SYSTEMS ANALYSIS

OF THE

PLANNING SURVEY DIVISION

TEXAS HIGHWAY DEPARTMENT

VOLUME 1

1968

SYSTEMS ANALYSIS

of the

PLANNING SURVEY DIVISION

TEXAS HIGHWAY DEPARTMENT

A STAFF REPORT

in cooperation with the

U.S. DEPARTMENT of TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
BUREAU of PUBLIC ROADS

VOLUME 1 JUNE 1, 1968

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VOLUME I

INTEROFFICE MEMORANDUM

TO: J. E. Wright, Director, Planning Survey Division

Date June 1, 1968

FROM: The Task Force Study Committee

Responsible Desk D-10 Inv.

SUBJECT: Systems Analysis (Phase I)

We have completed our Staff Report of the existing system of operation for the Planning Survey Division.

This report is divided into four sections so as to clearly identify the study and the Division operations as they now exist. Section I is an introduction as to how the systems analysis was carried out. Section II briefly describes the Division organization. Section III is the body of the report and explains in depth each Division operation where computer applications might be feasible. Section IV (Volume II) is a manual of illustrations related by cross reference to the material in Section III of Volume I.

We would also like to take this opportunity to express our appreciation to the Steering Committee and other employees of the Department for their assistance in this study.

Melvin L. Euers, Chairman
Road Inventory Section

Charles M. Drake, Member
Financial Section

Bernard F. Barton, Member
Automation Section

Howard Moneysmith, Member
Road Inventory Section

Otto W. Wehring, Member
Traffic Section

Emil J. Svrcek, Member
Road Inventory Section

Gus Willeford, Member
Accounting Section

I INTRODUCTION

A. PURPOSE AND OBJECTIVE OF THE STUDY

In December of 1967 the Director of Planning Survey Division requested a study of the Division operations to determine future needs of the Department. The objective of the study was to compile and select data in the present system of operation to assist in determining future requirements. This determination would then aid in formulating a unique systems design.

B. METHODS AND SCOPE

In December of 1967 a Task Force was organized and instructed to make a systems analysis of the operations within the Division. A committee member was selected from each section in the Division so as to give a broad cross section of experience. A steering committee consisting of the Assistant Director, the Section Heads and the Division Programmer was appointed to give guidance and advice to the Task Force.

The Task Force deemed it necessary to analyze all operations in each section of the Division. Using its own cross-section of experience the Task Force selected each operation to be studied in detail, those to be studied moderately and those to be given a cursory examination.

C. TECHNIQUES USED

In conducting the systems analysis the Task Force interviewed personnel responsible for various operations throughout the Division.

Descriptive narration and flow-charts of each operation were developed as needed by members assigned to their individual sections.

D. DEPTH OF STUDY

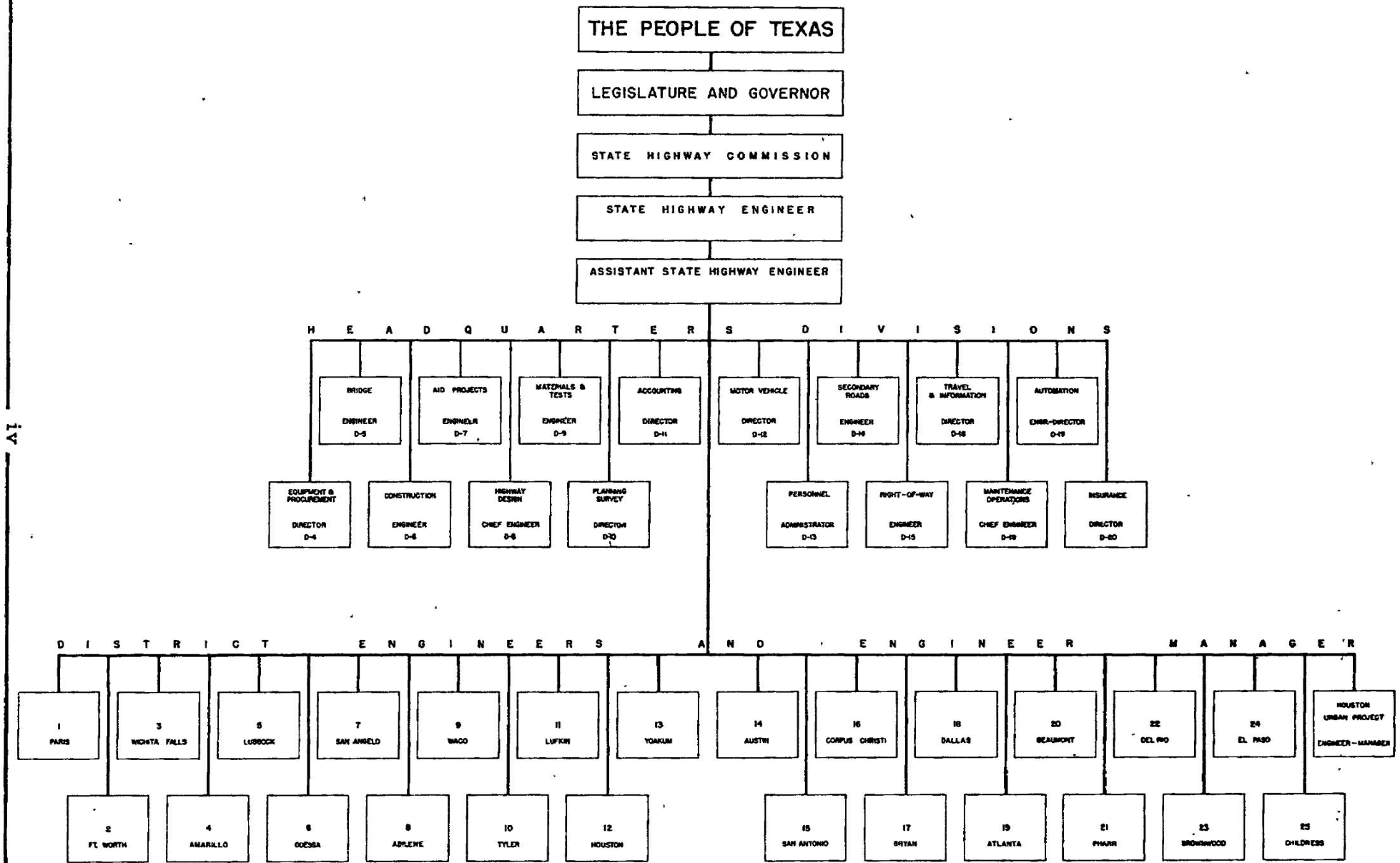
Terms describing the depth of study to be applied to each operation in the Division:

a. Overall. To develop a broad understanding of the operation, exclusive of precise fundamentals.

b. General. A close examination of the operation without specific details.

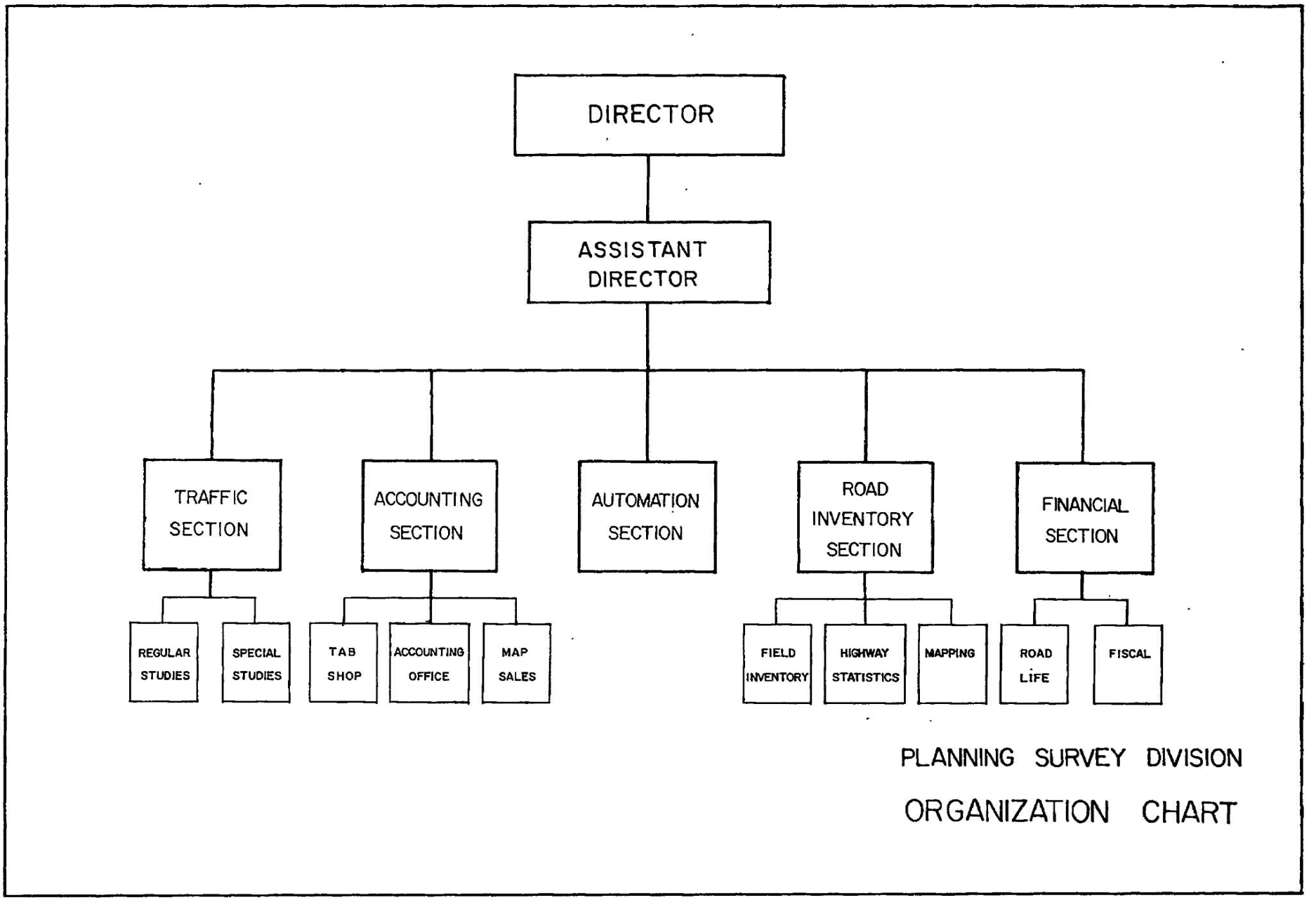
c. Detail. A detailed examination to understand each phase of the operation, including flowcharting of each step.

This report is divided into four sections so as to identify clearly the Study and the Division Operations as they now exist. Volume I is a documentation of the existing system, divided into three sections. Section I is an introduction as to how the systems analysis was carried out. Section II briefly describes the past history and the present Division organization. Section III is the body of Volume I, and explains each operation within that section of the Division. Those operations where computer applications are now being carried out or might be feasible were given a detailed examination, others a more cursory examination. Section IV (Volume II) is a manual of illustrations directly related by cross reference to the material in Section III of Volume I. No graphic display of material is presented where operations of a lesser degree were studied.



TEXAS HIGHWAY DEPARTMENT
ORGANIZATION CHART

A1



PLANNING SURVEY DIVISION

ORGANIZATION CHART

II DIVISION ORGANIZATION

The Planning Survey Division currently operates with a personnel force of approximately 185 employees. It operates on a budget of approximately $3,000,000 annually carrying out the programs for which it is responsible, including numerous special jobs and studies. These special jobs and studies are described individually and the programs in which each is involved are identified.

A. HISTORY

On June 18, 1934, congressional action resulted in the authorization to create State-Wide Highway Planning Surveys in each state as a cooperative project between the Bureau of Public Roads and the various State Highway Departments.

On March 25, 1936 a project agreement was signed between the Texas Highway Department and the Bureau of Public Roads to form a Highway Planning Survey in Texas.

On April 2 and 3, 1936, a conference was held between Highway Department officials and representatives of the Bureau of Public Roads to formulate the Highway Planning Survey. On May 2, 1936, the State-Wide Highway Planning Survey officially came into being.

The Highway Planning Survey operated from 1936 to 1939 as a cooperative project during which time various surveys and reports were completed for the entire state. It was then officially accepted as a permanent Division of the Highway Department. The word Highway was dropped from the Division name in 1957 to reflect its broader scope.

Throughout the years new programs and responsibilities have been added to the Division.

B. DUTIES AND RESPONSIBILITIES

1. Inventory and construct straight-line diagrams of all state highways and rural county roads in the State.

2. Conduct traffic surveys and compile data on volumes, classifications, weights and speeds of vehicles.

3. Analyze construction costs, retirements, investments and life characteristics of roadways and bridges.

4. Compile data on the receipts and disbursements of funds by counties and cities on roads and streets under their jurisdiction.

5. Maintain and report the official road mileage of the State Highway System, county roads and streets in unincorporated and incorporated places.

6. Compile and maintain road maps and traffic volume maps of all counties, highway districts and the State.

7. Make these maps and reports available to the public at a schedule of prices to cover printing costs and furnish a reasonable number of copies free to other governmental agencies.

8. Upon request the public is furnished with such statistical data as may be published or of record.

9. Conduct major traffic surveys involving origin and destination studies of traffic in urban and rural areas when authorized by the Highway Commission.

10. Supply specialized services to Districts, Divisions and Administration pertaining to traffic surveys and mapping.

11. Make studies relative to the expansion of the Secondary Road System.

12. Make investigations and reports concerning deficiencies and needs of the Highway System.

13. Order and distribute U. S. Geological Survey topographic maps to Divisions and Districts.

It is the duty of the Planning Survey Division to cooperate with all Divisions and Districts of the Department and to coordinate its efforts with those of the Divisions and Districts for the general welfare and efficiency, rendering its specialized services where required.

The Division operates under project agreement with the Bureau of Public Roads with the State in control but subject to audits, inspections and approval of the Bureau as a requisite for reimbursement of expenditures to the extent of the Project Agreement.

C. ORGANIZATION AND ADMINISTRATION

The control of the Planning Survey Division is vested in a State Highway Engineer appointed by the State Highway Commission. The State Highway Engineer appoints the Director of the Division. The Assistant Director is appointed by the Director with approval of the State Highway Engineer. The Director appoints the various Section Heads of the Division.

D. OBJECTIVE AND MISSION OF THE DIVISION

The objective of the Planning Survey Division is to collect and process the necessary information for planning to meet the needs of the highway system.

The mission of the Planning Survey Division is to provide services to and in behalf of the Texas Highway Department. Essentially these include mileage, traffic, financial statistics and such tables, reports,

studies and maps as necessary for use in planning, constructing, maintaining and financing the various road systems which are the responsibility of the Department.

III - A

ROAD INVENTORY

A. ROAD INVENTORY SECTION (D-10 I)

The Inventory Section (D-10 I) surveys counties and cities on a scheduled basis to include each highway, road and street for road mileage, surface type, administrative system and other roadway characteristics. At the same time, cultural items, drainage and other physical details are secured for preparation of County General Highway planimetric maps. Mileage, surface type, system, traffic and other statistical tables, summaries and reports are prepared from the field data. Other maps prepared include the District Control-Section maps, the Official Departmental Map, District General Highway Maps, Urban Area Maps and others as required by the Department. Special field surveys include disaster damage, military maneuver damage, signboard and junkyard, railroad crossings, etc.

1. HIGHWAY STATISTICS

A. 01 STRAIGHT LINE DIAGRAM (Form RI-1)

Purpose:

To prepare a schematic diagram in straight line form of all highways in Texas. These diagrams are used by the several District Highway Offices for speed zoning studies and by Maintenance Operations (D-18-T) for accident reports. Information from these diagrams enhances other information compiled for the County General Highway Maps. The diagrams, divided into appropriate codeable sections, are the basis for a vehicular mile tabulation of annual state wide Traffic Counts. A secondary purpose is the reproduction of prints for the superimposing of field inventory information collected for updating at the time of a complete revision. The primary use of the diagram is by Road Inventory Section for the manual recording of information that is to be coded on the Roadway Code Sheet (RI-2), the Bridge Code Sheet (RI-3) and the Railroad Code Sheet (RI-4).

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Field Inventory information is superimposed on the straight line diagrams at the time of a complete revision. Information for complete revisions and partial revisions evolves from Highway Construction Plans, Maintenance Plans, the City Map file, the Urban Area file, Federal Aid Designations, Commission Minutes, Administration Orders and Railroad grade crossing information.

Compilation Procedure:

All straight line diagrams are originally compiled in the same manner. New diagrams are made from construction plans of projects completed and taken over by maintenance during the calendar year. Complete note revisions are unique only in that they contain much information from field inventory, and that at the time of the complete note revision an effort is made to rebuild sub-standard straight line diagrams. Existing diagrams are updated by reconstruction plans or maintenance folders of projects completed during the calendar year. The diagrams show numerous items of coding and mapping information. Each year some one thousand municipalities are contacted as to changes in city limits. These changes are placed on the diagrams in so far as they affect highways. Changes in highway numbers and control and section numbers are reflected on the diagrams as prescribed by Highway Commission minutes and Administrative Orders. Several items pertaining to Railroad grade crossings are superimposed on the diagrams. Any corrections, deletions or additions discovered since the previous annual note revision are listed on "Note Corrections" (Form RI-85) and at this time added to the straight line diagrams.

Frequency:

Complete note revisions are made for selected counties annually based on complete field inventories. An effort is made to completely re-inventory the entire state during a cycle of five years. A partial note revision is made of the remaining counties each year.

Volume:

Approximately 15,000 sheets of straight line diagrams are required to

record some 65,000 miles of Highways on the maintained system. Several thousand sheets are altered or built each year as part of the annual note revision.

Status of Storage:

The straight line diagrams are contained in binders and stored in vertical files in county order.

Dispersement:

Copyflow prints of those diagrams altered during the annual note revision are sent to the individual Highway District offices and to Maintenance Operations (D-18-T) for the annual updating of their file. Another complete set of copyflow prints is sent to Maintenance operations for their work in accident reporting. The microfilming and printing of approximately 15,000 sheets of diagrams annually is an almost continuous process during the months of June through December.

A. 02 STATE ROADWAY FILE (Form RI-2)

Purpose:

To record, in coded form, the roadway information superimposed on the straight line diagrams. This information is later transferred to cards by keypunch.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The straight line diagrams and Federal Aid Designations.

Compilation Procedure:

Roadway information from the straight line diagrams is coded in numerical form as per code index (Plate 25). Federal Aid is coded as shown on Designation maps. Total Federal Aid mileages of all types and non Federal Aid mileages are checked against a tabulation from the Road Mileage Summary (Form RI-12). Such corrections necessary to the Roadway code sheet discovered since the previous annual note revision are shown on "Note Corrections" (Form RI-85) and at this time made a part of current annual note revision. Each section of highway that is added, altered or voided must be listed on the summary of Revisions (Form RI-72 state system) as notification to the keypunch operation, that cards are to be added, altered or voided. Any highways that are built, reconstructed, abandoned, revised or transferred to another system must be listed on the Revision, Transfers, Reconstruction and Abandonment Tabulation (Form PR-502A) for final tabulation and balancing against the Summary of Revisions. When the net differ-

ences of these two forms are in agreement, the final changes are added to or subtracted from the previous years mileage by administrative system and surface type as shown in the appropriate state system columns on the County Road Mileage Sheet (Form RI-59) for the individual county. The new totals constitute the correct State Highway mileage for the current year for each individual county. After each individual county has been corrected for the current year, machine listings are furnished for rural sections only in order to code average daily traffic on each section of highway for each county. These average daily traffic figures are keypunched on the original tab card annually to compute vehicle miles. If there still exists an appreciable difference in mileage between the RI-2 and state maintenance road log it is shown on the RI -78 discrepancy form and will be reconciled by the Road Inventory field party and the District office.

Frequency:

The coding process follows the revising of the straight line diagrams and is done annually during the months of January through May.

Volume:

Dependent upon the amount of highway construction or reconstruction during the calendar year and the number of counties selected for complete revision, several thousand roadway code sheets are revised, checked, corrected and subsequently keypunched.

Status of Storage:

The Roadway Code sheets combined with the Bridge Code sheets are contained in binders and stored in vertical files in county order.

Dispersement:

Upon completion of the individual county, the code sheets are passed to the keypunch operation for storage on cards. The information from cards is transferred to tape and later translated into numerous statistical tables.

A. 02-1 ANNUAL MILEAGE CHANGE (PR 519)

Purpose:

This report shows the annual mileage changes of increases and decreases from the previous year to the current year, for the Federal Aid systems, Access Control, Interstate, Local City Streets and State or Local systems.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Compiled from various Bureau of Public Roads Tables.

Frequency:

Annually.

Volume:

Six copies.

Status of Storage:

RI-2 Punched Cards.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A. 02-2 SUMMARY OF EXISTING STATE AND LOCAL ROADS AND STREETS (PR 528)

Purpose:

This report is to account for the summary of existing state and local roads and street mileage, segregated according to Federal Aid and Non-Federal Aid systems.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Compiled from the RI-2 Punched cards, RI-6 Punched cards and the City Street Punched cards.

Frequency:

Annually.

Volume:

Six copies.

Status of Storage:

RI-2 Punched cards.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A. 02-3 SUMMARY TABLE OF STATE MILEAGES

Purpose:

This table is necessary as a master tabulation to serve as a check for all other tables made from punched cards. It also has a tremendous versatility in Intra-Sectional requests in filling out various tables. This table is broken

down by surface type groups, administrative system, Federal Aid systems and highway systems.

Source of Information:

This table is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Computed from the RI-2 punched cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

RI-2 Punched cards.

Dispersement:

Planning Survey Division.

A. 02-4 INTERSTATE AND PRIMARY SYSTEM INSIDE NATIONAL RESERVATION (CHECK LISTING)

Purpose:

The only purpose of this listing is to proof a similar listing made from the RI-12 magnetic tape.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Listed on the 402 Accounting Machine by Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

RI-2 Punched cards.

Dispersement:

To the Statistician of Road Inventory Section of the Planning Survey Division.

A. 02-5 STATE MAINTAINED RI-2 TABULATION

Purpose:

This tabulation is necessary to find any discrepancy between the RI-2 tabulation and similar tabulation of the RI-12 and State Maintained Tabulation.

Source of Information:

This information is obtained from the RI-2 Punched cards.

Compilation Procedure:

Computed from the RI-2 Punched cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

RI-2 Punched cards.

Dispersement:

This report is given to the Statistician of Road Inventory Section of the Planning Survey Division.

A. 02-6 RI-2 MECHANICIAL RI-59 TABULATION

Purpose:

This tabulation is necessary to prepare the RI-59.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Listed on the 402 Accounting Machine by Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

RI-2 Punched cards.

Dispersement:

This tabulation is given to the Statistician of Road Inventory Section of the Planning Survey Division.

A. 02-7 LISTING OF FEDERAL AID AND STATE SYSTEM BY CONTROL-SECTION ORDER FORM RI-2

Purpose:

This tabulation is needed to cross check a similar tabulation of the RI-12.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Listed on the 402 Accounting Machine by Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

RI-2 Punched cards.

Dispersement:

This tabulation is given to the Statistician of Road Inventory Section of the Planning Survey Division.

A.02-8 REVISIONS, TRANSFERS, RECONSTRUCTIONS AND ABANDONMENT TABULATION (PR 502A)

Purpose:

This tabulation is necessary as a supplement to complete the PR 502.

Source of Information:

PR 502A Punched cards.

Compilation Procedure:

Listed on the 402 Accounting Machine by Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

PR 502A Punched Cards.

Dispersement:

This report is submitted to the Bureau of Public Roads by June 1st of each year.

A. 02-9 SUMMARY OF DESIGNATED FA HIGHWAY SYSTEM MILEAGE (PR 529)

Purpose:

This report accounts for the official record of the designated Federal Aid System Mileages, with particular interest on the Chargeable and Non-Chargeable status of the Federal Aid Primary and Interstate Mileages, pursuant to the percentage limitation of the Federal Aid Primary system.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Compiled from the RI-2 Punched cards, in National Reservation Listing RI-12 cards, non-chargeable listing from RI-12 cards and from designated mileage tabulation from RI-12 cards.

Frequency:

Annually.

Volume:

Six copies.

Status of Storage:

RI-2 Punched cards.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A. 02-10 MILEAGE OF SURFACED HIGHWAYS (PR 506)

Purpose:

This report is to account for the existing mileage of surfaced highways by Traffic Lanes and Access Control.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Computed from the RI-2 Punched cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

Six copies.

Status of Storage:

RI-2 Punched cards.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A.02-11 EXISTING SURFACE MILEAGE (PR 505)

Purpose:

This report is to account for the existing surface mileage by type, width and average daily traffic volume.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Computed from the RI-2 Punched cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

Six copies.

Status of Storage:

RI-2 Punched cards.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A. 02-12 HIGHWAY MILEAGE ANALYSIS SCHEDULE (PR 502)

Purpose:

This report is to account for all changes that occurred during the year in the existing mileage of each surface classification.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Computed from the RI-2 Punched cards and the PR 502A by Automation Division (D-19).

Frequency:

Annually.

Volume:

Six copies.

Status of Storage:

RI-2 Punched cards.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A. 02-13 DUPLICATED HPS SECTION NUMBERS

Purpose:

This tabulation is to eliminate duplicated control-section and HPS

numbers by county.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

The computer seeks out the equals from the RI-2 punched cards which are then revised by Road Inventory Section.

Frequency:

Annually.

Volume:

One listing.

Status of Storage:

RI-2 Punched cards.

Dispersement:

Road Inventory Section of Planning Survey Division.

A. 02-14 FEDERAL-AID URBAN BEYOND CITY LIMITS REPORT

Purpose:

This report shows the Federal Aid Urban Mileage Beyond City Limits by counties. It also serves as an aid to compute non-chargeable Interstate Highway Mileage.

Source of Information:

This information is from the Roadway Code File (RI-2).

Compilation Procedure:

This information is obtained from the Roadway Code File.

Frequency:

Annually.

Volume:

One listing.

Status of Storage:

RI-2 Punched cards.

Dispersement:

Submitted to Road Inventory Section as a check against the Federal Aid Urban Maps for accuracy.

A.02-15 STATE TRAFFIC LISTING

Purpose:

The purpose of this tabulation is to determine the vehicle miles and the Average Daily Traffic for all highways in the state.

Source of Information:

This information is obtained from the Roadway Code File (RI-2).

Compilation Procedure:

Listed on the 402 Accounting Machine by Planning Survey Division.

Frequency:

Annually.

Volume:

One listing for each county in the state.

Status of Storage:

RI-2 Punched cards.

Dispersement:

This tabulation is given to Road Inventory Section of Planning Survey Division.

A. 02-16 and A. 06-5 MILEAGE OF RURAL ROADS IN EACH HIGHWAY SYSTEM BY AVERAGE DAILY TRAFFIC VOLUME GROUPS AND MILES AND AVERAGE DAILY VEHICLE MILES OF ALL RURAL ROADS BY COUNTIES, HIGHWAY DISTRICTS AND SYSTEM (TT)

Purpose:

These tables are designed to summarize rural road mileages by local road mileage, highway system, Federal Aid system, traffic volume groups and by Counties, Districts and State totals.

Source of Information:

This information is obtained from the RI-2 and RI-6 Roadway Code Files.

Compilation Procedure:

Computed from the RI-2 and RI-6 Punched cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

100 copies.

Status of Storage:

RI-2 and RI-6 Punched cards.

Dispersement:

This table is submitted to all Districts, Divisions and to the Bureau of Public Roads by June 1st of each year.

A.02-17 and A.06-6 EXISTING SURFACE MILEAGE BY TYPE, WIDTH AND AVERAGE DAILY TRAFFIC (505A)

Purpose:

This table is to show the existing surface mileage on rural roads by Average Daily Traffic volume groups, surface type group and width group.

Source of Information:

This information is from the County Roadway File (RI-6) and the Roadway Code File (RI-2).

Compilation Procedure:

Computed from the RI-2 and RI-6 punched cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

100 copies

Status of Storage:

RI-6 and RI-2 Punched cards.

Dispersement:

This table is submitted to all Districts, Divisions and to the Bureau of Public Roads by June 1st of each year

A.03 BRIDGE FILE (Form RI-3)

Purpose:

To record, in coded form, the bridge information superimposed on the straight line diagram. The information is transferred to punch cards by the keypunch branch of the Division.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The straight line diagrams (RI-1).

Compilation Procedure:

Bridge information from the straight line diagrams is coded in numerical form as per code index (Plate 25).

Frequency:

The coding process follows the revising of the straight line diagrams done annually during the months of January through May.

Volume:

Dependent upon the number of bridges constructed or altered during the calendar year, several hundred Bridge Code Sheets are altered and subsequently keypunched.

Status of Storage:

The bridge code sheets combined with the roadway code sheets are contained in binders and stored in vertical files in county order.

Dispersement:

Upon completion of the individual county, the code sheets are passed to

keypunch for storage on cards. From this information evolves one table, "Inventory of Bridges Report."

A.03-1 INVENTORY OF BRIDGES REPORT

Purpose:

This report shows the number of kinds of various bridges on all highways.

Source of Information:

This information is obtained from the Bridge Code File (RI-3).

Compilation Procedure:

Listed on the 402 Accounting Machine by Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

RI-3 Punched cards.

Dispersement:

This report is by request only.

A. 04 ROAD MILEAGE SUMMARY (RI-12)

Purpose:

This report is necessary to have current information of Designated Mileage as to Federal Aid systems, Urban State Maintained and Urban City Maintained systems, Highways system and Civil Status systems.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

This information is obtained from the Roadway Code File (RI-2), Administrative Circular, all Districts and Divisions.

Compilation Procedure:

Roadway information coded on the Road Mileage Summary (RI-12) code sheets is taken from the Roadway Code File (RI-2). Administrative circulars, notice from Divisions and Districts. Once this information is coded on the RI-12, revisions are entered on the RI-12R for alternations, cancellations, deletions and additions. These changes are then keypunched, verified and sorted. They are then given to the Division Programmer for updating the RI-12 magnetic tape from which the monthly Road Mileage Summary report is made, and published by Travel and Information Division (D-16).

In addition to this he also receives additional data cards that were punched from the RI-12 void cards code sheets.

In order to be accurate in making the revisions a manual mileage change form (RI-12SR) is kept to check ultimately the listing made by the Division Programmer's.

There are some nine tabulations and listings made annually at the first of each year to assist in making final tables for the Bureau of Public Roads and for checking the Roadway Code File (RI-2).

Frequency:

Monthly Road Mileage Summary and annual listings and tabulations.

Volume:

There are approximately 16,000 punched cards.

Status of Storage:

Magnetic Tape.

Dispersement:

The monthly report is submitted to Travel and Information Division (D-16) which in turn distributes it to the Districts, Divisions and by Planning Survey (D-10) to the Bureau of Public Roads.

The annual listings and tabulations are supplemented by tables which in turn are forwarded to Bureau of Public Roads and also given to Road Inventory (D-10) to assist the coding personnel.

A.04-1 MILES BY FEDERAL AID SYSTEM BY DISTRICT

Purpose:

This tabulation by Districts is needed by the Draftsman to check Federal Aid and Non-Federal Aid against Federal Aid and Non-Federal Aid Coding.

Source of Information:

This information is obtained from the Road Mileage Summary (R-12).

Compilation Procedure:

Computed from the RI-12 Punched cards by the Automation Section of

Planning Survey Division.

Frequency:

Annually.

Volume:

One tabulation.

Status of Storage:

Magnetic tape.

Dispersement:

Road Inventory Section of Planning Survey Division.

A. 04-2 MAINTAINED RI-12 TABULATION BY CONTROL-SECTION

Purpose:

This tabulation is necessary to find discrepancies between the RI-12 and similar tabulations of the RI-2 and State Maintenance. This tabulation is in numerical Control-Section order by counties.

Source of Information:

This information is obtained from the RI-12 Punched cards.

Compilation Procedure:

Computed by the Automation Section of Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

Magnetic tape.

Dispersement:

This tabulation is given to the Statistician of Road Inventory Section of Planning Survey Division.

A. 04-3 DESIGNATED AS FARM TO MARKET ROADS BUT NOW ARE SIGNED AS STATE HIGHWAYS

Purpose:

This listing is necessary to reflect the number of miles in each county designated as Farm to Market Roads that are signed as State Highways or so marked on the travel map.

Source of Information:

This information is obtained from the Road Mileage Summary (RI-12).

Compilation Procedure:

Computed by the Automation Section of Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

Magnetic Tape.

Dispersement:

To the Statistician of Road Inventory of Planning Survey Division.

A. 04-4 RI-12 PUNCHED CARD LISTING

Purpose:

This listing is necessary to find the original information when mistakes

are made in the process of revising the RI-12 code sheets.

Source of Information:

This information is obtained from the Road Mileage Summary (RI-12).

Compilation Procedures:

Computed by the Automation Section of Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

Vertical File.

Dispersement:

To the Statistician of Road Inventory Section of Planning Survey Division.

A. 04-5 INTERSTATE AND PRIMARY SYSTEMS INSIDE NATIONAL RESERVATIONS

Purpose:

This listing is necessary to complete the PR 529 in regards to FAI and FAP mileage in National Reservations.

Source of Information:

This listing is obtained from the Road Mileage Summary (RI-12).

Compilation Procedure:

Computed by the Automation Section of Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

Magnetic tape.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A. 04-6 LISTING OF FA AND STATE SYSTEM BY CONTROL-SECTION ORDER

Purpose:

This tabulation is needed to check the FA system against a similar tabulation of the Roadway Code File (RI-2).

Source of Information:

This information is obtained from the Road Mileage Summary (RI-12).

Compilation Procedure:

Computed from the RI-12 Punched cards by Automation Section of Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

Magnetic tape.

Dispersement:

This tabulation is given to the Statistician of Road Inventory Section of the Planning Survey Division.

A. 04-7 DESIGNATED MILEAGE OF FA AND NON-FA BY DISTRICTS

Purpose:

This report is to furnish information of Designated Mileage by Federal Aid and Non-Federal Aid by Districts.

Source of Information:

This information is from the Road Mileage Summary (RI-12).

Compilation Procedure:

This information is coded from the Road Mileage Summary (RI-12).

Frequency:

Annually.

Volume:

Six copies.

Status of Storage:

Magnetic Tape.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A. 04-8 DESIGNATED MILEAGE TABULATION (PR 529A)

Purpose:

To complete the PR 529.

Source of Information:

This information is obtained from the Road Mileage Summary (R-12).

Compilation Procedure:

Computed by the Automation Section of Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

Magnetic tape.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A.04-9 INTERSTATE SYSTEM DESIGNATED MILEAGE

Purpose:

This report prepared at the request of the Bureau of Public Roads shows the Interstate Highway Designated Mileage by counties, Interstate Highway Number, Control-Section and by chargeable inside and outside of National Reservation and Non-chargeable inside and outside National Reservation.

Source of Information:

This information is obtained from Road Mileage Summary (RI-12).

Compilation Procedure:

Computed by the Automation Section of Planning Survey Division.

Frequency:

Annually.

Volume:

One listing.

Status of Storage:

Magnetic Tape.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A.04-10 ANNUAL ROAD MILEAGE SUMMARY BY COUNTY AND DISTRICT

Purpose:

The purpose is to give a report of designated mileage by Federal Aid System and Highway System by counties and districts to each District in a table form.

Source of Information:

This information is obtained from the RI-12 punched cards.

Compilation Procedure:

Computed by the Automation Section of Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

Magnetic Tape.

Dispersement:

Submitted to each District as of January 1st of each year.

A.04-11 MONTHLY ROAD MILEAGE SUMMARY

Purpose:

The purpose of this report is to furnish a monthly publication of current designated miles for the state of Texas.

Source of Information:

This information is obtained from the Road Mileage Summary (RI-12).

Compilation Procedure:

Computed by the Automation Section of the Planning Survey Division.

Frequency:

Monthly.

Volume:

500 copies.

Status of Storage:

Magnetic Tape.

Dispersement:

Submitted to the Bureau of Public Roads, Divisions and Districts as of the first of each month. Upon request it is furnished to other agencies, publicity outlets and to the general public.

A.05 RAILROAD GRADE CROSSING

Purpose:

To furnish current information regarding existing protection, roadway details, highway traffic and data on number and speed of trains for each highway - rail grade crossing by railroad, district, county, highway, mile-point, etc.

Depth of Study:

A close examination of the operation without specific details.

Source of Information:

Railroad Companies, Districts, D-10 field inventory and Bridge Division (D-5).

Compilation Procedure:

Primary data by individual crossing serial number shown on straight line diagram (RI-1). Coded on RI-4, keypunched, tape prepared yearly for permanent record.

Frequency:

Revised currently using RI-4R, keypunched monthly or as needed. Tape revised August 31st yearly for payment of maintenance funds for protected crossings to railroad companies.

Volume:

2400-2500 highway- rail crossing cards. 20% revised yearly based on field checks (D-10) plus railroad and district checks yearly.

Status of Storage:

Punched cards and magnetic tape.

Dispersement:

Each year as of August 31st, tabulations and summaries of railroad-highway grade crossings are prepared for each railroad company, each Highway Department District and certain Main Office Administrative and Division Offices.

A.06 - COUNTY ROADWAY FILE (FORM RI-6)

Purpose:

To record, in coded form, the information superimposed on the county road notes.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The County Road Notes (Form RI-5) and the Annual Average Traffic Maps.

Compilation Procedure:

Information from the county road notes is coded in numerical form as per code index (Plate 25). Average daily traffic is coded for rural sections of the county roads on a three year cycle, with approximately 85 counties being updated each year. Such corrections necessary to the county road code sheet discovered since the previous annual note revision are listed on "Note Corrections" (Form RI-85) and at this time made part of the current annual note revision. Each section of county road which is added, altered or voided must be listed on the summary of Revisions (Form RI-72 county system) as notification to keypunch that cards are to be added, altered or voided. Any county roads which are built, reconstructed, abandoned must be listed on the Revisions, Transfers, Reconstruction and Abandonment Tabulation (Form PR-502A) for final tabulation and balancing against the summary of Revisions (Form RI-72 county system). When the net difference of these two forms are in agreement, the final changes are added to

or subtracted from the previous years mileage by Administrative System and surface type as shown in the appropriate county system columns on the county road mileage sheet (Form RI-59) for the individual county. The new totals constitute the corrected county road mileage for the current year for each individual county.

Frequency:

The coding process follows the revising of the county road notes. Counties not involved in a complete revision are altered only by information other than field inventory. Such county roads as are revised by highway construction, city limit changes, reservoir construction, etc. are the only annual alterations. These alterations are a paralleling process to the partial note revision of highways and occurs during the months of January through May.

Volume:

Dependent upon the amount of highway construction during the year a few hundred county road code sheets are revised, checked, corrected and subsequently keypunched for reasons of roadway changes. Annual average traffic count will alter the code sheet and cause subsequent re-punching of cards. One third of the counties of the state are altered in this manner. There are approximately 44,000 county road code sheets.

Status of Storage:

The county road code sheets are contained in folders in vertical files in county order with the county road notes (RI-5).

Dispersement:

Upon completion of the individual county, the code sheets are passed to

keypunch for storage on cards. The information from cards is transferred to tape and later translated into numerous statistical tables.

A. 06-1 RI-6 MECHANICAL RI-59 TABULATION

Purpose:

This tabulation is necessary to prepare the RI-59.

Source of Information:

This information is obtained from the County Roadway File (RI-6).

Compilation Procedure:

Listed on the 402 Accounting Machine by Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

RI-6 Punched cards.

Dispersement:

This tabulation is given to the Statistician of Road Inventory Section of Planning Survey Division.

A. 06-2 REVISIONS, TRANSFERS, RECONSTRUCTIONS AND ABANDONMENT TABULATION PR 521A

Purpose:

This tabulation is necessary as a supplement to complete the PR 521.

Source of Information:

PR 521A Punched cards.

Compilation Procedure:

Listed on the 402 Accounting Machine by Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

PR 521A Punched cards.

Dispersement:

This report is submitted to the Bureau of Public Roads by June 1st of each year.

A.06-3 COUNTY OR OTHER LOCAL MILEAGE REPORT (PR 521)

Purpose:

This report is to account for all local road mileages by county.

Source of Information:

This information is obtained from the County Roadway File (RI-6).

Compilation Procedure:

Computed from the RI-6 punched cards by Automation Division and computed by the 402 Accounting Machine from the PR 521A punched cards.

Frequency:

Annually.

Volume:

Six copies.

Status of Storage:

RI-6 Punched cards.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A. 06-4 LOCAL MILEAGE TABLE (LM-1)

Purpose:

This table is to collect the mileage by surface types on the county roads by counties.

Source of Information:

This information is obtained from the County Roadway File (RI-6).

Compilation Procedure:

Computed from the RI-6 punched cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

100 copies.

Status of Storage:

RI-6 Punched cards.

Dispersement:

This table is submitted to all Districts, Divisions and to the Bureau of Public Roads by June 1st of each year. It is available to other agencies and individuals upon request.

A. 07 STATE MAINTENANCE ROAD LOG CARDS

Purpose:

The road log data cards are kept current in Maintenance Operations Division (D-18) by the State Highway log clerk. These cards are similar to the Roadway Code Sheets (RI-2) in roadway, surface type, city maintained, rural and urban mileage. On January 1st and September 1st of each year reports are published from these cards as the official mileage report.

These cards are sent to Planning Survey Division (D-10) annually by the first of each year. This information is then recorded on magnetic tape from which two tables are made, one entitled "Official State Highway Mileage" (Farm or Ranch to Market) and the other "Official State Highway Mileage" (All Systems). There also is a tabulation by Control-State Highway Department Section order and by District-Control and State Highway Department Section order.

A. 07-1 HIGHWAY MAINTENANCE TABULATION

Purpose:

This tabulation is necessary to find discrepancies between the State Maintained tabulation and similar tabulations of the RI-12 and RI-2.

Source of Information:

This information is obtained from the State Maintenance Punched Cards.

Compilation Procedure:

Computed from the State Maintenance Punched Cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

State Maintenance Punched Cards.

Dispersement:

This tabulation is given to the Statistician of Road Inventory Section of Planning Survey Division.

A. 07-2 STATE MAINTAINED MILEAGE TABLE (ALL SYSTEMS)

Purpose:

This table is made from the official State Highway Maintenance Road Log showing surface types, by counties for State Highways and Farm to Market Roads combined.

Source of Information:

This information is from the Maintenance Road Log punched cards.

Compilation Procedure:

This table is computed from the Maintenance Road Log Punched cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

100 copies.

Status of Storage:

Punched cards.

Dispersement:

This table is submitted to all Districts, Divisions and to the Bureau of Public Roads by June 1st of each year.

A.07-3 STATE MAINTAINED MILEAGE TABLE (FARM TO MARKET)

Purpose:

This table is made from the Official State Highway Maintenance Road Log showing surface types, by counties for Farm to Market Roads.

Source of Information:

This information is from the Maintenance Road Log Punched Cards (D-18).

Compilation Procedure:

This table is computed from the Maintenance Road Log Punched Cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

100 copies.

Status of Storage:

Punched cards.

Dispersement:

This table is submitted to all Districts, Divisions and to the Bureau of Public Roads by June 1st of each year.

A. 07-4 HIGHWAY MAINTENANCE TABULATION BY DISTRICT

Purpose:

This tabulation is required to assist the Draftsman in checking his work against the Maintenance Road Log. Any discrepancy that may arise is then reconciled.

Source of Information:

This information is obtained from the Maintenance Road Log Cards (D-18).

Compilation Procedure:

Computed from the Maintenance Road Log Punched Cards by Automation Division (D-19).

Frequency:

Annually.

Volume:

One tabulation.

Status of Storage:

Maintenance Road Log Punched cards.

Dispersement:

Road Inventory Section of Planning Survey Division.

2. FIELD INVENTORY

A. 08 ROAD INVENTORY

Purpose:

The primary purpose of the "road inventory" surveys is to obtain data for the compilation of statistics on the mileage and characteristics of the several types of roads, streets, structures, etc. found throughout the State. Other information necessary for the production of maps is also obtained. Any data pertinent to the production of a clear, graphical or analytical representation of the cultural development, growth or anything else that would tend to influence traffic flow is considered.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

All data is obtained or verified in the field at its origin except for general correspondence.

Compilation Procedure:

The field inventory is performed by experienced men trained to recognize and record this information. Each field party makes a complete survey of all roads, etc. either on the ground, by car, or by aircraft, or a combination of both, depending on the type of inventory being carried out. All information obtained is recorded on field notes, maps, highway logs, aerial photographs, etc. It is recorded in such a manner that it can readily be transcribed to code sheets or maps.

Frequency:

The total inventory program is divided into five parts. One part being

inventoried each year, until all counties have been inventoried thus completing the cycle. On occasions this program is altered to coincide with new map construction, workload adjustments, etc. It is the intention of the program to update all information in each county at least every five years.

Volume:

The volume of work to be done each year corresponds mainly to the size and density of the Districts involved. Scheduled in the existing program is approximately 40,000 miles for each year's inventory or roughly five to six highway districts. This mileage represents only the State and County mileage. The city street mileage is a separate inventory even though it is carried out simultaneously with the road inventory.

Status of Storage:

Upon completion of the inventory of a county, all information, such as inventory maps and records, are stored in a vertical file until used for coding.

Dispersement:

When coding operations are complete, the maps, notes, etc. are returned to their specific files for storage. The files are made available to all sections of the Planning Survey and to other divisions within the Highway Department but specifically for the tabulating and mapping needs of the Road Inventory Section.

A. 09 CITY STREET INVENTORY

Purpose:

The purpose of the street inventory is to obtain information necessary for the compilation of the PR-522 and RI-522C Tabulation (Mileage by system and surface types) and the PR-523 (Street mileage by surface type and population grouping). Each street is surveyed and the data recorded so as to compile the total street mileage within the corporate limits into three separate administrative systems and six surface type categories.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

All such data is obtained from field surveys whereby each street is investigated and the surface type determined. Some information is obtained through correspondence but must still be verified in the field.

The mileage is compiled by measuring the length of each surface type from the field maps.

Compilation Procedure:

At the present time the maps used for the inventory are reproduced to a convenient scale from the office file maps. A canvass is then made of all streets to determine the various surface types and the map is marked with the appropriate colors from a preselected color code chart. The State and County extension administrative system is identified by bracketing and showing the highway or county inventory road number on the map. Any street not marked with a road number is considered to be a locally

administered street.

All information concerning the incorporated status of any city can be obtained from the tabulation form CS-1. This tabulation is revised annually and is updated from the form CS-1S which is a supplementary form on which all changes or similar information is collected during the year while awaiting a new CS-1 revision.

Frequency:

The frequency of the city street inventory is similar to the county road inventory. Additional street inventories are usually taken only on a needs basis.

Volume:

As of April 1, 1967, 954 cities were being maintained in this manner. Contained in these cities are 32,573 miles of pure city streets, 5531 miles of highways and 2641 miles of county road extensions for a total of 40,744 miles of urban roads.

Status of Storage:

City street information is stored with the county inventory records until it can be compiled. The mileage is taken from the maps with a map measure and then recorded on the work copy of the city street listing.

Dispersement:

The work copy is a duplicate machine listing of the office file copy and updated continuously during the year as inventories are being made. At the end of each calendar year the stored computer tape is updated to take in all changes since the last revision. All the information collected then becomes

the PR-522 and PR-523 Tabulations.

A. 09-1 CITY STREET MILEAGE BY SYSTEM AND SURFACE CLASSIFICATION (PR 522)

Purpose:

This report is a summary of all municipal mileage classified by system and surface type.

Source of Information:

This information is obtained from the City Street Listing.

Compilation Procedure:

The current tabulation is revised and a new tabulation is made from the revision.

Frequency:

Annually.

Volume:

Six copies.

Status of Storage:

Magnetic Tape.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A. 09-2 CITY STREET MILEAGE BY SURFACE AND CITY SIZE GROUP (PR 523)

Purpose:

This report accounts for city street mileage by surface types and city size group.

Source of Information:

This information is obtained from the City Street Listing.

Compilation Procedure:

The current tabulation is revised and a new tabulation is made from the revision.

Frequency:

Annually.

Volume:

Six copies.

Status of Storage:

Magnetic tape.

Dispersement:

Submitted to the Bureau of Public Roads by June 1st of each year.

A. 09-3 A NON-BUREAU TABULATION BY CITY, POPULATION, SURFACE TYPE AND SYSTEM (522-C)

Purpose:

This tabulation is designed to give a detailed listing of all Texas incorporated cities from the latest population census. It also gives the number of miles by surface type, population and kinds of city streets, whether it is highway extension, county road extension, or city street.

Source of Information:

This information is obtained from the City Street Listing.

Compilation Procedure:

The current tabulation is revised and a new tabulation is made from the revision.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

Magnetic tape.

Dispersement:

This report is by request only.

A.10 COUNTY ROAD NOTES (Form RI-5)

Purpose:

To record a schematic diagram in straight line form of all county roads in Texas. The primary use is by Road Inventory for the manual recording of information that is to be coded on the county Road Code Sheets (Form RI-6). At times the notes serve as the basis of field inventory for updating at the time of the complete revision. On occasions in areas where natural disasters have occured the notes serve as a record of conditions prior to the disaster. The County Road Notes, divided into suitable sections, are the basis for coding vehicular miles of annual average traffic. They also serve as a mapping aid for the construction of General Highway Maps.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The information is entirely from field inventory.

Compilation Procedure:

Field Inventory, at the time of the complete revision, will compile county road information, bridge and small structure information in straight line diagram form. These diagrams are altered annually only in so far as county roads are affected by highway construction as shown on construction plans by city limit changes, reservoir construction, etc. Any corrections, deletions or additions discovered since the previous annual note revision are listed on "Note Corrections" (Form RI-85) and at this time superimposed on the existing County Road Notes.

Frequency:

A complete note revision is made of several selected counties annually. An effort is made to completely re-inventory the entire state during a cycle of five years. No effort is made to partially revise the remaining counties except those changes indicated by information from sources other than field inventory.

Volume:

Approximately 140,000 sheets of county road notes are required to record some 140,000 miles of county roads.

Status of Storage:

The county road notes are stored in folders in vertical files in county order.

A. 11 SPECIAL SURVEYS

Purpose:

Special surveys are carried out periodically due to special jobs or requests for information not usually obtained in normal inventories.

Some of the special surveys which have been done were triangulation station recovery and traverses; city limit investigation, Signboard and Junkyard Study, Vertical Clearance Study, Interstate Needs Estimate and Railroad Crossing Study. Another unique survey which occurs quite often is the estimating of damage caused by flood or wind disasters or due to Army maneuvers.

All such information is compiled in the field and processed according to its needs since there is no set pattern for doing special surveys. Each project has to be planned separately and the field procedures adjusted to fit the needs.

3. MAPPING

A. 12 MAP RECONSTRUCTION

Purpose:

To replace an existing map of substandard quality.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Information for new map reconstruction is obtained from USGS Quad-sheets, Aerial Photos, Reservoir Maps, City Maps, Airport Location Maps and Railroad Right of Way Maps. Other sources are from Highway Construction Plans, Maintenance Construction Jobs, Road Inventory Maps and Logs and various National and State agencies.

Compilation Procedure:

The basic procedure used on new map reconstruction is the construction of a polyconic grid to the desired scale. If USGS Quads are available, trace the basic road and drainage network, add additional information from aerial photos and other sources. A field check for accuracy and completeness of roads, drainage and other features is performed by this section. The map is then corrected from field changes. The map is then scribed and reproduced on cronaflex.

Frequency:

New construction is performed as time permits.

Volume:

An average of five counties are reconstructed each year.

Status of Storage:

Flat Map File cabinets.

Dispersement:

Copies of these maps are submitted to all Districts, Divisions and to the Bureau of Public Roads. There is also a mutual exchange arrangement with other State and Governmental agencies.

A. 13 COMPLETE MAP REVISION

Purpose:

To update items in detail to current conditions.

Depth of Study:

To develop a broad understanding of the operation exclusive of precise fundamentals.

Source of Information:

Physical Field Inventory including sources used for Partial Map Revisions.

Compilation Procedure:

Maps are revised to reflect field changes and indicate changes from office research.

Frequency:

Each map approximately every five years.

Volume:

Approximately 50 counties per year.

Status of Storage:

Flat Map File cabinets.

Dispersement:

Copies of these maps are submitted to all Districts, Divisions and to the Bureau of Public Roads. There is also a mutual exchange arrangement with other State and Governmental agencies.

A. 14 PARTIAL MAP REVISION

Purpose:

Maps are updated in a limited number of items so that current information will be available on a yearly basis.

Depth of Study:

To develop a broad understanding of the operation exclusive of precise fundamentals.

Source of Information:

Information for Partial Map Revision is obtained from Highway Construction Plans, Maintenance Jobs and City Limit changes from correspondence and/or field check with city officials. Other sources are from the State Water Board, Federal Aviation Agency and other governmental and state agencies.

Compilation Procedure

Maps are revised to show indicated changes, specifically Highway Systems.

Frequency:

Annually.

Volume:

All Counties are revised (254).

Status of Storage:

Flat Map File cabinets.

Dispersement:

Copies of these maps are submitted to all Districts, Divisions and to the

Bureau of Public Roads. There is also a mutual exchange arrangement with other state and governmental agencies.

A. 15 DISTRICT CONTROL-SECTION MAPS

Purpose:

The District Control-Section Maps show all U. S. Highways, Interstate Highways, Farm and Ranch to Market Roads, Loops and Spurs and Park Roads including the existing designated roads, Control-Section Numbers and Mileage. Also shown are railroads, major drainage and lakes, cities and towns, county boundaries and names, etc.

Depth of Study:

To develop a broad understanding of the operation exclusive of precise fundamentals.

Source of Information:

Information is obtained from Commission Minutes, Designation Circulars, FA Route Changes, New Contracts for Highways, Construction Reports and from Maintenance Operations and Highway Design Divisions.

Compilation Procedure:

The District Control-Section Maps are revised to show indicated changes.

Frequency:

Annually.

Volume:

Twenty-Five Cronoflex originals (25 Districts).

Status of Storage:

Flat Map File.

Dispersement:

Automatic map distribution to Divisions, Districts and other State and Governmental Agencies, and to the Public upon request.

A.16 DEPARTMENTAL MAP — FOR COLOR PRINTS

Purpose:

The Departmental Map shows all U. S. Highways, State Highways, Farm and Ranch to Market Roads, Loops and Spurs including the existing and designated roads. Also shown are the railroads, major drainage and lakes, Federal Aid and Interstate Highway Systems, cities and towns and county boundaries and names, etc.

Depth of Study:

To develop a broad understanding of the operation exclusive of precise fundamentals.

Source of Information:

Information is obtained from Commission Minutes, Designation Circulars, FA Route Changes, New Contracts for Highways, Construction Reports and from Maintenance Operations Division.

Compilation Procedure:

Departmental Map is revised to show all changes due to highway construction, new reservoirs, railroad changes, place and feature name changes, etc.

Frequency:

Annually.

Volume:

Cronoflex Originals. (Five Color Separations Sheets)

Status of Storage:

Flat Map File.

Dispersement:

Map distribution to State Highway Commission, State Highway Engineers, Engineers of Texas Railroads, and various designated cooperating agencies. Maps are available for sale to other agencies; firms and individuals.

A. 17 DEPARTMENTAL MAP — FOR BLUE LINE PRINTS

Purpose:

The Departmental Map shows all U. S. Highways, State Highways, Farm and Ranch to Market Roads and Loops and Spurs including the existing and designated roads. Also shown are the railroads, major drainage and lakes, Federal Aid and Interstate Highway Systems, cities and towns and county boundaries and names, etc.

Depth of Study:

To develop a broad understanding of the operation exclusive of precise fundamentals.

Source of Information:

Information is obtained from Commission Minutes, Designation Circulars, FA Route Changes, New Contracts for Highways, Construction Reports and from Maintenance Operations Division.

Compilation Procedure:

Departmental Map is revised to show all changes due to highway construction, new reservoirs, railroad changes, place and feature name changes, etc.

Frequency:

Annually.

Volume:

Cronoflex originals.

Status of Storage:

Flat Map File.

Dispersement:

Map distribution to State Highway Commission, State Highway Engineers, Engineers of Texas Railroads and various designated cooperating agencies. Maps are available for sale to other agencies, firms and individuals.

A. 18 INTERSTATE NEEDS ESTIMATE STRIP MAP

Purpose:

See Financial Section.

Depth of Study:

To develop a broad understanding of the operation exclusive of precise fundamentals.

Source of Information:

See Financial Section.

Compilation Procedure:

Each District is furnished a direct cronaflex reproducible strip map of all sections of Interstate Highway in its District. Prior to this action each strip map must be updated to represent changes that have occurred since the previous estimate. When these maps are received by the Districts involved, necessary changes will be entered and returned to D-10. These changes will be transferred to the original strip maps. After all changes have been made, a specified number of ozalid prints will be submitted to the Bureau of Public Roads for approval or comments.

Frequency:

See Financial Section.

Volume:

One Strip Map (69 sheets).

Status of Storage:

Vertical File.

Dispersement:

See Financial Section.

A. 19 INTERSTATE SYSTEM TRAVELED-WAY TRAFFIC FLOW MAP

Purpose:

This data is furnished to the Bureau of Public Roads for compilation of Traffic Flow Maps of the Interstate Traveled-Way System Nationwide.

Depth of Study:

To develop a broad understanding of the operation exclusive of precise fundamentals.

Source of Information:

This information is obtained from the "Status of Improvement to the Interstate System Book" and the PR 511 Report issued by Financial Section. Other sources are from Urban Area Maps, City Maps, and ADT from Traffic Section.

Compilation Procedure:

The 1961 Traveled-Way Study Recording Form Book is used as a basis for the annual revision of the traffic flow map. To update the Traveled-Way System, the present year book is compared with the previous year's book. The completed sections of the interstate system for the year are marked in red on the previous year's book. This data is then transferred to the Recording Form Book. From the Recording Form Book the data is inserted into milepost position on the machine listing sheet. For each section revised the PR 511 is used for proper code breakdown relation. Urban area limits are checked for corresponding urban section lengths and costs estimate section breaks. The District Half Scale Map Revision Map Books are checked for city limit changes.

After all changes to the Traffic Flow Machine Listing Sheets have been made, a Xerox Copy is made and sent to Traffic Section for ADT. The Xerox copies are then returned and the ADT is transferred to the machine listing sheets.

Frequency:

Annually.

Status of Storage:

Vertical File.

Dispersement:

A request memorandum arrives in late December from the Bureau of Public Roads. Listing must be submitted to Bureau of Public Roads Regional Office in Austin by February 16th in order to arrive in Washington by February 19th.

A.20 URBAN AREA MAPS

Purpose:

Rural and Urban classifications are used by the Bureau of Public Roads, District offices and Divisions for Highway Fund (Federal and State) breakdowns. This information is also used by the Division for coding purposes.

Depth of Study:

To develop a broad understanding of the operation exclusive of precise fundamentals.

Source of Information:

This information is obtained from the city map file and recommendations from the Districts with approval and recommendations from the Bureau of Public Roads.

Compilation Procedure:

All Urban Area Maps are printed on 18" x 25" cronaflex showing highway FA designations, urban boundary and urban beyond city limits according to the legend. A blue tape is used to highlight highways on the FA system.

Frequency:

Necessary revisions are made when notices are received from the Districts and Highway Design Division.

Volume:

There are approximately 157 urban area map sheets.

Status of Storage:

Flat map cabinets in Road Inventory Section.

Dispersement:

Five ozalid prints are submitted to the Bureau of Public Roads for

approval with one copy being returned for file. Copies are submitted to Districts and Divisions after approval.

A. 21 HIGHWAY SYSTEM DESIGNATION CIRCULARS

Purpose:

To distribute information to Divisions and Districts relative to changes in Highway designations and numbering.

Depth of Study:

To develop a broad understanding of the operations exclusive of precise fundamentals.

Source of Information:

This information is obtained from Commission Minute Orders and changes authorized by Administrative Authority.

Compilation Procedure:

Changes are incorporated and made a part of existing official systems designations maintained on 8 1/2" x 11" cards showing history of each numbered Federal Aid Route in chronological order. This information is published in Administrative Circulars.

Frequency:

Circulars published as required, usually monthly or semi-monthly.

Volume:

The yearly Farm to Market Road Program generally requires addition of 50 to 75 numbers. Changes to other systems are few.

Status of Storage:

Vertical Files.

Dispersement:

This information is submitted to all Divisions and Districts.

A. 22 FEDERAL-AID SYSTEMS DESIGNATIONS AND CIRCULARS

Purpose:

To distribute information to Divisions and Districts relative to modifications and additions to the Federal-Aid Systems. Also to submit to the Bureau of Public Roads requests for approval of additions and modifications to the Federal-Aid Secondary System.

Depth of Study:

To develop a broad understanding of the operations exclusive of precise fundamentals.

Source of Information:

Information is obtained from the Program Engineer, Design Division and the Bureau of Public Roads.

Compilation Procedure:

Changes are incorporated and made a part of existing official Systems Designations maintained on 8 1/2" x 11" cards showing history of each numbered Federal-Aid Route in chronological order. Information is published in Administrative Circulars.

Frequency:

As required.

Volume:

Varies.

Status of Storage:

Vertical Files.

Dispersement:

This information is submitted to all Divisions and Districts.

A.23 MISCELLANEOUS MAPPING

Miscellaneous mapping is carried out periodically on request for information not usually obtained in the normal mapping program. Listed below are some of the maps presently being updated and maintained.

1. District General Highway Maps
2. National System of Interstate and Defense Highways Map
3. Senatorial, Representative and Congressional District Maps (State wide)

A. a STATE MAINTENANCE CHANGE IN HIGHWAY MILEAGE

Purpose:

This report is furnished by the Maintenance Operations Division monthly, showing the changes in maintained highway mileage, surface type changes and administrative changes.

Source of Information:

This information is obtained from the 25 Districts by Maintenance Operations Division and disseminated to other Divisions.

Compilation Procedure:

The changes as given on this report are used to check or revise the RI-1, Control-Section Map, and the RI-12.

Frequency:

Monthly.

Volume:

One copy.

Status of Storage:

Vertical File.

Dispersement:

To Road Inventory Section.

A.b SHD CONTROL-SECTION AND JOB

Purpose:

This listing serves as a code catalog for aperture cards, microfilm, and construction plans.

Source of Information:

This information is from the record of aperture cards, microfilm, and construction plans.

Compilation Procedure:

Listed on the 402 Accounting Machine by Planning Survey Division.

Frequency:

Annually.

Volume:

One copy.

Status of Storage:

Punched cards.

Dispersement:

To Road Inventory Section.

III - B

FINANCIAL

B. FINANCIAL SECTION (D-10F)

The Road Life unit of Financial Section is responsible for a continuous study of construction and retirement of all highways on the State System. Statistics regarding construction and expenditures on all highways on the State Highway System are procured, analyzed and reports formulated. Various special studies of both national and state scope are collated, summarized and issued by this Section in cooperation with the other Divisions of the Highway Department, as well as the Bureau of Public Roads. Special attention is given to maintaining and issuing frequent reports on the Status of the Interstate System.

The Fiscal unit obtains and compiles from the records of each city and county all motor vehicle related receipts and disbursements. This information is also obtained, on the state level, from the State Highway Department, the Board of County and District Road Indebtedness, the Department of Public Safety, the Railroad Commission and the State Comptroller.

The Fiscal unit also obtains and compiles data on driver's licenses issued, motor vehicle registration and motor fuel consumption.

Numerous reports, relative to the data obtained by this section, are made to the Bureau of Public Roads.

1. ROAD LIFE

B. 01 CURRENT CONSTRUCTION FILE

Purpose:

Certain information on new construction jobs is coded at the time the letting notice or work authorization order is received in this office. This file is necessary in order to fill requests for information on construction underway.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The information used in compiling the Current Construction File is from the Construction Report and the Maintenance Operations Projects Report. These reports are made by the Construction Division (D-6) and the Maintenance Operations Division (D-18) of the Department.

Compilation Procedure:

The Construction Report and Maintenance Operations Projects Report are received by Road Life on approximately the fifteenth of each month. These reports contain a listing of the construction jobs underway at the end of the month previous to the month the reports are received. The information given for each construction job contains the following: the county name, district number, control-section and descriptive limits within which the job is located; the job number, type of project, length of job, description of work performed; date contracted or authorized, name of contractor, amount of money spent to date and the percentage of completion. The location

information, civil status, FA system, job number, date of letting or authorization, type of work, length of job, amount of contract or authorization and the highway design for construction jobs which were let or authorized during the previous month are all entered on a Current Construction code sheet. More than one code line entry is made when there is more than one civil status, type of work, or highway design within one job. In these cases the amount of money contracted or authorized is normally distributed on the mileage basis. The code sheets are then forwarded to the tabulating unit where the data are punched on cards. The Construction Report and Maintenance Operations Projects Report are next examined to find which jobs were completed during the previous month (designated as 100% of completion). The cards on those jobs are removed from the Construction Underway File, the date of completion punched in a field which was previously left blank for this use, and the punched card is then filed in the Completed Construction File. It is necessary to keep these cards on completed jobs in the Current Construction File until such time as the jobs are compiled and become a part of the Roadway or Bridge Construction Record File.

Frequency:

The file is updated each month by the addition of punched cards on new jobs let, and by addition and transfer to the Construction Completed section of the file on those jobs completed during the previous month. The punched cards used on construction jobs completed during the previous year are removed from the Current Construction File after they have been compiled and have become a part of the Roadway or Bridge Construction Record File.

These cards are removed from the Current Construction File annually.

Volume:

Approximately two hundred and forty new construction jobs requiring about three hundred cards are added to the Current Construction File each month and a like number of cards are moved from the Construction Underway to the Construction Completed File each month. Approximately three thousand five hundred punched cards, on jobs completed the previous year, will be removed annually from the Current Construction File. The size of the file will vary from five thousand to nine thousand cards.

Status of Storage:

Data on the Current Construction File is recorded on punched cards. A program has been written to read the data onto tape and to tabulate and list the information that is normally anticipated from this file. The decision to "automate" the file was delayed because of the advent of the systems analysis study of the Division.

Dispersement:

A tabulation is listed from this file each year for use in preparing reports for the Department. The data on expenditures of urban freeways in major cities, which are used in preparing a quarterly report to the Travel and Information Division (D-16), can also be obtained from this file. Other uses of this file for special reports or requests cannot be anticipated.

B. 02 ROADWAY CONSTRUCTION RECORD FILE

Purpose:

A record is made of each completed construction job let by the Texas Highway Department or performed by Highway Department forces in order that a complete file of historical information and construction, can be maintained for the State Highway System. These records are in detail as to type and design of construction and the dollar investment by construction components. This file is necessary in order that requests for information on construction and dollar investment may be met. The information in this file is also used in determining future needs and for the study of the service life of the different types of surfaces.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The source of data used in compiling the records on roadway construction is from the construction plans, the Maintenance Operations Division job folder and cost folder. These plans and folders, although originating in different divisions of the Department, are in the general files of Equipment and Procurement Division (D-4). Some of the information used in updating the file is obtained from the Maintenance Operations Division Roadway Log and from an RI-12 listing provided by Road Inventory Section of the Division.

Compilation Procedure:

Near the first of each year those plans and cost folders available in the

general files on construction jobs, which have been completed during the previous year, are obtained by Road Life so that a record may be made of each construction job. The information pertaining to the roadway on each job is coded in pencil on a "Construction Record for Road Life Study" form or forms. The majority of construction jobs will require only one form (record) to code the information pertaining to that job; however, some jobs will require as many as twenty-five forms on which to code the information pertaining to the roadway. A separate form is used when there is a difference in civil status, type of surface, surface width or depth, type of base, type of work performed and the amount of new surface applied, to the width or type of shoulders. A separate form is also used for each direction of divided highways. The information coded on the Construction Record form furnishes data as to the FA system, the highway system (FM or other), the location where the construction work was performed, the type of project, the job number, the completion date, the surface type, the kind of work performed, the width and depth of the base and the surface, the type and width of shoulders and the type and amount of surface treatment used. Also used are the Bureau of Public Roads surface type codes, the width, depth and type of stabilization of the subgrade and the length to the nearest thousandth of a mile within which the work described on each form is located. The cost by construction components (grading, surface, base, traffic services, roadside improvement, shoulders, maintenance, right-of- way and total) expended on this job within the limits described on the form are also coded. After the job information is coded it is then plotted in straight line diagram form on a

strip map (RL - 2) with a brief description of the work performed. Approximately every two months the coded forms are forwarded to the tabulating unit where the information coded on each form is punched and verified on cards. These cards are identified by a card control 1 punch. When a construction job is done over a section of roadway which is covered by a previous job and causes retirement, (by resurface, reconstruction, relocation, or transfer), the information pertaining to the retirement (location, mileage retired, date, reason and method of retirement and surface replacement type) is entered on the previous job form and this information, along with the construction information from the job being retired, is entered on a code sheet and sent to the tabulating unit along with the construction forms for punching and verification. The information punched from the retirement code sheet is identified by a ca rd control 2 punch. A "RX" is entered on the straight line diagram under the mileage which has been retired. When a section of road - way becomes one lane of a divided highway (due to new construction of a parallel lane), or is transferred to a different control - section from that which it is presently on, then the existing mileage is retired and a new construction form is prepared and punched. These new forms reflect the new status of the highway and the design information which was shown on the retired job. When city limits are extended or a city becomes newly incorporated the existing rural highway will be shown as being retired to city.

See section on Master City File.

Frequency:

All construction projects which have been completed during a year are

worked in the calendar year after the year in which they were completed.

Volume:

Approximately three thousand construction and Right-Of-Way jobs are completed each year. Close to ten thousand roadway construction forms are required to compile these jobs, and around thirty three thousand cards are required to record the information from the roadway construction forms. On these cards the first seventy two columns are used for construction data, and eight columns are used for the designation code and cost of each construction component (grading, surface, base, etc.). Approximately five thousand roadway retirements are made each year which will require the same number of punched cards for the retirement data. The total number of cards added to the Roadway Construction File each year is approximately thirty eight thousand. At present, the Roadway Construction and Retirement File contains around ninety thousand roadway construction forms and three hundred and seventeen thousand punched cards.

Status of Storage:

Data on roadway construction are coded on roadway construction forms, and the data from these forms are punched on cards.

Dispersement:

Data tabulated from the Roadway Construction Record File are used in compiling the "Estimate of State Highway Finance Data" (PR 530) and "State Highway Expenditures" (PR 532) reports which are submitted to the Bureau of Public Roads.

B.03 BRIDGE CONSTRUCTION RECORD FILE

Purpose:

The function of the Bridge Construction File is the same as the Roadway Construction File except that no study of service life is made on bridges.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Same as Roadway Construction Record File.

Compilation Procedure:

Basically, the procedure used in compiling the bridge file is the same as that used for the Roadway Construction File. One form is used to record the data for each bridge except in cases where one bridge extends over two or more separate roadways. A separate form would then be used for the bridge information over each roadway. The highway status, job information, and location information is coded in the same way as on the roadway forms. Other data which are coded on the bridge construction form are the clear roadway, number and width of sidewalks or curbs, type of railing, degree of skew and whether bridge has lights or not, main span type and the number and length of main spans, the type, number, and length of minor spans, vertical clearance, bridge number, added roadway width for one side of bridge widening, length of bridge, and the amount of money expended. These bridge construction forms are given to the tabulating unit every two months where the data coded on these forms are punched and verified. Bridge

construction punched cards are identified by a card control 1^x punch. When a construction job is done (widening, reconstruction, replacement with a new bridge, relocation, or transfer) which will retire an existing bridge the construction information from the bridge being retired, as well as the retirement information is coded and these are sent to the tabulating unit for punching and verifying. These retirement cards are identified by a card control 2^x punch. The bridges on each job are plotted along the roadway of a strip map (RL-2). Bridges are handled the same way as roadway when they are transferred to a different control-section from that on which they are presently located; however, in the case of a bridge going from rural to city because of city limits extension or new incorporation or an existing single roadway bridge becoming a part of a divided highway due to construction of a parallel roadway; the data on the existing bridge are entered on a "Destroy" code sheet and the data from the existing bridge, revised to a new status and entered on a "Punch" code sheet. These are sent to the tabulating unit where the existing card for this bridge is removed from the file and destroyed and the data from the "Punch" code sheet are punched on a new card.

Frequency:

Same as Roadway Construction Record File.

Volume:

New type of construction work is done on approximately eighteen hundred bridges each year. As stated earlier, one bridge construction form is normally used to record the information for each bridge on which work is performed. The cost for only one construction component (Total) is recorded on bridges; therefore, only one punched card is required for each bridge

construction record. Approximately nine hundred bridge retirements, requiring nine hundred card control 2^x punched cards, are made each year. At this time the bridge construction file contains approximately forty thousand bridge construction forms and the file contains fifty three thousand bridge construction and retirement cards.

Status of Storage:

Same as Roadway Construction Record File.

Dispersement:

Same as Roadway Construction Record File except that a report is submitted to the Bridge Division (D-5) each year showing bridge cost by system of bridge construction completed during the previous year.

B.04 MASTER CITY FILE

Purpose:

Some of the mileage on the State Highway System within incorporated cities is built and maintained by the city. The Master City File is used to keep a record, by control-section, of the mileage on the State Highway System within each city. This total city mileage is not always reflected by the Roadway Construction Record File because of sections of highway within the city not having construction work done by the Highway Department and because of mileage retirements which are made when a previously rural section is taken into the city by incorporation or city limits extension.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The main sources of information used in compiling the Master City File are the construction plans, the Maintenance Operations Division highway log and an RI-12 listing from Road Inventory Section (D-10).

Compilation Procedure:

A master city form is coded for each city at the time the initial construction on the highway within the city is completed. If the highway brought onto the system is already built--that is, not built or reconstructed by the highway department, --then the master city card is coded at the time that the highway becomes a part of the State Highway System. The information coded on the master city form includes location, civil status, FA system, type of highway

(FM or other), work field denoting this as a master city card, card control number (designated by 0), and total mileage within the city and the control-section that the master city card covers. These data from the master city cards are entered on a code sheet and the code sheets are sent to the tabulating unit every two months where the data are punched and verified on cards. At such time as the city mileage increases because of highway extension or city limits extension a new master city form is coded and entered on the code sheet, and data on the existing master city card are entered on a "Destroy" code sheet. The new master city data are punched on a card and this card replaces the existing one in the master city card file.

Frequency:

The existing city mileage within each control-section is compared to the city mileage on the RI-12 Listing at the beginning of each year. If there is an appreciable difference between the existing master city mileage and RI-12 Listing, a new master city card will be coded showing the correct mileage within the city. If there is a construction job within the city which has been completed within the previous year, a new master city form will be coded. At this time the roadway construction forms are compiled.

Volume:

Approximately two hundred and fifty master city card changes and one hundred new master city cards are made each year. At present, there are approximately four thousand cards in the Master City File.

Status of Storage:

The information on master city mileage is retained in two forms. One is the card on which the information is coded, the other is the card which is

punched from data on the code sheets.

Dispersement:

The Master City File is maintained for its service in tabulating mileage within certain cities, counties, districts, etc. as needed to satisfy requests for information from the Public, Administration, Legislature etc.

B.05 DIVIDED HIGHWAY FILE

Purpose:

The file on divided highways is maintained in order that a complete record may be available on all divided highways which have been let or completed.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The information used in compiling this file is obtained from the construction plans and the Construction Report.

Compilation Procedure:

A manual card record is made at the time a project is first let to construct a divided highway or to reconstruct an existing single roadway to a divided highway. The information on later projects which show additional stages of construction or upgrade the divided highway to a higher type is also entered on the manual card record.

The information entered on the manual card record includes the district number, county name, control and section number, job number(s), project number, highway system, highway number and date on which the initial project was let and completed. Also shown is the mileage by rural and city, the control of access status, the number of grade separations, the number of crossings at grade, the right-of-way width, the beginning and ending stations on the divided highway covered by this record, and the job number which

first advances the section of highway to a divided status. The descriptive limits encompassed by this record are shown on the back of each card.

The mileage on each record is identified as being freeway by either an orange or brown color code, an expressway by a purple color code and a boulevard by no color code.

The card records are in district, county and control-section order. Separate listings, showing total mileage by district, county and class, are tabulated from the information shown on these cards.

Frequency:

New card records are added each month and updating of existing cards is also done each month; however, card records are rarely deleted from this file. The total listings which are made from the data on these records are usually sufficient to meet requests for information on divided highways.

Volume:

This file presently has approximately one thousand seven hundred twenty-five card records. Some of the records can probably be combined and entered on one card.

Status of Storage:

The manual card records and the listings relative to the information shown are kept in the Financial Section files.

Dispersement:

Information obtained from this file is used in preparing a quarterly report entitled "Freeway, Expressways and Multi-lane Divided Highways." This report is submitted to the Travel and Information Division (D-16).

District maps showing divided highways, by class, are also maintained from information in this file. Requests for information on divided highways are frequent.

B. 06 COST INVESTMENT FILE (RL-6 File)

Purpose:

The information in the Cost Investment File is used in compiling the Dollar Life Study Report to the Bureau of Public Roads. The investment study is also used to compile studies on remaining investment.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Same as Roadway Construction Record File.

Compilation Procedure:

The Cost Investment File includes rural roadway construction only. About twelve percent of the rural roadway mileage on the State Highway System is used in compiling the Cost Investment File. This percentage of the total rural mileage is represented by selected control-sections within each of the twenty five highway districts. The cost and construction data are coded on the cost investment form at the same time the Roadway Construction Record is coded. The information coded is the same as that coded on the Roadway Construction Record forms except for the following items--the type and width of shoulders, the amount of surface placed and the mileage within which the construction work is done. After all construction jobs completed during the previous year have been coded, the cost investment forms are sent to the tabulating unit for punching and verifying. These cards are identified by a card control "1" punch. The cost investment forms, just as the roadway construction forms,

require more than one card for each form when cost is expended on more than one construction component. Cost retirements on the existing investment are made on the basis of the salvage value retained after completion of the retiring job. Salvage dollars remaining are obtained by taking into consideration the physical portion of the old work taken into the new construction, or by taking into consideration the cost of replacement when the physical portion remaining is unknown. The practice is to retire oldest invested dollars first. The construction component code, the amount of dollars retired, the year and reason and method of retirement are entered for the job on which the retirement is being made. This information, along with the construction information from the job on which the retirement is made, is entered on an RL-6 code sheet and these code sheets are also sent to the tabulating unit once each year for punching and verifying.

Frequency:

Same as the Roadway Construction Record File except that the punched card file is updated once each year.

Volume:

Approximately four hundred and fifty cost investment forms are coded each year and from these one thousand cards are punched. Approximately eight hundred and fifty cost retirements are made each year. At present there are eight thousand cost investment forms and the file contains thirty-three thousand cards.

Status of Storage:

The cost investment forms on which the construction and cost data are first coded is stored in Road Life files. The forms are to record the cost

retirements made and to keep a running total of the cost investment remaining. The initial construction costs for each job and subsequent cost retirements are punched on cards and retained on file.

Dispersement:

All cost investment study records and cards are kept on file for use at such time as the Bureau of Public Roads requests a report on the average life of dollar invested. A tabulation is made from the punched cards for use in making the Average Dollar Life Report.

B.07 DOLLAR LIFE STUDY REPORT

Purpose:

This study is made and submitted to the Bureau of Public Roads upon request. It is usually requested in conjunction with the report "Service Life on Surfaces ".

Depth of Study:

A close examination of the operation without specific details.

Source of Information:

The information utilized in compiling this study is obtained from the Dollar Life Study File. This file, as previously mentioned, is compiled from the construction and cost records.

Compilation Procedure:

The procedure used and the functions performed in compiling are the same as those for the study on "Service Life on Surfaces ". Dollars, rather than mileage, are used; and a separate study is made on the different cost components. A study is normally made on dollar investment in grading and small structures, bituminous surface, asphaltic-concrete pavement, concrete pavement and flexible base. Dollars invested are usually retired (replaced) over a number of years and, in the majority of cases, by more than one construction job; therefore, the method of retirement and the replacement type studies which are made on the "Service Life on Surfaces" report cannot be applied to dollars invested.

Frequency:

Same as "Service Life Study on Surfaces".

Volume:

The number of records from which data are tabulated for use in this study will vary according to the number of years covered by the study.

Status of Storage:

The data used in compiling this study are tabulated from the Dollar Life Study card file.

Dispersement:

Three typed copies of each table compiled in making this study are submitted to the Bureau of Public Roads. The average dollar life developed from this study is used in making remaining investment studies.

B.08 SERVICE LIFE STUDY ON SURFACES

Purpose:

This study is made and submitted to the Planning and Research Section of the Bureau of Public Roads.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The data used in compiling this study are taken from the Roadway Construction Record File. The principles applied in this study are set forth in Bulletin 125, entitled "Statistical Analysis of Industrial Property Retirements".

Compilation Procedure:

A tabulation covering the study period is made from the punched cards in the Roadway Construction Record File. This tabulation lists the number of miles constructed (by surface type) in each of the years included in the study and also the number of miles retired (by year of retirement and surface type). The number of miles built, by year, are then entered on Table 1, and by subtracting the mileage retired each year, the miles remaining on January 1st of each year is determined and entered on Table 1. The mileage remaining is then tabulated for each successive year.

The mileage remaining at the beginning of each age interval is then determined, and this information plus the mileage remaining at the end of each age interval is entered on Table 2. The percent of mileage remaining at

the end of each age interval is then calculated by dividing the miles remaining at the end of each age interval by the mileage remaining at the beginning of that age interval; this percentage is entered on Table 2. Next, the percent of mileage remaining at the beginning of each age interval is calculated by showing 100% existing at the beginning of the first age interval (0-1/2 years), and then multiplying this percentage by the percentage of miles remaining at the end of the first age interval to determine the percentage remaining at the beginning of the second age interval. The percentage remaining at the beginning of the second age interval is then multiplied by the percentage remaining at the end of the second age interval to determine the percentage remaining at the beginning of the third age interval. This process is repeated until the percent remaining at the beginning of each age interval covered by the study has been determined. A survivor curve is then plotted, using the age in years as the abscissa and the percent surviving at the beginning of the age periods as the ordinate. The survivor curve is compared to each of the eighteen type curves in Bulletin 125 to determine which one it most nearly matches. The table for the type selected is then referred to and the percent surviving at each five percent of the average life is entered on Table 3. The average service life is then determined by finding the point at which the percent surviving at one hundred percent of age, as shown by the table for the selected curve, intersects with the survivor curve of the actual data. The age at each five percent of average life is then calculated and entered on Table 3. The smoothed survivor curve is then plotted on the graph on which the survivor curve of the actual data was plotted. The probable life of the mileage which

is surviving at the average life age is then determined by multiplying the probable life percentage values, as shown on the selected curve table, by the average service life. These probable life ages are entered on Table 3, and by using the probable life age as the abscissa and the percent surviving as the ordinate, the probable life survivor curve is then plotted on the graph previously mentioned. The complete process described above is repeated for each type of surface included in this report.

Another table which is submitted as part of the Service Life Study on Surfaces Report is the "Miles Retired by Method of Retirement". The first step in preparing this table is to prepare a tabulation from the Roadway Construction Record card file. The information tabulated is the year of construction and the amount of miles retired, by method and year of retirement, for each construction year. The year of construction and the miles constructed are entered on the table in vertical order, and the year of retirement and the mileage retired by resurface are entered on the table in horizonal order. All mileage entries are then added vertically and horizontally. The year and mileage of construction and of retirement, by method, are then entered in spearate sections of the table for the reconstruction method, the transferred method, the abandoned method, and all methods combined. The miles constructed for two or more years and the miles retired for two or more years are often combined on this table. Also included in the study on surface service life is a table similar to the one just described with the exception that the replacement surface type is entered vertically and the year and mileage constructed is not used. The mileages entered on this table are

added horizontally for each replacement surface type, for each method of retirement, and for total mileage retired. The mileages are then added vertically for each year(s) of retirement by method and by all methods combined.

Frequency:

This study is prepared at the time it is requested by the Bureau of Public Roads. This study is normally made once each five years; however, it is impossible to anticipate the frequency of future requests for this information.

Volume:

The volume is dependent on the variance in the number of years included in the study.

Status of Storage:

The data used in compiling this study are tabulated from the Roadway Construction Record File.

Dispersement:

Three copies of each table compiled in this study are submitted to the Bureau of Public Roads. The average service life of surfaces arrived at by this study is frequently referred to when preparing needs estimates.

B.09 TRAFFIC ACCIDENT REPORT

Purpose:

This report (TA-1) is compiled and submitted as required by the Bureau of Public Roads.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Information used in compiling the Traffic Accident Report is obtained from three primary sources. The information on traffic accidents, injuries, and fatalities is obtained from the Department of Public Safety through the Maintenance Operations Division (D-18). The information on vehicle miles is obtained from Traffic Section (D-10) and the information relative to vehicle registration, licensed drivers, motor fuel consumption, etc. is obtained from records of data previously obtained by the Fiscal unit of the Division.

Compilation Procedure:

The data from accident records are coded and punched on cards by Maintenance Operations Division personnel stationed at the Department of Public Safety. Separate forms are used for data on accidents in rural areas and for data on accidents in urban areas. The punch cards on rural accidents are sent to the Automation Division (D-19) and the data are read on to a computer tape. The cards on accidents in urban areas are sent to the Automation Section (D-10) each quarter, and the data are read on to a computer tape. The final cards, on urban accidents which occurred in the

previous year, are sent to the Division on approximately March 1st. The tape on the rural accident data are also forwarded to the Automation Section at this time. The cards on urban accidents have a code field showing the Bureau of Public Roads system code although this information is not shown on the rural accident records. The Planning Survey Division section number location on each rural accident record is matched by a computer program against the RI 2 tape record in order to classify the rural accident records into the proper Bureau of Public Roads system. A program listing is run on the rural accidents, and separately on urban accidents. The format on these listings is composed of a breakdown by system (Interstate, Other F. A. P., F. A. S. State, Other State, Not Classified, and Total) of the number of fatal accidents, number of fatalities, number of nonfatal injury accidents and the number of nonfatal injuries. The "Not Classified" system category includes the accidents which occurred on a highway that became part of the State Highway System after January 1st of the year in which the accident occurred. These listings are sent to the Traffic Section of Maintenance Operations Division located at the Department of Public Safety.

An estimated PR 528 (Summary of Existing State and Local Roads and Streets) is prepared by Road Inventory Section. The mileages from this PR 528 are entered on a preliminary Traffic Accident Report form, and this form is sent to the Traffic Section. The amount of annual vehicle miles and daily vehicle miles per road mile is calculated by the Traffic Section and entered on the preliminary form. The percentages of the state total of mileage and vehicle miles are also calculated and entered on the preliminary form. One copy of this completed preliminary form is sent to the

Maintenance Operations Division and another to the Fiscal unit of the Planning Survey Division.

Upon receiving the program listings mentioned previously, Maintenance Operations Division distributes on the annual vehicle mile basis; the accidents, fatalities, injuries, etc. on the Interstate System to Interstate, Final and to Interstate, Traveled-way on the rural accident listing and the urban accident listing. "Not Classified" accidents, fatalities, etc. are classified manually to the proper system and are added to the totals for each system. The final list of accidents, injuries and fatalities, classified by system is then forwarded to the Fiscal unit.

In the Fiscal unit the information on mileage and vehicle miles from the preliminary form and the accident information, is entered on the final report form. The rate per hundred million vehicle miles of fatal accidents, fatalities, nonfatal injury accidents and nonfatal injuries, is calculated for each Bureau of Public Roads system category and entered on the final report. Various subtotals on mileage, vehicle miles, accidents, fatalities, etc. are calculated and entered on the report. The number of vehicles registered, the gallons of motor fuel used, the population and the number of licensed drivers is then entered on the report. The annual miles per vehicle, gallons of motor fuel per vehicle, miles travel per gallon, persons per vehicle, licensed drivers per vehicle, annual miles of travel per capita, annual miles of travel per licensed driver and the percent of population which are licensed drivers is calculated and entered on the report. The rate of fatal accidents, fatalities, nonfatal injury accidents and nonfatal injuries per each thousand vehicles, population and licensed drivers is then calculated and entered on

the report.

Frequency:

This report is compiled and submitted once each year.

Volume:

The number of accident records used in compiling this report will vary but the amount used in the last report was seventy-one thousand five hundred and forty-five. Six hundred and twenty-two manual entries, requiring approximately five hundred and fifty calculations are made on this report.

Status of Storage:

The accident data are stored on computer tape. The data on mileage, vehicle miles, licensed drivers, etc. are stored in the Financial Section files.

Dispersement:

Three copies of the TA-1 Report are submitted to the Bureau of Public Roads and one copy is sent to Maintenance Operations Division (D-18).

B.10 DEFENSE BRIDGE STUDY

Purpose:

An annual report on bridges (including overpasses and underpasses) on the Interstate and Federal Aid Primary systems and on major highways on the Federal Aid Secondary system within each state is requested by the Defense Department through the Bureau of Public Roads. The information from this report is used in determining routing of military troop and equipment movements.

Source of Information:

The construction plans, the Maintenance Operations Division (D-18) bridge log and the district traffic maps from the Traffic Section of the Division are used in preparing the Defense Bridge Study.

Depth of Study:

A close examination of the operation without specific details.

Compilation Procedure:

The Defense Bridge Study from the previous year is updated annually after all construction jobs completed during the previous year have been compiled and have become a part of the Roadway or Bridge Construction Record File. The report includes a table showing the number of miles of highways by FA system, which are covered by this study, a bridge section and highway number index, a numerical code listing of each county and each city in the state, a bridge section index map and the bridge record showing certain information on each bridge covered by the study.

A listing of the bridge record used on the previous year's study is made

from the computer tape, and the information shown on this listing is compared to the information on bridges existing at the end of the current year. If there has been a change in any of the line information listed for a bridge, the line listing for that bridge is deleted by marking through it and the up to date information for the bridge is entered on a code sheet. Fields provided on the code sheet are for road section number, bridge number, highway route number, county number, city number, average daily traffic, miles from beginning of section, design loading, vertical clearance, horizontal clearance, total length of bridge, maximum span length, type of main span, year built and name of feature crossed. Section numbers are assigned to each highway route number in numerical sequence, from west to east and from south to north. The section number changes at each point the highway route intersects with another route which is included in the study. The average daily traffic is shown for rural bridges only; and since the average daily traffic change will apply to every rural bridge within the section, it is entered on a special code sheet so that these changes may be made without disturbing the other fields. Changes which occur on the section index map and on the bridge section and highway number index are noted and new revised copies are made for each of these. The bridge record listing and code sheets are sent to Automation Division; and from these a corrected tape is made and a new bridge record listing is sent to Road Life. This listing is then checked and it along with the table, map and indexes are sent to the Reproduction section for printing and binding.

Frequency:

The Defence Bridge Study is updated and a new report submitted once

each year.

Volume:

Information on approximately twelve thousand and five hundred bridges is shown on the Defense Bridge Study.

Status of Storage:

The data on bridges reported on the Defense Bridge Study are stored on computer tape.

Dispersement:

Fifteen copies of this study are submitted to the Bureau of Public Roads. Copies are also furnished to Maintenance Operations (D-18) and Bridge Division (D-5).

B.11 REST AREA INVENTORY REPORT

Purpose:

This report is compiled and submitted at the request of the Bureau of Public Roads.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The primary information on rest areas is obtained from the files of the Landscape Section of the Maintenance Operations Division (D-18). Supplementary information relative to the rest areas is taken from the "Roadway Construction Record" strip maps in the Road Life unit of the Division. Traffic information is entered on each rest area record by the Traffic Section.

Compilation Procedure:

Each rest area location is marked on a district map by Landscape Section. The rest areas are then numbered in the following order. The district number is the first part of the rest area number. The second part of the number is assigned by placing the counties within that district in alphabetical order and then numbering each rest area in the first county. After all rest areas in the first county are numbered, continue numbering numerically in the second county etc. These rest area numbers are also plotted on the district map which shows the location.

Using the prepared district maps as a guide, the Financial Section obtains the information on the number and type of facilities available in each rest

area from the Landscape Section files. The rest area number, the county in which it is located, the control and section number and highway number of the highway along which it is located, the descriptive location, the type of rest area and the information on facilities is then entered on the "Rest Area Inventory Report" form. Information on the highway system, number of lanes, type and distance of preceding and succeeding available stopping points is then obtained from the "Roadway Construction Record" strip maps and entered on each rest area report form. The hours per day spent on custodial care of each rest area are estimated and entered on the report form. This estimate is made on the basis of the average daily traffic on the highway along which the rest area is located, i. e. under 1,000 A. D. T. = fifteen minutes per day; 1,000 to 2,000 A. D. T. = thirty minutes per day; 2,000 to 3,000 A. D. T. = one hour per day; 3,000 to 4,000 A. D. T. = one hour and fifteen minutes per day and over 4,000 A. D. T. = one hour and thirty minutes per day.

The rest area inventory records are then sent to Traffic Section and there the peak season and the peak season average daily traffic is entered on the records. The records are then returned to Financial Section.

Frequency:

This report is submitted once each year and inventory records will be updated at the time the new report is prepared.

Volume:

The number of rest areas included in this report will vary. The number in the report submitted for 1967 was one thousand and ten.

Status of Storage:

All rest area records contained in this report are stored in the Financial Section files. Punch cards are not used at this time.

Dispersement:

Four copies of this report are submitted to the Bureau of Public Roads and one copy is sent to Maintenance Operations Division. The rest area inventory records and location map for each district are sent to the District Offices.

B.12 FOREST HIGHWAY REPORT

Purpose:

The Forest Highway Report is submitted as required by the Bureau of Public Roads. The information contained in the report of each State is used to determine allocation of Forest Highway Funds.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

The information on changes and additions to the Forest Highway System is obtained from the Bureau of Public Roads through the Road Inventory Section of the Division. The information on projects let or completed on the Forest Highway System is obtained from the Construction Report and from construction plans and cost folders.

Compilation Procedure:

The Forest Highway Report is a report on the estimated needs, the cost of completed projects and the cost of jobs underway which are on the Forest Highway System. The total report is submitted on three separate forms labeled "Construction Completed", "Additional Construction Required 19___ (next fiscal year) to 1971" and "Projects Completed During Fiscal Year____ to ____" (fiscal year ending with date of report). Before going into the procedure used in updating each of these forms, it is appropriate to explain the types of Forest Highways and the nature of the initial report. Highways on the Forest Highway System are divided into three classes. Class 1 for

highways on the Federal Aid Primary System, Class 2 for those on the Federal Aid Secondary System and Class 3 for those on Non-Federal Aid Systems. Each Forest Highway route is assigned a number by Road Inventory Section.

The Needs Estimates compiled for the initial Forest Highway Study were derived from information on those roads which were on the Forest Highway System as of July 1, 1958. These estimates were made on the basis of present deficiencies and anticipated future deficiencies which might occur up to July 1, 1971. The Needs Estimate used on those roads which have been added to the Forest Highway System since July 1, 1958 is normally the amount which has been programmed by the Highway Department for the construction or reconstruction of this type road.

The costs which were shown on the initial report for construction completed were the total costs of all construction projects completed on the Forest Highway System routes since these roads were first brought into the State Highway System.

The "Construction Completed" report form shows the route numbers for each class of Forest Highway, the approved system mileage of each route, the miles graded only, the miles surfaced, the estimated costs of construction underway and the costs of completed construction projects. The cost on completed construction projects are listed under the type of fund from which it was paid. Totals are listed for each Forest Highway class and for all classes combined according to total cost, total mileages and total cost to each fund. The procedure for updating this form is by the addition of the

costs of the projects which have been let and/or completed during the fiscal year covered by the report. Miles will be added only on the completion of the project which does the first grading only, or places the first surface.

The "Additional Construction Required" report form also lists the Forest Highway routes separated by classes. The amount of miles and needs costs are shown in two separate categories. These are new work and reconstruction. Under each of these categories the needs costs will be shown for grading and for surfacing. The needs costs shown under surfacing are the costs for work needed on base, surface, shoulders and traffic service. All other needs costs will be shown under grading. The miles and costs of projects which were started during the past fiscal year and which do not involve Forest Highway Funds are also shown on this form. The procedure for updating this form is to subtract the needed miles and/or costs which will arise from projects let in the fiscal year since the last report.

The "Projects Completed During Fiscal Year " shows the Forest Highway routes by class on which construction projects have been completed during the past fiscal year. Also shown is the project number, the length of project, the miles of grading only, the miles surfaced and the amount of money charged to each type of fund. The procedure for updating this form is to make appropriate entries each fiscal year.

Frequency:

The Forest Highway Report is made once each year. It is usually updated and submitted after the information on project lettings and completions through the month of June is received.

Volume:

There are thirty-six Forest Highway routes requiring thirty-nine entries on each of the first two forms in this report. Each of three routes are composed of two different classes of Forest Highways.

Approximately twenty changes each year are made on the two forms showing information on completed construction and approximately five changes each year are made on the "Additional Construction Required" report form.

Status of Storage:

All the information obtained and used in compiling this report is in the Financial Section files.

Dispersement:

Four copies of the Forest Highway Report are submitted to the Bureau of Public Roads.

B.13 INTERSTATE NEEDS ESTIMATE

Purpose:

An Interstate Needs Estimate study is made by each State in conjunction with the Bureau of Public Roads. The reports on these estimates are submitted to Congress for it's use in appropriation and allocation of funds for construction of the Interstate Highway System.

Depth of Study:

A close examination of the operation without specific details.

Source of Information:

These estimates are made by personnel in each of the District Offices and forwarded to the Planning Survey Division for review and compilation.

Compilation Procedure:

Upon receiving instructions from the Bureau of Public Roads for an Interstate Needs Estimate, the instructions are submitted to each District in which an Interstate Highway is located and to those Divisions which will be reviewing the estimate. *All changes (new section numbers or break points, urban limit change, approved project numbers, etc.) are entered on a strip map. Reproduced copies of these maps are then forwarded to the District Offices. These maps are reviewed by District personnel and any additional changes are made by them. The maps are returned to Planning Survey Division and submitted to the Bureau of Public Roads for approval. Approved copies of the strip maps are then sent to the Districts. The traffic data to be used in the needs estimate are then sent to the Districts by the Planning Survey Traffic Section. After the Districts have secured approval

* See D-10 Inventory.

one unit prices, which are submitted to the Bureau of Public Roads through thee Highway Design Division, they can begin preparing the estimates. The esti-mates upon completion by District personnel, are submitted to the Division to be checked and added. and copies of the estimate tables and the final strip maps are sent to the Bureau of Public Roads, the Right of Way Division, the Highway Design Division, the Maintenance Division and Traffic Section of Planning Survey Division for review and approval. After the estimates have been approved by the above and the Bureau of Public Roads approved copy returned, the tables are typed and the estimate data are coded and sent to the tabulating unit for punching and verifying. The tables are then sent to the printer and the maps are sent to Reproduction Section of Automation Division. Upon completion of the reproduction, the tables are assembled in Interstate Highway number and section number order and are bound in sets. The maps are also assembled in the above order and are bound in sets under separate cover.

Frequency:

An Interstate Needs Estimate Study is prescribed by Congress. Previous submissions: 1956, 1960, 1965 and 1968. Another estimate is contemplated in 1969.

Volume:

The record file on the data in the latest needs estimate contains approximately forty-one hundred punched cards.

Status of Storage:

All information relative to the Interstate Needs Estimate, with the

exception of punched cards, is stored in the Financial Section files.

Dispersement:

Twenty complete sets (tables and maps) of the estimate and a deck of the estimate cards are submitted to the Bureau of Public Roads. Complete sets of the estimate are also sent to the Administration, to other Divisions of the Highway Department and to each of the Highway Districts in which Interstate mileage is located. The estimate is frequently referred to in making reports on the status of the Interstate System, etc.

B.14 STATUS OF THE INTERSTATE SYSTEM (PR 511)

Purpose:

The PR 511 Report is compiled and submitted at the Request of the Bureau of Public Roads. It is used by both the Division and the National Bureau Offices to keep abreast of the development of the Interstate System.

Depth of Study:

A close examination of the operation without specific details.

Source of Information:

The information used in making the PR 511 report is obtained from construction plans, the Bureau of Public Roads, the Interstate Needs Estimate, schematic project lay-out plans from the Districts and the Interstate Program Book from the Highway Design Division (D-8).

Compilation Procedure:

The Status of the Interstate System study is determined by a continuous record of the progress of development and improvements on Interstate Highways. This record is kept on strip map sheets in a straight line diagram form with pertinent information describing the present status and planned development. Basically this study contains, with the exception of costs, the same information updated to the present status that is in the last Interstate Needs Estimate. The straight line diagram is shown in more detail than the needs estimate strip map and whereas the needs estimate shows the estimated letting date of only the initial Interstate project construction, the PR 511 study shows the estimated data of letting for other improvements as well. The majority of changes made in updating this study are a result of a project authorization, letting, or completion. Changes, deletions and additions

which have been made on the strip map sheets since the submission of the previous month's PR 511 report are denoted by a red check mark, and only those sheets having a red check mark are submitted as part of the report. A state map and sixteen separate urban area maps of the Interstate Highway System are also included in the report. The system status code for each section of roadway is entered on these maps in the proper location. Any change in the status code from the previous report is denoted on the maps by a red check mark.

Frequency:

The PR 511 Report is submitted each month and the information contained in the report shows the status and changes which have occurred during the last month. This report will continue to be submitted each month until the completion of the Interstate Highway System in Texas.

Volume:

One hundred and ninety separate strip map work sheets are maintained for recording the information on the Interstate System; however, the number of separate sheets submitted in each report will vary according to the number on which changes have been made.

Status of Storage:

The strip map work sheets and the maps are stored in the Financial Section files.

Dispersement:

Five sets of the strip map sheets having changes and four sets of maps are submitted to the Bureau of Public Roads. This study is often referred to when making other studies relative to the Interstate System.

B.15 STATUS OF IMPROVEMENTS TO THE INTERSTATE SYSTEM BOOK

Purpose:

This book is composed of strip maps showing in a geographical layout form the status of the Interstate Highway System. This book is published as a reference aid for the Highway Administrator and for other Highway Department Divisions.

Depth of Study:

A close examination of the operation without specific details.

Source of Information:

The Interstate Needs Estimate is used primarily as a basis for the geographical layout of the Interstate System in this book. The information relative to the status of improvements is taken from the "Construction Report", the "Interstate Program Book" and the construction plans. Also used are "Construction Fund Authorization" sheets and the "Stage 7" listings which are received from the Aid Division.

Compilation Procedure:

The approved location of the Interstate routes, whether on new location or along an existing highway, is initially shown on the strip maps. Also shown are the intersecting highways, city limits, city names and county lines. As projects appear in the "Interstate Program Book", the description of work and the length of the project are plotted on a line above its proper location on the Interstate System. As each project is let for contract, the information on the project number, length of project, type of work and amount of contract is taken from the "Construction Report" and is plotted on

a line below its proper location on the Interstate System. The construction plans are then secured and the construction plan layout of the project is plotted along the approved Interstate route. By the use of symbols, all interchanges, grade separations and ramps that are to be constructed in accord with the project are plotted on the proper location on the Interstate route. Roadway, interchanges, etc. are identified as under construction by hatch marks. The beginning and the ending station numbers of all projects which do roadway construction are entered below the Interstate route at the proper location.

At the time that a project is shown as complete in the "Construction Report", the segments of roadway completed by this job are shown as a solid line. The solid "colored in" section shows completed construction; conversely, the construction underway is shown by hatch marks. After the "Stage 7" (final cost) list is received from the Aid Division (D-7), the amount of contract cost of projects on this list is replaced with the final cost.

A table showing the route length and mileage in each status group for each Interstate route is also included in the book. Also included is a state map showing the Interstate routes with the status of each route segment identified by a color code. The mileage of each status group is obtained from the PR-511 Report ("Status of Improvements to the Interstate System").

The last step in the preparation of this book is the printing and binding which is done by the Reproduction Section of the Automation Division.

Frequency:

The work copy strip maps and the state map are updated each month as

the new "Construction Report" is received. The table of routes and mileages is updated once each quarter; also the printing, binding and publication.

Volume:

This book is composed of seventy-six strip map sheets in addition to the map and table of mileages. Sixty copies of this book are printed each quarter.

Status of Storage:

All work copies used in preparing this book are kept in the Financial Section files.

Dispersement:

Eight copies of this book are sent to the Bureau of Public Roads, four copies to the Highway Administration and thirty-five additional copies are distributed to the different Highway Department Divisions. Three Districts receive books and eleven other Districts receive strip map sheets covering their districts.

B.16 COMPARISON OF ACTUAL VERSUS ESTIMATED COST ON THE INTERSTATE SYSTEM

Purpose:

The file on Interstate projects was started in anticipation of requests for information regarding the actual cost versus the needs estimate cost.

Depth of Study:

A close examination of the operation without specific details.

Source of Information:

All information used in maintaining the file and in preparing this report is obtained from the Bureau of Public Roads.

Compilation Procedure:

The file is composed of a set of data cards manually prepared and filed in District order. Upon receiving the PR-37A sheets (Comparison of Interstate System Costs), the project number and the estimated and actual cost, by rural and urban for each cost segment are entered on the cards. The cost segments are preliminary engineering, construction and right-of-way.

Additional PR-37A sheets (showing changes in the actual cost) are issued as the project progresses. The final PR-37A is issued after the project is completed and has been closed out. Only this last PR-37A shows the true cost.

Frequency:

The file is updated each month. Reports are by request only.

Volume:

This file is composed of approximately eleven hundred project records.

Status of Storage:

The data in this file are recorded on manual cards and these are kept in the Financial Section.

Dispersement:

This report is submitted to the Bureau of Public Roads and to the Highway Administration upon request.

2. FISCAL

B.17 ESTIMATES OF SELECTED STATE HIGHWAY FINANCE DATA (FORM PR-530)

Purpose:

To estimate the major items of highway-related revenues and expenditures for the current calendar year and the subsequent year.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Motor fuel revenues are obtained from the State Comptroller's Department. Registration receipts and Federal Aid receipts are obtained from the Accounting Division.

The Accounting Division also estimates the total expenditures for maintenance, construction and right-of-way.

Compilation Procedure:

Trend of revenues to time of compilation are projected into the future. Total construction is broken down into Federal Aid Systems and into rural and urban based on Road Life tabulations of Highway Contracts Completed. The Right of Way Division estimates the breakdown of right of way into systems and rural and urban.

Frequency:

Annually.

Three copies to the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to Bureau of Public Roads by October 1st of each year.

B. 18 STATE HIGHWAY INCOME (FORM PR-531)

Purpose:

To show details of income related to state highways in such a manner that the items will be comparable on a calendar year basis with similar items of other states.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

The Accounting Division furnishes most of the information including the Farm-to-Market Highway Fund. Data of receipts from counties, cities and others via Comptroller's Trust Fund # 927 are secured from the Aid Division.

Compilation Procedure:

Reports of the Farm-to-Market Road Fund, Trust Fund # 927 and State Highway Fund # 6 must be combined and transfers eliminated. A Bureau Manual is used to classify items in a manner different from the Highway Department classifications, for example, the costs of the Motor Vehicle Registration Division are deducted from motor vehicle receipts and various refunds are deducted from receipts and from the related disbursements. Receipts shown on this form must tie-in with receipts shown on PR-566 relative to registrations and to PR-576 relative to State Motor-Carrier taxes or the differences must be explained. The same is true of PR-556 relative to motor-fuel taxes.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by March 15th of each year.

B. 19 STATE HIGHWAY EXPENDITURES (PR 532)

Purpose:

To show details of expenditures related to state highways in such a manner that the items will be comparable with similar items of other states on a calendar year basis.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

The Accounting Division furnishes most of the information including the Farm to Market Road Fund. Disbursements from Comptrollers Trust Fund # 927, showing funds transferred to Highway Fund # 6 or returned to counties, cities, or others, are obtained from the Aid Division.

Compilation Procedure:

Reports of the Farm to Market Road Fund, Trust Fund # 927 and State Highway Fund # 6 must be combined and transfers eliminated. A Bureau Manual is used to classify items in a manner different from those shown on most Highway Department reports; for example, the Planning Survey and certain research projects are shown separately. Numerous break-downs are required by the Bureau that must be estimated based on State Fiscal Year disbursements. The Biennial Reports are used as a basis to classify maintenance items as rural or urban, while Road Life tabulations of contracts completed are used as a basis to break-down construction as rural or urban.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Road by March 15th of each year.

B. 20 CAPITAL OUTLAY BY STATE HIGHWAY DEPARTMENTS, CLASSIFIED BY FEDERAL-AID SYSTEMS (PR 532A).

Purpose:

To classify Capital Outlay (right-of-way, construction and engineering) for highways by Federal Aid Systems in such a manner that each item will be comparable with similar items of other states on a calendar year basis.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Principally records of the Accounting Division. Records of the Road Life unit of the Financial Section and Right-of-Way Division records are also used.

Compilation Procedure:

The Accounting Division's cost of construction is adjusted to Bureau classifications and then divided into Federal Aid Systems using the Road Life tables of Construction Contracts completed. The same procedures are used for engineering. Gross right-of-way costs, less sales and refunds related to right-of-way, are determined and the Right-of-Way Division then breaks this down by Federal Aid Systems.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by March 15th of each year.

B. 21 STATE HIGHWAY EXPENDITURES WITHIN STANDARD METROPOLITAN STATISTICAL AREAS (PR 532B)

Purpose:

To show expenditures by the State for construction (including right-of-way and engineering) and maintenance for each county included in one of the S. M. S. A. s on a calendar year basis.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

PR-532 for total expenditures of construction and maintenance. Break down of construction and maintenance. Breakdown by counties is based on the Biennial Report.

Compilation Procedure:

The percent spent for capital outlay during the State's Fiscal Year is determined for each county which is in one of the S. M. S. A. This percent for each of these counties is then multiplied by the total capital outlay by the State for the calendar year in order to determine estimated disbursements for each county on a calendar year. Maintenance costs are broken down in a similar manner. The form calls for these expenditures to be broken down between rural and urban for each county, but there is no basis for breaking down rural and urban except on the basis of state totals.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by March 15th of each year.

B. 22 STATUS OF STATE HIGHWAY DEBT (PR 542)

Purpose:

To show the road debt on State Highways at the beginning of the calendar year, the amount paid, the amount outstanding at the end of the year and the amount of money in the State Sinking Fund at the end of the year.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Board of County and District Road Indebtedness.

Compilation Procedure:

Information shown on PR 543 and PR 544 are entered on this form in summary totals.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by March 15th of each year.

B.23 STATE HIGHWAY SINKING FUND OR BOND AND INTEREST TRANSACTIONS (FORM PR 543)

Purpose:

To show the calendar year receipts and disbursements related to road debt for State highways.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Board of County and District Road Indebtedness.

Compilation Procedure:

The information is received from the County and District cash ledgers. (These published reports are for the State Fiscal Year.)

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by March 15th of each year.

B.24 FUTURE STATE HIGHWAY DEBT SERVICE REQUIREMENTS (FORM PR 544)

Purpose:

To show the amount of Principal and Interest due each year by the State on assumed road debt.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Board of County and District Road Indebtedness.

Compilation Procedure:

The information is furnished, upon request, in the form submitted to the Bureau.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by March 15th of each year.

B.25 MOTOR FUEL CONSUMPTION (PR 551)

Purpose:

To provide a report showing the monthly gallons of motor fuels, by types and by tax rates, consumed on all highways. The report is by calendar year and in a manner that it will be comparable to similar data of other states.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Motor Fuel Tax Division of the State Comptroller's Office.

Compilation Procedure:

Intricate tabulations of the dollars for each type of motor fuel sold, less refunds paid and for each tax rate are made and converted into gallons of fuel consumed on the public highways. In order to save correspondence between Washington and Austin relating to this report and PR 556, the detailed work papers are submitted to the Bureau rather than its form.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one copy for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads as soon after March 1st as data becomes available, usually by March 15th of each year.

B.26 STATE MOTOR FUEL TAX COLLECTIONS AND INITIAL DISTRIBUTION BY COLLECTION AGENCIES (PR 556)

Purpose:

To record on a calendar year the receipts from the State Motor fuel taxes and other incidental related receipts. After deducting the costs of collection and administration, the distribution of these receipts to the various State Agencies is shown.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

State Comptroller's Department. Two different records are used. One is monthly reports of gallons consumed and refunds paid. The other report is the receipts of Fund # 60, the Motor Fuel Tax fund and how the funds were distributed.

Compilation Procedure:

The dollars collected from all motor fuels are shown. From this is deducted the refunds paid and collection expense and the initial distribution of the remaining funds.

This report must show amounts which correspond with PR 532 and PR 543.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one copy for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by February 15th of each year.

B. 27 STATE MOTOR VEHICLE REGISTRATIONS, REGISTRATION FEES, AND MISCELLANEOUS RECEIPTS (PR 561)

Purpose:

To show the total number of motor vehicles registered during the calendar year by type or class of vehicle together with the corresponding registration fees collected, as well as other miscellaneous fees related to motor vehicle registrations, in a manner that will be comparable with similar data of other states.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Most of the information comes from records of the Motor Vehicle Division of the Department. The State Department of Education and the Texas Coordinating Agency are contacted to help determine the number of school buses in operation. Each City owned Bus Transit Department is contacted as well as some private bus companies. Motor Vehicle Inspection and Miscellaneous Driver License information comes from the Department of Public Safety. The Comptroller's motor fuel records are used also.

Compilation Procedure:

The records of the Motor Vehicle Division are adjusted in order to classify the types of vehicles and the fees according to Bureau classifications. Federal vehicles with Texas licenses must be deducted from registrations. Private buses are transferred from passenger cars to buses, and Soil Conservation and Disaster Relief are re-classified according to types of

vehicles. School type buses are adjusted to eliminate "robber" or junked buses still having exempt licenses. Both Motor Vehicle and Comptroller records are used in classifying vehicles according to the type of fuel used.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by March 1st of each year.

B. 28 STATE MOTOR-VEHICLE REGISTRATION FEES AND OTHER RECEIPTS; INITIAL DISTRIBUTION BY COLLECTING AGENCIES (PR 566)

Purpose:

To record the total fees paid to register motor vehicles, secure drivers license, have motor vehicles inspected and all other fees related to these operations on a calendar year basis comparable to similar data of other states.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

The Highway Department Accounting and Motor Vehicle Division records and those of the Department of Public Safety.

Compilation Procedure:

Receipts are classified as Registration or registration related fees and as Operator's License fees. These figures must correspond with those on PR 561 and PR 562. After deducting costs of collection and administration, the balances are shown according to the way the funds are distributed. Funds shown as flowing to the Highway Fund on this report must correspond to the receipts shown on PR 531.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one copy for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by March 15th of each year.

B. 29 RECEIPTS FROM STATE TAXATION OF MOTOR VEHICLES OPERATED FOR HIRE (PR 571) AND STATE MOTOR-CARRIER TAXES; INITIAL DISTRIBUTION BY COLLECTING AGENCIES (PR 576)

Purpose:

To show the total number of common carrier trucks and buses, the fees collected from them and related revenues collected and their distribution.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

The Texas Railroad Commission and The State Comptroller's Department.

Compilation Procedure:

The Motor Carrier Division of the Railroad Commission supplies the number of carriers, by types and the fees paid on a State Fiscal Year. The Comptrollers Department Annual Report shows the official receipts from Motor Buses and from Motor Carriers including fines assessed. The fiscal year is used because the Motor Carrier Division does not furnish reliable information on a calendar year basis. Data available does not conform to the data requested by the Bureau; a work paper with the best information available is submitted.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one copy for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by February 15th of each year.

B. 30 RECEIPTS, DISBURSEMENTS AND DEBT RELATED TO TOLL ROADS AND BRIDGES OWNED BY COUNTIES AND CITIES (PR 535)

Purpose:

To determine the data pertaining to each toll facility owned by a County or a City.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Records of the individual toll facilities.

Compilation Procedure:

Data of each facility are secured in the field at the toll facility office or at the County or City offices.

Frequency:

Annually.

Volume:

Three copies each of four City owned and six County owned facility reports (as of February, 1968) are submitted to the Bureau of Public Roads and a copy for file.

Status of Storage:

Vertical files.

Dispersement:

Copies of each facility report are submitted to the Bureau of Public Roads by December 31st of the following year.

B.31 RECEIPTS, DISBURSEMENTS AND DEBT RELATED TO COUNTY ROADS (PR 535)

Purpose:

To determine all receipts, disbursements and debt related to the use of the automobile by Counties, in a manner comparable to similar data of other states.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

County Audit Reports, County Treasurer's Records, County Clerk's records.

State Comptroller's Bond Division records showing debt issued for county roads.

Compilation Procedure:

Data of individual counties are tabulated and combined by Assessed Valuation Groups. Since no uniform accounting or reporting system is required, it is necessary for personnel to travel to each county to secure data in order that similar data of each county will be similarly classified. Tables showing data of all counties combined are submitted to the Bureau. The tabulations made of individual counties and totals show numerous details used in the Department that are shown only in summary form in reporting to the Bureau.

Frequency:

Annually.

Volume:

Individual reports of each of the 254 counties are made each year. Three copies of the summary report are submitted to the Bureau of Public Roads.

Status of Storage:

Vertical files.

Dispersement:

Summary reports are submitted to the Bureau of Public Roads by December 31st of the following year.

B. 32 RECEIPTS AND DISBURSEMENTS FOR ROAD OR STREET PURPOSES BY CITIES AND COUNTIES IN STANDARD METROPOLITAN STATISTICAL AREAS (PR 535)

Purpose:

To record all receipts and disbursements for road purposes by the county and each city within the county for each county in one of the S. M. S. A.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Data gathered for regular PR-535 reports of counties and cities. Data for cities not worked are estimated, based on cities worked.

Compilation Procedure:

Data of each county and of each city within each county, plus estimates for cities not worked, are combined and tabulated for each county.

Frequency:

Annually.

Volume:

As of February 1968, there are 39 counties in S. M. S. A. Three copies of each of these 39 reports are sent to the Bureau of Public Roads and one copy is retained for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by December 31st of the following year.

B. 33 RECEIPTS, DISBURSEMENTS AND DEBT RELATED TO CITY STREETS (PR 535)

Purpose:

To determine all receipts, disbursements and debt related to the use of the motor vehicle by incorporated cities, in such a manner that similar data of other states will be comparable.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Audit reports, cash ledgers and bond registers of the various cities. State Comptroller's Bond Division records showing Street Debt Issued.

Compilation Procedure:

Data of individual cities which issue street debt and a sample of cities which issue no debt are worked and data are estimated for those cities not worked. In order that data of each city will be comparable with other cities, it is necessary to travel to each city worked, since cities have no uniform system of accounting or reporting.

Frequency:

Annually.

Volume:

Individual reports of 250 to 300 cities are made each year. Summary reports, representing these cities and cities not worked, are sent to the Bureau--three copies each year.

Status of Storage:

Vertical files.

Dispersement:

Summary reports are submitted to the Bureau of Public Roads by December 31st of the following year.

B.34 MOTOR-FUEL CONSUMPTION AND TAXATION

Purpose:

To report monthly the number of gallons of motor fuel produced, the number of gallons of diesel and liquefied petroleum gas produced for use on the highways, the number and amounts of motor fuel refunds paid and the total fuel tax collected.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

State Comptroller's Office, Motor Fuel Tax Division, in three separate reports.

Compilation Procedure:

All gallons of fuel produced must be analyzed and gallons not taxed deducted from the gross to determine net taxed for highway use, then add allowance for collection. Refunds are reported in detail in the same manner as received from the Comptroller.

Frequency:

Monthly.

Volume:

Three copies of the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads each month. Time of month varies due to date information is received from the Comptroller.

B. 35 REGISTERED GROSS WEIGHT OF VEHICLES, SPECIAL STUDY

Purpose:

To determine the number of vehicles of each class of registration, by 2000 pound weight groups, by type of fuel consumed.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Registration records of Motor Vehicle Division.

Compilation Procedure:

Tabulated was a 100% sample of classifications having not over 50,000 vehicles registered, if the classification might have legislation effecting it. Other classifications were run from a 5% to a 25% sample, separating diesel vehicles from others. After Motor Vehicle Division (D-12) becomes completely automated these tables can be run from tapes.

Frequency:

Each two years.

Volume:

100 copies.

Status of Storage:

Vertical files.

Dispersement:

One copy sent to each District and Division of the Highway Department, a copy to the Good Roads Association, the Texas Motor Transportation

Association, the American Trucking Associations Inc. and the Texas Transportation Institute. Copies are available to others.

B.36 SPECIAL REPORTS

Purpose:

1. Road User Taxes: Determine various taxes paid by each type of vehicles from normal use.

2. Special Fuels: Determine the portion of liquefied petroleum gas that is diesel and the portion butane.

3. Miscellaneous: Various requests of Highway Administration.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

All of the various reports in detail collected from the Fiscal unit of the Division.

Compilation Procedure:

Varies.

Frequency:

1. Road User Taxes: about every four years.

2. Special Fuels: every June.

3. As requested.

Volume:

Varies--usually not over three copies.

Status of Storage:

Vertical files.

Dispersement:

Usually within the Department, or to the Bureau of Public Roads.

B.37 DRIVER'S LICENSES ISSUED, FEES PAID AND NUMBER OF LICENSES IN FORCE (PR 562)

Purpose:

to show the number of licenses issued each year, by type of license, the fees paid and the number of licenses in effect at the end of the calendar year, by sex and age groups.

Depth of Study:

To develop a broad understanding of the operation, exclusive of precise fundamentals.

Source of Information:

Two reports are secured from the Department of Public Safety. One shows the receipts of the Operators and Chauffeurs' License Fund. The other shows the number of licenses issued during the year, by type of license and the fees paid per license.

Compilation Procedure:

The procedure varies almost every two years due to changes in the law made by the Legislature. At this time procedures for compiling next years reports have not been determined due to many changes in the law. In general, it is necessary to calculate the number of licenses issued by the fees due per license and make minor adjustments with the cash receipts. Bad checks, funds in transit and other reasons account for variances each year. A book of Conversion Factors is published by the Department of Public Safety each five years. By use of these factors, the age and sex of licenses in effect can be estimated.

Frequency:

Annually.

Volume:

Three copies to the Bureau of Public Roads and one for file.

Status of Storage:

Vertical files.

Dispersement:

Submitted to the Bureau of Public Roads by March 1st of each year.

III - C

TRAFFIC

C. TRAFFIC SECTION (D-10 T)

The Traffic Section collects and analyzes data relative to traffic volume, classification, speed and weight. State and District Traffic Maps are prepared and distributed annually. County Traffic Maps are prepared and distributed on a three year rotation basis with approximately one-third of the State's 254 counties updated each year. Various traffic tables and reports, including a tabulation of the 30th Highest Hour from permanent traffic recording stations, Vehicle Weight and Classification Studies, Day and Night Speed Reports and Trends in Traffic Volumes by months of the year, are prepared and distributed annually. Present and projected traffic information is furnished to other Divisions and Districts upon request. This Section is also responsible for the data collection, analysis and publication of origin-destination studies, special studies and traffic assignment programs made in connection with the Department's urban transportation planning.

1. REGULAR STUDIES

C.01 PERMANENT TRAFFIC RECORDERS

Purpose:

To establish historical trends in traffic usage of the various highway systems in the State. Design data, including peak hours of travel and the directional distribution of traffic during these hours are obtained from the recorders. The data are also used as a control in the adjustment of short term coverage counts, made at various times during the year, to annual average daily traffic (AADT).

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Traffic is recorded hourly, and by direction of travel if location is on a divided highway. In urban areas where high traffic volumes are counted, a separate recording unit is used for each traffic lane, or a summator for totaling all lanes.

During the three summer months, machines located on selected high volume urban expressways record traffic volumes by 5 minute increments. Technicians change the timing devices and the duration of the count is for 48 hours at each location.

Compilation Procedure:

The recorders punch hourly traffic volumes on a paper tape in binary numbers. Tapes are changed at the end of the month and machines are routinely serviced at this time by Austin shop based technicians. At some

locations district personnel perform this duty. The recorder is also inspected weekly and minor adjustments may be made by local maintenance personnel. Shop technicians install and repair all traffic recorders used in the field. Additional equipment and personnel assistance is provided by local maintenance crews.

The paper tapes, after removal from the recorders, are processed by a translator which converts the traffic data contained on the tapes to punched cards.

The cards are analyzed by a computer program and a printout is prepared showing hourly traffic volumes for a complete month. See Table 1-A. A computer tabulation is prepared for each recorder showing the week-day, Saturday, Sunday and monthly average traffic volumes for the calendar month. The ADT for the past month, the weekday seasonal adjustment factor along with the percent variation with the same month of last year is also shown on the tabulation. Other related data such as the temperature, weather condition and the factor necessary to adjust the daily count to AADT are included. See Table 1-B.

A table is prepared showing the highest hourly volumes with date and day of occurrence noted. These data are based on 12 full months of recorder operation. The directional distribution and hourly factors are included on this tabulation. See Table 1-C. Tables 1-C through Table 1-G are based upon data from 12 full months of operation at each recorder location.

Table 1-D shows the annual average hourly volumes by day of week at each location. Included is the average day of the week and percent each is

of the annual daily traffic.

Table 1-E shows for each of the past 15 years the annual average daily traffic volumes at individual recorder locations. Also shown on this tabulation is the percent variation, by years, in AADT.

Table 1-F shows the AADT volumes by month, day of week and season. The average of various weekday periods and the percent of AADT is also shown.

A computer plotted graph for each recorder location shows the average of the twelve monthly traffic volumes as compared to AADT. See Figure 1.

An annual publication is prepared which shows the location of all permanent traffic recorders and the annual average daily traffic volumes for the past 16 years. This tabulation is manually compiled and typed. See Table 1-G.

Figure 2 is a graph showing percent variation of current traffic volumes with that of one and two years previous. This graph is based upon data from 70 rural recorders which are considered to be representative of statewide trends.

The truck percentage is calculated from manual counts made at these same locations.

Table 1-H shows the average of the current month and the percent variation of the same month last year. These data from Table 1-B are assembled and typed manually.

Frequency:

Tabulations for each permanent recorder are prepared monthly and annually.

Volume:

There were 225 recording units at 152 locations in operation during 1967. At some locations, urbanization and the construction of relocated routes have made the data of little value, consequently records are removed or relocated. As the need for additional control data becomes apparent, more recorders will be installed. It is anticipated that a net gain of approximately five recorder locations per year will be realized for the next ten years.

Status of Storage:

There were approximately 175,000 cards punched and computer processed in 1967. The counting unit paper tapes are kept one month and then destroyed. After monthly processing, the cards are returned to the files and kept six months. Simultaneously a back-up magnetic tape is kept on all data. Cards are destroyed after the completion of annual analysis. The data for the entire year are stored on a master back-up magnetic tape on both the Automation Division and D-10 Traffic Section. These master tapes are retained in a permanent file.

Monthly tabulations are chronologically filed by recorder in file folders. The complete records of the prior year are retained in the current file. Older data are stored in a semi-active file for future periodic reference.

Annual tabulations are assembled in booklet form and show specific data at all recorder locations.

Dispersement:

Copies of all tabulations are transmitted to the Bureau of Public Roads, various Districts and Austin Office Divisions. These data are available to

the general public upon request. A small service charge is made to help defray the cost of reproduction and handling.

TABULATIONS AND FIGURES FOR PERMANENT TRAFFIC RECORDERS

Purpose:

Same as previously shown.

Depth of Study:

Same as previously shown.

Source of Information:

Same as previously shown.

Compilation Procedure:

Same as previously shown.

Frequency:

Table	Monthly	Annually
1-A	x	
1-B	x	
1-C		x
1-D		x
1-E		x
1-F		x
1-G		x
1-H	x	
Figure 1		x
Figure 2	x	

Volume:

Same as previously shown.

Status of Storage:

Same as previously shown.

Dispersement:

All tabulations are transmitted upon completion, usually within 10 days after end of the period.

Bureau of Public Roads receives four copies of each publication and the

districts receive either one or two copies, according to agreements with each district. The Highway Design Division receives one copy and occasionally makes subsequent requests for any number of copies.

C.02 ANNUAL TRAFFIC VOLUME STUDY

Purpose:

Traffic volume coverage counts are the basis for the publications of the annual state, district and county traffic maps.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Field personnel make coverage counts annually at designated locations on all types of roadways throughout the state.

Compilation Procedure:

A three year rotation system is used in counting all public rural roads within a county. During this traffic study, counts are also made at selected locations on highway routes within all cities and communities. During the two years when a complete county survey is not made, only selected locations on all rural highways are counted.

The Austin shop technicians construct the recording units and maintain a warehouse of all related equipment.

Field personnel are issued the recording units along with necessary supplies.

After a period of training, schedules and maps showing designated locations are furnished. (See Form 2-A). Supervisors inspect the field operation and aid in related matters.

Counts are made on weekdays for a period of twenty-four hour duration

at each location. One man usually makes from 90 to 100 counts during a normal five day work week. A separate recording unit is used for each direction of travel on locations where the highway is divided or marked as a four-lane facility. On controlled access highways, each service road is also counted. At locations where the count is unacceptable for any reason, an attempt is made to reset the recorder at the end of the first time period for another count providing that personnel will remain in the area. If the schedule requires personnel to be at an inconvenient distance, the count will be made by a pick-up schedule in the latter months of the year. This pick-up schedule will also include locations on recently completed highways that were under construction at the time of first schedule.

A separate record showing the results of each count is made and mailed to the office each day along with a daily time report. (See Form 2-B). The record for each recording unit set up shows identification data, weather and beginning and ending counter readings of the time period. Day, date and time during which the counter was in operation is also shown. Other information such as pavement type, road condition, observed machine performance, traffic condition, intermediate inspections and general remarks are shown for the individual station counts.

The daily time report is used to show the date, day, station locations counted and the time of each machine set up. (See Form 2-C). The daily report also serves as a control where conflicting data later are discovered during the processing of the traffic count records. Also included on the daily time report is the mileage driven during the entire daily field operation

which is needed to prepare the monthly expense statement. Other information shown is the name of the motel or hotel and city where the field man is lodging. This information is useful to field supervisors and the Austin office when it is necessary to contact personnel during field operation. A concise itinerary of the next five consecutive days is included.

In the office, the axle count is checked and the location identification is verified. A factor of .50 is applied to the axle count, which converts the data to vehicles. A seasonal variation factor is then applied to establish the annual average daily traffic volume (AADT). The factor is from data at a permanent traffic recorder on a highway having similar traffic characteristics.

In counties where a comprehensive traffic study is made, two hourly count machines (HCM) are set up. Each HCM records traffic volumes by the hour and will operate continuously for seven days before servicing is required. This machine records the data on film. The film is developed by the Reproduction Department and the data are transferred to appropriate forms in the office. (See Form 2-D). By comparison of the HCM data with records of a representative permanent recorder, a factor is developed that considers immediate area traffic conditions in addition to the seasonal traffic factor. This adjusting factor is for control of twenty-four hour counts made on county roads.

The adjusted counts are posted to work maps and compared with previous traffic volumes. An analysis of the counts is made and realistic traffic volumes are selected.

The drafting department shows the approved traffic volumes on maps. Drafted maps are verified and then reproduced by the Reproduction Department.

Frequency:

The State and District Traffic Maps are annual publications. Each year approximately eighty-five county maps which show traffic on all rural highways and county roads are published.

Volume:

The normal annual operation, using fifteen full time men such as in 1967, required set ups of approximately 51,300 recording units at 47,000 locations.

Status of Storage:

The field traffic volume counts reports are divided for filing purposes in-to three separate systems; highway, "T" and county road stations. The re-ports are numerically filed by county.

Coverage count records supporting the current traffic map and those made for the preceding traffic map are retained in the active files. Older count records are destroyed.

A full scale county map is used to show all counts made during the comprehensive traffic study. After analysis and selection of traffic volumes on this work map, the volumes are then transferred to one-half scale maps. These are reproduced and general distribution is made. The current and last preceding work maps are kept on file. Older maps are destroyed.

Traffic volumes on all highways are transcribed from the work map to a

one-half scale map, which becomes part of the permanent file.

The separate county map sheets are alphabetically filed by date for ease in handling and file usage flexibility. After three years, the maps for the year are book bound and retained in a permanent file.

A supply of published county traffic maps is always available. As new issues are prepared, superseded copies are destroyed after being micro-filmed. The negatives are held for a period of approximately ten years.

An adequate supply of currently published district traffic maps are kept in stock. One copy of each issue is held in the permanent file.

State Traffic Maps are generally available for a number of years until the original supply is exhausted. However, one copy becomes a part of the permanent file.

A State Traffic Flow Band Map is made at irregular intervals of several years. Copies are usually available beyond the time of a subsequent issue. A copy is retained for a permanent file.

Dispersement:

Copies of all traffic maps are transmitted to the Bureau of Public Roads, various Districts and the Austin Office Divisions. Other interested governmental agencies also receive copies. The general public is furnished copies of these maps upon request, for which a service charge is made to defray the cost of reproduction and handling.

C.03 LOADOMETER STUDY

Purpose:

Wheel load data are the basis for determining the pavement structural design of highways.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Trucks on various type highways at specified locations are weighed and all vehicles are counted.

Compilation Procedure:

The schedule consists of three cycles, each covering a different 8-hour time period. Thus data for all hours of the day are included.

The loadometer study is made during the summer months by one truck weighing party. The field party to perform this duty usually consists of five temporary employees and one experienced regular employee acting as the party chief.

Nineteen stations are in rural areas and two are in urban areas. The rural stations have asphalt pavement turnouts for both directions of travel with a permanent pit constructed in which a portable scale is placed during the operation. The pit is covered by a 3/8 inch metal plate when not in use, giving the turnout an appearance of an emergency parking area. The two urban stations are operated with portable scales placed on the pavement sur-face.

The operational procedure is to set up the station to work one direction of travel at a time and then alternate the operation for the traffic in the opposite direction. During an operation an equal sample of truck data of both directions is obtained.

During the operation of a station the traffic is counted directionally and recorded on Form 4-A. Trucks are stopped, wheel loads weighed and the axle spacing is measured. These data are recorded on Form 3-A. Vehicle type, body type, operating classification, type fuel used and commodities carried are also recorded. The party chief directs the trucks upon the scale in the typical loadometer operation. Other personnel are a flagman, manual classification counter, measurer, scaleman and recorder of loadometer data.

At the completion of each operation the loadometer field record, manual classification count record and the daily work report (Form 3-B) are transmitted to the office. The daily work report shows the station number, county, day, date, hours of operation and a list of personnel on the party. The mileage driven and a concise itinerary of the next five consecutive days is also shown. A space for miscellaneous correspondence with the office is provided.

In the office the traffic classification count report is checked and posted on summary cards. The data are processed similarly to that as described in the manual classification count phase of operation. The loadometer data are checked, coded and punched on tabulating cards. The cards are analyzed by a computer program and tabulations are made.

The tables in the annual publication entitled "Truck Weight and Vehicle Classification Study" are constructed by the computer and manually calculated

(see publication 3-A). This publication shows a graph depicting the changes during the past ten years in truck usage from the smaller 3-axle type to the larger truck having five or more axles. Other graphs covering the past ten years show truck distribution by type of highway, average empty and loaded truck weight, percent loaded, percent of axles that were in excess of 18,000 pounds and percent tractor-truck semi-trailer combinations in excess of 72,000 pounds. A map showing the location of permanent recorders, loadometer and speed study stations is attached. Tables for each station showing axle load data, 18 kip axle equivalencies, various violations of Texas weight limits and associated information are also shown.

The computer "Road Test Program" (kip) is updated each year and becomes the basis for all 18-kip equivalencies requests (traffic analysis for pavement structural design).

Frequency:

The loadometer study is an annual operation during the three summer months and the report is published after completion of analysis.

Volume:

Approximately 8500 of the 41,300 trucks counted were weighed in the 1967 operation. A total of 169,100 vehicles were counted during the three months operation.

Status of Storage:

The field reports supporting the current publication are retained in the files. At the completion of a subsequent publication the older field reports are warehouse stored for five years and thereafter destroyed.

The cards containing the loadometer data are kept for an indefinite period. A back-up magnetic tape of all data is kept. The data is stored on a master back-up magnetic tape at both the Automation Division and D-10 Traffic Section. These master tapes are retained in a permanent file.

The publication on truck weight and vehicle classification for any year is usually available. One copy of each year is retained in the permanent file.

Dispersement:

Copies are transmitted to the Bureau of Public Roads, various Districts and Austin office divisions. This data is available to the general public upon request. A service charge is made to help defray the cost of reproduction and handling.

C.04 MANUAL CLASSIFICATION COUNTS

Purpose:

To compile data showing vehicle classification of traffic on various types of highways in all areas of the state.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Traffic is manually counted and recorded by vehicle type (see Form 4-A).

Compilation Procedure:

After a training period, schedules and maps showing the location of each station are furnished the recorder (See Form 4-B).

The normal operation is scheduled on weekdays and a 24-hour count is made during each season at all stations. A station is counted by three men, working in consecutive 8-hour shifts. During the summer months added personnel make counts on Saturdays and Sundays. These counts are used to obtain data for an average day of the week.

The completed traffic classification and density report form and the manual recorders daily work report (Form 4-C) are mailed to the office each day.

The daily time report is used to show the hour period, date, day and station number counted. The mileage driven and a concise itinerary of the next five consecutive days is also shown. A space for miscellaneous correspondance with the office is provided.

In the office the traffic classification count report is checked and posted on summary cards (See Form 4-D). Counts for the entire year are recorded on this form. The average traffic of each time period is calculated before the average 24-hour weekday traffic is determined.

An analysis of both the manual classification count and the count made during the annual traffic volume study must be made. A compromise of the AADT to be shown at a common location is sometimes necessary. After the AADT is established the various classifications are adjusted without changing the ratio of traffic composition. The same AADT will be shown on all publications for a specified location.

A tabulation showing the summary of all manual counts made during the calendar year is published and distributed (See Tabulation 4-A). This tabulation shows the AADT and the vehicle type distribution.

Frequency:

An annual publication is made, usually within six weeks after the end of the year.

Volume:

During 1967 approximately 2300 counts of eight hour duration were made at 200 locations throughout the state.

Status of Storage:

The traffic classification and density reports from the field are retained in the active file for five years and then destroyed. The summary cards are kept in active file for seven years and after being micro-filmed are destroyed.

Dispersement:

Copies of the published tabulation are transmitted to the Bureau of Public Roads, all Districts and various Austin Office Divisions. Other interested governmental agencies also receive copies. The general public is furnished copies upon request, for which a service charge is made to defray the cost of reproduction and handling.

C.05 SPEED STUDY

Purpose:

Speed data of vehicles by type at specified statewide locations are obtained to show the trend and comparison with that of the previous year.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

An annual survey is made during the summer months at locations throughout the state.

Compilation Procedure:

Field personnel participate in a training period, which includes the operation of a radar unit and familiarization of forms necessary to perform the duty. Schedules, similar to Form 4-B, and maps showing the locations are furnished from the Austin office.

By use of a radar unit, vehicle speeds are observed and recorded on Form 5-A.

The rural stations are usually in locations where there is free flowing traffic, or areas having relatively little development adjacent to the highway. By placing the radar unit to take advantage of concealment afforded by signs, shrubbery, rolling hills and curves, detection by the motorist is eliminated to a great extent. Consequently observation of traffic under actual operating conditions is possible. Each direction of travel is observed and recorded for four hours.

The completed speed study form and the daily report form are mailed to the office each day (See Form 4-C).

In the office the speed survey report is checked and coded. The data are analyzed by a computer program and tabulations showing data for the past two years are made (See Tabulations 5-A and 5-B). Average speed by vehicle type, by station, and associated speed grouping criteria are shown for both the day and night operations. A section of this tabulation shows the number of vehicles at each station, by type, that were checked during the survey.

Frequency:

An annual survey is made during the summer months.

Volume:

Statewide, thirty locations are studied in the daytime operation and five of these located in the central part of the state are also studied for night time operational characteristics.

Status of Storage:

The field speed survey forms are filed for five years and thereafter are destroyed. A supply of published tabulations for any year is usually available. One copy of each year is retained in the permanent file.

Dispersement:

Tabulations are published and distributed approximately six weeks after the completion of the field survey.

Copies of the tabulations are transmitted to the Bureau of Public Roads, all Districts and various Austin Office Divisions. Other interested governmental agencies also receive copies. The general public is furnished copies

of these tabulations upon request, for which a service charge is made to defray the cost of reproduction and handling.

C. 06 SHOP

Purpose:

Essentially the shop is the service department of the Traffic Section. Due to the nature of duties of this operational phase it will all be described under the heading Purpose.

The shop personnel consists of a shop foreman and seven traffic recorder technicians. The shop personnel have had experience with various field duties and generally are familiar with all field assignments of the traffic section. Shop duties require mechanical ability and a basic knowledge of electronics. The skills of machinists, welders, carpenters and miscellaneous craftsmen are needed.

Records are initiated and filed within the shop showing the traffic recorder numbers and those of other miscellaneous equipment that is issued to all field men in the Traffic Section. An inventory of equipment necessary for the performance of all the field operations by the Traffic Section is maintained by the shop.

The shop is resonsible for the construction and maintenance of portable traffic recorders and is the base of operation for the traffic recorder technicians who build some components of the permanent traffic recorders. These recorders are assembled from shop built components and purchased units from various commercial companies. The assemblies are installed, serviced and repaired in the field at recorder locations by the traffic recorder technicians. All major maintenance on permanent and portable recorders is done in the shop.

The shop personnel assist in the development of improved traffic recorders and operational techniques and participate in research programs that are the responsibility of the Traffic Section. Occasionally shop personnel assist on a temporary basis in other Traffic Section field duties.

C.07 SPECIAL DATA STUDIES-TRAFFIC FORECASTS

Purpose:

To provide District and Austin Office Design Engineers with anticipated traffic volumes on existing and proposed highway routes. The major highway system is designed to handle traffic volumes which are estimated for 20 years after construction. The Farm-to-Market System is designed on a basis of estimated traffic usage 5 and 10 years after construction. Various esti-mates of wheel load data based on truck percentage are used as an aid in design of base and pavement structures.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Historical trends developed from traffic volume and truck weight data for prior years generally form the basis of all future estimates. Special data gathering field trips are made when necessary to supplement insufficient information. A development and future land use study is often made to aid in projecting traffic volumes. Traffic assignment systems developed by Urban Transportation Studies are used as the basis for traffic projections within the larger urban areas (50,000 or more population).

Compilation Procedures:

On existing roads, recent counts are usually on file. Occasionally special field trips must be made to update these data.

Historical growth rate trends developed from previous traffic studies as well as improved road conditions are factors to consider in future traffic

estimates made for existing routes.

On proposed relocations, a diversion of traffic from existing facilities must be estimated considering factors such as travel time and travel distance. Areas opened to development by the construction of a new highway can be expected to generate traffic over and above the historical growth rate trend. By plotting a graph of the average daily traffic volumes for the past ten or fifteen years at a point near that to be forecasted, and projecting the relative rate of growth as indicated to a future year, an estimated future traffic volume can be obtained (See graph form). However, this method does not consider traffic generation or diversion. Generation and diversion must be estimated by using prior cases of similar conditions as a guide. As time passes the volumes of data and the numbers of examples increase, resulting in improved traffic forecasting techniques.

In nineteen urban areas of over 50,000 population, comprehensive transportation studies have been completed. A future street and highway network approved by all governmental agencies involved, was developed in each area showing projected traffic volumes on existing and proposed facilities. These systems become the basis for future planning within the study area. A corridor analysis of traffic is usually made to assist in obtaining future volumes for design purposes.

Data from classification count stations on highways having similarities, such as area served, traffic volumes and roadway conditions, are used as the basis to estimate truck percentage.

Data from a representative permanent recorder are used as reference in estimating the directional distribution and the design hour volume (D. H. V.).

When a request for traffic estimates on a section of road is received a complete file search is made to consider all prior traffic data projections. Consistency and continuity with data of adjoining roadway sections is thus maintained. A representative loadometer station in the area, or one with similar truck characteristics is used as the basis to estimate wheel load data. A computer program has been developed to calculate the total number of equivalent 18 Kip single axle load applications as related to pavement structural design.

Draftsman prepare location maps and sketches of the estimated future turning movements and traffic volumes where required. Maps, sketches and other data are transmitted by letter to interested Districts and Divisions.

Frequency:

Requests for data on a particular roadway section are received at irregular intervals. The need for construction or relocation of a highway determines the timing of these requests.

Volume:

In 1967 approximately 300 requests for future traffic estimates were received and processed.

Status of Storage:

The nature of information requested is such that custom handling is required. All work sheets and a copy of transmitted data are filed by route, district and county. Data are retained in active files for approximately 10 years before transferring to warehouse storage, where it is kept indefinitely.

Dispersement:

Data are transmitted to Districts and Divisions making the requests

immediately after computation is completed. These data are developed for departmental information only.

C. 08 EXTERNAL ORIGIN-DESTINATION SURVEY

Purpose:

The primary aim of an external origin-destination survey is to obtain data on the character and distribution of vehicles entering and leaving a municipality to assist in determining highway route locations.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Information relative to trip origin, destination and purpose is obtained by stopping a sufficient number of vehicles and interviewing the drivers during a time period representative of an average day's travel. Simultaneously, traffic is manually counted and classified. Hourly automatic traffic recorders set up at external stations give information on hourly traffic volumes. Volume counts on city streets and highways are made to determine twenty-four hour weekday traffic volumes. Records from permanently installed traffic recorders in the area are used to expand origin-destination data to annual average daily volumes and to determine if traffic patterns are representative of normal conditions.

Compilation Procedure:

Local governmental officials, along with the District Highway Office, recognize the need to plan for future streets and highways. To make such a plan, certain basic data are required. Request is made through the State Highway Engineer's office for these data. The Planning Survey Division is

responsible for external origin-destination surveys. As a preliminary to a survey, advance planning is necessary.

The Traffic Survey Supervisor contacts the representative of the District Engineer for the purpose of preparing for the survey. Together, they make an on the ground selection of external interview stations, traffic zones suitable for tabulating trips and locations for volume counts.

During the on-site selection, a visit to local governmental officials (city manager, mayor) to publicize plans for the survey is customary. At this meeting, local assistance is requested for the necessary job of zoning local addresses on completed interview forms. This meeting also allows the District representative to make preliminary preparations for the street and highway plan.

Interview forms and station location maps are designed and printed (See Forms 8-A and 8-B). Several street maps with zone lines and volume count locations are prepared. A plan of operation outlining the personnel, transportation and equipment requirements is prepared and submitted for the Traffic Manager's approval. A letter of confirmation outlining the date of the survey, the district personnel and equipment required, and any other details agreed upon during survey arrangements, is transmitted to the District. A letter outlining survey plans is sent to the Bureau of Public Roads.

The station supervisors meet District personnel for training in interviewer technique on the day of the survey. After this training, station personnel are assigned and proceed to external stations. The station equipment, including signs and traffic cones, are set in place. One of the District employees is trained to classify and manually record traffic (See Form 8-C).

The station supervisor assigns interviewers to interview positions along traffic lanes and assists interviewers in becoming proficient at interviewing motorists. The station supervisor checks the completed interviews and corrects any interviewer not recording properly. At the end of interview hours, the equipment is removed and survey personnel return to the designated meeting place. The Traffic Survey Supervisor takes the completed interviews to the municipal personnel for zoning. Only local addresses are assigned zone numbers and the supervisor assists so this will be accomplished with accuracy.

To establish annual average daily traffic volumes at external stations the hourly count records are analyzed and factored in Austin using traffic records from the recorders permanently installed in the area. Interviews from each station are carefully edited, factored and then sorted into vehicle types. Vehicle types are tabulated by local zones of origin or destination and through trips by stations of entry or exit (See Form 8-E and 8-F). Interviews from individual stations are then re-sorted and tabulated by towns of origin and destination.

Draftsmen prepare drawings showing desire lines of travel, total traffic movements for all stations and total traffic movements for individual stations for publication. A short narrative giving the background of the survey and pointing out some of the more apparent facts on traffic movement is prepared by the survey supervisor. This narrative, the typed tables and the illustrations are prepared for publication by the drafting department. The Reproduction Section of the Automation Division prints the report (See Publication 8-A).

Frequency:

Origin and Destination Surveys are made when there is a definite need for additional traffic data for planning highway facilities and when data on file are insufficient to make traffic assignments to proposed routes.

Volume:

An average of approximately 10,000 interviews are made during each survey. The number of surveys vary from year to year depending upon requests. The average is about five per year.

Status of Storage:

After the completion of all tabulations the field sheets are of no value and are destroyed. Copies of the publication are retained in a permanent file.

Dispersement:

The report is distributed through the District to local governmental officials and directly to interested divisions of the Texas Highway Department.

2. SPECIAL STUDIES

C.09 URBAN TRAFFIC STUDIES

Purpose:

Data collection as necessary to satisfy certain elements of the 1962 Highway Act as required of all urban areas of 50,000 or more population.

Depth of Study:

A detailed examination to understand each phase of the operation, including flowcharting of each step.

Source of Information:

Actual field operation of data gathering and compilation of data as set forth in the Bureau of Public Roads Comprehensive Home Interview Manual: 1954 source of operational phase:

1. Coding Index
    a. Street maps, street indices, city directories on the ground checks as needed in each urban area.
2. Internal Phase
    a. Home Interview—field count of dwelling units, controlled sample selection, actual interview of residents in their homes for trip reports.
    b. Truck—sample selection from registration files, actual contact of vehicle operator for trips reports.
    c. Taxi—controlled sample selection, contact taxi operator for trip reports.
    d. Parking Inventory—physical inventory of street and off-street parking, by block.

e. Central Business District Cordon Count—vehicle classification and pedestrian count for entering and leaving and accumula-tion summaries.

f. Speed-Delay—travel time and delays by route, using a mechanical data compiler.

g. Volume Count—complete coverage of existing facilities with 24 hour cumulative counts.

h. Screenline—weekly summary and manual classification of vehicle to develop data for accuracy checks.

3. External Phase

a. Personal interview of motorists entering or leaving the study area. Manual classification of vehicles at interview stations.

Compilation Procedure:

Compilation of field data as required to satisfy these objectives:

1. Preparation of tables and published O-D reports which depict the daily vehicular and person movements for an urban area in the study period.

2. Preparation of traffic assignments which simulate the study year traffic conditions and also serve as a basis of forecasting and assignments for target year traffic projections.

All trip data obtained in the internal and external phases of the data collection are punched on tabulating cards by coding the street addresses to a numerical code as defined in the coding index.

Six card types are developed and punched:

#1. Dwelling Unit Summary - Internal Phase

#2. Dwelling Unit Trip Reports - Internal Phase

#3. External Trip Report - External Phase

#4. Commercial Vehicle Trip Report - Internal Phase

#5. Taxi Vehicle Trip Report - Internal Phase

#6. Employment Report - Internal Phase

From these card types are developed various tables and summaries which are used in the preparation of the tables and illustrations as shown in the urban Origin-Destination Survey reports.

Trip movements are summarized by traffic survey zones, serial zones and districts, directional and non-directional volumes. Data are also compiled by hour periods, mode of travel, purpose of trips, etc.

Vehicular trip movements are summarized by traffic survey zones-total origins and destinations for each zone by various trip purposes, as requested for use in the planning office as a basis for forecasting future year trip origins and destinations for each survey zone.

Using an hourly distribution vehicle trip summary, the AM and PM peak hour periods are determined. Directional serial zone trip volume tapes are processed for various trip purposes for 24-hour volumes, AM peak hour and PM peak hour volumes. The existing expressway and arterial street system is simulated by punch cards using actual distance and speeds as obtained from the speed and delay study. The existing vehicular trip volumes are assigned by computer program to the existing expressway and arterial street system; the results are studied by corridor analysis, and adjustment made so

this assignment will simulate the actual on the ground travel condition.

Upon the receipt of the projected vehicle trip projections for each zone from the urban planning office, the preparation of "B" decks (expansion factors) are developed and the existing travel data and "B" decks are processed by a Fratar forecast program in the development of future year trip movements. The programmed and long range system of expressways and arterial street networks are obtained from the planning areas and these networks are simulated by punch cards.

There is then developed an assignment of future trips to a future network, or future trips to existing network, or whatever is deemed necessary.

The tables in the O-D report are typed and proofread; the illustrations are made in the drafting section and the O-D report is printed by the Reproduction Section of the Automation Division.

Frequency:

The frequency of the trip projection forecasts and assignments depends on the requests received from the study areas but are usually at five year intervals. The frequency of the "updating" of other data is dependent upon the development of the study area but normally no oftener than at 10 year intervals.

Volume:

These studies develop voluminous data; the field records, punch cards and basic data reduction tabulations are all kept in storage. Each network description, link cards and reproducible node maps are kept for each scheme. Output from the assignments, i. e., sum volumes and turns, link data, test

trees and posted volume maps, ozalid and cronaflex copies are kept in permanent files. Several hundred copies of the published O-D reports are kept on file to satisfy future requests from various agencies and individuals.

Status of Storage:

Storage of the field records and basic data tabulations and O-D reports are filed in the old Reproduction Building.

Punch cards from the field trip reports and inactive network descriptions are stored in D-10 Shop.

Current network description link cards are stored in the D-10 tabulating room.

Output from traffic assignments and cronaflex copies of posted volume maps, as well as some of the basic data reduction tabulations and screenline and volume count information, are stored in D-10 Insurance Building Office.

Dispersement:

Copies of data reduction tabulations are furnished the study office concerned and the Highway Design Division. A master tape is kept containing basic data as are trip volume tapes of the existing assignment and projected assignments, i. e., 1970, 1985, etc.

Traffic assignments are also furnished the study office and the Highway Design Division. The Bureau of Public Roads is furnished the existing and the recommended plan assignment.

The O-D report is furnished all highway department division heads, state traffic engineers, libraries and other states' highway planning departments.

The study planning office is furnished copies for local distribution. Copies of the O-D report are for sale to the public for the printing fee.

III - D

ACCOUNTING

D. ACCOUNTING SECTION (D-10 A)

The accounting section is responsible for all Material and Supply, Travel Expense, Equipment Rental and Salary Payrolls; preparation of requisitions for supplies, maintaining Divisional absence records, preparation of expenditure reports and billing to the Bureau of Public Roads, and other miscellaneous accounting and personnel records. The section also maintains a tabulation shop and map sales office.

1. GENERAL ACCOUNTING

1. GENERAL ACCOUNTING

.01 Payrolls

a. All Divisional Salary Payrolls are processed and distributed by the Accounting Section. The cash payroll has been automated and this Section is responsible for keeping the Payroll Master File up-to-date by submitting change forms on additions, deletions, change of salary, etc.

b. Two Material and Supply Payrolls are prepared each month to cover payment for supplies, office and field equipment, machine rental and repairs, printing, etc.

c. All Travel Expense Statements are audited and assembled into a payroll each month for submission to State Comptroller for payment.

d. An Equipment Rental Payroll is prepared each month to cover rental on equipment assigned to this Division by Equipment and Procurement Division (D-4).

.02 Purchasing

Purchase requests for supplies and equipment are sent to this office by each Section in the Division. The request is checked to see if the merchandise ordered is under contract or a bid item. A requisition is then sent to Equipment and Procurement Division (D-4) for processing and the merchandise is shipped or delivered directly to the Sections where it is checked in and the receiving report is then sent to Accounting for handling.

.03 Absence Record

The official absence and compensatory time record is kept in this office. The other sections keep an absence record for their convenience and periodically the records are compared and checked for accuracy.

.04 Equipment Inventory

A perpetual inventory is kept on all office machines, furniture, shop and field equipment, etc., and once a year it is checked by actual physical count. A list is then prepared in coded form for submission to the Highway Department property officer. This is done each year in April.

.05 Expenditure Report

A monthly report of expenditures is prepared and broken down by line items as outlined in the annual work program. This report is submitted to the Bureau of Public Roads and a copy is prepared for the Director and each of the Section Heads in the Division.

.06 Time Sheets

All monthly and hourly time sheets are audited and prepared for keypunching. A tabulation is then made for distribution of salaries on a composite rate basis.

.07 Ledgers and Work Sheets

Ledgers, Work Sheets and other accounting records on all operations are maintained in a manner suitable for Bureau audits. A voucher is prepared and submitted quarterly to the Bureau for federal participation.

2. TABULATION PROCESSING

2. TABULATION PROCESSING

.08 Tabulation Shop

The tabulating shop maintains a permanent file of approximately one million tabulating cards. In addition to the permanent file, records are keypunched into tab cards on various special jobs such as traffic surveys, origin and destination studies, interstate needs study, etc.

This section consists of four keypunch machines, one verifying machine, two card sorting machines, one reproducing punch and one accounting machine.

Numerous machine tabulations are furnished with data to compile Road Life Tables, Mileage and Vehicle Mileage Tables, Bridge Reports, Loadometer Tables, Construction Cost, Road Bonds and Notes, Payroll Cost Distribution and any special request from various agencies.

These permanent files are continuously updated: monthly or annually.

3. MAP SALES

3. MAP SALES

.09 Map Sales Office

The Map Sales Office must maintain a stock of current County General Highway Maps (428 Sheets)-(2 sizes), District Control-Section Maps (25 Sheets)-(2 sizes), State Official Departmental Maps (4 sizes), State Outline Maps (7 sizes) and District General Highway Maps.

Distribute approximately 320,000 maps annually.

Supply stock of maps to Travel and Information Division (D-16) and District Sales Offices upon request.

Tabulate sales reports from Travel and Information Division (D-16) and Districts.

Maintain automatic distribution lists and supply all Districts and Divisions with maps as they are revised.

Order Full-scale blue line prints daily to fill orders as received (Space liminations prohibit maintenance of a stock of these large scale maps).

Process an average of 14 map orders (mail, telephone and "over-the counter") from the public daily. (Annual total maps sold approximately 117,000 sheets).

Process requests for free maps from Departmental and other Governmental Agencies which amount to an average of 800 sheets per day or approximately 203,000 annually.

List cash receipts and submit to Accounting Division (D-11) semi-weekly. (Annual total approximately $22,000.00).

Weigh and stamp mail (Approximately 16,000 pieces annually) for all sections of Planning Survey Division and maintain a balance of daily postage records.