COMPUTERIZED METHOD OF PROJECTING REHABILITATION AND MAINTENANCE REQUIREMENTS DUE TO VEHICLE LOADINGS

by

Alberto Garcia-Diaz, Robert L. Lytton, and Dock Burke
of the
Texas Transportation Institute
and
B. Frank McCullough and C. Michael Walton
of the
Center for Transportation Research

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Computerized Methods of Projecting Rehabilitation and Maintenance Requirements Due to Vehicle Loadings

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DISCLAIMER

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CHAPTER 1

INTRODUCTION

This manual contains the user instructions for program RENU. The program provides a methodology for determining the effects of changes in truck size, weight, and configuration on pavement performance and for relating these effects to pavement maintenance and rehabilitation needs and costs. The procedure was developed for the Texas State Department of Highways and Public Transportation Project 298/312-5F, "Computerized Method of Projecting Rehabilitation and Maintenance Requirements Due to Vehicle Loadings," and is documented in the project final report [7].

OBJECTIVES

The objectives of this manual are three-fold:

1. To provide a summary description of the evaluation procedure.
2. To present descriptions of all necessary input parameters and guides to data sources.
3. To trace program RENU usage with a detailed user input guide and illustrative examples of program inputs and outputs.

SCOPE OF THE PROCEDURE

The procedure evaluates the effect of legal load limit changes on the life cycle costs of flexible, rigid, and/or composite pavements. Eighty representative design sections can be grouped by system (Interstate, State, FM, US) classifications of highways. The procedure allows a maximum of ten different truck types along with various axle and tire configurations, such as single and tandem axle configurations. While truck axle weight and configuration are the major variables considered, new trucks, such as triple trailer units, can be included in the procedure. The procedure contains a computerized gross vehicle weight and axle load distribution shifting procedure to assess the impact of changes in current legal load limits. The user may select different maintenance and rehabilitation cost models to be used for different representative sections. The procedure uses a separate age/lane-mile distribution for each representative section thereby allowing evaluation of a small road network, a district, or a state.

EVALUATION CONCEPTS

The evaluation procedure estimates total costs associated with changes in routine maintenance and rehabilitation requirements which result from changes in the legal load limits. There are five primary steps:
1. Read in input data.

2. Calculate proposed traffic load distributions and estimate the traffic rates for present and proposed legal load limits.

3. Determine the expected life cycles for all representative sections.

4. Predict maintenance, rehabilitation, and salvage value costs associated with each life cycle developed.

5. Output predicted cost ratios, cost differences, and remaining life information in terms of 18-kip (80-kN) equivalent single axle loads (ESAL) for present and proposed legal limits.

A brief conceptual flow diagram of the evaluation procedure is presented in Figure 1. For a listing of program RENU, refer to Appendix B.

Development of input data requires the cooperation of diverse highway agency departments including administration, construction, finance, design, maintenance, traffic, and transportation planning sections. Data needed include serviceability criteria, pavement structural characteristics, highway functional classifications, traffic data (both present and future), age/lane-mile distributions for representative existing highway sections, beginning of the analysis period, and rate of loss of pavement value. The amount of input data required is a function of the extent to which the user subdivides the highway network into classifications and representative sections.

No field or laboratory data are required for RENU input except for standard traffic count and loadometer weight information, i.e., W-4 and W-5 tables.

Input data for present and future traffic loading include estimates of the percent of trucks by type for each year of the analysis period; empty weight, single-axle weight, tandem-axle weight, triple-axle weight, and gross vehicle weight distributions for each truck type included in the analysis; equivalency factors; and an annual growth factor for 18-kip (80-kN) equivalent single-axle loads (ESAL). An important user option results from a feature of the traffic calculation that permits the user to select whether the total payload per year or total number of trips per year of the analysis period is maintained equal under present and proposed legal load limits.

The expected life cycles for each representative section are based upon conditions found prevalent in Texas. Table 1 shows the breakdown of representative sections for flexible pavements. Life cycle estimates are developed for pavements of each age from the age/lane-mile distribution, for each representative section. For pavements that fail due to serviceability, the rehabilitation routines of RENU determine the thickness and cost of asphalt concrete overlays for the existing pavement. In the case
Figure 1. Basic Methodology of RENU.
TABLE 1. Representative sections for flexible pavements.

<table>
<thead>
<tr>
<th>Highway Type</th>
<th>Rural/U rban</th>
<th>Traffic Intensity*</th>
<th>Pavement Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate Rural</td>
<td>High</td>
<td>Hot Mix</td>
<td></td>
</tr>
<tr>
<td>Interstate Urban</td>
<td>High</td>
<td>Hot Mix</td>
<td></td>
</tr>
<tr>
<td>Interstate Urban</td>
<td>High</td>
<td>Overlaid</td>
<td></td>
</tr>
<tr>
<td>Farm to Market Rural</td>
<td>High</td>
<td>Overlaid</td>
<td></td>
</tr>
<tr>
<td>Farm to Market Rural</td>
<td>Low</td>
<td>Overlaid</td>
<td></td>
</tr>
<tr>
<td>Farm to Market Rural</td>
<td>Not Applicable</td>
<td>Surface Treated</td>
<td></td>
</tr>
<tr>
<td>Farm to Market Urban</td>
<td>High</td>
<td>Hot Mix</td>
<td></td>
</tr>
<tr>
<td>Farm to Market Urban</td>
<td>High</td>
<td>Overlaid</td>
<td></td>
</tr>
<tr>
<td>Farm to Market Urban</td>
<td>Low</td>
<td>Hot Mix</td>
<td></td>
</tr>
<tr>
<td>Farm to Market Urban</td>
<td>Low</td>
<td>Overlaid</td>
<td></td>
</tr>
</tbody>
</table>

US & State - Same as for Farm to Market

*Breakpoints for high and low traffic intensity: 4500 vpd for urban
1800 vpd for rural

No low traffic intensity Interstate sections found in state.
of pavements that fail because of distress (the most common cause of failure) the user must specify an overlay thickness. The expected costs of bringing the shoulders up to the overlay level with either asphalt and/or granular material are included in the rehabilitation costs. With the exception of flexible pavements that fail because of distress, RENU permits only one overlay for any representative section-age segment during the analysis period. In the case of failure due to distress, multiple layers are allowed.

Routine maintenance and rehabilitation costs are computed as a function of pavement deterioration-age relationships. "Routine maintenance" in RENU includes only those work items related to pavement condition. Therefore, items such as crack sealing, pot hole filling, or sealing should be considered. These maintenance activities are routine in nature to differentiate from major items such as rehabilitation, reconstruction, and resurfacing. The routine maintenance cost model for flexible pavements included in RENU is from an FHWA study that calculated maintenance cost information obtained from maintenance management systems [5]. The user also has the option to disregard routine maintenance costs in the evaluation. In addition to a choice of types of input for maintenance data, the user may also elect to spend the same amount of maintenance money both under present and proposed legal load limits but at an accelerated rate under the proposed legal limits. The spending is a function of the pavement deterioration cycle. The historical pavement maintenance information is a function of pavement type, functional classification and age.

Salvage value for the existing system is considered in the economic comparisons. For existing roadways the value for each representative section by age at the beginning of the analysis period is supplied by the user as input to RENU. Using this user input salvage value and the loss rate or change in salvage value with time, in percent per year, the first component of salvage value for the existing pavements is determined at the end of the analysis period. The second component of salvage value, that for the overlays, is calculated by computing the value of the fraction of remaining life at the end of the analysis period. The total salvage value, which is the sum of these two components, is then used as a component of the economic comparison.

The predicted economic impact to a highway agency of a legal load limit change, including changes in size or axle configuration, is output by representative section, roadway classification, or total network system. While the predicted costs under present and proposed limits may be of interest, the cost differences or "delta costs" and cost ratios between present and proposed estimates are the most reliable information. The pavement life at the end of the analysis period in terms of 18-kip (80kN) ESAL for both load limits is also included in the output and should be of interest when making comparisons.
The evaluation procedure is an automated, modularized computer program. Thus, without hand calculations the engineer may investigate the effects of legal load limit and vehicle configuration changes and obtain an estimate of the economic impact of these changes on highway network routine maintenance and rehabilitation funding requirements and on pavement condition. For execution of the computer software of this procedure, a computer system such as the CDC 6600, IBM S/360, AMDAHL 470, or the Univac 1108 is required.
CHAPTER 2

DESCRIPTION AND GENERATION OF INPUT DATA

The evaluation procedure requires inputs from the following areas:

1. Traffic and load survey information
2. Performance prediction variables
3. Economic cost prediction data
4. Program controls and decision criteria

These data are supplied to program RENU using specific "keywords," as explained in Chapter 4 of Appendix A of this manual.

TRAFFIC AND LOAD SURVEY INFORMATION

Table 2 contains the input variables involved in the traffic calculations. The traffic information is expected to be available most readily on a system basis since it is collected in this manner for preparation of the standard W-4 and W-5 tables which include data for:

1. Interstate rural data
2. Other rural data
3. All rural data
4. All urban data
5. All systems data

The percent of each truck type as a percent of all vehicles is projected into the future to obtain an estimate of the traffic stream composition. These projected percentages should be made compatible with trends in the percent of total trucks for all systems.

The number of truck types can easily be changed during the analysis period. For example, if a change in load limit laws leads to the conclusion that a particular type of truck will be replaced with a new type, this can be effected by gradually reducing the percent of the particular truck to zero at the expected date of occurrence in the analysis period.

One final point of particular interest is the ability of RENU to handle tridem-axle configurations, axles with single tires (i.e., steering axles), and trucks with multiple trailers.

Information on vehicle weights, present and proposed, is available in the literature. There are also numerous reports on the collection of
TABLE 2. Traffic and load survey information.

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>TYPICAL VALUES</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. AASHTO Truck Type Notations</td>
<td>3S2</td>
<td>Up to 10</td>
</tr>
<tr>
<td>2. Percent of Truck Type as percent of all vehicles</td>
<td>6.31</td>
<td></td>
</tr>
<tr>
<td>3. Percent trucks as percent of all vehicles (Summation of all variable 2 inputs)</td>
<td>8.00</td>
<td></td>
</tr>
<tr>
<td>4. Axle code (number singles, tandems, tridems, and steering axles) Based on configuration</td>
<td>0200</td>
<td></td>
</tr>
<tr>
<td>5. Single axle load limits present and proposed, kips</td>
<td>20.0/22.4</td>
<td></td>
</tr>
<tr>
<td>6. Tandem axle load limits present and proposed, kips</td>
<td>34.0/36.0</td>
<td></td>
</tr>
<tr>
<td>7. Tridem axle load limits present and proposed, kips</td>
<td>56.0/56.0</td>
<td></td>
</tr>
<tr>
<td>8. GVw$^{(1)}$ load limits present and proposed, kips</td>
<td>80.0/120.0</td>
<td></td>
</tr>
<tr>
<td>9. Steering axle weights present and proposed, kips</td>
<td>11.0/16.0</td>
<td>Up to 10</td>
</tr>
<tr>
<td>10. Expected percent change in empty vehicle weights</td>
<td>0</td>
<td>Up to 10</td>
</tr>
<tr>
<td>11. Number of single axles weighed by weight interval</td>
<td>1885</td>
<td>W-4 Table</td>
</tr>
<tr>
<td>12. Number of tandem axles weighed by weight interval</td>
<td>3720</td>
<td>W-4 Table</td>
</tr>
<tr>
<td>13. Number of vehicles by GVW weight interval</td>
<td>1862</td>
<td>W-5 Table</td>
</tr>
<tr>
<td>14. Number of empty vehicles weighted by weight interval</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>15. Number of steering axles measured by weight interval</td>
<td>725</td>
<td></td>
</tr>
<tr>
<td>16. Growth rate for 18 kip (80 kN) ESAL, percent per year</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

(1) GVW is gross vehicle weight
Note: 1 kip = 4.45 kN
truck weight data (References [1], [2], and [9]). Percent of trucks by truck type can be obtained from planning survey groups within each highway agency. New techniques are also being developed to evaluate weights of in-motion vehicles (References [3], [4], and [8]). Figure 2 shows the AASHO truck type codes which may be used in RENU input.

Figure 2. Common commercial vehicle types as designated by code based on axle arrangement.
PERFORMANCE PREDICTION VARIABLES

The performance prediction variables are related to measurements in the following three major categories:

2. Representative design section structure.
3. Pavements older than the average age at terminal serviceability (POTTS).

Using these data and the AASHTO Interim Guide as a performance model, predictions of the time to overlay and thickness of overlay are made for the lane miles in each representative design section. All the input variables of this type are listed in Table 3.

Highway Network Statistics

The local, state, or federal agency using this procedure must select an appropriate number of representative structural sections to adequately model the typical designs of each network. For each representative structural section the total number of lane-miles must be determined, as well as the age of each mile where age is defined as the period of time since construction or major reconstruction and the beginning of the analysis period. These inputs can also be obtained from the Road Life and Road Inventory files of SDHPT.

Other variables required in this area of input are the present serviceability index (PSI) values. These variables may be input either constant for the system or individually for each representative section and include: initial PSI, terminal PSI, and PSI after overlay construction.

Representative Design Section Structure

For each representative design section certain information is required to characterize the remaining life of sections of each age. Variables required for representative sections, regardless of pavement type, include section title information, lane widths, regional factor (R), material type codes, and layer thicknesses (requirements vary for flexible and rigid pavements). Portland cement concrete (PCC) and composite pavements require composite soil support values (K), elastic modulus of concrete, and concrete flexural strength. The AASHTO continuity factors (J) for different PCC pavement types are built into the program as a function of the material type codes. An interesting option generated by the representative section input concept is that a state
<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>TYPICAL VALUES</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lane width, ft.</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>2. Number of years for lane-mile data</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>3. Lane mile - age distributions for each section</td>
<td>150.0 mile/10 yr.</td>
<td></td>
</tr>
<tr>
<td>4. PSI at initial construction and terminal condition</td>
<td>4.7/2.5</td>
<td></td>
</tr>
<tr>
<td>5. PSI after overlay</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>6. Potts Maintenance costs $/lane mile/yr.</td>
<td>1800</td>
<td></td>
</tr>
<tr>
<td>7. Target fraction of Potts</td>
<td>10.0</td>
<td>% of lane miles</td>
</tr>
<tr>
<td>8. Percent of total lane miles never overlaid</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>9. District Number</td>
<td>17</td>
<td>One of district numbers if more than one district in representative section</td>
</tr>
<tr>
<td>10. Highway Type</td>
<td>1</td>
<td>Interstate</td>
</tr>
<tr>
<td>11. Type of pavement</td>
<td>1</td>
<td>Hot Mix</td>
</tr>
<tr>
<td>12. Highway Classification</td>
<td>1</td>
<td>Rural</td>
</tr>
<tr>
<td>13. Traffic Intensity</td>
<td>2</td>
<td>High</td>
</tr>
<tr>
<td>14. Time between first and second overlay</td>
<td>8</td>
<td>For distressed pavements</td>
</tr>
<tr>
<td>15. Asymptotic serviceability</td>
<td></td>
<td>User specified as 3.0</td>
</tr>
<tr>
<td>16. Minimum overlay thickness</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17. Maximum overlay thickness</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
may use one representative structural section a number of times and vary the regional factor and/or other variables such as soil support to predict the costs of increased load limits by environmental regions or soil areas of interest within their jurisdiction. In fact any one variable may be changed and a new solution run by simply inputting one additional data card (see input guide in Appendix A).

Pavements Older Than Terminal Serviceability

Procedures have been developed for considering those lane-miles of pavement which at the time of evaluation have serviceability values lower than the system terminal PSI. Data concerning these pavements can be found in the National Highway Inventory and Performance Summary [10] or a DOT Report to the Congress [11]. These variables concerning pavement age at terminal PSI for each representative section type are used along with the performance equations to determine the number of lane-miles which is in need of rehabilitation during each year of the analysis period. Various other inputs in this area concern the manner in which the program models the life cycle of sections in POTTS. These variables include a POTTS operation switch, an overlay funding switch, a target fraction (percent of lane miles remaining below terminal PSI at end of analysis period) to express policy options, a percent of total lane-miles never overlayed, and annual projected overlay funds. Using these variables POTTS sections can be studies in three different ways:

1. The number of lane miles of POTTS remains constant for the entire analysis period. Those miles of roadway which begin the analysis period below terminal PSI remain in that condition. The cost of overlays on this section is zero since no overlays occur, however maintenance costs are considered.

2. The number of lane-miles of POTTS is changed gradually during the analysis period to obtain an input target percentage at the end of the analysis period. The choice of the target percentage can cause the lane-miles in POTTS to increase or decrease; however, the target percentage does not change within a run. The economic effects of these changes in the target percentage are predicted.

3. The number of lane-miles changes as a direct function of available overlay funds. If the cost of miles due for overlay exceeds the overlay funds available during any one year of the analysis period, the mileage in POTTS will increase. Likewise, if more overlay money is available than needed, some mileage will be brought out of POTTS and rehabilitated.

For any of the three POTTS options, the expected maintenance costs in dollars per lane-mile per year for POTTS mileage must be input.

ECONOMIC COST PREDICTION DATA

To predict the maintenance and rehabilitation costs associated with new size, and weight, of vehicles, RENU requires certain input costs. These data can typically be gathered from maintenance management systems and rehabilitation cost records. Table 4 contains a list of variables, typical values,
TABLE 4. Economic cost prediction data.

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>TYPICAL VALUES</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Percent paved shoulders</td>
<td>95.0</td>
<td></td>
</tr>
<tr>
<td>2. Average shoulder width per lane, feet</td>
<td>4.75</td>
<td>See Keyword Dictionary</td>
</tr>
<tr>
<td>3. Unit cost of AC</td>
<td>66.00</td>
<td>$/cy</td>
</tr>
<tr>
<td>4. Unit cost of Granular Material</td>
<td>0.50</td>
<td>$/cy</td>
</tr>
<tr>
<td>5. Unit cost switches</td>
<td>1, 2, or 3</td>
<td>1 = $/ton, 2 = $/cy, 3 = $/sy/in</td>
</tr>
<tr>
<td>6. Unit cost of AC Patching, $/sy</td>
<td>47.00</td>
<td>MODEL(2)</td>
</tr>
<tr>
<td>7. Unit cost of AC Crack Sealing, $/L.F.</td>
<td>.25</td>
<td>MODEL</td>
</tr>
<tr>
<td>8. Unit cost of AC Base and Surface Repair, $/cy</td>
<td>414.00</td>
<td>MODEL</td>
</tr>
<tr>
<td>9. Surfacing Cost Index</td>
<td>11.8%</td>
<td></td>
</tr>
<tr>
<td>10. Maintenance Cost Index</td>
<td>9.0%</td>
<td></td>
</tr>
<tr>
<td>11. Unit cost of failure per lane mile</td>
<td>1,000</td>
<td>MODEL</td>
</tr>
<tr>
<td>12. Number of failures at time of survey</td>
<td>3.86</td>
<td>MODEL</td>
</tr>
<tr>
<td>13. Date of survey</td>
<td>8/75</td>
<td>MODEL</td>
</tr>
<tr>
<td>14. Initial date of planning</td>
<td>12/90</td>
<td>MODEL</td>
</tr>
</tbody>
</table>

(2) MODEL - Required only for MODEL MAINTENANCE directive

Note: 1 lane mile = 1.61 lane km
1 foot = .305 m
1 pcf = 15 lb/m³
1 sy = .91 m²
1 cy = .76 m³
and comments. The various required maintenance inputs are a function of the maintenance prediction model which can be either:

1. Prediction equations, or

2. Historical maintenance data from highway department records.

The forecasting of maintenance spending using either the prediction models or historical data can be accelerated for proposed traffic limits using the variable IARMS (accelerated routine maintenance spending switch).

Input information required for use of the historical model consists of arrays of costs that are based on past highway department experience. The average costs per lane-mile per year are input as a function of pavement type and age. The data may be changed for any system or representative pavement section.

Overlay cost predictions require the input of geometric, cost, and placement data. The geometric inputs include a percent of lane-miles which have paved shoulders, and the percentage of shoulders which are not paved (i.e. granular or soil). The asphalt and granular shoulder widths per lane-mile are the total shoulder width divided by the number of lanes. The following example shows the calculation of these variables:

Given: 100 miles, 4 lanes, shoulder widths of 4, 4, 10, and 10 feet, 50% paved and 50% granular.

250 miles, 2 lanes, shoulder widths of 8 and 8 feet, 60% paved and 40% turf.

The percent paved shoulders (PSS), average paved shoulder width (APSW), and average granular shoulder width (AGSW) are, therefore, calculated as:

\[
\begin{align*}
\text{PPS} &= \frac{100 \text{ mi.} \times 0.5 + 250 \text{ mi.} \times 6}{350 \text{ mi.}}\times 100 \\
\text{PPS} &= 57\% \text{ and therefore } 43\% \text{ of the shoulders are unpaved} \\
\text{APSW} &= \frac{28 \text{ ft.} \times 100 \text{ mi.} \times 0.5}{4} + \frac{16 \text{ ft.} \times 250 \text{ mi.} \times 0.6}{2} \times \frac{350 \text{ mi.}}{} \\
\text{AGSW} &= \frac{350 \text{ ft.}-\text{mi.} + 1200 \text{ ft.}-\text{mi.}}{350 \text{ mi.}} \\
\text{AGSW} &= \frac{28 \text{ ft.} \times 100 \text{ mi.} \times 0.5}{4} + \frac{16 \text{ ft.} \times 250 \text{ mi.} \times 0.4}{2} \times \frac{350 \text{ mi.}}{} \\
\text{AGSW} &= \frac{350 \text{ ft.}-\text{mi.} + 800 \text{ ft.}-\text{mi.}}{350 \text{ mi.}} \\
\text{AGSW} &= 3.29 \text{ ft.}
\end{align*}
\]
where 1 mile = 1.61 km, and 1 foot = .305 m.

Unit cost information for in-place asphalt concrete and granular material may be input in dollars per ton, dollars per cubic yard, or dollars per square yard per inch. The in-place unit cost of granular material should be lower if a large percentage of the shoulders in the granular class are actually soil or turf. The in-place densities of asphalt concrete and granular material are also required to predict the quantity of overlay material if unit costs are per ton.

For an average lane-mile of each representative section the user must develop both the present value of the existing pavement structure and the rate of decrease in that present value. The user may have available construction information that can be used to obtain the initial construction costs of the pavement structure. If this information is not readily available, an estimate can be made by using current bid information and adjusting it by the construction cost index between the present time and the year of initial construction. The engineer must then determine how much the pavement materials are worth today and also estimate the value of the remaining life of the structure. These calculations will not be easy and the state of the art is not very advanced; however, the best estimates of the present worth of the investment in the pavement structure is essential to a complete analysis. The engineer must then estimate what the rate of change of salvage value will be for the duration of the analysis period. This can most easily be done by analyzing the effects of time of the compound interest present worth factor. If the rate of change of salvage value is 1 percent per year, at the end of 20 years the salvage value is worth 82 percent of the value at the beginning of the period; if the rate of change is 2, 3, or 4 percent per year the salvage value is 67, 55, and 46 percent, respectively. These types of logical comparisons can assist the engineer in making estimates that are compatible with his own experiences.

The additional input parameters which affect economic predictions in program RENU are (1) the interest rate which is used for economic analyses, and (2) the length of the analysis period in years. The analysis period must be less than or equal to 20 years, and 20 years is the recommended value. If the Highway Cost Index is used for predicting funding amounts the interest rate used for the economic analyses should be the recommended interest rate plus the HCI to thus discount the effect of the index.

PROGRAM CONTROLS

Several input variables are needed to control RENU's operation. These variables are in the form of keyword directives as described in Appendix A. These keywords and their functions are:

- **RUN** - This keyword must be the first card of a data deck and the first directive after any 'EXECUTE' directive if any of the parameters on the 'RUN' card change. This begins program operation.

- **SYSTEM TITLE** - This keyword inputs a three card alpha-numeric title which is printed on the output to identify the solutions by system classification.

- **EXECUTE** - This keyword must be the last card of a problem set (of
representative section data).

-OUTPUT- This keyword allows the user to choose the amount and type of output desired. It causes the program to summarize certain segments of the calculations as output.

-STOP- This keyword is the last data card of a data deck and it terminates the program operation.

These keyword directives along with all other keyword directives permit program users to tailor the use of RENU to a desired situation.

SUMMARY

All of the data described in this chapter are input through the use of keyword directives. Table 5 shows these keywords and the data area to which they pertain. The keywords themselves are somewhat descriptive of their associated data. In addition, the variable order of data input permits the user the option, after the complete data deck for the first solution, of inputting only those variables that differ from solution to solution. Additional data details are provided in the program input guide in Appendix A.
<table>
<thead>
<tr>
<th>KEYWORDS</th>
<th>DATA AREA(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE DISTRIBUTION</td>
<td>2</td>
</tr>
<tr>
<td>EMPTY</td>
<td>1</td>
</tr>
<tr>
<td>EXECUTE</td>
<td>4</td>
</tr>
<tr>
<td>FLEXIBLE</td>
<td>2</td>
</tr>
<tr>
<td>GVW</td>
<td>1</td>
</tr>
<tr>
<td>HISTORICAL MAINTENANCE</td>
<td>3</td>
</tr>
<tr>
<td>LOAD LIMITS</td>
<td>1</td>
</tr>
<tr>
<td>MODEL MAINTENANCE</td>
<td>3</td>
</tr>
<tr>
<td>NO MAINTENANCE</td>
<td>3</td>
</tr>
<tr>
<td>OLD SECTIONS</td>
<td>2</td>
</tr>
<tr>
<td>OUTPUT</td>
<td>4</td>
</tr>
<tr>
<td>OVERLAY</td>
<td>3</td>
</tr>
<tr>
<td>PERFORMANCE</td>
<td>2</td>
</tr>
<tr>
<td>RIGID</td>
<td>2</td>
</tr>
<tr>
<td>RUN PARAMETERS</td>
<td>4</td>
</tr>
<tr>
<td>SINGLE AXLES</td>
<td>1</td>
</tr>
<tr>
<td>STEERING AXLES</td>
<td>1</td>
</tr>
<tr>
<td>STOP</td>
<td>4</td>
</tr>
<tr>
<td>TANDEM AXLES</td>
<td>1</td>
</tr>
<tr>
<td>SYSTEM TITLE</td>
<td>4</td>
</tr>
<tr>
<td>TRIDEMS</td>
<td>1</td>
</tr>
<tr>
<td>TRUCK TYPE</td>
<td>1</td>
</tr>
</tbody>
</table>

(1) Data Area 1 = Traffic Data
2 = Network Design and Condition Data
3 = Maintenance/Rehabilitation Data
4 = Program Controls
Program RENU has the capability to model various sizes of highway network for which input data can be developed. The mileage of a network should be distributed based on functional classification (Inter-state Urban, Interstate Rural, FM Urban, etc.), pavement structure (AC, PCC, or composite), and pavement age (time since construction or major reconstruction). A network may be divided into as many representative structural sections as is necessary to adequately characterize the network. The lane-miles of each representative section are distributed by pavement age. Program RENU predicts pavement performance and related costs for both present and proposed traffic loadings for all lane-miles of each pavement age of each representative section. RENU can consider up to eight systems, each having a maximum of ten representative sections.

Instructions to RENU are supplied in the form of directives, each of which occupies an entire card. The first twenty characters of each directive contain a "keyword" identifying the type of information being entered. All relevant information must be supplied for the first problem of a run via the various directives. Subsequent problems in the same program execution need only specify directives which are to be changed, since all other variable values will be retained from the preceding problem. Some directives require additional data cards which are placed immediately after the card on which the keyword directive appears.

The major capabilities of RENU include:

1. The ability to handle up to a maximum of ten representative sections for each system.
2. The ability to make predictions with the total payload per year under present and proposed limits either equal or unequal.
3. Different maintenance cost models can be used for each representative section.
4. A traffic stream mix of up to 10 types of trucks can be considered for both present and proposed regulations.
5. The percent of each truck type as a percent of all vehicles can vary by year in the analysis period.
6. Pavement performance predictions are based not only on pavement structure and traffic but also on existing pavement age.
7. Overlay cost predictions include necessary costs to bring the shoulders up.
8. Remaining network functional life in terms of remaining 18-kip (80 kN) ESAL at the end of the analysis period provides information on structural condition of the systems.
9. The expected economic consequences of various proposed legal limits changes on maintenance and rehabilitation, and salvage value, are predicted and summarized by section, by system classification, and for the entire network.
10. A number of rehabilitation options is available to the user for pavements older than terminal serviceability (POTTS).

11. Stacking and solution of numerous different problems is possible through the flexible input order of Program RENU.

12. Asphalt concrete, portland cement concrete, and composite pavements may be considered in any problem.

13. The effect of new truck types and multiple trailer configurations can be modeled using vehicle designations and equivalency factors for single axles, steering axles, tandem axles, and triaxles.

14. A modified NCHRP load distribution shifting procedure has been included in RENU.

SUMMARY OF INPUT INFORMATION REQUIRED

Although no special field or laboratory studies are required, the use of RENU requires much data from highway agency records. The information required to determine input values for RENU is summarized as follows:

1. Traffic and load survey information includes traffic stream makeup, truck types, single-axle load distributions, tandem-axle load distributions, tridem-axle load distributions, steering-axle distributions, gross vehicle weight distributions, empty vehicle weights, and legal limits. This information can be used to estimate the growth in 18-kip (80-kN) ESAL.

2. Performance prediction information includes highway network statistics, in particular mileage breakdowns by pavement type, pavement age, and system classification; also, representative design section structural information.

3. Economic prediction data include unit cost information, historical maintenance expenditures, geometric dimensions, interest rates, pavement types, present worth of the existing representative sections and the rate of change of salvage value for each.

The problem in Chapter 4 and the typical values of variables given in Chapter 2 provide realistic values for sample input; however, these are merely representative data and specific data should be developed for each prediction desired.

RENU OUTPUT CAPABILITY

Program RENU has four output options available for use, depending on the degree of detail desired. These options are described in the Keyword
Dictionary under keyword -OUTPUT-. Keyword -OUTPUT- can be changed for each representative section if desired. Basically output predictions are provided for all representative sections and summarized by system and for the entire network. The point at which the preceding results are summarized is defined through input of the -SYSTEM TITLE- keyword. This keyword implies that a new system and its representative section information are being input and that summaries for previous representative sections should be prepared.

The first of the four output options (Option 0) is a default option because if keyword -OUTPUT- is not used certain information is always printed out. This output includes all input information and summary results. The summary results provide maintenance and rehabilitation cost differences and cost ratios between proposed and present legal limits. Maintenance and rehabilitation costs are printed out for each year in the analysis period. The data are provided for all representative sections and summarized by system. These costs are presented in three forms: unadjusted, present worth, and uniform annual cost. The various other output options are as follows:

Option 1: All the default information is output plus performance tables, POTTS tables, and summary cost tables.

The performance table contains information for each pavement age concerning number of lane miles overlaid each year, overlay thickness, PSI at the beginning and end of analysis period, remaining 18-kip (80-kN) ESAL at end of analysis period, and cost of overlay in dollars per lane mile. This information is supplied for present and proposed limits. The POTTS tables contain similar information for pavements which have already reached terminal serviceability before the beginning of the analysis period. The summary cost tables contain a summary of undiscounted maintenance and rehabilitation costs by year in the analysis period for both present and proposed legal limits.

Option 2: All information of Option 1 is supplied with summary payload and 18-kip (80-kN) ESAL information.

The additional information consists of payloads and number of 18-kip (80-kN) ESAL for an average truck of each type, and the ratio (for each year) of ESAL per year under proposed limits to ESAL per year under present limits. This ratio summarizes in one number the effect of load limit changes on the damage generation potential for each truck type.

Option 3: All information of Option 2 is supplied plus a listing of the weight distributions resulting from the application of the shifting procedure.

These shifted weighted data shows the shifted load distributions in 2000-lb (908-kg) weight intervals for single axles, tandem axles, tridem axles, and steering axles.

Basically, keyword -OUTPUT- is most useful for a diagnostic study to insure summary output validity and reasonableness based on the availability of input data, calculations, and decision criteria. This is often
useful because the predicted effects of changing parameters on "delta costs" are not always obvious, and can be quite data-specific.

INPUT GUIDE

Program RENU was designed so that the required data are input in a simple yet logical manner; problems dealing with nearly similar situations can be handled easily by providing for successive problems after the first, only those directives (data input cards) containing the data which are changed. For any one problem the directives can appear in any order, except that the -RUN PARAMETERS- directive must begin the data deck, and a -STOP- directive must follow the data for the last problem. An input guide describing the full use of RENU appears in Appendix A. The Input Guide contains not only card images and definitions but an alphabetical listing and description of all the keywords. Table 6 contains a sample ordering of the keywords to demonstrate how subsequent problems may be stacked in one run of program RENU.
### TABLE 6. Sample keyword ordering.

<table>
<thead>
<tr>
<th>KEYWORDS</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUN PARAMETERS</td>
<td>First Representative Interstate Flexible Section</td>
</tr>
<tr>
<td>SYSTEM TITLE</td>
<td>Salvage Value Information Also Included</td>
</tr>
<tr>
<td>FLEXIBLE AGE DISTRIBUTION TRUCK TYPE LOAD LIMITS STEERING AXLES SINGLE AXLES TANDEM AXLES TRIDEMS GVW EMPTY PERFORMANCE OVERLAY MODEL MAINT OLD SECTIONS EXECUTE FLEXIBLE AGE DISTRIBUTION EXECUTE RIGID AGE DISTRIBUTION OVERLAY EXECUTE RIGID AGE DISTRIBUTION EXECUTE SYSTEM TITLE FLEXIBLE AGE DISTRIBUTION TRUCK TYPE LOAD LIMITS STEERING AXLES SINGLE AXLES TANDEM AXLES TRIDEMS GVW EMPTY PERFORMANCE OVERLAY HISTORICAL MAINT OLD SECTIONS EXECUTE RIGID AGE DISTRIBUTION EXECUTE OUTPUT STOP</td>
<td></td>
</tr>
</tbody>
</table>

First Representative Interstate Flexible Section
Salvage Value Information Also Included
Interstate Truck Data
Interstate Truck Data
Interstate Truck Data
Interstate Truck Data
Interstate Truck Data
Interstate Truck Data
Interstate Truck Data
Interstate Truck Data
EAROMAR Maintenance Model Used
Handling of POTTS Sections
Run 1st Representative Section
Second Representative Interstate Flexible Section
First Representative Interstate Rigid Section
Overlay Parameters Changed
Second Representative Interstate Rigid Section
Beginning of Second Classification System
Representative Primary Flexible Section
Primary Truck Data (Different than Interstate)
Primary Truck Data (Different than Interstate)
Primary Truck Data (Different than Interstate)
Primary Truck Data (Different than Interstate)
Primary Truck Data (Different than Interstate)
Primary Truck Data (Different than Interstate)
Primary Truck Data (Different than Interstate)
Maintenance Model changed for Primary Sections
Representative Primary Rigid Section
Program RENU contains numerous input data and solution output capabilities. An illustrative sample problem is presented which covers many of these options. This chapter reviews the input data requirements, output forms, and results of this illustrative problem.

The illustrative problem represents the type of RENU solution which would be required to analyze an Interstate system with two representative sections. All of the data used for the problem were gathered during visits with SDHPT personnel conducted during this project. None of the safety implications of the vehicles are considered in RENU, only their effects on the pavement.

ILLUSTRATIVE PROBLEM INPUT DATA

Input data should be arranged according to a system classification and representative section hierarchy. In the illustrative problem, the only highway network classification system is the Interstate. For this system there are two different sections used to represent the lane mileage of the system.

RENU has the capability to handle eight systems and a maximum of ten sections per system in a single solution. The program can use different loadometer data for every representative section if the user has such data; however, the axle load distribution information is more system dependent as evidenced by the forms used for reporting those data in the W-4 and W-5 tables.

All input information is printed in the output in two forms to assist the user. First, an echo print of the data cards exactly as punched is provided to assist the user in locating data punching and arrangement errors. Secondly, these data are repeated in a "report form," which is easier to decipher and could be used more effectively in reporting. These two data forms are printed successively for each representative section, one at a time. Appendix C contains an echo print from the illustrative problem input data and the "report form" output of all data for the illustrative problem. These figures show that the traffic data are quite extensive. If the data remain the same in successive problems as a previous representative section, for example keywords LOAD LIMITS, SINGLE AXLES, TRUCK TYPE, GVW, PERFORMANCE, etc., these data are held constant and need not be reinput. Conversely, if the user desires to change in the information contained on any keyword directive only that keyword needs to be input between two -EXECUTE- keywords. A solution will be prepared which is different from a preceding solution by only those factors that are changed for the directive.
ILLUSTRATIVE PROBLEM OUTPUT

Program RENU can provide different amounts of output for each representative section as desired by the user. Using the output options of keyword -OUTPUT- as defined in Chapter 3 various amounts of printed output can be obtained. The input data (previously discussed) and cost differences and cost ratios of the network under present and proposed legal limits are always printed for each solution. These differences and ratios are presented for each representative section, and summarized for each system and the total network using unadjusted, present worth, and average annual cost bases. The summary output for the illustrative problem is also contained in Appendix C.

Other output options are as follows:

Option 1: All regular information plus a performance table for all representative sections and a summary of predicted costs.

Option 2: All Option 1 output plus a summary table of payload per truck type and a ratio of the final 18-kip (80-kN) ESAL per year for proposed and present legal limits.

Option 3: All Option 2 output plus the shifted weight distributions summarized in 2000-lb. (908-kg) intervals.

Appendix C contains output Option 1, 2, and 3 results, respectively, for the illustrative problem. These outputs are considered useful for both program verification and detailed analyses of those items which significantly affect the output. The default output which is always printed is considered to be the type of information most of interest to the user.

DISCUSSION OF ILLUSTRATIVE PROBLEM RESULTS

The illustrative problem has the following conditions:

1. One system - Interstate
2. Two representative sections - flexible and rigid
3. Analysis period - 18 years
4. Calculations based on
   a. Equal payload under present and proposed limits
   b. Model maintenance - accelerated
   c. Old sections - target value of 10%
5. Four truck types (See Figure 5)
   a. 2D
   b. 3A
   c. 3-S2
   d. 2-S1-2

6. Legal load changes
   a. Single axle  20 to 22.4 kips (89 to 99 kN)
   b. Tandem axle  34 to 36 kips (151 to 160 kN)
   c. Gross weight  80 to 120 kips (356 to 534 kN)

Appendix C contains the summary output information which is of most importance. The total predicted additional cost of allowing new increased vehicle loads is $4,738,000 in present worth terms for an eighteen-year analysis period.

In a uniform annual cost context, the increased cost of maintenance and rehabilitation on the 48 lane miles (72 km) of flexible pavements is approximately $604 per lane mile more annually, and for the 499 lane miles (803 km) of rigid pavement the costs are increased $1575 per lane mile more annually. On a system basis, this is weighted value of approximately $1489 per lane mile more annually.

Appendix C contains much detailed information concerning the calculation of the summary costs contained in the output. Five major tables for each of the representative sections are given including:

1. Performance tables under present and proposed regulations.
2. POTTS tables under present and proposed regulations.
3. A breakdown of the undiscounted total costs by section, system and overall.
4. The survivor curve results.
5. Predicted increased payloads and number of 18-kip (80-kN) by truck type.
6. Final axle load distribution shifts obtained by applying the NCHRP procedure. These can be compared with the input distributions to see the effect of the axle load distribution shifting procedure.
REFERENCES


APPENDIX A

PROGRAM RENU INPUT GUIDE

Instructions to RENU are supplied in the form of directives which occupy an entire card. The first twenty characters of each directive contain a keyword identifying the type of information being entered. All keywords may be abbreviated to their first four characters, the rest of the identifier is ignored. Keywords must begin in column one. All integers must be right justified.

The -RUN PARAMETERS- directive must be the first data input directive. The last card of the input data must be the -STOP- directive. More than one problem may be solved in a single execution of the program. Each problem must have an -EXECUTE- directive as the last directive. This directive informs the program that all data for the problem have been read. Other directives may appear in any order with the exception that the -TRUCK TYPE- directive must precede the -LOAD LIMITS-, -STEERING AXLES-, -SINGLE AXLES-, -TANDEM AXLES-, -TRIDEMS-, -GVW-, and -EMPTY- directives. If the user desires to consider both steering axles and no steering axles within a run, all problems which do not consider steering axles must set the number of axles code on the -TRUCK TYPES- directive to zero. All relevant information must be supplied for the first problem of a run via the various directives explained herein. Subsequent problems in the same program execution need only specify directives which are to be changed, because all other values will be retained from the preceding problem. All data on a single directive must be supplied, however, even if only one number is being changed.

All directives share a common format, but the meanings of the fields differ depending on the keyword identifier. These specific meanings are described for each appropriate keyword. The general format is as follows:

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Column Number</th>
<th>Type of Value</th>
<th>Format used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyword</td>
<td>1-20</td>
<td>Alphanumeric</td>
<td>5A4</td>
</tr>
<tr>
<td>IVAL(1)</td>
<td>21-25</td>
<td>Integer</td>
<td>I5</td>
</tr>
<tr>
<td>IVAL(2)</td>
<td>26-30</td>
<td>Integer</td>
<td>I5</td>
</tr>
<tr>
<td>VAL(1)</td>
<td>31-40</td>
<td>Real</td>
<td>F10.0</td>
</tr>
<tr>
<td>VAL(2)</td>
<td>41-50</td>
<td>Real</td>
<td>F10.0</td>
</tr>
<tr>
<td>VAL(3)</td>
<td>51-60</td>
<td>Real</td>
<td>F10.0</td>
</tr>
<tr>
<td>VAL(4)</td>
<td>61-70</td>
<td>Real</td>
<td>F10.0</td>
</tr>
<tr>
<td>VAL(5)</td>
<td>71-80</td>
<td>Real</td>
<td>F10.0</td>
</tr>
</tbody>
</table>
Some directives require additional data cards which are placed immediately after the card on which the directive appears. The cards are read in varying formats. Refer to the coding instructions for specific card formats. As many cards as are necessary to provide the set of input values should be supplied. It should be noted that some of the fields provided on a card may be blank.
**KEYWORD:** RUN PARAMETERS*

**DIRECTIVE** (one card)

<table>
<thead>
<tr>
<th>RUN PARAMETERS</th>
<th>NYAP</th>
<th>IEQTRP</th>
<th>AGR</th>
<th>RTINT</th>
<th>XHCIO</th>
<th>XHCIM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15</td>
<td>15</td>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NYAP** - Number of Years in the Analysis Period, \( \leq 20 \), (right justified)

**IEQTRP** - 18-kip (80-kN) Equivalent Single Axle Loads (ESAL) Analysis Method Switch, (right adjusted)
- \( = 0 \): 18 kip (80-kN) ESAL analysis based on trucks carrying equal total payload under present and proposed load limits
- \( = 1 \): 18-kip (80-kN) ESAL analysis method based on trucks making the same number of trips (unequal total payload) under the two sets of load limits
  (for further explanation see the Keyword Dictionary, pg. 20)

**AGR** - Annual Growth Rate in 18-kip (80-kN) Equivalent Single Axle Loads (percent per year)

**RTINT** - Interest Rate used for economic analysis (percent per year)

**XHCIO** - Surfacing Cost Index (express in decimal form)

**XHCIM** - Maintenance Material Cost Index (express in decimal form)

*Must be the first directive of the data deck and the first directive after any -EXECUTE- directive if NYAP, IEQTRP, AGR, or RTINT are to be changed, except that only the -SYSTEM TITLE- directive may precede this directive.*
KEYWORD: SYSTEM TITLE

DIRECTIVE (one card required for each highway system)

```
SYSTEM TITLE
1   20
```

PROBLEM AND SYSTEM IDENTIFICATION (three cards required)

```
TITLE
20A4
1   80
```

TITLE - Alphanumeric Problem and System Title and all identifying information to be printed on each page of output
KEYWORD: FLEXIBLE (omit if -RIGID- directive is used)*

DIRECTIVE (one card)

<table>
<thead>
<tr>
<th>WLANE</th>
<th>PF</th>
<th>PFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLEXIBLE</td>
<td>F10.0</td>
<td>F10.0</td>
</tr>
</tbody>
</table>

WLANE - Lane Width (feet)
PF - Assymptotic serviceability index
PFO - Assymptotic serviceability index for overlay

SECTION DESCRIPTION (one card required)

<table>
<thead>
<tr>
<th>SECTTL</th>
</tr>
</thead>
<tbody>
<tr>
<td>20A4</td>
</tr>
</tbody>
</table>

SECTTL - Alphanumeric Section Title to identify each representative section in the output. The first eight columns should contain an eight letter alphanumeric label which will be used in abbreviated prints

*Only one representative section can be placed between -EXECUTE- keywords. Therefore either -RIGID- keyword or -FLEXIBLE- keyword is used but not both for any one problem.
<table>
<thead>
<tr>
<th>NDIST</th>
<th>NIS</th>
<th>NPT</th>
<th>NRU</th>
<th>NLH</th>
<th>NDEL</th>
<th>TPE</th>
<th>MNOVTK</th>
<th>MXOVTK</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

- **NDIST**: District Number. If more than one district is in the section, include the number of one of the districts within the group.
- **NIS**: Indicator 1. Interstate 2. FM 3. US or State
- **NPT**: Type of Pavement* 1. Hot Mix 3. Surface treated 4. Overlaid
- **NRU**: Indicator 1. Rural 2. Urban
- **NLH**: Indicator 1. Low traffic intensity 2. High traffic intensity
- **NDEL**: Estimated time between overlays for distressed pavements
- **TPE**: Flag 0 - PF, PFO given 1 - Use Texas Performance Equations Option
- **MNOVTK**: Minimum overlay thickness
- **MXOVTK**: Maximum overlay thickness

* Pavement type 2 is Thick Hot Mix and pavement type 5 is Hot Mix on Black Base; however, since these pavement types are such a small proportion of the Texas highway network, survivor curves have not been included in RENU.
MATERIALS (one card required; up to four layers; place surface layer first and proceed down into structure; Format specification is 4(A3, 2x, 2F5.0, 1x))

<table>
<thead>
<tr>
<th>MCODE</th>
<th>THICK</th>
<th>STRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>F5.0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>17</td>
<td>22</td>
<td>27</td>
</tr>
<tr>
<td>33</td>
<td>38</td>
<td>43</td>
</tr>
<tr>
<td>49</td>
<td>54</td>
<td>59</td>
</tr>
</tbody>
</table>

**MCODE** - Material Code
- ACP - Asphalt Concrete Pavement
- ATB - Asphalt Treated Base
- AGB - Aggregate Base
- CTB - Cement Treated Base
- SAB - Sand Asphalt Base
- LTB - Lime Treated Base
- AGS - Aggregate Subbase
- LTS - Lime Treated Subbase

**THICK** - Layer Thickness (inches) (Layer thicknesses for representative sections will be used if left blank)

**STRC** - Structural Coefficient (if blank, default is used; refer to Table 7)

(FOR FLEXIBLE PAVEMENTS INSERT BLANK CARD)
Table 7. AASHTO structural coefficients.

<table>
<thead>
<tr>
<th>MATERIAL TYPE</th>
<th>MATERIAL CODE</th>
<th>AASHTO STRUCTURAL COEFFICIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt Concrete Pavement</td>
<td>ACP</td>
<td>.44</td>
</tr>
<tr>
<td>Jointed Concrete Pavement</td>
<td>JCP</td>
<td></td>
</tr>
<tr>
<td>Continuously Reinforced Pavement</td>
<td>CRC</td>
<td></td>
</tr>
<tr>
<td>Asphalt Treated Base</td>
<td>ATB</td>
<td>.34</td>
</tr>
<tr>
<td>Aggregate Base</td>
<td>AGB</td>
<td>.14</td>
</tr>
<tr>
<td>Cement Treated Base</td>
<td>CTB</td>
<td>.23</td>
</tr>
<tr>
<td>Sand Asphalt Base</td>
<td>SAB</td>
<td>.30</td>
</tr>
<tr>
<td>Lime Treated Base</td>
<td>LTB</td>
<td>.18</td>
</tr>
<tr>
<td>Aggregate Subbase</td>
<td>AGS</td>
<td>.11</td>
</tr>
<tr>
<td>Lime Treated Subbase</td>
<td>LTS</td>
<td>.14</td>
</tr>
</tbody>
</table>
KEYWORD: RIGID (omit if -FLEXIBLE- directive is used)*

DIRECTIVE (one card)

<table>
<thead>
<tr>
<th>WLANE</th>
<th>XK</th>
<th>AGG</th>
<th>E</th>
<th>DISTCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIGID</td>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
</tr>
</tbody>
</table>

WLANE - Lane Width (feet)

XK - Composite Support Value, k (pci)

AGG - Type of aggregate (0=Siliceous river gravel, 1=Limestone)

E - Modulus of Concrete (psi), DISTCT - District number

SECTION DESCRIPTION (one card required)

<table>
<thead>
<tr>
<th>SECTTL</th>
</tr>
</thead>
<tbody>
<tr>
<td>20A4</td>
</tr>
</tbody>
</table>

SECTTL - Alphanumeric Section Title to identify each representative section in the output. The first eight columns should contain an eight letter alphanumeric label which will be used in abbreviated prints.

*Only one representative section can be placed between -EXECUTE- keywords. Therefore either -RIGID- keyword or -FLEXIBLE- keyword is used but not both for any one problem.
MATERIALS (one card required; up to four layers; Format specification is 4 (A3, 2x, 2F5.0, 1x)**

<table>
<thead>
<tr>
<th>MCODE</th>
<th>THICK</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>F5.0</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>A3</td>
<td>F5.0</td>
</tr>
<tr>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>A3</td>
<td>F5.0</td>
</tr>
<tr>
<td>33</td>
<td>38</td>
</tr>
<tr>
<td>A3</td>
<td>F5.0</td>
</tr>
<tr>
<td>49</td>
<td>54</td>
</tr>
</tbody>
</table>

**The input of ACP and a thickness for the first layer, followed by a CRC or JCP layer, will key the procedure to consider the section as composite. The asphalt and rigid layer thicknesses will be converted to an equivalent thickness of rigid material.**

MCODE = Material Code
JCP = Jointed Concrete Pavement
CRC = Continuously Reinforced Concrete
(also, any applicable material codes under the -FLEXIBLE- directive)**
KEYWORD: SINGLE AXLES

DIRECTIVE (one card)

<table>
<thead>
<tr>
<th>SINGLE AXLES</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLDI</td>
<td></td>
</tr>
<tr>
<td>STARTS</td>
<td>F100</td>
</tr>
</tbody>
</table>

NLDI - Number of Load Intervals in the Single Axle Load Distribution Array, \( \leq 30 \) (right justified).

STARTS - Beginning of First Load Interval for Single Axle Load Distribution Array

SINGLES (NLDI cards required; maximum of 30 intervals)

<table>
<thead>
<tr>
<th>ELDINT</th>
<th>10</th>
<th>17</th>
<th>24</th>
<th>31</th>
<th>38</th>
<th>45</th>
<th>52</th>
<th>59</th>
<th>66</th>
<th>73</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>F10.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ELDINT - Load at Upper End of Load Interval

SA - Number of Single Axles Weighed within this Interval by Truck Type (order of input must conform to order of truck type labels following the -TRUCK TYPE- directive)
**KEYWORD:** AGE DISTRIBUTION

**DIRECTIVE** (one card)

<table>
<thead>
<tr>
<th>AGE DISTRIBUTION</th>
<th>NASL</th>
<th>ISLV</th>
<th>FLRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
</tbody>
</table>

**NASL** - Number of Years for which Lane-Mile Data is Provided, \(< 30\) (right justified).

**ISLV** - Salvage Value Switch
- 0 - No salvage value data read; no salvage value computations
- 1 - Read NASL values of material value and NASL values of rate of loss of value; calculate salvage value at beginning of analysis period and at the end under both present and proposed regulations.

**FLRP** - Factor by which the loss rate is to be multiplied for any mileage going into POTTs (Pavement Older Than Terminal Serviceability). If no value is provided, a default is selected from an internal table based on the input value of terminal PSI, PTERM.

**MILEAGE** (one or two cards required)

<table>
<thead>
<tr>
<th>XLM (I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
</tbody>
</table>

**XLM** - Number of Lane Miles for Pavement Ages 1 through NASL (First card must have at least one non-zero entry).

**VALUE** (one or two cards required)

<table>
<thead>
<tr>
<th>VALUE (I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
<tr>
<td>F5.0</td>
</tr>
</tbody>
</table>

**VI** - Material value of existing pavement, estimated at the beginning of the analysis period. One value for each pavement age, in thousands of dollars per lane mile. (Read only if ISLV \(> 0\))
LOSS RATE (one or two cards required)

<table>
<thead>
<tr>
<th>RI(t)</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
<th>0.0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>55</td>
<td>60</td>
</tr>
</tbody>
</table>

RI - Rate of loss of value, percent per year, for each pavement age.
(Read only if ISLV > 0)
KEYWORD: TRUCK TYPE (must precede -LOAD LIMITS-, -STEERING AXLES-, -SINGLE AXLES-, -TANDEM AXLES-, -TRIDEMS-, -GVW-, and -EMPTY- directives)

DIRECTIVE (one card)

<table>
<thead>
<tr>
<th>TRUCK TYPE</th>
<th>NTTY</th>
<th>NATT</th>
<th>PERCT(1)</th>
<th>PERCT(2)</th>
<th>PERCT(3)</th>
<th>PERCT(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
</tr>
</tbody>
</table>

NTTY - Number of Truck Types (≤ 10) (right adjusted)

NATT - Number of Truck Types Added During Analysis Period (≤ 10 - NTTY). If NATT > 0: read a second set of truck percent data for proposed regulations (see Keyword Dictionary, pg. 89)

PERCT(i) - Percentage of each truck type (2D, 3A, 3-s2, 2, S1-2, respectively) which is shifted.

LABEL (maximum of 2 cards; Format specification 8(2A4, 2x))

<table>
<thead>
<tr>
<th>TTYP(2 NTTY + NATT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A4 2A4 2A4 2A4 2A4 2A4 2A4 2A4</td>
</tr>
<tr>
<td>8 11 21 31 41 51 61 71</td>
</tr>
</tbody>
</table>

TTYP - AASHTO Truck Type Notation for Vehicle Axle Arrangement*
(up to ten truck types, eight on first card and two on second card)

*See Recommended Policy of Maximum Dimensions and Weights of Motor Vehicles to be Operated Over the Highways for the United States, American Association of State Highways and Transportation Officials, 1974.
AXLES (maximum of 2 cards; Format specification (I3, 1x, 11F6.0))

<table>
<thead>
<tr>
<th>NAXLES</th>
<th>NAXLES (IO, 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 2 0 1</td>
<td>412 412 412 412</td>
</tr>
<tr>
<td>1 2 3 4 5 6 7 8 9 0</td>
<td>10 18 20 28 30 38 40 48 50 58 60 68 70 78 78</td>
</tr>
</tbody>
</table>

NAXLES - Number of Single, Tandem, Tridem and Steering Axles per Truck by Truck Type (see Keyword Dictionary, pg. 89 for a sample input). Numbers must be right justified integers. First Field has example input for 3-S2

TRUCK DATA (one card for each analysis year required; Format specification 8(4I2, 2x))

<table>
<thead>
<tr>
<th>I</th>
<th>PTTYP (IO, 20, 2)</th>
<th>PCTTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3 5 11 17 23 29 35 41 47 53 59 65</td>
<td></td>
</tr>
</tbody>
</table>

I - Analysis Year (right adjusted)

PTTYP - Percent of Given Truck Type as a Percentage of all Vehicles

PCTTR - Percent of all Trucks as a Percentage of all Vehicles
KEYWORD: LOAD LIMITS

DIRECTIVE (one card)

IEWS - Empty Weight Switch
- 0: omit WEIGHT INCREASE card
- >0: read WEIGHT INCREASE card

WEIGHT LIMITS (two cards required; first card must contain present limits a-d second card must contain proposed limit)

PGVWL - Gross Vehicle Weight Limit (kips)
PSAL - Single Axle Legal Load Limit (kips)
PTAL - Tandem Axle Legal Load Limit (kips)
PTRLAL - Tridem Axle Legal Load Limit (kips)
STEERING WEIGHT (two cards required; first card must contain present limits; second card must contain proposed limits)

<table>
<thead>
<tr>
<th>PSTAW (10,2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F80</td>
</tr>
<tr>
<td>16</td>
</tr>
</tbody>
</table>

PSTAW - Steering Axle Weight by Truck Type (kips) (first field corresponds to first truck type)

WEIGHT INCREASE (one card required if IEWS>0)

<table>
<thead>
<tr>
<th>EPI (10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F80</td>
</tr>
<tr>
<td>16</td>
</tr>
</tbody>
</table>

EPI - Percentage Increase of Empty Vehicle Weight from Present to Proposed Weights Limits (first field corresponds to first truck type)
This card is read if IEWS>0
KEYWORD: TANDEM AXLES

DIRECTIVE (one card)

<table>
<thead>
<tr>
<th>TANDEM AXLES</th>
<th>NLDI</th>
<th>STARTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15</td>
<td>F100</td>
</tr>
</tbody>
</table>

NLDI - Number of Load Intervals in the Tandem Axle Load Distribution Array (<30)(right justified).

STARTS - Beginning of First Load interval for Tandem Axle Load Distribution Array

TANDEMS (NLDI cards required; maximum of 30 intervals)

<table>
<thead>
<tr>
<th>ELINT</th>
<th>TA (10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F100</td>
<td>F70</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

ELDINT - Load at Upper End of Load Interval

TA - Number of Tandem Axles Weighted within this Interval by Truck Type (order of input must conform to order of truck type labels following the -TRUCK TYPE- directive)
KEYWORD: GVW

DIRECTIVE (one card)

NLDI - Number of Load Intervals in the Gross Vehicle Weight Load Distribution Array, (<75) (right adjusted)

STARTS - Beginning of first load interval in the Gross Vehicle Weight Load Distribution Array

GROSS (NLDI cards required; maximum of 75 intervals)

ELDINT - Load at Upper End of Load Interval

VG - Number of Trucks with Gross Vehicle Weight in this Interval by Truck Type (order of input must conform to order of truck type labels following the -TRUCK TYPE- directive)
KEYWORD: EMPTY

DIRECTIVE (one card)

NLDI - Number of Load Intervals in the Empty Load Distribution Array, \((<= 30)\) (right justified).

STARTS - Beginning of first load interval in the Empty Load Distribution Array

EMPTY VEHICLES (NLDI cards required; maximum of 30 intervals)

ELDINT - Load at Upper End of Load Interval

VE - Number of Trucks with Empty Vehicle Weight in this Interval by Truck Type (order of input must conform to order of truck type labels following the -TRUCK TYPE- directive)
KEYWORD: STEERING AXLES (optional)

DIRECTIVE (one card)

NLDI - Number of Load Intervals in the Steering Axle Load Distribution Array, \( \leq 30 \) (right justified)

STARTS - Beginning of First Load Interval in the Steering Axle Load Distribution Array

STEERING AXLES (NLDI card required; maximum of 30 intervals)

ELDINT - Load at Upper End of Load Interval

ST - Number of Steering Axles Weighed within this Interval by Truck Type (order of input must conform to order of truck type labels following the -TRUCK TYPE- directive)
KEYWORD: TRIDEMS (optional)

DIRECTIVE (one card)

NLDI - Number of Load Intervals in the Tridem Axle Load Distribution Array, (~<50)(right justified).

STARTS - Beginning of First Load Interval in the Tridem Axle Load Distribution Array

TRIDEM AXLES (NLDI cards required; maximum of 50 intervals)

ELDINT - Load at Upper End of Load Interval

TR - Number of Tridem Axles Weighed within this interval by Truck Type (order of input must conform to order of truck type labels following the -TRUCK TYPE- directive)
KEYWORD: PERFORMANCE

DIRECTIVE (one card)

PICON - PSI at Initial Construction
PTERM - PSI Terminal
PIOV - PSI after Overlay
OVLIF - Overlay Design Life (years); if left blank defaults to 20 years

ATP - Average Age at Terminal PSI (age at which 50% of the pavements have been overlaid) for a Representative Section (years) (default is 20.0)
**KEYWORD:** OVERLAY

**DIRECTIVE** (one card)

<table>
<thead>
<tr>
<th>ICAC</th>
<th>ICGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERLAY</td>
<td>15 15</td>
</tr>
</tbody>
</table>

| 1 | 20 | 25 | 30 |

- **ICAC** - Switch for Units on Asphalt Concrete Unit Cost (right adjusted)
  - 1 = $/ton
  - 2 = $/cy
  - 3 = $/sy/in

- **ICGR** - Switch for Units on Granular Base Unit Cost (right adjusted)

**MISC. DATA** (one card required)

<table>
<thead>
<tr>
<th>PPVDSH</th>
<th>WPSH</th>
<th>WGSH</th>
<th>CAC</th>
<th>CGR</th>
<th>ACDENS</th>
<th>GRDENS</th>
</tr>
</thead>
<tbody>
<tr>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
</tr>
</tbody>
</table>

| 1 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

- **PPVDSH** - Percent Paved Shoulders

- **WPSH** - Average Paved Shoulder Width per Lane (feet), see example calculation Chapter 3

- **WGSH** - Average Granular Shoulder Width per Lane (feet), see example calculation Chapter 3

- **CAC** - Unit Cost of AC (units based on ICAC)

- **CGR** - Unit Cost of Granular Material (units based on ICGR)

- **ACDENS** - Density of Compacted AC (pcl) (required only 11 ICAC - 1)

- **GRDENS** - Density of Compacted Granular or Turf Material (pcl) (required only 11 ICGR - 1)
KEYWORD:  HISTORICAL MAINT (omit if -MODEL MAINT- or -NO MAINT- directive is used)*

DIRECTIVE (one card)

IARMS - Accelerated Routine Maintenance Spending Switch (right justified).
  = 0: do not accelerate
  = 1: accelerate

COST DATA (24 cost values for each pavement structure)

USRMDL - Historical Maintenance Costs in Dollars per Lane Mile, by Age, in order of increasing age for Flexible and Rigid pavement (read flexible pavement maintenance costs followed by rigid pavement maintenance costs)

*Only one maintenance model may be used for each representative section. If one model is applicable for all sections this data need be input only with first representative section.
KEYWORD: NO MAINT (omit if -MODEL MAINT- or -HISTORICAL MAINT- directive is used)*

DIRECTIVE (one card)

*Only one maintenance model may be used for each representative section. If one model is applicable for all sections this data need be input only with first representative section.
KEYWORD: MODEL MAINT (omit if -HISTORICAL MAINT- or -NO MAINT- directive is used)*

DIRECTIVE (one card)

IARMS - Accelerated Routine Maintenance Spending Switch (right justified).
- 0: do not accelerate
- 1: accelerate

COST DATA (two cards required)

Card 1: Cost Data for Flexible Pavement

<table>
<thead>
<tr>
<th>UNTCST (1)</th>
<th>UNTCST (2)</th>
<th>UNTCST (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
</tr>
</tbody>
</table>

*Only one maintenance model may be used for each representative section. If one model is applicable for all sections this data need be input only with first representative section.
Card 2: Cost Data for Rigid Pavement

<table>
<thead>
<tr>
<th>UNTCST (4)</th>
<th>DISS</th>
<th>DCON</th>
<th>DINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
<td>F10.0</td>
</tr>
</tbody>
</table>

1 10 20 30 40

UNITCST(4) - Unit Cost of failure per lane-mile ($)
DISS - Number of failure at the time of survey
DCON - Date of survey condition (years)
DINT - Initial data of planning
**KEYWORD:** OLD SECTIONS

**DIRECTIVE (one card)**

<table>
<thead>
<tr>
<th>OLD SECTIONS</th>
<th>IPOT</th>
<th>IFF</th>
<th>OLDMNT</th>
<th>TPF</th>
<th>PFNO</th>
<th>RTINF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
</tr>
</tbody>
</table>

**IPOT - POTTS Operation Switch**
- =0: keep pavement older than Age to Terminal PSI (ATP) in POTTS
- =1: change percent of POTTS to some new target value at end of the analysis period
- =2: change POTTS size depending on projected overlay funding in dollars/yr for this representative section

**IFF - Funding Operating Switch (used only if IPOT = 2)**
- =0: funding under proposed limits is set to funding under present limits
- =1: read projected funding under proposed limits

**OLDMNT - Maintenance Cost for These Sections in Dollars/Lane Mile/Yr (read for all values of IPOT)**

**TPF - Target Fraction of POTTS in Percent of Total Lane Miles (read for IPOT = 1)**

**PFNO - Percent of Total Lane Miles Not Expected to be Overlaid in the Analysis Period (read for IPOT = 1 or 2)**

**RTINF - Percent Inflation for Project Overlay Funding (read for IPOT = 2)**
PROJECT FUNDS (up to six cards; read only if IPOT = 2)

<table>
<thead>
<tr>
<th>APOF (20, 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.0</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

APOF - Annual Projected Overlay Funds (dollars/year)
IFF = 0: read projected overlay funds under present regulations per each year of the analysis period
IFF = 1: read projected overlay funds under present regulations followed by projected overlay funds under proposed regulations for each year of the analysis period
Begin each array with year 1 of analysis period and specify for successively higher years
KEYWORD: EXECUTE (this card must be the last card of each problem set; see -STOP- directive)

DIRECTIVE (one card)

KEYWORD: OUTPUT

DIRECTIVE (one card)

IOUT - Output Form Switch
(refer to Table 8 for the various output values)
Table 8. Output options.

<table>
<thead>
<tr>
<th>OPTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 0*: Provides maintenance and rehabilitation cost differences and cost ratios between proposed and present legal limits. The data are provided for all representative sections and summarized by system. These costs are presented in three forms: unadjusted, present worth, and uniform annual cost.</td>
<td></td>
</tr>
<tr>
<td>Option 1: All the default information is supplied plus performance tables, Potts tables, and summary cost tables.</td>
<td></td>
</tr>
<tr>
<td>Option 2: All of information of Option 1 is supplied plus summary payload and 18-kip (80-kN) ESAL information.</td>
<td></td>
</tr>
<tr>
<td>Option 3: All information of Option 2 is supplied plus a listing of the shifted weight distributions resulting from application of the NCHRP 141 shifting procedure.</td>
<td></td>
</tr>
</tbody>
</table>
KEYWORD: STOP (this directive is always the last data card)

DIRECTIVE (one card)
APPENDIX B

LISTING OF PROGRAM RENU
PROGRAM TO DETERMINE EFFECT OF LEGAL LOAD LIMITS ON LONG-RANGE
PAVEMENT COSTS.

THIS VERSION CREATED AUG 7-1981

COMMON /MECH/XKT,NRU,NLH,ND,NDEL
COMMON /COSTS/ COSM(20,2), COSV(20,2), COSMS(20,2), COSVS(20,2),
1 CSMPW(2), CSVPW(2), CSMUA(2), CSVUA(2)
COMMON /EALPAY/ EALPT(10,2), APPT(10,2), EALFCT(20), IEQTRP
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /FUNDS/ APFO(20,2), RTINT, RTINF
COMMON /IO/ LI, LO, LD
COMMON /LABELS/ MATLAB(5,10)
COMMON /LMP/ XLM(30), YLM(30), POTLM(20,2), OUTP(20,2),
1 TOTALM, PPF, PFNO, NML, NSL, TOVL(30,2)
COMMON /MISC/ IPOT, IARMS, OLDMNT, AGF
COMMON /OUT/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTOVM(30,2),
1 PSIB(30)
COMMON /OVER/ TOV(30,2), SNOV(30,2), THOV(30,2)
COMMON /DRLAY/ XHCID, XHCM, WML, WPSH, WSH, PPVDM, CAC, CGR
COMMON /PV/ SNOPV(20,2), THOPV(20,2), CSTOPV(20,2), PP(20,2),
1 RLP(20,2)
COMMON /PS/ PFI, PFCON, PTERM, PID, PTOV
COMMON /STROE/ STROD(8), MC(11), NC, STRC(5), RF(4), RB(4)
COMMON /TEMP/ COM(25), DISTCT
COMMON /STRUC/ SN, S, R, AG, XJ, XE
COMMON /SUM/ SECTL(2,10,8), SYSTLE(60,8), NSECT(8), DELC(10,8),
1 COSR(10,8), DECPW(10,8), COSRPW(10,8), DELCUA(10,8),
2 COSMUA(10,8), RLRT(10,8), TLM(10,8), DSLV(10,8), NSYS
COMMON /CMP/ COM(30,34), PCOMP(30), AATP(30)
COMMON /SLVG/ ISLV, FLR, V(30), RI(30), VI(30), RL(30),
1 U(30), PL(30), MI(30), P(20), VP(20), RP(20),
2 PB, VPB, RB, NS, NY, SV(6,2), SVB, FLRPT(4)
COMMON /TIME/ ATP, DVLIF, NVAP, NVR, YR(40)
COMMON /TITLE/ TITLE(20,3), SECTL(20)
COMMON /HOR/A(10), B(10), C(10), DT(10), DF(10), S(10), T(10), TR(5), PI(5)
1 P(5), AC(5), AA, SCT(5), XMNW18(10), XKTO
COMMON /EXTRA/ TPE, PF, MNVTK, MXVTK, NS
CALL INIT(1)
CALL INPUT (IGO)
GO TO (110, 200, 300, 300), IGO
CALL INIT(2)
CALL PLOT
CALL MINTSET
CALL INPRINT
CALL EALGET
CALL OUTPUT (2)

RENU

LEVEL 2.3.0 (JUNE 78)
LEVEL 2.3.0 (JUNE 78) MAIN 05/360 FORTRAN H EXTENDED DATE 82.147/20.12.14 PAGE 2

ISN 0035  CALL LIFCYC
ISN 0036  CALL OUTPUT(1)
ISN 0037  IF (ISLV .GT. 0) CALL SALVAG
ISN 0039  CALL FINANC (IERR)
ISN 0040  CALL OUTPUT (4)
ISN 0041  IF (IERR .GT. 0) GO TO 300
ISN 0043  GO TO 100
ISN 0044  200 CONTINUE
ISN 0045  GO TO 100
ISN 0046  300 CALL OUTPUT(0)
ISN 0047  STOP
ISN 0048  END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP FORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 47, PROGRAM SIZE = 696, SUBPROGRAM NAME = MAIN

*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION ***** 128K BYTES OF CORE NOT USED
SUBROUTINE NPAGE

THIS ROUTINE EJECTS THE CURRENT PRINTER PAGE AND PRINTS THE
HEADING AND PAGE NUMBER

COMMON /10/ LI, LO, LD
DATA NPG /0/
NPG = NPG + 1
WRITE (LO,20) NPG
20 FORMAT(1H1/1X,30HTEXAS TRANSPORTATION INSTITUTE,90X,
      5HPAGE , I3 //
      1X,48HRENU * - WEIGHT EFFECTS ON PAVEMENT PERFORMANCE /
      1X,27HVERSION 1.1 - AUGUST 1981 //)

RETURN
END
**LEVEL 2.3.0 (JUNE 78)**

**OS/360 FORTRAN**

**EXTENDED DATE 82.147/20.12.27**

**PAGE 1**

**REQUESTED OPTIONS:** NODECK, NOLIST, OPT(O), NODUMP

**OPTIONS IN EFFECT:** NAME(MAIN) NOOPTIMIZE LICECOUNT(60) SIZE(MAX) AUTODBL(NONE)

**SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(1)**

```
ISN 0002   BLOCK DATA
ISN 0003   COMMON /TEMPC/ CONT(25),DISTCT
ISN 0004   COMMON /MECH/XKT,NRU,NLH,ND,NDEL
ISN 0005   COMMON/HOR/A(10),B(10),C(10),DT(10),DF(10),S(10),T(10),TR(5),PI(5)
*  PT(5),AC(5),AA,SCT(5),XMNW18(10),XXTD
ISN 0006   COMMON /EXTRA/ TPE,PF0,MMNV,MMVTK,MMVTK,NIS
ISN 0007   COMMON /CNSTS/ NAPOV,PAPOV,SIZE,AVRG
ISN 0008   COMMON /EXPVT/ NPT,THICK(4),MTYPE(4),NLAY,IP,IF,IR,IC
ISN 0009   COMMON /FUNDS/ APOF(20.2),RTINT,RTINF
ISN 0010   COMMON /ID/ LI,LO,LD
ISN 0011   COMMON /LABELS/ MATLAB(5,10)
ISN 0012   COMMON /LMP/ XLM(30),YLM(30),POTLM(20,2),OUTP(20,2)
1          TOTALM,PPF,PN0,vASL,NSL,TDVLM(30,2)
ISN 0013   COMMON /MISC/ IPT,IA3,OLDMNT,AGF
ISN 0014   COMMON /OVLAY/ XHCIO,XHCIO,WLANE,WSHP,WGSH,PPVDSH,CAC,CGR
ISN 0015   COMMON /PSI/ PFC,P1CON,PTERM,PIOV,PTOV
ISN 0016   COMMON /STEER/ EQFACT(15,5),PTST(4)
ISN 0017   COMMON /STRUC/ SN,SS,R,D,AGG,XJ,XK,E
ISN 0018   COMMON /STRODE/ STRC(8),CC(4),MC(11),NC,STRC(5),RFS(4),RFB(4)
ISN 0019   COMMON /TIME/ ATP,OVLIF,MYAP,MYR,MYR(40)
ISN 0020   COMMON /SLVG/ ISLV,FLRP,VI(30),RI(30),VL(30),RL(30)
1          U(30),P(30),M1(30),P(20),VP(20),RP(20)
2          PB,VBP,RPB,NS,NQ,SV(6,2),SVB,FLRP(4)

C **************************************************************
C VARIABLES COMPARISON BETWEEN AASHO & TEXAS EQUATIONS
C
C    TEXAS      AASHO      DESCRIPTIONS
C    --------   --------   ------------------------
C    C(1)       ALF       HARMONIC MEAN TEMPERATURE
C    C(2)       TI        THORN THWAITE INDEX
C    C(3)       FTC       ANNUAL AVERAGE FREEZE-THAW CYCLES
C    C(4)       WFTC      MEAN MONTHLY TEMPERATURE
C    C(5)       PR        ANNUAL AVERAGE RAINFALL
C    C(6)       TM        MEAN MONTHLY TEMPERATURE
C    DF(1)      DMD       MAXIMUM DEFLEXION
C    DF(2)      SCI       SURFACE CURVATURE INDEX
C    DT(1)      AS        ASPHALT STIFFNESS
C    S(1)       TTC       TEXAS TRIAXIAL CLASS
C    S(2)       SLL       LIQUID LIMIT
C    S(3)       SPI       PLASTICITY INDEX
C    S(4)       SPP       PERCENT PASSING #200
C    T(1)       T         AGE IN YEARS
C    TR(1)      ADT       AVERAGE DAILY TRAFFIC
C    TR(2)      18-KIP    18-KIPS SINGLE AXLE LOADS
C    TR(NPT)    W         18-KIPS SINGLE AXLE LOADS

C **************************************************************
C *** REFER TO SUBROUTINES PSIT & RUTA
C
C ***************************************************************

ISN 0021   DATA NAPOV,PAPOV,SIZE,AVRG /21,5.0,2.0,100./
LEVEL 2.3.0 (JUNE 78) TEMPC 05/360 FORTRAN H EXTENDED DATE 82.147/20.12.27 PAGE 2

ISN 0022 DATA XHCIO/0.0/,XHCIM/0.0/
ISN 0023 DATA PICON, PTERM, PIV0, PIV0, PTOV / 4**1. /  
ISN 0024 DATA IF, IR, IC /1, 2, 3/  
ISN 0025 DATA LI, LO, LD /5, 6, 1/  
ISN 0026 DATA SS, R, AGG, XK, E /3., 1., 195.43, 150., 4.0E6/  
ISN 0027 DATA NYAP, OVLIF, ATP, NYR / 20, 20., 20., 40 /  
ISN 0028 DATA RTINT, RTINF /0., 0. /  

C TABLE OF STEERING AXLE EQUIVALENCIES BY AXLE LOAD AND TERMINAL PSI

ISN 0029 DATA XMNM/18/10*0.0/  
ISN 0030 DATA SCT/5, 5, 5, 5, 5/  
ISN 0031 DATA A/13., 13., 10., 10., 10., 10., 10., 10., 0./  
ISN 0032 DATA AC/5.5, 5.5, 5.5, 5.5/  
ISN 0033 DATA B/12., 12., 10., 10., 10., 10., 10., 10., 0./  
ISN 0034 DATA C/9.30., 125., 20., 16., 15., 0., 0., 0., 0./  
ISN 0035 DATA DT/5.0., 0., 0., 0., 0., 0., 0., 0., 0./  
ISN 0036 DATA DF/1.5, 1.2, 2.225, 0., 0., 0., 0., 0., 0./  
ISN 0037 DATA T/15., 0., 0., 0., 0., 0., 0., 0., 0./  
ISN 0038 DATA TR/36000., 36000., 36000., 36000., 36000./  
ISN 0039 DATA S/5.5, 5.5, 5.5, 5.5, 5.5/  
ISN 0040 DATA PI/4.7, 4.7, 4.4, 4.8, 4.6/  
ISN 0041 DATA PT/2.5, 2.5, 2.5, 2.5, 2.5/  
ISN 0042 DATA NAPOV, PAPOV, SIZE, AVRG /21, 5.0, 2.0, 100./  
ISN 0043 DATA PICON, PTERM, PIVO, PTOV / 4**1. /  
ISN 0044 DATA IF, IR, IC /1, 2, 3/  
ISN 0045 DATA NYAP, OVLIF, ATP, NYR / 20, 20., 20., 40 /  
ISN 0046 DATA PPF, PPF, PFFNO /0., 0., 0./  
ISN 0047 DATA RTINT, RTINF /0., 0. /  
ISN 0048 DATA PST/1.5, 2.0, 2.5, 3.0/  
ISN 0049 DATA EQFAC /2., 4., 6., 8., 10., 12., 14., 16., 18., 20., 22., 1  
   24., 26., 28., 30., 2  
   .0005, .008, .04, .13, .28, .52, .92, 1.42, 2.12, 3  
   2.95, 4.02, 5.29, 6.73, 8.31, 10.19, 4  
   .0009, .01, .05, .14, .31, .54, .86, 1.13, 1.94, 5  
   2.52, 3.35, 4.4, 5.49, 6.67, 8.05, 6  
   .002, .02, .06, .18, .36, .62, .93, 1.33, 1.9, 2.44, 7  
   3.15, 3.95, 4.82, 5.83, 6.8, 8  
   .004, .03, .09, .23, .41, .66, .94, 1.28, 1.74, 9  
   2.16, 2.7, 3.28, 3.89, 4.59, 5.23/  

ISN 0050 DATA STRCD / .44, .34, .23, .14, .30, .18, .11, .14 /  
ISN 0051 DATA RFS / .9, .7, .5/  
ISN 0052 DATA RFB /1., .9, .7, .5/  
ISN 0053 DATA CC / 1.0, 0.85, 0.75, 0.75 /  
ISN 0054 DATA NC / 11/  
ISN 0055 DATA MC / 3HACP, 3HALT, 3HCTB, 3HAGB, 3HSAB, 3HLTB, 3HAGS, 3HLS, 1  
   3HACP, 3HCRG, 3HACD /  
ISN 0056 DATA MATLAB / 4HASP, 4HALT, 4HSURF, 4HACE, 4H, 1  
   4HASP, 4HALT, 4HBAS, 4H, 4H  
   4HEM, 4HNT, 4HREAT, 4HED B, 4HASE, 3  
   4HAGGR, 4HEGAT, 4HE BA, 4HSE, 4H  
   4HES, 4HASP, 4HHALT, 4H BAS, 4HE  
   4HLIME, 4H TRE, 4HATED, 4H BAS, 4HE  
   4HAGGR, 4HEGAT, 4H SEU, 4HBAS, 4HE  
   4HLIME, 4H TRE, 4HATED, 4H SUB, 4HBAS  
   4HCRC, 4HSURF, 4HACE, 4H, 4H  
   4HCRC, 4HSURF, 4HACE, 4H, 4H  

A  

ISN 0057 DATA FLRTP / 1.2, 1.4, 1.6, 1.8 /  
*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 58, PROGRAM SIZE = 0, SUBPROGRAM NAME = TEMPC

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF-compilation ******

120K BYTES OF CORE NOT USED
SUBROUTINE INPUT (IGO)

COMMON /TEMPC/ CONTP(25), DISTCT

COMMON /EXTRA/ TPE, PF0, MVVTK, MXVTK, NIS

COMMON /MNTPAR/ UNTCST(4), USRMDL(3,1), WOTH, S, DISS, DCDN, DIN, MFLG

COMMON /MECH/XKT, NRU, NHL, ND, NDN

COMMON /EALPAY/ EALP(10), APPT(10,2), EALFCT(20), IEQTPR

COMMON /EXPT/ NPT, THICK(4), MTYP(4), NYF, IF, IR, IC

COMMON /FUNDS/ AP0F(20,2), RTINT, RTINF

COMMON /INTVLS/ STARTS(6)

COMMON /IO/ LI, L0, LD

COMMON /LABELS/ MATLAB(5,10)

COMMON /LDS/ PGWL, PSAL, PTAL, PTRL, LGVWL, FSAL, FTAL, PTRL, 1 PSTAW(10), FSTAW(10)

COMMON /LMP/ XLM(30), YLM(30), POTLM(20,2), OUTP(20,2), TOTALM, PPF, 1 TPF, FN0, NAO, NSL, TVLM(30,2)

COMMON /MISS/ IPT, IARMS, OLMN, AGF

COMMON /NEWSYS/ NEWSYS

COMMON /NMBR/ SA(30,11), TA(30,11), TR(50,11), VE(30,11), 1 VG(75,11), NLDI(10), EPI(10), ST(30,11)

COMMON /OUTSW/ IOUT

COMMON /OVLAY/ XHCCD, XHCM, WLAME, WPSh, WGSN, PPVDSH, CAC, CRG

COMMON /PSI/ P, PICON, PTERM, PINO, PT0V

COMMON /STRCD/ STRCD(8), CC(4), MC(11), NC, STRC(5), RFS(4), RFB(4)

COMMON /STRUC/ SN, S, R, O, AGG, XJ, XK, E

COMMON /TIME/ ATP, OVLIF, NVAP, NVR, YR(40)

COMMON /TITLE/ TITLE(20,3), SECTS(20)

COMMON /RTYP/ TYP(20,10), PTYP(30,20,2), PCTTR(20,2), PERCT(4), 1 NAXLES(10,4), NT(4), NTT, NMT, NEWTRK

COMMON /SLVG/ ISLV, FLRP, VL(30), RL(30), 1 U(30), PL(30), MI(30), P(20), VP(20), RP(20), 2 PB, VBP, RB, NS, NV, SV(6,2), SVB, FLRPTP(4)

COMMON /SWITCH/ OVLIF, PCTNT, PCTINF, TPFFC, FNOPC, AGR, SPCUT, 1 XML1, CAC, CDR, IAC, ACDSN, CDR, CRP, GRED, 2 INTT, SAVMNT, IDT, NLD, MCODE(5)

DIMENSION KWORD(5), IVAL(2), VAL(5), KEY(22), STRCIN(5)

DATA ISTOP /4, STOP/

DATA SATP /0, /

DATA IACO /4, ACO/

DATA ENKEY /22/

IDST = 0

NEWTRK = 0

NEWSYS = 0

ATP = SATP

CALL NPAGE

READ AND ECHO PRINT A KEYWORD CARD

2 READ (L,1) KWORD, IVAL, VAL

3 FORMAT(5A4,215,5F10.0)
WRITE (LO,4) KWORD, IVAL, VAL
4 FORMAT(1X,5A4,215,5(F10.2,2X))

C TEST FOR NORMAL PROGRAM TERMINATION
C
IF (KWORD(1) .EQ. ISTOP) GO TO 9992
C
SEARCH THE KEY TABLE FOR THE KEYWORD READ IN
C
DO 10 I=1,NIKEY
KEY = I
IF (KWORD(1) .EQ. KEY(I)) GO TO 15
10 CONTINUE
GO TO 9996
15 GO TO (9998, 9997, 100, 200, 300, 400, 500, 600, 700, 800, 900,
1 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900,
2 2000), IKEY
C
*** FLEXIBLE SECTION ***
C
100 IP = IF
WLANE = VAL(1)
WDTH = WLANE
SS = VAL(2)
R = VAL(3)
PF=VAL(4)
PFO=VAL(5)
C
READ A TITLE CARD FOR THIS SECTION
C
101 READ (LI,102) SECTTL
102 FORMAT (20A4)
WRITE (LO,103) SECTTL
103 FORMAT (1X,20A4)
IF(IP.EQ.IR) GO TO 105
C
READ AND ECHO PRINT THE MATERIALS CARD
READ(LI,19) NDIST,NIS,NPT,NRU,NLH,NDIST,TPE,MNOVTK,MXOVTK
DISTCT=FLOAT(NDIST)
105 ND=1
IF(NDIST.GT. 1.AND.NDIST.LE.9) ND=2
ND=2
19 FORMAT(915)
WRITE(LO,21) NDIST,NIS,NPT,NRU,NLH,NDIST.TPE,MNOVTK,MXOVTK
21 FORMAT(1X,915)
READ(LI,110) (MCODE(I), THICK(I), STRCIN(I), I=1,4)
IF(IP.EQ.IR) GO TO 1010
MCODE(1)=MC(1)
MCODE(2)=MC(4)
MCODE(3)=MC(8)
C
THICK REPRESENTS THE LAYER THICKNESSES OF REPRESENTATIVE
C
SECTIONS
C
IF(THICK(1).NE.0) GO TO 1010
C
IF(NPT.NE.3.0R.NRU.NE.1) GO TO 50
LEVEL 2.3.0 (JUNE 78)  INPUT 05/360 FORTRAN H EXTENDED  DATE 82.147/20.12.29  PAGE 3

ISN 0085  THICK(1)=.75
ISN 0086  THICK(2)=6.0
ISN 0087  GO TO 1010
ISN 0088  50 IF(NPT.NE.3.OR.NRU.NE.2) GO TO 51
ISN 0089  THICK(1)=0.75
ISN 0090  THICK(2)=8.0
ISN 0091  GO TO 1010
ISN 0092  IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 52
ISN 0093  THICK(1)=2.0
ISN 0094  THICK(2)=8.0
ISN 0095  GO TO 1010
ISN 0097  IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 53
ISN 0098  THICK(1)=0.75
ISN 0099  THICK(2)=8.0
ISN 0100  GO TO 1010
ISN 0102  51 IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 52
ISN 0103  THICK(1)=2.0
ISN 0104  THICK(2)=8.0
ISN 0105  GO TO 1010
ISN 0106  52 IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 53
ISN 0107  THICK(1)=4.0
ISN 0108  THICK(2)=12.0
ISN 0109  GO TO 1010
ISN 0110  53 IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 54
ISN 0111  THICK(1)=2.0
ISN 0112  THICK(2)=8.0
ISN 0113  54 IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 55
ISN 0114  THICK(1)=4.0
ISN 0115  THICK(2)=10.0
ISN 0116  GO TO 1010
ISN 0117  55 MCODE(2)=MC(2)
ISN 0118  MCODE(3)=MC(4)
ISN 0119  MCODE(4)=MC(8)
ISN 0120  IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 56
ISN 0121  THICK(1)=2.0
ISN 0122  THICK(2)=8.0
ISN 0123  GO TO 1010
ISN 0124  56 IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 57
ISN 0125  THICK(1)=4.0
ISN 0126  THICK(2)=10.0
ISN 0127  GO TO 1010
ISN 0128  57 IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 58
ISN 0129  THICK(1)=3.0
ISN 0130  THICK(2)=4.0
ISN 0131  THICK(3)=12.0
ISN 0132  GO TO 1010
ISN 0133  58 IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 1010
ISN 0134  THICK(1)=3.0
ISN 0135  THICK(2)=4.0
ISN 0136  THICK(3)=6.0
ISN 0137  GO TO 1010
ISN 0138  59 IF(NPT.NE.1.OR.NRU.NE.1.OR.NLH.NE.1) GO TO 1010
ISN 0139  THICK(1)=3.0
ISN 0140  THICK(2)=4.0
ISN 0141  THICK(3)=10.0
ISN 0142  THICK(4)=6.0
ISN 0143  GO TO 1010
ISN 0144  CONTINUE
ISN 0145  1010 CONTINUE
ISN 0146  110 FORMAT(5(A3,2X,2F5.0,1x))
ISN 0147  WRITE (LO,120) (MCODE(I),THICK(I),STRINC(I),I=1,4)
ISN 0148  120 FORMAT(1X,5(A3,2X,F5.1,F5.3,1x))

C DETERMINE THE NUMBER OF LAYERS IN THE PAVEMENT STRUCTURE
C
ISN 0149  IPFLG = 0
ISN 0150  DD 140 I=1,4
ISN 0151  IF (THICK(I) .LE. 0.0) GO TO 160
NLAY = I
STRC(I) = STRCIN(I)
DO 135 J=1,NC
IF (MCODE(I) .NE. MC(J)) GO TO 135
IF ((IP .EQ. IF) .AND. (J .EQ. 9) .OR. (J .EQ. 10)) GO TO 9994
IF ((IP .EQ. IF) .AND. (J .EQ. 1)) IPFLG = J
MTYPE(I) = J
GO TO 140
135 CONTINUE
GO TO 9993
140 CONTINUE
150 IF (IPFLG .EQ. 0) GO TO 165
IF (MTYPE(2) .NE. 9 .AND. MTYPE(2) .NE. 10) GO TO 9989
NIS = 1
IP = IR
165 STRC(5) = STRC(1)
MCOOE(5) = MCOO
GO TO 2
C
*** RIGID SECTION ***
C
200 IP = IR
WLANE = VAL(1)
WIDTH = WLANE
KK=VAL(2)
IF (VAL(3) .NE. 0.0) AGG = VAL(3)
IF (VAL(4) .NE. 0.0) E = VAL(4)
IF (VAL(5) .NE. 0.0) DIST = VAL(5)
GO TO 101
C
*** PERFORMANCE SECTION ***
C
300 PICON = VAL(1)
PTERM = VAL(2)
P(IO = VAL(3)
PTOV = PTERM
QVLIFE = VAL(4)
QVLIF = NYAP
IF (VAL(4) .GT. 0.) OVLIF = VAL(4)
READ (LI,310) ATP
310 FORMAT(3F10.0)
WRITE (L0,320) ATP
320 FORMAT(1X,8F5.0)
SATP = ATP
GO TO 2
C
*** AGE DISTRIBUTION SECTION ***
C
400 NASL = IVAL(1)
ISLV = IVAL(2)
FLRP = VAL(1)
C
READ AND ECHO PRINT THE DISTRIBUTION OF LANE MILES BY AGE
C
READ (LI,410) (YLM(I),I=1,NASL)
410 FORMAT(16F5.0)
ISN 0207 WRITE (LO,420) (YLM(I),I=1,NASL)
ISN 0208 420 FORMAT(1X,15F8.1/1X,15F8.1)
ISN 0209 IF (ISLV .EQ. 0) GO TO 404
ISN 0211 READ (LI,430) (VI(I),I=1,NASL)
ISN 0212 WRITE (LO,320) (VI(I),I=1,NASL)
ISN 0213 430 FORMAT(16F5.0)
ISN 0214 READ (LI,430) (RI(I),I=1,NASL)
ISN 0215 WRITE (LO,320) (RI(I),I=1,NASL)
ISN 0216 404 IF(NASL.LE.25) GO TO 421
ISN 0218 DD 422 I=26,NASL
ISN 0219 422 YLM(25)=YLM(25)+YLM(I)
ISN 0220 NASL=25
ISN 0221 421 CONTINUE
ISN 0222 GO TO 2

C
*** OVERLAY SECTION ***
C
ISN 0223 500 ICAC = IVAL(1)
ISN 0224 ICGR = IVAL(2)
C
READ AND ECHO PRINT THE OVERLAY PARAMETERS
C
ISN 0225 510 FORMAT(7F10.0)
ISN 0226 READ (LI,510) PPVDSH, WPSH, WGSH, CACI, CGRI, ACDENS, GRDENS
ISN 0227 520 FORMAT (1X,7F10.2)
ISN 0228 WRITE (LO,520) PPVDSH, WPSH, WGSH, CACI, CGRI, ACDENS, GRDENS
ISN 0229 520 FORMAT (1X,7F10.2)
ISN 0229 GO TO 2
C
*** MODEL MAINTENANCE SECTION ***
C
ISN 0230 600 IARMS = IVAL(1)
ISN 0231 MFLG = 1
C
READ AND ECHO PRINT THE UNIT COSTS FOR BOTH FLEXIBLE AND RIGID
C PAVEMENTS, AND THE JOINT SEALING PARAMETERS
C
ISN 0232 610 FORMAT(3F10.0)
ISN 0233 READ (LI,610) UNTCST(I),I=1,3
ISN 0234 620 FORMAT(4F10.0,2F5.0,15)
ISN 0235 READ (LI,620) UNTCST(4),DISS,DCON,DIN
ISN 0236 630 FORMAT(1X,3F10.2/1X,6F10.2,
ISN 0237 630 FORMAT(1X,3F10.2/1X,6F10.2,15)
ISN 0238 GO TO 2
C
*** HISTORICAL MAINTENANCE SECTION ***
C
ISN 0239 700 IARMS = IVAL(1)
ISN 0240 MFLG = 2
C
READ AND ECHO PRINT THE MAINTENANCE COSTS PER LANE MILE BY AGE FOR
C FLEXIBLE PAVEMENTS
C
ISN 0241 710 FORMAT(8F10.0)
ISN 0242 READ (LI,710) USRMDL(I,1),I=1,24
ISN 0243 720 FORMAT(1X,8F10.0)
ISN 0244 WRITE (LO,720) USRMDL(I,1),I=1,24
C
READ AND ECHO PRINT THE MAINTENANCE COSTS PER LANE MILE BY AGE FOR
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**RIGID PAVEMENTS**

ISN 0245

READ (LI,110) (USRMDL(I,2),I=1,24)

ISN 0246

WRITE (LO,720) (USRMDL(I,2),I=1,24)

ISN 0247

GO TO 2

*** NO MAINTENANCE SECTION ***

ISN 0248

800 MFLG = 0

ISN 0249

GO TO 2

*** TRUCK TYPES SECTION ***

ISN 0250

900 NTTY = IVAL(1)

ISN 0251

NATT = IVAL(2)

ISN 0252

PERCT(1)=VAL(1)

ISN 0253

PERCT(2)=VAL(2)

ISN 0254

PERCT(3)=VAL(3)

ISN 0255

PERCT(4)=VAL(4)

ISN 0256

NEWTRK = NEWTRK + 1

ISN 0257

IF ((NTTY+NATT).GT.10) GO TO 9995

ISN 0259

NTT = NTTY

ISN 0260

K = 0

ISN 0261

INTT = NTT + NATT

READ AND ECHO PRINT THE TRUCK LABELS

ISN 0262

READ (LI,910) ((TTVP(M,J),M=1,2),J=1,INTT)

ISN 0263

910 FORMAT(8(2A4,2X))

ISN 0264

WRITE (LO,920) ((TTVP(M,J),M=1,2),J=1,INTT)

ISN 0265

920 FORMAT(1X,8(2A4,2X))

READ AND ECHO PRINT THE AXLE CONFIGURATIONS

ISN 0266

READ (LI,921) ((NAXLES(M,J),J=1,4),M=1,INTT)

ISN 0267

921 FORMAT(8(4I2,2X))

ISN 0268

WRITE (LO,922) ((NAXLES(M,J),J=1,4),M=1,INTT)

ISN 0269

922 FORMAT(1X,8(4I2,2X))

ISN 0270

DO 929 J=1,4

ISN 0271

NT(J) = 0

ISN 0272

DO 928 M=1,NTT

ISN 0273

NT(J) = NT(J) + NAXLES(M,J)

ISN 0274

928 CONTINUE

ISN 0275

929 CONTINUE

READ AND ECHO PRINT THE TRUCK PERCENTAGES

ISN 0276

935 K = K+1

ISN 0277

DO 950 N=1,NVAP

ISN 0278

READ (LI,930) I, (PTTYP(J,I,K),J=1,10), PCTTR(I,K)

ISN 0279

930 FORMAT(13,1X,11F6.0)

ISN 0280

WRITE (LO,940) I, (PTTYP(J,I,K),J=1,10), PCTTR(I,K)

ISN 0281

940 FORMAT(1X,13,1X,11F6.2)

ISN 0282

950 CONTINUE

ISN 0283

IF ((NATT.GT.0).AND. (K.EQ. 1)) GO TO 935

ISN 0285

IF (K.EQ. 2) GO TO 2

ISN 0287

DO 970 J=1,10

ISN 0288

DO 960 I=1,20
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**ISN 0289**

\[
\text{PTTYP}(J, I, 2) = \text{PTTYP}(J, I, 1)
\]

**ISN 0290**

\[
960 \text{ CONTINUE}
\]

**ISN 0291**

\[970 \text{ CONTINUE}\]

**ISN 0292**

\[C\]

\[*/*

\[** TITLE CARD SECTION ***

\]

\[C*

\[** READ AND ECHO PRINT THE THREE TITLE CARDS ***

\]

**ISN 0293**

\[
1000 \text{ DO 1030 } J=1,3
\]

**ISN 0294**

\[
\text{READ (LI,102)} \left(\text{TITLE}(I,J), I=1,20\right)
\]

**ISN 0295**

\[
\text{WRITE (LO,103)} \left(\text{TITLE}(I,J), I=1,20\right)
\]

**ISN 0296**

\[1030 \text{ CONTINUE}\]

**ISN 0297**

\[\text{NEWSYS = 1}\]

**ISN 0298**

\[\text{GO TO 2}\]

\[C\]

\[*/*

\[** OLD SECTIONS ***

\]

**ISN 0299**

\[1100 \text{ SAVMNT = VAL(1)}\]

**ISN 0300**

\[\text{IPOT =IVAL(1)}\]

**ISN 0301**

\[\text{IFF =IVAL(2)}\]

**ISN 0302**

\[\text{IF (IPOT .EQ. 0) GO TO 2}\]

**ISN 0304**

\[\text{IF (IPOT .EQ. 1) GO TO 1150}\]

**ISN 0306**

\[\text{PFNOPC = VAL(3)}\]

**ISN 0307**

\[\text{PCTINF = VAL(4)}\]

\[C\]

\[*/*

\[** READ AND ECHO PRINT THE ANNUAL PROJECTED OVERLAY FUNDS FOR PRESENT ***

\]

**ISN 0308**

\[
\text{READ (LI,1110)} \left(\text{APOF}(I,1), I=1, \text{NYAP}\right)
\]

**ISN 0309**

\[1110 \text{ FORMAT(8F10.0)}\]

**ISN 0310**

\[
\text{WRITE (LO,1120)} \left(\text{APOF}(I,1), I=1, \text{NYAP}\right)
\]

**ISN 0311**

\[1120 \text{ FORMAT(1X,8F10.0)}\]

\[\text{IF (IFF .EQ. 1)} \text{GO TO 1140}\]

**ISN 0312**

\[\text{DO 1130 } I=1, \text{NYAP}\]

**ISN 0313**

\[\text{APOF}(I,2) = \text{APOF}(I,1)\]

**ISN 0314**

\[1130 \text{ CONTINUE}\]

**ISN 0315**

\[\text{GO TO 2}\]

\[C\]

\[*/*

\[** READ AND ECHO PRINT THE ANNUAL PROJECTED OVERLAY FUNDS FOR FUTURE ***

\]

**ISN 0316**

\[1140 \text{ READ (LI,1110)} \left(\text{APOF}(I,2), I=1, \text{NYAP}\right)\]

**ISN 0317**

\[1110 \text{ FORMAT(8F10.0)}\]

**ISN 0318**

\[
\text{WRITE (LO,1120)} \left(\text{APOF}(I,2), I=1, \text{NYAP}\right)
\]

**ISN 0319**

\[1120 \text{ FORMAT(1X,8F10.0)}\]

\[\text{IF (IVAL(1) .NE.0) NYAP = MINO(IVAL(1),20)}\]

**ISN 0320**

\[\text{IEOTRP} = \text{IVAL(2)}\]

**ISN 0321**

\[\text{AGR} = \text{VAL(1)}\]

**ISN 0322**

\[\text{PCTINF} = \text{VAL(2)}\]

**ISN 0323**

\[\text{IF(IVAL(3).NE.0.0)XHCIO=VAL(3)}\]

**ISN 0324**

\[\text{IF(IVAL(4).NE.0.0)XHCIM=VAL(4)}\]

**ISN 0325**

\[\text{GO TO 2}\]
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```fortran
*** LOAD LIMITS SECTION ***

READ THE PRESENT AND FUTURE LOAD LIMITS

ISN 0334
  1300 IEWS = IVAL(1)
ISN 0335
  IDST = 1
ISN 0336
  NEWTRK = NEWTRK + 2
ISN 0337
  READ (LI, 1310) PGWL, PSLA, PTAL, PTRAL
ISN 0338
  1310 FORMAT(4F10.0)
ISN 0339
  WRITE (LO, 1315) PGWL, PSLA, PTAL, PTRAL
ISN 0340
  1315 FORMAT(4X,4F10.2)
ISN 0341
  READ (LI, 1310) FGWL, FSLA, FTLA, FTTRAL
ISN 0342
  WRITE (LO, 1315) FGWL, FSLA, FTLA, FTTRAL

READ THE PRESENT AND FUTURE STEERING AXLE WEIGHS FOR EACH TRUCK TYPE

ISN 0343
  NTT = INTT
ISN 0344
  READ (LI, 1320) (PSTAW(I), I=1, NTT)
ISN 0345
  READ (LI, 1320) (FSTAW(I), I=1, NTT)
ISN 0346
  1320 FORMAT(10F8.0)
ISN 0347
  WRITE (LO, 1325) (PSTAW(I), I=1, NTT)
ISN 0348
  WRITE (LO, 1325) (FSTAW(I), I=1, NTT)
ISN 0349
  1325 FORMAT(1X, 10F8.0)

READ THE NEW EMPTY WEIGHT (AS A PERCENTAGE OF THE CURRENT EMPTY WEIGHT) FOR EACH TRUCK TYPE

ISN 0350
  IF (IEWS .LE. 0) GO TO 2
ISN 0351
  READ (LI, 1320) (EPI(I), I=1, NTT)
ISN 0352
  WRITE (LO, 1330) (EPI(I), I=1, NTT)
ISN 0353
  1330 FORMAT(1X, 10F8.2)
ISN 0354
  GO TO 2

*** SINGLE AXLE SECTION ***

ISN 0355
  1400 NLDI(1) = IVAL(1)
ISN 0356
  NLD = IVAL(1)
ISN 0357
  NTT = INTT
ISN 0358
  NEWTRK = NEWTRK + 2
ISN 0359
  STARTS(1) = VAL(1)
ISN 0360

READ THE LOAD INTERVALS AND, FOR EACH TRUCK TYPE, THE NUMBER OF SINGLE AXLES FOR EACH INTERVAL

ISN 0361
  DO 1420 L=1, NLD
ISN 0362
  READ (LI, 1410) ELINT, (SA(L,J), J=1, NTT)
ISN 0363
  1410 FORMAT(F10.0, 10F7.0)
ISN 0364
  WRITE (LO, 1415) ELINT, (SA(L,J), J=1, NTT)
ISN 0365
  1415 FORMAT(1X, F10.0, 10F7.0)
ISN 0366
  SA(L,11) = ELINT
ISN 0367
  1420 CONTINUE
ISN 0368
  DO 1422 K=1, NLD
ISN 0369
  SA(K,2) = 0.000001
ISN 0370
  SA(K,3) = 0.000001
ISN 0371
  1422 CONTINUE
ISN 0372
  GO TO 2
```

---

The code snippet above reads input data and performs calculations to determine load limits and steering axle weights for different truck types. It involves reading input data, calculating present and future load limits, reading steering axle weights, and determining new empty weights. The code then calculates load intervals and the number of single axles for each interval.
*** TANDEM AXLE SECTION ***

```
1500 NLDI(2) = IVAL(1)
NLD = IVAL(1)
NTT = INTT
STARTS(2) = VAL(1)
NEWTRK = NEWTRK + 2
```

READ THE LOAD INTERVALS AND NUMBER OF DOUBLES PER TRUCK TYPE PER INTERVAL

```
DO 1510 L=1,NLD
READ (LI,1410) ELDINT, (TA(L,J),J=1,NTT)
WRITE (LO,1415) ELDINT, (TA(L,J),J=1,NTT)
TA(L,11) = ELDINT
1510 CONTINUE
```

*** TRIPLE AXLE SECTION ***

```
1600 NLDI(3) = IVAL(1)
NLD = IVAL(1)
NTT = INTT
STARTS(3) = VAL(1)
NEWTRK = NEWTRK + 2
```

READ THE LOAD INTERVALS AND NUMBER OF TRIPLES PER TRUCK TYPE PER INTERVAL

```
DO 1610 L=1,NLD
READ (LI,1410) ELDINT, (TR(L,J),J=1,NTT)
WRITE (LO,1415) ELDINT, (TR(L,J),J=1,NTT)
TR(L,11) = ELDINT
1610 CONTINUE
```

*** GROSS VEHICLE WEIGHT SECTION ***

```
1700 NLDI(4) = IVAL(1)
NLD = IVAL(1)
NTT = INTT
STARTS(4) = VAL(1)
NEWTRK = NEWTRK + 2
```

READ THE LOAD INTERVALS AND THE NUMBER OF EACH TRUCK TYPE WHOSE GVW FALLS WITHIN EACH INTERVAL

```
DO 1710 L=1,NLD
READ (LI,1410) ELDINT, (VG(L,J),J=1,NTT)
WRITE (LO,1415) ELDINT, (VG(L,J),J=1,NTT)
VG(L,11) = ELDINT
1710 CONTINUE
```

*** EMPTY VEHICLE WEIGHT SECTION ***

```
1800 NLDI(5) = IVAL(1)
NLD = IVAL(1)
NTT = INTT
STARTS(5) = VAL(1)
```
NEWTRK = NEWTRK + 2

READ THE LOAD INTERVALS AND THE NUMBER OF EACH TRUCK TYPE WHOSE EVW FALLS WITHIN EACH INTERVAL

DO 1810 L=1,NLD
READ (LI,1410) ELINT, (VE(L,J),J=1,NTT)
WRITE (LO,1415) ELINT, (VE(L,J).J=1,NTT)
VE(L,11) = ELINT
1810 CONTINUE
GO TO 2

*** STEERING AXLES SECTION ***

NLDI(6) = IVAL(1)
NLD = IVAL(1)
NTT = INTT
STARTS(6) = VAL(1)
IDST = 6
NEWTRK = NEWTRK + 2

READ THE LOAD INTERVALS AND, FOR EACH TRUCK TYPE, THE NUMBER OF STEERING AXLES FOR EACH INTERVAL

DO 1910 L=1,NLD
READ (LI,1410) ELINT, (ST(L,J),J=1,NTT)
WRITE (LO,1415) ELINT, (ST(L,J).J=1,NTT)
ST(L,11) = INTT
1910 CONTINUE
GO TO 2

*** OUTPUT KEYWORD SECTION ***

IOUT IVAl(l) GO TO 2

*** KEYWORD ERROR PROCESSING SECTION ***

WRITE (LO,9089) IPFLG
9089 FORMAT(/1X,19H*** ERROR IN LAYER ,I1.4H ***/,
1 38H ACP NOT PERMITTED FOR RIGID PAVEMENT /
2 30H UNLESS ABOVE JCP OR CRC LAYER//
3 15H RUN TERMINATED)
GO TO 9999

WRITE (LO,9093) IPFLG
9093 FORMAT(/1X,37H*** UNRECOGNIZABLE MATERIALS CODE ***//
1 15H RUN TERMINATED)
GO TO 9999

WRITE (LO,9093) IPFLG
9093 FORMAT(/1X,37H*** ILLEGAL MATERIAL CODE FOR THIS TYPE OF PAVEMENT.
1 4H ***//15H RUN TERMINATED)
GO TO 9999

WRITE (LO,9095) IPFLG
9095 FORMAT(/1X,28H*** TOO MANY TRUCK TYPES ***//
1 15H RUN TERMINATED)
GO TO 9999

GO TO 9999
ISN 0445  9996 WRITE (L0,9096)
ISN 0446  9096 FORMAT(/1X,44H*** SPECIFIED KEYWORD NOT FOUND IN TABLE ***,
           1     //15H RUN TERMINATED)
ISN 0447  GO TO 9999
ISN 0448  9997 IGO = 1
ISN 0449  GO TO 99999
ISN 0450  9998 WRITE (L0,9098)
ISN 0451  9098 FORMAT(/1X,44H*** STOP DIRECTIVE FOUND OUT OF SEQUENCE ***,
           1     //15H RUN TERMINATED)
ISN 0452  9999 IGO = 4
ISN 0453  99999 DO 3500 I=1,30
ISN 0454  XLM(I) = YLM(I)
ISN 0455  3500 CONTINUE
ISN 0456  S = SCJUT
ISN 0457  IF (XMLI .NE. 0.) XML = XMLI
ISN 0458  LP = MINO(4, MAXO(1. INT(7.1 - 2.*PTERM)))
ISN 0459  IF (FLRP .LE. 0.) FlRP = FlRPTP(LP)
ISN 0461  RETURN
ISN 0463  END

*OPTIONS IN EFFECT*NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTOOBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 463, PROGRAM SIZE = 10552, SUBPROGRAM NAME = INPUT

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

44K BYTES OF CORE NOT USED
REQUESTED OPTIONS: NODECK, NOLIST, OPT(0), NODUMP

OPTIONS IN EFFECT: NAME (MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTO DBL (NONE)

SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(1)

SUBROUTINE INPRNT

COMMON /TEMPC/ CONT(25), DISTC
COMMON /EALPAY/ EALPT(10,2), APPT(10,2), EALFCT(20), IEQTRP
COMMON /EXPT/ NPT, THICK(4), MTYPE(4), NLAY, IF, IR, IC
COMMON /FUND/ APOF(20,2), RTINT, RTINF
COMMON /INTVS/ STARTS(6)
COMMON /1O/ LI, LO, LD
COMMON /LABELS/ MATLAB(5, 10)
COMMON /LDS/ PGWVL, PSAL, PTAL, PFGVL, FSAL, FTAL, FTAL,
COMMON /LMP/ XLM(30), YLM(30), POTLM(20, 2), OUTP(20, 2), TOTALM,
COMMON /MISC/ IPOT, IPNO, NASL, NSLR, TOVL(30, 2)
COMMON /NEWSYS/ NEWSYS
COMMON /NMBR/ SA(30, 11), TA(30, 11), TR(50, 11), VE(30, 11),
COMMON /OVR/ XHCL, XHCM, WLAME, WPSH, WGSF, SPSH, CAC, SGR
COMMON /OUTSW/ IOUT
COMMON /OVRL/ XHCIM, WLAME, WPSH, WGSF, SPSH, CAC, SGR
COMMON /PSR/ PF, PICON, PTERM, PTOV, PTOV
COMMON /STRCO/ STRCD(5), CC(4), MC(4), NC, STRC(5), RFS(4),
COMMON /SWTCHS/ OVLIFE, PCTINT, PCTINF, TPFPC, PFNOPC, AGR, SPCJT,
COMMON /STRUC/ SN, SS, R, D, AGG, XU, XE
COMMON /TIME/ ATP, OVLIF, NYAP, NVR, YR(40)
COMMON /TITLE/ TITLE(20, 3), SECTL(20)
COMMON /TRYP/ TTVP(2, 10), PTTYP(10, 20, 2), PCCTR(20, 2), PERCT(4),
COMMON /SLVG/ ISLV, FLRP, VI(30), RI(30), VL(30), RL(30),
COMMON /UO/ PL(30), MI(30), P(20), VP(20), RP(20),
COMMON /SWTCHS/ OVLIFE, POINT, PCINT, PTFPC, PNPDC, AGP, FPCJT,
COMMON /TEMPC/ CONT(25), DISTC
COMMON /LDS/ PGWVL, PSAL, PTAL, PFGVL, FSAL, FTAL, FTAL,
COMMON /LMP/ XLM(30), YLM(30), POTLM(20, 2), OUTP(20, 2), TOTALM,
COMMON /MISC/ IPOT, IPNO, NASL, NSLR, TOVL(30, 2)
COMMON /NEWSYS/ NEWSYS
COMMON /NMBR/ SA(30, 11), TA(30, 11), TR(50, 11), VE(30, 11),
COMMON /OVR/ XHCL, XHCM, WLAME, WPSH, WGSF, SPSH, CAC, SGR
COMMON /OUTSW/ IOUT
COMMON /OVRL/ XHCIM, WLAME, WPSH, WGSF, SPSH, CAC, SGR
COMMON /PSR/ PF, PICON, PTERM, PTOV, PTOV
COMMON /STRCO/ STRCD(5), CC(4), MC(4), NC, STRC(5), RFS(4),
COMMON /SWTCHS/ OVLIFE, PCTINT, PCTINF, TPFPC, PFNOPC, AGR, SPCJT,
COMMON /TEMPC/ CONT(25), DISTC
COMMON /LDS/ PGWVL, PSAL, PTAL, PFGVL, FSAL, FTAL, FTAL,
COMMON /LMP/ XLM(30), YLM(30), POTLM(20, 2), OUTP(20, 2), TOTALM,
COMMON /MISC/ IPOT, IPNO, NASL, NSLR, TOVL(30, 2)
COMMON /NEWSYS/ NEWSYS
COMMON /NMBR/ SA(30, 11), TA(30, 11), TR(50, 11), VE(30, 11),
COMMON /OVR/ XHCL, XHCM, WLAME, WPSH, WGSF, SPSH, CAC, SGR
COMMON /OUTSW/ IOUT
COMMON /OVRL/ XHCIM, WLAME, WPSH, WGSF, SPSH, CAC, SGR
COMMON /PSR/ PF, PICON, PTERM, PTOV, PTOV
COMMON /STRCO/ STRCD(5), CC(4), MC(4), NC, STRC(5), RFS(4),
COMMON /SWTCHS/ OVLIFE, PCTINT, PCTINF, TPFPC, PFNOPC, AGR, SPCJT,
OLDMNT = SAVMNT
IF (MFLG .GT. 0) OLDMNT = 0.
IF(IOUT.EQ.0) GO TO 3500
DO 2515 J=1,3
WRITE (L0,2510) (TITLE(I,J),I=1,20)
2510 FORMAT(1X,20A4)
2515 CONTINUE
WRITE (L0,2517) SECTTL
2517 FORMAT(/1X,20A4)
WRITE (LO,2520) NYAP, AGR, PCTINT
2520 FORMAT(/5X,14HRUN PARAMETERS/5X,3H-- ,IX,10(IH-)/
1 8X,26LENGTH OF ANALYSIS PERIOD ,27(IH-),10,6H YEARS/
2 8X,33HANNUAL GROWTH RATE OF 18 KIP EAL ,20(IH-),F10.2.
3 13H PERCENT/YEAR/
4 8X,53HANNUAL INTEREST RATE FOR PRESENT WORTH CALCULATIONS -
5 3 ,F10.2, 13H PERCENT/YEAR)
I = IEOTRP + 1
WRITE (L0,2522) (MEOTRP(J,I),J=1,4), (MDASH(J,I),J=1,4)
2522 FORMAT(/8X,48HNUMBER OF 18-KIP ESAL UNDER PROPOSED REGULATIONS/
1 8X,50HDERIVED FROM 18-KIP ESAL UNDER PRESENT REGULATIONS/
2 8X,28HANNUAL INTEREST RATE FOR PRESENT WORTH CALCULATIONS -
3 12H- ,F10.2 .13H PERCENT/YEAR)
IF (IP .EQ. IR) GO TO 2570
WRITE (LO,2580) NLAY, WLANE, XK, SC, E
2580 FORMAT(/8X.9HMATERIALS/8X.9(lH-)//
1 10X,6(HLAYER),4X,9HTHICKNESS,3X,10HSTRUCTURAL,4X,8HSTRUCTURAL/
2 10X,6HNUMBER,5X,5H(IN.),5X,11HCoeffICIENT,5X,4HCODE/
3 10X,6(IH-),3X,9(IH-),3X,11(IH-),3X,8(IH-)/
IF (IP .EQ. IR) GO TO 2535
WRITE (L0,2560) I=1,NLAY
2560 FORMAT(/12X,Il.F13.2.F12.3,9X,A4.2X.5A4)
DO 2570 I=1,NLAY
M = MTYPE(I)
WRITE (LO,2550) I, THICK(I), STRC(I), MCODE(I), (MATLAB(J,M),J=1,5)
2550 FORMAT(12X,11,F13.2,F12.3,9X,A4,2X,5A4)
2570 CONTINUE
GO TO 2590
WRITE (LO,2580) I, THICK(I), STRC(I), MCODE(I), (MATLAB(J,M),J=1,5)
2580 FORMAT(/5X,15HRIGID STRUCTURE/5X,5(IH-),1X,9(IH-)/
1 8X,17HNUMBER OF LAYERS ,11(IH-),I10/
2 8X,11HLANE WIDTH ,17(IH-),F10.2,5H FEET/
3 8X,20HDESIGN SOIL SUPPORT ,8(IH-),F10.2/
4 8X,16HREGIONAL FACTOR ,12(IH-),F10.2)
WRITE (L0,2535) NLAY, WLANE, XK, SC, E
2535 FORMAT(/8X,9HMATERIALS/8X.9(lH-)//
1 10X,6(HLAYER),4X,9HTHICKNESS,3X,10HSTRUCTURAL,4X,8HSTRUCTURAL/
2 10X,6HNUMBER,5X,5H(IN.),5X,11HCoeffICIENT,5X,4HCODE/
3 10X,6(IH-),3X,9(IH-),3X,11(IH-),3X,8(IH-)/
IF (IP .NE. IR) GO TO 2535
WRITE (L0,2560) I=1,NLAY
DO 2570 I=1,NLAY
M = MTYPE(I)
WRITE (LO,2550) I, THICK(I), STRC(I), MCODE(I), (MATLAB(J,M),J=1,5)
2550 FORMAT(12X,11,F13.2,F12.3,9X,A4,2X,5A4)
2570 CONTINUE
GO TO 2590
WRITE (LO,2580) I, THICK(I), STRC(I), MCODE(I), (MATLAB(J,M),J=1,5)
2580 FORMAT(/5X,15HRIGID STRUCTURE/5X,5(IH-),1X,9(IH-)/
1 8X,17HNUMBER OF LAYERS ,11(IH-),I12/
2 8X,11HLANE WIDTH ,25(IH-),F12.1,5H FEET/
3 8X,16HREGIONAL FACTOR ,12(IH-),F12.0,5H PCI/
4 8X,14HDESIGN SOIL SUPPORT ,8(IH-),F12.0,5H PCI)
WRITE (L0,2535) NLAY, WLANE, XK, SC, E
2535 FORMAT(/8X,9HMATERIALS/8X.9(lH-)//
1 10X,6(HLAYER),4X,9HTHICKNESS,3X,10HSTRUCTURAL,4X,8HSTRUCTURAL/
2 10X,6HNUMBER,5X,5H(IN.),5X,11HCoeffICIENT,5X,4HCODE/
3 10X,6(IH-),3X,9(IH-),3X,11(IH-),3X,8(IH-)/
IF (IP .NE. IR) GO TO 2535
WRITE (L0,2560) I=1,NLAY
DO 2570 I=1,NLAY
M = MTYPE(I)
WRITE (LO,2550) I, THICK(I), STRC(I), MCODE(I), (MATLAB(J,M),J=1,5)
2550 FORMAT(12X,11,F13.2,F12.3,9X,A4,2X,5A4)
2570 CONTINUE
GO TO 2590
WRITE (LO,2580) I, THICK(I), STRC(I), MCODE(I), (MATLAB(J,M),J=1,5)
2580 FORMAT(/5X,15HRIGID STRUCTURE/5X,5(IH-),1X,9(IH-)/
1 8X,17HNUMBER OF LAYERS ,11(IH-),I12/
2 8X,11HLANE WIDTH ,25(IH-),F12.1,5H FEET/
3 8X,16HREGIONAL FACTOR ,12(IH-),F12.0,5H PCI/
4 8X,14HDESIGN SOIL SUPPORT ,8(IH-),F12.0,5H PCI)
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**ISN 0076**

2590 WRITE (LO,3000) PICON, PTERM, PIOV, ATP, OVLIF

**ISN 0077**

3000 FORMAT(/5X,11HPERFORMANCE/5X,11(IH-))/

1 8X,21HPSI INITIAL CONSTANT .51(1H-).F10.2/

2 8X,13HTERMINAL PSI .59(1H-).F10.2/

3 8X,18HPSI AFTER OVERLAY .54(1H-).F10.2/

4 8X,49HAGE AVERAGE AGE AT TERMINAL PSI FOR EXISTING DESIGN /

5 23(1H-).F10.2,6H YEARS/

6 8X,20HPSI OVERLAY DESIGN LIFE .52(1H-).F10.2,6H YEARS)

**ISN 0078**

CALL NPAGE

0079 WRITE (LO,3010) FLRP

3010 FORMAT(5X,16HAGE DISTRIBUTION/5X,4H--- ,12(IH-)//

1 8X,4H--- ,4X,5HMILES,4X,5HVALUE,4X,4HRATE,9X/)!

2 8X,8H---,3X,5H---,4X,5H---,4X,4H---,9X/)!

**ISN 0081**

NLINES = MINO(NASL, MAXLN)

**ISN 0082**

DO 3030 J=1,NLINES

**ISN 0083**

WRITE (LO,3020) (I,YLM(I), VI(I), RIO), I=J,NASL,MAXLN)

3020 FORMAT(5X,3(I2,F9.1,Fl0.0,F8.2,8X»

3030 CONTINUE

WRITE (LO,3035)

3035 FORMAT(!10X,29HVALUE IN THOUSANDS OF DOLLARS!

1 /10X,29HLOSS RATE IN PERCENT PER YEAR)

**ISN 0084**

WRITE (LO,3040) PPVDSH, WPSH, WGSH, CACI, (IUNIT(I),I=ICAC,9,3)

1 CGRI, (IUNIT(I),I=ICGR,9,3)

3040 FORMAT(/!5X,7HOVERLAY!5X,7(IH-!!

1 8X,27HPERCENT OF PAVED SHOULDERS ,11(1H-).F10.2,8H PERCENT/!

2 8X,38HPSI AVERAGE PAVED SHOULDER WIDTH/LANE ----,F10.2,5H FEET/

3 8X,38HPSI GRANULAR SHOULDER WIDTH/LANE ----,F10.2,5H FEET/

4 8X,22HUNIT COST OF ACP .21(1H-).F10.2,1X,3A4/

5 8X,22HUNIT COST OF GRANULAR .16(1H-).F10.2,1X,3A4)

**ISN 0090**

IF (ICAC .NE. 1) GO TO 3044

**ISN 0092**

WRITE (LO,3042) ACDENS

3042 FORMAT(8X,24HDENSITY OF COMPACTED AC ,14(1H-),F10.2,!

1 12H LBS/CU. FT.)

**ISN 0093**

IF (ICGR .NE. 1) GO TO 3048

**ISN 0096**

WRITE (LO,3046) GRDENS

3046 FORMAT(8X,30HDENSITY OF COMPACTED GRANULAR .8(1H-),F10.2,!

1 12H LBS/CU. FT.)

**ISN 0098**

IARM1 = IARMS + 1

**ISN 0099**

IF (MFLG .EQ. 0) GO TO 3120

**ISN 0101**

IF (MFLG .EQ. 2) GO TO 3060

**ISN 0103**

IDJ = DISTCT

**ISN 0104**

WRITE (LO,3050) MCRAI(IARM1), UNTCST(4), IDJ

**ISN 0105**

3050 FORMAT(/5X,17HMODEL MAINTENANCE/5X,11(IH-))/

1 8X,26HACCELERATED MAINTENANCE ,44//

2 8X,25HUNIT COSTS OF MAINTENANCE/!

3 8X,4(1H-),1X,5(1H-),4H --,11(1H-)//

4 8X,F11.2,2X,16HPER ONE DISTRESS,//

5 8X,8HDISTRICT,15)

**ISN 0106**

CALL NPAGE

**ISN 0107**

WRITE (LO,3051)

**ISN 0108**

3051 FORMAT(8X,40HMaintenance costs per lane-mile per year/!

1 8X,11(1H-),1X,5(1H-),5H ---,9(1H-),5H ---.4(1H-)!)

2 12X,4HYEAR,3X,BHFlexible,3X,5HRigid,3X,9HComposite/!

3 12X,4H---,3X,8(1H-),3X,5(1H-),3X,9(1H-)//)

**ISN 0109**

WRITE (LO,3052) (I, (USRMDL(I,J),J=1,3), I=1,24)

**ISN 0110**

3052 FORMAT(13X,12,F10.2,F9.2,F10.2)
GO TO 3250

3060 CONTINUE

3090 CONTINUE

3120 CONTINUE

3190 CONTINUE

3250 CALL NPAGE

3260 FORMAT(5X,12HOLD SECTIONS/5X,4H---,8(1H-)//
1 8X,46HMAINTENANCE COST (DOLLARS/LANE MILE/YEAR) FOR ,
2 15HPAVEMENTS OLDER/  
3 8X,29HTERMINAL SERVICEABILITY .32(1H-).F10.2//
4 8X,40HPERCENT OF TOTAL LANE MILES IN POTS AT /
5 13X,42HBEGINNING OF ANALYSIS PERIOD (CALCULATED) .14(1H-).
6  F10.2)

IF (IPOT .EQ. 0) GO TO 3320
IF (IPOT .EQ. 2) GO TO 3280
WRITE (LO,3270) TPFPC, PFNOPC

3270 FORMAT(13X,44HEND OF ANALYSIS PERIOO (INPUT TARGET VALUE)/
1 12(1H-),F10.2//
2 8X,43HPERCENT OF TOTAL LANE MILES NEVER OVERLAI),
3 18(1H-).F10.2)

3300 FORMAT(5X,12, F 11.1 , F 13.1 )

GO TO 3320

PCTINF

3290 FORMAT(8X,52HINFLATION RATE TO DEFLATE THE PROJECTED DOLLARS PER /
1 8X,45HYEAR FOR OVERLAY FUNDING FOR THIS REPRESENTATIVE ,
2 10HSECTION ---,F10.2//
3 8X,30MANUAL PROJECTED OVERLAY FUNDS/8X,30(1H-)//
4 18X,7HPRESENT,5X,6HFUTURE/18X,7(1H-),5X,6(1H-)//)

DO 3310 I=1,NYAP
WRITE (LO,3300) I, (APDF(I,J),J=1,2)

3300 CONTINUE

3310 CONTINUE

K = 0
NUM = NTT

3310 CALL NPAGE
WRITE (LO,3330) (IPRFT(I,K),I=1,2), ((ITYP(M,J),M=1,2),J=1,NUM),
1 TQL T
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ISN 0154  3330 FORMAT(/5X,'11TRUCK TYPES,5X,2A4/5X,1X,5(1H-))
   1 10X,4HTYPE,3X,11(2A4,2X))
ISN 0155  WRITE (LO,3333) ((NAXLES(M,J),J=1,4),M=1,NUM)
ISN 0156  3333 FORMAT(/5X,9HAXLE CODE,3X,10(41,6X))
ISN 0157  WRITE (LO,3335)
ISN 0158  3335 FORMAT(/10X,4HYEAR,3X,23HPERCENT OF ALL VEHICLES/)
ISN 0159  DO 3350 I=1,NYAP
ISN 0160  WRITE (LO,3340) I, (PTTYP(J,I,K), J=1,NTT), PCTTR(I,K)
ISN 0161  3340 FORMAT(11X,2A5/11H-)
ISN 0162  3350 CONTINUE
ISN 0163  NTT = INTT
ISN 0164  IF ((NATT .GE. 0) .AND. (K .EQ. 1)) GO TO 3321
ISN 0165  IF (NEWTRK .LT. 2) GO TO 3500
ISN 0166  CALL NPAGE
ISN 0167  WRITE (LO,3053) PGWL, PSAL, PTAL, PTRAL, FGVW1, FSAL, FTAL, FTRAL
ISN 0170  3053 FORMAT(5X,11HLOAD LIMITS/5X,4(1H-),1X,6(1H-))/
   1 8X,36HPRESENT GROSS VEHICLE WEIGHT LIMIT -.F10.0,5H KIPS/
   2 8X,36HPRESENT SINGLE AXLE WEIGHT LIMIT ---.F10.0,5H KIPS/
   3 8X,36HPRESENT TANDEM AXLE WEIGHT LIMIT ---.F10.0,5H KIPS/
   4 8X,36HPRESENT TRIPLE AXLE WEIGHT LIMIT ---.F10.0,5H KIPS/
   5 8X,36HFUTURE GROSS VEHICLE WEIGHT LIMIT ---.F10.0,5H KIPS/
   6 8X,36HFUTURE SINGLE AXLE WEIGHT LIMIT ---.F10.0,5H KIPS/
   7 8X,36HFUTURE TANDEM AXLE WEIGHT LIMIT ---.F10.0,5H KIPS/
   8 8X,36HFUTURE TRIPLE AXLE WEIGHT LIMIT ---.F10.0,5H KIPS)
ISN 0171  WRITE (LO,3055)
ISN 0172  3055 FORMAT(/23X,7HPRESENT,11X,6HFUTURE/)
   1 16X,2(4X,13HSTEERING AXLE).6X,16PERCENT INCREASE/
   2 10X,6HTRUCK,8X,6HEIGHT,11X,6HWEIGHT,10X.
   3 15H EMPTY WEIGHT/
   4 10X,4HTYPE,9X,6H(KIPS).11X,6H(KIPS),15X,6H(KIPS)/
   5 10X,5(1H-).5X,11(1H-).4X,13(1H-).6X,16(1H-)/
ISN 0173  DO 3058 I=1,NTT
ISN 0174  WRITE (LO,3057) (TTYP(J,I),J=1,2), PSTAW(I), FSTAW(I), EPI(I)
ISN 0175  3057 FORMAT(8X,2A4,4X,F10.3,5X,F13.3,8X,F11.2)
ISN 0176  3058 CONTINUE
ISN 0177  NTT = INTT
ISN 0178  DO 3490 K=1,6
ISN 0179  NLD = NLDI(K)
ISN 0180  GO TO (3380, 3410, 3430, 3450, 3470, 3403), K
ISN 0181  3380 IF (NTT(I) .EQ. 0) GO TO 3490
ISN 0182  BLI = STARTS(K)
ISN 0183  CALL NPAGE
ISN 0184  WRITE (LO,3370) (HEAD(N,K),N=1,5), NLDI(K), (NAMES(N,1),N=1,4).
   1 (ITYPE,I=1,NTT)
ISN 0185  CALL NPAGE
ISN 0186  3370 FORMAT(5X,5A4/5X,6(1H-),1X,4(1H-),1X,5(1H-))/
   1 8X,26HNUMBER OF LOAD INTERVALS -.16/
   2 14X,4HLOAD,11X,10HNUMBER OF .4A4/
   3 12X,8HINTERVAL/
   4 30X,10(A4,6X))
ISN 0187  WRITE (LO,3371) (TTYP(M,N),M=1,2),N=1,NTT)
ISN 0188  3371 FORMAT(30X,10(2A4,2X))
ISN 0189  WRITE (LO,3372)
ISN 0190  3372 FORMAT(/)
ISN 0191  DO 3400 L=1,NLD
ISN 0192  WRITE (LO,3390) BLI, SA(L,11), (SA(L,J),J=1,NTT)
ISN 0193  3390 FORMAT(7X,F7.3,3H - .F7.3,3X,10(F6.0,4X))
ISN 0194  BLI = AINT(SA(L,11) * 10. + 0.5) / 10.
ISN 0195  3400 CONTINUE
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ISN 0196  GO TO 3490
ISN 0197   3410 IF (NT(2).NE.0) GO TO 3490
ISN 0199   BLI = STARTS(K)
ISN 0200   CALL NPAGE
ISN 0201   WRITE (LO,3370) (HEAD(N,K),N=1,5), NLDI(K), (NAMES(N,1),N=1,4),
1   (ITYPE,I=1,NTT)
ISN 0202   WRITE (LO,3371) ((TTYP(M,N),M=1,2),N=1,NTT)
ISN 0203   WRITE (LO,3372)
ISN 0204   DO 3420 L=1,NLD
ISN 0205   WRITE (LO,3390) BLI, TA(L,11), (TA(L,J),J=1,NTT)
ISN 0206   BLI = AINT(TA(L,11) * 10. + 0.5) / 10.
ISN 0207  3420 CONTINUE
ISN 0208  GO TO 3490
ISN 0209  3430 IF (NT(3).NE.0) GO TO 3490
ISN 0211   BLI = STARTS(K)
ISN 0212   CALL NPAGE
ISN 0213   WRITE (LO,3370) (HEAD(N,K),N=1,5), NLDI(K), (NAMES(N,1),N=1,4),
1   (ITYPE,I=1,NTT)
ISN 0214   WRITE (LO,3371) ((TTYP(M,N),M=1,2),N=1,NTT)
ISN 0215   WRITE (LO,3372)
ISN 0216   DO 3440 L=1,NLD
ISN 0217   WRITE (LO,3390) BLI, TR(L,11), (TR(L,J),J=1,NTT)
ISN 0218   BLI = AINT(TR(L,11) * 10. + 0.5) / 10.
ISN 0219  3440 CONTINUE
ISN 0220  GO TO 3490
ISN 0221  3450 CALL NPAGE
ISN 0222   WRITE (LO,3370) (HEAD(N,K),N=1,5), NLDI(K), (NAMES(N,2),N=1,4),
1   (ITYPE,I=1,NTT)
ISN 0223   WRITE (LO,3371) ((TTYP(M,N),M=1,2),N=1,NTT)
ISN 0224   WRITE (LO,3372)
ISN 0225   BLI = STARTS(K)
ISN 0226   DO 3460 L=1,NLD
ISN 0227   WRITE (LO,3390) BLI, VG(L,11), (VG(L,J),J=1,NTT)
ISN 0228   BLI = AINT(VG(L,11) * 10. + 0.5) / 10.
ISN 0229  3460 CONTINUE
ISN 0230  GO TO 3490
ISN 0231  3470 CALL NPAGE
ISN 0232   WRITE (LO,3370) (HEAD(N,K),N=1,5), NLDI(K), (NAMES(N,2),N=1,4),
1   (ITYPE,I=1,NTT)
ISN 0233   WRITE (LO,3371) ((TTYP(M,N),M=1,2),N=1,NTT)
ISN 0234   WRITE (LO,3372)
ISN 0235   BLI = STARTS(K)
ISN 0236   DO 3480 L=1,NLD
ISN 0237   WRITE (LO,3390) BLI, VE(L,11), (VE(L,J),J=1,NTT)
ISN 0238   BLI = AINT(VE(L,11) * 10. + 0.5) / 10.
ISN 0239  3480 CONTINUE
ISN 0240  GO TO 3490
ISN 0241  3403 IF (IDST .NE. 6) GO TO 3490
ISN 0243   CALL NPAGE
ISN 0244   WRITE (LO,3370) (HEAD(N,K),N=1,5), NLDI(K), (NAMES(N,1),N=1,4),
1   (ITYPE,I=1,NTT)
ISN 0245   WRITE (LO,3371) ((TTYP(M,N),M=1,2),N=1,NTT)
ISN 0246   WRITE (LO,3372)
ISN 0247   BLI = STARTS(K)
ISN 0248   DO 3407 L=1,NLD
ISN 0249   WRITE (LO,3390) BLI, ST(L,11), (ST(L,J),J=1,NTT)
ISN 0250   BLI = AINT(ST(L,11) * 10. + 0.5) / 10.
ISN 0251  3407 CONTINUE
ISN 0252 CONTINUE
ISN 0253 CONTINUE
ISN 0254 RTINT = PCTINT * 0.01
ISN 0255 RTINF = PCTINF * 0.01
ISN 0256 TPF = TPFPC* .01
ISN 0257 PFNO = PFNOCPC * 0.01
ISN 0258 AGF = AGF* 0.01
ISN 0259 CAC = CACI
ISN 0260 CGR = CGRI
ISN 0261 IF (ICAC .EQ. 1) GO TO 4000
ISN 0263 IF (ICAC .EQ. 2) GO TO 4010
ISN 0265 CAC = CACI * 36.
ISN 0266 GO TO 4010
ISN 0267 4000 CAC = CACI * (ACDENS + 27.) / 2000.
ISN 0268 4010 IF (ICGR .EQ. 2) GO TO 99999
ISN 0270 IF (ICGR .EQ. 1) GO TO 4020
ISN 0272 CGR = CGRI * 36.
ISN 0273 GO TO 99999
ISN 0275 99999 RETURN
ISN 0276 END

*OPTIONS IN EFFECT* NAME (MAIN) NOOPTIMIZE LINECOUNT (60) SIZE (MAX) AUTODBL (NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG (I)

*STATISTICS* SOURCE STATEMENTS = 275, PROGRAM SIZE = 11248, SUBPROGRAM NAME = INPRNT

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******
SUBROUTINE INIT (IGO)
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /STRUC/ SN, SS, R, D, AGG, XJ, XK, E
COMMON /STRCOE/ STRCD(8), CC(4), MC(4), STR(5), RFS(4), RFB(4)
COMMON /TIME/ ATP, OVLIF, NYAP, YR(4)
DATA ICON, F /2, 1 /
C ICON IS THE INDEX ON CONDITION FACTOR USED TO RELATE AN OLD PCC
C PAVEMENT WITH AN AC OVERLAY TO AN EQUIVALENT SLAB THICKNESS.
C F IS A FACTOR ALSO USED IN THE ABOVE RELATION.
GO TO (100, 200, 300), IGO
HERE FOR PROGRAM INITIALIZATION, FIRST EXECUTION.
100 DD 110 J=1, NVR
110 CONTINUE
HERE FOR SET UP CHORES AFTER READING INPUT DATA.
200 CONTINUE
C WE HAVE ALL THE INPUT FOR A REPRESENTATIVE SECTION. DETERMINE -SN-
C OR -D- FOR COMPOSITE PAVTS, AS WELL AS SET UP STRUCTURAL COEF.
IF (IP .EQ. IR .OR. IP .EQ. IC) GO TO 230
SN = 0.
DO 215 L=1, NLAY
M = MTYPE(L)
REPLACE VALUE IN DATA STATEMENT WITH VALUE READ IN.
IF (STRC(L) .NE. 0.) STRCD(M) = STRCL(L)
IF NO VALUE READ IN, SET VALUE FROM THE DATA STATEMENT.
IF (STRC(L) .EQ. 0.) STRC(L) = STRCD(M)
215 SN = SN + THICK(L)
SET -A- VALUE FOR OVERLAY = -A- FOR AC IF NOT READ IN SEPARATELY.
IF (STRC(5) .EQ. 0.) STRC(5) = STRCD(1)
250 CONTINUE
GO TO 900
900 CONTINUE
RETURN
END

SUBROUTINE INIT (IGO)
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /STRUC/ SN, SS, R, D, AGG, XJ, XK, E
COMMON /STRCOE/ STRCD(8), CC(4), MC(4), STR(5), RFS(4), RFB(4)
COMMON /TIME/ ATP, OVLIF, NYAP, YR(4)
DATA ICON, F /2, 1 /
C ICON IS THE INDEX ON CONDITION FACTOR USED TO RELATE AN OLD PCC
C PAVEMENT WITH AN AC OVERLAY TO AN EQUIVALENT SLAB THICKNESS.
C F IS A FACTOR ALSO USED IN THE ABOVE RELATION.
GO TO (100, 200, 300), IGO
HERE FOR PROGRAM INITIALIZATION, FIRST EXECUTION.
100 DD 110 J=1, NVR
110 CONTINUE
HERE FOR SET UP CHORES AFTER READING INPUT DATA.
200 CONTINUE
C WE HAVE ALL THE INPUT FOR A REPRESENTATIVE SECTION. DETERMINE -SN-
C OR -D- FOR COMPOSITE PAVTS, AS WELL AS SET UP STRUCTURAL COEF.
IF (IP .EQ. IR .OR. IP .EQ. IC) GO TO 230
SN = 0.
DO 215 L=1, NLAY
M = MTYPE(L)
REPLACE VALUE IN DATA STATEMENT WITH VALUE READ IN.
IF (STRC(L) .NE. 0.) STRCD(M) = STRCL(L)
IF NO VALUE READ IN, SET VALUE FROM THE DATA STATEMENT.
IF (STRC(L) .EQ. 0.) STRC(L) = STRCD(M)
215 SN = SN + THICK(L)
SET -A- VALUE FOR OVERLAY = -A- FOR AC IF NOT READ IN SEPARATELY.
IF (STRC(5) .EQ. 0.) STRC(5) = STRCD(1)
250 CONTINUE
GO TO 900
900 CONTINUE
RETURN
END
SUBROUTINE POTSET

COMMON /PSI/ PF, PICON, PTERM, PIOV, PTOV

COMMON /LMP/ XLM(30), YLM(30), POTLM(20,2), OUTP(20,2),
  TOTALM, PPF, TPF, PFNO, NASL, NSLR, TOVMLM(30,2)

COMMON /TIME/ ATP, OVIF, NYAP, NYR, YR(40)

COMMON /CMP/ COMP(30,34), PCOMP(30), AATP(30)

COMMON /MECH/XKT, NRU, NLH, ND, NDEL

COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC

DIMENSION ZLM(30), P(25)

NHIST = 25

POTTS = 0.0

TOTALM = 0.

CALL ZERO (COMP, 1020)

CALL ZERO (PCOMP, 30)

DO 7 I = 1. NASL

TOTALM = TOTALM + XLM(I)

CONTINUE

NSLR = 0

CALL DISTR (P, NHIST)

NSLICE = 0

DO 2 I = 1.30

NSLICE = NSLICE + 1

IF (I.EQ.1) GO TO 83

11 = 1

IF (I.EQ.1) GO TO 83

DO 80 J = I, 11

TEMP = P(J) + PCOMP(NSLICE)

POTTS = POTTS + TEMP

80 CONTINUE

83 CONTINUE

11 = 0

YLM(NSLICE) = PCOMP(NSLICE) + TEMP

DO 90 J = 1. NHIST

140 CONTINUE

XLM(I) = ZLM(I) + COMP(NSLICE, L)

IF(XLM(I).GT.0.0) NSLR = NSLR + 1

140 CONTINUE

DO 100 J = 1. NHIST

100 CONTINUE

DO 140 I = 1. NASL

XLM(I) = ZLM(I)

IF(XLM(I).GT.0.0) NSLR = NSLR + 1

140 CONTINUE

DO 160 J = 1. NHIST

160 CONTINUE

POTTS = POTTS / TOTALM

RETURN
OPTIONS IN EFFECT: NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

OPTIONS IN EFFECT: SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

STATISTICS: SOURCE STATEMENTS = 55, PROGRAM SIZE = 1708, SUBPROGRAM NAME = POTSET

STATISTICS: NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

132K BYTES OF CORE NOT USED
SUBROUTINE DISTR (p, n)

COMMON /SWTCHS/ QVLF.E, PCTINT, PCTINF, TPCPC, PFNDPC, AGA, SPCUT,
  1 XML, CACI, CGRI, ICAC, AGDENS, ICGR, GROENS,
  2 INTT, SAVMNT, IDST, NL0, NCODE(S)

COMMON /PSI/ PF, PICON, PTERM, PIOV, PTOV
COMMON /MECH/XKT, NLH, ND, NOEL
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC

DIMENSION P(25)
REAL WX(5,2,2)/20*0.0/, XN(5,2,2)/20+0.0/, AO(5,2,2)/20*0.0/, SF(5,2,2)/20*0.0/

IF(IP.EQ.IF) GO TO 10

P(1)=0
P(2)=0
P(3)=0
P(4)=0.0125
P(5)=.0125
P(6)=0.0295
P(7)=P(6)
P(8)=P(7)
P(9)=0.03
P(10)=P(9)
P(11)=.085
P(12)=P(11)
P(13)=.0325
P(14)=P(13)
P(15)=.0595
P(16)=P(15)
P(17)=.0325
P(18)=.085
P(19)=P(18)
P(21)=P(20)
P(20)=.03
P(21)=0.03
P(22)=.0295
P(23)=P(22)
P(24)=P(23)
P(25)=.025
RETURN

10 CONTINUE

IF(TPE.EQ.1.0) CALL PSIT(PICON,PF,W1,XKT)
IF(PF.LT.PTERM) GOTO 1000
WX(1,2,1)=500000.
AO(1,2,1)=6.93E21
A0(1,2,1)=6.93E21
AO(1,2,1)=2.92E17
A0(1,2,1)=2.92E17
WX(1,2,1)=1.75
A0(1,2,1)=6.93E21
AO(1,2,1)=6.93E21
WX(1,1,1)=20000.
ISN 0056  XN(1,1,1)=3.0
ISN 0057  AO(1,1,1)=1.87E16
ISN 0058  XN(1,1,1)=2.5
ISN 0059  A2(1,1,1)=0.23E14
ISN 0060  SF(1,1,1)=0.8
ISN 0061  WX(1,1,2)=100000.
ISN 0062  XN(1,1,2)=2.5
ISN 0063  AO(1,1,2)=1.08E16
ISN 0064  XN(1,1,2)=2.5
ISN 0065  A2(1,1,2)=0.73E16
ISN 0066  SF(1,1,2)=0.8
ISN 0067  WX(3,2,1)=5000.
ISN 0068  XN(3,2,1)=2.3
ISN 0069  AO(3,2,1)=4.45E10
ISN 0070  A2(3,2,1)=1.47E9
ISN 0071  XN(3,2,1)=2.0
ISN 0072  SF(3,2,1)=0.9
ISN 0073  WX(3,1,1)=2000
ISN 0074  XN(3,1,1)=2.25
ISN 0075  AO(3,1,1)=3.3E9
ISN 0076  A2(3,1,1)=3.64E12
ISN 0077  XN(3,1,1)=2.75
ISN 0078  SF(3,1,1)=0.86
ISN 0079  WX(3,2,2)=5000.
ISN 0080  XN(3,2,2)=2.3
ISN 0081  AO(3,2,2)=4.45E10
ISN 0082  A2(3,2,2)=1.47E9
ISN 0083  XN(3,2,2)=2.0
ISN 0084  SF(3,2,2)=0.9
ISN 0085  WX(3,1,2)=2000.
ISN 0086  XN(3,1,2)=2.25
ISN 0087  AO(3,1,2)=3.3E9
ISN 0088  A2(3,1,2)=3.64E12
ISN 0089  XN(3,1,2)=2.75
ISN 0090  SF(3,1,2)=0.86
ISN 0091  WX(4,2,1)=50000.
ISN 0092  XN(4,2,1)=2.9
ISN 0093  AO(4,2,1)=4.99E16
ISN 0094  A2(4,2,1)=0.26E12
ISN 0095  XN(4,2,1)=2.0
ISN 0096  SF(4,2,1)=0.93
ISN 0097  WX(4,1,1)=20000.
ISN 0098  XN(4,1,1)=3.0
ISN 0099  AO(4,1,1)=1.22E16
ISN 0100  A2(4,1,1)=0.32E15
ISN 0101  XN(4,1,1)=2.75
ISN 0102  SF(4,1,1)=0.75
ISN 0103  WX(4,2,2)=500000.
ISN 0104  XN(4,2,2)=3.1
ISN 0105  AO(4,2,2)=9.14E20
ISN 0106  A2(4,2,2)=1.3E15
ISN 0107  XN(4,2,2)=2.25
ISN 0108  SF(4,2,2)=0.92
ISN 0109  WX(4,1,2)=200000.
ISN 0110  XN(4,1,2)=2.5
ISN 0111  AO(4,1,2)=7.56E15
ISN 0112  A2(4,1,2)=0.17E15
ISN 0113  XN(4,1,2)=2.25
LEVEL 2.3.0 (JUNE 78) DISTR 05/360 FORTRAN H EXTENDED

ISN 0114  SF(4,1,2)=0.95
ISN 0115  GO TO 1005
ISN 0116  1000  WX(1,1,1)=25000.
ISN 0117  A2(1,1,1)=7.028E54
ISN 0118  XN(1,1,1)=10.
ISN 0119  WX(1,2,1)=62500.
ISN 0120  A2(1,2,1)=6.667E58
ISN 0121  XN(1,2,1)=10.
ISN 0122  WX(1,1,2)=250000.
ISN 0123  A2(1,1,2)=7.028E64
ISN 0124  XN(1,1,2)=10.
ISN 0125  WX(1,2,2)=625000.
ISN 0126  A2(1,2,2)=6.703E68
ISN 0127  XN(1,2,2)=10.
ISN 0128  WX(3,1,1)=3000.
ISN 0129  A2(3,1,1)=1.373E44
ISN 0130  XN(3,1,1)=10.
ISN 0131  WX(3,2,1)=6250.
ISN 0132  A2(3,2,1)=2.115E47
ISN 0133  XN(3,2,1)=10.
ISN 0134  WX(3,1,2)=3000.
ISN 0135  A2(3,1,2)=1.373E44
ISN 0136  XN(3,1,2)=10.
ISN 0137  WX(3,2,2)=6250.
ISN 0138  A2(3,2,2)=2.115E47
ISN 0139  XN(3,2,2)=10.
ISN 0140  WX(4,1,1)=25000.
ISN 0141  A2(4,1,1)=2.1E54
ISN 0142  XN(4,1,1)=10.
ISN 0143  WX(4,2,1)=62500.
ISN 0144  A2(4,2,1)=4.24E47
ISN 0145  XN(4,2,1)=8.
ISN 0146  WX(4,1,2)=250000.
ISN 0147  A2(4,1,2)=2.1E64
ISN 0148  XN(4,1,2)=10.
ISN 0149  WX(4,2,2)=625000.
ISN 0150  A2(4,2,2)=2.0E68
ISN 0151  XN(4,2,2)=10.
ISN 0152  1005  ACUM=WX(NPT,NUR,NLH)
ISN 0153  TOLD=0.
ISN 0154  DO 2 K=1,N
ISN 0155  ACUM=ACUM+WX(NPT,NUR,NLH)*((1+AGR/100.00)**FLOAT(K)
ISN 0156  XTEMP=A2(NPT,NUR,NLH)
ISN 0157  IF(ND.EQ.1.AND.PTERM.LT.PF)XTEMP=AO(NPT,NUR,NLH)
ISN 0158  ATEMP=XN(NPT,NUR,NLH)
ISN 0159  IF(ND.EQ.1.AND.PTERM.LT.PF)ATEMP=XNO(NPT,NUR,NLH)
ISN 0160  XRE=-1.0*XTEMP/(ACUM**ATEMP)
ISN 0161  T=EXP(XRE)
ISN 0162  TNEW=T-TOLD
ISN 0163  TOLD=T
ISN 0164  2 P(K)=TNEW
ISN 0165  CALL SUM (P,24,DUMMY)
ISN 0166  P(25)=1.0-DUMMY
ISN 0167  RETURN
ISN 0168  END

*OPTIONS IN EFFECT*NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
SUBROUTINE EALGET
C THIS ROUTINE CALCULATES THE RATIO OF EAL PER UNIT TIME UNDER THE
C PROPOSED REGULATIONS TO THAT UNDER THE PRESENT REGULATIONS,
C SUBJECT TO THE RESTRAINT OF EQUAL PAYLOAD PER UNIT TIME (IEOTRP=0).
C OR TO THE RESTRAINT OF EQUAL NUMBER OF TRIPS (IEOTRP=1).
COMMON /EALPAY/ EALPT(10,2), APPT(10,2), EALFCT(20), IEOTRP
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /PSI/ PF, PICON, PTERM, PIOW, PTOV
COMMON /STCRT/ SN, SS, R, D, AGG, XJ, XK, E
COMMON /TIME/ ATP, OVLIF, NYAP, NVR, YR(40)
COMMON /TRTYP/ TTYP(2,10), PTTYP(10,20,2), PCTTR(20,2), PERCT(4).
1 COMMON /NXT/ NAXLES(10,4), NTT, NTT, NYT, NTT, NEWTRK
DIMENSION S1(10), S2(10), T1(10), T2(10)
IPVT = IP
IF (IP .EQ. IC) IPVT = IR
CALL TRAFFIC-ONLY IF NEW LIMITS OR WEIGHT DISTRIBUTIONS HAVE BEEN
READ FOR THIS PROBLEM
IF (NEWTRK .GT. 1) CALL TRAFFIC
CALL EAL18 (SN, D, PTERM, IPVT)
CALL EAL18 RETURNS 18K EAL PER AVERAGE TRUCK, EALPT, AND PAYLOAD PER
AVERAGE TRUCK, APPT, FOR EACH TRUCK TYPE.
FOR EACH YEAR OBTAIN THE (NORMALIZED) TOTAL PAYLOAD AND TOTAL 18K
EAL
DO 10 J=1,NYAP
   CALL MULT (PTTYP(1,J,1), APPT(1,1), NTTY, S1)
   CALL MULT (PTTYP(1,J,2), APPT(1,2), NTTY, S2)
   CALL MULT (PTTYP(1,J,1), EALPT(1,1), NTTY, T1)
   CALL MULT (PTTYP(1,J,2), EALPT(1,2), NTTY, T2)
   CALL SUM (S1, NTTY, SUM1)
   CALL SUM (S2, NTTY, SUM2)
   CALL SUM (T1, NTTY, TUM1)
   CALL SUM (T2, NTTY, TUM2)
   IF (IEOTRP .EQ. 0) EALFCT(J) = SUM1*TUM2/(SUM2*TUM1)
   IF (IEOTRP .EQ. 1) EALFCT(J) = TUM2/TUM1
10 CONTINUE
RETURN
END
SUBROUTINE LDSHFT (XN1, XN2, N, M)
C
MULTIPLY (EAl/YR, PRESENT REGS.) FOR EACH YEAR BY CORRESPONDING
C
RATIO FROM EALGET TO OBTAIN (EAl/YR, PROPOSED).
C
DIMENSION XN1(1), XN2(1)
C
XN2(1) = EALFCT(1)*XN1(1)
DO 10 J=2,N
C
FACT = EALFCT(M)
IF (J .LE. M) FACT = EALFCT(J)
10 XN2(J) = XN2(J-1) + FACT*(XN1(J) - XN1(J-1))
RETURN
END

*STATISTICS*   SOURCE STATEMENTS = 11. PROGRAM SIZE = 532. SUBPROGRAM NAME =LDShFT

****** END OF COMPILATION ******
SUBROUTINE LIFCYC
C FOR GIVEN STRUCTURE, EVALUATES AASHO-PREDICTED 18KEAL TO TERMINAL
C TOT EAL, EVALUATES 18KEAL IN FIRST YEAR OF PAVEMENT LIFE
C DEFINES AN AVERAGE TRAFFIC AND OVERLAY DESIGNS FOR PAVEMENT CYCLED
C OUT OF POTS, AND, FOR PRESENT AND PROPOSED REGULATIONS, OBTAINS
C THE PRODUCT OF COST/(LANE MILE) AND (LANE MILES) FROM -CXLM-

COMMON /CMP/ COMP(30,34), PCOMP(30), AATP(30)
COMMON /COST/ COSM(20,2), COSV(20,2), COSMS(20,2), COSVS(20,2),
                  CSMPW(2), CSVPW(2), CSMUA(2), CSVUA(2)
COMMON /DSN/ EALDSN(30,2), EALDNP(20,2)
COMMON /EXPT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /FUNDS/ APOF(20,2), RTINT, RTINF
COMMON /LMP/ XLM(30), XLMF(30), KLMF(20,2), OUTP(20,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /MISC/ IPMT, IARMS, OLDMTN, AGF
COMMON /OUT/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTMV(30,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /POV/ SNOV(30,2), THOV(30,2)
COMMON /POT/ SNOV(30,2), THOV(30,2)
COMMON /PSI/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTMV(30,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /RPT/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTMV(30,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /TOTAL/ TOTV(30,2), SNOV(30,2), THOV(30,2)
COMMON /PSI/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTMV(30,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /EXTRA/ TPE, PFO, MNOVTK, MXOVTK, NIS
COMMON /ACCEAL/ EXP10(X) = EXP(X*2.302585)
COMMON /TIME/ ATP, OVLIF, NYP, NYPF, LAY, YR(40)
COMMON /HOR/ (10), (10), (10), (10), (10), (10), (10), (10), (10), (10)
* , PT(5), AC(5), AA, SCT(5), XNNW(18,10), XKTQ
COMMON /PSI/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTMV(30,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /EXTRA/ TPE, PFO, MNOVTK, MXOVTK, NIS
DIMENSION ACCEAL(40,2)

CALL ZERO (SNOV, 60)
CALL ZERO (THOV, 60)
CALL ZERO (CSTOV, 60)
CALL ZERO (TOVLM, 60)
SATP = ATP
ISN 0025 IF (IP .EQ. IF .AND. TPE .EQ. 1) THEN
                    1 CALL TEXAS (TOTAL)
ISN 0027 IF (IP .EQ. IF .AND. TPE .EQ. 0) CALL TMCH (TOTAL)
ISN 0029 IF (IP .EQ. IR .OR. IP .EQ. IC) THEN
                    1 TOTAL = EXP10(RWT18L(D.PICON.PTERM) + (4.22- .32*PTERM)*
                               EXP10(X*2.302585))
                    2 RNAS(AD)

C EAL1 = NUMBER OF EAL IN FIRST YR OF PAVT. LIFE. NOT YEAR 1 OF A.P.
DO 10 L=1,NLSR
    YR(L) IS A SEQUENTIAL REAL ARRAY, FROM 1 TO NYR.
   10 ATP = AATP(L)
ISN 0031 IF (AGF .EQ. 0.) EAL1 = TOTAL/ATP
ISN 0034 IF (AGF .NE. 0.) EAL1 = TOTAL*AGF/((1.+AGF)**ATP-1.)
ISN 0036 CALL CYCLE (L, TOTAL, AGE, EAL1, ACCEAL)

SUBROUTINE LIFCYC
C FOR GIVEN STRUCTURE, EVALUATES AASHO-PREDICTED 18KEAL TO TERMINAL
C TOT EAL, EVALUATES 18KEAL IN FIRST YEAR OF PAVEMENT LIFE
C DEFINES AN AVERAGE TRAFFIC AND OVERLAY DESIGNS FOR PAVEMENT CYCLED
C OUT OF POTS, AND, FOR PRESENT AND PROPOSED REGULATIONS, OBTAINS
C THE PRODUCT OF COST/(LANE MILE) AND (LANE MILES) FROM -CXLM-

COMMON /CMP/ COMP(30,34), PCOMP(30), AATP(30)
COMMON /COST/ COSM(20,2), COSV(20,2), COSMS(20,2), COSVS(20,2),
                  CSMPW(2), CSVPW(2), CSMUA(2), CSVUA(2)
COMMON /DSN/ EALDSN(30,2), EALDNP(20,2)
COMMON /EXPT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /FUNDS/ APOF(20,2), RTINT, RTINF
COMMON /LMP/ XLM(30), XLMF(30), KLMF(20,2), OUTP(20,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /MISC/ IPMT, IARMS, OLDMTN, AGF
COMMON /OUT/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTMV(30,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /POV/ SNOV(30,2), THOV(30,2)
COMMON /POT/ SNOV(30,2), THOV(30,2)
COMMON /PSI/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTMV(30,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /RPT/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTMV(30,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /EXTRA/ TPE, PFO, MNOVTK, MXOVTK, NIS
COMMON /ACCEAL/ EXP10(X) = EXP(X*2.302585)
COMMON /TIME/ ATP, OVLIF, NYP, NYPF, LAY, YR(40)
COMMON /HOR/ (10), (10), (10), (10), (10), (10), (10), (10), (10), (10)
* , PT(5), AC(5), AA, SCT(5), XNNW(18,10), XKTQ
COMMON /PSI/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTMV(30,2),
                    TOTALM, PPF, PPND, NASL, NLSR, TOLM(30,2)
COMMON /EXTRA/ TPE, PFO, MNOVTK, MXOVTK, NIS
DIMENSION ACCEAL(40,2)

CALL ZERO (SNOV, 60)
CALL ZERO (THOV, 60)
CALL ZERO (CSTOV, 60)
CALL ZERO (TOVLM, 60)
SATP = ATP
ISN 0025 IF (IP .EQ. IF .AND. TPE .EQ. 1) THEN
                    1 CALL TEXAS (TOTAL)
ISN 0027 IF (IP .EQ. IF .AND. TPE .EQ. 0) CALL TMCH (TOTAL)
ISN 0029 IF (IP .EQ. IR .OR. IP .EQ. IC) THEN
                    1 TOTAL = EXP10(RWT18L(D.PICON.PTERM) + (4.22- .32*PTERM)*
                               EXP10(X*2.302585))
                    2 RNAS(AD)

C EAL1 = NUMBER OF EAL IN FIRST YR OF PAVT. LIFE. NOT YEAR 1 OF A.P.
DO 10 L=1,NLSR
    YR(L) IS A SEQUENTIAL REAL ARRAY, FROM 1 TO NYR.
   10 ATP = AATP(L)
ISN 0031 IF (AGF .EQ. 0.) EAL1 = TOTAL/ATP
ISN 0034 IF (AGF .NE. 0.) EAL1 = TOTAL*AGF/((1.+AGF)**ATP-1.)
ISN 0036 CALL CYCLE (L, TOTAL, AGE, EAL1, ACCEAL)
10 CONTINUE
NY2 = NYAP/2
EALBP = EAL1*(1. + AGF)**NY2
DO 20 K=1,2
IF (K .EQ. 1) CALL ACCTFC(EALBP, AGF, NYR, ACCEAL(1,1))
IF (K .EQ. 2) CALL LDHFT (ACCEAL(1,1), ACCEAL(1,2), NYR, NYAP)
CALL PDVSN (ACCEAL(1,K), SNOVP(1,K), THOVP(1,K), PP(1,K),
1 IST0VP(1,K), RLP(1,K), EALONP(1,K))
CALL CXLM (TOV(1,K), COSTM(1,1,K), CSTOV(1,K), CSTOVP(1,K), APOF(1,K),
1 COSM(1,K), COSV(1,K), POTLM(1,K), OUTP(1,K), TOVLM(1,K))
20 CONTINUE
ATP, SATP
RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 51, PROGRAM SIZE = 2212, SUBPROGRAM NAME = LIFCYC

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

128K BYTES OF CORE NOT USED
SUBROUTINE CYCLE (I, TOTEAL, AGE, EAL1, ACCEAL)
C FOR GIVEN AGE SLICE
C DETERMINES AGE AT BEGINNING OF ANALYSIS PERIOD, AND 18KEAL IN
C FIRST YEAR OF ANALYSIS PERIOD
C USES GROWTH FACTOR TO PROJECT 18KEAL FOR FUTURE YEARS
C GETS TIME, THICKNESS AND COST OF OVERLAY

COMMON /DSN/ EALDSN(30,2), EALDNP(20,2)
COMMON /OVRLAY/ XHC10, XHC1M, WLANE, WP5H, WP5SH, PVPD5H, CAC, CGR
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /MISC/ IPOT, IARMS, OLDMNT, AGF
COMMON /OUT/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTOV(30,2).
1
COMMON /OVER/ TOV(30,2), SNOV(30,2), THDV(30,2)
COMMON /PSI/ PF, PICON, PTERM, PIQV, PIQV
COMMON /STRUCT/ SN, SS, R, D, AGG, XJ, XK, E
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /OUT/ PSIE(30,2), EALREM(30,2), COSTM(20,30,2), CSTOV(30,2).
1.

DIMENSION DOV(30,2), EALAPI(30,2), EALAPI(40,2)
DIMENSION EALDSN(30,2), EALREM(30,2)
EQUALISE (SNOD(1,1), DOV(1,1))
DIMENSION ACCE1(40,2)
EALAPI = EAL1*(I, + AGF)**AGE
IF (AGF .EQ. 0.) EALBAP = EAL1*AGE
IF (AGF .NE. 0.) EALBAP = EAL1*(1. + AGF)**AGE - 1.)/AGF
XNREM = TOTD1 - EALBAP
CALL ACCTFC (EALAPI, AGF, NYR, ACCE1(1,1))
CALL LDSD1 (ACCE1(1,1), ACCE1(2,1), NVR, NYR)
IF (IP .EQ. IF) CALL GSPSF (EALREM, PSIB(I))
IF (IP .EQ. IR OR IP .EQ. IC) PSIB(I) = GPSIR(EALBAP, PICON, D)
IF (XNREM .LE. 0.) XNREM = 1.

CALL OVCOST (THOV(I,K), CSTOV(I,K))
GO TO 50

IF (K .EQ. 1) TOV(I,K) = FLOAT(I)
Determine OVERLAY TIME FOR PROPOSED REGULATIONS
TIME AT WHICH CUMULATIVE 18KEAL FROM BEGINNING OF ANALYSIS PERIOD
EQUALS REMAINING ALLOWABLE 18KEAL TO TERMINAL PSI.
CALL INTERP (ACCE1(1,2), YR,XYR, XNREM, TOV(I,2))
CALL TOVTO (K, Y(1), Y(25)) GO TO 40
IF (IP .EQ. IR OR IP .EQ. IC) GO TO 25
CALL OVSYP (ACCE1(I,K), TOV(I,K), SNOV(I,K), EALREM(I,K), XNOD)
CALL OVTHKF (XNOV, THOV(I,K), DOV(I,K))
GO TO 30
25 CALL OVSYP (ACCE1(I,K), TOV(I,K), DOV(I,K), EALREM(I,K), XNOD)
CALL OVSYP (DOV(I,K), DEX, THOV(I,K))
30 CONTINUE
CALL OVCOST (THOV(I,K), CSTOV(I,K))
CONTINUE
EALDSN(I,K) = XNOV
GO TO 50
40 CONTINUE
EALREM(I,K) = TOTD1 - EALBAP - ACCE1(NYAP,K)
EALDSN(I,K) = TOTD1
50 CONTINUE
CALL MPPR (I, AGE, EALBAP, ACCEAL, TOTEAL)
RETURN
END
SUBROUTINE SUBCY (XNC, YROV, OV, REM, XNOV)
C OBTAINS DESIGN 18KEAL FOR OVERLAY AND CORRESPONDING STRUCTURAL
C NUMBER OR SLAB THICKNESS, D.
C DETERMINES REMAINING LIFE (18KEAL) AT END OF ANALYSIS PERIOD
PUBLIC /EXPVT/, /PSI/, /STRUCT/, /TIME/
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /PSI/ PF, PICON, PTERM, PIOV, PTOV
COMMON /STRUCT/ SN, SS, R, D, AGG, XJ, XK, E
COMMON /TIME/ ATP, OVLIF, NYAP, NYR, YR(40)
DIMENSION XNC(l)

CALL INTERP (YR, XNC, NYR, YROV, BN)
CALL INTERP (YR, XNC, NYR, YROV + OVLIF, EN)
XNOV = EN - BN
REM = EN - XNC(NYAP)
IF (IP .EQ. IR .OR. IP .EQ. IC) GO TO 10
OV = 9999999999999.
10 CALL GETD (ALOG10(XNOV), PIOV, PTOV, D, DOV)

RETURN
END
SUBROUTINE POVDSN (EALC, SNOVP, THOVP, PP, CSTOVP, RL, DL)

C ROUTINE TO DESIGN OVERLAYS FROM THE POT.
C REDUCE PTERM FOR ORIG. PAVT BY 0.5 TO KEY PROPER CONDITION
C LEVEL IN THICKNESS ROUTINES.
C SNOVP = SN FOR OVERLAY DESIGN OUT OF THE POT (EQUIV. TO DOVP)
C THOVP THICKNESS FOR OVERLAY DESIGN OUT OF THE POT.
C PP = PSI AT END OF ANALYSIS PERIOD FOR THESE PAVTS.

COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /PSI/ PF, PICON, PTERM, PIOV, PTOV
COMMON /STRUCT/ SN, SS, R, D, AGG, XJ, XK, E
COMMON /TIME/ ATP, OVLIF, NYAP, YR, TR(40)
COMMON /HOR/ A(10), 8(10), C(10), DT(10), DF(10), S(10), T(10), TR(5), PI(5)
* PT(5), AC(5), AA, SCT(5), XMINW(10), XKTO
COMMON /EXTRA/ TPE, PFO, MNVTK, XMOVTK, NIS

DIMENSION EALC(1), SNOVP(1), THOVP(1), PP(1), CSTOVP(1)
DIMENSION RL(1), DL(1)

PTS = PTERM
IF(IP.EQ.IR.OR.IP.EQ.IC) PTERM = PTERM - 0.5
IF(IP.EQ.IF) PTERM = PTERM + 0.1
IF(PTERM.EQ.PFO) PTERM = PTERM + 0.05
DO 100 J = 1, NYAP
IF (IP .EQ. IR, OR. IP .EQ. IC) GO TO 25
CALL SUBCY (EALC, FLOAT(J), SNOVP(J), EALR, XNOV)
CALL OVTHKF (XNOV, THOVP(J), FLOAT(J))
IF(PTS.LT.PFO) THOVP(J) = THOVP(J) + 0.5
XM = XNOV - EALR
PP(J) = PIOV
IF (XM .GT. 0.) CALL GPSIF (XM, PP(J))
GOTO 90
25 CONTINUE

C FOR RIGID DESIGN, SNOVP HOLDS THE VALUE OF DOVP.
CALL SUBCY (EALC, FLOAT(J), SNOVP(J), EALR, XNOV)
DEX = D
CALL OVTHKR (SNOVP(J), DEX, THOVP(J))
XM = XNOV - EALR
PP(J) = PIOV
IF (XM .GT. 0.) PP(J) = GPSIR(XM, PIOV, SNOVP(J))
90 CALL OVCOST (THOVP(J), CSTOVP(J))
RL(J) = EALR
DL(J) = XNOV
100 CONTINUE

RETURN
END
SUBROUTINE OVCOST (THOV, OVCST)
OBTAINS COST/(LANE MILE) FOR GIVEN OVERLAY THICKNESS
COMMON /OVRLAY/ XHCIO, XHCIM, WLANE, WPSH, WGSH, PPVDSH, CAC, CGR
DATA C1/16.2962963/
C COSTS ARE INPUT TO THIS ROUTINE IN DOLLARS/CU YD.
C C1 IS THE NUMBER OF CUBIC YDS IN A LAYER 1 MILE BY 1 FOOT BY 1 IN.
C
F = PPVDSH/100.
TH = THOV
C FIND THE VOLUME/(LANE MILE) OF ROAD OVERLAY, OF PAVED SHOULDER
C OVERLAY, AND OF GRANULAR SHOULDER OVERLAY
VPO = WLANE*TH*C1
VPSO = WPSH*TH*C1
VGSO = WGSH*TH*C1
C PAVEMENT OVERLAY COST
PVTOC = VPO*CAC
C UNPAVED SHOULDER OVERLAY COST
UPSHOC = CGR*(1.-F)*VGSO
C PAVED SHOULDER COST
PSHOC = CAC*F*VPSO
C TOTAL OVERLAY COST
OVCST = PVTOC + UPSHOC + PSHOC
RETURN
END
SUBROUTINE ACCTFC (TFC1, AGF, NYR, TFCA)  
C CUMULATIVE TRAFFIC BY YEAR FROM BASE YEAR (18 KIP EAL). 
C INPUT 
C TFC1 - 18KIP EAL IN BASE YEAR (YEAR 1) 
C AGF - ANNUAL GROWTH FACTOR (PERCENT/100.) 
C NYR - NUMBER OF YEARS FOR WHICH ACCUMULATED TRAFFIC DESIRED. 
C OUTPUT 
C TFCA - ARRAY OF CUMULATIVE 18 KIP EAL THROUGH END OF INDEX YEAR. 
ISN 0003 DIMENSION TFCA (NYR)  
ISN 0004 TFCA(1) = TFC1  
ISN 0005 T = TFC1  
ISN 0006 DO 10 I=2,NYR  
ISN 0007 T = T*(1. + AGF)  
ISN 0008 TFCA(I) = TFCA(I-1) + T  
ISN 0009 10 CONTINUE  
ISN 0010 RETURN  
ISN 0011 END  

*STATISTICS* SOURCE STATEMENTS = 10, PROGRAM SIZE = 398, SUBPROGRAM NAME =ACCTFC  

******* END OF COMPILATION *******  

136K BYTES OF CORE NOT USED
SUBROUTINE MPPR (I, AB, CNB, XNA, XNTP)

INPUT AB
TOV(I,K) - PAVEMENT AGE AT BEGINNING OF ANALYSIS PERIOD.
TOV(I,K) - TIME IN THE ANALYSIS PERIOD AT WHICH PAVEMENT
SLICE I REACHES TERMINAL PSI AND IS OVERLAID
K=1 - PRESENT LIMITS.
K=2 - FUTURE LIMITS.
CNB - CUMULATIVE EAL ON PAVT TO START OF A.P.
XNA(J,K) - CUMULATIVE EAL THRU YEAR J FROM BEG. OF A.P.
XNTP(J,K) - TOTAL EAL TO TERM. PSI (PAVT BEFORE OVERLAY).
N - NUMBER OF YEARS IN ANALYSIS PERIOD (A.P.).
IP - PAVEMENT TYPE (*IF, IR, OR IC)

OUTPUT P(J,K) - PSI AT END OF YEAR J, LOAD LIMITS K.
COSTM(J,K) - MAINTENANCE COSTS
PVAGE(J,K) - PAVEMENT AGE IN YEAR J OF A.P.
PVAGE(J,K) - INTERNAL
PVAGE(J,K) - PAVEMENT AGE AT BEGINNING OF ANALYSIS PERIOD.
PVAGE(J,K) - TIME IN THE ANALYSIS PERIOD AT WHICH PAVEMENT
SLICE I REACHES TERMINAL PSI AND IS OVERLAID
K=1 - PRESENT LIMITS.
K=2 - FUTURE LIMITS.
K=3 - PROPOSED LIMITS INTERPOLATED TO PRESENT
LIMITS AT SAME PSI.

COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /LMP/ XLM(30), YLM(30), POTLM(20,2), OUTP(20,2).
1 TOTALM, PPF, PBFN, NASL, NSLR, TOVLM(30,2)
COMMON /MISC/ IPOT, IARMS, OLDMTN, AGF
COMMON /OUT/ PSEL(30,2), EALREM(30,2), COSTM(20,30,2), CSTOV(30,2)
1 PSIB(30)
COMMON /OVER/ TOV(30,2), SNOV(30,2), THOV(30,2)
COMMON /PSI/ PF, PICON, PTERM, PTOV
COMMON /STRUCT/ SN.SS.R,D,AGG,XJ XK,E
COMMON /TIME/ ATP, OVLIF, NYAP, NYR, YR(40)
COMMON/HOR/A(10),B(10),C(10),DT(10),DF(10),S(10),T(10),TR(5),PI(5)
*PT(5),AC(5),AA,SCT(5),XMNW18(10),XKTD
COMMON /EXTRA/ TPE,PFO,MNOVTK, MXOVTK, NIS
DIMENSION DOV(30,2)
DIMENSION DOV(30,2)
EQUIVALENCE (SNOV(1,1), DOV(1,1))
DIMENSION XNA(40,2), PVAGE(20,3), P(20,2),NY(2)
DO 40 K=1,2
NY(K) = INT (TOV(I,K))
NA = MINO(NY(K), NYAP)
NY1 = NA
40 CONTINUE
DO 10 J=1,NA
PVAGE(J,K) = AB + FLOAT(J)
XN = CNB + XNA(J,K)
IF (XN.LE. 0.) XN = 1.
IF (IP.EQ. IF) CALL GPSIF (XN,P(J,K))
10 CONTINUE
IF (IP.EQ. IR.OR. IP.EQ. IC) P(J,K) = GPSIR(XN, PICON, D)
10 CONTINUE
IF (NY(K) .GE. NYAP) GO TO 25
ISN 0034  12 NA1 = NA + 1
ISN 0035  YN = XNTP - CNB
ISN 0036  DO 20 J=NA1,NYAP
ISN 0037  PVAGE(J,K) = FLOAT(J) - TOV(I,K)
        \( C \) YN IS TOTAL 18K EAL USED IN A.P. BEFORE OVERLAY.
ISN 0038  XN = XNA(J,K) - YN
ISN 0039  IF (XN .LE. 0.) XN = 1.
ISN 0040  IF (IP .EQ. IF) CALL GPSIF (XN,P(J,K))
ISN 0041  IF (IP .EQ. IR .OR. IP .EQ. IC) P(J,K) = GPSIR(XN, PIOV, DOV(I,K))
ISN 0042  20 CONTINUE
        \( C \) PSI AT END OF A.P.
ISN 0043  PSIE(I,K) = P(NYAP,K)
ISN 0044  GO TO 40
ISN 0045  25 PSIE(I,K) = P(NYAP,K)
ISN 0046  IF (TOV(I,K) .EQ. YR(NYAP)) PSIE(I,K) = PIOV
ISN 0047  40 CONTINUE
ISN 0048  NA1 = 1
ISN 0049  IF (IARMS .EQ. 0) GO TO 52
ISN 0050  IF (NY(1) .LE. 1) GO TO 52
ISN 0051  NA = MINO(NY(2), NYAP)
ISN 0052  IF (NA .EQ. 0) GO TO 52
ISN 0053  DO 60 J=1,NA
ISN 0054  CALL INTERP (P(I,1), PVAGE(1,1), NY1, P(J,2), PVAGE(J,3))
ISN 0055  50 IF (PVAGE(J,3) .GT. ATP) PVAGE(J,3) = ATP
ISN 0056  IF (NY(2) .GE. NYAP) GO TO 60
ISN 0057  NA1 = NA + 1
ISN 0058  52 CONTINUE
ISN 0059  DO 55 J=NA1, NYAP
ISN 0060  PVAGE(J,3) = PVAGE(J,2)
ISN 0061  55 CONTINUE
ISN 0062  60 CONTINUE
ISN 0063  CALL MAINT (AB, PVAGE(1,1), TOV(1,1), COSTM(1,1,1))
ISN 0064  CALL MAINT (AB, PVAGE(1,3), TOV(1,2), COSTM(1,1,2))
ISN 0065  RETURN
ISN 0066  END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NONSF NOTERM IBM FLAG(I)
*STATISTICS* SOURCE STATEMENTS = 74, PROGRAM SIZE = 2752, SUBPROGRAM NAME = MPPR
*STATISTICS* NO DIAGNOSTICS GENERATED
****** END OF COMPILATION ******

124K BYTES OF CORE NOT USED
SUBROUTINE CXLM (TOV, COSTM, CSTOV, CSTOVP, APOF, COSM, COSV, 
PTLM, POUT, TVLM)

C COSTS/LANE MILE X LANE MILES
C ALSO MANAGES Potts BASED ON Potts OPTION SWITCH.

COMMON /LMP/ XLM(30), YLM(30), POTLM(20,2), OUTP(20,2), 
TOTALM, PPF, PPFNO, NASL, NSLR, TOVLM(30,2)

COMMON /OVLAY/ XHCIO, XHCM, WLANE, WPSh, WGS, PPVDSh, CAC, CGR

COMMON /MISC/ IPOT, IARMS, OLDMMT, AGF

COMMON /TIME/ ATP, OVLIF, NYAP, NYR, YR(40)

DIMENSION TOV(1), COSTM(20,1), CSTOV(1), CSTOVP(1)

DIMENSION APOF(1), COSM(1), COSV(1), PTLM(1), POUT(1)

DIMENSION TVLM(1), ZLM(30)

T = YR(NYAP)

SUM = 0.

DO 10 I=1,NSLR

10 IF (TOV(I) .GT. T) SUM = SUM + XLM(I)

GFNO = SUM / TOTALM

Q = PFNO * TOTALM

W = AMAX1(PPF, PFNO)

X = (W - PFNO) / (1. - PPF - GFNO)

Y = (W - PFNO) / (1. - PPF - GFNO)

DO 20 I=1,NSLR

20 ZLM(I) = XLM(I)

BANK = 0.

DO 200 J=1,NYAP

CM = 0.

CV = 0.

U=0.

C -IN- AND -OUT- REFER TO IN AND OUT OF THE POT.

XOUT = 0.

YIN = 0.

IF (IPOT .EQ. 2) BANK = BANK + APOF(J)

IF (J.GT.NSLL .AND. P.GT.0.0) GO TO 101

ON 100 I=1,NSLR

CM = CM + COSTM(J,1)*XLM(I)

ITOV = TOV(I) + 0.99999

IF (ITOV .NE. J) GO TO 100

IF (IPOT .EQ. 2) GO TO 50

IF (IPOT .EQ. 1) GO TO 40

CV = CV + CSTOV(I)*XLM(I)

TVLM(I) = XLM(I)

GO TO 100

40 T = Y*ZLM(I)

S = X*ZLM(I)

YIN = YIN + T

XOUT = XOUT + S

IF(XOUT.GT.P) XOUT=0.85*P

CV = CV + CSTOV(I)*(ZLM(I) - T)

TVLM(I) = XLM(I) - T

GO TO 100
```
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ISN 0057  50  IL = I
ISN 0058  R = BANK/CSTOV(I)
ISN 0059  IF(R.GT.P) R=0.0
ISN 0061  S = AMIN1(R,XLM(I))
ISN 0062  C = CSTOV(I)*S
ISN 0063  TVLM(I) = S
ISN 0064  BANK = BANK - C
ISN 0065  CV = CV + C
ISN 0066  U = U + XLM(I) - S
ISN 0067  100  CONTINUE
ISN 0068  GO TO 102
ISN 0069  101  IF(IPOT.EQ.1.AND. P.GT.TOTALM*TPF)XOUT=(P-TOTALM*TPF)/(NYAP-NSLR)
ISN 0071  102  CONTINUE
ISN 0072  COSM(J) = CM + P*OLDMNT
ISN 0073  COSM(J)=COSM(J)*((1+XHCIM)**FLOAT(J)
ISN 0074  IF (IPOT.EQ. 2) GO TO 150
ISN 0076  IF (IPOT.EQ. 1) GO TO 140
ISN 0078  COSV(J) = CV
ISN 0079  COSV(J)=COSV(J)*((1+XHCIO)**FLOAT(J)
ISN 0080  GO TO 200
ISN 0081  140  COSV(J) = CV + XOUT*CSTOVP(J)
ISN 0082  COSV(J)=COSV(J)*((1+XHCIO)**FLOAT(J)
ISN 0083  P = P - XOUT + YIN
ISN 0084  PTLM(J) = P
ISN 0085  POUT(J) = XOUT
ISN 0086  GO TO 200
ISN 0087  150  R = BANK/CSTOVP(J)
ISN 0088  S = AMIN1(R, AMAX1(P-O, O.))
ISN 0089  COSV(J) = CV + S*CSTOVP(J)
ISN 0090  COSV(J)=COSV(J)*((1+XHCIO)**FLOAT(J)
ISN 0091  BANK = BANK - S * CSTOVP(J)
ISN 0092  P = P - S + U
ISN 0093  XLM(IL) = XLM(IL) - U + S
ISN 0094  IF (XLM(IL) .GE. 0.) GO TO 190
ISN 0096  XLM(IL+1) = XLM(IL+1) + ABS(XLM(IL))
ISN 0097  XLM(IL) = 0.
ISN 0098  190  CONTINUE
ISN 0099  PTLM(J) = P
ISN 0100  POUT(J) = S
ISN 0101  200  CONTINUE
ISN 0102  00  220 I+1,NSLR
ISN 0103  220  XLM(I) = ZLM(I)
ISN 0104  RETURN
ISN 0105  END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS =  104, PROGRAM SIZE = 3278, SUBPROGRAM NAME = CXLM

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

124K BYTES OF CORE NOT USED
```
SUBROUTINE FINANC (IERR)
C INCREMENTS SYSTEM/SECTION COUNTERS, STORES CURRENT SYSTEM
C AND SECTION TITLE, AND TESTS FOR OVERFLOW.
C DETERMINES PRESENT WORTH AND UNIFORM ANNUAL COSTS FROM ARRAYS OF
C ANNUAL UNDISCOUNTED COSTS.
COMMON /COSTS/ COSM(20,2),COSV(20,2),COSMS(20,2),COSVS(20,2),
1 CSMPW(2),CSMV(2),CSMUA(2),CSVUA(2)
COMMON /FUNDS/ APO(20,2),RTINT,RTINF
COMMON /10/
1.10.
1D
COMMON /IMP/ XLM(30),YLM(30).POTLM(20,2),OUTP(20,2),
1 TOTALM,PF,PFNO,NASL,NSLR,TOVL(30,2)
COMMON /NEWSYS/ NEWSYS
COMMON /SVS/ ISV,FRP,V(30),RL(30),
1 U(30),PL(30),MI(30),P(20),VP(20),RP(20),
2 PB,VPB,RPB,NS,NV,SV(6,2),SVB,FLRPTP(4)
COMMON /SUMARY/ SECTLE(2,10,8),SYSTLE(60,8),NSELECT(10,8),
1 DELC(10,8),DELCWP(10,8),DELCUA(10,8),
2 COSR(10,8),COSRPW(10,8),COSRU(10,8),DELSV(10,8),NSYS
COMMON /TIME/ ATP,OVLIF, NYAP, NYR,YR(40)
COMMON /TITLE/ TITLE(20,3).SECTTL(20)
DIMENSION CSV(2).CMS(2)
DATA ISYS /0/, MAXSEC, MAXSYS /10.8/
IERR = 0
IF (NEWSYS .EQ. 0) GO TO 10
ISYS = ISYS + 1
IF (ISYS.GT. MAXSYS) GO TO 98
SIMPLE(I+1) = TITLE(I)
SIMPLE(I+20) = TITLE(I)
ISECT = 0
ISECT = ISECT + 1
IF (ISECT .GT. MAXSEC) GO TO 97
ISECT(ISYS) = ISECT
ISECT(ISYS) = ISECT
ISECT(ISYS) = ISECT
ISECT(ISYS) = ISECT
ISECT(1,ISYS) = SECTTL(1)
TLM(ISECT,ISYS) = TOTALM
DO 20 K=1,2
CALL PWUAC(COSM(1,K),NYAP,RTINT,CMS(K),CSMPW(K),CSMUA(K))
ISYS = ISYS + 1
F = (1. + RTINT)**NYAP
PWFN = 1./F
W = RTINT/(F-1.)
NOTE THAT SALVAGE VALUE IS CONSIDERED A NEGATIVE COST.
IT HAS BEEN MULTIPLIED BY (-1.)
S = CMS(1) + CSV(1)
T = CMS(2) + CSV(2)
DSV = SV(6,2) - SV(6,1)
DSLV(IS,IVAL) = DSV
DELC(IS,IVAL) = T - S
COSR(IS,IVAL) = T/S
\[
\begin{align*}
S &= \text{CSMPW}(1) + \text{CSVPW}(1) \\
T &= \text{CSMPW}(2) + \text{CSVPW}(2) + \text{PWFN} \times \text{DSV} \\
\text{DELCPW}(\text{ISECT}, \text{ISYS}) &= T - S \\
\text{COSRPW}(\text{ISECT}, \text{ISYS}) &= T/S \\
S &= \text{CSMUA}(1) + \text{CSVUA}(1) \\
T &= \text{CSMUA}(2) + \text{CSVUA}(2) + \text{UACF} \times \text{DSV} \\
\text{DELCUA}(\text{ISECT}, \text{ISYS}) &= T - S \\
\text{COSRUA}(\text{ISECT}, \text{ISYS}) &= T/S \\
\end{align*}
\]

\text{C NOTE THAT THIS UACF (UNIFORM ANNUAL COST FACTOR) MULTIPLIES UNDISCOUNTED SALVAGE VALUE, NOT PRESENT WORTH.}

\text{C}

\text{GO TO 99}

\text{CALL REMLIF(\text{RATIO})}

\text{GO TO 99}

\text{97 WRITE (LO, 197) MAXSEC, \text{ISYS}}

\text{197 FORMAT(1X, 20H TOO MANY SECTIONS (>12, 12H) FOR SYSTEM, \text{ISYS}}} \\
\text{1 3H DIMENSIONS WOULD BE EXCEEDED. /}
\text{2 1X, 5H PLEASE CHECK DATA FOR PROPER USE OF -TITLE- KEYWORD}
\text{3 1X, 21H TO BEGIN NEW SYSTEM. /}
\text{4 1X, 47H A NEW SYSTEM WILL BE STARTED WITH THIS SECTION. /}
SUBROUTINE PWUAC (A,NYAP, RTINT, SUM, PW, UAC)
C CALCULATES PRESENT WORTH AND UNIFORM ANNUAL COST FACTORS FOR GIVEN
C INTEREST RATE.
ISN 0003 DIMENSION A(I), PWF(20)
ISN 0004 DATA RTOLO /1.E+10/
ISN 0005 IF (RTINT .EQ. RTOLD) GO TO 15
ISN 0007 RTOLD = RTINT
ISN 0008 R = RTINT
ISN 0009 F = 1./(1.+R)
ISN 0010 PWF(1) = F
ISN 0011 DO 10 I=2,20
ISN 0012 10 PWF(I) = PWF(I-1)*F
ISN 0013 UACF = R*((1.+R)**NYAP/((1.+R)**NYAP - 1.)
ISN 0014 15 CONTINUE
ISN 0015 SUMPW = 0.
ISN 0016 SUM = 0.
ISN 0017 DO 20 I=1,NYAP
ISN 0018 SUM = SUM + A(I)
ISN 0019 SUMPW = SUMPW + A(I)*PWF(I)
ISN 0020 20 CONTINUE
ISN 0021 PW = SUMPW
ISN 0022 UAC = SUMPW*UACF
ISN 0023 RETURN
ISN 0024 END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC Nolist NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 23, PROGRAM SIZE = 830, SUBPROGRAM NAME = PWUAC

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

132K BYTES OF CORE NOT USED
SUBROUTINE REMLIF (RATIO)

OBTAINS TOTAL REMAINING LIFE (EAL TO TERMINAL PSI REMAINING AT END)
OF ANALYSIS PERIOD) OVER ALL COMPONENTS (AGE SLICES) FOR A SECTION.
FOR BOTH PRESENT AND PROPOSED REGULATIONS.
FORMS THE RATIO OF THESE TOTALS (PROPOSED/PRESENT)

COMMON /LMP/ XLM(30), YLM(30), POTLM(20, 2), OUTP(20, 2),
TOTALM, PPF, TPF, PFND, NASL, NSLR, TOVLM(30, 2)
COMMON /OUT/ PSIE(30, 2), EALREM(30, 2), COSTM(20, 30, 2), CSTOV(30, 2)
COMMON /OVER/ TOV(30, 2), SNOV(30, 2), THOV(30, 2)
COMMON /POV/ SNOP(20, 2), THOP(20, 2), CSTOVP(20, 2), PP(20, 2)

C FORM TOTAL REMAINING LIFE IN (LANE MILE-EAL)
K = 1, 2
SUM = 0.
C SUM OVER TIMELY OVERLAID LANE MILES
AND OVER MILES NEVER COMING DUE FOR OVERLAY.
L = 1, NSLR
Z = TOVLM(L, K)
COMMON /TIME/ ATP, OVLIF, NYAP, NYR, YR(20)
DIMENSION TOTRL(30)
C SUM OVER LANE MILES OVERLAID FROM POTTS
J = 1, NYAP
C SUM OVER LANE MILES OVERLAID FROM POTTS

RATIO = TOTRL(2)/TOTRL(1)
RETURN
END
SUBROUTINE SAlVAG
COMMON /CMP/ COMP(30,34), PCOMP(30), AATP(30)
COMMON /DSN/ EALDSN(30,2), EALDNP(20,2)
COMMON /LMP/ XlM(30), YlM(30), POTLM(20,2), OUTP(20,2), TOTALM,
PPF, TPF, NASL, NSLR, TOVLM(30,2)
COMMON /OUT/ PSIE(30,2), EALREM(30,2), COSTV(20,2), PDV(20,2), 20(20,2),
1 PPF, TPF, NASL, NSLR, TOVLM(30,2)
COMMON /OVER/ TOV(30,2), SNOV(30,2), THOV(30,2)
COMMON /POV/ SNOVP(20,2), THOVP(20,2), CSTOVP(20,2), 20(20,2),
1 RLP(20,2)
COMMON /PSI/ PF, PICON, PTERM, PTOV, EALREM(30,2), EALDSN(30,2)
COMMON /SLVG/ ISLV, FLRP, VI(30), RI(30), VL(30), RL(30),
1 U(30), PL(30), MI(30), P(20), VP(20), RP(20),
2 PB, VPB, RPB, NS, NY, SV(6,2), SVE, FLRPTP(4)
COMMON /TIME/ ATP, OVLIF, NYAP, NYR, YR(40)
DIMENSION DUM(30), RIP(30)
NS = NSLR
NY = NYAP
SVB = -1000.0, * DOT(VI, YLM, NASL)
DO 5 I=1,NASL
5 RIP(I) = RI(I) * .01
DO 10 L=1,NS
10 VL(L) = DOT(VI, COMP(L,1), NASL)/XLM(L)
DO 20 L=1,NS
20 RL(L) = DOT (RIP, COMP(L,1), NASL) / XLM(L)
CALL SUM (PCOMP, NASL, PB)
VF = DOT (VI, COMP(L,1), NASL) / PB
YRNY = FLOAT(NY)
DO 100 K=1,2
100 20 L=1,NS
20 MI(L) = INT(TOV(L,K) + 1.0 - 1.E-5)
20 PL(L) = 0.
IF (TOV(L,K) LE. YRNY) PL(L) = XLM(L) - TOVLM(L,K)
U(L) = XLM(L) - PL(L)
CONTINUE
C SALVAGE VALUE OF EXISTING PAVEMENT EITHER OVERLAID ON TIMELY
C BASIS OR NEVER OVERLAID.
C SV(1,K) = SALV1(U, VL, RL, NY, NS)
C SALVAGE VALUE OF EXISTING PAVEMENT IN P0T AT END OF ANALYSIS
C PERIOD.
C SV(2,K) = SALV2(OUTP(1,K), DUM)
C SALVAGE VALUE OF EXISTING PAVEMENT OVERLAID FROM P0T.
C SV(3,K) = SALV3 (OUTP(1,K), VP, RP, NY)
C SALVAGE VALUE OF TIMELY OVERLAYS
C SV(4,K) = SALV4(TOVLM(1,K),CSTOV(1,K),EALREM(1,K),EALDSN(1,K),NS)
C SALVAGE VALUE OF OVERLAYS FROM P0T.
C SV(5,K) = SALV4(OUTP(1,K),CSTOV(1,K),RLP(1,K),EALDNP(1,K),NY)
C TOTAL SALVAGE VALUE OF REPRESENTATIVE SECTION, UNDISCOUNTED,
C AT END OF ANALYSIS PERIOD. STORED IN SV(6,K).
C SV(6,K) = 1000*(SV(1,K) + SV(2,K) + SV(3,K)) + SV(4,K) + SV(5,K)
CONTINUE
C SV(6,1) = -SV(6,1)
C SV(6,2) = -SV(6,2)
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ISN 0042 RETURN
ISN 0043 END

*OPTIONS IN EFFECT NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTOOBL(NONE)

*OPTIONS IN EFFECT SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS SOURCE STATEMENTS = 42, PROGRAM SIZE = 2230, SUBPROGRAM NAME = SALVAG

*STATISTICS NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

124K BYTES OF CORE NOT USED
FUNCTION SALV1 (U, V, R, NY, N)

DIMENSION U(N), V(N), R(N)

S = 0.

DO 10 L = 1, N

10 S = S + U(L) * V(L) * (1. - R(L)) ** NY

SALV1 = S

RETURN

END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(1)

*STATISTICS* SOURCE STATEMENTS = 8, PROGRAM SIZE = 494, SUBPROGRAM NAME = SALV1

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

136K BYTES OF CORE NOT USED
FUNCTION SALV2 (OP, DUM)
COMMON /SLVG/ ISLV, FLRP, VI(30), RI(30), VL(30), RL(30),
1       U(30), PL(30), MI(30), P(20), VP(20), RP(20),
2       PB, VPB, RPB, NS, NY, SV(6,2), SVB, FLRP, P(4)
DIMENSION OP(20), DUM(30), ONES(30)
DO 10 L= 1 . NS
ONES(L) = 1.
DUM(L) = 1 - RL(L)
10 CONTINUE
P(J) = P(J-1) - OP(J) + SUMEO(PL, ONES, ONES, MI, J, NS)
TMP = VPJ*(1.-RPJ)*(P(J-1) - OP(J)) + SUMEO(VL, PL, DUM, MI, J, NS)
VP(J) = TMP/P(J)
RP(J) = TMP/P(J)
DO 20 L= 1 . NS
20 DUM(L) = DUM(L)*(1.-RL(L))
TMP = VPJ*(1.-RPJ)*(P(J-1) - OP(J)) + SUMEO(PL, VL, DUM, MI, J, NS)
VPJ = TMP/PL(J)
RPJ = TMP/P(J)
50 CONTINUE
SALV2 = VPJ*P(NY)
RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINENUMBER(60) SIZE(MAX) AUTOZDL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 24, PROGRAM SIZE = 1442, SUBPROGRAM NAME = SALV2
*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

136K BYTES OF CORE NOT USED
ISN 0002 FUNCTION SALV3(OP, VP, RP, NY)
C VALUE OF ORIGINAL PAVEMENT OVERLAID FROM POT.
ISN 0003 DIMENSION OP(20), VP(20), RP(20)
ISN 0004 S=0.
ISN 0005 DO 10 J=1,NY
ISN 0006 10 S = S + OP(J)*VP(J)*((1.-RP(J))**(NY-J))
ISN 0007 SALV3 = S
ISN 0008 RETURN
ISN 0009 END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUCDDBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NOOPTIMIZE NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 8, PROGRAM SIZE = 498, SUBPROGRAM NAME = SALV3
*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

136K BYTES OF CORE NOT USED
FUNCTION SALV4(OV, C, ER, ED, N)
DIMENSION OV(1), C(1), ER(1), ED(1)
S = 0.
DO 10 I=1,N
10 S = S + OV(I)*C(I)*ER(I)/ED(I)
SALV4 = S
RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 8, PROGRAM SIZE = 474, SUBPROGRAM NAME = SALV4
*STATISTICS* NO DIAGNOSTICS GENERATED
****** END OF COMPILATION ******
FUNCTION SUMEQ (A, B, C, MI, J, N)
DIMENSION A(N), MI(N), B(N), C(N)
C ASSUME INTEGER ARRAY MI IS MONOTONICALLY INCREASING.
SUM = 0.
DO 10 L=1,N
IF (MI(L).LT. J) GO TO 10
IF (MI(L).GT. J) GO TO 20
SUM SUM + A(L)*B(L)*C(L)
10 CONTINUE
20 SUMEQ = SUM
RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 13. PROGRAM SIZE = 530. SUBPROGRAM NAME = SUMEQ
*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****
136K BYTES OF CORE NOT USED
FUNCTION DOT (A, B, N)

C       DOT PRODUCT OF TWO VECTORS A AND B OF LENGTH N.

DIMENSION A(N), B(N)

SUM = 0.

DO 10 I=1,N

10 SUM = SUM + A(I)*B(I)

DOT = SUM

RETURN

END
SUBROUTINE OUTPUT (LOCSW)

COMMON /TEMPC/ CONTP(25), DISTCT

COMMON /OVRLAY/ XHCIO, XHCIM, WLANE, WPSP, WGSH, PPVDHM, CAC, CCR

COMMON /IO/ LI, LO, LD

COMMON /OUTSWH/ IOUT

COMMON /TRINDX/ IT

COMMON /TRFFIC/ ELW1(75), APVWE(75), APWGL(75), SAAPW(75).
1 TAPV(75), TRAPV(75), STAPV(75), NGW

COMMON /TRYP/ TYP(2,10), PITYP(10,20,2), PCTTR(20,2), PECT(4).
1 NAXLES(10,4), NT(4), NTY, NAT, NTT, NEWTRK

COMMON /COSTS/ COSM(20,2), COSV(20,2), COSMS(20,2), COSVS(20,2).
1 CSMPW(2), CVSPW(2), CSMUA(2), CSVUA(2)

COMMON /EALPAY/ EALPIT(10,2), APPT(10,2), EALFCT(20), IEDTRP

COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IR, IC

COMMON /LMP/ XLM(30), YLM(30), POTLM(20,2), OUTP(20,2).
1 TOTALM, PPF, TPF, NASL, NSLR, TDVL(30,2)

COMMON /OUT/ PSIE(30,2), EALREM(30,2), CSTM(20,30,2), CSTOV(30,2).
1 PSIB(30)

COMMON /OVER/ TDV(30,2), SNOV(30,2), THOV(30,2)

COMMON /PDV/ SNOVP(20,2), THOVLP(20,2), CSTOVLP(20,2), PP(20,2).
1 RLP(20,2)

COMMON /SUMARY/ SECTLE(2,10,8), SYSTLE(60,8), NSECT(10,8), DELCI(10,8).
1 COSI(10,8), DELCPW(10,8), COSR(10,8), DELCUA(10,8).
2 CSRUA(10,8), SLRAT(10,8), TLM(10,8), DLSV(10,8), NSYS

COMMON /TIME/ A TP, OVLIF, NYAP, N YR, YR(40)

COMMON /TITLE/ TITLE(20,3), SECTTL(20)

COMMON /CMP/ COMP(30,34), PCOMP(30), AATP(30)

COMMON /LVG/ ISLV, FLRP, VI(30), RI(30), VL(30), RL(30),
1 U(30), PL(30), ML(30), P(20), VP(20), RP(20).
2 PB, VBP, RPB, NS, NV, SV(6,2), SVB, FLRPTP(4)

DIMENSION RESULT(2000,2), TABLE(8,11,50), IHEAD(5,5), IDUM(5), TX(10)

DIMENSION RMEM(2000,2), RESM(2000,2), TMEM(8,11,50), TRH(8,11,50)

DIMENSION IWORD(2), TOT(30), XM(50)

DATA IDUM/4H PR, 4HSEN, 4HT P, 4HRPD, 4HSED /

DATA LS/O

DATA MAXLN /10/

DATA IWORD(1), IWORD(2) /4HSN, 4H0/

DATA KSEC/O

IF (LOCSW LT. 0 OR. LOCSW .GT. 4) GO TO 9991

LOC1 = LOCSW + 1

GO TO (900, 1000, 2000, 3000, 2100), LOC1

900 K = 1

905 CALL NPAG

906 SUMTLM = 0.

907 SUMDC = 0.

908 SUMCPW = 0.

909 SUMC = 0.

910 SUMSV = 0.

911 WRITE (LO, 920) (SYSTLE(I.K), I=1,60)

920 FORMAT(5X,20A4)

925 WRITE (LO, 9020) (SYSTLE(I.K), I=1,60)

930 WRITE (LO, 9000)

935 WRITE (LO, 9400)

940 WRITE (LO, 9400)
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ISN 0046  940 FORMAT(3X,2(2X,7HSECTION),4X,4HLANE,8X,12HUNIFORM ANNUAL COST,3X.
1 13HPRESENT WORTH,3X,19HUNIFORM ANNUAL COST,3X.
2 23HRATIO OF REMAINING LIFE/
3 5X,6HNUMBER,2X,10IDENTIFIER,2X,5HMILES,3X,5HDELTA,6H COST
4 4X,5HDELTA,3X,5HDELTA,3X,4HDELTA,6X,5HDELTA,5X,4HDELTA,9X,
5 16HPROPOSED/PRESENT/
6 33X,4HDELTA,3X,5HDELTA,10X,13HSALVAGE COST,4X,5HDELTA,5X.
7 4HDELTA,6X,5HDELTA/8
8 48X,5HVALUE/1

ISN 0047  NS = NSECT(K)
ISN 0048  D0 960 J=1,NS
ISN 0049  SUMTLM = SUMTLM + TLM(J,K)
ISN 0050  SUMDC = SUMDC + DELC(J,K)
ISN 0051  SUMCPW = SUMCPW + DELCPW(J,K)
ISN 0052  SUMCUA = SUMCUA + DELCUA(J,K)
ISN 0053  SUMSV = SUMSV + DSLV(J,K)
ISN 0054  WRITE (LO,950) J, (SECTLE(I,J,K),I=1,2), TLM(J,K), DELC(J,K).
1  COSR(J,K), DSLV(J,K), DELCPW(J,K), COSRPW(J,K),
2 DELCUA(J,K), COSRUA(J,K), RLRAT(J,K)
ISN 0055  950 FORMAT(8X.I2,4X.2A4,F8.3,6P8.3,0PF6.2,6P8.3,0PF6.2,6P8.3,0PF6.2,6P8.3,0PF6.2,6P8.3,0PF6.2)

ISN 0056  960 CONTINUE
ISN 0057  K = K+1
ISN 0058  WRITE (LO,970)
ISN 0059  970 FORMAT(/(/)
ISN 0060  980 WRITE (LO,990) SUMTLM, SUMDC, SUMSV, SUMCPW, SUMCUA
ISN 0061  990 FORMAT(/6X,5HTOTAL, 10X,F9.0,-6PF8.3,-6PF16.3,-6PF8.3,-6PF17.3///
1 5X,36HALL COSTS ARE IN MILLIONS OF DOLLARS)

ISN 0062  9301 FORMAT(10X,20A4)
ISN 0063  IF(K.LE.NSYS)GO TO 905
ISN 0065  981 N2=NYAP*2
ISN 0066  D0 9310 K=1,NSYS
ISN 0067  NS=NSECT(K)
ISN 0068  DO 9310 J=1,NSYS
ISN 0069  DO 9310 I=2,N2,2
ISN 0070  LS=LS+1
ISN 0071  I1=I-1
ISN 0072  TMAN(K,J,I)=RESM(LS,1)
ISN 0073  TMAN(K,J,I)=RESM(LS,2)
ISN 0074  TRH(K,J,I)=RESR(LS,1)
ISN 0075  TRH(K,J,I)=RESR(LS,2)
ISN 0076  TABLE(K,J,I)=RESULT(LS,1)
ISN 0077  TABLE(K,J,I)=RESULT(LS,2)
ISN 0078  9310 TABLE(K,J,I)=RESULT(LS,2)
ISN 0079  DO 9315 K=1,NSYS
ISN 0080  NS=NSECT(K)
ISN 0081  DO 9315 J=1,N50
ISN 0082  TRH(K,11,1)=0.0
ISN 0083  9316 TABLE(K,11,J)=0.0
ISN 0084  DD0 9315 J=1,NS
ISN 0085  DD0 9315 I=1,N52
ISN 0086  TRH(K,11,1)=TRH(K,11,1)+TMAN(K,J,I)
ISN 0087  TRH(K,11,1)=TRH(K,11,1)+TRH(K,J,1)
ISN 0088  9315 TABLE(K,11,1)=TABLE(K,11,1)+TABLE(K,J,1)
ISN 0089  DD0 9311 K=1,5
ISN 0090  DD0 9311 J=1,5
ISN 0091  IHEAD(K,J)=IHDUM(K)
ISN 0092  DO 19400 K=1,NSYS
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ISN 0093 NS=NSECT(K)
ISN 0094 IFRST=1
ISN 0095 19401 IF(IFIRST.EQ.1) GO TO 19411
ISN 0097 IF(IFIRST.EQ.11) GO TO 19411
ISN 0099 GO TO 19402
ISN 0100 19411 CONTINUE
ISN 0101 CALL NPAG3E
ISN 0102 WRITE(LO,19403)(SYSTLE(I,K),I=1,60)
ISN 0103 19403 FORMAT(/10X,14HSUMMARY REPORT
1.10X,3(5X.20A4/)
1.10X,15HMMAINTENANCE
1.10X,36HALL COSTS ARE IN MILLIONS OF DOLLARS/)
ISN 0104 19402 LAST=IFIRST+4
ISN 0105 IF(LAST.GT.NYAP) LAST=NYAP
ISN 0107 LX=LAST-IFRST+1
ISN 0108 IL=LAST*2
ISN 0109 IR=(IFRST-1)*2+1
ISN 0110 WRITE(LO,9405)(I.I=IFRST.LAST)
ISN 0111 WRITE(LO,9412)(IHEAD(I,J),I=1,5),J=1,LX)
ISN 0112 TX(K)=0.
ISN 0113 DO 19407 J=1,NS
ISN 0114 TX(K)=TX(K)+TLM(J,K)
ISN 0115 19407 WRITE(LO,9408)(SECTLE(I,J,K),I=1,2),TLM(J,K),(TMAN(K,J,I),
1.I=IR(IL)
ISN 0116 WRITE(LO,9410) TX(K), (TMAN(K,11,I),I=IR.IL)
ISN 0117 IF(LAST.EQ.NYAP) GO TO 19400
ISN 0119 IFRST=LAST+1
ISN 0120 GO TO 19401
ISN 0121 19400 CONTINUE
ISN 0122 IFRST=1
ISN 0123 CALL NPAG3E
ISN 0124 WRITE(LO,19453)
ISN 0125 CALL SUM (TX,10,TLLM)
ISN 0126 CALL ZERO (TXM,50)
ISN 0127 DO 19478 K=1,NSYS
ISN 0128 DO 19478 J=1,50
ISN 0129 19478 TXM(J)=TXM(J)+TMAN(K,11,J)
ISN 0130 19453 FORMAT(/10X,25HSUMMARY FOR ALL SYSTEMS
1.10X,15HMMAINTENANCE
1.10X,36HALL COSTS ARE IN MILLIONS OF DOLLARS/)
ISN 0131 19452 LAST=IFIRST+4
ISN 0132 IF(LAST.GT.NYAP) LAST=NYAP
ISN 0134 LX=LAST-IFRST+1
ISN 0135 IL=LAST*2
ISN 0136 IR=(IFRST-1)*2+1
ISN 0137 WRITE(LO,9405)(I.I=IFRST.LAST)
ISN 0138 WRITE(LO,9472)((IHEAD(I,J),I=1,5),J=1,LX)
ISN 0139 DO 19467 K=1,NSYS
ISN 0140 19467 WRITE(LO,9445) K,TXM(K),IHEAD(K,11,I),I=IR.IL)
ISN 0141 WRITE(LO,9445) K,TXM(K),IHEAD(K,11,I),I=IR.IL)
ISN 0142 IFRST=LAST+1
ISN 0143 IF(LAST.LE.NYAP) GO TO 19452
ISN 0145 DO 29400 K=1,NSYS
ISN 0146 NS=NSECT(K)
ISN 0147 IFRST=1
ISN 0148 29401 IF(IFIRST.EQ.1) GO TO 29411
ISN 0150 IF(IFIRST.EQ.11) GO TO 29411
ISN 0152 GO TO 29402
ISN 0153 29411 CONTINUE
ISN 0154 CALL NPAGE
ISN 0155 WRITE(L0,29403)(SYS1TE(I,K).I=1,60)
ISN 0156 29403 FORMAT(/11X.14SHSUMMARY REPORT .//.10X,3(5X.20A4)/. 1 /10X,15HREHABILITATION .//.10X,36HALL COSTS ARE IN MILLIONS OF DOLLARS //)
ISN 0157 29402 LAST=IFRST+4
ISN 0158 IF(LAST.GT.NYAP) LAST=NYAP
ISN 0160 LX=LAST-IFRST+1
ISN 0161 IL=LAST+2
ISN 0162 IR=(IFRST-1)*2+1
ISN 0163 WRITE((L0,9405)(I,I=IFRST,LAST)
ISN 0164 WRITE((L0,9412)((IHEAD(I,J),I=1,5),J=1,LX)
ISN 0165 TX(K)=0.
ISN 0166 DO 29407 J=1,NS
ISN 0167 TX(K)=TX(K)+TLM(J,K)
ISN 0168 29407 WRITE((L0,9408)I(SECTE(I,J,K),I=1,2,TLM(J,K),(TRH(K,J,I),I=IR,IL)
ISN 0169 WRITE((L0,9410)TX(K),(TRH(K,11,I),I=IR,IL)
ISN 0170 IF(LAST.EQ.NYAP) GO TO 29400
ISN 0172 IFRST=LAST+1
ISN 0173 GO TO 29401
ISN 0174 29400 CONTINUE
ISN 0175 IFRST=1
ISN 0176 CALL NPAGE
ISN 0177 WRITE((L0,29453)
ISN 0178 CALL SUM((TX,10,TLLM)
ISN 0179 CALL ZERO((TXM,50)
ISN 0180 DO 29478 K=1,NSYS
ISN 0181 DO 29478 J=1,50
ISN 0182 29478 TXM(J)=TXM(J)+TRH(K,11,J)
ISN 0183 29453 FORMAT(/11X.14THSUMMARY FOR ALL SYSTEMS .//.1 /10X,15HREHABILITATION .//.10X,36HALL COSTS ARE IN MILLIONS OF DOLLARS //)
ISN 0184 29452 LAST=IFRST+4
ISN 0185 IF(LAST.GT.NYAP) LAST=NYAP
ISN 0187 LX=LAST-IFRST+1
ISN 0188 IL=LAST+2
ISN 0189 IR=(IFRST-1)*2+1
ISN 0190 WRITE((L0,9405)(I,I=IFRST,LAST)
ISN 0191 WRITE((L0,9412)((IHEAD(I,J),I=1,5),J=1,LX)
ISN 0192 DO 29467 K=1,NSYS
ISN 0193 29467 WRITE((L0,9445)K,TX(K),(TRH(K,11,I),I=IR,IL)
ISN 0194 WRITE((L0,9468)TLM((TXM(I),I=IR,IL)
ISN 0195 IFRST=LAST+1
ISN 0196 IF(LAST.EQ.NYAP) GO TO 29452
ISN 0198 DO 9400 K=1,NSYS
ISN 0199 NS=NSECT(K)
ISN 0200 CALL NPAGE
ISN 0201 9401 IF(IFRST.EQ.1) GO TO 9411
ISN 0202 IF(IFRST.EQ.11) GO TO 9411
ISN 0203 GO TO 9402
ISN 0205 9411 CONTINUE
ISN 0206 CALL NPAGE
ISN 0207 WRITE((L0,9403)(SYS1TE(I,K),I=1,60)
ISN 0209 9403 FORMAT(/11X.14THSUMMARY REPORT .//.10X,3(5X.20A4)/. 1 /10X,36HALL COSTS ARE IN MILLIONS OF DOLLARS //)
ISN 0210 9402 LAST=IFRST+4
ISN 0211 IF(LAST.GT.NYAP) LAST=NYAP
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ISN 0213 LX=LAST-IFRST+1
ISN 0214 IL=LAST+2
ISN 0215 IR=(IFRST-1)*2 +1
ISN 0216 WRITE(LO,9405)(I,I=IFRST,LAST)
ISN 0217 9405 FORMAT(/30X,5(10X,12,8X))
ISN 0218 WRITE(LO,9412)((IHEAD(I,J),I=1,5),J=1,LX)
ISN 0219 9412 FORMAT(/2X,7,9HSECTION .5X,13HTOTAL LNMILES .5X,5(5A4))
ISN 0220 TX(K)=0.
ISN 0221 DO 9407 J=1,NS
ISN 0222 TX(K)=TX(K)+TLM(J,K).
ISN 0223 WRITE(LO,9408)(IHEAD(I,J),I=1,5),J=1,LX)
ISN 0224 9408 FORMAT(/X,2A4,6X,F7.1X,10(-6PF10.3))
ISN 0225 WRITE(LO,9410) TX(K),(TABLE(K,J,I),I=IR,IL)
ISN 0226 9410 FORMAT(/,3X,5HTOTAL .5X,F7.1X,10(-6PF10.3))
ISN 0227 IF(LAST.EQ.NYAP) GO TO 9400
ISN 0228 IFRST=LAST+1
ISN 0229 CONTINUE
ISN 0230 GO TO 9401
ISN 0231 9400 CONTINUE
ISN 0232 IFRST=1
ISN 0233 CALL NPAGE
ISN 0234 WRITE(LO,9453)
ISN 0235 CALL SUM (TX,10,TLLM)
ISN 0236 CALL ZERO (TLM,50)
ISN 0237 DO 9478 K=1,NSYS
ISN 0238 DO 9478 J=1,50
ISN 0239 9478 TXM(J)=TXM(J)+TABLE(K,11,J)
ISN 0240 9453 FORMAT(/.10X,25HSUMMARY FOR ALL SYSTEMS ,/)
ISN 0241 9452 LAST=IFRST+4
ISN 0242 IF(LAST.GT.NYAP) LAST=NYAP
ISN 0243 IL=LAST+2
ISN 0244 IR=(IFRST-1)*2 +1
ISN 0245 WRITE(LO,9405)(I,I=IFRST,LAST)
ISN 0246 WRITE(LO,9472)((IHEAD(I,J),I=1,5),J=1,LX)
ISN 0247 9472 FORMAT(2X,7,9HTOTAL .5X,13HTOTAL LNMILES .5X,5(5A4))
ISN 0248 DO 9468 I=IR,IL
ISN 0249 9468 TLLM,(TXM(I),I=IR,IL)
ISN 0250 9467 WRITE(LO,9445) K,TX(K),(TABLE(K,11,I),I=IR,IL)
ISN 0251 9445 FORMAT(8X,12,5X,F7.1X,10(-6PF10.3))
ISN 0252 DO 9467 TXM(I),I=IR,IL)
ISN 0253 9445 FORMAT(/,3X,5HTOTAL ,6X,F9.1X,10(-6PF10.3))
ISN 0254 IFRST=LAST+1
ISN 0255 IF(LAST.LT.NYAP) GO TO 9452
ISN 0256 GO TO 9999
ISN 0257 1000 IF (IOUT.LT.1) GO TO 9999
ISN 0258 CALL NPAGE
ISN 0259 PPFF = PPFF * 100.
ISN 0260 WRITE (LO,1011) PPFF
ISN 0261 1011 FORMAT(5X,36HPERCENT OF TOTAL LANE MILES IN POTS/)
ISN 0262 LIM = MINO(NSLR,13)
ISN 0263 PTOT = 0.
ISN 0264 DO 1004 I=1,30
ISN 0265 TOT(I) = PCOMP(I)
ISN 0266 1000 IF (IOUT.LT.1) GO TO 9999
ISN 0267 PPFF = PPFF + PCOMP(I)
ISN 0268 WRITE (LO,1011) PPFF
ISN 0269 DATE 82.147/20.13.53 PAGE 5
DO 1007 J=1,NSLR
TOT(I) = TOT(I) + COMP(I,J)
1007 CONTINUE
WRITE (LO,1001) (I,I=I,LIM)
1001 FORMAT(16X,BPAVEMENT/
      1 17X,6HAGE AT,13HANALYSIS YEAR/
      2 10X,4HLOSS,2X,9HBEGINNING,11X,9HINTO/
      3 2X,5HVALUE,3X,4HRATE,3X,7HOF A.P.,3X,5HTOTAL,4X,5HPOTTS,
      4 1X,12(15.2X),15)
WRITE (LO,1009)
1009 FORMAT (/)
WRITE (LO,1002) VI(I), RI(I), TOT(I), PCOMP(I),
      (COMP(I,J),J=I,LIM)
1002 FORMAT(IX,F7.0,F6.2,17,F11.1,F8.1,13(1X,F6.1))
WRITE (LO,1014) (AATP(I),I=1,LIM)
1014 FORMAT(/21X,6HTOTAlS,4X,F9.1,IX,13(IX,F6.1))
WRITE (LO,1016) PTOT, (XLM(I),I=1,LIM)
1016 FORMAT(/2X,29HVALUE IN THOUSANDS OF DOLLARS,
      19X,29HLOSS RATE IN PERCENT PER YEAR)
IF (NSLR .LE. 13) GO TO 1018
CALL NPAGE
WRITE (LO,1008) (SECTTL(I),I=1,20)
1008 FORMAT(5X,20A4//)
WRITE (LO,1010) (L,2)
1010 FORMAT(31X.34HP E R FOR MAN C ETA B L E//)
WRITE (LO,1015) (AATP(I),I=1,LIM)
1015 FORMAT(29X,38HP RES E N T REG U L A T r ON S//)
DO 1010 K=1,2
H(IP.EQ IR)
1020 FORMAT(72X,6HPSI AT/
      1 1X,2(4X,10Hlane-Miles),3X,7HYEAR OF,4X,7HOVERLAY,5X,
      2 7HOVERLAY,5X,16HBEGINNING END,7X,
3 14REMAINING LIFE,6X.12HOVERLAY COST/
4 5X.1HUE OVERLAY,4X.8HOVERLAID,4X.7HOVERLAY,3X.7HDESIGN .
5 A4,1OH THICKNESS,3X.1BHOF ANALYSIS PERIOD,3X.
6 20H(MILLION 18-KIP EAL),3X.13H($/LANE-MILE)///

ISN 0317
IF(IP.EQ.IF) WRITE (LO,1022)
ISN 0319
1022 FORMAT(60X,6HPSI AT END OF,4X,7HOVERLAY,5X.
2 16HBEGINNIGN YEAR,7X.
3 14REMAINING LIFE,6X.12HOVERLAY COST/
4 5X.1HUE OVERLAY,4X.8HOVERLAID,4X.7HOVERLAY,3X.
5 10H THICKNESS,3X.1BHOF ANALYSIS PERIOD,3X.
6 20H(MILLION 18-KIP EAL),3X.13H($/LANE-MILE)///

ISN 0320
DD 1040 J=1,NSLR
ISN 0321
XCOST=CSTOV(J,K)*(1+XHCIO)**FLOAT(J)
ISN 0322
IF(IP.EQ.IR)WRITE (LO,1120) IWORD(L)
1120 FORMAT(5X,8HANALYSIS,2(2X,10HLANE-MILES),3X,7HDESIGN,5X,7HPSI
2 AT END OF,4X,7HOVERLAY,5X.
3 9THICKNESS,2X.15HANALYSIS PERIOD,3X.13H($/LANE-MILE)///
4 27X,1OHFROM POTTS///

ISN 0323
K=1
ISN 0324
IF(K.EQ.2) GO TO 1070
ISN 0325
1070 CONTINUE

ISN 0326
CALL NPAGE
ISN 0327
WRITE (LO,1050)
1050 FORMAT(36X,22HPOTTS TABLE/)

ISN 0328
GO TO 1070
ISN 0329
1060 WRITE (LO,1050)
ISN 0330
1070 CONTINUE

ISN 0331
CALL NPAGE
ISN 0332
WRITE (LO,1080)
ISN 0333
WRITE (LO,1090)
ISN 0334
WRITE (LO,1050)
ISN 0335
1050 FORMAT(/28X,40HPOTTS TABLE///)

ISN 0336
GO TO 1070
ISN 0337
1060 WRITE (LO,1050)
ISN 0338
1070 CONTINUE

ISN 0339
CALL NPAGE
ISN 0340
WRITE (LO,1080)
ISN 0341
WRITE (LO,1090)
ISN 0342
1080 FORMAT(36X,22HPOTTS TABLE//)

ISN 0343
GO TO 1070
ISN 0344
1060 WRITE (LO,1050)
ISN 0345
1070 CONTINUE

ISN 0346
CALL NPAGE
ISN 0347
WRITE (LO,2005) (SECTTL(I),I=1,20)

ISN 0348
1050 FORMAT(28X,40HPOTTS TABLE//)

ISN 0349
DD 1150 K=1,2
ISN 0350
IF(IP.EQ.IR)WRITE (LO,1100) IWORD(L)
1100 FORMAT(5X,8HANALYSIS,2(2X,10HLANE-MILES),3X,7HOVERLAY,4X.
2 4X.13HPSI AT END OF,4X,12HOVERLAY COST/
3 7X.4HYEAR,5X.8HIN POTTS,4X.8HOVERLAY,3X.7HDESIGN .A4.
4 9THICKNESS,2X.15HANALYSIS PERIOD,3X.13H($/LANE-MILE)///
5 27X,1OHFROM POTTS///

ISN 0351
IF(IP.EQ.IF)WRITE (LO,1101)
1101 FORMAT(5X,8HANALYSIS,2(2X,10HLANE-MILES),3X,7HOVERLAY
1 4X,13HPSI AT END OF,4X,12HOVERLAY COST/
2 7X.4HYEAR,5X.8HIN POTTS,4X.8HOVERLAY,3X.
3 9THICKNESS,2X.15HANALYSIS PERIOD,3X.13H($/LANE-MILE)///
4 27X,1OHFROM POTTS///

ISN 0352
DD 1120 J=1,NYAP
ISN 0353
XAO=STOV(J,K)*(1.0+XHCIO)**FLOAT(J)
ISN 0354
IF(IP.EQ.IR)WRITE (LO,1110) J, POTLM(J,K), OUTP(J,K),
15110 J, POTLM(J,K), OUTP(J,K), THOVP(J,K), XCOST
ISN 0355
1110 FORMAT(8X,12.2FJ2.2F14.2,F18.0)
ISN 0356
IF(IP.EQ.IF)WRITE (LO,1111) J, POTLM(J,K), OUTP(J,K), THOVP(J,K),
PP(J,K), XCOST

1111 FORMAT(8X,I2,2F12.1,F11.2,F14.2,F18.0)

ISN 0361 1120 CONTINUE
ISN 0362 IF (K .EQ. 2) GO TO 1150
ISN 0363 IF (NYAP .LE. 17) GO TO 1140
ISN 0364 CALL NPAG
ISN 0365 WRITE (LO,2005) (SECTTL(I),I=1,20)
ISN 0366 WRITE (LO,1080)
ISN 0367 WRITE (LO,lt30)
ISN 1130 FORMAT(/27X,40HP REDUCTION IN MAINTENANCE COSTS)//
ISN 0372 GO TO 1150
ISN 0373 WRITE (LO,1130)
ISN 0374 1150 CONTINUE
ISN 0375 GO TO 9999
ISN 0376 2000 IF (IOUT .LT. 2) GO TO 9999
ISN 0377 CALL NPAG
ISN 0378 WRITE (LO,2005) (SECTTL(I),I=1,20)
ISN 0379 WRITE (LO,2010)
ISN 0380 ISN 0381 2010 FORMAT(5X,10HTRUCK TYPE,4X,17HPAYLOAD PER TRUCK,4X,12H18-KIP AXLES 1 10H PER TRUCK//
ISN 0382 19X,7HPRESENT,2X,8HPROPOSED,6X,7HPRESENT,3X,8HPROPOSED//) INTT = NTTY + NATT
ISN 0383 DO 2030 I=1,INTT
ISN 0384 WRITE (LO,2020) (TTYP(J),J=1,2), APPT(I,1), APPT(I,2),
ISN 0385 1 EALPT(I,1), EALPT(I,2)
ISN 0386 2020 FORMAT(6X,2A4,5X,F7.2,2X,F7.2,6X,F7.2,3X,F7.2)
ISN 0387 2030 CONTINUE
ISN 0388 WRITE (LO,2040)
ISN 0389 ISN 0390 2040 FORMAT(/7X,4HYEAR,3X,17H18-KIP ESAL RATIO,10X,4HYEAR,
ISN 0391 1 3X,17H18-KIP ESAL RATIO//
ISN 0392 14X,18H(PROPOSED/PRESENT),16X,18H(PROPOSED/PRESENT)//) NLINES = MINO(NYAP,MAXLN)
ISN 0393 DO 2060 I=1,NLINES
ISN 0394 WRITE (LO,2070) (J, EALFCT(J), J=1,NYAP,MAXLN)
ISN 0395 2050 FORMAT(8X,I2,6X,F10.3,16X,I2,6X,F10.3)
ISN 0396 2060 CONTINUE
ISN 0397 2070 FORMAT(22X,36HU N D U R E D CO S T S )/
ISN 0398 ISN 0399 2070 FORMAT(22X,36HUN D U R E D CO S T S)//
ISN 0400 TOTM1 = 0.
ISN 0401 TOTM2 = 0.
ISN 0402 TOTV1 = 0.
ISN 0403 TOTV2 = 0.
ISN 0404 DO 2090 I=1,NYAP
ISN 0405 WRITE (LO,2080) I, (COSM(I,K),K=1,2), (COSV(I,K),K=1,2)
ISN 0406 2080 FORMAT(12X,12.6X,-6PF10.3,4X,-6PF10.3,6X,-6PF10.3,3X,-6PF10.3)
ISN 0407 ISN 0408 KSEC=KSEC+1
ISN 0409 RESULT(KSEC,1) = COSM(I,1)+COSV(I,1)
ISN 0410 RESULT(KSEC,2) = COSM(I,2)+COSV(I,2)
ISN 0411 RESM(KSEC,1)=COSM(I,1)
ISN 0412 RESM(KSEC,2)=COSM(I,2)
RESR(KSEC,1) = COSV(I,1)
RESR(KSEC,2) = COSV(I,2)
TOTM1 = TOTM1 + COSM(I,1)
TOTM2 = TOTM2 + COSM(I,2)
TOTV1 = TOTV1 + COSM(I,1)
TOTV2 = TOTV2 + COSV(I,2)

RESR(KSEC,1) = COSV(I,1)
RESR(KSEC,2) = COSV(I,2)
TOTM1 = TOTM1 + COSM(I,1)
TOTM2 = TOTM2 + COSM(I,2)
TOTV1 = TOTV1 + COSM(I,1)
TOTV2 = TOTV2 + COSV(I,2)

2090 CONTINUE
WRITE (LO, 2095) TOTM1, TOTM2, TOTV1, TOTV2
2095 FORMAT(/10X,6HTOTALS,4X,-6PF10.3,4X,-6PF10.3,6X,-6PF10.3,3X,
1 -6PF10.3)
XSLVG = SV(6,2) - SV(6,1)
WRITE (LO, 2096) SVB, SV(6,1), SVB, SV(6,2), XSLVG
2096 FORMAT(//24X,26HS A L V A G E V A L U E///
1 26X,21H(MILLIONS OF DOLLARS)//
2 29X.15HANALYSIS PERIOD/
3 25X.9HBEGINNING,9X,3HEND///
4 15X,7HPRESENT,-6PF12.3,4X,-6PF10.3///
5 15X,8HPROPOSED,-6PF11.3,4X,-6PF10.3///
6 31X,5HDELTA,-6PF12.3)
GO TO 9999
3000 IF (IOUT .LT. 3) GO TO 9999
II = 1
LIMIT = MINO(NGVW, 40)
3005 CALL NPAGE
WRITE (LO, 3010) (SECTTL(I), I = 1, 20)
3010 FORMAT(5X, 20A4///
1 5X, 48HCUMULATIVE SHIFTED AXLE DISTRIBUTIONS (IN 2-KIP ///
2 25HINTERVALS) FOR EACH TRUCK///)
WRITE (LO, 3020) (TYP(I, IT), I = 1, 2)
3020 FORMAT(5X, 11HTRUCK TYPE,A4///
1 10X, 6HWEIGHT,4X,6(3X,7HWEIGHTED),3X,6HWEIGHTED,4X,///
2 6HTANDEM,4X,6HTANDEM,4X,///
3 10X,6(H(KIPS),3X,2(5X,5HGROSS),4X,///
4 5X,5HAXLES,3(5X,5HAXLES)//)
DO 3040 I = II, LIMIT
WRITE (LO, 3030) ELVWI(I), APVWE(I), APVWG(I), SAAPV(I), TAAPV(I),
1 TRAPV(I), STAPV(I)
3030 FORMAT(6X, F10.3, 3X, F10.2)
3040 CONTINUE
IF ((NGVW .LE. 40) .OR. (LIMIT .EQ. NGVW)) GO TO 9999
II = 41
LIMIT = NGVW
GO TO 3005
9991 WRITE (LO, 9091) LOCSW
9091 FORMAT(/18H LOCATION SWITCH =,I3,16H IS OUT OF RANGE///)
9999 RETURN
END
FUNCTION FWT18L (SN, SS, R, PI, PT)
AASHO-FLEXIBLE PREDICTION OF 18-KIP EAL TO TERMINAL PSI

GT = ALOG10((PI-PT)/(PI-PF))
GTERM = GT/(0.40+1094./(SN+1.)**5.19)
FWT18L = 9.36*ALOG10(SN+1.)-0.20+GTERM-ALOG10(R)+0.372*(SS-3.0)
RETURN

END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 6, PROGRAM SIZE = 582, SUBPROGRAM NAME = FWT18L
*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

136K BYTES OF CORE NOT USED
SUBROUTINE GPSIF(EALBAP, PSB)

COMMON/HOR/ A(10), B(10), C(10), DT(10), DF(10), S(10), T(10), TR(5), PI(5)
       *.PT(5), AC(5), AA, SCT(5), XMNW18(10), XKTO

COMMON /EXTRA/ TPE, PF0, MNOVTK, MNOVTK, NIS
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IR, IC
COMMON /PSI/ PF, PICON, PTERM, PIDV, PTDV
COMMON /MECH/XKT, NRU, NLH, NDL, NDEL

ISN 0001 CALL PSIT(P, PF, W, XKT)
ISN 0011 QTEMP=-1.*XKT/EALBAP
ISN 0012 IF(QTEMP.LT.-50.0) QTEMP=-50.0
ISN 0014 Q=EXP(QTEMP)
ISN 0015 PSB=PICON-(PICON-PF)*Q
ISN 0016 RETURN
ISN 0017 END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 16, PROGRAM SIZE = 440, SUBPROGRAM NAME = GPSIF
*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

136K BYTES OF CORE NOT USED
SUBROUTINE OVTHKF (XNOV, THOV, YR)
REAL*8 THICK1(5), DMDRU, DMDRE
COMMON /MECH/XKT, NRU, NLH, ND, NDEL
COMMON/HOR/A (10), B (10), C (10), D (10), E (10), S (10), T (10), TR (5), PI (5)
* , PT (5), AC (5), AA, SC (5), XMNW18 (10), XKTO
COMMON /EXTRA/ TP, PFO, MNOVTK, MXOVTK, NIS
COMMON /EXPVT/ NPT, THICK (4), MTYPE (4), NLAY, IP, IF, IR, IC
COMMON /PSI/PF, PICON, PTERM, PIOV, PTOV
COMMON /STRCOE/ STRCD (8), CC (4), MC (11), NC, STRC (5), RFS (4), RFB (4)
DIMENSION BETA (5, 2, 2), CO (5, 2, 2)

BETA(1, 1, 1)=-1.5287
BETA(1, 1, 2)=-1.5387
BETA(3, 1, 1)=-1.4370
BETA(3, 1, 2)=-1.4370
BETA(4, 1, 1)=-1.5605
BETA(4, 1, 2)=-1.5767
BETA(1, 2, 1)=-1.53
BETA(1, 2, 2)=-1.562
BETA(3, 2, 1)=-1.4649
BETA(3, 2, 2)=-1.4649
BETA(4, 2, 1)=-1.5700
BETA(4, 2, 2)=-1.6085
CO(3, 1, 1)=600.0
CO(3, 1, 2)=600.0
CO(4, 1, 1)=10000.0
CO(4, 1, 2)=10000.0
CO(1, 1, 2)=50000.0
CO(1, 1, 2)=50000.0
CO(1, 2, 1)=100.0
CO(1, 2, 2)=100.0
CO(3, 2, 1)=1000.0
CO(3, 2, 2)=1000.0
CO(3, 2, 1)=1000.0
CO(3, 2, 2)=1000.0
CO(1, 2, 1)=10000.0
CO(1, 2, 2)=10000.0
CO(4, 2, 1)=10000.0
CO(4, 2, 2)=10000.0
NLAY1=NLAY+1
DO 10 K=2, NLAY1
10 THICK1(K)=THICK1(K-1)

THICK1(1)=MNOVTK
IF (PF, GT, PTERM, OR, TPE, EQ, 0) GO TO 100
TNPT=NPT
NPT=4
CALL PSIT (P, PFO, W, XKTO)
NPT=TNPT
IF (PFO, GE, PTOV) GO TO 3
GO TO 8
GO TO 8
100 IF (PFO, GE, PTOV) GOTO 3
IF (PFO, GE, PTOV) GOTO 3
IF (PFO, GE, PTOV) PTERM=PTERM+0.05
XKTO=-.8*XNOV*ALOG((PTERM-TERM)/(PIOV-PFO))
DMDRE=(100.0+XKTO/CO(NPT, NRU, NLH))**((BETA(NPT, NRU, NLH))
N=(MXOVTK-MNOVTK)+4
DO 1 =1, N
CALL RUSIAN (THICK1, DMDRU, NLAY1, NPT, NRU, NLH)
IF (DMDRU, LE, DMDRE) GO TO 2
ISN 0059  1  THICK1(1)=THICK1(1)+.25
ISN 0060  2  THOV=THICK1(1)
ISN 0061  GO TO 4
ISN 0062  3  THOV=MNOVTK
ISN 0063  4  RETURN
ISN 0064  END

*OPTIONS IN EFFECT*NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT NOMEM NOFORMAT GOSTMT ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS*  SOURCE STATEMENTS = 63.  PROGRAM SIZE = 1700.  SUBPROGRAM NAME =OVTHKF

*STATISTICS*  NO  DIAGNOSTICS  GENERATED

***** END OF COMPILATION *****

128K BYTES OF CORE NOT USED
LEVEL 2.3.0 (JUNE 78)  OS/360 FORTRAN H EXTENDED  DATE 82.147/20.14.33  PAGE 1

REQUESTED OPTIONS: NOOECK, NOLIST, OPT(O), NOOUMP

OPTIONS IN EFFECT:
NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTOOBL(NONE)
SOURCE EBCDIC NOLIST NOOECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(1)

ISN 0002
RETURN
ISN 0003
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTOOBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NOOECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(1)

*STATISTICS* SOURCE STATEMENTS = 2, PROGRAM SIZE = 166, SUBPROGRAM NAME = MAIN

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION *****

136K BYTES OF CORE NOT USED
FUNCTION RWT18L(D,PI,PT)
AASHO-RIGID PREDICTION OF 18 KIP EAL TO TERMINAL PSI

GT = ALOG10((PI-PT)/(PI-1.5))

GTERM = GT/(1.1624E7/(D+1.)*8.46)

RWT18L = 7.35*ALOG10(D+1.) - 0.06 + GTERM

RETURN
END
LEVEL 2.3.0 (JUNE 78)  05/360 FORTRAN H EXTENDED  DATE 82.147/20.14.53  PAGE 1

REQUESTED OPTIONS: NODECK,NOLIST,OPT(O),NODUMP

OPTIONS IN EFFECT: NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

FUNCTION RNAASH(DA)
MODIFY AASHO-RIGID PREDICTION FOR NON-AASHO CONDITIONS
COMMON /STRUC/ SN,SS,R,D,AGG,XJ,XK,E
ISN 0002  C
ISN 0003  Z = E/XK
ISN 0004  CT = 223.3
ISN 0005  IKK = AGG
ISN 0006  IF( IKK .EQ. 0 ) CT=204.16
ISN 0007  D75 = DA**.75
ISN 0009  RNAASH = ALOG10((CT/215.63)*(D75-1.132)/
ISN 0010  (D75-18.42/Z**0.25))
ISN 0012  RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS*  SOURCE STATEMENTS = 11, PROGRAM SIZE = 478, SUBPROGRAM NAME = RNAASH

*STATISTICS*  NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

136K BYTES OF CORE NOT USED
FUNCTION GPSIR (XN, PI, D)
C AASHO-RIGID PREDICTION OF PSI AFTER GIVEN 18 KIP EAL
DATA MAX, TEST /10, .001 /
EXP10(X) = EXP(2.302585*X)
PTN = 3.
ITER = 0
RN = RNAASH(D)
XNL = ALOG10(XN)
DT1 = 7.35*ALOG10(D+1.) - 0.06
DT2 = 1. + 1.624E7/(D+1.)**8.46
ITER = ITER + 1
IF (ITER .GT. MAX) GO TO 30
PT = PTN
GT = (XNL - DT1 - (4.22 - 0.32*PT)*RN)*DT2
PTN = PI - (PI - 1.5)*EXP10(GT)
IF (ABS(PTN - PT) .LT. TEST) GO TO 20
GO TO 10
20 GPSIR = PTN
RETURN
30 GPSIR = PTN
WRITE (6,1) MAX, PTN, PT, XN
1 FORMAT (1X, 37HFUNCTION GPSIR DID NOT CONVERGE AFTER, 15, 12
11H ITERATIONS / 1X, 33HLAST AND PREVIOUS PSI VALUES WERE, 2Fl0.6
1X, 3HFOR, Fl0.0,26H 18KIP EAL TO DATE. ABORT.)
STOP
END

*OPTIONS IN EFFECT=NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT=SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS* SOURCE STATEMENTS = 25, PROGRAM SIZE = 944, SUBPROGRAM NAME = GPSIR
*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****
132K BYTES OF CORE NOT USED
SUBROUTINE GETD (W18, PI, PT, DB, DF)

C AASHO-RIGID SLAB THICKNESS FOR GIVEN LIFE (18 KIP EAL) AND INITIAL
C AND TERMINAL PSI

DATA MAX, TEST /10, .001 /

EXP10(X) = EXP(2.302585*X)

ITER 0

IF (ITER .GT. MAX) GO TO 99

" ON W " RWTI8L(O.PI,PT) + (4.22-.32*PT)*RNAASH(D)

D1NLOG = (W18 - (W - DTERM))/7.35

DN = EXP10(D1NLOG) - 1.

IF (ABS(D-DN) .LT. TEST) GO TO 20

GO TO 10

20 OF " ON RETURN

RETURN

FORMAT (1X, 27HTOD MANY ITERATIONS IN GETD /

1 1X, 20HLAST TWO VALUES WERE , 2F8.4 /

2 1X, 36HINPUT LOG N18. PI. PT. STARTING D = /

3 1X, 4F10.4 /)

END

**OPTIONS IN EFFECT** NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTO DBL(NONE)

*STATISTICS* SOURCE STATEMENTS = 23. PROGRAM SIZE = 870. SUBPROGRAM NAME = GETD

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

132K BYTES OF CORE NOT USED
SUBROUTINE OVTHKR (O, EXD, TH)
OBTAIN THICKNESS OF AC OVERLAY TO BRING EQUIVALENT SLAB THICKNESS, D, OF COMBINATION UP TO NEW DESIGN VALUE.

EXISTING D DISCOUNTED FOR USE

COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /PSI/ PF, PICON, PTERM, PIOV, PTOV
COMMON /STROOT/ STRCD(4), CC(4), MC(11), NC, STRC(5), RFS(4), RFB(4)
DATA F/l./ INDX = 7.5 - 2.*PTERM
INDX = MINO(4, MAXO(1, INDX))
C = CC(INDX)
TH = 2.5*(F*D - C*EXD)
RETURN
END
SUBROUTINE MNTSET
C
SET UP THE CUMULATIVE MAINTENANCE COST ARRAYS FOR MODEL OR
HISTORICAL MAINTENANCE
C
INPUTS ARE
C
1. UNTCST(7) ---- UNIT COST OF MAINTENANCE
   (1) - $/SQ.YD. OF FLEXIBLE PATCHING
   (2) - $/LINEAL FT. OF BITUMINOUS CRACK SEALING
   (3) - $/CU.YD. OF BITUMINOUS BASE AND SURFACE REPAIR
   (4) - $/SQ.YD. OF CONCRETE PATCHING
   (5) - $/AVERAGE CONCRETE BLOWUP
   (6) - $/AVERAGE CONCRETE MUDJACK
   (7) - $/LINEAL FT. OF CONCRETE JOINT SEALING
C
2. USRMDL(31,2) - USER INPUT COST OF MAINTENANCE PER YEAR FOR
   31 YEARS
C
   COLUMN 1 - FOR FLEXIBLE PAVEMENTS
   COLUMN 2 - FOR RIGID PAVEMENTS
C
3. WDTH - LANE WIDTH IN FEET
C
4. S ----- JOINT SPACING IN FEET
C
5. XML --- FRACTION OF JOINTS SEALED EACH YEAR
C
6. USLMG - TIME BEFORE FIRST JOINT SEAL IN YEARS
C
7. MFLG -- MAINTENANCE TYPE
   0 = NO MAINTENANCE
   1 = EAROMAR MODEL
   2 = USER INPUT MODEL
C
OUTPUT IS
C
ACCMDL(31,3) - EAROMAR MODEL COST OF MAINTENANCE PER YEAR FOR
31 YEARS (CUMULATIVE) FOR
C
COLUMN 1 - FLEXIBLE PAVEMENTS
COLUMN 2 - RIGID PAVEMENTS
COLUMN 3 - COMPOSITE PAVEMENTS
C
COMMON /EXTRA/ TPE,PF0,NOVTK,NOVTK,NIS
COMMON /MNTPAR/ UNTCST(4),USRMDL(31,3),WDTH,S.DISS,DCON,DIN,MFLG
COMMON /MODELS/ ACCMDL(31,3)
COMMON /10/ LI, LO, LD
COMMON /PARAM/ CONT(25),DISTC
COMMON /STRUC/ SN, SS, R, D, AGG, XJ, XK, E
DIMENSION XO(3),FO(3)
DATA LEN /24/
DATA MAX /31/
C
TEST FOR USER OVERRIDE OF EAROMAR MODELS
C
IF (MFLG .EQ. 0) GO TO 9999
IF (MFLG .EQ. 1) GO TO 8
C
ACCUMULATE THE USER DEFINED COSTS PER YEAR.
C
ACCMDL(1,1) = USRMDL(1,1)
ACCMDL(1,2) = USRMDL(1,2)
DO 5 I=2,LEN
DO 1 J=1,2
K = I-1
ACCMOL(I,J) = ACCMDL(K,J) + USRMDL(I,J)
CONTINUE
5 CONTINUE
DO 7 I=2,MAX
DO 6 J=1,2
ACCMDL(I,J) = ACCMDL(I-1,J) + USRMDL(LEN,J)
6 CONTINUE
7 CONTINUE
DO 10 I=25,MAX
DO 6 J=1,2
ACCMDL(I,J) = ACCMDL(I,J) + USRMDL(LEN,J)
6 CONTINUE
7 CONTINUE
DO 10 I=1,MAX
ACCMDL(I,3) = ACCMDL(I,1)
10 CONTINUE
GO TO 9999

C FLEXIBLE PAVEMENT - CALCULATE YEARLY MAINTENANCE COSTS (20 YEARS)

8 CONTINUE
X1 = DCON
X3 = DISS
X2 = DIN
JT = DISTCT
X4 = CONTP(JT)
X5 = 0.0
IF ( AGG .EQ. 0. ) X5 = -5.840 + 1.1856*X2
X2 = A
FACT1 = 1. + EXP(-1. * (A - 10.) / 1.16)
SUM = 1100. / FACT1 * UNTCST(1)
C CRACK SEALING
SUM = SUM + 1000. / FACT1 * UNTCST(2)
USRMDL(I,3) = SUM
IF (NIS.EQ.2) USRMDL(I,3)=USRMDL(I,3)+0.282
IF (NIS.EQ.3) USRMDL(I,3)=USRMDL(I,3)+0.316
C BASE AND SURFACE REPAIR
USRMDL(I,1) = SUM * 5. / FACT1 * UNTCST(3)
IF (NIS.EQ.2) USRMDL(I,1)=USRMDL(I,1)+0.382
IF (NIS.EQ.3) USRMDL(I,1)=USRMDL(I,1)+0.316
IF (I.LT.IDIN) GO TO 40
C RIGID PAVEMENT - CALCULATE YEARLY MAINTENANCE COSTS (25 YEARS)
FAIL = (-.381 - .4272*X1 + .018864*(X2**2) + .5532*X3*(X2-X1) + .0005928*X2*X4 +X5) * 0.65
SUM = FAIL * UNTCST(4) * 0.65
ISN 0068  IF(I .EQ. IDIN) FO(3) = FAIL
ISN 0070  USRMOL(I,2) = SUM
ISN 0071  X2 = X2 + 1.0
ISN 0072  40 CONTINUE
ISN 0073  ILOOP = IDIN - 1
ISN 0074  DO 900 I = 1, ILOOP
ISN 0075    XIN = I
ISN 0076  CALL INTERP(XD,FO,3,XIN,FROUT)
ISN 0077  USRMOL(I,2) = FROUT * UNTCST(4)
ISN 0078  900 CONTINUE
ISN 0079  KI = 1
ISN 0080  DO 905 J = 16, LEN
C**** 0.75 * REDUCTION FACTOR OF NO. OF FAILURES
ISN 0081  USRMOL(J,2) = 0.75 * 0.65 * USRMOL(KI,2)
ISN 0082  KI = KI + 1
ISN 0083  905 CONTINUE
C C SET THE COSTS OF YEARS 25-MAX EQUAL TO THE COST OF YEAR LEN
C ISN 0084  DO 46 I = 25, MAX
ISN 0085    DO 43 J = 1, 3
ISN 0086    USRMOL(I,J) = USRMOL(I-1,J)
ISN 0087    43 CONTINUE
ISN 0088    46 CONTINUE
C C CALCULATE THE ACCUMULATED COSTS ARRAY
C ISN 0089  ACCMDL(1,1) = USRMOL(1,1)
ISN 0090  ACCMDL(1,2) = USRMOL(1,2)
ISN 0091  ACCMDL(1,3) = USRMOL(1,3)
ISN 0092  DO 60 I = 2, MAX
ISN 0093    DO 55 J = 1, 3
ISN 0094      ACCMDL(I,J) = USRMOL(I,J)
ISN 0095    55 CONTINUE
ISN 0096    60 CONTINUE
ISN 0097  9999 RETURN
ISN 0098  END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(1)
*STATISTICS* SOURCE STATEMENTS = 97, PROGRAM SIZE = 2544, SUBPROGRAM NAME = MNTSET
*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******
SUBROUTINE MAINT (AGEI, AGE, TOV, YMCOST)

CALCULATE MAINTENANCE COSTS PER YEAR FOR EACH YEAR IN THE A. P.

THE INPUTS ARE

COMMON /OVRLAY/ XHCIO, XHCIM, WLANE, WPSH, WGSH, PPVDSH, CAC, CGR
1. AGEI ------ PAVEMENT AGE AT BEGINNING OF ANALYSIS PERIOD
2. AGE(20) ---- PAVEMENT AGE FOR EACH YEAR OF THE A. P.
3. TOV ------ TIME OF OVERLAY

THE OUTPUT IS

YMCOST(20) - COST OF MAINTENANCE PER YEAR FOR EACH YEAR OF THE ANALYSIS PERIOD

COMMON /MISC/ IPOT, IARMS, OLDMNT, AGF
COMMON /TIME/ ATP, OVLIF, NYAP, NVR, YR(40)
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC

DIMENSION AGE(20), YMCOST(20)

INITIALIZE THE YEARLY MAINTENANCE COSTS ARRAY

DO 10 I=1,20
YMCOST(I) = 0.
10 CONTINUE

PAVEMENT AGE AT TIME OF OVERLAY

PAV = ATP
IF (IARMS .EQ. 0) PAV = AGEI + TOV


ITOV = INT(TOV-1.E-5)
NP = IP
CALL MCOSTS (AGEI, NP, COSTZ)

CALCULATE THE MAINTENANCE COST FOR EACH YEAR IN THE A. P.

DO 50 I=1,NYAP
C TEST FOR FIRST YEAR OF THE ANALYSIS PERIOD
IF (I .GT. 1) GO TO 30
C TEST FOR OVERLAY IN FIRST YEAR OF THE ANALYSIS PERIOD
IF (ITOV .EQ. 0) GO TO 20
C YEAR 1 OF ANALYSIS PERIOD --- NO OVERLAY

CALL MCOSTS (AGE(1), NP, SVCOST)
YMCOST(1) = SVCOST - COSTZ
IF( YMCOST(1) .LT. 0.0 ) YMCOST(1) = SVCOST
GO TO 50

OVERLAY IN FIRST YEAR OF ANALYSIS PERIOD
C
ISN 0027
20 CALL MCOSTS (PAV, NP, COST)
C TEST FOR UNACCELERATED MAINTENANCE
ISN 0028
IF (IARMS .EQ. 0) GO TO 25
ISN 0030
COST = COST - COSTZ
ISN 0031
IF (AGE(1) .LE. 1.) GO TO 23
ISN 0033
YMCDST(1) = COST
ISN 0034
SVCOST = 0.
C IF RIGID PAVEMENT OVERLAI, CHANGE PAVEMENT TYPE TO COMPOSITE
ISN 0035
IF (IP .EQ. IR) NP = IC
ISN 0037
GO TO 50
ISN 0038
23 IF (IP .EQ. IR) NP = IC
ISN 0040
CALL MCOSTS (AGE(1), NP, SVCOST)
ISN 0041
YMCDST(1) = COST + (1. - AGE(1)) + SVCOST
ISN 0042
GO TO 50
C UNACCELERATED MAINTENANCE - OVERLAY IN YEAR 1 OF ANALYSIS PERIOD
ISN 0043
25 IF (AGE(1) .LE. 1.) GO TO 27
ISN 0045
YMCDST(1) = COST - COSTZ
ISN 0046
IF (YMCDST(1) .LT. 0.0) YMCDST(1) = COST
ISN 0048
SVCOST = 0.
ISN 0049
IF (IP .EQ. IR) NP = IC
ISN 0051
GO TO 50
ISN 0052
27 AG = AGE(1) + (1. - AGE(1))
ISN 0053
CALL MCOSTS (AG, NP, COST)
ISN 0054
IF (IP .EQ. IR) NP = IC
ISN 0056
CALL MCOSTS (AGE(1), NP, SVCOST)
ISN 0057
YMCDST(1) = COST - COSTZ + SVCOST
ISN 0058
IF (YMCDST(1) .LT. 0.0) YMCDST(1) = COST + SVCOST
ISN 0060
GO TO 50
C TEST FOR OVERLAY YEAR
ISN 0061
30 IF (I .EQ. ITOV+1) GO TO 40
C YEAR I OF ANALYSIS PERIOD --- NO OVERLAY
ISN 0063
CALL MCOSTS (AGE(I), NP, COST)
ISN 0064
YMCDST(I) = COST - SVCOST
ISN 0065
SVCOST = COST
ISN 0066
IF (YMCDST(I) .LT. 0.0) YMCDST(I) = COST
ISN 0068
GO TO 50
C OVERLAY IN YEAR I OF ANALYSIS PERIOD
C TEST FOR UNACCELERATED MAINTENANCE
ISN 0069
40 IF (IARMS .EQ. 0) GO TO 45
ISN 0071
IF (AGE(1) .LE. 1.) GO TO 43
ISN 0073
CALL MCOSTS (AGE(I), NP, COST)
ISN 0074
YMCDST(I) = COST - SVCOST
ISN 0075
IF (YMCDST(I) .LT. 0.0) YMCDST(I) = COST
ISN 0077
SVCOST = 0.
C IF RIGID PAVEMENT OVERLAI, CHANGE PAVEMENT TYPE TO COMPOSITE
ISN 0078
IF (IP .EQ. IR) NP = IC
ISN 0080
GO TO 50
ISN 0081
43 CALL MCOSTS (PAV, NP, COST)
ISN 0082
COST = COST - SVCOST
ISN 0083
IF (COST .LT. 0.0) COST = 0.0
ISN 0085
IF (IP .EQ. IR) NP = IC
ISN 0087
CALL MCOSTS (AGE(I), NP, SVCOST)
ISN 0088
YMCDST(I) = COST + SVCOST
GO TO 50
C UNACCELERATED MAINTENANCE - OVERLAY IN YEAR I OF ANALYSIS PERIOD
45 IF (AGE(I) .LE. 1.) GO TO 47
CALL MCOSTS (AGE(I), NP, COST)
YMCDST(I) = COST - SVCOST
IF (YMCDST(I) .LT. 0.0) YMCDST(I) = COST
SVCOST = 0.
IF (IP .EQ. IR) NP = IC
GO TO 50
AG = AGE(I-1) + (1. - AGE(I))
CALL MCOSTS (AG, NP, COST)
COST = COST - SVCOST
IF (IP .EQ. IR) NP = IC
CALL MCOSTS (AGE(I), NP, SVCOST)
YMCDST(I) = COST + SVCOST
CONTINUE
RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 108, PROGRAM SIZE = 2214, SUBPROGRAM NAME = MAINT

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******
124K BYTES OF CORE NOT USED
SUBROUTINE MCOSTS (A, NP, COST)
   THIS ROUTINE CALCULATES THE MAINTENANCE COSTS FOR EACH YEAR OF THE
   ANALYSIS PERIOD
   THE INPUTS ARE THE FOLLOWING
   1. A ------ PAVEMENT AGE FOR THE CURRENT YEAR
   2. NP ------ PAVEMENT TYPE INDICATOR FOR ARRAY ACCMDL WHERE,
      NP=1 - FLEXIBLE
      2 - RIGID
      3 - COMPOSITE
   THE OUTPUT IS
      COST - THE CALCULATED CUMULATIVE COST TO THE GIVEN PAVEMENT AGE
COMMON /MODELS/ ACCMDL(31,3)
ISN 0003   IF (A .GT. 1.) GO TO 10
ISN 0006   COST = ACCMDL(1,NP) * A
ISN 0007   GO TO 20
ISN 0008   10 I1 = INT(A)
ISN 0009   I2 = I1 + 1
ISN 0010   AG = A - AINT(A)
ISN 0011   COST = ACCMDL(I1,NP) + (ACCM DL(I2,NP) - ACCMDL(I1,NP)) * AG
ISN 0012   20 RETURN
ISN 0013   END

****** END OF COMPILATION ******
SUBROUTINE TRAFIC

THIS ROUTINE COMPUTES THE FOLLOWING:
1. THE ADJUSTED AVERAGE EMPTY WEIGHT OF VEHICLES WEIGHED EMPTY
2. ADJUSTED GROSS WEIGHT AND TOTAL PAYLOAD CARRIED - PRESENT AND PROPOSED REGULATIONS
3. DISTRIBUTION OF AXLE WEIGHTS - PRESENT AND PROPOSED REGS.
4. AXLE WEIGHT DISTRIBUTIONS BY VEHICLE CLASSIFICATION - PROPOSED REGULATIONS

THE INPUTS ARE:
1. NAXLES(10,4) - THE NUMBER OF SINGLE, TANDEM, TRIPLE AND STEERING AXLES FOR EACH TRUCK TYPE
2. NTTY - NUMBER OF TRUCK TYPES TO BE CONSIDERED (EXISTING)
3. NATT - NUMBER OF ADDED TRUCK TYPES (FUTURE DESIGN)
4. NEWTRK - SHIFTING INDICATOR
   0 - SHIFTING PROCEDURE TO BE DONE
   1 - SHIFTING PROCEDURE NOT TO BE DONE (ALREADY DONE)
5. SA(30,11) - NUMBER OF SINGLE AXLES WEIGHED BY INTERVAL AND TRUCK TYPE
6. TA(30,11) - NUMBER OF TANDEM AXLES WEIGHED BY INTERVAL AND TRUCK TYPE
7. TR(50,11) - NUMBER OF TRIPLE AXLES WEIGHED BY INTERVAL AND TRUCK TYPE
8. ST(30,11) - NUMBER OF STEERING AXLES WEIGHED BY INTERVAL AND TRUCK TYPE
9. VE(30,11) - NUMBER OF VEHICLES WEIGHED EMPTY BY INTERVAL AND TRUCK TYPE
10. VG(75,11) - NUMBER OF VEHICLES WEIGHED GROSS BY INTERVAL AND TRUCK TYPE
11. NLDI(6) - NUMBER OF INTERVALS INPUT FOR EACH OF THE ABOVE SIX ARRAYS, WHERE,
   1 = SA  2 = TA  3 = TR  4 = VG  5 = VE  6 = ST
12. EMPTY(10) - PERCENT INCREASE IN AVERAGE EMPTY WEIGHT FOR EACH TRUCK TYPE
13. PGVWL - PRESENT GROSS VEHICLE WEIGHT LIMIT
14. PSAL -- PRESENT SINGLE AXLE WEIGHT LIMIT
15. PTAL -- PRESENT TANDEM AXLE WEIGHT LIMIT
16. PTRAL - PRESENT TRIPLE AXLE WEIGHT LIMIT
17. PSTAW(10) - PRESENT STEERING AXLE WEIGHT LIMIT
18-22. FGVWL, FSAL, FTAL, FTRAL, FSTAW(10) - SAME AS 13 THROUGH 17 EXCEPT THAT THESE ARE VALUES UNDER PROPOSED REGULATIONS
23. SIZE - STANDARD INTERVAL SIZE (2-KIPS)
24. AVRG - AVERAGE VARIABLE (AVRG = 100. GIVES AVERAGE VALUES PER 100 TRUCKS)
25. NAPOV - NUMBER OF SELECTED CUMULATIVE PERCENTAGES FOR THE DISTRIBUTION OF AXLE WEIGHTS - PROPOSED REGS. SECTION
26. PAPOV - PERCENTAGE INCREMENT CORRESPONDING TO NAPOV ABOVE

COMMON /TRFFIC/ ELVW(75), APVWE(75), APVGW(75), SAAPV(75),
                  TAAPV(75), TRAPV(75), STAPV(75), NGVW

COMMON /EXPVT/NPT, THICK(4), MTYPE(4), NLAY, IF, IR, IC
COMMON /TRTYP/ TYP(2,10), PTTYP(10,20,2), PCTTR(20,2), PERCT(4),
  1 NAXLES(10,4), NTY(4), NTTY, NATT, NTT, NEWTRK
COMMON /NMBR/ SA(30,11), TA(30,11), TR(50,11), VE(30,11),
  1 VG(75,11), NLDI(6), EMPTY(10), ST(30.11)
COMMON /LDS/ PGWL, PSL, PTAL, PTLAL, FGLV, FSAL, FTAL, FRAL,
  1 PSTAV(10), FSTAV(10)
COMMON /CNSTS/ NAPOV, PAPOV, SIZE, AVRG
COMMON /TRINDX/ ITT
COMMON /IOD/ IT, LO, LD
COMMON /OUTPTS/ TD4(10,6,2)
COMMON EWI(75), EVWMP(75), ELVWM(75), GLVWI(75), VWE(75),
  2 PVWE(75), TWFAV(75), TPFAV(75), TW(75),
  3 APPV(75), PPV(75), FACT(75), SAI(75), TA(75), TR(75),
  4 SAA(75), TAA(75), TRA(75), SLA(75), TL(75),
  5 TRLA(75), APSA(75), APA(75), APR(75), APV(75),
  6 GWA(75), GWA(75), SLA(75), TRL(75), TL(75),
  7 SANOV(75), TANOV(75), TNAL(75), PSA(75), PA(75),
  8 PTR(75), SL(75), TL(75), TR(75), STA(75),
  9 P(75), STL(75), STL(75), ST(75), AP(75),
  A STI(75), STNOV(75), NLDIV(6)
IF (NEWTRK .EQ. 1) GO TO 9999
DO 6 K=1,2
DO 4 J=1,6
DO 2 I=1,10
TD4(I,J,K) = 0.0
2 CONTINUE
4 CONTINUE
6 CONTINUE
DO 7 I=1,6
7 CONTINUE
DO 8 J=1,10
P(75) = NLDIV(I) = NLDI(I)
8 CONTINUE
DO 160 IT=1,NTT
PERC = PERCT(1T)
IT = IT
V = 0.
NS = 0
NTA = 0
N = 0
NA = 0
NTT = 0
NNT = 0
ST1 = 0.
SANOV(75) = 0.
SANOV(75) = 0.
SANOV(75) = 0.
SANOV(75) = 0.
SANOV(75) = 0.
SANOV(75) = 0.
SANOV(75) = 0.
ISN 0052  APVWG(I) = O.
ISN 0053  SAPV(I) = O.
ISN 0054  TAAPV(I) = O.
ISN 0055  TRAPV(I) = O.
ISN 0056  STAPV(I) = O.
ISN 0057  FACT(I) = O.
ISN 0058  GLVWNI(I) = O.
ISN 0059  APSAI(I) = O.
ISN 0060  APTA(I) = O.
ISN 0061  APTR(I) = O.
ISN 0062  APST(I) = O.
ISN 0063  8 CONTINUE  
ISN 0064  DO 9 I=1,6  
ISN 0065  NLDI(I) = NLDISV(I)  
ISN 0066  9 CONTINUE  

*** ADJUSTED AVERAGE EMPTY WEIGHT SECTION ***

ISN 0067  CALL INTVL (VE, EVWI, NLDI(5), NI. 5, 30, VWE, IT)

CALL THE NUMBER OF EMPTY VEHICLES WEIGHED IN EACH 2-KIP GROSS
EMPTY WEIGHT INTERVAL

ISN 0068  CALL PCTAGE (VWE, NI, PVWE)
ISN 0069  CALL ACMITE (PVWE, NI, APVWE)
ISN 0070  CALL MIDPNT (EVWI, NI, EVWMP)
ISN 0071  CALL MULT (PVWE, EVWMP, NI, TWFAV)
ISN 0072  CALL AVRGE (TWFAV, NI, AVRG, AEW)

COMPUTE THE PRACTICAL MAXIMUM GROSS VEHICLE WEIGHT FOR PRESENT AND
PROPOSED LIMITS AND MAKE SURE THAT THE VEHICLE GROSS INTERVALS
INPUT HAS A MAXIMUM END-OF-INTERVAL VALUE GREATER THAN OR EQUAL TO
THE CALCULATED PMGW.

ISN 0073  K = 1
ISN 0074  TD4(IT,6,K) = AEW
ISN 0075  TD4(IT,1,K) = PSTAW(IT)
ISN 0076  TD4(IT,2,K) = PSAL
ISN 0077  TD4(IT,3,K) = PTAL
ISN 0078  TD4(IT,4,K) = PTRAL
ISN 0079  TD4(IT,5,K) = PSTAW(IT) + PSAL*FLOAT(NAXLES(IT,1)) + PTAL +
        1  FLOAT(NAXLES(IT,2)) + PTRAL*FLOAT(NAXLES(IT,3))
ISN 0080  NLD = NLDI(4)
ISN 0081  11 IF (TD4(IT,5,1) .LE. VG(NLD,11)) GO TO 15
ISN 0082  NLD = NLD + 1
ISN 0083  VG(NLD,11) = VG(NLD-1,11) + SIZE
ISN 0084  DO 12 ID=1,NTT  
ISN 0085  VG(NLD,ID) = 0.  
ISN 0086  12 CONTINUE  
ISN 0087  GO TO 11
ISN 0088  15 NLDI(4) = NLD
ISN 0089  K = K+1
ISN 0090  TD4(IT,6,K) = AEW + (EMPTY(IT) + 0.01) * AEW
ISN 0091  TD4(IT,1,K) = PSTAW(IT)
ISN 0092  TD4(IT,2,K) = FSAL
ISN 0093  TD4(IT,3,K) = FTAL
ISN 0094  TD4(IT,4,K) = FTRAL
*** ADJUSTED GROSS WEIGHT AND TOTAL PAYLOAD CARRIED - PRESENT REGS

C

ISN 0096

TD4(IT,5.K) = FSTAW(IT) + FSAL*FLOAT(NAXLES(IT.1)) + FTAL +

1

FLOAT(NAXLES(IT.2)) + FTRAL*FLOAT(NAXLES(IT.3))

ISN 0097

NLDS = NLDI(4)

ISN 0098

CALL COUNT (VG1,IT), NLDS)

ISN 0099

CALL INTVL (VG, ELVWI, NLDS, NJ, 4. 75, TVWE, IT)

ISN 0100

ELOAD = ELVWI(NJ)

ISN 0101

CALL PCTAGE (TVWE, NJ, PVWE)

ISN 0102

CALL ACMLTE (PVWE, NJ, APVWE)

ISN 0103

DO 888 JU=1,50

888 CONTINUE

ISN 0105

IF (IT .GT. NTty) GO To 50

ISN 0107

CALL MIDPNT (ELVWI, NJ, ELVWMp)

ISN 0108

DO 10 1=1,NJ

ISN 0109

APPV(1) = ELVWMp(1) - AEW

ISN 0110

10 CONTINUE

ISN 0111

CALL MULT (PVWE, APPV, NJ, TPFAV)

ISN 0112

CALL AVRGE (TPFAV, NJ, AVRG, APV)

*** ADJUSTED GROSS WEIGHT AND TOTAL PAYLOAD CARRIED - PROPOSED REG

C

ISN 0113

DO 200 J=1.75

ISN 0114

IF (APVWE(J) .GT. PERC) GO To 202

ISN 0116

IF (APVWE(J) .LT. PERC) INN = J

ISN 0118

200 CONTINUE

ISN 0119

202 CONTINUE

ISN 0120

ESTART = ELVWI(INN)

ISN 0121

RATIO = TD4(IT,5,2) / TD4(IT,5,1)

ISN 0122

SMALL = AMIN1(TD4(IT,5,1),ELOAD)

ISN 0123

NK = INT(SMALL) - INT(ELVWI(INN) + 0.5) + 1

ISN 0124

XNK = FLOAT(NK) / 2.0 + 0.5

ISN 0125

NK = INT(XNK)

ISN 0126

NK2 = INT(SMALL) - INT(ESTART + 0.5) + 1

ISN 0127

XNK2 = FLOAT(NK2) / 2.0 + 0.5

ISN 0128

NK2 = INT(XNK2)

ISN 0129

NDIF = NK - NK2

ISN 0130

DO 210 L=1,NDIF

ISN 0131

FACT(L) = 1.0

ISN 0132

210 CONTINUE

C

FOR ALL INTERVALS GREATER THAN THE PRESENT PMGW VALUE, RECORD THE

C

VALUE OF THE RATIO OF THE PMGW'S IN *FACT*

C

ISN 0133

DIST = (RATIO - 1.0) / FLOAT(NK2)

ISN 0134

NDDD = NDIF + 1

ISN 0135

NDiff = NDDD + 1

ISN 0136

FACT(NDDD) = 1.0 + DIST

ISN 0137

DO 20 J=NDIFF,NK

ISN 0138

I = J-1

ISN 0139

FACT(J) = FACT(I) + DIST

ISN 0140

20 CONTINUE

ISN 0141

DO 667 K2=1,NK

ISN 0142

667 CONTINUE

ISN 0143

IF (NJ .LE. NK) GO TO 35

ISN 0145

J = NK+1
DO 30 I=J,NJ
30 CONTINUE

NK = NJ

C COMPUTE THE END OF INTERVAL WEIGHT FOR THE PROPOSED REGULATIONS,
C AND EXTEND THE 2-KIP INTERVAL ARRAY *ELVWI* TO THE MAXIMUM END OF
C INTERVAL WEIGHT COMPUTED

35 CALL MULT (ELVWI, FACT, NJ, GLVWNI)
36 ELI = GLVWNI(NJ)
37 I = NJ
40 NJ = NJ+1
50 ELVWI(NJ) = ELVWI(I) + SIZE
51 I = I+1
52 IF (ELVWI(I) .LT. ELI) GO TO 40

CALL ITRP (GLVWNI, APVWE, ELVWI, I, NJ, NK, APVWG, 0)

PVWE(1) = APVWG(1)
CALL OIFF (APVWG, NJ, PVWE)

CALL MIDPNT (ELVWI, NJ, ELVWMP)

DO 60 I=1,NJ

PPV(I) = ELVWMP(I) - TD4(IT,6.2)
60 CONTINUE

CALL MULT (PVWE, PPV, NJ, TPFAV)

CALL AVRGE (TPFAV, NJ, AVRG, PAPV)

*** NUMBER OF VEHICLES REQUIRED TO CARRY TOTAL PAYLOAD (CARGO) -
*** PROPOSED LIMITS ***

VTN = APV / PAPV * 100.

*** DISTRIBUTION OF AXLE WEIGHS - PRESENT LIMITS ***

IF (NAXLES(IT,1) .EQ. 0) GO TO 64

SINGLE AXLES

64 IF (NAXLES(IT,2) .EQ. 0) GO TO 66

TANDEM AXLES

66 IF (NAXLES(IT,3) .EQ. 0) GO TO 68

TRIPLE AXLES

NLDI = NLDI(3)
CALL COUNT (TR(1, IT), NLDS)
CALL INTVL (TR, TRI, NLDS, NTR, 3.50, TRA, IT)
CALL PCTAGE (TRA, NTR, PTR)
CALL ACMLTE (PTR, NTR, APTR)
NNR = NTR
68 IF (NAXLES(IT,4) .EQ. 0) .OR. (IP .NE. IF) GO TO 69

STEERING AXLES

NLDS = NLDI(6)
CALL COUNT (ST(1,IT), NLDS)
CALL INTVL (ST, STI, NLDS, NST, 6, 30, STA, IT)
CALL PCTAGE (STA, NST, PST)
CALL ACMLTE (PST, NST, APST)
NNS = NST
69 IF (IT .GT. NTTY) GO TO 146

NGW = NJ

*** DISTRIBUTION OF SINGLE/TANDEM/TRIDEM AXLE WEIGHTS - PROPOSED LIMITS **

SET UP THE TABLE OF SELECTED CUMULATIVE PERCENTAGES DEFINING THE
GROSS WEIGHT AND AXLE WEIGHT CURVES

P = 0.0
DO 70 I=1, NAPOV
APOV(I) = P
70 CONTINUE

FOR THE GROSS WEIGHT PRESENT AND PROPOSED, AND FOR THE AXLE
WEIGHTS, FIND, BY INTERPOLATION, THE WEIGHTS CORRESPONDING TO THE
PERCENTAGES IN ARRAY *APOV*. COMPUTE THE RATIOS OF THE AXLE
WEIGHTS TO THE GROSS WEIGHTS IN *GWA* AND FINALLY, COMPUTE THE
AXLE WEIGHT DISTRIBUTIONS FOR THE PROPOSED REGS. USING *GWAF*.

GWA(1) = ELVWI(1) - SIZE
IF (GWA(1) .LT. 0.0) GWA(1) = 0.0
CALL ITRP (APVWE, ELVWI, APOV, 2, NAPOV, NK, GWA, 0)
GWAF(1) = ELVWI(1) - SIZE
IF (GWAF(1) .LT. 0.0) GWAF(1) = 0.0
CALL ITRP (APVWG, ELVWI, APOV, 2, NAPOV, NJ, GWAF, 0)
SLA(1) = SAI(1) - SIZE
IF (SLA(1) .LT. 0.0) SLA(1) = 0.0
CALL ITRP (APSAL, SAI, APOV, 2, NAPOV, NSA, SLA, 0)
DO 80 I=1, NAPOV
IF (GWA(I) .EQ. 0.0) GO TO 81
SLAR(I) = SLA(I) / GWA(I)
80 CONTINUE
CALL MULT (SLAR, GWAF, NAPOV, SLAT)
72 IF (NAXLES(IT,2) .EQ. 0) GO TO 75
TLA(1) = TAI(1) - SIZE
IF (TLA(1) .LT. 0.0) TLA(1) = 0.0
CALL ITRP (APTA, TAI, APOV, 2, NAPOV, NTA, TLA, 0)
DO 82 I=1, NAPOV
IF (GWA(I) .EQ. 0.0) GO TO 81
ISN 0239  TLRAR(I) = TLA(I) / GWA(I)
ISN 0240  GO TO 82
ISN 0241  81 TLRAR(I) = 0.
ISN 0242  82 CONTINUE
ISN 0243  CALL MULT (TLAR, GWA, NAPOV, TLA)
ISN 0244  75 IF (NAXLES(IT,3) .EQ. 0) GO TO 86
ISN 0246  TRLA(I) = TRI(I) - SIZE
ISN 0247  IF (TRLA(I) .LT. 0.0) TRLA(I) = 0.0
ISN 0248  CALL ITRP (APTR, TRI, APOV, 2, NAPOV, NTR, TRLA, 0)
ISN 0250  DO 84 I=1,NAPOV
ISN 0251  IF (GWA(I) .EQ. 0.0) GO TO 83
ISN 0253  TRLAR(I) = TRLA(I) / GWA(I)
ISN 0254  GO TO 84
ISN 0255  83 TRLAR(I) = 0.
ISN 0256  84 CONTINUE
ISN 0257  CALL MULT (TRLAR, GWA, NAPOV, TRLAT)
ISN 0258  86 IF ((NAXLES(IT,4) .EQ. 0) .OR. (IP .NE. IF)) GO TO 88
ISN 0260  STLAA(I) = STI(I) - SIZE
ISN 0261  IF (STLA(I) .LT. 0.0) STLAA(I) = 0.0
ISN 0262  CALL ITRP (APST, STI, APOV, 2, NAPOV, NST, STLAA, 0)
ISN 0264  DO 87 I=1,NAPOV
ISN 0265  IF (GWA(I) .EQ. 0.0) GO TO 85
ISN 0267  STLAR(I) = STLAA(I) / GWA(I)
ISN 0268  GO TO 87
ISN 0269  85 STLAR(I) = 0.
ISN 0270  87 CONTINUE
ISN 0271  CALL MULT (STLAR, GWA, NAPOV, STLAT)
ISN 0272  88 CONTINUE

C
C *** AXLE WEIGHT DISTRIBUTIONS BY VEHICLE CLASSIFICATION - PROPOSED
C LIMITS ***
C
C DETERMINE THE PERCENTAGE OF EACH 2-KIP INTERVAL OF WEIGHT FOR THE
C PROPOSED DISTRIBUTION
C
ISN 0273  IF (NAXLES(IT,1) .EQ. 0) GO TO 105
C
C SINGLE AXLES
C
ISN 0275  IF (SLAT(NAPOV) .LE. SAI(NSA)) GO TO 100
ISN 0277  ELI = SLAT(NAPOV)
ISN 0278  90 I = NSA + 1
ISN 0279  SAI(I) = SAI(NSA) + SIZE
ISN 0280  NSA = I
ISN 0281  IF (SAI(I) .LT. ELI) GO TO 90
ISN 0283  100 CALL ITRP (SLAT, APOV, SAI, 1, NSA, NAPOV, SAAPV, 0)
ISN 0284  CALL DIFF (SAAPV, NSA, SANOV)
ISN 0285  105 IF (NAXLES(IT,2) .EQ. 0) GO TO 125
C
C TANDEM AXLES
C
ISN 0287  IF (TLAT(NAPOV) .LE. TAI(NTA)) GO TO 120
ISN 0289  ELI = TLAT(NAPOV)
ISN 0290  110 I = NTA + 1
ISN 0291  TAI(I) = TAI(NTA) + SIZE
ISN 0292  NTA = I
ISN 0293  IF (TAI(I) .LT. ELI) GO TO 110
ISN 0295  120 CALL ITRP (TLAT, APOV, TAI, 1, NTA, NAPOV, TAAPV, 0)
CALL DIFF (TAAPV, NTA, TANOV)

125 IF (NAXLES(IT,3) .EQ. 0) GO TO 145

TRIPLE AXLES

ISN 0299
130 IF (TRLAT(NAPOV) .LE. TRI(NTR)) GO TO 140

ISN 0301
ELI = TRLAT(NAPOV)

ISN 0302
130 I = NTR + 1

ISN 0303
TRI(I) = TRI(NTR) + SIZE

ISN 0304
NTR = I

ISN 0305
IF (TRI(I) .LT. ELI) GO TO 130

ISN 0307
140 CALL ITRP (TRLAT, APOV, TRI, 1, NTR, NAPOV, TRAPV, O)

ISN 0308
CALL DIFF (TRAPV, NTR, TRNOV)

ISN 0309
145 IF ((NAXLES(IT,4) .EQ. 0) .OR. (IP .NE. IF)) GO TO 170

STEERING AXLES

ISN 0311
IF (STLAT(NAPOV) .LE. STI(NST)) GO TO 168

ISN 0313
ELI = STLAT(NAPOV)

ISN 0314
162 I = NST + 1

ISN 0315
STI(I) = STI(NST) + SIZE

ISN 0316
NST = I

ISN 0317
IF (STI(I) .LT. ELI) GO TO 162

ISN 0319
168 CALL ITRP (STLAT, APOV, STI, 1, NST, NAPOV, STAPV, O)

ISN 0320
CALL DIFF (STAPV, NST, STNOV)

ISN 0321
170 CONTINUE

ISN 0322
GO TO 150

ISN 0323
146 DO 147 I=1,NSA

ISN 0324
SAAPV(I) = APSA(I)

ISN 0325
SANOV(I) = PSA(I)

ISN 0326
PSA(I) = 0.

ISN 0327
147 CONTINUE

ISN 0328
NNA = NSA

ISN 0329
DO 148 I=1,NTA

ISN 0330
TAAPV(I) = APTA(I)

ISN 0331
TANOV(I) = PTR(I)

ISN 0332
PTA(I) = 0.

ISN 0333
148 CONTINUE

ISN 0334
MNT = NTA

ISN 0335
DO 149 I=1,NST

ISN 0336
TRAPV(I) = APTR(I)

ISN 0337
TRNOV(I) = PTR(I)

ISN 0338
PTR(I) = 0.

ISN 0339
149 CONTINUE

ISN 0340
NNR = NTR

ISN 0341
DO 151 I=1,NST

ISN 0342
STAPV(I) = APST(I)

ISN 0343
STNOV(I) = PST(I)

ISN 0344
PST(I) = 0.

ISN 0345
151 CONTINUE

ISN 0346
NNS = NST

ISN 0347
DO 152 I=1,NJ

ISN 0348
APVWG(I) = APVWE(I)

ISN 0349
152 CONTINUE

ISN 0350
NGVW = MAXO(NSA,NTA,NTR,NST,NJ)

WRITE TO DISK FOR RECALL IN EQUIVALENT LOAD APPLICATIONS ROUTINE
ISN 0351  ISN 0352
ISN 0353  ISN 0354  ISN 0355

150 CALL OUTPUT (3)
WRITE (LD) NSA, NTA, NTR, NST, NNA, NNT, NNR, NNS,
1 (PSA(I), I=1, NNA), (PTA(I), I=1, NNT), (PTR(I), I=1, NNR).
2 (PST(I), I=1, NNS), (SANDV(I), I=1, NSA).
3 (TANDV(I), I=1, NTA), (TRNOV(I), I=1, NTR).
4 (STNOV(I), I=1, NST), (SAI(I), I=1, NSA), (TAI(I), I=1, NTA).
5 (TRI(I), I=1, NTR), (STI(I), I=1, NST), VTN, APV, PAPV

160 CONTINUE

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 354, PROGRAM SIZE = 9414, SUBPROGRAM NAME = TRAFIC

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ****** 72K BYTES OF CORE NOT USED
SUBROUTINE EAl18 (STRNUM, SLBTHK, TPSI, IPVT)

This routine calculates the equivalent 18-KIP axle load applications for each vehicle using information written on disk by subroutine TRAFIC.

The inputs are:
1. STRNUM - structural number for a flexible pavement
2. SLBTHK - slab thickness for a rigid pavement
3. TPSI - terminal PSI
4. IPVT - pavement type switch
5. APPT(10,2) - average payload per vehicle, present + proposed

The output is:
EALPT(10,2) - 18-KIP EAL per truck - present and proposed REGS.

DIMENSION PSA(75), PTA(75), PTR(75), SANOV(75), TANOV(75),
1 TRNOV(75), EFSA(75), EFTR(75), SAN18(75),
2 TAN18(75), TRN18(75), DPN18(75), WPN18(75), TFN18(75),
3 SAI(75), TAI(75), TRI(75), TAM(75), TFM(75),
4 PST(75), STNOV(75), EFST(75), STN18(75), STPN18(75),
5 STI(75), STM(75)

COMMON /EAlPAY/ EAlPT(10,2), APPT(10,2), EALFCT(20), IEQTPR
COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON /CNSTS/ NAPOV, PAPQV, SIZE, AVRG
COMMON /TRTYP/ TTVP(2,10), PTTVP(10,20,2), PERCT(4),
1 NAXLES(10,4), NT(4). NTT, NATT, NTT, NEWTRK
COMMON /IO/ LI, LD, LO
COMMON /PSI/ PF, PICON, PTERM, PIOV, PTOV
DATA PSI1, PK1, PSI2, PK2 /4.2, 2.7, 4.5, 3.0/
REWIND 1
NTT = NTTT + NATT
DO 1000 IT = 1, NTT

READ FROM DISK THE INFORMATION STORED BY SUBROUTINE TRAFIC

READ (LD) NSA, NTA, NTR, NST, NNA, NNT, NNR, NNS,
1 (PSA(I),I=1,NNA), (PTA(I),I=1,NNT), (PTR(I),I=1,NNR),
2 (STNOV(I),I=1,NST), (SANOV(I),I=1,NSA),
3 (TANOV(I),I=1,NTA), (TRNOV(I),I=1,NTR),
4 (STPN18(I),I=1,NST), (SAI(I),I=1,NSA), (TAI(I),I=1,NTA),
5 (TRI(I),I=1,NTR), (STI(I),I=1,NST), VTN, APV, PAPV

APPT(IT,1) = APV
APPT(IT,2) = PAPV

COMPUTE THE 18-KIP EAL FOR EACH AXLE TYPE

TSN18 = 0.
TN18 = 0.
IF (NAXLES(IT,1).EQ.0) GO TO 50

SINGLE AXLES
```
ISN 0021 CALL MIDPNT (SAI, NSA, SAM)
ISN 0022 IF (IPVT .EQ. 2) GO TO 10
ISN 0024 GT = ALOG10((PSI1 - TPSI) / PK1)
ISN 0025 CALL FLEXEQ (SAM, NSA, 1.0, STRNUM, GT, EFSA)
ISN 0026 GO TO 20
ISN 0027 10 GT = ALOG10((PSI2 - TPSI) / PK2)
ISN 0028 CALL RIGEQ (SAM, NSA, 1.0, SLBTHK, GT, EFSA)
ISN 0029 20 CALL MULT (EFSA, PSA, NNA, SAN18)
ISN 0030 CALL MULT (EFSA, SANOV, NSA, SPN18)
ISN 0031 CALL SUM (SAN18, NNA, TSN18)
ISN 0032 CALL SUM (SPN18, NSA, TXN18)
ISN 0033 50 CONTINUE
ISN 0034 TDN18 = 0.
ISN 0035 TYN18 = 0.
ISN 0036 IF (NAXLES(IT,2) .EQ. 0) GO TO 100

C C TANDEM AXLES
C
ISN 0038 CALL MIDPNT (TAI, NTA, TAM)
ISN 0039 IF (IPVT .EQ. 2) GO TO 12
ISN 0041 GT = ALOG10((PSI1 - TPSI) / PK1)
ISN 0042 CALL FLEXEQ (TAM, NTA, 2.0, STRNUM, GT, EFTA)
ISN 0043 GO TO 22
ISN 0044 12 GT = ALOG10((PSI2 - TPSI) / PK2)
ISN 0045 CALL RIGEQ (TAM, NTA, 2.0, SLBTHK, GT, EFTA)
ISN 0046 22 CALL MULT (EFTA, PTA, NNT, TAN18)
ISN 0047 CALL MULT (EFTA, TANOV, NTA, DPN18)
ISN 0048 CALL SUM (TAN18, NNT, TSN18)
ISN 0049 CALL SUM (DPN18, NTA, TYN18)
ISN 0050 100 CONTINUE
ISN 0051 TTN18 = 0.
ISN 0052 TZN18 = 0.
ISN 0053 IF (NAXLES(IT,3) .EQ. 0) GO TO 150

C C TRIPLE AXLES
C
ISN 0055 CALL MIDPNT (TRI, NTR, TRM)
ISN 0056 IF (IPVT .EQ. 2) GO TO 14
ISN 0058 GT = ALOG10((PSI1 - TPSI) / PK1)
ISN 0059 CALL FLEXEQ (TRM, NTR, 3.0, STRNUM, GT, EFTR)
ISN 0060 GO TO 24
ISN 0061 14 GT = ALOG10((PSI2 - TPSI) / PK2)
ISN 0062 CALL RIGEQ (TRM, NTR, 3.0, SLBTHK, GT, EFTR)
ISN 0063 24 CALL MULT (EFTR, PTR, NNR, TRN18)
ISN 0064 CALL MULT (EFTR, TRNOV, NTR, TPN18)
ISN 0065 CALL SUM (TRN18, NNR, TTN18)
ISN 0066 CALL SUM (TPN18, NTR, TZN18)
ISN 0067 150 CONTINUE
ISN 0068 TSTN18 = 0.
ISN 0069 TWN18 = 0.
ISN 0070 IF (((NAXLES(IT,4) .EQ. 0) .OR. (IP .NE. IF)) GO TO 200

C C STEERING AXLES
C
ISN 0072 CALL MIDPNT (STI, NST, STM)
ISN 0073 IA = -1.5 + 2*TPSI
ISN 0074 IF(IP .EQ. IF) IA = -1*PF + 2*TPSI
ISN 0076 IA = MAX0(1, MIN0(4,IA))
```
ISN 0077    CALL STEREO (IA, EFST, NST, STM)
ISN 0078    CALL MULTI (EFST, PST, NNS, STN18)
ISN 0079    CALL MULTI (EFST, STNOV, NST, STPN18)
ISN 0080    CALL SUM (STN1B, NNS, TSTN18)
ISN 0081    CALL SUM (STPN18, NST, TWN18)
ISN 0082    200 EALPT(IT, 1) = (TSN1B*FLOAT(NAXLES(IT, 1)) + TDN18 * 
1 FLOAT(NAXLES(IT, 2)) + TTN1B*FLOAT(NAXLES(IT, 3)) + 
2 TSN18*FLOAT(NAXLES(IT, 4))) * 0.01
ISN 0083    EALPT(IT, 2) = (TXN1B*FLOAT(NAXLES(IT, 1)) + TYN18 * 
1 FLT(NAXLES(IT, 2)) + TZN1B*FLOAT(NAXLES(IT, 3)) + 
2 TVN1B*FLOAT(NAXLES(IT, 4))) * 0.01
ISN 0084    1000 CONTINUE
ISN 0085    RETURN
ISN 0086    END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS* SOURCE STATEMENTS = 85, PROGRAM SIZE = 11450, SUBPROGRAM NAME = EAL18
*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****
SUBROUTINE RIGEQ(XL, NL, ST, D, GT, EO)

DIMENSION XL(1), EQ(1)

D1 = D + 1.0
D1P = D1 ** 8.46
C = 3.28 * ALOG10(ST)
GTB18 = GT / (1.0 + 1.620E+7 / D1P)
STP = ST ** 3.52
CON = 5.908 + C - GTB18
D0 10 L=1,NL
B2 = 3.63 * (XL(L) + ST) ** 5.20
BX = 1.0 + B2 / (D1P * STP)
E = CON - 4.62 * ALOG10(XL(L) + ST) + GT / BX
10 EQ(L) = 10.0 ** (-E)
RETURN
END
SUBROUTINE FLEXEQ (XL, NL, ST, SN, GT, EO)

DIMENSION XL(1), EO(1)

SNP = (SN + 1.0) ** 5.19
GTB18 = GT / (0.40 + 1094.0 / SNP)
B1 = SNP * ST ** 3.23

CON = 6.125 + 4.33 * ALOG10(ST) - GTB18

B2 = 4.79 * ALOG10(XL(L) + ST)
BX = 0.40 + 0.081 * (XL(L) + ST) ** 3.23 / B1
E = CON - B2 + GT / BX
EO(L) = 10.0 ** (-E)
RETURN
END
SUBROUTINE STEREQ (IEQ, SEQ, NEQ, EQM)

THIS ROUTINE COMPUTES STEERING AXLE EQUIVALENCY FACTORS

THE INPUTS ARE
1. EQM - ARRAY OF INTERVAL MIDPOINTS
2. NEQ - NUMBER OF MIDPOINTS IN EQM
3. IEQ - INDICATES WHICH COLUMN OF THE EQUIVALENCY FACTOR TABLE (BY PSI) IS TO BE USED

THE OUTPUT IS
SEQ - ARRAY OF STEERING AXLE EQUIVALENCIES

DIMENSION SEQ(1), EQM(1)

COMMON /STEER/ EQFACT(15,5), PTST(4)

EQFACT(J,1) CONTAINS THE LOAD VALUES (J).
EQFACT(J,K) CONTAINS THE EQUIVALENCY FOR LOAD J, TERM PSI PTST(K-1)

DO 30 I=1,NEQ
   IF (EQM(I) .LT. EQFACT(1,1)) GO TO 25
   DO 10 J=2,15
      IF (EQFACT(J,1) .GE. EQM(I)) GO TO 20
  10 CONTINUE
   SEQ(I) = EQFACT(15,IEQ)
  20    K = J-1
   SEQ(I) = EQFACT(K,IEQ) + (EQM(I) - EQFACT(K,1)) * 
            ((EQFACT(J,IEQ)-EQFACT(K,IEQ)) / (EQFACT(J,1)-EQFACT(K,1)))
  25 CONTINUE
30 CONTINUE
RETURN
END
SUBROUTINE INTVL (AI, A2, N, N1, IS, NN, A3, NM)

THIS ROUTINE CONVERTS THE END-OF-INTERVAL KIP TABLES TO EVENLY DISTRIBUTED INTERVALS BASED ON THE VARIABLE *SIZE*.

THE INPUTS ARE
1. A1 - ARRAY OF END-OF-INTERVAL KIP VALUES
2. N -- NUMBER OF VALUES IN A1
3. IS - ARRAY IDENTIFIER WHERE,
   IS=1 - SINGLE AXLE ARRAY
   IS=2 - TANDEM AXLE ARRAY
   IS=3 - TRIPLE AXLE ARRAY
   IS=4 - GROSS WEIGHT ARRAY
   IS=5 - EMPTY WEIGHT ARRAY
   IS=6 - STEERING AXLE ARRAY
4. NN - MAXIMUM ALLOWABLE ROW LENGTH OF A1
5. NM - INDICATES WHICH TRUCK TYPE IS CURRENTLY BEING CONSIDERED

THE OUTPUTS ARE
1. N1 - THE NEW LENGTH OF THE END-OF-INTERVAL KIP TABLE
2. A2 - THE NEW END-OF-INTERVAL KIP TABLE
3. A3 - THE NUMBER OF TRUCKS (OR AXLES) WEIGHED IN EACH INTERVAL

COMMON /INTVLS/ STARTS(6)
COMMON /CNSTS/ NAPOV, PAPOV, SIZE, AVRG
DIMENSION A1(NN,1), A2(1), A3(1), ACC(75)
XMLOAD = A1(N,11)

A2(1) = SIZE

SET *S* TO THE LARGEST EVEN NUMBER GREATER THAN OR EQUAL TO THE FIRST END-OF-INTERVAL KIP VALUE

S = 0.
K = 0
I = 1

IF (S .GE. STARTS(IS)) GO TO 7

S = S + SIZE
K = K + I
GO TO 5

SET UP THE EVENLY DISTRIBUTED END-OF-INTERVAL KIP TABLE AND ZERO ALL INTERVALS AT BEGINNING OF TABLE IN WHICH NO TRUCKS/AXLES WERE WEIGHED

I = 1
J = 1

IF (A2(I) .GE. XMLOAD) GO TO 20

A2(I) = A2(J) + SIZE
GO TO 10

N1 = I
GO 30 I=1,K
A3(1) = 0.
ISN 0026 30 CONTINUE
ISN 0027 I = K+1
ISN 0028 CALL ACMLTE (A1(1,NM), N, ACC)
ISN 0029 CALL ITRP (A1(1,11), ACC, A2, I, N1, N, A3, I)
ISN 0030 RETURN
ISN 0031 END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 30, PROGRAM SIZE = 1236, SUBPROGRAM NAME = INTVL

*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

136K BYTES OF CORE NOT USED
SUBROUTINE ITRP (V1, V2, V3, LIS, NV, NL, V4, IV)

C
THE INPUTS ARE
C
1. V1 -- ARRAY OF X1 VALUES
C
2. V2 -- ARRAY OF F2(X) VALUES
C
3. V3 -- ARRAY OF X-VALUES
C
4. LIS - FIRST NON-ZERO VALUE IN V3
C
5. NV -- LAST VALUE IN V3
C
6. NL -- LAST VALUE IN VI
C
7. IV -- INTERPOLATION INDICATOR WHERE,
   IV=1 - VALUES ARE CUMULATIVE
   0 - VALUES ARE NOT CUMULATIVE
C
THE OUTPUT IS
C
V4 -- ARRAY OF INTERPOLATED RESULTS
C
DIMENSION V1(1), V2(1), V3(1), V4(1)

IF (LIS .EQ. 1) V4(1) = 0.0
J = 1
DD 50 I=LIS,NV
DD 10 K=J,NL

FIND THE SMALLEST X1 GREATER THAN OR EQUAL TO X

IF (V1(K) .GE. V3(I)) GO TO 20
10 CONTINUE
K = NL+1
V2SV = V2(K)
V1SV = V1(K)
V2(K) = V2(NL)
V1(K) = V3(I)
L = NL
GO TO 25

SET X1 AND F1 VALUES APPROPRIATELY, THEN INTERPOLATE

20 J = K
L = K-1
IF (L .EQ. 0) GO TO 30
25 F1 = V2(L)
X1 = V1(L)
GO TO 40

30 X1 = 0.0
27 F1 = V4(1)
40 V4(I) = F1 + (V3(I)-X1) * ((V2(K)-F1) / (V1(K)-X1))
IF (K .LE. NL) GO TO 50
V2(K) = V2SV
V1(K) = V1SV
GO TO 50

IF VALUES ARE CUMULATIVE, SUBTRACT TO GET CORRECT VALUES PER
C INTERVAL

ISN 0034 IF (IV .EQ. 0) GO TO 999
ISN 0036 J = NV
ISN 0037 DO 60 I=2,NV
ISN 0038 V4(J) = V4(J) - V4(J-1)
ISN 0039 J = J-1
ISN 0040 60 CONTINUE
ISN 0041 999 RETURN
ISN 0042 END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 41. PROGRAM SIZE = 1132. SUBPROGRAM NAME = ITRP

*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

12Bk BYTES OF CORE NOT USED
SUBROUTINE PCTAGE (Pl, NP, P2)

C THIS ROUTINE SUMS THE *NP* VALUES IN ARRAY Pl AND DETERMINES, FOR
C EACH VALUE IN P1, ITS PERCENTAGE OF THE TOTAL

DIMENSION P1(1), P2(1)
TOT = 0.0
DO 10 I=1,NP
   TOT = TOT + P1(I)
10 CONTINUE
DO 20 I=1,NP
   P2(I) = P1(I) / TOT * 100.0
20 CONTINUE
RETURN
END
SUBROUTINE COUNT (CA, ICA)

C
C THIS ROUTINE DETERMINES WHICH OF THE *ICA* VALUES IN ARRAY CA IS
C THE LAST NON-ZERO VALUE

C
DIMENSION CA(1)
DO 10 I=1,ICA
IF (CA(I) .GT. 0.0) J = I
10 CONTINUE
ICA = J
RETURN
END

***** END OF COMPILATION *****
136K BYTES OF CORE NOT USED
SUBROUTINE ACMLE (AIN, NA, AOUT)
C
C THIS ROUTINE CONVERTS ARRAY AIN TO A CUMULATIVE ARRAY
C
DIMENSION AIN(1), AOUT(1)
AOUT(1) = AIN(1)
NB = NA - 1
DO 10 I = 1, NB
J = I + 1
AOUT(J) = AOUT(I) + AIN(J)
10 ,CONTINUE
RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(1)

*STATISTICS* SOURCE STATEMENTS = 10, PROGRAM SIZE = 410, SUBPROGRAM NAME =ACMLE

****** END OF COMPILATION ******

136K BYTES OF CORE NOT USED
SUBROUTINE MIDPNT (X1, NM, X2)

C
C THIS ROUTINE DETERMINES THE MIDPOINT OF EACH INTERVAL IN ARRAY X1.
C WHERE EACH VALUE IN X1 IS AN ENDP-INTERVAL KIP VALUE
C
COMMON /CNSTSI NAPOV, PAPOV, SIZE, AVRG

DIMENSION X1(1), X2(1)
I = 0
J = 1
ELI = X1(NM)
X2(1) = X1(1) - (SIZE/2.)
10 I = I+1
J = J+1
X2(J) = X2(I) + SIZE
IF (X1(J) .LT. ELI) GO TO 10
RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 14, PROGRAM SIZE = 448, SUBPROGRAM NAME = MIDPNT

*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

136K BYTES OF CORE NOT USED
SUBROUTINE MULT(YA, YB, NU, YC)

C
C THIS ROUTINE MULTIPLIES TWO VECTORS SUCH THAT YC(I) = YA(I)*YB(I)
C
DIMENSION YA(I), YB(I), YC(I)

DO 10 I=1, NU

10 YC(I) = YA(I) * YB(I)

RETURN

END
REQUESTED OPTIONS: NODECK,NOLIST,OPT(O),NODUMP

OPTIONS IN EFFECT: NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

ISN 0002       SUBROUTINE AVRGE (AV, NV, AN, AVG)
               C
               C    THIS ROUTINE COMPUTES THE AVERAGE OF THE VALUES IN ARRAY AV
               C
               C
ISN 0003       DIMENSION AV(1)
ISN 0004       AVG = 0.0
ISN 0005       DO 10 I=1,NV
ISN 0006       AVG = AV(I) + AVG
ISN 0007       10 CONTINUE
ISN 0008       AVG = AVG / AN
ISN 0009       RETURN
ISN 0010       END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS*    SOURCE STATEMENTS = 9, PROGRAM SIZE = 350, SUBPROGRAM NAME = AVRGE

*STATISTICS*    NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

136K BYTES OF CORE NOT USED
SUBROUTINE DIFF (D1, NO, D2)
  
  THIS ROUTINE TAKES SUCCESSIVE DIFFERENCES OF THE VALUES IN
  ARRAY D1

  DIMENSION D1(1), D2(1)
  D2(I) = D1(I)
  DO 10 I=2, NO
  J = I-1
  D2(I) = D1(I) - D1(J)
  10 CONTINUE
  RETURN
END
SUBROUTINE SUM (NS, SI)

DIMENSION SI(NS)

S2 = 0.0

DO 10 I = 1, NS

S2 = S2 + SI(I)

10 CONTINUE

RETURN
END

STATISTICS

SOURCE STATEMENTS = 8, PROGRAM SIZE = 322, SUBPROGRAM NAME = SUM

NO DIAGNOSTICS GENERATED

136K BYTES OF CORE NOT USED
SUBROUTINE ZERO (A,N)

DIMENSION A(N)

DO 10 I = 1, N
10 A(I) = 0.

RETURN
END
SUBROUTINE INHRP (X, F, N, XR, FR)

PARABOLIC INTERPOLATION (LINEAR IF ONLY TWO POINTS GIVEN) FOR
FR(XR) GIVEN N VALUES FOR F(X).

INPUT VALUES OF X MUST BE MONOTONIC INCREASING OR DECREASING.
EXTRAPOLATION, WHEN NEEDED, IS PARABOLIC. USE WITH CARE.

DIMENSION X(N), F(N)

IF (N .GT. 2) GO TO 10
FI = F(1) + (XR-X(1))*(F(2)-F(1))/(X(2)-X(1))
GO TO 99
10 CONTINUE
IB = 1
IF (N .EQ. 3) GO TO 30
R = +1.
IF (X(2) .LT. X(1)) R = -1.
DO 15 I=2,N
IX = I
IF (((X(I) - XR)*R .GT. 0.)) GO TO 20
15 CONTINUE
20 IF (2.*XR - X(IX-1) X(IX)*R .LT. 0.) IX = IX - 1
IB = IX - 1
IF (IB .LT. 1) IB = 1
IF (IB .GT. (N-2)) IB = N-2
30 FI = PARAB (XR, X(IB), F(IB))
99 FR = FI
RETURN
END
FUNCTION PARAB (XR, X, F)

PART OF INTERPOLATION PACKAGE.

DIMENSION X(3), F(3)

XL = X(2) - X(1)
XU = X(3) - X(2)
D = XL*UX*(X(3) - X(1))
P1 = XL*(F(3) - F(2))
P2 = UX*(F(2) - F(1))
S1 = P1*XL + P2*UX
S2 = P1 - P2
T = XR - X(2)
PARAB = F(2) + (S1 + S2*T)*T/D
RETURN
END
SUBROUTINE TEXAS (TOTEAL)

REAL XMNW18

COMMON /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
COMMON/HOR/A(10), B(10), C(10), DT(10), DF(10), S(10), T(10), TR(5), PI(5)
COMMON/EXTRA/ TPE, PFO, MNOVTK, MXDVTK, NIS
C(2) = C(2) + 50.
W = TR(NPT)
CALL PSIT(P, PF, W, XKTO)
IF(PT(NPT).LE.PF) GO TO 40
CALL STAOPT(NPT, TOTEAL)
GO TO 41
40 CONTINUE
CALL DTROPT(NPT, TOTEAL)
41 CONTINUE
RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 17, PROGRAM SIZE = 396, SUBPROGRAM NAME = TEXAS

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

136K BYTES OF CORE NOT USED
SUBROUTINE STA0PT(NPT,TOTAL)

COMMON/HOR/ A(10), B(10), C(10), D(10), DF(10), S(10), T(10), TR(5), PI(5)

* PT(5), AC(5), AA, SCT(5), XMNW18(10), XKTO

COMMON /EXTRA/ TPE, PFO, MN0VTK, MX0VTK, NIS

GO TO (10, 20, 30, 40, 50), NPT

10 CALL W18PRY(NPT, TOTAL)

GO TO 60

20 CALL W18PRY(NPT, TOTAL)

GO TO 60

30 CALL W18PRV(NPT, TOTAL)

GO TO 60

40 CALL W18PRY(NPT, TOTAL)

GO TO 60

50 CALL W18PRY(NPT, TOTAL)

60 CONTINUE

RETURN

END
**REQUESTED OPTIONS:** NODECK, NOLIST, OPT(0), NODUMP

**OPTIONS IN EFFECT:**
- NAME(MAIN)
- NOOPTIMIZE
- LINECOUNT(60)
- SIZE(MAX)
- AUTODBL(NONE)
- SOURCE EBCDIC
- NOLIST
- NODECK
- OBJECT
- NOMAP
- NOFORMAT
- GOSTMT
- NOXREF
- ALC
- NOANSF
- NOTERM
- IBM
- FLAG(I)

**ISN 0002**
SUBROUTINE W18PRTY(NPT, TOTALE)

**ISN 0003**
COMMON/HDR/A(10), B(10), C(10), DT(10), DF(10), S(10), T(10), TR(5), PI(5)
*, PT(5), AC(5), AA, SCT(5), XMNW18(10), XKTO

**ISN 0004**
COMMON /EXTRA/ TPE, PF0, MNVTK, MXVTK, NIS

**ISN 0005**
XN = 4.51

**ISN 0006**
CALL PSIT(P, PF, W, XKTO)

**ISN 0007**
IF(PF.LE.1.4) PF = 1.45

**ISN 0009**
TOTALE = (-XKTN/LOG((PI(NPT)-PT(NPT))/(PI(NPT)-PF)))**1./XN

**ISN 0010**
RETURN

**ISN 0011**
END

**OPTIONS IN EFFECT**
- NAME(MAIN)
- NOOPTIMIZE
- LINECOUNT(60)
- SIZE(MAX)
- AUTODBL(NONE)

**OPTIONS IN EFFECT**
- SOURCE EBCDIC
- NOLIST
- NODECK
- OBJECT
- NOMAP
- NOFORMAT
- GOSTMT
- NOXREF
- ALC
- NOANSF
- NOTERM
- IBM
- FLAG(I)

**STATISTICS**
- SOURCE STATEMENTS = 10
- PROGRAM SIZE = 492
- SUBPROGRAM NAME = W18PRTY

**STATISTICS**
- NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

136K BYTES OF CORE NOT USED
SUBROUTINE DTROPT (NPT, TOTEAL)

COMMON/HOR/A(10), B(10), C(10), DT(10), DF(10), S(10), T(10), TR(5), PI(5)
* , PT(5), AC(5), AA, SCT(5), XMNW18(10), XKT0
COMMON /EXTRA/ TPE, PFO, MNOVTK, MXOVTK, NIS

K = 0
CALL ALGRA(NPT, WAREA, WSEVER)
XMNW18(1) = AA

K = K + 1
CALL LOCRA(NPT, WAREA, WSEVER)
XMNW18(2) = AA

CALL TRCRA(NPT, WAREA, WSEVER)
XMNW18(3) = AA

CALL RUTA(NPT, WAREA, WSEVER)
XMNW18(4) = AA

CALL FLSHA(NPT, WAREA, WSEVER)
XMNW18(5) = AA

CALL CORA(NPT, WAREA, WSEVER)
XMNW18(6) = AA

CALL RAVA(NPT, WAREA, WSEVER)
XMNW18(7) = AA

CALL FAPM(NPT, WAREA, WSEVER)
XMNW18(8) = AA

W1ST = AMIN1(XMNW18(1), XMNW18(2), XMNW18(3), XMNW18(4), XMNW18(5), XMNW18(6), XMNW18(7), XMNW18(8))

TOTEAL = W1ST

RETURN
END
SUBROUTINE ALGRA(NPT, WAREA, WSEVER)
DOUBLE PRECISION PWR1, PWR2
COMMON/HOR/
A (10), B(10), C(10), D(10), E(10), F(10), G(10), H(10), I(10), J(10), K(10), L(10)
COMMON/MIN/
A(10), B(10), C(10), D(10), E(10), F(10), G(10), H(10), I(10), J(10), K(10), L(10)
COMMON/EXTRA/
TPE, PFO, MNOVTK, MXOVTK, NIS
COMMON/MIN/
A(10), B(10), C(10), D(10), E(10), F(10), G(10), H(10), I(10), J(10), K(10), L(10)
COMMON/EXTRA/
TPE, PFO, MNOVTK, MXOVTK, NIS

GO TO (10, 20, 30, 40, 50), NPT
10 CONTINUE
AO = 10.0**6.81
A1 = 10.0**1.233
A2 = 10.0**6.57
SF = 10.0**(-1.09)*T(1)**(-5.84)*S(1)**17.3*S(3)**(-9.82)*TR(1)**6.7
*B*TR(2)**(-9.07)

GO TO 60
20 CONTINUE
AO = 10.0**7.01
A1 = 10.0**26.46*DF(2)**.24*C(1)**(-1.17)*S(1)**1.25*C(2)**(-15.41)*
*T(1)**1.24
A2 = 10.0**6.886
SF = 10.0**(-1.07)*DF(2)**1.05*C(1)**(-4.64)*S(3)**1.97*T(1)**5.22

GO TO 60
30 CONTINUE
AO = 10.0**7.47*C(2)**(-.00015)*DF(1)**(-.00017)*C(4)**(-.00017)*S(1)**(1.00013)*TR(1)**(-.00012)
A1 = 10.0**1.491
A2 = 10.0**7.43
SF = 10.0**(-.247)

GO TO 60
40 CONTINUE
AO = 10.0**6.877
A1 = 10.0**.487
A2 = 10.0**6.74
SF = 10.0**(-.726)

GO TO 60
50 CONTINUE
AO = 10.0**7.029
A1 = 10.0**.819
A2 = 10.0**5.877
SF = 10.0**3.524

GO TO 60
60 CONTINUE
CALL MINIMU(NPT, WAREA, WSEVER)
RETURN
END
SUBROUTINE LOCRA(NPT, WAREA, WSEVER)
DOUBLE PRECISION PWR1, PWR2
COMMON/HOR/C(10), B(10), DT(10), DF(10), S(10), T(10), TR(5), PI(5)
* PT(5), AC(5), AA, SCT(5), XMW18(10), XKTO
COMMON/EXTRA/ TPE, PFO, MNODVT, MXODVT, NIS
COMMON/MIN/SF, AO, A1, A2
GO TO (10, 20, 30, 40, 50), NPT

10 CONTINUE
AO = 10.0**2.597
A1 = 10.0**1.089
A2 = 10.0**2.501
SF = 10.0**(-44.85)*S(1)**14.61*DT(1)**(-12.75)*C(2)**8.46*C(3)**1.71
**S(2)**24.62*S(3)**(-22.61)
GO TO 60

15 CONTINUE
AO = 10.0**1.845
A1 = 10.0**20.68*C(2)**(-11.7)*T(1)**.54*S(1)**.83*S(3)**(-.27)*TR(2)
**(-.17)
A2 = 10.0**1.741
SF = 10.0**2.26*TR(2)**(-1.35)*S(3)**(-1.29)*T(1)**4.49
GO TO 60

20 CONTINUE
AO = 10.0**3.05*T(1)**(-.00055)*C(5)**-.0026*S(3)**(-.0049)*S(1)**( +.0013)
A1 = 10.0**(-.36)*S(2)**.33*C(2)**.39*DF(3)**(-.076)*C(5)**(-.49)*S( +1)**1.28
A2 = 10.0**3.0
SF = 10.0**(-11.07)*T(1)**2.11*C(5)**(-5.1)*C(1)**(-6.78)*S(3)**7.1
*+B*S(1)**14.39
GO TO 60

25 CONTINUE
AO = 10.0**2.161
A1 = 10.0**1.413
A2 = 10.0**4.21*C(3)**(-.17)*DF(2)**.16*S(1)**(-.86)*TR(1)**.18*C(2)
**(-1.23)
SF = 10.0**(-15.37)*S(2)**(-3.79)*TR(1)**(-.7)*C(2)**7.*C(3)**1.88*
*S(1)**16.74*T(1)**(-2.0)
GO TO 60

30 CONTINUE
AO = 10.0**2.06
A1 = 10.0**.879
A2 = 10.0**1.602
SF = 10.0**(-1.06)
GO TO 60

40 CONTINUE
CALL MINIMU(NPT, WAREA, WSEVER)
RETURN
END
*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

124K BYTES OF CORE NOT USED
SUBROUTINE TRCRA(NPT, WAREA, WSEVER)
DOUBLE PRECISION PWR1, PWR2,
COMMON/HOR/A(10), B(10), C(10), DF(10), S(10), T(10), TR(5), PI(5)
* PT(5), AC(5), AA, SCT(5), XMNW1B(10), XKTO
COMMON /EXTRA/ TPE, PFO, MNOVTK, MXOVTK, NIS
COMMON/MIN/SF, AO, A1, A2
W = TR(1)
GO TO (10, 20, 30, 40, 50), NPT
10 CONTINUE
AD = 10.0**2.496
A1 = 10.0**1.32
A2 = 10.0**(-14.64)*DT(1)**5.74+DF(3)**2.34*S(4)**17.44*C(5)**(-.25)*
*T(1)**(-2.36)
SF = 10.0**(-.754)
GO TO 60
20 CONTINUE
AD = 10.0**2.126
A1 = 10.0**.473*C(3)**(-.26)*C(5)**(-1.21)*TR(2)**(-.51)*DF(5)**
*(-.26)*T(1)**(-2.12)
A2 = 10.0**(-1.7)*T(1)**(-.7)*C(5)**1.54*C(3)**.83*DT(1)**(-4.03)
SF = 10.0**11.79*C(5)**(-6.23)*TR(2)**(-1.41)*C(3)**(-2.69)*T(1)**
*7.2*DT(1)**12.76
GO TO 60
30 CONTINUE
AD = 10.0**2.843
A1 = 10.0**1.464
A2 = 10.0**2.812
SF = 10.0**(-1.965)
GO TO 60
40 CONTINUE
AD = 10.0**2.581
A1 = 10.0**1.431
A2 = 10.0**2.533
SF = 10.0**(-.936)
GO TO 60
50 CONTINUE
AD = 10.0**.88
A1 = 10.0**.728
A2 = 10.0**.887
SF = 10.0**(-1.294)
GO TO 60
60 CONTINUE
CALL MINIMU(NPT, WAREA, WSEVER)
RETURN
END
SUBROUTINE RUTA(NPT, WAREA, WSEVER)

DOUBLE PRECISION PWR1, PWR2

COMMON/HOR/A (10), B(10), C(10), D(10), F(10), S(10), T(10), TR(5), PI(5)
*PT(5), AC(5), AA, SC(5), XMNW15(10), XKTD

COMMON /EXTRA/ TPE, PFO, MNKOVTK, MXOVTK, N15

COMMON/MIN/SF, AO, A1, A2

W = TR(1)

GO TO (10, 20, 30, 40, 50, NPT)

10 CONTINUE

AO = 10.0**.6562
A1 = 10.0**.98*5(3)**(98)*C(1)**.47*DF(1)**.54+W**(-.31)
A2 = 10.0**.6294

SF = 10.0**.42*DF(1)**.345+W**(-1.91)*S(3)**(-5.54)*C(1)**.28

GO TO 10

11 CONTINUE

AO = 10.0**.97*DF(2)**.0054*S(3)**.0033+C(3)**(-.0029)*TR(2)**.0098
**T(1)***.022*TR(1)**(-.018)
A1 = 10.0**.36*S(1)**(-.88)*DF(3)**.36*C(4)**.23*TR(1)**.38*TR(2)**( *-.45)
A2 = 10.0**(-.75)*DF(3)**(-1.34)*C(4)**1.81*S(1)**7.11*TR(1)**(1.58
*)C(1)**-1.23*C(5)**(-8.22)

SF = 10.0**(-1.13)*DF(3)**2.44*C(4)**9*S(1)**(-5.25)*TR(2)**(-2.32)
**TR(1)***1.84

GO TO 60

12 CONTINUE

AO = 10.0**7.05*C(3)**.0006*T(1)**.0035+C(4)**(-.0067)*TR(1)**(-.0041)
A1 = 10.0**1.009
A2 = 10.0**.84*C(5)**(-.69)*S(3)**(-.85)*C(5)**.55*S(2)**1.82*S(1)**(-1.75)

SF = 10.0**1.58

GO TO 60

13 CONTINUE

AO = 10.0**7.17*C(1)**(-.0053)*TR(1)**(-.0041)*C(5)**.011*S(3)**.017
+S(2)**(-.03)
A1 = 10.0**(-1.86)*C(2)**.84*C(5)**(-.69)*S(3)**.4*TR(1)**.25*T(1)**( *-.38*TR(2)**(-.27)
A2 = 10.0**7.014

SF = 10.0**(-12.95)*C(2)**3.55*C(5)**(-.35)*S(3)**.185*TR(1)**.73*
+TR(2)**(-2.15)*T(1)**.327

GO TO 60

14 CONTINUE

AO = 10.0**6.951
A1 = 10.0**.651
A2 = 10.0**5.619
SF = 10.0**1.852

GO TO 60

15 CONTINUE

CALL MINIMU(NPT, WAREA, WSEVER)
RETURN
END
LEVEL 2.3.0 (JUNE 78) 05/360 FORTRAN H EXTENDED DATE 82.147/20.17.25 PAGE 2

*STATISTICS* SOURCE STATEMENTS = 40, PROGRAM SIZE = 4356, SUBPROGRAM NAME = RUTA
*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

120K BYTES OF CORE NOT USED
**OPTIONS IN EFFECT:**

- NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
- SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(1)

**Statistics:**

- Source Statements = 39
- Program Size = 3068
- Subprogram Name = FLSHA

**Options in Effect:**

- NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
- SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(1)

**Statistics:**

- NO DIAGNOSTICS GENERATED
LEVEL 2.3.0 (JUNE 78)  

OS/360 FORTRAN H EXTENDED  

DATE 82.147/20.17.29  

PAGE 2  

****** END OF COMPILATION ******  

128K BYTES OF CORE NOT USED
SUBROUTINE CORA(NPT,WAREA,WSEVER)
DOUBLE PRECISION PWR1,PWR2
COMMON/HOR/A(10),B(10),C(10),DT(10),DF(10),S(10),T(10),TR(5),PI(5)
*PT(5),AC(5),AA,SCT(5),XMNW18(10),XKTO
COMMON/MIN/SF,A0,A1,A2
W = TR(I)
GO TO (10,20,30,40,50),NPT
10 CONTINUE
AO=0.
A1=10.0**(-1.77)*C(1)**1.18*C(3)**.51*S(1)**.67*T(1)**.91*TR(1)**(-.86)*W**.9
A2=0.
SF=10.0**(-5.96)*C(1)**2.37*C(3)**1.03*S(1)**1.37*T(1)**1.91*TR(1)**(-1.74)*TR(2)**1.83
GO TO 60
20 CONTINUE
AO=0.
A1=10.0**(-.0434)
A2=0.
SF=10.0**(-2.22)
GO TO 60
30 CONTINUE
AO=10.0**6.225
A1=10.0**.977
A2=10.0**6.178
SF=10.0**(-1.908)
GO TO 60
40 CONTINUE
AO=10.0**.143
A1=10.0**(-4.95)*C(3)**(-.063)*C(5)**(-.22)*S(4)**4.58
A2 = 10.0**.139
C
************ CRITIC SEVERITY ***** IS TOO BIG ************
C
SF = .899
GO TO 60
50 CONTINUE
AO=0.
A1=0.
A2=0.
SF=0.
GO TO 60
60 CONTINUE
CALL MINIMU(NPT,WAREA,WSEVER)
RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS* SOURCE STATMENTS = 39, PROGRAM SIZE = 1790, SUBPROGRAM NAME = CORA
*STATISTICS* NO DIAGNOSTICS GENERATED
***** END OF COMPILATION *****

132K BYTES OF CORE NOT USED
SUBROUTINE PATA(NPT, WAREA, WSEVER)
DOUBLE PRECISION PWR1, PWR2
COMMON/HOR/A(10), B(10), C(10), DT(10), DF(10), S(10), T(10), TR(5), PI(5)
COMMON/MIN/SF, AO, A1, A2
W = TR(I)
GO TO (10, 20, 30, 40, 50).NPT
10 CONTINUE
AO = 10.0**6.35
A1 = 10.0**1.077
A2 = 10.0**6.165
SF = 10.0**(-1.275)
GO TO 60
11 CONTINUE
20 CONTINUE
AO = 10.0**6.779
A1 = 10.0**6.165
A2 = 10.0**6.666
SF = 10.0**(-1.688)
GO TO 60
12 CONTINUE
30 CONTINUE
AO = 10.0**6.92*DF(I)**0.0014*DF(3)**(-0.002)*C(5)**0.0065*C(2)**(-0.0015)*S(4)**(-0.0017)
A1 = 10.0**1.602
A2 = 10.0**6.864
SF = 10.0**(-1.309)
GO TO 60
13 CONTINUE
40 CONTINUE
AO = 10.0**6.878
A1 = 10.0**1.172
A2 = 10.0**6.781
SF = 10.0**(-1.471)
GO TO 60
14 CONTINUE
50 CONTINUE
AO = 10.0**6.651
A1 = 10.0**0.925
A2 = 10.0**5.327
SF = 10.0**(-0.891)
GO TO 60
15 CONTINUE
60 CONTINUE
CALL MINIMU(NPT, WAREA, WSEVER)
RETURN
END
SUBROUTINE RAVA(NPT, WAREA, WSEVER)

DOUBLE PRECISION PWR1, PWR2

COMMON/HOR/A(10), B(10), C(10), DT(10), DF(10), S(10), T(10), TR(5), PI(5)

* PT(5), AC(5), AA, SCT(5), XMNW1(10), XKTO

COMMON/MIN/SF, AO, A1, A2

W = TR(1)

10 CONTINUE

AO = 10.0**6.96*DF(1)**.00015*T(1)**.000036

C(5)**.000062

AI = 10.0**9.21*C(1)**(-2.99)*DF(1)**.8*DF(3)**(-.88)*T(1)**(-1.17)*

W**(-.33)*C(3)**(-.89)

A2 = 10.0**6.958

SF = 10.0**2.397

GO TO 60

20 CONTINUE

AO = 10.0**5.2*C(3)**.00076*C(4)**(-.0011)*S(3)**.0012*S(4)**(-.01)*

DF(3)**.0004*T(1)**.0017

A1 = 10.0**.968

A2 = 10.0**3.74*DT(1)**3.73*C(5)**(-1.22)*S(3)**1.93*TR(2)**(-1.41)

**TR(1)** + 1.11

SF = 10.0**1.572

GO TO 60

30 CONTINUE

AO = 10.0**4.86*C(3)**(-.00006)*C(5)**(-.00031)*TR(1)**(-.000063)*

DF(1)**.00016*C(2)**.00052

A1 = 10.0**(-.35)*DF(3)**(-.57)*DT(1)**(2.42)*C(3)**.56*C(5)**.4*

C(4)**(-.39)*TR(2)**(-.064)

A2 = 10.0**1.05*C(2)**.67*C(1)**.78*DF(3)**.23*TR(2)**(-.24)*

S(3)**(-1.46)*S(2)**2.44

SF = 10.0**.00921

GO TO 60

40 CONTINUE

AO = 10.0**5.246

A1 = 10.0**.51

A2 = 10.0**3.43

SF = 10.0**.45

GO TO 60

50 CONTINUE

AO = 10.0**4.576

A1 = 10.0**.51

A2 = 10.0**3.43

SF = 10.0**.45

GO TO 60

60 CONTINUE

CALL MINIMU(NPT, WAREA, WSEVER)

RETURN

END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODULE OBJECT NODMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(1)

*STATISTICS* SOURCE STATEMENTS = 39, PROGRAM SIZE = 3336, SUBPROGRAM NAME = RAVA
*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

128K BYTES OF CORE NOT USED
REQUESTED OPTIONS: NODECK,NOLIST,OPT(O),NODUMP

OPTIONS IN EFFECT: NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTOOBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

ISN 0002 SUBROUTINE FAPM(NPT,TWAREA,WSEVER)
ISN 0003 DOUBLE PRECISION PWR1,PWR2
ISN 0004 COMMON/HOR/A(10),B(10),C(10),DT(10),DF(10),S(10),T(10),TR(5),PI(5)
ISN 0005 COMMON/MIN/SF,AD,A1,A2
ISN 0006 W = TR(1)
ISN 0007 GO TO (10,20,30,40,50),NPT
ISN 0008 10 CONTINUE
ISN 0009   A1=10.0**(-1.37)*C(3)**.59*S(1)**2.13*C(1)**2.03*TR(1)**(-.59)*
           +S(2)**(-1.35)*TR(2)**-8.
ISN 0010   A2=0.
ISN 0011   SF=10.0**(-1.275)
ISN 0012   GO TO 60
ISN 0013   20 CONTINUE
ISN 0014   A1=10.0**.104
ISN 0015   A2=0.
ISN 0016   SF=10.0**(-1.688)
ISN 0017   GO TO 60
ISN 0018   30 CONTINUE
ISN 0019   A1=10.0**1.684
ISN 0020   A2=10.0**.24
ISN 0021   SF=10.0**(-1.857)
ISN 0022   GO TO 60
ISN 0023   40 CONTINUE
ISN 0024   A1=10.0**1.4945
ISN 0025   A2=10.0**.114
ISN 0026   SF=10.0**(-1.595)
ISN 0027   GO TO 60
ISN 0028   50 CONTINUE
ISN 0029   A1=10.0**.601
ISN 0030   A2=0.
ISN 0031   SF=10.0**(-.891)
ISN 0032   60 CONTINUE
ISN 0033   AD = 9999999.
ISN 0034   CALL MINIMU(NPT,TWAREA,WSEVER)
ISN 0035   RETURN
ISN 0036   END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTOOBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 35, PROGRAM SIZE = 1314, SUBPROGRAM NAME = FAPM

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

136K BYTES OF CORE NOT USED
REQUESTED OPTIONS: NODECK, NOLIST, OPT(O), NODUMP

OPTIONS IN EFFECT:
NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

SUBROUTINE MINIMU(NPT, WAREA, WSEVER)
COMMON/HOR/A(10), B(10), C(10), D(10), S(10), T(10), TR(5), PI(5)
* PT(5), AC(5), AA, SCT(5), XMW18(10), XKT0
COMMON/EXTRA/ TP, PFG, MNVTK, MXVTK, NIS
COMMON/MIN/SF, AQ, A1, A2
XN = 1.
SF = 1.009*SCT(NPT)
WAREA = (-AQ/ALOG(AC(NPT)))**1./XN
XX = -1.*ALOG(SCT(NPT)/SF)
IF(XX.LE.A1) GO TO 888
WSEVER = (-A2/A1+ALOG(SCT(NPT)/SF))**1./XN
GO TO 333
888 WSEVER = (-A2/(-A1))**1./XN
333 IF(WSEVER.GE.9999999.) WSEVER = 9999999.
IF(WSEVER.LE.TR(NPT)) WAREA = TR(NPT)*1000.
AA = AMIN1(WAREA, WSEVER)
RETURN
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 29, PROGRAM SIZE = 1018, SUBPROGRAM NAME =MINIMU

*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****

136K BYTES OF CORE NOT USED
SUBROUTINE PSIT(P,PF,W,XKT)
COMM /EXPVT/ NPT, THICK(4), MTYPE(4), NLAY, IP, IF, IR, IC
DOUBLE PRECISION PWR
COMMON/HOR/A(10),B(10),C(10),DT(10),DF(10),S(10), T(10),TR(5),PI(5)
*PT(5),AC(5),AA,SCT(5),XMN19(10),XKTO
COMMON /EXTRA/ TPE,PFO,MNOVTK,MXOVTK,NIS
W = TR(1) = 0.1
P=PI(NPT)
GO TO (10,20,30,40,50),NPT
10 CONTINUE
XKT=89.15+.00367*T(1)**1.49*O.l+P/PI(NPT)
GO TO 60
20 CONTINUE
XKT=92.83+.15*.0120*S(1)\**.086)*C(6)**.3*C(3)**.12*C(4)**(-.21)
**C(2)**(-.22)*DF(1)**.25*C(1)**(-.13)*C(5)**.31
GO TO 60
30 CONTINUE
XKT=91.51+.6837*DF(1)**.23*C(2)**.38*C(4)**(-.18)*TR(NPT)**(-.15)*
T(1)**.45
GO TO 60
40 CONTINUE
XKT=91.84+5.052*DF(2)**(-.32)*DF(1)**.14*C(2)**.89*T(1)**.25*
S(1)**(-.74)
GO TO 60
50 CONTINUE
XKT=-.0737+231.63*T(1)**.26*S(4)**.3*TR(NPT)**(-.47)
GO TO 60
60 CONTINUE
PFO=PF
RETURN
END

OPTIONS IN EFFECT: NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 31. PROGRAM SIZE = 3838. SUBPROGRAM NAME = PSIT
*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******
120K BYTES OF CORE NOT USED
SUBROUTINE RUSIAN (DPTEMP,DMDRU,NLAY,NPT,NRU,NLH)

E represents the elasticity moduli for the representative sections

IMPLICIT REAL*8 (A-H,O-Z)
REAL*8 MTERM, NTERM
DIMENSION X(5), EX(5), DP(5), R(6), E(6), WHAT(5), DPTEMP(5)

IF(NPT .NE. 3.0R.NRU .NE. 1) GO TO 112
E(1) = 65000.0
E(2) = 20000.0
E(3) = 12000.0
E(4) = 5000.0

IF(NPT .NE. 3.0R.NRU .NE. 2) GO TO 120
E(1) = 65000.0
E(2) = 20000.0
E(3) = 12000.0
E(4) = 5100.0

IF(NPT .NE. 1.0R.NRU .NE. 1.0R.NLH .NE. 1) GO TO 30
E(1) = 300000.0
E(2) = 80000.0
E(3) = 15000.0
E(4) = 6000.0

IF(NPT .NE. 1.0R.NRU .NE. 2.0R.NLH .NE. 2) GO TO 40
E(1) = 305000.0
E(2) = 100000.0
E(3) = 22000.0
E(4) = 16400.0
E(5) = 6000.0

IF(NPT .NE. 4.0R.NRU .NE. 1.0R.NLH .NE. 1) GO TO 70
E(1) = 325000.0
E(2) = 130000.0
E(3) = 90000.0
E(4) = 18500.0
E(5) = 6000.0

IF(NPT .NE. 4.0R.NRU .NE. 1.0R.NLH .NE. 2) GO TO 80
E(1) = 325000.0
E(2) = 130000.0
E(3) = 90000.0
E(4) = 18500.0
E(5) = 6000.0
IF(NPT.NE.4.0 .OR. NRU.NE.2.0 .OR. NLH.NE.1.) GO TO 90

E(1) = 325000.
E(2) = 130000.0
E(3) = 900000.0
E(4) = 380000.0
E(5) = 190000.0
E(6) = 60000.

IF(NPT.NE.4.0 .OR. NRU.NE.2.0 .OR. NLH.NE.2.) GO TO 100

E(1) = 325000.
E(2) = 150000.0
E(3) = 115000.0
E(4) = 420000.0
E(5) = 220000.0
E(6) = 6000.0

CONTINUE

DO 915 K = 1, 5
RTEMP = 10.**2. + (12*(K-1))**2.
R(K) = DSORT(RTEMP)

DO 5 K = 1, NLAY
X(K) = E(K)/1000000.
IF( DP(NOL-1) .LE. 10.0.) LEO = 1
NC = NOL
IF( LEQ .EQ. 1 ) NC = NOL - 1
IF( LEQ .EQ. 1 ) X(NOL-1) = X(NOL)

BTERM = 10.0 ** (-0.05071) * DP(1) ** 0.10148
TERM = 10.0 ** (-0.50233) * DP(1) ** 0.087879
CTERM = 10.0 ** (-0.060039) * DP(1) ** 0.0095198
MTERM = 0.704 - 0.026 * DP(1)
HTERM = 10.0 ** 1.8631 * DP(1) ** (-0.0038499)

TMB = 2.0 * MTERM * BTERM
NL = NLAY
EI = X(NC)
N1 = NL - 1
SUM = 0.0
DO 10 I = 1, N1
SUM = SUM + DP(I)
HS = HTERM - SUM
DP( NL) = HS

NT = NC - 1

DO 11 I = 1, NT
EX(I) = X(I)
EX(NL) = X(NC)
EXT = EX(NL) * 1000000.0
IF( LEQ .EQ. 0 ) GO TO 14
C
GO TO (12, 12, 13, 13, 12, 12, 12). IPVMT
C
GO TO 14
C
12 EX(NL - 1) = EX(NL) * (1.0 + 7.18 * DLOG10( DP( NC)) - 1.56 *
= ( DLOG10( EXT ) + DLOG10( DP( NC)) ))
C
GO TO 14

13 EX(NL - 1) = EX(NL) * (1.0 + 10.52 * DLOG10( DP( NC)) - 2.10 *
= ( DLOG10( EXT ) + DLOG10( DP( NC)) ))
C
14 CONTINUE
C
HPR = 0.0
C
DO 15 I = 1, NL
XNUM = EX(I)/EI
HPR = HPR + ( XNUM ** NTERM) * DP( I)
C
15 CONTINUE
C
PHIALF = TMB * (((TMB + 1.0)/(TMB - 1.0)) ** 0.5
C
ALPHA = PHIALF/HPR
C
TTM = 2.0 * MTERM
C
DO 20 I = 1, NW
ARG = ALPHA * R(I)
C
WHAT( I) = 0.47746 * ((TERM/( EI *1000000.0)) * (1000.0/HPR) *
= (TTM + 1.0) * BESJ0( ARG )
C
20 CONTINUE
C
DMDRU = WHAT(1)
C
ISN 0132
RETURN
ISN 0134
END

*OPTIONS IN EFFECT* NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT* SOURCE EBCDIC NOLIST NOECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 133, PROGRAM SIZE = 4166, SUBPROGRAM NAME = RUSIAN
*STATISTICS* NO DIAGNOSTICS GENERATED

***** END OF COMPILATION *****
SUBROUTINE TMECH (TOT)
COMMON/HDR/A(10),B(10),C(10),DT(10),OF(10),S(10),T(10),TR(5),PI(5)
* ,PT(5),AC(5),AA,SCT(5),XMNW18(10),XKTO
COMMdn /EXTRA/ TPE,PF0,MNVTK,MXOVTK,NIS
COMMON /EXPT/ NPT,THICK(4),MTYPE(4),NLAY,IP,IF,IR,IC
COMMON /PSI/PF,PICON,PTERM,PIOV,PTOV
COMMON /MECH/XKT,NRU,NLH,ND,NDEL
REAL A01(5,2,2)/20*0.0/,A11(5,2,2)/20*0.0/,SFF(5,2,2)/20*0.0/
W(1,1,1)=375000.
W(1,1,2)=3750000.
W(1,2,1)=937500.
W(1,2,2)=9375000.
W(3,1,1)=25000.
W(3,1,2)=250000.
W(3,2,1)=62500.
W(3,2,2)=625000.
W(4,1,1)=325000.
W(4,1,2)=3250000.
W(4,2,1)=812500.
W(4,2,2)=8125000.
A01(1,1,1)=10.0**5.32
A01(1,1,2)=10.0**6.32
A01(1,2,1)=10.0**5.71
A01(1,2,2)=10.0**6.72
A01(1,1,1)=10.0**5.26
A01(4,1,2)=10.0**6.26
A01(4,2,1)=10.0**5.65
A01(4,2,2)=10.0**6.65
A01(3,1,1)=10.0**4.14
A01(3,1,2)=10.0**4.14
A01(3,2,1)=10.0**4.54
A01(3,2,2)=10.0**4.54
A11(1,1,1)=10.0**0.9
A11(1,2,1)=10.0**0.9
SFF(1,1,1)=10.0**3.1496
A22(1,1,1)=10.0**2.8
A22(1,1,2)=10.0**2.8
A11(1,1,2)=10.0**0.9
A11(1,2,2)=10.0**0.9
SFF(1,1,2)=10.0**3.1496
A22(1,1,2)=10.0**3.8
A11(2,1,1)=10.0**0.96
SFF(1,2,1)=10.0**3.5769
A22(1,2,1)=10.0**4.1
A11(1,2,2)=10.0**0.95
SFF(1,2,2)=10.0**3.5769
A22(1,2,2)=10.0**5.09
A11(4,1,1)=10.0**0.8
SFF(4,1,1)=10.0**2.4394
A22(4,1,1)=10.0**2.1
A11(4,1,2)=10.0**0.8
SFF(4,1,2)=10.0**2.4394
A22(4,1,2)=10.0**3.11
A11(4,2,1)=10.0**0.8
SFF(4,2,1)=10.0**2.44
ISN 0054  A22(4,2,1)=10.0**3.1
ISN 0055  A11(4,2,2)=10.0**0.80
ISN 0056  SFF(4,2,2)=10.0**2.44
ISN 0057  A22(4,2,2)=10.0**0.09
ISN 0058  A11(3,1,1)=10.0**0.6
ISN 0059  A11(3,1,2)=10.0**0.6
ISN 0060  SFF(3,1,1)=10.0**1.4293
ISN 0061  SFF(3,1,2)=10.0**1.4293
ISN 0062  A22(3,1,1)=10.0**1.8
ISN 0063  A22(3,1,2)=10.0**1.8
ISN 0064  A11(3,2,1)=10.0**0.6
ISN 0065  A11(3,2,2)=10.0**0.6
ISN 0066  SFF(3,2,1)=10.0**1.429
ISN 0067  SFF(3,2,2)=10.0**1.429
ISN 0068  A22(3,2,1)=10.0**2.1
ISN 0069  A22(3,2,2)=10.0**2.1
ISN 0070  IF(PF.GT.PTERM)GO TO 1
ISN 0071  TOTEAL=W(NPT,NRU,NLH)
ISN 0072  XKT=-1.0*ALOG((PICON-PTERM)/(PICON-PF))*TOTEAL
ISN 0073  RETURN
ISN 0074  1 IF(ND.EQ.1)GOTO 5
ISN 0075  TOTEAL=A22(NPT,NRU,NLH)/(ALOG(SFF(NPT,NRU,NLH)))-A11(NPT,NRU,NLH)
ISN 0076  XKT=-1.0*ALOG(0.5)
ISN 0077  GOTO 3
ISN 0078  3 CONTINUE
ISN 0079  XKT=-1.0*ALOG((PICON-PTERM)/(PICON-PTERM+0.5))*W(NPT,NRU,NLH)
ISN 0080  RETURN
ISN 0081  END

*OPTIONS IN EFFECT*NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS = 82. PROGRAM SIZE = 3140. SUBPROGRAM NAME = TMECH

*STATISTICS* NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ******

116K BYTES OF CORE NOT USED
FUNCTION BESJO ( X )

IMPLICIT REAL*8 (A-H, O-Z)

C A FUNCTION TO CALCULATE BESSEL FUNCTION J0(X) USING POLYNOMIAL

C APPROXIMATION - REFERENCE HANDBOOK OF MATH. FUNCTIONS, BUREAU OF

C STANDARDS, PAGES 369-370

ASSIGN 2 TO JOJ1

CONTINUE

X3 = X/3.0

IF( X.GT. 3.0 ) X3 = 3.0/ X

X32= X3*X3

X33=X3*X3

X34=X3*X3

X35=X3*X3

X36=X3*X3

GO TO JOJ1(2, 10)

2 IF( DABS( X ) .LE. 3.3 ) GO TO 3

X1 = X - 0.7853982 -0.04166397*X3 - 0.3954E-04 * X32 +

+ 0.262573E-02*X33 - 0.54125E-03* X34 - 0.29333E-03 * X35 +

+ 0.13558E-03 * X36

BESJO=((-1.7978846 - .77E-6 * X3 - 0.552740E-02 * X32 -

- 0.9512E-04 * X33 + 0.13723E-02 * X34 - 0.72805E-03 * X35 +

+ 0.14476E-03 * X36 ) / DSQRT(X) ) + DCOS(X1 )

RETURN

3 BES JO* 1.0 - 2.249997 * X32 + 1.2666208 * X34 -

- 0.3016866 * X36 + 0.0444479*(X34*X34)-0.0039444 *(X35*X35) +

* 0.000210* (X36*X36)

RETURN

ENTRY BES J1(X)

BESSEL FUNCTION J1 WHERE X IS BETWEEN -3 AND - INFINITY.

ASSIGN 10 TO JOJ1

GO TO 1

10 IF( DABS( X ) LT. 3.0 ) GO TO 30

X1 = X - 2.3561951 + 0.1249961 * X3 + 0.565E-4 * X32 -

- 0.637879E-02 * X33 + 0.74333E-03 * X34 + 0.72805E-03 * X35 -

- 0.29166E-03 * X36

BESJ1 = DCOS( X1 ) +

* ( 0.79788456 + 0.156E-05 * X3

1 + 0.1659667 * X32 + 0.17105E-03 * X33 - 0.24951E-02 * X34 BES 340

2 + 0.113653E-02 * X35 - 0.20033E-03 * X36 ) / DSQRT(X)

RETURN

30 BES J1* X * ( 0.5 - 0.562499 * X32 + 0.2109357 * X34 -

- 0.20354289 * X36 + 0.4319E-02 * (X34 * X34) - 0.91761E-03 * X35 +

2 * (X35*X35) + 0.1109E-04* (X36*X36) )

RETURN

END

*OPTIONS IN EFFECT NAME(MAIN) NOOPTIMIZE LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT SOURCE EBCDIC NODLIST NODECK OBJECT NOMAP NOFORMAT GOSTMT NOXREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS* SOURCE STATEMENTS * 31. PROGRAM SIZE * 1934. SUBPROGRAM NAME = BESJO

*STATISTICS* NO DIAGNOSTICS GENERATED
APPENDIX C

SAMPLE PROBLEM OUTPUT
## Run Parameters

<table>
<thead>
<tr>
<th>Run</th>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>0</td>
<td>3.35</td>
</tr>
<tr>
<td></td>
<td>16.00</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>0.09</td>
<td>0.0</td>
</tr>
</tbody>
</table>

## System Title

- Interstate Flex Pavements District 17
- Texas Transportation Institute

## Sample Run for Flexible Pavements

### Flexible Run

- ACP: 4.00
- AGB: 12.00
- LTS: 0.00

## Age Distribution

- ACP: 4.00
- AGB: 12.00
- LTS: 0.00

### Load Limits

<table>
<thead>
<tr>
<th>Load Limits</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>80.00</td>
<td>20.00</td>
</tr>
<tr>
<td>120.00</td>
<td>34.00</td>
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</table>

### Single Axles

<table>
<thead>
<tr>
<th>Axle</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.0</td>
</tr>
<tr>
<td>7</td>
<td>26.0</td>
</tr>
<tr>
<td>8</td>
<td>20.0</td>
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</tbody>
</table>

### Age Distribution

<table>
<thead>
<tr>
<th>Age</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>190.00</td>
<td>173.00</td>
</tr>
<tr>
<td>157.00</td>
<td>143.00</td>
</tr>
<tr>
<td>104.00</td>
<td>125.00</td>
</tr>
<tr>
<td>104.00</td>
<td>91.00</td>
</tr>
</tbody>
</table>

## Truck Type

- 2D: 0.0
- 3A: 0.0
- 3-S: 0.0
- 2-S: 0.0
- 4: 0.0

## Notes

- Run parameters include weight effects on pavement performance.
- Version 1.1 - August 1981
<table>
<thead>
<tr>
<th>Weight (Tons)</th>
<th>Axle 1</th>
<th>Axle 2</th>
<th>Axle 3</th>
<th>Axle 4</th>
<th>Axle 5</th>
<th>Axle 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-10</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>12-18</td>
<td>568.0</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>20-26</td>
<td>552.0</td>
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<td>0.00</td>
</tr>
<tr>
<td>28-34</td>
<td>518.0</td>
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<td>36-42</td>
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<tr>
<td>44-50</td>
<td>244.0</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>52-60</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>62-70</td>
<td>70.0</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>72-80</td>
<td>15.0</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>82-90</td>
<td>26.0</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>92-100</td>
<td>143.0</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>102-110</td>
<td>107.0</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>112-120</td>
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<tr>
<td>122-130</td>
<td>50.0</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>132-140</td>
<td>14.0</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>142-150</td>
<td>7.0</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>152-160</td>
<td>3.0</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>162-170</td>
<td>23.0</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Performance</td>
<td>Overlay</td>
<td>Model Maint</td>
<td>Old Sections</td>
<td>Output</td>
<td>Execute</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>---------</td>
<td>-------------</td>
<td>--------------</td>
<td>--------</td>
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<td>0.0</td>
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<td>0.0</td>
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</tr>
</tbody>
</table>
**TEXAS TRANSPORTATION INSTITUTE**

**RENU** - **WEIGHT EFFECTS ON PAVEMENT PERFORMANCE**
**VERSION 1.1 - AUGUST 1981**

**INTERSTATE FLEX PAVEMENTS DISTRICT 17**
**TEXAS TRANSPORTATION INSTITUTE**
**SAMPLE RUN FOR FLEXIBLE PAVEMENTS**

**INTFLX A - INTERSTATE FLEX RURAL HOTMIX HIGH TRAFF**

**RUN PARAMETERS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Analysis Period</td>
<td>18 Years</td>
</tr>
<tr>
<td>Annual Growth Rate of 18 Kip Eal</td>
<td>3.35 Percent/Year</td>
</tr>
<tr>
<td>Annual Interest Rate for Present Worth Calculations</td>
<td>16.00 Percent/Year</td>
</tr>
</tbody>
</table>

**NUMBER OF 18-KIP ESAL UNDER PROPOSED REGULATIONS**
Derived from 18-Kip ESAL under present regulations and the assumption of equal payload.

**FLEXIBLE STRUCTURE**

<table>
<thead>
<tr>
<th>Layer Number</th>
<th>Thickness (in.)</th>
<th>Structural Coefficient</th>
<th>Material Code</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.00</td>
<td>0.440</td>
<td>ACP</td>
<td>Asphalt Surface</td>
</tr>
<tr>
<td>2</td>
<td>12.00</td>
<td>0.140</td>
<td>AGB</td>
<td>Aggregate Base</td>
</tr>
</tbody>
</table>

**PERFORMANCE**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSI Initial Constant</td>
<td>4.70</td>
</tr>
<tr>
<td>Terminal PSI</td>
<td>1.50</td>
</tr>
<tr>
<td>PSI after Overlay</td>
<td>4.70</td>
</tr>
<tr>
<td>Average age at terminal PSI for existing design</td>
<td>13.00 Years</td>
</tr>
<tr>
<td>Overlay design life</td>
<td>20.00 Years</td>
</tr>
</tbody>
</table>
### Age Distribution

Loss rate factor for mileage in Potts = 1.80

<table>
<thead>
<tr>
<th>Age</th>
<th>LANE MILES</th>
<th>Value</th>
<th>Loss Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>190.0</td>
<td>3.00</td>
</tr>
<tr>
<td>2</td>
<td>0.0</td>
<td>173.0</td>
<td>3.00</td>
</tr>
<tr>
<td>3</td>
<td>0.0</td>
<td>157.0</td>
<td>3.00</td>
</tr>
<tr>
<td>4</td>
<td>0.0</td>
<td>143.0</td>
<td>3.00</td>
</tr>
<tr>
<td>5</td>
<td>0.0</td>
<td>135.0</td>
<td>3.00</td>
</tr>
<tr>
<td>6</td>
<td>0.0</td>
<td>132.0</td>
<td>3.00</td>
</tr>
<tr>
<td>7</td>
<td>39.0</td>
<td>125.0</td>
<td>3.00</td>
</tr>
<tr>
<td>8</td>
<td>0.0</td>
<td>91.0</td>
<td>3.00</td>
</tr>
<tr>
<td>9</td>
<td>0.0</td>
<td>80.0</td>
<td>3.00</td>
</tr>
<tr>
<td>10</td>
<td>0.0</td>
<td>73.0</td>
<td>3.00</td>
</tr>
</tbody>
</table>

Loss rate in thousands of dollars

Loss rate in percent per year

### Overlay

- Percent of paved shoulders: 95.00 percent
- Average paved shoulder width/lane: 4.75 feet
- Average granular shoulder width/lane: 0.25 feet
- Unit cost of ACP: 66.00 $/CY
- Unit cost of granular: 0.50 $/SY/IN.

### Model Maintenance

- Accelerated maintenance: YES
- Unit costs of maintenance: 1000.00 per one distress

District: 17
### Maintenance Costs per Lane-Mile per Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Flexible</th>
<th>Rigid</th>
<th>Composite</th>
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<tbody>
<tr>
<td>1</td>
<td>2.62</td>
<td>52.50</td>
<td>1.74</td>
</tr>
<tr>
<td>2</td>
<td>6.20</td>
<td>205.28</td>
<td>4.11</td>
</tr>
<tr>
<td>3</td>
<td>14.66</td>
<td>458.37</td>
<td>9.72</td>
</tr>
<tr>
<td>4</td>
<td>34.61</td>
<td>811.75</td>
<td>22.93</td>
</tr>
<tr>
<td>5</td>
<td>81.32</td>
<td>1265.43</td>
<td>53.89</td>
</tr>
<tr>
<td>6</td>
<td>189.14</td>
<td>1819.41</td>
<td>125.35</td>
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<tr>
<td>7</td>
<td>429.78</td>
<td>2473.68</td>
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<tr>
<td>8</td>
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<td>1822.12</td>
<td>4083.12</td>
<td>1207.52</td>
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<td>11</td>
<td>4314.88</td>
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<td>12</td>
<td>5208.23</td>
<td>7249.51</td>
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<tr>
<td>13</td>
<td>5707.21</td>
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<td>14</td>
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<td>3941.65</td>
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<tr>
<td>15</td>
<td>6055.68</td>
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<td>6102.39</td>
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<td>17</td>
<td>6122.34</td>
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<td>4057.28</td>
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<tr>
<td>18</td>
<td>6130.80</td>
<td>223.45</td>
<td>4062.89</td>
</tr>
<tr>
<td>19</td>
<td>6134.38</td>
<td>395.73</td>
<td>4065.27</td>
</tr>
<tr>
<td>20</td>
<td>6135.89</td>
<td>616.90</td>
<td>4066.27</td>
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<tr>
<td>21</td>
<td>6136.54</td>
<td>886.96</td>
<td>4066.69</td>
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<td>22</td>
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<td>4066.87</td>
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<tr>
<td>23</td>
<td>6136.91</td>
<td>1573.77</td>
<td>4066.95</td>
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<tr>
<td>24</td>
<td>6136.96</td>
<td>1990.52</td>
<td>4066.98</td>
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</table>
OLD SECTIONS

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAINTENANCE COST (DOLLARS/LANE MILE/YEAR) FOR PAVEMENTS OLDER THAN TERMINAL SERVICEABILITY</td>
<td>1800.00</td>
</tr>
<tr>
<td>PERCENT OF TOTAL LANE MILES IN POTTS AT BEGINNING OF ANALYSIS PERIOD (CALCULATED)</td>
<td>13.88</td>
</tr>
<tr>
<td>END OF ANALYSIS PERIOD (INPUT TARGET VALUE)</td>
<td>10.00</td>
</tr>
<tr>
<td>PERCENT OF TOTAL LANE MILES NEVER OVERLAID</td>
<td>0.0</td>
</tr>
<tr>
<td>TRUCK TYPES PRESENT</td>
<td>TYPE 2D</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------</td>
</tr>
<tr>
<td>AXLE CODE</td>
<td>1000</td>
</tr>
<tr>
<td>YEAR</td>
<td>PERCENT OF ALL VEHICLES</td>
</tr>
<tr>
<td>1</td>
<td>3.77</td>
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# RENU - WEIGHT EFFECTS ON PAVEMENT PERFORMANCE

## VERSION 1.1 - AUGUST 1981

### GROSS VEHICLE WEIGHT

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INTFLX A INTERSTATE FLEX RURAL HOTMIX HIGH TRAFFIC

CUMULATIVE SHIFTED AXLE DISTRIBUTIONS (IN 2-KIP INTERVALS) FOR EACH TRUCK

TRUCK TYPE 2D

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INTFLX A  INTERSTATE FLEX RURAL HOTMIX HIGH TRAFF

CUMULATIVE SHIFTED AXLE DISTRIBUTIONS (IN 2-KIP INTERVALS) FOR EACH TRUCK

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INTFLX A  INTERSTATE FLEX RURAL HOTMIX HIGH TRAFF  

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**Average Age at Terminal PSI**

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**Value in Thousands of Dollars**

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**AVERAGE AGE AT TERMINAL PSI**

| 21.00 | 22.00 | 23.00 | 24.00 | 25.00 | 26.00 |

**VALUE IN THOUSANDS OF DOLLARS**

**LOSS RATE IN PERCENT PER YEAR**
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<th>OVERLAY THICKNESS</th>
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<th>REMAINING LIFE (MILLION 18-KIP EAL)</th>
<th>OVERLAY COST ($/LANE MILE)</th>
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## Performance Table

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INTFLX A  INTERSTATE FLEX RURAL HOTMIX HIGH TRAFF

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**UNDISCOUNTED COSTS**

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### Run Parameters

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<tr>
<td>Length of Analysis Period</td>
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<tr>
<td>Annual growth rate of 18 kip eal</td>
<td>3.35 percent/year</td>
</tr>
<tr>
<td>Annual interest rate for present worth calculations</td>
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<tr>
<td>Number of 18-kip ESAL under proposed regulations</td>
<td>Derived from 18-kip ESAL under present regulations and the assumption of equal payload</td>
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### Rigid Structure

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### Performance

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<td>Terminal PSI</td>
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<td>PSI after Overlay</td>
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<td>Average age at terminal PSI for existing design</td>
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<td>Overlay design life</td>
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**AGE DISTRIBUTION**

**LOSS RATE FACTOR FOR MILEAGE IN Potts - 1.20**

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<th>LOSS VALUE</th>
<th>LOSS RATE</th>
<th>LANE AGE</th>
<th>MILES</th>
<th>LOSS VALUE</th>
<th>LOSS RATE</th>
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**OverLay**

- **Percent of Paved Shoulders** --- 95.00 Percent
- **Average Paved Shoulder Width/Lane** ---- 4.75 Feet
- **Average Granular Shoulder Width/Lane** --- 0.25 Feet
- **Unit Cost of ACP** ----------------------- 66.00 $/CY
- **Unit Cost of Granular** ------------------ 0.50 $/SY/IN.

**Model Maintenance**

- **Accelerated Maintenance** - Yes
- **Unit Costs of Maintenance**
  - 1000.00 Per One Distress
- **District** 1
## Maintenance Costs Per Lane-Mile Per Year

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<th>RIGID</th>
<th>COMPOSITE</th>
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### Old Sections

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<th>Maintenance Cost (dollars/lane mile/year) for pavements older than terminal serviceability</th>
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<td>Percent of total lane miles in Poits at the beginning of analysis period (calculated)</td>
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<tr>
<td>End of analysis period (input target value)</td>
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<tr>
<td>Percent of total lane miles never overlaid</td>
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<td>TYPE 2D 3A 3-S2 2-S1-2 TOTAL</td>
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<td>4.69</td>
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### Load Limits

| Present Gross Vehicle Weight Limit | 80. Kips |
| Present Single Axle Weight Limit | 20. Kips |
| Present Tandem Axle Weight Limit  | 34. Kips |
| Present Triple Axle Weight Limit  | 56. Kips |
| Future Gross Vehicle Weight Limit | 120. Kips |
| Future Single Axle Weight Limit   | 22. Kips |
| Future Tandem Axle Weight Limit   | 36. Kips |
| Future Triple Axle Weight Limit   | 56. Kips |

<table>
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<tr>
<th>Truck Type</th>
<th>Present Steering Axle Weight (Kips)</th>
<th>Future Steering Axle Weight (Kips)</th>
<th>Percent Increase in Empty Weight (Kips)</th>
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<tr>
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### Single Axle Loads

**Number of Load Intervals:** 11

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<th>Type 2-S1-2</th>
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### TANDEM AXLE LOADS

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**Number of Load Intervals:** 15

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## Gross Vehicle Weight

**Number of Load Intervals:** 28

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<th>Type 3-S2</th>
<th>Type 2-S1-2</th>
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### CUMULATIVE SHIFTED AXLE DISTRIBUTIONS (IN 2-KIP INTERVALS) FOR EACH TRUCK

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RGIH D17  INTERSTATE RIGID DISTRICT 17

CUMULATIVE SHIFTED AXLE DISTRIBUTIONS (IN 2-KIP INTERVALS) FOR EACH TRUCK

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RGIH D17  INTERSTATE RIGID DISTRICT 17

CUMULATIVE SHIFTED AXLE DISTRIBUTIONS (IN 2-KIP INTERVALS) FOR EACH TRUCK

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### RGIH D17 INTERSTATE RIGID DISTRICT 17

**CUMULATIVE SHIFTED AXLE DISTRIBUTIONS (IN 2-KIP INTERVALS) FOR EACH TRUCK**

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### RG1H D17  INTERSTATE RIGID DISTRICT 17

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PERCENT OF TOTAL LANE MILES IN POTTS (BEGINNING OF ANALYSIS PERIOD) -------------------------- 36.28

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**Average Age at Terminal PSI**

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**Value in Thousands of Dollars**

**Loss Rate in Percent Per Year**
### Present Regulations

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### Interstate Flex Pavements District 17

**Texas Transportation Institute**

Sample Run for Flexible Pavements

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All costs are in millions of dollars.
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TOTAL 499. 6.860 -1.728 4.572 0.786

ALL COSTS ARE IN MILLIONS OF DOLLARS
### SUMMARY REPORT

**INTERSTATE FLEX PAVEMENTS DISTRICT 17**

TEXAS TRANSPORTATION INSTITUTE

SAMPLE RUN FOR FLEXIBLE PAVEMENTS

**MAINTENANCE**

ALL COSTS ARE IN MILLIONS OF DOLLARS

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## SUMMARY REPORT

### INTERSTATE FLEX PAVEMENTS DISTRICT 17
TEXAS TRANSPORTATION INSTITUTE
SAMPLE RUN FOR FLEXIBLE PAVEMENTS

### MAINTENANCE

**ALL COSTS ARE IN MILLIONS OF DOLLARS**

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<td>0.068</td>
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### Summary Report

**Interstate Rigid Pavements District 17**

Texas Transportation Institute

Sample Run for Rigid Pavements

**Maintenance**

All costs are in millions of dollars

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<td>0.584</td>
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| TOTAL         | 499.0          |    |    |    |    |    |    |    |    |    |    |
| Present       | 1.297          | 1.138 | 1.589 | 0.935 | 1.534 | 0.783 | 0.741 | 0.603 | 0.584 | 0.536 |
| Proposed      | 1.297          | 1.138 | 1.589 | 0.935 | 1.534 | 0.783 | 0.741 | 0.603 | 0.584 | 0.536 |

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<td>0.538</td>
<td>0.485</td>
<td>0.540</td>
<td>0.462</td>
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| TOTAL         | 499.0          |    |    |    |    |    |
| Present       | 0.556          | 0.507 | 0.538 | 0.485 | 0.540 | 0.462 |
| Proposed      | 0.556          | 0.507 | 0.538 | 0.485 | 0.540 | 0.462 |
### SUMMARY REPORT

**INTERSTATE RIGID PAVEMENTS DISTRICT 17**

**TEXAS TRANSPORTATION INSTITUTE**

**SAMPLE RUN FOR RIGID PAVEMENTS**

**MAINTENANCE**

**ALL COSTS ARE IN MILLIONS OF DOLLARS**

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**Maintenance**  
All costs are in millions of dollars

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### SUMMARY REPORT

**INTERSTATE FLEX PAVEMENTS DISTRICT 17**

**TEXAS TRANSPORTATION INSTITUTE**

**SAMPLE RUN FOR FLEXIBLE PAVEMENTS**

**REHABILITATION**

**ALL COSTS ARE IN MILLIONS OF DOLLARS**

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### Summary Report

#### Interstate Flex Pavements District 17

**Texas Transportation Institute**

**Sample Run for Flexible Pavements**

**Rehabilitation**

All costs are in millions of dollars.

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SUMMARY REPORT

INTERSTATE RIGID PAVEMENTS DISTRICT 17
TEXAS TRANSPORTATION INSTITUTE
SAMPLE RUN FOR RIGID PAVEMENTS

REHABILITATION
ALL COSTS ARE IN MILLIONS OF DOLLARS

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## Summary Report

**Interstate Rigid Pavements District 17**

Texas Transportation Institute

Sample Run for Rigid Pavements

### Rehabilitation

All costs are in millions of dollars

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## SUMMARY FOR ALL SYSTEMS

### REHABILITATION

All costs are in millions of dollars.

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### Summary Report

**Interstate Flex Pavements District 17**

Texas Transportation Institute

Sample Run for Flexible Pavements

All costs are in millions of dollars

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### SUMMARY REPORT

**INTERSTATE FLEX PAVEMENTS DISTRICT 17**

**TEXAS TRANSPORTATION INSTITUTE**

**SAMPLE RUN FOR FLEXIBLE PAVEMENTS**

**ALL COSTS ARE IN MILLIONS OF DOLLARS**

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**SUMMARY REPORT**

**INTERSTATE RIGID PAVEMENTS DISTRICT 17**

**TEXAS TRANSPORTATION INSTITUTE**

**SAMPLE RUN FOR RIGID PAVEMENTS**

All costs are in millions of dollars.

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SUMMARY REPORT

INTERSTATE RIGID PAVEMENTS DISTRICT 17
TEXAS TRANSPORTATION INSTITUTE
SAMPLE RUN FOR RIGID PAVEMENTS

ALL COSTS ARE IN MILLIONS OF DOLLARS

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### Summary for All Systems

All costs are in millions of dollars.

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