         VALUE IS "VIRGINIA STATE POLICE ".
     03  FILLER                     PICTURE X(74)
         VALUE IS "INSPECTION STATION VOLUME WORKSHEET ".
     03  FILLER                     PICTURE X(5)
         VALUE IS "PAGE ".
     03  PAGE-NO                    PICTURE ZZ9.
     03  FILLER                     PICTURE X     VALUE IS SPACES.
```

```
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(23)
        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".
    03  FILLER                     PICTURE X(27)
        VALUE IS "--------I--------I--------I".
01  VERTICLE-LINE.
    03  FILLER                     PICTURE X     VALUE IS SPACES.
    03  FILLER                     PICTURE X(23)
        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".
    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  FILLER                     PICTURE X.
    03  STATION-TYPE               PICTURE 9.
    03  STATION-TYPE-REDEF REDEFINES STATION-TYPE  PICTURE X.
    03  FILLER                     PICTURE XXXX.
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 SPACES.
01  STRATA-LABELS-REDEF REDEFINES STRATA-LABEL-TABLE.
    03  STRATA-LABEL    OCCURS 5 TIMES  PICTURE X(12).
```

```
PROCEDURE DIVISION.                                          2469
OPEN-FILES-INITIALIZE.
    OPEN INPUT STATIONFILE.
    OPEN OUTPUT PRINT.
    MOVE 1 TO I
    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
    WRITE PRINT-LINE FROM HEADER AFTER ADVANCING NEW-PAGE.
    WRITE PRINT-LINE FROM EDGE-LINE AFTER ADVANCING 2 LINES.
    WRITE PRINT-LINE FROM HEADER-1 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEADER-2 AFTER ADVANCING 1 LINE.
READ-A-RECORD-AND-PRINT.
    READ STATIONFILE INTO INPUT-REC AT END GO TO END-OF-JOB.
    EXAMINE STATION-NO-REDEF REPLACING ALL SPACES BY ZEROS.
    EXAMINE STATION-TYPE-REDEF REPLACING ALL SPACES BY ZEROS.
CHECK-FOR-MISSING-NUMBERS.
    ADD 1 TO STATION-NO-IN
    IF STATION-NO-IN IS NOT EQUAL TO STATION-NO
            MOVE 5 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 5
                MOVE 5 TO STATION-TYPE-IN.
    MOVE STATION-NO-IN TO STATION-NO-OUT
    MOVE STRATA-LABEL (STATION-TYPE-IN) TO STATION-TYPE-OUT
    WRITE PRINT-LINE FROM HORIZONTAL-LINE AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM OUTLINE AFTER ADVANCING 1 LINE.
    ADD 1 TO LINE-COUNT
    IF LINE-COUNT IS GREATER THAN 26
            WRITE PRINT-LINE FROM EDGE-LINE AFTER ADVANCING
                                                    1 LINE
            PERFORM PRINT-HEADING.
GO-TO-READ-REC.
    GO TO READ-A-RECORD-AND-PRINT.
PRINT-BLANK-LINES.
    WRITE PRINT-LINE FROM HORIZONTAL-LINE AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM VERTICLE-LINE AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HORIZONTAL-LINE AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM VERTICLE-LINE AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM EDGE-LINE AFTER ADVANCING 1 LINE.
END-OF-JOB.
    MOVE 5 TO STATION-TYPE-IN.
END-LOOP.
```

```
IF STATION-NO-IN IS LESS THAN 4000
        ADD 1 TO STATION-NO-IN
        PERFORM PRINT-A-LINE
        GO TO END-LOOP.
PERFORM PRINT-BLANK-LINES
CLOSE STATIONFILE PRINT.
STOP RUN.
```

SAMPLE LISTING PROGRAM

```
 IDENTIFICATION DIVISION.
 PROGRAM-ID.              PMVISL.
 AUTHOR. PHILIP HARRIS.
 DATE-WRITTEN.   MAY 1977.
 DATE-COMPILED.
 REMARKS.
*
*    THIS PROGRAM READS THE MONTHLY VOLUMES FOR EACH
*    STATION, CLASSIFIES THE STATION INTO ONE OF THE
*    NINE STRATA, AND LISTS THE STATIONS OF EACH STRATA
*    IN RANDOM ORDER FOR SAMPLING.  THIS PROGRAM ALSO
*    DETERMINES THE SAMPLE SIZE AND PRINTS INSTRUCTIONS
*    INDICATING HOW MANY RECEIPTS TO SAMPLE FROM
*    EACH STRATA.
*

 ENVIRONMENT DIVISION.
 CONFIGURATION SECTION.
 SOURCE-COMPUTER.      UNIVAC-9000.
 OBJECT-COMPUTER.   UNIVAC-9000.
 SPECIAL-NAMES.
     SYSCHAN-15 IS NEW-PAGE.
 INPUT-OUTPUT SECTION.
 FILE-CONTROL.
     SELECT STATION-VOLUMES ASSIGN TO SYSD01 DISC-8425.
     SELECT  CLASSIFIED-STATIONS ASSIGN TO SYSD02 DISC-8425.
     SELECT  SORTED-STATIONS ASSIGN TO SYSD03 DISC-8425.
     SELECT  SORT-FILE ASSIGN TO DM01 DISC-8425.
     SELECT  CARD ASSIGN TO CARD-READER.
     SELECT PRINT ASSIGN TO PRINTER.

 DATA DIVISION.
 FILE SECTION.
 FD  STATION-VOLUMES
         LABEL RECORDS ARE STANDARD
         RECORD CONTAINS 80 CHARACTERS
         DATA RECORD IS VOLUME-REC.
 01  VOLUME-REC.
     03  STATION-NUMBER          PICTURE XXXX.
     03  FILLER                  PICTURE X.
     03  STATION-CLASS           PICTURE 9.
     03  FILLER                  PICTURE XX.
     03  MONTHVOL    OCCURS 12 TIMES     PICTURE X(5).
     03  FILLER                  PICTURE X(12).
 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  FILLER                  PICTURE X.
```

```
    03  CS-CLS                     PICTURE 9.
    03  CS-VOLM                    PICTURE 9.
    03  FILLER                     PICTURE XXX.
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  FILLER                     PICTURE X.
    03  SS-CLS                     PICTURE 9.
    03  SS-VOLM                    PICTURE 9.
    03  FILLER                     PICTURE XXX.
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  FILLER                     PICTURE X.
    03  CLS                        PICTURE 9.
    03  VOLM                       PICTURE 9.
    03  FILLER                     PICTURE XXX.

WORKING-STORAGE SECTION.
77  PAGE-NUM                       PICTURE 999.
77  LINE-COUNT                     PICTURE 99.
77  LINE-LIMIT                     PICTURE 99.
77  I                              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  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  FILLER                       PICTURE X.
    03  STATION-STRATA.
        05  CLSS                     PICTURE 9.
        05  VOL                      PICTURE 9.
    03  FILLER                       PICTURE XXX.

01  STRATATOTALTABEL.
    03  STRATA  OCCURS 9 TIMES       PICTURE 9(5).

01  STATION-TABEL.
    03  STATION-ENT      OCCURS 700 TIMES          PICTURE X(10).

01  PAGE-HEAD.
    03  FILLER                       PICTURE X(16)    VALUE IS
         "     CATEGORY:  ".
    03  STRATA-LABEL                 PICTURE X(29).
    03  YEAR-OUT                     PICTURE XXXX.
    03  YEAR-LABEL                   PICTURE X(15).
    03  FILLER                       PICTURE X(5)     VALUE IS "PAGE ".
    03  PAGE-NO                      PICTURE ZZ9.
    03  FILLER                       PICTURE X(60)    VALUE IS SPACES.

01  INSTRUCTION1.
    03  FILLER                       PICTURE X(27)    VALUE IS
         "     INSTRUCTIONS:  SAMPLE ".
    03  SAMPLE-NUM                   PICTURE ZZ9.
    03  FILLER                       PICTURE X(102)   VALUE IS
        " RECEIPTS FROM THIS LIST OF STATIONS ".

01  INSTRUCTION2.
    03  FILLER                       PICTURE X(20)    VALUE IS SPACES.
    03  FILLER                       PICTURE X(112)   VALUE IS
```

```
        "FOR EACH MONTH IN THE ORDER LISTED. ".

01  HEAD1.
    03  FILLER                     PICTURE X(59)  VALUE IS SPACES.
    03  FILLER                     PICTURE X(73)   VALUE IS
        "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(76)   VALUE IS
        "RECEIPTS SAMPLED ".

01  UNDERLINE.
    03  FILLER                     PICTURE X(5)    VALUE IS SPACES.
    03  FILLER                     PICTURE X(51)   VALUE IS
        "-----      --------------       ------------ ".
    03  FILLER                     PICTURE X(76)   VALUE IS
        "---------------- ".

01  OUTLINE.
    03  FILLER                     PICTURE X(5)  VALUE IS SPACES.
    03  ORDER-O                    PICTURE ZZZ9B(12).
    03  STATION-NUM-O              PICTURE ZZZ9.
    03  FILLER                     PICTURE X(107)  VALUE IS SPACE.

01  STATIONS-LINE.
    03  FILLER                     PICTURE X(4)  VALUE IS SPACES.
    03  STATION-OUT     OCCURS 8 TIMES  PICTURE XXXXB(4).
    03  FILLER                     PICTURE X(64)   VALUE IS SPACES.

01  STRATA-LABEL-TABLE.
    03  S11     PICTURE X(21) VALUE IS "PRIVATE - LOW        ".
    03  S12     PICTURE X(21) VALUE IS "PRIVATE - MEDIUM     ".
    03  S13     PICTURE X(21) VALUE IS "PRIVATE - HIGH       ".
    03  S21     PICTURE X(21) VALUE IS "SMALL EXEMPT - LOW   ".
    03  S22     PICTURE X(21) VALUE IS "SMALL EXEMPT - MEDIUM".
    03  S23     PICTURE X(21) VALUE IS "SMALL EXEMPT - HIGH  ".
    03  S31     PICTURE X(21) VALUE IS "UNLIMITED - LOW      ".
    03  S32     PICTURE X(21) VALUE IS "UNLIMITED - MEDIUM   ".
    03  S33     PICTURE X(21) VALUE IS "UNLIMITED - HIGH     ".

01  STRATA-LABELS REDEFINES STRATA-LABEL-TABLE.
    03  STRATA-LABEL-ENT OCCURS 9 TIMES PICTURE X(21).
```

```
PROCEDURE DIVISION.
BEGIN1.
    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 END-OF-JOB.
    MOVE YEAR-IN TO YEAR-OUT
    CLOSE CARD.
    OPEN INPUT STATION-VOLUMES.
    OPEN OUTPUT CLASSIFIED-STATIONS.
    MOVE ZEROS TO YEARTOTAL NONZEROMONTHS STRATATOTALTABEL
                  STATEYEARTOTAL COUNT.

READ-VOLUME.
    ADD 1 TO COUNT
    READ STATION-VOLUMES AT END GO TO CLOSE1.
    EXAMINE STATION-NUMBER REPLACING LEADING SPACES BY ZEROS
    IF STATION-CLASS EQUALS 4
                MOVE 3 TO STATION-CLASS
                GO TO THERE.
    IF STATION-CLASS EQUALS 3
                MOVE 4 TO STATION-CLASS.
THERE.
    IF STATION-CLASS IS LESS THAN 1 OR
       STATION-CLASS IS GREATER THAN 3
            MOVE COUNT TO COUNT-OUT
            MOVE VOLUME-REC TO REC-OUT
            WRITE PRINT-LINE FROM ERROR-LINE AFTER ADVANCING
                                                   2 LINES
                GO TO READ-VOLUME.
    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
            MOVE COUNT TO COUNT-OUT
            MOVE VOLUME-REC TO REC-OUT
            WRITE PRINT-LINE FROM ERROR-LINE AFTER ADVANCING
                                                   2 LINES
                GO TO READ-VOLUME.
    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 TEMP2 IS LESS THAN 1 GO TO READ-VOLUME.
     DIVIDE YEARTOTAL BY NONZEROMONTHS GIVING MONTHLYAVRG
     ADD HALF MONTHLYAVRG GIVING VOLTEMP
     MOVE 2 TO VOL
     IF VOLTEMP IS LESS THAN 100 MOVE 1 TO VOL.
     IF VOLTEMP IS GREATER THAN 299 MOVE 3 TO VOL.
     MOVE STATION-CLASS TO CLSS
     MOVE STATION-NUMBER TO STATION-NUM
     WRITE CLASSIFIED-STATION FROM STATION-REC.
     SUBTRACT 1 FROM CLSS GIVING I
     MULTIPLY 3 BY I
     ADD VOL TO I
     ADD YEARTOTAL TO STRATA (I) STATEYEARTOTAL
     GO TO READ-VOLUME.

CLOSE1.
     CLOSE STATION-VOLUMES CLASSIFIED-STATIONS.

SORT-CLASSIFIED-STATIONS.
     SORT SORT-FILE ON ASCENDING KEY CLS VOLM STATION-NO
         USING   CLASSIFIED-STATIONS
         GIVING  SORTED-STATIONS.

BEGIN2.
     OPEN INPUT SORTED-STATIONS.
     MOVE 0 TO I
     MOVE 11 TO LAST-STRATA
*
*    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.
*

READ-STRATA-INTO-TABEL.
     READ SORTED-STATIONS AT END
                  PERFORM LIST-STATIONS THROUGH PRINT-SAMPLE-LIST
                  GO TO END-OF-JOB.
     MOVE SORTED-STATION TO STATION-REC
     IF STATION-STRATA IS NOT EQUAL TO LAST-STRATA
                  PERFORM LIST-STATIONS THROUGH PRINT-SAMPLE-LIST.
     ADD 1 TO I
     IF I IS GREATER THAN 700
                  DISPLAY "   TABLE SIZE EXCEEDED."
                  GO TO END-OF-JOB.
```

```
           MOVE STATION-REC TO STATION-ENT (I)
           GO TO READ-STRATA-INTO-TABEL.

       LIST-STATIONS.
           MOVE I TO COUNT
           MOVE STATION-ENT (1) TO STATION-REC
           SUBTRACT 1 FROM CLSS GIVING I
           MULTIPLY 3 BY I
           ADD VOL TO I
           MOVE STRATA-LABEL-ENT (I) TO STRATA-LABEL
           DIVIDE STRATA (I) BY STATEYEARTOTAL GIVING PROPORTION
           MULTIPLY SAMPLE-SIZE BY PROPORTION GIVING TEMP
           DIVIDE 12 INTO TEMP
           ADD HALF TEMP GIVING SAMPLE-NUM
           MOVE " LIST " TO YEAR-LABEL
           MOVE 1 TO PAGE-NUM PAGE-NO I
           WRITE PRINT-LINE FROM PAGE-HEAD AFTER ADVANCING NEW-PAGE.
           MOVE 0 TO LINE-COUNT
           MOVE 1 TO J
           MOVE SPACES TO STATIONS-LINE.

       LOOP.
           IF I IS NOT GREATER THAN COUNT
                       MOVE STATION-ENT (I) TO STATION-REC
                       MOVE STATION-NUM TO STATION-OUT (J)
                       EXAMINE STATION-OUT (J) REPLACING LEADING
                       ZEROS BY SPACES.
           ADD 1 TO I J
           IF J IS LESS THAN 9 GO TO LOOP.
           IF LINE-COUNT IS GREATER THAN 27
                       ADD 1 TO PAGE-NUM
                       MOVE PAGE-NUM TO PAGE-NO
                       MOVE 0 TO LINE-COUNT
                       WRITE PRINT-LINE FROM PAGE-HEAD
                       AFTER ADVANCING NEW-PAGE.
           WRITE PRINT-LINE FROM STATIONS-LINE AFTER ADVANCING 2 LINES.
           ADD 1 TO LINE-COUNT
           IF I IS NOT GREATER THAN COUNT
                       MOVE 1 TO J
                       MOVE SPACES TO STATIONS-LINE
                       GO TO LOOP.
           MOVE COUNT TO I.

       RANDOMIZE-STATIONS.
           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 RANDOMIZE-STATIONS.
    MOVE 1 TO I
    MOVE 0 TO PAGE-NUM
    PERFORM PRINT-HEADING.

PRINT-SAMPLE-LIST.
    MOVE STATION-ENT (I) TO STATION-REC
    MOVE I TO ORDER-O
    MOVE STATION-NUM TO STATION-NUM-O
    IF LINE-COUNT IS GREATER THAN LINE-LIMIT
                PERFORM PRINT-HEADING.
    WRITE PRINT-LINE FROM OUTLINE AFTER ADVANCING 2 LINES.
    ADD 1 TO LINE-COUNT I
    IF I IS NOT GREATER THAN COUNT GO TO PRINT-SAMPLE-LIST.
    MOVE SORTED-STATION TO STATION-REC
    MOVE STATION-STRATA TO LAST-STRATA
    MOVE 0 TO I.

PRINT-HEADING.
    MOVE " SAMPLE " TO YEAR-LABEL
    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 LINE.
    WRITE PRINT-LINE FROM HEAD1 AFTER ADVANCING 2 LINES.
    WRITE PRINT-LINE FROM HEAD2 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM UNDERLINE AFTER ADVANCING 1 LINE.

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.

END-OF-JOB.
    CLOSE   SORTED-STATIONS
            PRINT.
SORT-BY-STATION-NUMBER.
    SORT SORT-FILE ON ASCENDING KEY STATION-NO
        USING   CLASSIFIED-STATIONS
        GIVING  SORTED-STATIONS.
    STOP RUN.
```

EDIT PROGRAM

```
 IDENTIFICATION DIVISION.
 PROGRAM-ID. PMVIED.
 AUTHOR.     PHILIP HARRIS.
 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 4000
*    IS ALREADY LARGER THAN THE HIGHEST STATION NUMBER.
*    BUT IN THE FUTURE IF A STATION IS ASSIGNED A NUMBER
*    HIGHER THAN 4000, 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.
*
*    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-9000.
 OBJECT-COMPUTER.   UNIVAC-9000.
 SPECIAL-NAMES.
     SYSCHAN-15 IS NEW-PAGE.
 INPUT-OUTPUT SECTION.
 FILE-CONTROL.
     SELECT OLDSAMPLES ASSIGN TO SYSD01 DISC-8425.
     SELECT OLDSRCERRORS ASSIGN TO SYSD02 DISC-8425.
     SELECT STATION-CLASS-TABLE ASSIGN TO SYSD03 DISC-8425.
     SELECT UNSORTED-SAMPLES ASSIGN TO SYSD04 DISC-8425.
     SELECT EDITEDSAMPLES ASSIGN TO SYSD05 DISC-8425.
     SELECT SOURCEERRORS ASSIGN TO SYSD06 DISC-8425.
     SELECT SORTED-SAMPLES ASSIGN TO SYSD07 DISC-8425.
     SELECT SORT-FILE ASSIGN TO DM01 DISC-8425.
     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  FILLER                      PICTURE X.
    03  STATION-CLASSIFICATION.
        05  CLSS                    PICTURE 9.
        05  VOL                     PICTURE 9.
    03  FILLER                      PICTURE XXX.
SD  SORT-FILE
    RECORD CONTAINS 80 CHARACTERS
    DATA RECORD IS SORT-REC.
01  SORT-REC.
    03  FILLER                      PICTURE X(41).
    03  STA-NUM                     PICTURE XXXX.
    03  FILLER                      PICTURE X(35).
FD  UNSORTED-SAMPLES
    LABEL RECORDS ARE STANDARD
    RECORD CONTAINS 80 CHARACTERS
    DATA RECORD IS UNSORTED-REC.
01  UNSORTED-REC.
    03  FILLER                      PICTURE X(41).
    03  STA-NO                      PICTURE XXXX.
    03  FILLER                      PICTURE X(35).
FD  SORTED-SAMPLES
    LABEL RECORDS ARE STANDARD
    RECORD CONTAINS 80 CHARACTERS
    DATA RECORD IS INPUT-REC.
01  INPUT-REC                       PICTURE X(80).
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.
            07  SY1                 PICTURE 9.
            07  SY2                 PICTURE 9.
    03  FILLER                      PICTURE X(75).
    03  MODE-FLAG                   PICTURE X.
FD  OLDSAMPLES
    LABEL RECORDS ARE STANDARD
    RECORD CONTAINS 80 CHARACTERS
    DATA RECORD IS RECIN.
01  RECIN                           PICTURE X(80).
FD  EDITEDSAMPLES
    LABEL RECORDS ARE STANDARD
    RECORD CONTAINS 80 CHARACTERS
```

```
    DATA RECORD IS OUTREC.
01  OUTREC  PIC X(80).
FD  OLDSRCERRORS
    LABEL RECORDS ARE STANDARD
    RECORD CONTAINS 80 CHARACTERS
    DATA RECORD IS BADIN.
01  BADIN                          PICTURE X(80).
FD  SOURCEERRORS
    LABEL RECORDS ARE STANDARD
    RECORD CONTAINS 80 CHARACTERS
    DATA RECORD IS BADOUT.
01  BADOUT                         PICTURE X(80).
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  YR2                            PICTURE X.
77  STANDARD-CHARGE                PICTURE X(5) VALUE IS "00300".
77  STATION-NO-UPPER-LIMIT         PICTURE XXXX VALUE IS "4000".
77  I                              PICTURE 99.
77  YEARSTORE                      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 99999V99.
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 99      VALUE IS 62.

01  INREC.
        03  FILLER                 PICTURE XX.
        03  INSPECTION-DATE.
            05  M1                 PIC X.
            05  M2                 PIC X.
            05  DD                 PIC XX.
            05  YY                 PIC X.
        03  SOURCE-ERROR-FLAGS.
            05  DATE-F             PICTURE X.
            05  MAKE-TYPE-F        PICTURE X.
            05  MILEAGE-F          PICTURE X.
            05  YR-BUILT-F         PICTURE X.
            05  CHARGES-NONDEF     PICTURE X.
            05  CHARGES-DEF        PICTURE X.
```

```
           05  MC-TRL-DEFECTS  PICTURE X.
       03  FILLER              PICTURE X(10).
       03  STICKER             PICTURE X.
       03  MAKE                PIC XX.
       03  NMAKE REDEFINES MAKE  PIC 99.
       03  VEHICLE-TYPE        PIC XX.
       03  YR-BUILT            PIC XX.
       03  SPEEDOM.
           05  FIRSTMDIGIT     PICTURE X.
           05  RESTOFM         PICTURE XXXX.
       03  CHARGES             PIC X(5).
       03  STATION             PIC X(4).
       03  DEFECT              PIC 9.
       03  DEFECTS.
           05 DEFECT-ENT OCCURS 19 TIMES PICTURE X.
       03  FILLER              PICTURE X.
       03  SECOND-EDIT-MARK    PICTURE X.
   03  STATION-TYPE.
       05 ST-CLASS             PICTURE X.
       05  STVOLUME            PICTURE X.
   03  FOR-IMP                 PICTURE 99.
   03  FILLER                  PICTURE X(9).
*
*  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 SECOND
*  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  FILLER  PICTURE 99  VALUE IS 00.
     03  FILLER  PICTURE 99  VALUE IS 10.
     03  FILLER  PICTURE 99  VALUE IS 03.
     03  FILLER  PICTURE 99  VALUE IS 13.
     03  FILLER  PICTURE 99  VALUE IS 13.
     03  FILLER  PICTURE 99  VALUE IS 01.
     03  FILLER  PICTURE 99  VALUE IS 01.
     03  FILLER  PICTURE 99  VALUE IS 14.
     03  FILLER  PICTURE 99  VALUE IS 01.
     03  FILLER  PICTURE 99  VALUE IS 15.
     03  FILLER  PICTURE 99  VALUE IS 03.
     03  FILLER  PICTURE 99  VALUE IS 03.
     03  FILLER  PICTURE 99  VALUE IS 13.
     03  FILLER  PICTURE 99  VALUE IS 02.
     03  FILLER  PICTURE 99  VALUE IS 03.
     03  FILLER  PICTURE 99  VALUE IS 13.
     03  FILLER  PICTURE 99  VALUE IS 12.
```

```
           03  FILLER  PICTURE 99  VALUE IS 01.
           03  FILLER  PICTURE 99  VALUE IS 01.
           03  FILLER  PICTURE 99  VALUE IS 02.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 02.
           03  FILLER  PICTURE 99  VALUE IS 01.
           03  FILLER  PICTURE 99  VALUE IS 01.
           03  FILLER  PICTURE 99  VALUE IS 01.
           03  FILLER  PICTURE 99  VALUE IS 05.
           03  FILLER  PICTURE 99  VALUE IS 12.
           03  FILLER  PICTURE 99  VALUE IS 14.
           03  FILLER  PICTURE 99  VALUE IS 02.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 15.
           03  FILLER  PICTURE 99  VALUE IS 01.
           03  FILLER  PICTURE 99  VALUE IS 03.
           03  FILLER  PICTURE 99  VALUE IS 01.
           03  FILLER  PICTURE 99  VALUE IS 12.
           03  FILLER  PICTURE 99  VALUE IS 12.
           03  FILLER  PICTURE 99  VALUE IS 03.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 15.
           03  FILLER  PICTURE 99  VALUE IS 03.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 01.
           03  FILLER  PICTURE 99  VALUE IS 12.
           03  FILLER  PICTURE 99  VALUE IS 03.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 03.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 02.
           03  FILLER  PICTURE 99  VALUE IS 12.
           03  FILLER  PICTURE 99  VALUE IS 15.
           03  FILLER  PICTURE 99  VALUE IS 12.
           03  FILLER  PICTURE 99  VALUE IS 14.
           03  FILLER  PICTURE 99  VALUE IS 12.
           03  FILLER  PICTURE 99  VALUE IS 12.
           03  FILLER  PICTURE 99  VALUE IS 13.
           03  FILLER  PICTURE 99  VALUE IS 01.
           03  FILLER  PICTURE 99  VALUE IS 02.
           03  FILLER  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          VALUE IS 0, 2, 3, 4.
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        88  TRUCK       VALUE IS 0, 1, 2.
        88  MOTORCYCLE  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  HEADER2.
    03  FILLER                     PICTURE X(50)   VALUE IS SPACES.
    03  HEADER2-ENT                PICTURE X(82)   VALUE IS
    "** MOTORCYCLE/TRAILER RECEIPTS **".
01  HEAD1.
    03  FILLER                     PICTURE X(33)  VALUE IS SPACES.
    03  FILLER                     PICTURE X(46)
        VALUE IS "YEAR     SPEEDOMETER                  STATION".
    03  FILLER                     PICTURE X(53)
        VALUE IS "STATION    STICKER".
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(36)
        VALUE IS "  TYPE     RECODED       DEFECTS".
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  M10                        PICTURE X.
    03  M20                        PICTURE X.
    03  FILLER                     PICTURE X  VALUE IS "/".
    03  DDO                        PICTURE XX.
    03  FILLER                     PICTURE XX VALUE IS "/7".
    03  YYO                        PICTURE X.
    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).
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           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(16).
       01  ERROR-IND.
           03  FILLER                      PICTURE X(6)  VALUE IS SPACES.
           03  MMER                        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 X(16).
       01  SUMHEAD1.
           03  FILLER                      PICTURE X(60) VALUE IS SPACES.
           03  FILLER                      PICTURE X(72) 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(20) 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).
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PROCEDURE DIVISION.
SORT-DATA.
    SORT SORT-FILE ON ASCENDING KEY STA-NUM
        USING UNSORTED-SAMPLES
        GIVING SORTED-SAMPLES.
BEGIN.
    OPEN INPUT STATION-CLASS-TABLE
    OPEN INPUT SORTED-SAMPLES.
    OPEN OUTPUT PRINT.
    OPEN OUTPUT 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.
    MOVE YEAR-OF-SAMPLE TO YEAR-OUT
    MOVE SY2 TO YR2.
    MOVE SAMPLE-YEAR TO I.
    ADD 1 TO I.
    MOVE I TO YEARSTORE.
    IF MODE-FLAG EQUALS SPACE
                MOVE "** AUTO/TRUCK RECEIPTS **" TO HEADER2-ENT.
    CLOSE CARD.
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 HEADER2 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEAD1 AFTER ADVANCING 3 LINES.
    WRITE PRINT-LINE FROM HEAD2 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM UNDERLINE AFTER ADVANCING 1 LINE.
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-OLDSRCERRORS.
    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 INTO INREC AT END GO TO EOJ.
    MOVE SPACES TO ERROR-IND SOURCE-ERROR-FLAGS
    MOVE 0 TO FATAL-ERROR CODE-ERROR-FLAG
    ADD 1 TO READ-COUNT
    EXAMINE CHARGES REPLACING ALL SPACES BY ZEROS.
*
*  BECAUSE OF SPACE ON THE CODING FORM FOR EQUIPMENT REMOVED,
*  THE THREE NEW INSPECTION ITEMS ARE SEPARATED FROM THE OTHER 15.
*  SINCE EQUIPMENT REMOVED IS NOT IMPORTANT, THE 18 ITEMS ARE PUT
*  IN ONE GROUP.
*
    MOVE DEFECT-ENT (17) TO DEFECT-ENT (16).
    MOVE DEFECT-ENT (18) TO DEFECT-ENT (17).
    MOVE DEFECT-ENT (19) TO DEFECT-ENT (18).
    MOVE SPACE TO DEFECT-ENT (19).
MM-EDIT.
    IF M1 EQUALS SPACE AND M2 EQUALS SPACE OR
       M1 IS NOT EQUAL TO SPACE AND M2 IS NOT EQUAL TO SPACE OR
       M1 EQUALS SPACE AND M2 IS GREATER THAN "2"
        MOVE 1 TO FATAL-ERROR
        MOVE "1" TO DATE-F
        MOVE "* " TO MMER
        MOVE M1 TO M10
        MOVE M2 TO M20
        GO TO DA-EDIT.
    MOVE SPACE TO M10
    MOVE M1 TO M20.
    IF M2 IS NOT EQUAL TO SPACE
        MOVE "1" TO M10
        MOVE M2 TO M20.
DA-EDIT.
    IF DD IS NOT NUMERIC OR DD IS LESS THAN "01" OR
       DD IS GREATER THAN "31"
        MOVE 1 TO FATAL-ERROR
        MOVE "1" TO DATE-F
        MOVE "* " TO DDER.
YR-EDIT.
    IF YY IS NOT EQUAL TO YR2 MOVE "* " TO YYER
                              MOVE "1" TO DATE-F
                              MOVE 1 TO FATAL-ERROR.
STICKER-EDIT.
    IF STICKER IS LESS THAN "0" OR STICKER IS GREATER THAN "4"
                MOVE 1 TO CODE-ERROR-FLAG
                GO TO STICKER-TYPE-MAKE-ERROR.
    IF MODE-FLAG EQUALS SPACE AND STICKER EQUALS "3"
                MOVE 1 TO CODE-ERROR-FLAG
                GO TO STICKER-TYPE-MAKE-ERROR.
    IF MODE-FLAG IS NOT EQUAL TO SPACE AND
       STICKER IS LESS THAN "3"
```

```
                MOVE 1 TO CODE-ERROR-FLAG
                GO TO STICKER-TYPE-MAKE-ERROR.
TYPE-EDIT.
    IF VEHICLE-TYPE IS NOT NUMERIC OR
       VEHICLE-TYPE IS LESS THAN "00" OR
       VEHICLE-TYPE IS GREATER THAN "06" AND LESS THAN "10" OR
       VEHICLE-TYPE IS GREATER THAN "20" AND LESS THAN "30" OR
       VEHICLE-TYPE IS GREATER THAN "36"
                MOVE 1 TO CODE-ERROR-FLAG
                GO TO STICKER-TYPE-MAKE-ERROR.
MAKE-EDIT.
    IF MAKE IS NOT NUMERIC OR NMAKE IS LESS THAN 1 OR
       NMAKE IS GREATER THAN MAX-MAKE
                MOVE 1 TO CODE-ERROR-FLAG
                GO TO STICKER-TYPE-MAKE-ERROR.
    MOVE V-T (NMAKE) TO FOR-IMP VEH-TYP.
STICKER-TYPE-MAKE-EDIT.
    IF STICKER EQUALS "4" AND
       VEHICLE-TYPE IS GREATER THAN "29"
            GO TO MOTORCYCLE-TRAILER-STICKER.
    IF STICKER EQUALS "3" GO TO MOTORCYCLE-TRAILER-STICKER.
    IF VEHICLE-TYPE IS GREATER THAN "29"
                GO TO STICKER-TYPE-MAKE-ERROR.
    IF VEHICLE-TYPE IS LESS THAN "07" GO TO PASSENGER-VEHICLE.
    IF NOT TRUCK
                GO TO STICKER-TYPE-MAKE-ERROR.
    GO TO MILEAGE-EDIT.
MOTORCYCLE-TRAILER-STICKER.
    IF VEHICLE-TYPE IS LESS THAN "30"
                GO TO STICKER-TYPE-MAKE-ERROR.
    IF VEHICLE-TYPE IS NOT EQUAL TO "31" GO TO MILEAGE-EDIT.
    IF MOTORCYCLE
                GO TO MILEAGE-EDIT.
    GO TO STICKER-TYPE-MAKE-ERROR.
PASSENGER-VEHICLE.
    IF AUTO
                GO TO MILEAGE-EDIT.
STICKER-TYPE-MAKE-ERROR.
    MOVE 1 TO FATAL-ERROR
    MOVE "1" TO MAKE-TYPE-F
    MOVE "* " TO TPER MKER STCER.
MILEAGE-EDIT.
    IF SPEEDOM IS NOT NUMERIC OR SPEEDOM EQUALS "00000"
        MOVE "1" TO MILEAGE-F
        MOVE "* " TO SPER.
YR-BUILT-EDIT.
    IF YR-BUILT IS NOT NUMERIC OR
       YR-BUILT IS GREATER THAN YEARSTORE OR
       YR-BUILT IS LESS THAN "10"
            MOVE 1 TO FATAL-ERROR
            MOVE "1" TO YR-BUILT-F
            MOVE "* " TO YRER.
```

```
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 SPACES TO STATION-TYPE
        MOVE "* " TO STNER STPER.
    MOVE 1 TO DEFECT
    MOVE 1 TO I.
DEFECTS-EDIT.
    IF DEFECT-ENT (I) IS NOT EQUAL TO " " AND
       DEFECT-ENT (I) IS NOT EQUAL TO "1" AND
       DEFECT-ENT (I) IS NOT EQUAL TO "2"
            MOVE 1 TO FATAL-ERROR CODE-ERROR-FLAG
            MOVE "* " TO DFER
            GO TO CHARGES-EDIT.
    IF DEFECT-ENT (I) IS NOT EQUAL TO SPACE
            MOVE 2 TO DEFECT.
    ADD 1 TO I
    IF I IS LESS THAN 19  GO TO DEFECTS-EDIT.
    IF VEHICLE-TYPE IS LESS THAN "30" GO TO CHARGES-EDIT.
    IF VEHICLE-TYPE EQUALS "31"
                PERFORM MOTORCYCLE-DEFECT-EDIT
                GO TO CHARGES-EDIT.
    IF DEFECT-ENT (3) IS NOT EQUAL TO SPACE OR
       DEFECT-ENT (10) IS NOT EQUAL TO SPACE OR
       DEFECT-ENT (11) IS NOT EQUAL TO SPACE OR
       DEFECT-ENT (13) IS NOT EQUAL TO SPACE OR
       DEFECT-ENT (17) IS NOT EQUAL TO SPACE OR
       DEFECT-ENT (18) IS NOT EQUAL TO SPACE
                MOVE 1 TO FATAL-ERROR
                MOVE "1" TO MC-TRL-DEFECTS
                MOVE "* " TO DFER.
CHARGES-EDIT.
    IF DEFECT EQUALS 1 AND CHARGES IS NOT EQUAL TO
        STANDARD-CHARGE
                MOVE "* " TO CHER
                MOVE "1" TO CHARGES-NONDEF
                GO TO REJECT-EDIT.
    IF DEFECT EQUALS 2 AND CHARGES IS NOT GREATER THAN
        STANDARD-CHARGE
                MOVE "* " TO CHER
                MOVE "1" TO CHARGES-DEF
                GO TO REJECT-EDIT.
    IF STICKER EQUALS "4" AND CHARGES IS NOT EQUAL TO
        STANDARD-CHARGE
                MOVE "* " TO CHER
                MOVE "1" TO CHARGES-DEF.
REJECT-EDIT.
    IF STICKER EQUALS "4" AND DEFECT EQUALS "1"
            MOVE "* " TO DFER
            MOVE "* " TO STCER
            MOVE 1 TO FATAL-ERROR.
```

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2591
RECODED-EDIT.
    IF SECOND-EDIT-MARK IS NOT EQUAL TO "0" AND
       SECOND-EDIT-MARK IS NOT EQUAL TO "1"
                MOVE "* " TO RECER
                MOVE 1 TO CODE-ERROR-FLAG.
    IF STNER EQUALS "* "
                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 "* " TO STNER
                MOVE "* " TO STPER
                MOVE SPACES TO STATION-TYPE
                GO TO LIST-INVALID-REC.
    MOVE STATION-CLASSIFICATION TO STATION-TYPE.
WRITE-GOOD-RECORD.
    IF ERROR-IND IS NOT EQUAL TO SPACES GO TO CHECK-SECOND-EDIT.
    WRITE OUTREC FROM INREC.
    ADD 1 TO EDITED-COUNT
    GO TO READ-REC.
CHECK-SECOND-EDIT.
    IF SECOND-EDIT-MARK EQUALS "0" OR
       CODE-ERROR-FLAG IS NOT EQUAL TO 0
                GO TO LIST-INVALID-REC.
    WRITE BADOUT FROM INREC.
    ADD 1 TO SE-COUNT.
    IF FATAL-ERROR EQUALS 1
            GO TO READ-REC.
    IF FIRSTMDIGIT IS NOT NUMERIC OR
       FIRSTMDIGIT EQUALS "0"
            GO TO READ-REC.
    IF SPER EQUALS "* "
            ADD 1 TO ZER-MIL-COUNT
            MOVE "0000" TO RESTOFM.
    IF DEFECT EQUALS  1  AND
        CHARGES IS NOT EQUAL TO STANDARD-CHARGE
            MOVE STANDARD-CHARGE TO CHARGES
            ADD 1 TO NONDEF-COUNT.
    IF DEFECT EQUALS  2  AND
        CHARGES IS NOT GREATER THAN STANDARD-CHARGE
            MOVE STANDARD-CHARGE TO CHARGES
            ADD 1 TO DEF-COUNT.
    WRITE OUTREC FROM INREC.
    ADD 1 TO EDITED-COUNT
    GO TO READ-REC.
LIST-INVALID-REC.
    ADD 1 TO ERLST-COUNT
    MOVE DD TO DDO
    MOVE YY TO YYO
    MOVE MAKE TO MAKEO
```

```
    MOVE VEHICLE-TYPE TO VEHICLE-TYPEO
    MOVE YR-BUILT TO YR-BUILTO
    MOVE SPEEDOM TO SPEEDOMO
    MOVE CHARGES TO TEMPCH
    DIVIDE TEMPCH BY 100 GIVING CHARGESO
    MOVE STATION TO STATIONO
    MOVE STATION-TYPE TO STATION-TYPEO
    MOVE STICKER TO STICKERO
    MOVE SECOND-EDIT-MARK TO RECODEDO
    MOVE DEFECTS TO DEFECTSO
    IF STICKER EQUALS "0" MOVE "REGULAR" TO STICKERO.
    IF STICKER EQUALS "1" MOVE "ANNUAL" TO STICKERO.
    IF STICKER EQUALS "2" MOVE "REG (A)" TO STICKERO.
    IF STICKER EQUALS "3" MOVE "MC/TRL" TO STICKERO.
    IF STICKER EQUALS "4" MOVE "REJECT" TO STICKERO.
    IF SECOND-EDIT-MARK EQUALS "0" MOVE "NO" TO RECODEDO.
    IF SECOND-EDIT-MARK EQUALS "1" MOVE "YES" TO RECODEDO.
    IF LINE-COUNT EQUALS 26 PERFORM HEADING-OUT.
    WRITE PRINT-LINE FROM ERROR-IND AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM OUTLINE AFTER ADVANCING 1 LINE.
    ADD 1 TO LINE-COUNT
    GO TO READ-REC.
MOTORCYCLE-DEFECT-EDIT.
    IF DEFECT-ENT (9) IS NOT EQUAL TO SPACE OR
       DEFECT-ENT (18) IS NOT EQUAL TO SPACE
                MOVE 1 TO FATAL-ERROR
                MOVE "1" TO MC-TRL-DEFECTS
                MOVE "* " TO DFER.
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 LINE.
    WRITE PRINT-LINE FROM SUMUNDERLINE AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM SUMMARYLINE AFTER ADVANCING 2 LINES.
    CLOSE SORTED-SAMPLES EDITEDSAMPLES SOURCEERRORS PRINT
          STATION-CLASS-TABLE.
    STOP RUN.
```

2496

```
 IDENTIFICATION DIVISION.
 PROGRAM-ID.              PMVISD.
 AUTHOR. PHILIP HARRIS.
 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:
*    DATE, 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-9000.
 OBJECT-COMPUTER.     UNIVAC-9000.
 SPECIAL-NAMES.
     SYSCHAN-15 IS NEW-PAGE.
 INPUT-OUTPUT SECTION.
 FILE-CONTROL.
     SELECT SOURCE-ERRORS ASSIGN TO SYSD01 DISC-8425.
     SELECT SORT-FILE ASSIGN TO DM01 DISC-8425.
     SELECT SOURCE-DOCUMENT-ERROR-FILE ASSIGN TO SYSD03 DISC-8425.
     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 80 CHARACTERS
         DATA RECORD IS ERROR-REC.


 01  ERROR-REC.
     03  FILLER                  PICTURE X(7).
     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  FILLER                  PICTURE X(11).
     03  STICKER                 PICTURE X.
     03  FILLER                  PICTURE X(16).
     03  STATION                 PICTURE 9999.
     03  FILLER                  PICTURE X(35).
```

SOURCE DOCUMENT ERROR PROGRAM

```
    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(70) 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(71)   VALUE IS SPACES.
    03  FILLER                     PICTURE X(61)   VALUE IS
    "NONDEFECTIVE        DEFECTIVE              NUMBER OF ".
01  HEAD5.
    03  FILLER                     PICTURE X(5)    VALUE IS SPACES.
    03  FILLER                     PICTURE X(50)   VALUE IS
    "STATION NUMBER    DATE    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(5)    VALUE IS SPACES.
    03 FILLER                      PICTURE X(50)   VALUE IS
    "--------------    ----    ---------    ------- ".
    03  FILLER                     PICTURE X(52)   VALUE IS
    "----------    ---------------    -------------- ".
    03  FILLER                     PICTURE X(25)   VALUE IS
    "------------------- ".
```

```
SD  SORT-FILE
        RECORD CONTAINS 80 CHARACTERS
        DATA RECORD IS SORT-REC.
01  SORT-REC.
    03  FILLER                      PICTURE X(41).
    03  STATION-NO                  PICTURE 9999.
    03  FILLER                      PICTURE X(35).
FD  SOURCE-ERRORS
        LABEL RECORDS ARE STANDARD
        RECORD CONTAINS 80 CHARACTERS
        DATA RECORD IS SOURCE-ERROR-REC.
01  SOURCE-ERROR-REC.
    03  FILLER                      PICTURE X(41).
    03  STATION-NUMBER              PICTURE 9999.
    03  FILLER                      PICTURE X(35).
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  DATE-ST                     PICTURE 9999.
    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-G                      PICTURE 9999.
    03  TYPE-G                      PICTURE 9999.
    03  DATE-G                      PICTURE 9999.
```

```
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 STICKER EQUALS "3" GO TO READ-REC.
    IF STATION IS NOT EQUAL TO LAST-STATION
                PERFORM FINISHED-STATION.
    PERFORM CHECK-FOR-ERRORS
    GO TO READ-REC.

CHECK-FOR-ERRORS.
    IF DATE-F IS NOT EQUAL TO SPACE
                ADD 1 TO DATE-ST DATE-G ERROR-FLAG.
    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 ERROR-FLAG IS NOT EQUAL TO 0
                ADD 1 TO ERROR-RECS-ST ERROR-RECS-G
```

```
01  OUTLINE.
    03  FILLER                 PICTURE X(6)     VALUE IS SPACES.
    03  LABELA                 PICTURE XXXX     VALUE IS SPACES.
    03  STATION-NUM            PICTURE XXXX.
    03  LABELB                 PICTURE X(7)     VALUE IS SPACES.
    03  DATEO                  PICTURE Z,ZZ9B(6).
    03  MAKE-TYPE-O            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).
```

```
           MOVE DATE-G TO DATEO
           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.
```

```
                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
       DATE-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 DATE-ST TO DATEO
    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 LINE.
    WRITE PRINT-LINE FROM HEAD4 AFTER ADVANCING 2 LINES.
    WRITE PRINT-LINE FROM HEAD5 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM UNDERLINE AFTER ADVANCING 1 LINE.

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-NUM
    MOVE "IONS" TO LABELB
```

2504

```
 IDENTIFICATION DIVISION.
 PROGRAM-ID. PMVIAP.
 AUTHOR. PHILIP HARRIS.
 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.
*
 ENVIRONMENT DIVISION.
 CONFIGURATION SECTION.
 SOURCE-COMPUTER.         UNIVAC-9000.
 OBJECT-COMPUTER.         UNIVAC-9000.
 SPECIAL-NAMES.
     SYSCHAN-15 IS NEW-PAGE.
 INPUT-OUTPUT SECTION.
 FILE-CONTROL.
     SELECT SAMPLES ASSIGN TO SYSD01 DISC-8425.
     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 80 CHARACTERS
     DATA RECORD IS SAMPLE-REC.
 01  SAMPLE-REC.
     03  FILLER                    PICTURE X(24).
     03  STICKER                   PICTURE 9.
     03  MAKE                      PICTURE 99.
     03  VEHICLE-TYPE              PICTURE 99.
     03  YR-BUILT                  PICTURE 99.
     03  MILEAGE                   PICTURE 9(5).
```

ANALYSIS PROGRAM

```
    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.
    03  FILLER                      PICTURE X(60) VALUE IS SPACES.

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.
    03  FILLER                      PICTURE X(55) VALUE IS SPACES.

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.
    03  FILLER                      PICTURE X(49) VALUE IS SPACES.

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  COST                        PICTURE 999V99.
    03  FILLER                      PICTURE XXXX.
    03  DEFECTIVE                   PICTURE 9.
    03  DEFECTIN OCCURS 18 TIMES PICTURE X.
    03  FILLER                      PICTURE XXX.
    03  STTYP                       PICTURE 9.
    03  STVOL                       PICTURE 9.
    03  FOR-IMP                     PICTURE 9.
    03  FILLER                      PICTURE X(10).


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".
```

```
           "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(114) VALUE IS
        "DEFECT".

01  DEFHEAD3LINE.
    03  FILLER                     PICTURE X(13) VALUE IS SPACES.
    03  FILLER                     PICTURE X(119) 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).
```

```
    03  FILLER                     PICTURE X(49) 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).
    03  FILLER                     PICTURE X(74) VALUE IS SPACES.

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
```

```
           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".
```

```
*
*   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 DEFECT
*   BY YEAR, MILEAGE, AND MAKE CATEGORIES.
*
 01  DEFECTS-CROSSTAB-TABLE.
     03  YEAR-MILE-MAKE OCCURS 17 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 VEHICLES
*   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 17 TIMES.
         05  COST-TYPE-C OCCURS 2 TIMES.
             07 COST-C OCCURS 4 TIMES    PICTURE 9(6)V99.

 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".
```

```
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 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.

READ-A-SAMPLE.
    READ SAMPLES AT END GO TO GET-TOTALS.
    IF STICKER IS EQUAL TO 3
                GO TO READ-A-SAMPLE.
    SUBTRACT 1 FROM STTYP GIVING TEMP
    MULTIPLY 3 BY TEMP
    ADD TEMP STVOL GIVING CLASSUB
    MOVE 2 TO MAJTYP
    IF VEHICLE-TYPE IS LESS THAN 10
            MOVE 1 TO MAJTYP TYPSUB
            IF MAKE IS GREATER THAN 29
                    MOVE 2 TO TYPSUB.
    IF VEHICLE-TYPE EQUALS 19
            MOVE 3 TO MAJTYP
            MOVE 8 TO TYPSUB.
```

```
      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).
```

```
                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 STICKER EQUALS 4 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 " "
        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.

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 TYPE.
*   INFORMATION IS FROM SAMPLE-TABLE.
*
PRINT-PAGE-TYPE-I.
    MOVE 1 TO PAGE-COUNT
    MOVE 10 TO I.
```

```
     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.
     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-MAKE.
     SUBTRACT 1 FROM I
     IF I IS GREATER THAN 1 GO TO YR-BUILT-LOOP.

DETERMINE-MILE-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.
     MOVE 16 TO MAKESUB
     IF FOR-IMP 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 2 PERFORM DEFECT-VEH THROUGH DEFECT-LOOP.
     GO TO READ-A-SAMPLE.


DEFECT-VEH.
     IF STICKER IS NOT EQUAL TO 4
     ADD COST TO COST-C (YRSUB, 2, MAJTYP)
                 COST-S (CLASSUB, 2, MAJTYP)
                 COST-C (MILESUB, 2, MAJTYP)
```

```
           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 LINE.
           WRITE PRINT-LINE FROM DEFUNDERLINE AFTER ADVANCING 1 LINE.
           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.
```

```
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 LINE.
     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 LINE.
     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.
     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 DEFECT
*    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 LINE.
```

```
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 LINE.
     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 LINE.
     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 LINE.

*
*    PAGE-TYPE-III SHOWS PERCENTAGE OCCURRENCE OF EACH TYPE OF DEFECT
*    AND COST PER INSPECTED VEHICLE AND COST PER REPAIRED VEHICLE BY
*    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 LINE.
     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 LINE.
     WRITE PRINT-LINE FROM DEFUNDERLINE AFTER ADVANCING 1 LINE.
```

```
           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.
```

```
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.
```

```
           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.
```

```
    MOVE "  DATE CARD MISSING" TO PRINT-LINE
    WRITE PRINT-LINE AFTER ADVANCING NEW-PAGE.
CLOSE-FILES.
    CLOSE SAMPLES PRINT CARD
    STOP RUN.
```

TABULATION PROGRAM

```
 IDENTIFICATION DIVISION.
 PROGRAM-ID. PMVITB.
 AUTHOR.     PHILIP HARRIS.
 DATE-WRITTEN.   JUNE 1977.
 DATE-COMPILED.
 REMARKS.
*
*   THIS PROGRAM READS A FILE OF EDITED INSPECTION
*   RECEIPTS AND LISTS THE NUMBER OF RECEIPTS FROM EACH
*   OF THE NINE STATION TYPES AND THE PROPORTION OF THE
*   WHOLE CONTRIBUTED BY EACH TYPE.  IF A PARAMETER CARD
*   IS INCLUDED WITH "STATIONS" IN COLUMNS 1-8, THEN
*   EACH STATION IS LISTED WITH THE NUMBER OF SAMPLES
*   FROM THAT STATION AND THE MONTH OF THOSE SAMPLES.
*
 ENVIRONMENT DIVISION.
 CONFIGURATION SECTION.
 SOURCE-COMPUTER.        UNIVAC-9000.
 OBJECT-COMPUTER.        UNIVAC-9000.
 SPECIAL-NAMES.
     SYSCHAN-15 IS NEW-PAGE.
 INPUT-OUTPUT SECTION.
 FILE-CONTROL.
     SELECT UNSORTED-SAMPLES ASSIGN TO SYSD01 DISC-8425.
     SELECT SAMPLES ASSIGN TO SYSD02 DISC-8425.
     SELECT SORT-FILE ASSIGN TO DM01 DISC-8425.
     SELECT CARD ASSIGN TO CARD-READER.
     SELECT PRINT ASSIGN TO PRINTER.
 DATA DIVISION.
 FILE SECTION.
 FD  SAMPLES
         LABEL RECORDS ARE STANDARD
         RECORD CONTAINS 80 CHARACTERS
         DATA RECORD IS SAMPLE-REC.
 01  SAMPLE-REC.
     03 FILLER                    PICTURE XX.
     03  MONTHIN                  PICTURE 99.
     03  MONTHIN-REDEF REDEFINES MONTHIN PICTURE XX.
     03  FILLER                   PICTURE X(37).
     03  STATION-NO               PICTURE 9999.
     03  FILLER                   PICTURE X(22).
     03  CLS                      PICTURE 9.
     03  VOL                      PICTURE 9.
     03  FILLER                   PICTURE X(11).
 SD  SORT-FILE
         RECORD CONTAINS 80 CHARACTERS
         DATA RECORD IS SORT-REC.
 01  SORT-REC.
     03  FILLER                   PICTURE XX.
     03  MNTH                     PICTURE XX.
     03  FILLER                   PICTURE X(37).
```

```
    03  STA                          PICTURE XXXX.
    03  FILLER                       PICTURE X(35).
FD  UNSORTED-SAMPLES
        LABEL RECORDS ARE STANDARD
        RECORD CONTAINS 80 CHARACTERS
        DATA RECORD IS UNSORTED-REC.
01  UNSORTED-REC.
    03  FILLER                       PICTURE X(41).
    03  STA-NO                       PICTURE XXXX.
    03  FILLER                       PICTURE X(35).
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  STATIONS-FLAG                    PICTURE 9   VALUE IS ZERO.
77  PAGE-COUNT                       PICTURE 99.
77  LAST-STATION                     PICTURE 9999.
77  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  PAGE-HEAD.
    03  FILLER                       PICTURE X(49)   VALUE IS
          "            VIRGINIA STATE POLICE ".
    03  FILLER                       PICTURE X(64)   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(11)   VALUE IS SPACES.
    03  FILLER                       PICTURE X(121)  VALUE IS
        "STATION ".
01  HEAD2.
    03  FILLER                       PICTURE X(50)   VALUE IS
          "            NUMBER              STATION TYPE ".
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    03  FILLER                      PICTURE X(44)   VALUE IS
        "MONTH  SAMPLED           MONTH  SAMPLED ".
    03  FILLER                      PICTURE X(38)   VALUE IS
        "MONTH  SAMPLED           TOTAL ".
01  UNDERLINE.
    03  FILLER                      PICTURE X(50)   VALUE IS
         "              -------        ---------------- ".
    03  FILLER                      PICTURE X(44)   VALUE IS
        "-----  -------           -----  ------- ".
    03  FILLER                      PICTURE X(38)   VALUE IS
        "-----  -------           ----- ".
01  STATION-TOTALS.
    03  STATION-NUMBER              PICTURE 9999.
    03  MONTH1                      PICTURE 99.
    03  TOT1                        PICTURE 9999.
    03  MONTH2                      PICTURE 99.
    03  TOT2                        PICTURE 9999.
    03  MONTH3                      PICTURE 99.
    03  TOT3                        PICTURE 9999.
    03  STA-TOTAL                   PICTURE 9999.
01  STATION-LINE.
    03  FILLER                      PICTURE X(13)   VALUE IS SPACES.
    03  STATION-NUMBER-L            PICTURE 9999B(9).
    03  STA-TYPE-OUT                PICTURE X(24).
    03  MONTH1-OUT                  PICTURE X(8).
    03  TOT1-L                      PICTURE Z,ZZZB(9).
    03  MONTH2-OUT                  PICTURE X(8).
    03  TOT2-L                      PICTURE Z,ZZZB(9).
    03  MONTH3-OUT                  PICTURE X(8).
    03  TOT3-L                      PICTURE Z,ZZZB(9).
    03  STA-TOTAL-L                 PICTURE Z,ZZ9B(11).
01  HEAD3.
    03  FILLER                      PICTURE X(34)   VALUE IS SPACES.
    03  FILLER                      PICTURE X(98)   VALUE IS
        "VOLUME ".
01  HEAD4.
    03  FILLER                      PICTURE X(34)   VALUE IS SPACES.
    03  FILLER                      PICTURE X(21)   VALUE IS
        "------ ".
    03  FILLER                      PICTURE X(77)   VALUE IS
        "I                        I                         I ".
01  HEAD5.
    03  FILLER                      PICTURE X(42)   VALUE IS SPACES.
    03  FILLER                      PICTURE X(55)   VALUE IS
        "LOW           I        MEDIUM        I          HIGH ".
    03  FILLER                      PICTURE X(35)   VALUE IS
        "I        TOTAL ".
01  HEAD6.
    03  FILLER                      PICTURE X(55)   VALUE IS SPACES.
    03  FILLER                      PICTURE X(77)   VALUE IS
        "I                        I                         I ".
01  HEAD7.
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    03  FILLER                      PICTURE X(55)   VALUE IS
         "                  CLASS ".
    03  FILLER                      PICTURE X(77)   VALUE IS
        "I                        I                        I ".
01  HEAD8.
    03  FILLER                      PICTURE X(34)   VALUE IS
         "                  ----- ".
    03  FILLER                      PICTURE X(43)   VALUE IS
        "I--------------------I--------------------I".
    03  FILLER                      PICTURE X(55)   VALUE IS
        "--------------------I-------------------- ".
01  HEAD9.
    03  FILLER                      PICTURE X(34)   VALUE IS SPACES.
    03  FILLER                      PICTURE X(42)   VALUE IS
        "I                       I ".
    03  FILLER                      PICTURE X(56)   VALUE IS
        "I                       I ".
01  NUMBERS-OUT.
    03  FILLER                      PICTURE X(18)   VALUE IS SPACES.
    03  CLASS-LABEL                 PICTURE X(16).
    03  FILLER                      PICTURE X(8)    VALUE IS "I ".
    03  LOW-NUM                     PICTURE ZZ,ZZ9B(7).
    03  FILLER                      PICTURE X(8)    VALUE IS "I ".
    03  MEDIUM-NUM                  PICTURE ZZ,ZZ9B(7).
    03  FILLER                      PICTURE X(8)    VALUE IS "I ".
    03  HIGH-NUM                    PICTURE ZZ,ZZ9B(7).
    03  FILLER                      PICTURE X(8)    VALUE IS "I ".
    03  TOTAL-NUM                   PICTURE ZZ,ZZ9B(21).
01  PERCENT-OUT.
    03  FILLER                      PICTURE X(34)   VALUE IS SPACES.
    03  FILLER                      PICTURE X(8)    VALUE IS
        "I       (".
    03  LOW-PER                     PICTURE ZZ9.99.
    03  FILLER                      PICTURE X(15)   VALUE IS
        "%)      I       (".
    03  MEDIUM-PER                  PICTURE ZZ9.99.
    03  FILLER                      PICTURE X(15)   VALUE IS
        "%)      I      (".
    03  HIGH-PER                    PICTURE ZZ9.99.
    03  FILLER                      PICTURE X(15)   VALUE IS
        "%)      I       (".
    03  TOTAL-PER                   PICTURE ZZ9.99.
    03  FILLER                      PICTURE X(21)   VALUE IS "%) ".
01  HEAD10.
    03  FILLER                      PICTURE X(14)   VALUE IS SPACES.
    03  FILLER                      PICTURE X(52)   VALUE IS
        "-------------------------------------------------".
    03  FILLER                      PICTURE X(66)   VALUE IS
        "-------------------------------------------------".
01  STRATA-LABELS.
    03  S1       PICTURE X(16) VALUE IS "PRIVATE LOW ".
    03  S2       PICTURE X(16) VALUE IS "PRIVATE MEDIUM ".
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           03  S3       PICTURE X(16) VALUE IS "PRIVATE HIGH ".
           03  S4       PICTURE X(16) VALUE IS "SMALL-EXEMPT LOW".
           03  S5       PICTURE X(16) VALUE IS "SMALL-EXEMPT MED".
           03  S6       PICTURE X(16) VALUE IS "SMALL-EXEMPT HI ".
           03  S7       PICTURE X(16) VALUE IS "UNLIMITED LOW ".
           03  S8       PICTURE X(16) VALUE IS "UNLIMITED MEDIUM".
           03  S9       PICTURE X(16) VALUE IS "UNLIMITED HIGH ".
       01  STRATA-LABELS-REDEF REDEFINES STRATA-LABELS.
           03  STRATA-LABEL    OCCURS 9 TIMES  PICTURE X(16).
       01  STRATA-TOTALS.
           03 STRATA-TOT   OCCURS 10 TIMES     PICTURE 99999.
       01  MONTH-LABEL-TABLE.
           03  ML1      PICTURE XXXX    VALUE IS "JAN.".
           03  ML2      PICTURE XXXX    VALUE IS "FEB.".
           03  ML3      PICTURE XXXX    VALUE IS "MAR.".
           03  ML4      PICTURE XXXX    VALUE IS "APR.".
           03  ML5      PICTURE XXXX    VALUE IS "MAY ".
           03  ML6      PICTURE XXXX    VALUE IS "JUNE".
           03  ML7      PICTURE XXXX    VALUE IS "JULY".
           03  ML8      PICTURE XXXX    VALUE IS "AUG.".
           03  ML9      PICTURE XXXX    VALUE IS "SEPT".
           03  ML10     PICTURE XXXX    VALUE IS "OCT.".
           03  ML11     PICTURE XXXX    VALUE IS "NOV.".
           03  ML12     PICTURE XXXX    VALUE IS "DEC.".
           03  ML13     PICTURE XXXX    VALUE IS SPACES.
       01  MONTH-LABELS REDEFINES MONTH-LABEL-TABLE.
           03  MONTH-LABEL OCCURS 13 TIMES PICTURE XXXX.
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```
PROCEDURE DIVISION.
SORT-BY-STATION-NUMBER.
    SORT SORT-FILE ON ASCENDING KEY STA MNTH
        USING UNSORTED-SAMPLES
        GIVING SAMPLES.
BEGIN.
    OPEN INPUT SAMPLES CARD.
    OPEN OUTPUT PRINT.
    MOVE ZEROS TO STRATA-TOTALS STATIONS-FLAG PAGE-COUNT
        STATION-TOTALS
    MOVE 13 TO MONTH1 MONTH2 MONTH3
    READ CARD AT END GO TO FIRST-READ.
    IF LIST-STATIONS EQUALS "STATION"
                MOVE 1 TO STATIONS-FLAG.
FIRST-READ.
    READ SAMPLES AT END GO TO PRINT-STRATA-TABLE.
    MOVE STATION-NO TO STATION-NUMBER
    GO TO FIND-STRATA.
READ-SAMPLES.
    READ SAMPLES AT END
                MOVE I TO J
                PERFORM PRINT-STATION
                GO TO PRINT-STRATA-TABLE.
FIND-STRATA.
    MOVE I TO J
    SUBTRACT 1 FROM CLS GIVING I
    MULTIPLY 3 BY I
    ADD VOL TO I
    IF I IS LESS THAN 1 OR GREATER THAN 9
                DISPLAY "INVALID STATION STRATA. EDIT THE DATA "
                GO TO CLOSE-FILES.
    ADD 1 TO STRATA-TOT (10) STRATA-TOT (I)
    IF STATIONS-FLAG EQUALS 0 GO TO READ-SAMPLES.
    IF STATION-NO IS NOT EQUAL TO STATION-NUMBER
                PERFORM PRINT-STATION
                MOVE STATION-NO TO STATION-NUMBER.
    EXAMINE MONTHIN-REDEF REPLACING ALL SPACES BY ZEROS
    IF MONTHIN IS LESS THAN 10
                ADD 10 MONTHIN GIVING MONTH
                GO TO ADD-TO-STATION-COUNT.
    DIVIDE MONTHIN BY 10 GIVING MONTH.
ADD-TO-STATION-COUNT.
    ADD 1 TO STA-TOTAL
    IF MONTH1 EQUALS 13
                MOVE MONTH TO MONTH1
                ADD 1 TO TOT1
                GO TO READ-SAMPLES.
    IF MONTH EQUALS MONTH1
                ADD 1 TO TOT1
                GO TO READ-SAMPLES.
    IF MONTH2 EQUALS 13
                MOVE MONTH TO MONTH2
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                ADD 1 TO TOT2
                GO TO READ-SAMPLES.
        IF MONTH EQUALS MONTH2
                ADD 1 TO TOT2
                GO TO READ-SAMPLES.
        IF MONTH3 EQUALS 13
                MOVE MONTH TO MONTH3
                ADD 1 TO TOT3
                GO TO READ-SAMPLES.
        IF MONTH EQUALS MONTH3
                ADD 1 TO TOT3.
        GO TO READ-SAMPLES.
PRINT-STATION.
        IF LINE-COUNT IS GREATER THAN 26
                PERFORM PRINT-PAGE-HEAD
                WRITE PRINT-LINE FROM HEAD1 AFTER 3 LINES
                WRITE PRINT-LINE FROM HEAD2 AFTER 1 LINE
                WRITE PRINT-LINE FROM UNDERLINE AFTER 1 LINE.
        MOVE STRATA-LABEL (J) TO STA-TYPE-OUT
        MOVE STATION-NUMBER TO STATION-NUMBER-L
        MOVE TOT1 TO TOT1-L
        MOVE TOT2 TO TOT2-L
        MOVE TOT3 TO TOT3-L
        MOVE STA-TOTAL TO STA-TOTAL-L
        MOVE MONTH-LABEL (MONTH1) TO MONTH1-OUT
        MOVE MONTH-LABEL (MONTH2) TO MONTH2-OUT
        MOVE MONTH-LABEL (MONTH3) TO MONTH3-OUT
        WRITE PRINT-LINE FROM STATION-LINE AFTER ADVANCING 2 LINES.
        ADD 1 TO LINE-COUNT
        MOVE ZEROS TO STATION-TOTALS
        MOVE 13 TO MONTH1 MONTH2 MONTH3.
PRINT-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 LINE.
PRINT-TABLE-LINE.
        ADD 1 I GIVING J
        ADD 1 J GIVING K
        MOVE STRATA-TOT (I) TO LOW-NUM
        MOVE STRATA-TOT (J) TO MEDIUM-NUM
        MOVE STRATA-TOT (K) TO HIGH-NUM
        ADD STRATA-TOT (I) STRATA-TOT (J) STRATA-TOT (K) GIVING TEMP
        MOVE TEMP TO TOTAL-NUM
        WRITE PRINT-LINE FROM NUMBERS-OUT AFTER ADVANCING 1 LINE.
        DIVIDE TEMP BY STRATA-TOT (10) GIVING PERTEMP
        MULTIPLY 100 BY PERTEMP GIVING TOTAL-PER
        DIVIDE STRATA-TOT (I) BY STRATA-TOT (10) GIVING PERTEMP
        MULTIPLY 100 BY PERTEMP GIVING LOW-PER
        DIVIDE STRATA-TOT (J) BY STRATA-TOT (10) GIVING PERTEMP
        MULTIPLY 100 BY PERTEMP GIVING MEDIUM-PER
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    DIVIDE STRATA-TOT (K) BY STRATA-TOT (10) GIVING PERTEMP
    MULTIPLY 100 BY PERTEMP GIVING HIGH-PER
    WRITE PRINT-LINE FROM PERCENT-OUT AFTER ADVANCING 1 LINE.
PRINT-HORIZONTAL-LINE.
    WRITE PRINT-LINE FROM HEAD9 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEAD9 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEAD9 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEAD10 AFTER ADVANCING 0 LINES.
    WRITE PRINT-LINE FROM HEAD9 AFTER ADVANCING 1 LINE.
PRINT-STRATA-TABLE.
    PERFORM PRINT-PAGE-HEAD
    WRITE PRINT-LINE FROM HEAD3 AFTER ADVANCING 2 LINES.
    WRITE PRINT-LINE FROM HEAD4 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEAD5 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEAD6 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEAD7 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEAD8 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEAD9 AFTER ADVANCING 1 LINE.
    MOVE " PRIVATE " TO CLASS-LABEL
    MOVE 1 TO I
    PERFORM PRINT-TABLE-LINE THROUGH PRINT-HORIZONTAL-LINE
    MOVE "SMALL-EXEMPT " TO CLASS-LABEL
    MOVE 4 TO I
    PERFORM PRINT-TABLE-LINE THROUGH PRINT-HORIZONTAL-LINE
    MOVE " UNLIMITED " TO CLASS-LABEL
    MOVE 7 TO I
    PERFORM PRINT-TABLE-LINE THROUGH PRINT-HORIZONTAL-LINE
    ADD STRATA-TOT (7) STRATA-TOT (4) STRATA-TOT (1)
    GIVING STRATA-TOT (1)
    ADD STRATA-TOT (8) STRATA-TOT (5) STRATA-TOT (2)
    GIVING STRATA-TOT (2)
    ADD STRATA-TOT (9) STRATA-TOT (6) STRATA-TOT (3)
    GIVING STRATA-TOT (3)
    MOVE "   TOTAL " TO CLASS-LABEL
    MOVE 1 TO I
    PERFORM PRINT-TABLE-LINE
    WRITE PRINT-LINE FROM HEAD9 AFTER ADVANCING 1 LINE.
    WRITE PRINT-LINE FROM HEAD9 AFTER ADVANCING 1 LINE.
CLOSE-FILES.
    CLOSE SAMPLES CARD PRINT.
    STOP RUN.
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