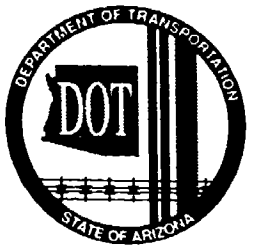

ARIZONA DEPARTMENT OF TRANSPORTATION

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SIMPLIFIED BRIDGE LOAD RATING METHODOLOGY USING THE NATIONAL BRIDGE INVENTORY FILE

Volume I: Users Manual

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in cooperation with
U.S. Department of Transportation
Federal Highway Administration

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16. ABSTRACT

The purpose of this research was to develop a computerized system to determine the adequacy of a bridge or group of bridges to carry specified overload vehicles. The system utilizes two levels of analysis. The Level 1 analysis is the basic rating system for the Arizona Department of Transportation. This analysis computes the overload capacity with a limited amount of data. A Level 2 evaluation, which conducts a more detailed evaluation, uses an enhanced NBIF database, Standard Plans, or a more detailed analysis similar to Brass. A Special Level 2 analysis was also developed to analyze continuous slab bridges by utilizing data from standard slab plans.

Detailed case studies were conducted on twenty-five typical Arizona bridges to verify the methodology used in the Level 1 procedure and to correlate the bridge plans with data in the NBIF. The Level 1 procedure gives ratings which are within 10% of the Level 2 procedure for bridges which satisfy the level one assumptions. Similarly, the Special Level 2 analysis for reinforced concrete continuous bridges gives ratings within 10% of the Level 2 analysis. The NBIF compared well with general bridge plans and is applicable to Level 1 analysis for "typical bridges".

The research results are reported in three documents:

1. Final Report
2. Volume I: Users Manual
3. Volume II: Program Listing

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1.0 INTRODUCTION

1.1 Purpose of the Program

The FORTRAN-77 computer program, OVERLOAD, computes overload vehicle load capacity ratings based on the operating rating obtained from the NBIF (National Bridge Inventory File) for various overload configurations. Considering both the required response time and the number of bridges on the Arizona State Highway System, a Level 1 evaluation will be the basic rating system. The advantage of the Level 1 evaluation is that it computes the overload rating capacity rapidly with a limited amount of data. A Level 2 evaluation, which conducts a more detailed evaluation, would use an enhanced NBIF data base, standard plans, or a more detailed frame analysis similar to BRASS. OVERLOAD currently conducts a Special Level 2 analysis for continuous slab bridges by utilizing data from standard slab plans.

1.2 Rating Methodology

The Level 1 procedure transforms the given load capacity ratings for the specified vehicles as contained in the NBIF at the operating level into the overload load ratings. This procedure is expressed mathematically as:

$$OVLDRR = T*RF_{op}$$

where

OVLDRR = Overload rating ratio calculates the bridge capacity as a decimal fraction of the overload vehicle. A value of 1.0 indicates that the bridge has the capacity to support the overload vehicle. Values between 0.7 and 1.0 indicate potential under capacity, but are inconclusive for a given bridge unless a more detailed Level 2 evaluation is considered. Values under 0.70 indicate an inadequate capacity to support overload vehicles.

T = Function transforming the AASHTO load rating factor, RF_{op}, to the OVLDRR.

RF_{op} = Rating factor contained in NBIF at the operating level that indicates the capacity of the bridge as a decimal fraction of the rating vehicle.

The transformation function, T, which takes into account the difference in the load effects of the overload and the rating vehicles is expressed mathematically as:

$$T = f(R_L, C, R_T, R_I) = \frac{1}{R_L\, C\, R_T\, R_I}$$

where

R_L = Ratio of the controlling simple span longitudinal response of the overload vehicle to that of the rating vehicle.

C = Correction factor applied to continuous bridges.

R_T = Ratio of the transverse load distribution factor of the overload vehicle to the AASHTO design vehicle.

R_I = Ratio of the impact effects of the overload vehicle to the AASHTO design formula.

The Special Level 2 procedure uses standard reinforced concrete slab plans to calculate the overload rating capacity. This procedure is expressed mathematically as:

$$OVLDRR = \frac{M_{CAPACITY} - M_{DL}}{M_{(LL+I)}\, R_T\, R_I}$$

where

OVLDRR = Overload rating ratio that is calculated directly. The values of OVLDRR limits are similar to those of the Level 1 procedure.

$M_{CAPACITY}$ = Working stress moment capacity calculated from standard plans for a unit foot width.

M_{DL} = Dead load moment calculated from standard plans for a unit foot width.

$M_{(LL+I)}$ = AASHTO live load plus impact moment using a three-span influence line.

R_T = Ratio of the transverse load distribution factor of the overload vehicle to the AASHTO design vehicle.

R_I = Ratio of the impact effects of the overload vehicle to the AASHTO design formula.

1.3 Assumptions

The following assumptions for the program are made for the Level 1 evaluation and Special Level 2 analysis:

1) Level 1 is applicable to those types of bridges designed or constructed as "slab," "stringer/multi-beam or girder," "girder and floorbeam system," "T-beam," "box beam or girders-multiple," "box beam or girders-single," and "culverts." Also Level 1 is applicable to those types of bridges designed with materials as "concrete," "steel," "prestress concrete," and "timber." Bridges not applicable to those bridge types are screened for a Level 2 analysis which requires a more detailed evaluation (i.e. BRASS). The overload rating in Level 1 is applicable to primary members in the bridge, while secondary members are ignored.

2) Special Level 2 analysis is applicable to reinforced concrete continuous slab bridges that have three or more spans and that were designed using Arizona standard plans. The controlling rating is assumed not to be effected by hinges in the bridge.

3) AASHTO impact and load distribution formulae are used in the NBIF. For girder type bridges the girder spacing is assumed constant from span to span.

4) The operating rating in the NBIF is coded correctly and that it is based only on the flexure mode using AASHTO working stress method of design. The operating rating for bridges that have been administratively rated (i.e. RFIN = RFop = 236) and that are coded with structural conditions of 7 and greater will be increased by a factor of 1.36 (i.e. 0.75/0.55).

5) The overload vehicle is assumed to be able to cross the bridge with no clearance restrictions. Bridges are only checked for vehicle width

clearance based on the curb-to-curb width and approach span width. The program will print a warning if these limitations are exceeded but will proceed with the rating evaluation.

6) The longitudinal moment ratio, R_L, is based on the simple beam moment for the maximum span length. The positive moment is computed at the 0.4 and 0.5 point in the maximum span.

7) The longitudinal moment continuity correction factor, C, is computed for a two-span and three-span continuous bridge. For two-span bridges both spans are assumed equal to the maximum span. The positive moment is computed at the 0.4 point and the negative moment is computed at the middle support. For bridges having three or more spans, the "three-span" influence line configuration is used. The interior spans are assumed equal to the maximum span length and the exterior spans are calculated as the remainder based on the overall length and maximum span length of the bridge. The positive moment is computed at the 0.4 point of Span 1 or the exterior span and at the 0.5 point of Span 2 or the interior span. The negative moment is computed at the support. All supports are assumed to be on rollers and the cross-section of the bridge is uniform.

The longitudinal moment ratio and continuity factor are computed by "marching" the AASHTO and overload trucks over the computed influence lines for a one-span, two-span, or three-span configuration, as shown in Figures 1-1, 1-2, and 1-3, respectively. Each axle is placed at the lead position and marched at each 10th point on the spans to determine the maximum moment. For influence lines that are non-symmetrical, the truck is marched foward and backward. For H20 and HS20 type vehicles the lane loading is also considered in the evaluation.

1.4 Limitations

The following limitations are applicable to the program for the Level 1 evaluation and Special Level 2 analysis:

1) Only the State of Arizona has been considered for evaluation. Bridges that fall outside this state may use different rating procedures.

2) Secondary members are ignored for rating which may lead to errors for "stringer/multi-beam or girder" type designs or other similar bridge types.

3) Hinges are ignored in the Special Level 2 evaluation. Only a limited number of slab plans have been incorporated into the program.

4) The shear mode for rating has been ignored.

5) Calculation of the transverse distribution ratio has not been incorporated into the program. Currently the user must input this value.

6) The end span calculation for continuous spans may be in error in the Level 1 evaluation if the maximum span length and overall length are coded incorrectly in the NBIF or the bridge has an unusual span configuration.

7) Columns are ignored in the Level 1 procedure and may introduce conservative results for the overload rating capacity.

8) A routing system has not been incorporated into the program. Currently the user is able to input a series of bridges on a specified route.

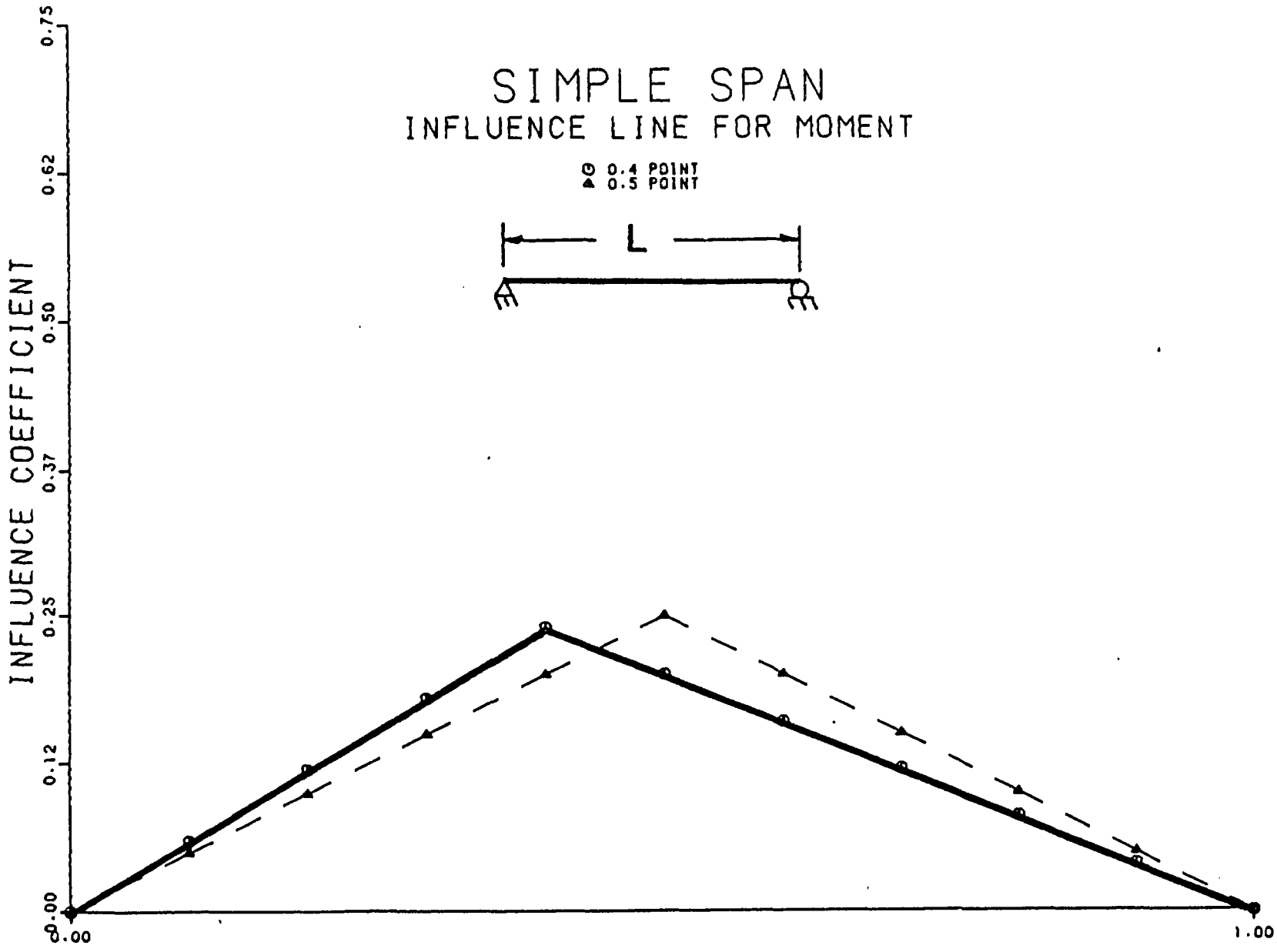


FIGURE 1-1. INFLUENCE LINE FOR A ONE-SPAN BRIDGE

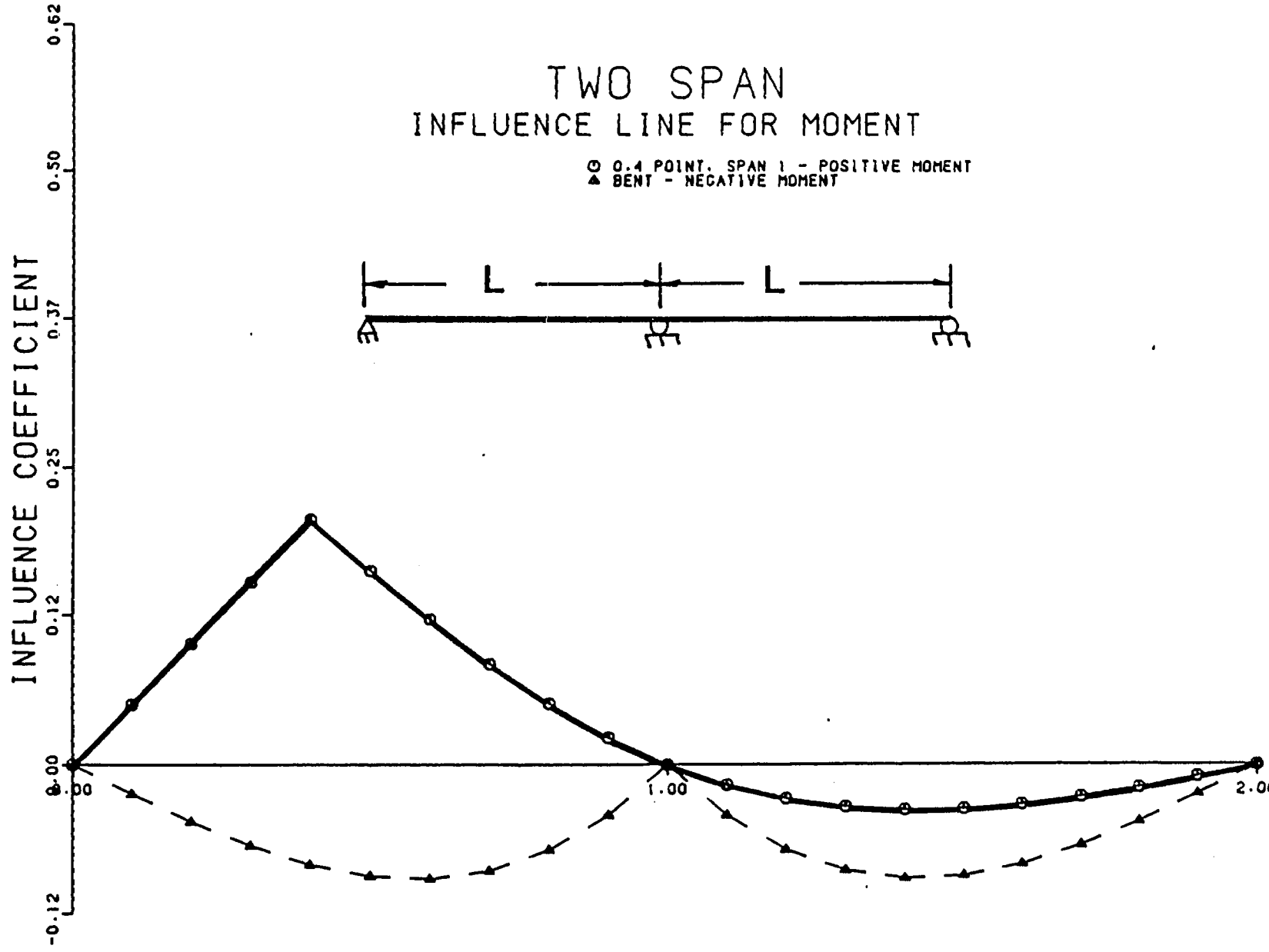


FIGURE 1-2. INFLUENCE LINE FOR A TWO-SPAN BRIDGE

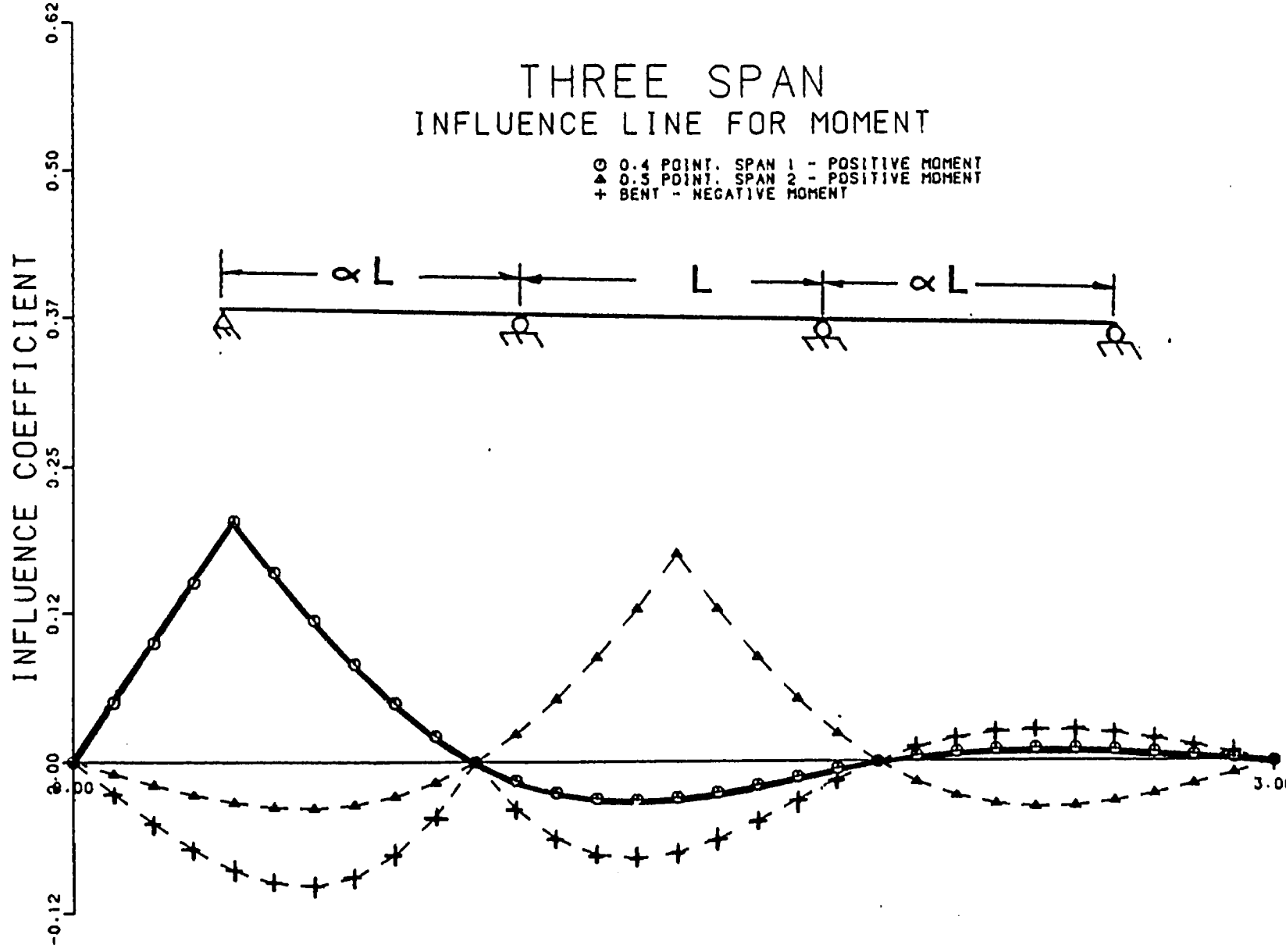


FIGURE 1-3. INFLUENCE LINE FOR A THREE-SPAN BRIDGE

2.0 PROGRAM OPERATION

2.1 CREATOR and MENU Programs

A windows option has been incorporated into the OVERLOAD system by utilizing a pair of programs, named CREATOR and MENU, developed at the University of Wyoming (4,5). The first program, CREATOR, is used to define the menu system by interactively defining the individual menu screens while the second program, MENU, is used to display the menus and develop the output for batch, data, and command language files. For this project the command language file is used as input to the OVERLOAD program.

The menus developed in CREATOR are arranged in a tree structure fashion from first screen to last screen where the data is input. Several screens are available that include these types: a menu screen for transferring control or branching, a tabular screen that has a spreadsheet format and is used to enter numeric data, a graphical screen to draw primitive shapes to define a drafted figure, a text screen to enter a one-line alphanumeric input field, and a help screen to describe the current screen. The tree structure and corresponding screen type and screen numbers developed for the OVERLOAD program are shown in Figure 2-1. OVERLOAD utilizes all screen types except the graphical screen. The actual screen created by MENU for the OVERLOAD program are shown in Figures 2-2 to 2-10. The number in the upper righthand corner of each screen corresponds to those screen numbers shown on the tree structure in Figure 2-1. The information entered into these screens for batch processing will be discussed in detail in Chapter 3.

2.1.1 File Assignment

Several files are used in the execution of the MENU program and they should be located in the same directory as MENU. These files are as follows:

MENUFILE.TXT	The menu storage file contains screen information which is accessed by MENU.

OVERPC.INV	The inventory file contains data input by the user of MENU. It is defined and initialized in CREATOR, but MENU writes input data into the file. The inventory file may be accessed for addition, modification, selection, and deletion of records.
OVERPC.HLP	This file contains the data describing the help screens.
OVERPC.ERR	The error code file contains error messages for tabular or graphical screens.
OVERPC.DFT	The default value file is generated in MENU, but is defined in CREATOR. This file contains default data which is printed to the screen when an input type screen is entered.
ADOT.RUN	A runtime file contains user input from MENU which is submitted to the POST PROCESSOR to generate batch files. The file is defined in MENU.
FILSTORE.TXT	This file is generated by CREATOR. The file must reside in the default directory. The data files, access codes, and programmed input paths are stored in this file.

2.1.2 Program Execution

The program MENU, which is used as a windows option for the OVERLOAD program, is executed from the IBM-AT computer terminal by typing the DOS command MENU as follows:

```
c:\>MENU
```

The first executable screen is shown in Figure 2-11. The user should hit the carriage return for the third command (PLEASE INPUT A DEFAULT TITLE:) to give a blank default.

The transfer screens appear next, as shown in Figure 2-12. The remainder of execution is accomplished by selecting the appropriate input screens which are shown in Figures 2-2 to 2-10. The operation of these screens is

described on the [F2] legend toggle. The last screen to appear is shown in Figure 2-13.

2.2 OVERLOAD Program

The OVERLOAD program computes the overload rating capacity by using a Level 1 procedure. Evaluation by this Level 1 procedure can be accomplished by supplying OVERLOAD with data that is grouped into data blocks.

The correct ordering of the input data blocks is shown in Figure 2-14. A solid triangle in the upper right-hand corner indicates a required data block for a single analysis.

The information in these data blocks will be explained in detail in Chapter 3.

2.2.1 File Assignment

Several files are used in the execution of the OVERLOAD program. These are assigned to various units as follows:

File 5 - Input file to the scan interpretor.
File 6 - Scan Echo file
File 7 - Output file which contains the calculated overload rating capacities.
File 8 - Reduced NBIF direct access file named ARIZONA.DIR.
File 9 - Input file created in the MENU program and named ADOT.POL.

2.2.2 Format of Reduced NBIF

The original NBIF with 90 data fields was reduced to 26 data fields that were accessed in the OVERLOAD program. The items included in the reduced NBIF are as follows:

ITEM NUMBER	ITEM NAME
08	STRUCTURE NO.
05	INVENTORY ROUTE
07	FACILITY CARRIED BY STRUCTURE
09	LOCATION
11	MILEPOINT
27	YEAR BUILT/RECONSTRUCTION
29	AVERAGE DAILY TRAFFIC
30	YEAR OF AVERAGE DAILY TRAFFIC
32	APPROACH ROADWAY WIDTH (FT)
34	SKEW (DEGREES)
41	OPEN(A),POSTED(P),CLOSED(C)
43	STRUCTURE TYPE, MAIN
44	STRUCTURE TYPE, APPROACH SPANS
45	NO. OF SPANS IN MAIN UNIT
46	NO. OF APPROACH SPANS
48	LENGTH OF MAXIMUM SPAN (FT)
49	STRUCTURE LENGTH (FT)
51	BRIDGE WIDTH,CURB-TO-CURB (FT)
53	MINIMUM VERTICAL CLEARANCE
57	WEARING SURFACE
58	DECK CONDITION
59	SUPERSTRUCTURE CONDITION
60	SUBSTRUCTURE CONDITION
64	OPERATING RATING
66	INVENTORY RATING
67	STRUCTURAL CONDITION

In addition to reducing the original NBIF, the undercrossings were eliminated. The final file is a direct access file containing 126 byte records.

2.2.3 Program Execution

The program OVERLOAD is executed from the IBM-AT computer terminal by typing the DOS command OVERLOAD as follows:

c:\>OVERLOAD

The screen will then prompt the user for the input file created by MENU or a file created by the user, as shown in Figure 2.15. If the user chooses to select the MENU file, it must be modified to correspond to the POL commands in OVERLOAD. This is accomplished internally in OVERLOAD by reading File 9 called ADOT.POL and modifying it to File 5 called OVER.DAT.

Otherwise, if the user chooses to select a POL file that was created specifically for OVERLOAD, than File 5 will be read directly.

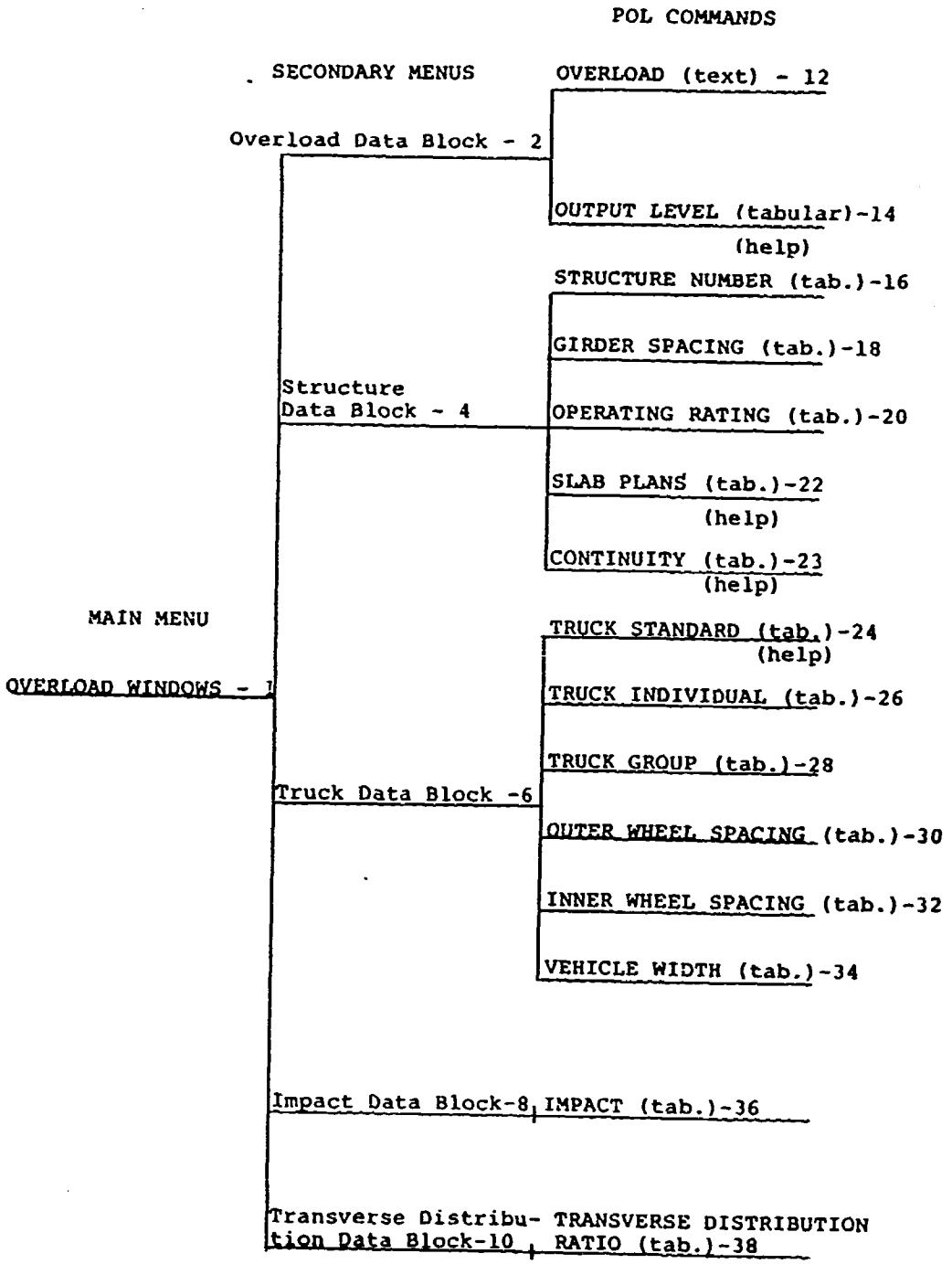


FIGURE 2-1. TREE STRUCTURE AND CORRESPONDING SCREEN NUMBERS

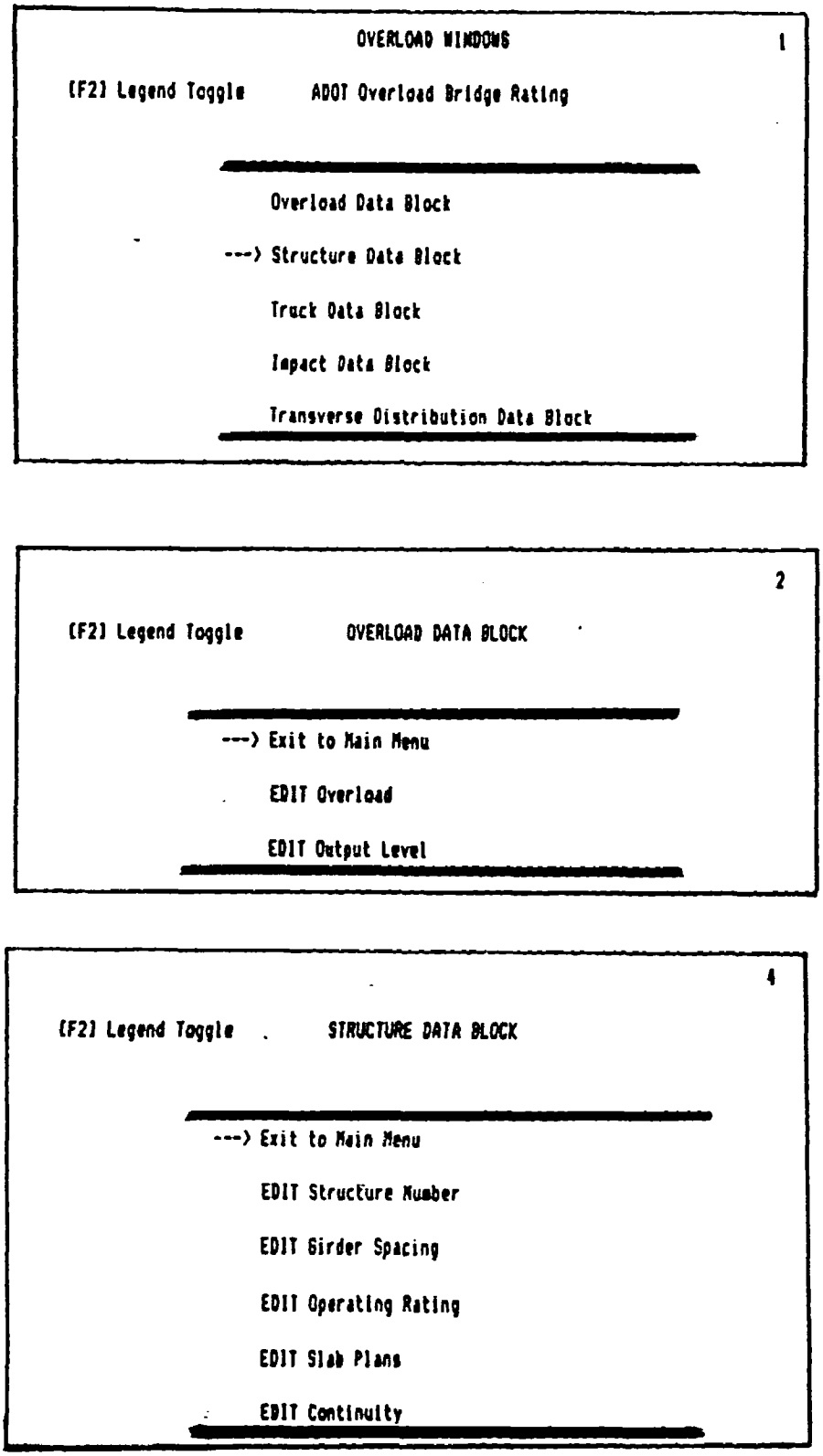


FIGURE 2-2. MENU SCREENS 1, 2, AND 4

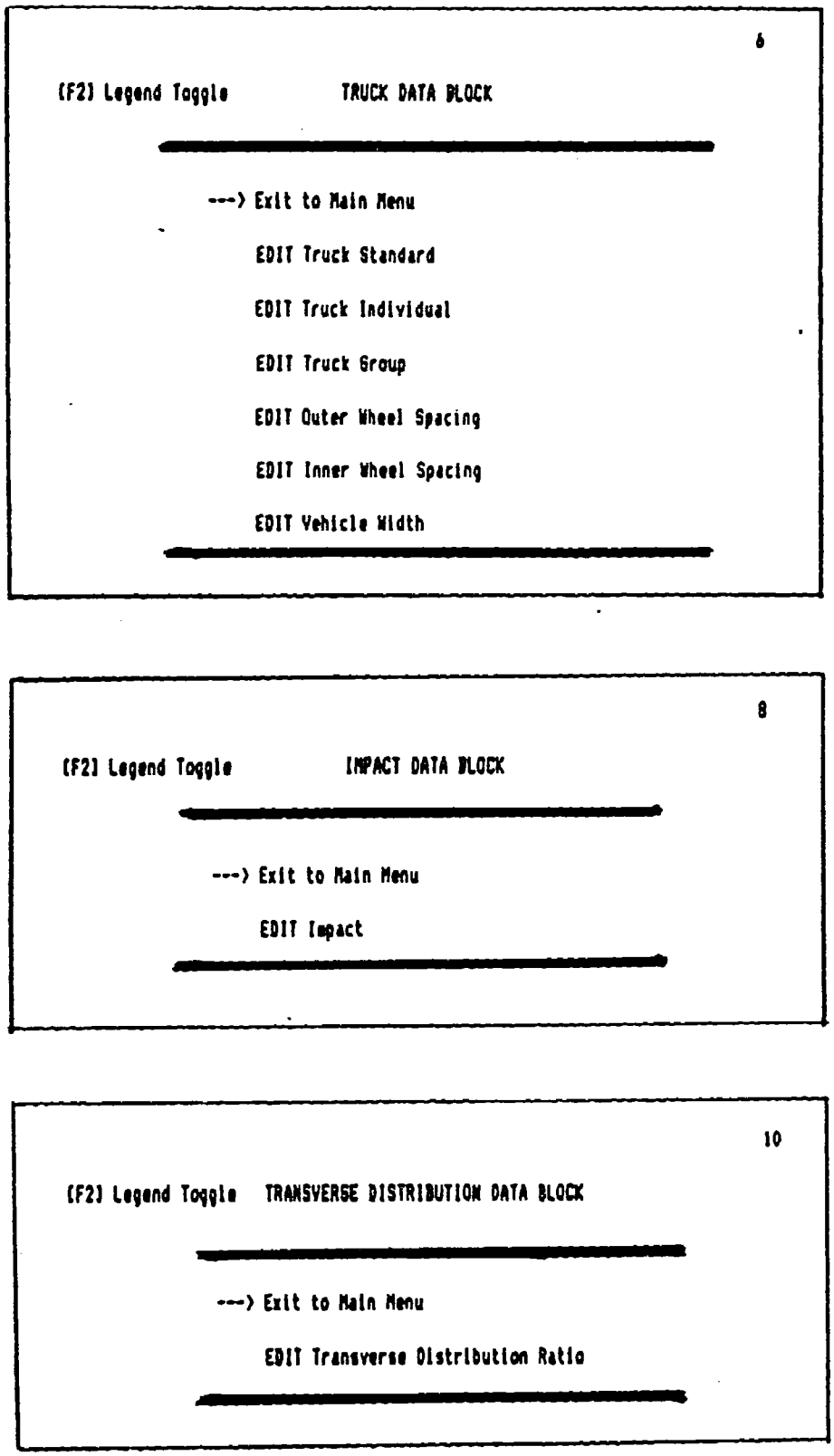
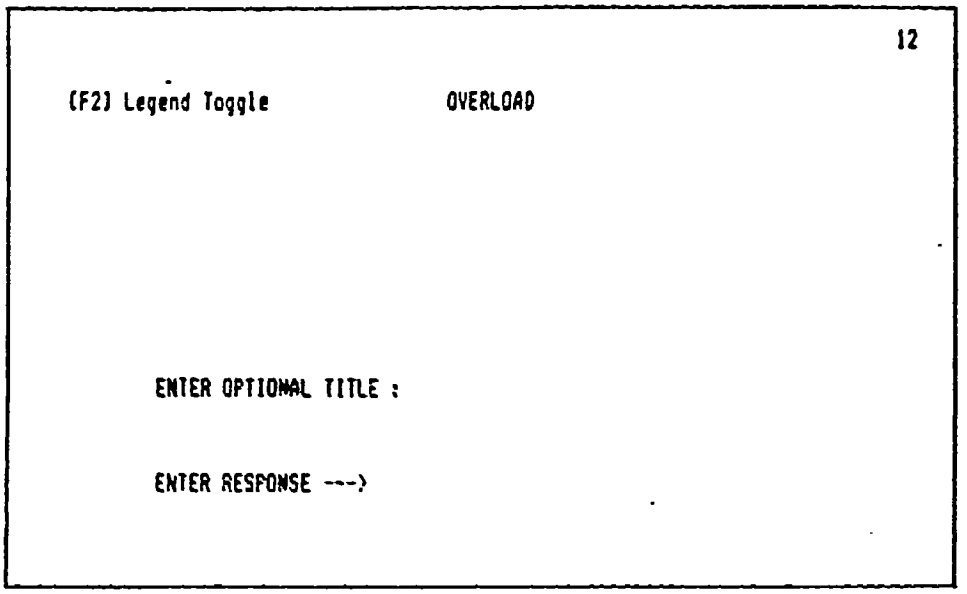


FIGURE 2-3. MENU SCREENS 6, 8 AND 10



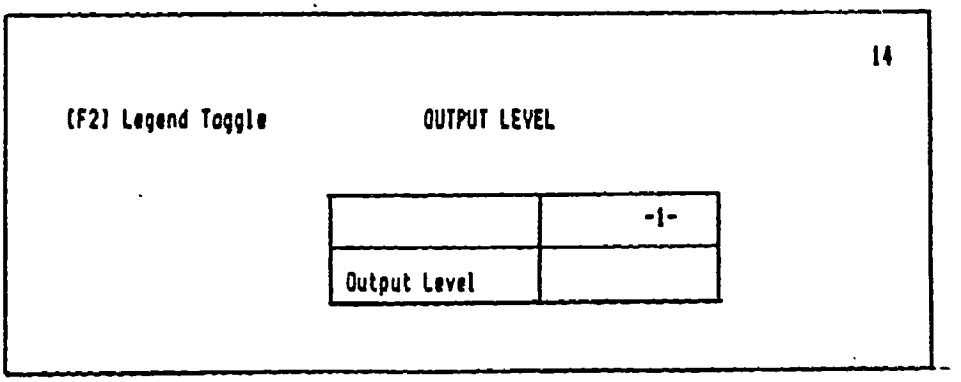


FIGURE 2-4. TEXT AND TABULAR SCREENS 12 AND 14

16

(F2) Legend Toggle STRUCTURE NUMBER

	-1-	-2-	-3-	-4-	-5-
Structure Number					
Structure Number					
Structure Number					
Structure Number					
Structure Number					

18

(F2) Legend Toggle GIRDER SPACING

	-1-	-2-	-3-	-4-	-5-
Girder Spacing (ft)					
Girder Spacing (ft)					
Girder Spacing (ft)					
Girder Spacing (ft)					
Girder Spacing (ft)					

FIGURE 2-5. TABULAR SCREENS 16 AND 18

20

[F2] Legend Toggle OPERATING RATING

	-1-	-2-	-3-	-4-	-5-
Operating Rating					
Operating Rating					
Operating Rating					
Operating Rating					
Operating Rating					

22

[F2] Legend Toggle SLAB PLANS

	-1-	-2-	-3-	-4-	-5-
Slab Plans					
Slab Plans					
Slab Plans					
Slab Plans					
Slab Plans					

FIGURE 2-6. TABULAR SCREENS 20 AND 22

23

[F2] Legend Toggle CONTINUITY

	-1-	-2-	-3-	-4-	-5-
Continuity					
Continuity					
Continuity					
Continuity					
Continuity					

24

[F2] Legend Toggle TRUCK STANDARD

	-1-
Vehicle Code	

FIGURE 2-7. TABULAR SCREENS 23 AND 24

26

[F2] Legend Toggle TRUCK INDIVIDUAL

	-1-	-2-	-3-	-4-	-5-
Axle Load (kips)					
Axle Spacing (ft)					
Axle Load (kips)					
Axle Spacing (ft)					
Axle Load (kips)					
Axle Spacing (ft)					

28

[F2] Legend Toggle TRUCK GROUP

	-1-	-2-	-3-	-4-	-5-
Axle Load (kips)					
No. Axles per Group					
Axle Sp. in Group (ft)					
Sp. to Next Group (ft)					

FIGURE 2-8. TABULAR SCREENS 26 AND 28

30

[F2] Legend Toggle OUTER WHEEL SPACING

	-1-	-2-	-3-	-4-	-5-
Outer Wheel Spacing (ft)					
Outer Wheel Spacing (ft)					
Outer Wheel Spacing (ft)					
Outer Wheel Spacing (ft)					
Outer Wheel Spacing (ft)					
Outer Wheel Spacing (ft)					

32

[F2] Legend Toggle INNER WHEEL SPACING

	-1-	-2-	-3-	-4-	-5-
Inner Wheel Spacing (ft)					
Inner Wheel Spacing (ft)					
Inner Wheel Spacing (ft)					
Inner Wheel Spacing (ft)					
Inner Wheel Spacing (ft)					
Inner Wheel Spacing (ft)					

FIGURE 2-9. TABULAR SCREENS 30 AND 32

34

(F2) Legend Toggle VEHICLE WIDTH

	-1-
Vehicle Width (ft)	

36

(F2) Legend Toggle IMPACT

	-1-	-2-	-3-	-4-	-5-
Impact					
Impact					
Impact					
Impact					
Impact					

38

(F2) Legend Toggle TRAN DIST RATIO

	-1-	-2-	-3-	-4-	-5-
Ratio					
Ratio					
Ratio					
Ratio					
Ratio					

FIGURE 2-10. TABULAR SCREENS 34, 36 AND 38

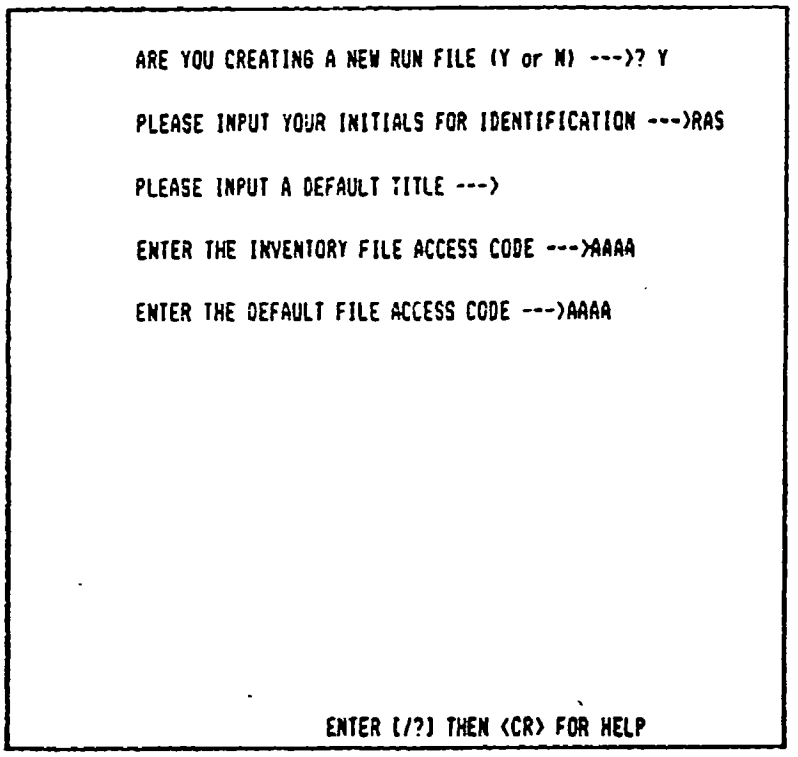
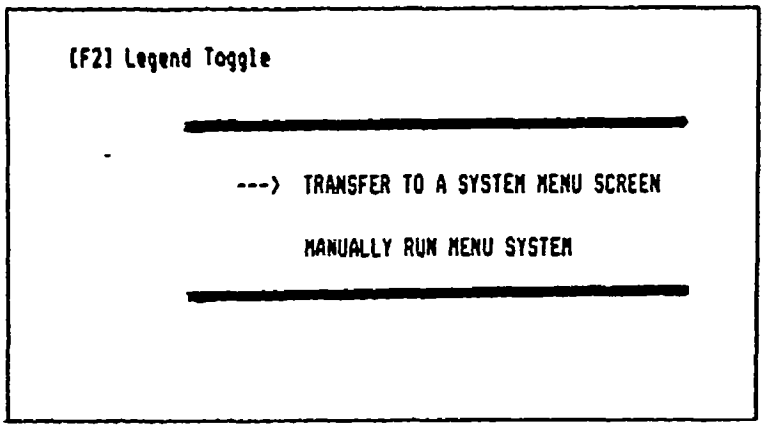


FIGURE 2-11. FIRST EXECUTABLE SCREEN IN MENU



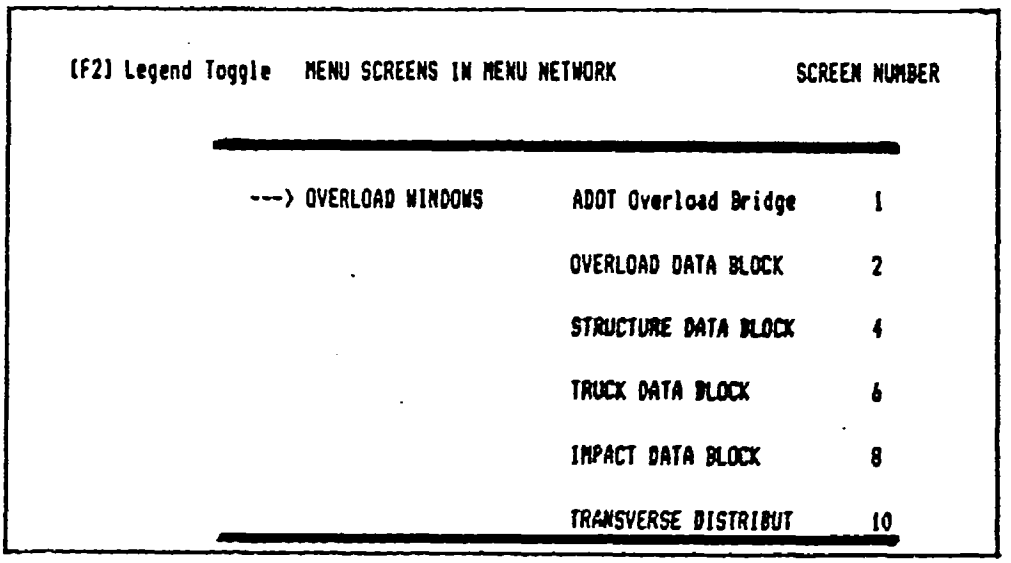


FIGURE 2-12. TRANSFER SCREENS IN MENU

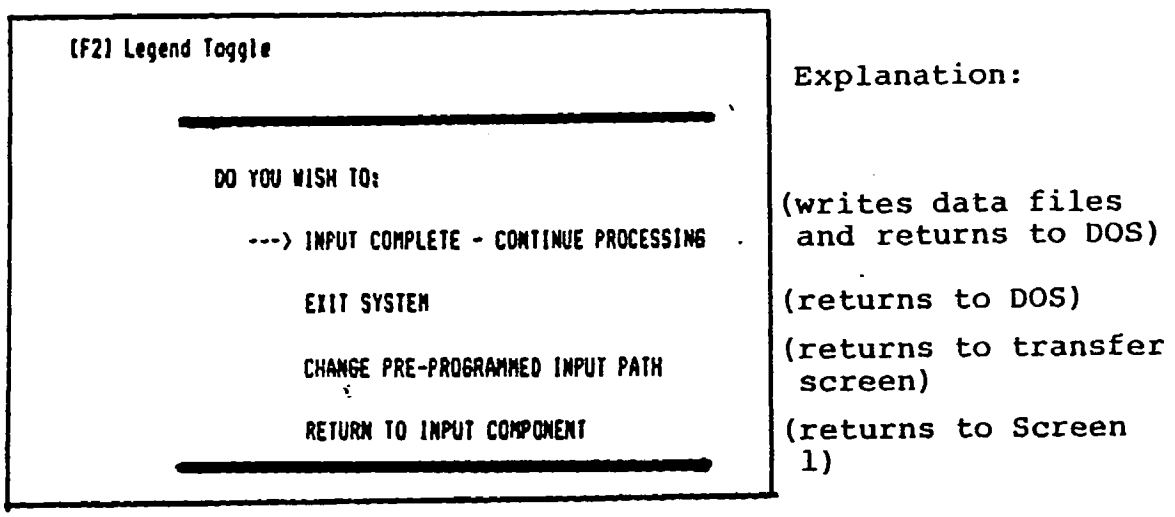


FIGURE 2-13. LAST EXECUTABLE SCREEN IN MENU

OVERLOAD recognizes the following input data blocks:

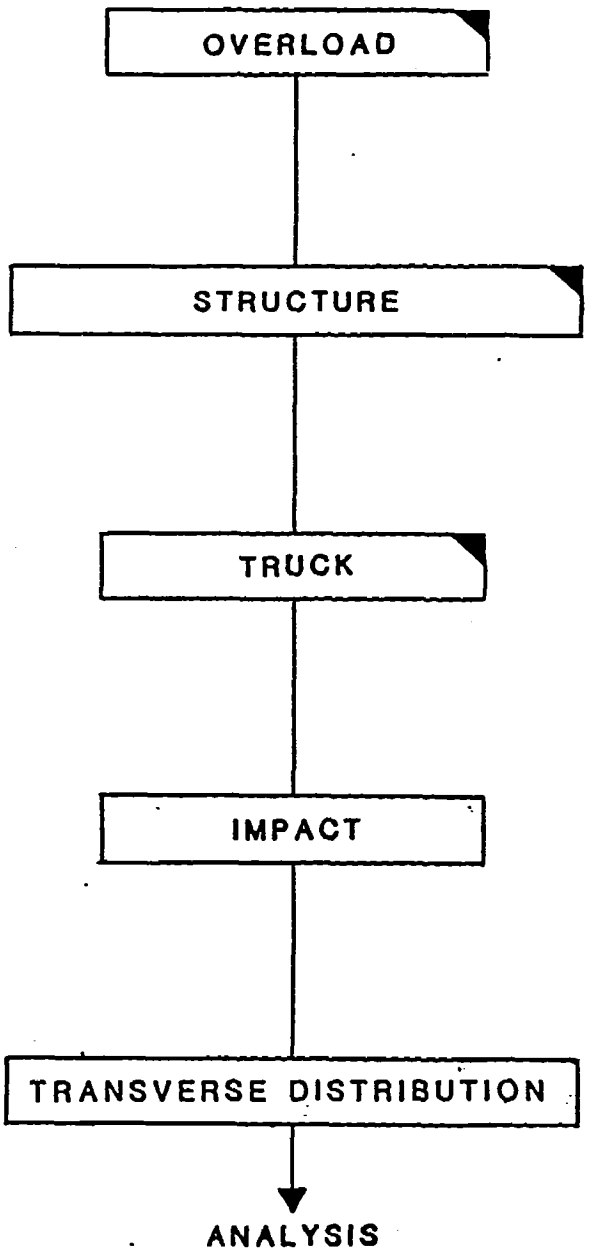


FIGURE 2-14. PROPER ORDER OF DATA BLOCKS

```
ADOT OVERLOAD BRIDGE RATING (VERSION 1.3)

Do you want to read in the MENU file?
(Enter YES or NO)YES

Scan Echo Name :CON
Output File Name:EXAM1.OUT

OVERLOAD NOW EXECUTING

      OVERLOAD  'EXAMPLE PROBLEM 1: CALIFORNIA P13 VEHICLE'
      OUTPUT LEVEL     1
      STRUCTURE NUMBER    461
      TRUCK STANDARD     11
      VEHICLE WIDTH     12
      FINISH

Stop - Program terminated.
```

FIGURE 2-15. OVERLOAD PROGRAM EXECUTION

3.0 OVERLOAD DATA ENTRY USING THE SCAN INTERPRETOR

3.1 Windows Option

The OVERLOAD program may access the POL file created by the MENU program. The MENU program is explained in detail in Chapter 2.

3.2 Scan Commands and Numeric Input

3.2.1 Commands

The input commands within a data block consist of words and numbers that identify data to the program. When a command consists of more than one word, the words must be supplied in the order shown. The commands within a data block may be ordered arbitrarily; the very few exceptions to this are noted.

A command word may be abbreviated. The complete command word is shown as upper case letters with the abbreviation underlined.

3.2.2 Numerical Input

1. General

A numeric field must be separated from other entries on the command line using the delimiters described below and cannot contain blanks.

2. Integers

Integers are signed (+/-) or unsigned whole numbers without a decimal point and without an exponential multiplier. Blanks are not permitted between the sign and first digit. Examples of integers are 125, -34, +238.

3. Real Numbers

Real numbers are signed (+/-) or unsigned numbers containing an optional decimal point (.) and optional exponential multiplier. The exponential multiplier consists of the upper case letter 'E' followed by a signed (+/-) or unsigned integer. If the exponential multiplier is used, a decimal point must be present in the numeric field preceding it. Blanks are not permitted anywhere within a real numeric field. Examples of reals are 3.2, -1., +4.52E4, -1.E-4.

4. Alphanumeric Titles

Each alphanumeric title must be enclosed within a pair of quotation marks (") or apostrophes ('). There cannot be quotation marks, apostrophes or semicolons within the title itself.

5. Conventions Used in Input Commands

SYMBOL	MEANING
xx	Single integer numeric field input
xx ...	Multiple input of integer numeric fields
xx.x	Single real numeric field input
xx.x ...	Multiple input of real numeric fields
'aaaaaaaa'	Alphanumeric title, eight or fewer characters in length, enclosed in either quotes or apostrophes.

6. Special Characters

a. Delimiters

Blanks and commas (,) are the only valid delimiters.

b. Separators

The minus (-) comprises the set of separators.

(1) Continuation

The minus (-) is used as a continuation symbol for command lines exceeding the maximum length of eighty characters. Continuations may not break up a command word or a numeric field.

Correct use of the continuation:

```
TRUCK INDIVIDUAL 12.94 17.75 22.68 4.33 22.68 -
        16. 29.13 6.
```

Incorrect use of the continuation:

```
TRUCK INDIVIDUAL 12.94 17.75 22.68 4.33 22. -
          68 16. 29.13 6.
```

(2) Comments

The upper case letter 'C' entered in column one followed by a blank in column two will make the data line a comment line.

3.3 Data Block Input

3.3.1 Overload Data Block

The OVERLOAD data block must be the first data block input for any analysis.

A. Summary of Commands

*OVERLOAD "bbb...bbb" (1)**

	Entry Definition	
*OUTPUT LEVEL xx	1: ALL 2: ECHO 3: RESULTS	(2)

B. OVERLOAD Data Example

1. OVERLOAD "ESB TRUCKING COMPANY-SALT LAKE CITY"
   OUTPUT 1

2. OVERLOAD "JAKES CRANE AND RIGGING-LAS VEGAS"
   OUTPUT 3

NOTES:

(1) An optional title may be specified on the same input line. This title is denoted by "bbb...bbb" and is up to 64 alphanumeric characters in length, must be enclosed in either apostrophes or quotes, and may not contain apostrophes, quotes or semicolons within the title.

(2) Levels of output are specified with the OUTPUT command: An entry of 1 generates a scan echo, data check, NBIF, and Level 1 analysis; 2 generates a scan echo, data check, and NBIF; and 3 generates a scan echo, data check, and Level 1 analysis.

* Required input
** Refers to notes

3.3.2 Structure Data Block

The STRUCTURE data block consists of commands to define the bridge to be rated.

A. Summary of Commands

*STRUCTURE NUMBER xx ... (1)
GIRDER SPACING xx.x ... (2)
OPERATING RATING xx ... (3)

SLAB PLANS xx ... (4)

Entry	Definition
0:	LEVEL 1 Evaluation
1:	CS-2-15
2:	CS-2-20
3:	CS-3-20
4:	CS-4-20
5:	CS-5-20I
6:	CS-20
7:	CS-20I

CONTINUITY xx ... (5)

Entry	Definition
0:	NBIF Default
1:	Simple
2:	Continuous

B. STRUCTURE Data Examples

1. Rating of bridges on Route 93 (all structures are non-girder type bridges, structure 413 is a slab bridge)

```
STRUCTURE NUMBER 388 846 413
OPERATING RATING 0 0 240
SLAB PLANS 3
```

2. Rating of bridges on Route I-10 (Structures 390 and 463 are slab bridges and structures 881 and 1085 are P/S I-girder bridges)

```
STRUCTURE NUMBER 1725 1723 881 1085 390 463
GIRDER SPACING 8.0 9.0 8.0 5.58 0.0 0.0
OPERATING RATING 256 256 0 0 0 0
SLAB PLANS 1 5
CONTINUITY 0 0 2 2 0 0
```

* Required input

NOTES:

(1) STRUCTURE NUMBER must be the first line of information in the STRUCTURE data block. The value of the integer corresponds to that bridge number which is located in the Arizona National Bridge Inventory File (NBIF). The integer range is from 1 to 9861. The NBIF for Arizona contains 2292 bridges and 2885 culverts. A maximum of 40 structures may be entered for an analysis.

(2) GIRDER SPACING is an optional command. The default value is 0. It must be specified for those bridges which have girder type systems; i.e. steel stringers, reinforced concrete T-beams, prestressed and reinforced concrete boxes, etc. Those bridges which do not have a girder type system should be given a value of 0.0. The units of the girder spacing must be in feet.

(3) OPERATING RATING is an optional command. The default is the NBIF value. It must be specified to overwrite the NBIF value. The coding should conform to the ratings given in Item 64 of the NBIF. Those ratings that are satisfactory in the NBIF should be given a value of 0.

(4) SLAB PLANS is an optional command. The default is a Level 1 evaluation. For those continuous slab bridges that were designed with standard plans the coded entry should be specified. A Special Level 2 evaluation will be performed. Those slab bridges that use a Level 1 evaluation should be given a value of 0.

(5) CONTINUITY is an optional command. The default is the NBIF specification. Bridges that are coded as simply supported (i.e. prestressed concrete I-girder bridges) even though they are actually continuous for live load, need an entry of 2. Similarly, an erroneous coded entry in item 43 of the NBIF for a simply supported bridge would require an entry of 1. Those bridges that are assumed coded correctly in the NBIF should be given a value of 0.

3.3.3 Truck Data Block

The TRUCK data block consists of a series of commands to define the overload truck configuration of axle loads, longitudinal axle spacings, outer and inner transverse wheel spacings, and the vehicle width.

Individual axle loads and spacings, standard vehicles, or group axle configurations may be used in the TRUCK data block. The units for this data block must be in kips and feet.

A. Summary of Commands

*TRUCK

- STANDARD xx

Entry	Definition
1:	H20
2:	HS20
3:	ALTERNATE MILITARY
4:	TYPE 3
5:	TYPE 3S2
6:	TYPE 33
7:	P5
8:	P7
9:	P9
10:	P11
11:	P13

(1)

- INDIVIDUAL xx.x ...
- GROUP (xx.x xx xx.x xx.x) ...

*OUTER WHEEL SPACING xx.x ... (2)

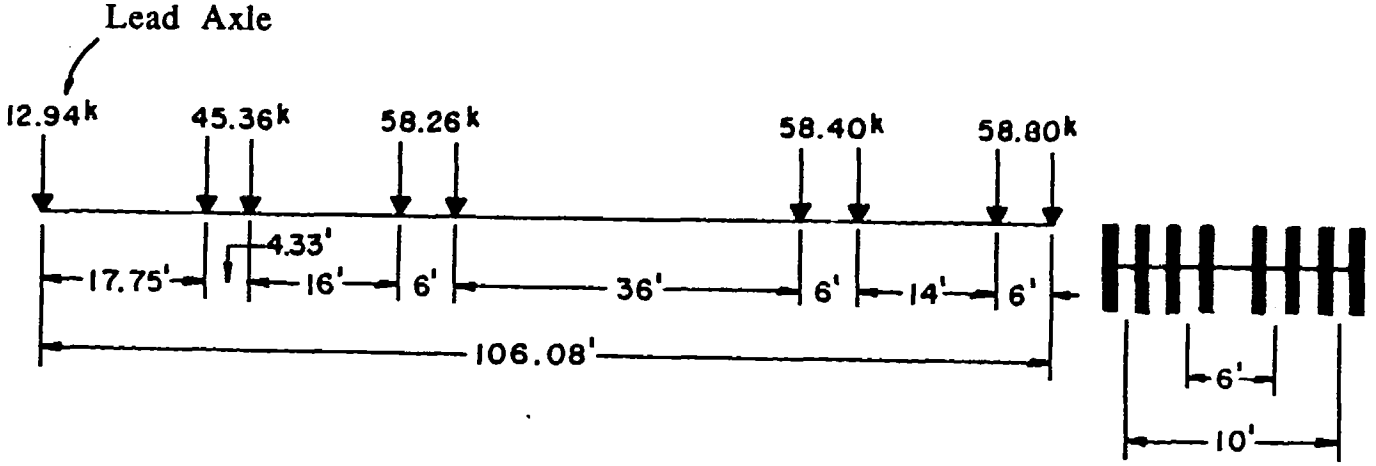
INNER WHEEL SPACING xx.x ... (3)

*VEHICLE WIDTH xx.x (4)

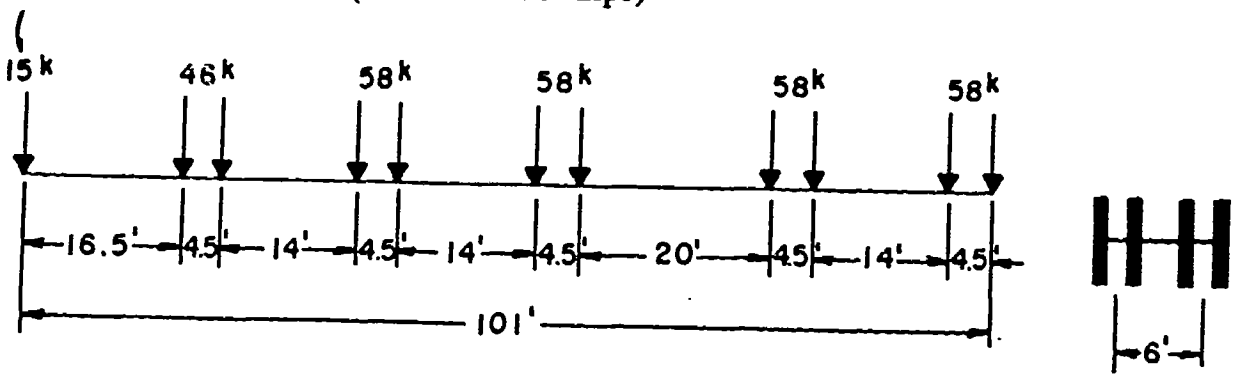
* Required Input

B. TRUCK Data Examples

Overload Vehicle 1 (GVW = 233.76 kips)



Overload Vehicle 2 (GVW = 293 kips)



1. Standard Vehicle Type 3S2

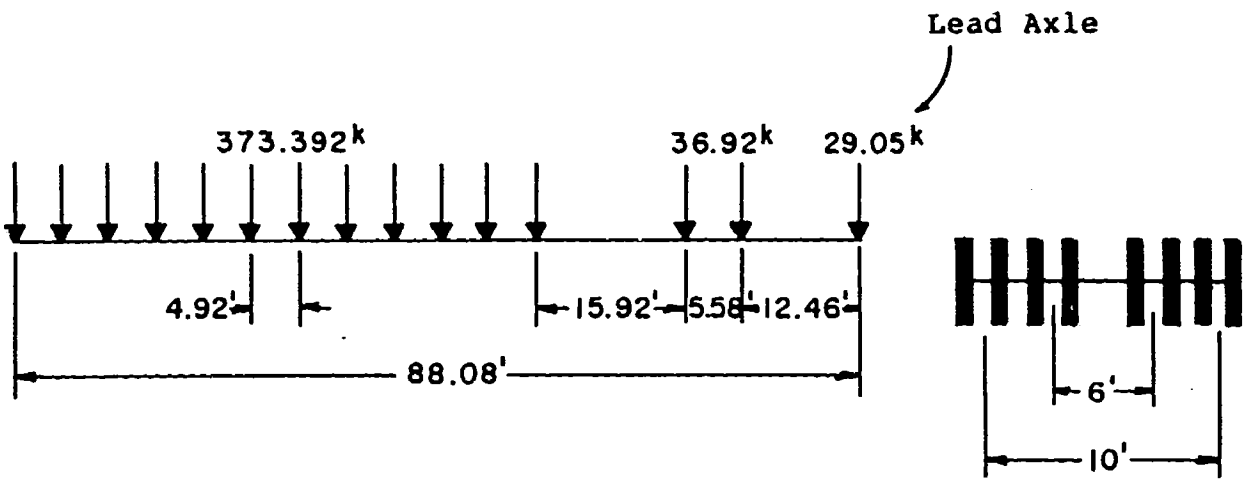
```
TRUCK STANDARD 5
VEHICLE WIDTH 12.
```

2. Individual Axle Input for Overload Vehicle 1

```
TRUCK INDIVIDUAL 12.94 17.75 22.68 4.33 22.68 16. -
                 29.13 6. 29.13 36. 29.2 6. -
                 29.2 14. 29.4 6. 29.4
OUTER WHEEL SPACING 10. 10. 10. 10. 10. 10. 10. 10. 10.
INNER WHEEL SPACING 6. 6. 6. 6. 6. 6. 6. 6. 6.
VEHICLE WIDTH 12.
```

3. Group Axle Input for Overload Vehicle 2

```
TRUCK GROUP 15. 1 0. 16.5 -
                 23. 2 4.5 14. -
                 29. 2 4.5 14. -
                 29. 2 4.5 20. -
                 29. 2 4.5 14. -
                 29. 2 4.5
OUTER WHEEL SPACING 6. 6. 6. 6. 6. 6.
VEHICLE WIDTH 12.
```



4. Group Axle Input

```
TRUCK GROUP 29.05 1 0. 12.46 -
            18.46 2 5.58 15.92 -
            31.116 12 4.92
OUTER WHEEL CONFIGURATION 10. 10. 10.
INNER WHEEL CONFIGURATION 6. 6. 6.
VEHICLE WIDTH 12.
```

NOTES:

(1) Standard vehicles have been implemented into the program for ease of input. These vehicle configurations are AASHTO design and legal vehicles and California P-series overloads. When the TRUCK STANDARD command is used, the outer and inner wheel spacing commands are not required.

Individual axle loads and spacings, using the TRUCK INDIVIDUAL command, or group axle configurations, using the TRUCK GROUP command, may be used. A group is defined as axles which have identical loads, longitudinal spacings, and transverse wheel spacings. The units are in kips and feet. When the TRUCK INDIVIDUAL or TRUCK GROUP command is used, the outer wheel spacing is required. A maximum of 30 axle loads may be entered for an analysis.

(2) Outer wheel spacings are specified in feet. The number of spacings should be equal to the number of indivdual axles or group axles entered previously.

(3) Inner wheel spacings are specified in feet. The number of spacings should be equal to the number of individual axles or group axles entered previously.

(4) The vehicle width is specified in feet. This value will be checked with the approach roadway width (Item 32) and the bridge width, curb-to-curb (Item 51) in the NBIF.

3.3.4 Impact Data Block

The impact of the overload vehicle is specified in the IMPACT data block.

A. Summary of Commands

IMPACT xx.x ... (1)

B. IMPACT Data Example

IMPACT 0.01 0.01 0.01 0.01 0.01 (assume no impact)

NOTES:

(1) IMPACT is an optional command. The value must correspond to those bridges entered in the STRUCTURE block. If IMPACT is omitted, the value will default to the AASHTO formula. Those impacts which are to have AASHTO values should be given a value of 0.0.

3.3.5 Transverse Distribution Data Block

The TRANSVERSE DISTRIBUTION data block specifies the ratio of the overload distribution to the rating vehicle distribution.

A. Summary of Commands

TRANSVERSE DISTRIBUTION RATIO xx.x ... (1)

B. TRANSVERSE DISTRIBUTION Data Example

TRA DIS RATIO 1.0 0.90 1.0 0.85 0.97
FINISH

NOTES:

(1) TRANSVERSE DISTRIBUTION is an optional command. The default is 1.0 which indicates an overload distribution equal to the rating vehicle distribution.

(2) The value of RATIO must correspond to those bridges entered in the STRUCTURE block. A ratio less than 1.0 indicates a better distribution for the overload vehicle than the rating vehicle.

* Required Input

The OVERLOAD commands and example number illustrating the use of the scan commands are as follows:

	Example Problem			
	1	2	3	4
WINDOWS OPTION:	X			
OVERLOAD COMMANDS:				
OVERLOAD	X	X	X	X
OUTPUT LEVEL 1	X	X		X
OUTPUT LEVEL 3			X	
STRUCTURE NUMBER	X	X	X	X
GIRDER SPACING		X	X	
OPERATING RATING		X	X	X
SLAB PLANS	X	X	X	X
CONTINUITY		X	X	X
TRUCK STANDARD	X			
TRUCK INDIVIDUAL				X
TRUCK GROUP		X	X	
OUTER WHEEL SPACING		X	X	X
INNER WHEEL SPACING				
VEHICLE WIDTH	X	X	X	X
IMPACT			X	
TRANSVERSE DIST. RATIO	X	X	X	X

4.1 Example Problem 1 - California P13 Vehicle with Windows Option

12

[F2] Legend Toggle OVERLOAD

ENTER OPTIONAL TITLE :

ENTER RESPONSE --->EXAMPLE PROBLEM 1: CALIFORNIA P13 OVERLOAD

14

[F2] Legend Toggle OUTPUT LEVEL

	-1-
Output Level	1

16

[F2] Legend Toggle STRUCTURE NUMBER

	-1-	-2-	-3-	-4-	-5-
Structure Number	461				
Structure Number					
Structure Number					
Structure Number					
Structure Number					

22

[F2] Legend Toggle SLAB PLANS

	-1-	-2-	-3-	-4-	-5-
Slab Plans	5				
Slab Plans					
Slab Plans					
Slab Plans					
Slab Plans					

24

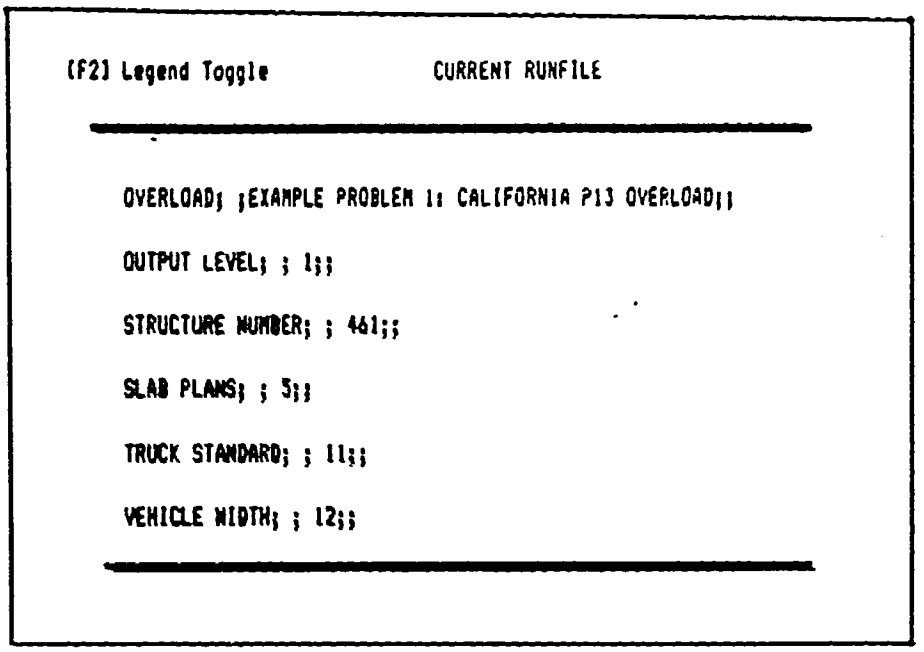
[F2] Legend Toggle TRUCK STANDARD

	-1-
Vehicle Code	11

34

[F2] Legend Toggle VEHICLE WIDTH

	-1-
Vehicle Width (ft)	12




```
ADOT OVERLOAD BRIDGE RATING (VERSION 1.3)

Do you want to read in the MENU file?
(Enter YES or NO)YES

Scan Echo Name  :CON
Output File Name:EXAMPLE1.OUT

OVERLOAD NOW EXECUTING

     OVERLOAD  "EXAMPLE PROBLEM 1: CALIFORNIA P13 OVERLOAD"
     OUTPUT LEVEL    1
     STRUCTURE NUMBER    461
     SLAB PLANS    5
     TRUCK STANDARD    11
     VEHICLE WIDTH    12
     FINISH

Stop - Program terminated.
```

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 1: CALIFORNIA P13 OVERLOAD

****

OVERLOAD SCAN ECHO

****

```
OVERLOAD   EXAMPLE PROBLEM 1: CALIFORNIA P13 OVERLOAD"
OUTPUT LEVEL     1
STRUCTURE NUMBER     461
SLAB PLANS     3
TRUCK STANDARD     11
VEHICLE WIDTH     12
FINISH
```

******* OVERLOAD ******* VERSION 1.3
ADOT OVERLOAD BRIDGE RATING BY JANSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 1: CALIFORNIA PIS OVERLOAD

****

OVERLOAD DATA CHECK

********** STRUCTURE DATA **********

STRUCTURE NUMBER	GIRDER SPACING (FT)	OPERATING RATING (0= NBIS DEFAULT)	CONTINUITY (0= NBIS DEFAULT) (1=SIMPLE) (2=CONTINUOUS)
461	.00	0	0

******* OVERLOAD ******* VERSION 1.3
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 1: CALIFORNIA P13 OVERLOAD

****
OVERLOAD DATA CHECK
****

********** SLAB PLAN DATA **********

SLAB SEQUENCE NUMBER	SLAB PLAN CODE	SLAB PLAN ACTUAL	TYPE OF ANALYSIS
1	5	CS-5-20 I	SPECIAL LEVEL 2

NOTE: SPECIAL LEVEL 2 DOES NOT CONSIDER A
SLAB WITH HINGES

******* OVERLOAD ******* (VERSION 1.3)
CDOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 1: CALIFORNIA P13 OVERLOAD

****

OVERLOAD DATA CHECK

****

********** TRUCK DATA **********

STANDARD VEHICLE: P13

AXLE LOAD ID	AXLE LOAD (KIPS)	AXLE LAYOUT (FT)	WHEEL SPACING OUTER (FT)	WHEEL SPACING INNER (FT)	AXLE GROUP ID
1	26.00	.00	6.00	.00	1
2	48.00	13.00	6.00	.00	2
3	48.00	36.00	6.00	.00	3
4	48.00	54.00	6.00	.00	4
5	48.00	72.00	6.00	.00	5
6	48.00	90.00	6.00	.00	6
7	48.00	108.00	6.00	.00	7

VEHICLE WIDTH 12.00 (FT)

******* OVERLOAD ******* (VERSION 1.0)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 1: CALIFORNIA P13 OVERLOAD

****
OVERLOAD DATA CHECK
****

********** IMPACT DATA **********

STRUCTURE NUMBER	IMPACT FACTOR
461	.00 *

ASTERISK (*) INDICATES DEFAULTS TO AASHTO IMPACT FORMULA

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 1: CALIFORNIA P13 OVERLOAD

****
OVERLOAD DATA CHECK
****

******** TRANSVERSE DISTRIBUTION DATA ********

STRUCTURE NUMBER	RATIO
461	1.00

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING B. IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 1: CALIFORNIA P13 OVERLOAD

****

NATIONAL BRIDGE INVENTORY FILE

****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	461
05	INVENTORY ROUTE	111C00404
07	FACILITY CARRIED BY STRUCTURE	I 40: WB
09	LOCATION	10.3 MI WEST OF JCT US191
11	MILEPOINT	323.08
27	YEAR BUILT/RECONSTRUCTION	5676
29	AVERAGE DAILY TRAFFIC	4400
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	38
34	SKEW (DEGREES)	30
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	201
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	5
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	30
49	STRUCTURE LENGTH (FT)	142
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	42.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	2
58	DECK CONDITION	8
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	244
66	INVENTORY RATING	229
67	STRUCTURAL CONDITION	8

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 1: CALIFORNIA P1J OVERLOAD

****

RESULTS

****

********** NBIP GENERAL INFORMATION **********

STRUCTURE NO.	461	YR BLT/RECON	56/7[illegible]
INVENTORY RT.	11000404	NO.SPANS,MAIN	3
FAC. CARRIED	I 40: WB	NO.SPANS,APP	0
LOCATION	10.3	LEN. MAX SPAN	3[illegible]
MILEPOINT	323.08	STRUCTURE LEN	142

STRUCTURE TYPE : REIN CONC SLAB (CONTIN)

******** OVERLOAD VEHICLE INFORMATION ********

	L.L. MOMENT PER LANE (K-FT)	AASHTO IMPACT	AASHTO LOAD DISTRIBUTION (LANES)
EXT SPAN	243.73	1.30	.0914
INT SPAN	208.07	1.30	.0862
BENT	-257.52	1.30	.0887

********** SPECIAL LEVEL 2 ANALYSIS **********
(HINGES NOT CONSIDERED)

EXTERIOR TO INTERIOR SPAN RATIO .817

	MOMENT - DEAD CAPACITY LOAD	L.L.MOMENT PLUS IMP.	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT SPAN	34.56	28.96	1.00	1.00	1.19
INT SPAN	35.46	23.32	1.00	1.00	1.52
BENT	40.39	-29.70	1.00	1.00	1.36

CONTROLLING OVLDRR = 1.19 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

4.2 Example Problem 2 - Overload Vehicle Mixed with Traffic (Truck Group)

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****

OVERLOAD SCAN ECHO

****

```
C
C            ---EXAMPLE PROBLEM 2---
C      OVERLOAD VEHICLE MIXED WITH TRAFFIC
C
OVERLOAD   "EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY"
OUTPUT LEVEL 1
C
C ---STRUCTURE DATA BLOCK---
C
STRUC NUMBER  1725 1727 881 1085 390 -  $ SLAB BRIDGES: 390 AND 463
              463
C
GIRDER SPACING  6.   9.  5. 5.58   0  -   $ TO BE ADDED LATER TO
                0                         $ LEVEL 1 EVALUATION
C
C
OPERATING RATING 256  256   0   0   0  -  $ RF OVERWRITE
                 0
C
SLAB PLANS  2  4                          $ SPECIAL LEVEL 2
C
CONTINUITY  0  0  2  2  0  0   $ P/S I-GIRDER: 881 AND 1085
C
C ---TRUCK DATA BLOCK---
C
C                                          $ 9 AXLES (GVW=234 KIPS)
C
TRUCK GROUP          12.94   1     0.     17.75  -
                     22.68   2     4.33   16.00  -
                     29.13   2     6.00   36.00  -
                     29.20   2     6.00   14.00  -
                     29.40   2     6.00
C
OUTER WHEEL SPACING  8.  8.  8.  8.  8.   $ TO BE ADDED LATER
C                                            TO LEVEL 1 EVALUATION
VEHICLE WIDTH 12.
C
C ---IMPACT DATA BLOCK---
C    (NOT REQUIRED FOR AASHTO DEFAULT)
C
C ---TRANSVERSE DISTRIBUTION DATA BLOCK---
C
C                                          $ ASSUME OVERLOAD AND HS20
TRA DIS FAT 0.75  0.75  0.90  0.90 0.97  -
            0.97
C
FINISH
```

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
OVERLOAD DATA CHECK
****

********** STRUCTURE DATA **********

STRUCTURE NUMBER	GIRDER SPACING (FT)	OPERATING RATING (0- NBIF DEFAULT)	CONTINUITY (0- NBIF DEFAULT) (1-SIMPLE) (2-CONTINUOUS)
1725	8.00	256	0
1723	9.00	256	0
881	8.00	0	2
1085	5.58	0	2
390	.00	0	0
463	.00	0	0

******* OVERLOAD ******* VERSION 1.3
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
OVERLOAD DATA CHECK
****

********** SLAB PLAN DATA **********

SLAB SEQUENCE NUMBER	SLAB PLAN CODE	SLAB PLAN ACTUAL	TYPE OF ANALYSIS
1	3	CS-2-20	SPECIAL LEVEL 2
2	4	CS-4-20	SPECIAL LEVEL 2

NOTE: SPECIAL LEVEL 2 DOES NOT CONSIDER A
SLAB WITH HINGES

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****

OVERLOAD DATA CHECK

****

********** TRUCK DATA **********

AXLE LOAD ID	AXLE LOAD (KIPS)	AXLE LAYOUT (FT)	WHEEL SPACING OUTER (FT)	WHEEL SPACING INNER (FT)	AXLE GROUP ID
1	13.94	.00	8.00	.00	1
2	22.68	17.75	8.00	.00	2
3	22.68	22.08	8.00	.00	2
4	29.13	38.08	8.00	.00	3
5	29.13	44.08	8.00	.00	3
6	29.20	80.08	8.00	.00	4
7	29.20	86.08	8.00	.00	4
8	29.40	100.08	8.00	.00	5
9	29.40	106.08	8.00	.00	5

VEHICLE WIDTH 12.00 (FT)

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
OVERLOAD DATA CHECK
****

********** IMPACT DATA **********

STRUCTURE NUMBER	IMPACT FACTOR
1725	.00 *
1727	.00 *
581	.00 *
1081	.00 *
390	.00 *
461	.00 *

ASTERISK (*) INDICATES DEFAULTS TO AASHTO IMPACT FORMULA

******* OVERLOAD ******* VERSION 1.3
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
OVERLOAD DATA CHECK
****

******** TRANSVERSE DISTRIBUTION DATA ********

STRUCTURE NUMBER	RATIO
1725	.75
1721	.75
881	.90
1085	.90
390	.97
463	.97

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
NATIONAL BRIDGE INVENTORY FILE
****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	1725
05	INVENTORY ROUTE	134000852
07	FACILITY CARRIED BY STRUCTURE	SS 85; RAMP B
09	LOCATION	JCT SS 85
11	MILEPOINT	154.41
27	YEAR BUILT/RECONSTRUCTION	7600
29	AVERAGE DAILY TRAFFIC	1000
30	YEAR OF AVERAGE DAILY TRAFFIC	85
32	APPROACH ROADWAY WIDTH (FT)	22
34	SKEW (DEGREES)	22
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	606
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	2
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	140
49	STRUCTURE LENGTH (FT)	274
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	26.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	1
58	DECK CONDITION	8
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	236
66	INVENTORY RATING	236
67	STRUCTURAL CONDITION	8

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMESEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	1725	YR BLT/RECON	76/ 0
INVENTORY RT.	10400085S	NO.SPANS,MAIN	1
FEAT. CARRIED	SS 85; RAMP B	NO.SPANS,APP	0
LOCATION	JCT SS 85	LEN. MAX SPAN	64
MILEPOINT	154.41	STRUCTURE LEN	174

STRUCTURE TYPE : P/S CONC BOX-S (CONTIN -NBIF DEFAULT)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT (TONS)	=	36.00
WT. RATING VEHICLE (TONS)	=	36.00
RF: OPERATING (NBIF OVERWRITE)	=	1.56

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	2240.00	NA	1.19
TWO	NA	1823.70	-2040.50	1.19

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)			
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	4522.79	NA	1.19 (AASHTO DEFAULT)
TWO	NA	3611.88	-2394.65	1.19 (AASHTO DEFAULT)

********** LEVEL 1 ANALYSIS **********
SPAN RATIO 1.00

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLRR
INT	2.02	.98	1.00	.75	1.05
BENT	2.02	.58	1.00	.75	1.77

CONTROLLING OVLRR = 1.05 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****

NATIONAL BRIDGE INVENTORY FILE

****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	1723
05	INVENTORY ROUTE	111000102
07	FACILITY CARRIED BY STRUCTURE	I 10; EB
09	LOCATION	19.5 M W JCT I10 I17
11	MILEPOINT	129.67
27	YEAR BUILT/RECONSTRUCTION	7800
29	AVERAGE DAILY TRAFFIC	5500
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	38
34	SKEW (DEGREES)	0
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	506
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	1
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	160
49	STRUCTURE LENGTH (FT)	163
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	42.3
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	1
58	DECK CONDITION	8
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	236
66	INVENTORY RATING	236
67	STRUCTURAL CONDITION	8

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****

RESULTS

****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	1713	YR BLT/RECON	78/ 0
INVENTORY RT.	111000102	NO.SPANS,MAIN	1
FAC. CARRIED	I 10: EB	NO.SPANS,APP	0
LOCATION	19.5 M W JCT I10 I17	LEN. MAX SPAN	160
MILEPOIN	129.67	STRUCTURE LEN	160

STRUCTURE TYPE : P/S CONC BOX-S (SIMPLE -NBIF DEFAULT)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT (TONS)	=	36.00
RT. RATING VEHICLE (TONS)	=	36.00
RF: OPERATING (NBIF OVERWRITE)	=	1.56

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	2768.00	NA	1.18

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)			
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	5644.84	NA	1.18 (AASHTO DEFAULT)

********** LEVEL 1 ANALYSIS **********

SPAN RATIO .000

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
SIMPLE	2.04	1.00	1.00	.75	1.02

CONTROLLING OVLDRR = 1.02 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
NATIONAL BRIDGE INVENTORY FILE
****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	881
05	INVENTORY ROUTE	111000102
07	FACILITY CARRIED BY STRUCTURE	I 10;EB
09	LOCATION	5.3 MI WEST JCT SR 360
11	MILEPOINT	149.62
27	YEAR BUILT/RECONSTRUCTION	6400
29	AVERAGE DAILY TRAFFIC	53000
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	52
34	SKEW (DEGREES)	14
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	502
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	4
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	52
49	STRUCTURE LENGTH (FT)	160
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	52.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	1
58	DECK CONDITION	8
59	SUPERSTRUCTURE CONDITION	7
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	269
66	INVENTORY RATING	248
67	STRUCTURAL CONDITION	9

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****

RESULTS

****

********** NBIP GENERAL INFORMATION **********

STRUCTURE NO.	881	YR BLT/RECON	64/
INVENTORY RT.	111000102	NO.SPANS,MAIN	4
FAC. CARRIED	I 10;EB	NO.SPANS,APP	0
LOCATION	5.3 MI WEST JCT SR 360	LEN. MAX SPAN	52
MILEPOINT	149.62	STRUCTURE LEN	180

STRUCTURE TYPE : P/S CONC STRG (CONTIN -NBIP OVERWRITE)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT	(TONS) =	69.00	
WT. RATING VEHICLE	(TONS) =	36.00	
RF: OPERATING (NBIP DEFAULT)	=	1.92	

SPAN	LIVE LOAD MOMENT PER LANE (K-FT) EXT	INT	BENT	AASHTO IMPACT
SIMPLE	NA	656.00	NA	1.28
THREE	215.03	368.21	-315.71	1.28

******** OVERLOAD VEHICLE INFORMATION ********

SPAN	LIVE LOAD MOMENT PER LANE (K-FT) EXT	INT	BENT	IMPACT	
SIMPLE	NA	959.70	NA	1.28	(AASHTO DEFAULT)
THREE	278.04	510.93	-495.83	1.28	(AASHTO DEFAULT)

********** LEVEL 1 ANALYSIS **********

SPAN RATIO .SIB

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT	1.46	.88	1.00	.90	1.65
INT	1.46	.93	1.00	.90	1.53
BENT	1.46	1.07	1.00	.90	1.36

CONTROLLING OVLDRR = 1.36 (NOTE- NEGATIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****

NATIONAL BRIDGE INVENTORY FILE

****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE ID.	1085
05	INVENTORY ROUTE	111000102
07	FACILITY CARRIED BY STRUCTURE.....	I 10; EB
09	LOCATION	26.0 MI N OF JCT I-8
11	MILEPOINT	173.12
27	YEAR BUILT/RECONSTRUCTION	6400
29	AVERAGE DAILY TRAFFIC	9500
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	38
34	SKEW (DEGREES)	30
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	502
44	STRUCTURE TYPE, APPROACH SPANS ...	0
45	NO. OF SPANS IN MAIN UNIT	17
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	79
49	STRUCTURE LENGTH (FT)	1337
51	BRIDGE WIDTH,CURB-TO-CURB (FT) ...	30.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	1
58	DECK CONDITION	7
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	251
66	INVENTORY RATING	245
67	STRUCTURAL CONDITION	7

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	1085	YR BLT/RECON	64/ 0
INVENTORY RT.	111000102	NO.SPANS,MAIN	1
FAC. CARRIED	I 10: EB	NO.SPANS,APP	0
LOCATION	25.0 MI N OF JCT I-8	LEN. MAX SPAN	79
MILEPOINT	173.12	STRUCTURE LEN	1337

STRUCTURE TYPE : P/S CONC STRG (CONTIN -NBIF OVERWRITE)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT (TONS)	=	51.00
WT. RATING VEHICLE (TONS)	=	36.00
RF: OPERATING (NBIF DEFAULT)	=	1.42

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	1142.00	NA	1.25
THREE	870.15	740.17	-702.80	1.25

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)				
SPAN	EXT	INT	BENT	IMPACT	
SIMPLE	NA	1730.10	NA	1.25	(AASHTO DEFAULT)
THREE	1311.65	887.98	-1451.75	1.25	(AASHTO DEFAULT)

********** LEVEL 1 ANALYSIS **********

SPAN RATIO .962

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT	1.51	.99	1.00	.90	1.04
INT	1.51	.79	1.00	.90	1.31
BENT	1.51	1.36	1.00	.90	.76

CONTROLLING OVLDRR = .76 (NOTE- NEGATIVE MOMENT CONTROLS)

***** LEVEL 2 ANALYSIS REQUIRED *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
NATIONAL BRIDGE INVENTORY FILE
****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	390
05	INVENTORY ROUTE	111000104
07	FACILITY CARRIED BY STRUCTURE	I 10; WB
09	LOCATION	10.9 MI NORTH JCT I 19
11	MILEPOINT	249.49
27	YEAR BUILT/RECONSTRUCTION	5390
29	AVERAGE DAILY TRAFFIC	16000
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	38
34	SKEW (DEGREES)	0
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	201
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	11
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	32
49	STRUCTURE LENGTH (FT)	343
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	42.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	1
58	DECK CONDITION	8
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	233
66	INVENTORY RATING	220
67	STRUCTURAL CONDITION	8

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
RESULTS
****

********** NBIP GENERAL INFORMATION **********

STRUCTURE NO.	390	YR BLT/RECON	55/80
INVENTORY RT.	111000104	NO.SPANS,MAIN	11
FAC. CARRIED	I 10; WB	NO.SPANS,APP	0
LOCATION	10.9	LEN. MAX SPAN	32
MILEPOINT	249.49	STRUCTURE LEN	343

STRUCTURE TYPE : REIN CONC SLAB (CONTIN)

******** OVERLOAD VEHICLE INFORMATION ********

	L.L. MOMENT PER LANE (K-FT)	AASHTO IMPACT	AASHTO LOAD DISTRIBUTION (LANES)
EXT SPAN	244.49	1.30	.0898
INT SPAN	236.96	1.30	.0845
BENT	-282.40	1.30	.0871

********** SPECIAL LEVEL 2 ANALYSIS **********
(HINGES NOT CONSIDERED)

EXTERIOR TO INTERIOR SPAN RATIO .816

	MOMENT - DEAD CAPACITY LOAD	L.L.MOMENT PLUS IMP.	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT SPAN	25.33	28.55	1.00	.97	.91
INT SPAN	26.18	26.02	1.00	.97	1.04
BENT	33.09	-31.96	1.00	.97	1.07

CONTROLLING OVLDRR = .91 (NOTE- POSITIVE MOMENT CONTROLS)

***** LEVEL 2 ANALYSIS REQUIRED *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE TRUCKING COMPANY

****
NATIONAL BRIDGE INVENTORY FILE
****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	463
05	INVENTORY ROUTE	111000102
07	FACILITY CARRIED BY STRUCTURE	I10;EB
09	LOCATION	17.1 MI E JCT I 19
11	MILEPOINT	277.46
27	YEAR BUILT/RECONSTRUCTION	5680
29	AVERAGE DAILY TRAFFIC	7500
30	YEAR OF AVERAGE DAILY TRAFFIC	82
32	APPROACH ROADWAY WIDTH (FT)	36
34	SKEW (DEGREES)	0
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	201
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	4
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	25
49	STRUCTURE LENGTH (FT)	94
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	35.9
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	2
58	DECK CONDITION	8
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	233
66	INVENTORY RATING	226
67	STRUCTURAL CONDITION	8

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 2: RELIABLE ROOFING COMPANY

****
RESULTS
****

********** USER GENERAL INFORMATION **********

STRUCTURE NO.	461	YR BLT/RECON	56 80
INVENTORY RT.	111000103	NO.SPANS,MAIN	4
FAC. CARRIED	I10;EB	NO.SPANS,APP	0
LOCATION	17.1	LEN. MAX SPAN	25
MILEPOINT	277.46	STRUCTURE LEN	94

STRUCTURE TYPE : REIN CONC SLAB (CONTIN)

******** OVERLOAD VEHICLE INFORMATION ********

	L.L. MOMENT PER LANE (K-FT)	AASHTO IMPACT	AASHTO LOAD DISTRIBUTION (LANES)
EXT SPAN	187.27	1.30	.0956
INT SPAN	147.88	1.30	.0909
BENT	-218.96	1.30	.0932

********** SPECIAL LEVEL 2 ANALYSIS **********
(HINGES NOT CONSIDERED)

EXTERIOR TO INTERIOR SPAN RATIO .920

	MOMENT - DEAD CAPACITY LOAD	L.L.MOMENT PLUS IMP.	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT SPAN	24.27	23.27	1.00	.97	1.08
INT SPAN	24.89	17.48	1.00	.97	1.47
BENT	30.69	-26.53	1.00	.97	1.19

CONTROLLING OVLDRR = 1.08 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

4.3 Example Problem 3 - Single Overload Vehicle

******* OVERLOAD ******* (VERSION 1.1)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
OVERLOAD SCAN ECHO
****

```
C
C            ---EXAMPLE PROBLEM 3---
C SINGLE OVERLOAD VEHICLE (NO MIXTURE WITH TRAFFIC)
C
OVERLOAD   "EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY"
OUTPUT LEVEL 3                              * NBIF OMITTED IN OUTPUT
C
C ---STRUCTURE DATA BLOCK---
C
STRUC NUMBER  1705 1733 981 1085 390 -  * SLAB BRIDGES: 390 AND 463
              463
C
GIRDER SPACING  8.   9.  8. 5.58   0  -    * TO BE ADDED LATER TO
                0                          * LEVEL 1 EVALUATION
C
C
OPERATING RATING 256  256   0   0   0  -  * RF OVERWRITE
                 0
C
SLAB PLANS  2  4                           * SPECIAL LEVEL 2
C
CONTINUITY  0  0  2  2  0  0   * P/S I-GIRDER: 981 AND 1085
C
C ---TRUCK DATA BLOCK---
C
C                                           * 9 AXLES  GVW=334 KIPS
C
TRUCK GROUP          12.94   1     0.      17.75  -
                     22.68   2     4.33    16.00  -
                     29.13   2     6.00    36.00  -
                     29.20   2     6.00    14.00  -
                     29.40   2     6.00
C
OUTER WHEEL SPACING  8.  8.  8.  8.  8.    * TO BE ADDED LATER
C                                             TO LEVEL 1 EVALUATION
VEHICLE WIDTH 12.
C
C ---IMPACT DATA BLOCK---
C
IMPACT  0.01 0.01 0.01 0.01 0.01 0.01      * ASSUME 5 MPH
C
C ---TRANSVERSE DISTRIBUTION DATA BLOCK---
C
C                                          * ASSUME OVERLOAD ONLY
TRA DIS FAT 0.50  0.50  0.55  0.55  0.60  -
            0.60
C
FINISH
```

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
OVERLOAD DATA CHECK
****

********** STRUCTURE DATA **********

STRUCTURE NUMBER	GIRDER SPACING (FT)	OPERATING RATING (0- NBIF DEFAULT)	CONTINUITY (0- NBIF DEFAULT) (1-SIMPLE) (2-CONTINUOUS)
1725	8.00	256	0
1723	9.00	256	0
881	8.00	0	2
1085	5.58	0	2
390	.00	0	0
463	.00	0	0

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
OVERLOAD DATA CHECK
****

********** SLAB PLAN DATA **********

SLAB SEQUENCE NUMBER	SLAB PLAN CODE	SLAB PLAN ACTUAL	TYPE OF ANALYSIS
1	2	CS-2-20	SPECIAL LEVEL 2
2	4	CS-4-20	SPECIAL LEVEL 2

NOTE: SPECIAL LEVEL 2 DOES NOT CONSIDER A
SLAB WITH HINGES

******* OVERLOAD ******* (VERSION 1.0)
ADOT OVERLOAD BRIDGE RATING BY JOSSEA AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
OVERLOAD DATA CHECK
****

********** TRUCK DATA **********

AXLE LOAD ID	AXLE LOAD (KIPS)	AXLE LAYOUT (FT)	WHEEL SPACING OUTER (FT)	WHEEL SPACING INNER (FT)	AXLE GROUP ID
1	12.94	.00	8.00	.00	1
2	22.68	17.75	8.00	.00	2
3	22.68	22.08	8.00	.00	2
4	29.10	38.08	8.00	.00	3
5	29.10	44.08	8.00	.00	3
6	29.20	80.08	8.00	.00	4
7	29.20	86.08	8.00	.00	4
8	29.40	100.08	8.00	.00	5
9	29.40	106.08	8.00	.00	5

VEHICLE WIDTH 12.00 (FT)

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
OVERLOAD DATA CHECK
****

********** IMPACT DATA **********

STRUCTURE NUMBER	IMPACT FACTOR
1725	.01
1723	.01
661	.01
1085	.01
390	.01
463	.01

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
OVERLOAD DATA CHECK
****

******** TRANSVERSE DISTRIBUTION DATA ********

STRUCTURE NUMBER	RATIO
1725	.50
1723	.50
881	.55
1085	.55
390	.60
463	.60

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	1725	YR BLT/RECON	75/ 0
INVENTORY RT.	13400085I	NO.SPANS,MAIN	2
FAC. CARRIED	85 85; RAMP B	NO.SPANS,APP	0
LOCATION	JCT 85 85	LEN. MAX SPAN	147
MILEPOINT	154.41	STRUCTURE LEN	274

STRUCTURE TYPE : P/S CONC BOX-S (CONTIN -NBIF DEFAULT)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT	(TONS) =	36.00
AT. RATING VEHICLE	(TONS) =	36.00
RF: OPERATING	(NBIF OVERWRITE) =	1.56

SPAN	LIVE LOAD MOMENT PER LANE (K-FT) EXT	INT	BENT	AASHTO IMPACT
SIMPLE	NA	2240.00	NA	1.19
TWO	NA	1823.70	-2040.50	1.19

******** OVERLOAD VEHICLE INFORMATION ********

SPAN	LIVE LOAD MOMENT PER LANE (K-FT) EXT	INT	BENT	IMPACT
SIMPLE	NA	4522.79	NA	1.01 (OVERWRITE)
TWO	NA	3611.88	-2394.65	1.01 (OVERWRITE)

********** LEVEL 1 ANALYSIS **********
SPAN RATIO 1.000

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
INT	2.02	.98	.85	.50	1.85
BENT	2.02	.56	.85	.50	3.12

CONTROLLING OVLDRR = 1.85 (NOTE- POSITIVE MOMENT CONTRCLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	1723	YR BLT/RECON	78/ 1
INVENTORY RT.	111000102	NO.SPANS,MAIN	1
FAC. CARRIED	I 10; EB	NO.SPANS,APP	0
LOCATION	19.5 M W JCT 110 117	LEN. MAX SPAN	160
MILEPOINT	129.67	STRUCTURE LEN	163

STRUCTURE TYPE : P/S CONC BOX-S (SIMPLE -NBIF DEFAULT)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT (TONS)	=	36.00
WT. RATING VEHICLE (TONS)	=	36.00
RF: OPERATING (NBIF OVERWRITE)	=	1.56

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	2768.00	NA	1.18

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)			
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	5644.84	NA	1.01 (OVERWRITE)

********** LEVEL 1 ANALYSIS **********
SPAN RATIO .000

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
SIMPLE	2.04	1.00	.86	.50	1.78

CONTROLLING OVLDRR = 1.78 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	881	YR BLT/RECON	64/ 0
INVENTORY RT.	111000102	NO.SPANS,MAIN	4
FAC. CARRIED	I 10;EB	NO.SPANS,APP	0
LOCATION	3.2 MI WEST JCT SR 360	LEN. MAX SPAN	52
MILEPOINT	149.62	STRUCTURE LEN	160

STRUCTURE TYPE : P/S CONC STRG (CONTIN -NBIF OVERWRITE)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT	(TONS)	=	69.00
WT. RATING VEHICLE	(TONS)	=	36.00
RF: OPERATING	(NBIF DEFAULT)	=	1.92

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	656.00	NA	1.28
THREE	215.03	368.21	-315.71	1.28

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)				
SPAN	EXT	INT	BENT	IMPACT	
SIMPLE	NA	959.70	NA	1.01	(OVERWRITE)
THREE	278.04	510.93	-495.83	1.01	(OVERWRITE)

********** LEVEL 1 ANALYSIS **********
SPAN RATIO .538

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT	1.46	.88	.79	.55	3.42
INT	1.46	.95	.79	.55	3.19
BENT	1.46	1.07	.79	.55	2.82

CONTROLLING OVLDRR = 2.82 (NOTE- NEGATIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	1065	YR BLT/RECON	64/ 0
INVENTORY RT.	111000102	NO.SPANS,MAIN	17
FAC. CARRIED	I 10; EB	NO.SPANS,APP	0
LOCATION	26.0 MI N OF JCT I-8	LEN. MAX SPAN	79
MILEPOINT	173.12	STRUCTURE LEN	1337

STRUCTURE TYPE : P/S CONC STRG (CONTIN -NBIF OVERWRITE)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT	(TONS)	=	51.00
WT. RATING VEHICLE	(TONS)	=	36.00
RF: OPERATING	(NBIF DEFAULT)	=	1.42

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	1142.00	NA	1.25
THREE	870.15	740.17	-702.80	1.25

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)			
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	1730.10	NA	1.01 (OVERWRITE)
THREE	1311.65	887.98	-1451.75	1.01 (OVERWRITE)

********** LEVEL 1 ANALYSIS **********
SPAN RATIO .962

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT	1.51	.99	.81	.55	2.11
INT	1.51	.79	.81	.55	2.65
BENT	1.51	1.36	.81	.55	1.54

CONTROLLING OVLDRR = 1.54 (NOTE- NEGATIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	390	YR BLT/RECON	53/90
INVENTORY RT.	111000104	NO.SPANS,MAIN	11
FAC. CARRIED	I 10; WB	NO.SPANS,APP	0
LOCATION	10.9	LEN. MAX SPAN	32
MILEPOINT	249.49	STRUCTURE LEN	343

STRUCTURE TYPE : REIN CONC SLAB (CONTIN)

******** OVERLOAD VEHICLE INFORMATION ********

	L.L. MOMENT PER LANE (K-FT)	AASHTO IMPACT	AASHTO LOAD DISTRIBUTION (LANES)
EXT SPAN	244.49	1.30	.0898
INT SPAN	236.96	1.30	.0845
BENT	-252.40	1.30	.0871

********** SPECIAL LEVEL 2 ANALYSIS **********
(HINGES NOT CONSIDERED)

EXTERIOR TO INTERIOR SPAN RATIO .816

	MOMENT - DEAD CAPACITY LOAD	L.L.MOMENT PLUS IMP.	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT SPAN	25.33	28.55	.78	.60	1.90
INT SPAN	26.18	26.02	.78	.60	2.16
BENT	33.09	-31.96	.78	.60	2.22

CONTROLLING OVLDRR = 1.90 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 3: RELIABLE TRUCKING COMPANY

****
RESULTS
****

********** NBIS GENERAL INFORMATION **********

STRUCTURE NO.	463	YR BLT/RECON	56/69
INVENTORY RT.	111000102	NO.SPANS,MAIN	4
FAC. CARRIED	I10;EB	NO.SPANS,APP	0
LOCATION	17.1	LEN. MAX SPAN	28
MILEPOINT	277.46	STRUCTURE LEN	94

STRUCTURE TYPE : REIN CONC SLAB (CONTIN)

******** OVERLOAD VEHICLE INFORMATION ********

	L.L. MOMENT PER LANE (K-FT)	AASHTO IMPACT	AASHTO LOAD DISTRIBUTION (LANES)
EXT SPAN	187.27	1.30	.0956
INT SPAN	147.88	1.30	.0909
BENT	-218.96	1.30	.0932

********** SPECIAL LEVEL 2 ANALYSIS **********
(HINGES NOT CONSIDERED)

EXTERIOR TO INTERIOR SPAN RATIO .820

	MOMENT - DEAD CAPACITY LOAD	L.L.MOMENT PLUS IMP.	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT SPAN	24.27	23.27	.78	.60	2.24
INT SPAN	24.89	17.48	.78	.60	3.06
BENT	30.69	-26.53	.78	.60	2.48

CONTROLLING OVLDRR = 2.24 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

4.4 Example Problem 4 - Overload Vehicle Mixed with Traffic (Truck Individual)

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
OVERLOAD SCAN ECHO
****

```
C
C            ---EXAMPLE PROBLEM 4---
C      OVERLOAD VEHICLE MIXED WITH TRAFFIC
C
OVERLOAD   "EXAMPLE PROBLEM 4: ANDERSON TRUCKING"
OUTPUT LEVEL 1
C
C ---STRUCTURE DATA BLOCK---
C
C                                          * RATING ON ROUTE I-40
C
STRUC NUMBER    461  539 519 1596 845 758  * SLAB BRIDGES: 461
C                                          * P/S I-GIRDER: 519,1596
C GIRDER SPACING                           * TO BE ADDED LATER TO
C (DEFAULT IS 0.)                            LEVEL 1 EVALUATION
C
OPERATING RATING 244 241 233 245 269 251   * RF OVERWRITE
C
SLAB PLANS 5
C
CONTINUITY 0 0 2 2 0 0
C
C ---TRUCK DATA BLOCK---
C
C                                          * 6 AXLES (GVW=113 KIPS)
C
TRUCK INDIVIDUAL     9.770   13.50  23.345 4.33 23.345 29.0 -
                    18.997    4.17  18.997 4.17 18.997
C
C
OUTER WHEEL SPACING  8.  8.  8.  8.  8.  8. * TO BE ADDED LATER
C                                              TO LEVEL 1 EVALUATION
VEHICLE WIDTH 12.
C
C ---IMPACT DATA BLOCK---
C    (NOT REQUIRED FOR AASHTO DEFAULT)
C
C ---TRANSVERSE DISTRIBUTION DATA BLOCK---
C
C                                            * ASSUME OVERLOAD AND HS20
TRA DIS RAT 0.97  0.80  0.90  0.90 0.90  0.90
C
FINISH
```

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
OVERLOAD DATA CHECK
****

********** STRUCTURE DATA **********

STRUCTURE NUMBER	GIRDER SPACING (FT.)	OPERATING RATING (0= NBIF DEFAULT)	CONTINUITY (0= NBIF DEFAULT) (1=SIMPLE) (2=CONTINUOUS)
461	.00	244	0
539	.00	241	0
519	.00	333	2
1596	.00	245	2
845	.00	269	0
758	.00	251	0

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
OVERLOAD DATA CHECK
****

********** SLAB PLAN DATA **********

SLAB SEQUENCE NUMBER	SLAB PLAN CODE	SLAB PLAN ACTUAL	TYPE OF ANALYSIS
1	5	03-5-20 I	SPECIAL LEVEL 2

NOTE: SPECIAL LEVEL 2 DOES NOT CONSIDER A.
SLAB WITH HINGES

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****

OVERLOAD DATA CHECK

****

********** TRUCK DATA **********

AXLE LOAD ID	AXLE LOAD (KIPS)	AXLE LAYOUT (FT)	WHEEL SPACING OUTER (FT)	WHEEL SPACING INNER (FT)	AXLE GROUP ID
1	9.77	.00	8.00	.00	1
2	23.34	13.50	8.00	.00	2
3	23.34	17.83	8.00	.00	3
4	19.00	46.83	8.00	.00	4
5	19.00	51.00	8.00	.00	5
6	19.00	55.17	8.00	.00	6

VEHICLE WIDTH 12.00 (FT)

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****

OVERLOAD DATA CHECK

****

********** IMPACT DATA **********

STRUCTURE NUMBER	IMPACT FACTOR
461	.00 *
509	.00 *
519	.00 *
1596	.00 *
545	.00 *
758	.00 *

ASTERISK (*) INDICATES DEFAULTS TO AASHTO IMPACT FORMULA

******* OVERLOAD ******* VERSION 1.3
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
OVERLOAD DATA CHECK
****

******** TRANSVERSE DISTRIBUTION DATA ********

STRUCTURE NUMBER	RATIO
451	.97
529	.80
519	.90
1596	.90
845	.90
758	.90

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
NATIONAL BRIDGE INVENTORY FILE
****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	461
05	INVENTORY ROUTE	111000404
07	FACILITY CARRIED BY STRUCTURE	I 40; WB
09	LOCATION	10.3 MI WEST OF JCT US191
11	MILEPOINT	323.08
27	YEAR BUILT/RECONSTRUCTION	5676
29	AVERAGE DAILY TRAFFIC	4400
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	38
34	SKEW (DEGREES)	30
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	201
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	5
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	30
49	STRUCTURE LENGTH (FT)	142
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	42.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	2
58	DECK CONDITION	8
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	244
66	INVENTORY RATING	229
67	STRUCTURAL CONDITION	8

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMSSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	461	YR BLT/RECON	56/76
INVENTORY RT.	111000404	NO.SPANS,MAIN	5
FAC. CARRIED	I 40; WB	NO.SPANS,APP	0
LOCATION	10.3	LEN. MAX SPAN	30
MILEPOINT	323.08	STRUCTURE LEN	142

STRUCTURE TYPE : REIN CONC SLAB (CONTIN)

******** OVERLOAD VEHICLE INFORMATION ********

	L.L. MOMENT PER LANE (K-FT)	AASHTO IMPACT	AASHTO LOAD DISTRIBUTION (LANES)
EXT SPAN	213.56	1.30	.0914
INT SPAN	201.29	1.30	.0862
BENT	-185.06	1.30	.0887

********** SPECIAL LEVEL 2 ANALYSIS **********
(HINGES NOT CONSIDERED)

EXTERIOR TO INTERIOR SPAN RATIO .817

	MOMENT - DEAD CAPACITY LOAD	L.L.MOMENT PLUS IMP.	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT SPAN	34.56	25.37	1.00	.97	1.40
INT SPAN	35.46	22.56	1.00	.97	1.62
BENT	40.39	-21.35	1.00	.97	1.95

CONTROLLING OVLDRR = 1.40 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
NATIONAL BRIDGE INVENTORY FILE
****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	539
05	INVENTORY ROUTE	111000402
07	FACILITY CARRIED BY STRUCTURE	I 40; EB
09	LOCATION	7.9 E JCT SR 77
11	MILEPOINT	300.75
27	YEAR BUILT/RECONSTRUCTION	5900
29	AVERAGE DAILY TRAFFIC	4600
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	38
34	SKEW (DEGREES)	15
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	505
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	10
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	32
49	STRUCTURE LENGTH (FT)	322
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	30.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	2
58	DECK CONDITION	8
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	241
66	INVENTORY RATING	234
67	STRUCTURAL CONDITION	8

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	539	YR BLT/RECON	59/ 0
INVENTORY RT.	11000402	NO.SPANS,MAIN	10
FAC. CARRIED	I 40; EB	NO.SPANS,APP	0
LOCATION	7.9 E JCT SR 77	LEN. MAX SPAN	32
MILEPOINT	300.75	STRUCTURE LEN	322

STRUCTURE TYPE : P/S CONC BOX-M (SIMPLE -NBIF DEFAULT)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT (TONS)	=	41.00
WT. RATING VEHICLE (TONS)	=	36.00
RF: OPERATING (NBIF OVERWRITE)	=	1.14

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	312.32	NA	1.30

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)			
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	376.71	NA	1.30 (AASHTO DEFAULT)

********** LEVEL 1 ANALYSIS **********
SPAN RATIO 1.000

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
SIMPLE	1.21	1.00	1.00	.80	1.18

CONTROLLING OVLDRR = 1.18 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****

NATIONAL BRIDGE INVENTORY FILE

****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	519
05	INVENTORY ROUTE	111000402
07	FACILITY CARRIED BY STRUCTURE	I 40; EB
09	LOCATION	1.8 MI E OF JCT SR 87
11	MILEPOINT	259.60
27	YEAR BUILT/RECONSTRUCTION	5880
29	AVERAGE DAILY TRAFFIC	4650
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	38
34	SKEW (DEGREES)	20
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	502
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	8
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	51
49	STRUCTURE LENGTH (FT)	402
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	42.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	2
58	DECK CONDITION	8
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	233
66	INVENTORY RATING	230
67	STRUCTURAL CONDITION	8

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	519	YR BLT/RECON	58/80
INVENTORY RT.	111000402	NO.SPANS,MAIN	3
FAC. CARRIED	I 40; EB	NO.SPANS,APP	0
LOCATION	1.6 MI E OF JCT SR 97	LEN. MAX SPAN	51
MILEPOINT	259.60	STRUCTURE LEN	402

STRUCTURE TYPE : P/S CONC STRG (CONTIN -NBIF OVERWRITE)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT	(TONS) =	33.00	
WT. RATING VEHICLE	(TONS) =	36.00	
RF: OPERATING	(NBIF OVERWRITE) =	.92	

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	638.00	NA	1.28
THREE	467.53	403.92	-345.09	1.28

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)				
SPAN	EXT	INT	BENT	IMPACT	
SIMPLE	NA	647.42	NA	1.28	(AASHTO DEFAULT)
THREE	483.55	350.96	-483.77	1.28	(AASHTO DEFAULT)

********** LEVEL 1 ANALYSIS **********
SPAN RATIO .941

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT	1.01	1.02	1.00	.90	.98
INT	1.01	.86	1.00	.90	1.17
BENT	1.01	1.38	1.00	.90	.73

CONTROLLING OVLDRR = .73 (NOTE- NEGATIVE MOMENT CONTROLS)

***** LEVEL 2 ANALYSIS REQUIRED *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
NATIONAL BRIDGE INVENTORY FILE
****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	1596
05	INVENTORY ROUTE	111000402
07	FACILITY CARRIED BY STRUCTURE	I 40; EB
09	LOCATION	11.6 MI EAST OF JCT SR 99
11	MILEPOINT	256.95
27	YEAR BUILT/RECONSTRUCTION	7200
29	AVERAGE DAILY TRAFFIC	4850
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	38
34	SKEW (DEGREES)	20
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	502
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	13
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	77
49	STRUCTURE LENGTH (FT)	1004
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	38.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	1
58	DECK CONDITION	6
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	245
66	INVENTORY RATING	240
67	STRUCTURAL CONDITION	6

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	1596	YR BLT/RECON	72/ 0
INVENTORY RT.	111000402	NO.SPANS,MAIN	13
FAC. CARRIED	I 40; EB	NO.SPANS,APP	0
LOCATION	11.6 MI EAST OF JCT SR 99	LEN. MAX SPAN	77
MILEPOINT	256.95	STRUCTURE LEN	1004

STRUCTURE TYPE : P/S CONC STRG (CONTIN -NBIF OVERWRITE)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT (TONS)	=	45.00
WT. RATING VEHICLE (TONS)	=	36.00
RF: OPERATING (NBIF OVERWRITE)	=	1.25

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	1106.00	NA	1.25
THREE	881.77	722.12	-695.63	1.25

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)			
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	1191.40	NA	1.25 (AASHTO DEFAULT)
THREE	943.20	724.69	-666.52	1.25 (AASHTO DEFAULT)

********** LEVEL 1 ANALYSIS **********
SPAN RATIO 1.000

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT	1.08	.99	1.00	.90	1.30
INT	1.08	.93	1.00	.90	1.38
BENT	1.08	.89	1.00	.90	1.45

CONTROLLING OVLDRR = 1.30 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
NATIONAL BRIDGE INVENTORY FILE
****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	845
05	INVENTORY ROUTE	111000404
07	FACILITY CARRIED BY STRUCTURE	I 40; WB
09	LOCATION	15.5 MI W OF SR 99
11	MILEPOINT	229.90
27	YEAR BUILT/RECONSTRUCTION	6500
29	AVERAGE DAILY TRAFFIC	4500
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	38
34	SKEW (DEGREES)	0
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	402
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	3
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	104
49	STRUCTURE LENGTH (FT)	238
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	30.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	1
58	DECK CONDITION	7
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	269
66	INVENTORY RATING	246
67	STRUCTURAL CONDITION	8

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	845	YR BLT/RECON	65/ 0
INVENTORY RT.	111000404	NO.SPANS,MAIN	3
FAC. CARRIED	I 40; WB	NO.SPANS,APP	0
LOCATION	15.5 MI W OF SR 99	LEN. MAX SPAN	104
MILEPOINT	229.90	STRUCTURE LEN	238

STRUCTURE TYPE : STEEL STRG (CONTIN -NBIF DEFAULT)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT (TONS)	=	69.00
WT. RATING VEHICLE (TONS)	=	36.00
RF: OPERATING (NBIF OVERWRITE)	=	1.92

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	1592.00	NA	1.22
THREE	768.43	964.77	-848.98	1.22

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)				
SPAN	EXT	INT	BENT	IMPACT	
SIMPLE	NA	1924.10	NA	1.22	(AASHTO DEFAULT)
THREE	773.95	1077.48	-915.01	1.22	(AASHTO DEFAULT)

********** LEVEL 1 ANALYSIS **********
SPAN RATIO .644

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
EXT	1.21	.83	1.00	.90	2.11
INT	1.21	.92	1.00	.90	1.91
BENT	1.21	.89	1.00	.90	1.98

CONTROLLING OVLDRR = 1.91 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBSEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
NATIONAL BRIDGE INVENTORY FILE
****

********** STATE OF ARIZONA **********

ITEM NUMBER	ITEM NAME	
08	STRUCTURE NO.	758
05	INVENTORY ROUTE	130002790
07	FACILITY CARRIED BY STRUCTURE	SR 279;FAS 326
09	LOCATION	08.8M.N.JCT I17
11	MILEPOINT	296.08
27	YEAR BUILT/RECONSTRUCTION	6300
29	AVERAGE DAILY TRAFFIC	3500
30	YEAR OF AVERAGE DAILY TRAFFIC	83
32	APPROACH ROADWAY WIDTH (FT)	40
34	SKEW (DEGREES)	25
41	OPEN(A),POSTED(P),CLOSED(C)	A
43	STRUCTURE TYPE, MAIN	402
44	STRUCTURE TYPE, APPROACH SPANS	0
45	NO. OF SPANS IN MAIN UNIT	2
46	NO. OF APPROACH SPANS	0
48	LENGTH OF MAXIMUM SPAN (FT)	90
49	STRUCTURE LENGTH (FT)	184
51	BRIDGE WIDTH,CURB-TO-CURB (FT)	30.0
53	MINIMUM VERTICAL CLEARANCE	9999
57	WEARING SURFACE	1
58	DECK CONDITION	8
59	SUPERSTRUCTURE CONDITION	8
60	SUBSTRUCTURE CONDITION	8
64	OPERATING RATING	251
66	INVENTORY RATING	233
67	STRUCTURAL CONDITION	8

******* OVERLOAD ******* (VERSION 1.3)
ADOT OVERLOAD BRIDGE RATING BY IMBEEN AND ASSOCIATES, INC.

EXAMPLE PROBLEM 4: ANDERSON TRUCKING

****
RESULTS
****

********** NBIF GENERAL INFORMATION **********

STRUCTURE NO.	758	YR BLT/RECON	63/ 0
INVENTORY RT.	130002790	NO.SPANS,MAIN	2
FAC. CARRIED	SR 279;FAS 326	NO.SPANS,APP	0
LOCATION	08.8M.N.JCT I17	LEN. MAX SPAN	90
MILEPOINT	296.08	STRUCTURE LEN	184

STRUCTURE TYPE : STEEL STRG (CONTIN -NBIF DEFAULT)

********** RATING VEHICLE INFORMATION ********
HS20 TRUCK

OPERATING WEIGHT (TONS)	=	51.00
WT. RATING VEHICLE (TONS)	=	36.00
RF: OPERATING (NBIF OVERWRITE)	=	1.42

	LIVE LOAD MOMENT PER LANE (K-FT)			AASHTO
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	1340.00	NA	1.23
TWO	NA	1086.18	-951.75	1.23

******** OVERLOAD VEHICLE INFORMATION ********

	LIVE LOAD MOMENT PER LANE (K-FT)			
SPAN	EXT	INT	BENT	IMPACT
SIMPLE	NA	1542.90	NA	1.23 (AASHTO DEFAULT)
TWO	NA	1236.96	-777.18	1.23 (AASHTO DEFAULT)

********** LEVEL 1 ANALYSIS **********

SPAN RATIO 1.000

	MOMENT RATIO	CONTIN	IMPACT RATIO	TRAN. RATIO	OVLDRR
INT	1.15	.99	1.00	.90	1.38
BENT	1.15	.71	1.00	.90	1.93

CONTROLLING OVLDRR = 1.38 (NOTE- POSITIVE MOMENT CONTROLS)

***** THIS BRIDGE IS A GO *****

5.0 REFERENCES

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10. "Structures Bridgelog Reports SI&A Reports NBI and PMF Update Program User Documentation," February 18, 1982.

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15. "Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges," FHWA, January, 1979.