

GRIMES

LIVE LOAD

CASE

PROGRAM

REVISED: 4/91

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1.0 DESCRIPTION OF PROGRAM

"LIVE LOAD CASE" is a computer program that can be used to find the input needed for the Multiple Column Pier Program. Using the range of possible truck loadings (see diagram on page 6) the program will find many different loading combinations with corresponding beam reactions.

A.) Loading Possibilities

There are 5 different truck loading strategies in this program. Each different strategy will create several loading cases as more trucks are added.

Strategy 1 is to place one truck at the left edge of the Range of Possible Loading. At this location one truck at a time will be added to the right until the maximum number of trucks is reached. Everytime a truck is added a new case is created.

Strategy 2 is to place one truck at the right edge of the Range of Possible Loading. The procedure for this location will be the same as location 1 except the trucks will be added to the left.

Strategy 3 is to place the one truck in such a way as to straddle the center beam. Additional trucks will then be added on each side of the first truck to get more cases.

Strategy 4 is to place one truck on each side of the center line of the bridge. Additional trucks will then be added to get more cases.

Strategy 5 is to place one truck at each end of the Range of Possible Loading. Additional trucks will then be added to get more cases.

2.0 INPUT DATA REQUIREMENTS

A.) Identification (B20 in c.c. 1-4)

The identification consists of one line of input data containing the problem number (c.c. 5-8) and pertinent identifying remarks (c.c. 9-80).

B.) Data

1.) row 2

- a.) WIDTH (c.c. 1-6) FORM: xxx.xxx ft
Total width of bridge.
- b.) X1 (c.c. 7-11) FORM: xx.xxx ft
Distance from left edge of bridge to starting location of where loads can be applied.
- c.) X2 (c.c. 12-16) FORM: xx.xxx ft
Distance from right edge of bridge to ending location of where loads can be applied.
- d.) XMID (c.c. 17-21) FORM: xx.xxx ft
Distance from left edge of bridge to center line of bridge.
- e.) NBM (c.c. 22-23) FORM: xx
Number of beams for the bridge.
- f.) LOAD (c.c. 24-29) FORM: xxx.xxx ft
Maximum resultant truck load at pier.

1.625

2.0 INPUT DATA REQUIREMENTS, cont.

g.) MT (c.c. 30-31)

FORM: xx

Maximum trucks allowed on bridge. Program defaults to 12 ft. lanes.

OPTIONAL INPUT DATA - needed only if dummy loads at the column faces are desired.

h.) NC (c.c. 32-33)

FORM: xx

Number of columns of pier.

i.) CWID (c.c. 34-38)

FORM: xx.xxx ft

Column width.

j.) SKEW (c.c. 39-41)

FORM: xxx degrees

Skew angle of pier. This angle is measured from a line that is perpendicular to the bridge to the center line of the pier.

2.) row 3

a.) Perpendicular Beam Spacings (c.c. 1-80) FORM: x.xxx ft

Perpendicular Beam spacings for bridge (see input form).

3.) row 4

a.) Skewed Column Spacings (c.c. 1-36) FORM: xx.xxx ft

Column spacings along the pier. The spacings are skewed. Required if optional input data NC, CWID, and SKEW where inputted.

GEORGIA DEPARTMENT OF TRANSPORTATION - OFFICE OF BRIDGE DESIGN

BRIDGE LIVE LOAD CASE PROGRAM (BRLLCA)

PROJECT NO.	COUNTY	NAME	DATE	REMARKS, ETC.
PROG. NO.				
* B 2 0				

DATA					OPTIONAL				
WIDTH (FT)	X1 (FT)	X2 (FT)	XMID (FT)	NBM	LOAD (KIPS)	MT	NC	CWID (FT)	SKEW
1	7	12	17	24			32		42

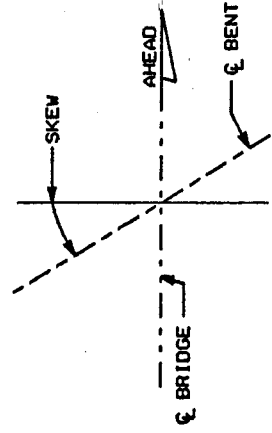
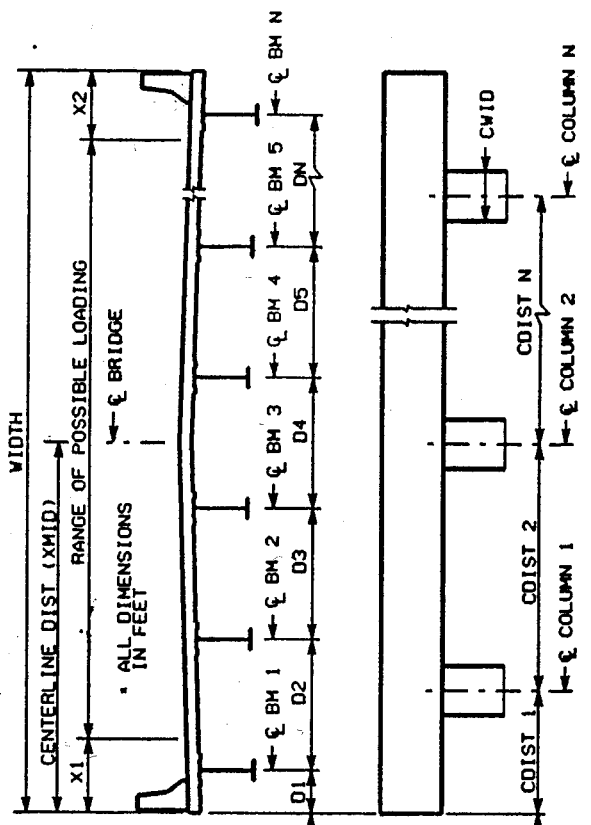
NBM - NUMBER OF BEAMS
 LOAD - ACTUAL LOAD APPLIED
 MT - MAX. NUMBER OF TRUCKS
 DEFAULT TO AASHTO SPECS
 NC - NUMBER OF COLUMNS
 CWID - COLUMN WIDTH
 SKEW - APPROXIMATE SKEW ANGLE IN DEGREES

* INPUT IF DUMMY LOADS AT THE COLUMN FACES ARE WANTED.

PERPENDICULAR BEAM SPACINGS (FT.)																
1	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16

SKEWED COLUMN SPACINGS (FT.)							
1	CDIST1	CDIST2	CDIST3	CDIST4	CDIST5	CDIST6	CDIST7

** REQUIRED ONLY IF THE OPTIONAL DATA IS INPUTTED.



3.0 OUTPUT DATA

Input information will first be outputted followed by each individual live load case with a corresponding illustration and beam reactions. The last page of output is a summary sheet. This summary will contain the live load cases, the beam numbers and the corresponding beam reactions. Also, the input for the pier program will be listed at the end of the output. This input for the pier will contain the dummy loads if the option was chosen.

GEORGIA DEPARTMENT OF TRANSPORTATION - OFFICE OF BRIDGE DESIGN
BRIDGE LIVE LOAD CASE PROGRAM (BRLLCA)

PROJECT NO.	COUNTY	NAME	DATE	REMARKS	ETC.								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">PROG. NO.</td> <td style="width: 10%;">29</td> <td style="width: 10%;">45</td> <td style="width: 10%;">58</td> </tr> <tr> <td colspan="4" style="text-align: center;">* B 2 0 0 0 0 T.E.S.T.</td> </tr> </table>						PROG. NO.	29	45	58	* B 2 0 0 0 0 T.E.S.T.			
PROG. NO.	29	45	58										
* B 2 0 0 0 0 T.E.S.T.													

DATA

WIDTH (FT)	X1 (FT)	X2 (FT)	NBM	LOAD (KIPS)	MT	NC	CVID (FT)	SKEW
47.250	3.625	3.625	8	55.000	4	3	30.00	1.6

* INPUT IF DUMMY LOADS AT THE COLUMN FACES ARE WANTED.

NBM - NUMBER OF BEAMS
LOAD - ACTUAL LOAD APPLIED
MT - MAX. NUMBER OF TRUCKS
 DEFAULT TO AASHTO SPECS
NC - NUMBER OF COLUMNS
CVID - COLUMN WIDTH
SKEW - APPROXIMATE SKEW ANGLE IN DEGREES

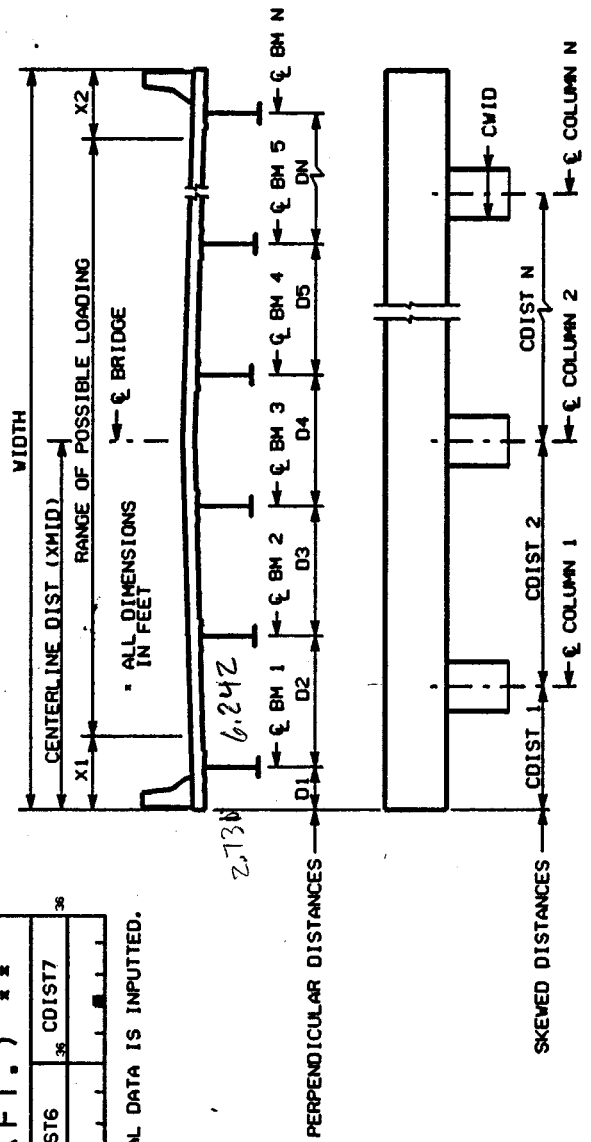
PERPENDICULAR BEAM SPACINGS (FT.)

D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16
2.625	6.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

SKEWED COLUMN SPACINGS (FT.) **

COIST1	COIST2	COIST3	COIST4	COIST5	COIST6	COIST7
5.577	19.000	19.000				

** REQUIRED ONLY IF THE OPTIONAL DATA IS INPUTTED.



17-APR-91

GEORGIA DEPARTMENT OF TRANSPORTATION

09:58:12

LIVE LOAD CASE PROGRAM

PROB. NO. 0000

TEST

BRIDGE			CENTER LINE	# OF	REACTION	MAXIMUM #	# OF	COLUMN	SKEW										
WIDTH	X1	X2	DISTANCE	BEAMS	FORCE	OF TRUCKS	COLUMNS	WIDTH	ANGLE										
47.250	3.625	3.625	23.625	8	55.000	4	3	3.000	16										
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
2.625	6.000	6.000	6.000	6.000	6.000	6.000	6.000												
XCCL1	XCCL2	XCCL3	XCCL4	XCCL5															
5.577	19.000	19.000																	

LIVE LOAD CASE # 1 1 TRUCKS

* *
 * *
 * *
 *** ***
 * *

I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I

BEAM	WHEEL FRACTION	P-LOAD
1	0.8333	45.833
2	1.0000	55.000
3	0.1667	9.167
4	0.0000	0.000
5	0.0000	0.000
6	0.0000	0.000
7	0.0000	0.000
8	0.0000	0.000

LIVE LOAD CASE # 2 2 TRUCKS

* * * *
 * * * *
 * * * *
 *** *** *** ***
 * * * *

I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I

BEAM	WHEEL FRACTION	P-LOAD
1	0.8333	45.833
2	1.1667	64.167
3	1.1667	64.167
4	0.8333	45.833
5	0.0000	0.000
6	0.0000	0.000
7	0.0000	0.000
8	0.0000	0.000

LIVE LOAD CASE # 3 3 TRUCKS

```

*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*** *** *** *** ***
*   *   *   *   *   *

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I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I

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BEAM	WHEEL FRACTION	P-LOAD
1	0.8333	45.833
2	1.1667	64.167
3	1.1667	64.167
4	1.3333	73.333
5	1.0000	55.000
6	0.5000	27.500
7	0.0000	0.000
8	0.0000	0.000

LIVE LOAD CASE # 4 4 TRUCKS

```

*   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *
*** *** *** *** *** *** ***
*   *   *   *   *   *   *   *

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```

I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I

```

BEAM	WHEEL FRACTION	P-LOAD
1	0.8333	45.833
2	1.1667	64.167
3	1.1667	64.167
4	1.3333	73.333
5	1.0000	55.000
6	1.3333	73.333
7	1.0000	55.000
8	0.1667	9.167

LIVE LOAD CASE # 5

1 TRUCKS

* *
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 I I I I I I I I
 I I I I I I I I
 I I I I I I I I
 I I I I I I I I

BEAM	WHEEL FRACTION	P-LOAD
1	0.0000	0.000
2	0.0000	0.000
3	0.0000	0.000
4	0.0000	0.000
5	0.0000	0.000
6	0.1667	9.167
7	1.0000	55.000
8	0.8333	45.833

LIVE LOAD CASE # 6

2 TRUCKS

* * * *
 * * * *
 * * * *
 *** *** *** ***
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I I I I I I I I
 I I I I I I I I
 I I I I I I I I
 I I I I I I I I
 I I I I I I I I

BEAM	WHEEL FRACTION	P-LOAD
1	0.0000	0.000
2	0.0000	0.000
3	0.0000	0.000
4	0.0000	0.000
5	0.8333	45.833
6	1.1667	64.167
7	1.1667	64.167
8	0.8333	45.833

LIVE LOAD CASE # 7 3 TRUCKS

```

*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*** *** *** *** *** ***
*   *   *   *   *   *

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I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I

```

BEAM	WHEEL FRACTION	P-LOAD
1	0.0000	0.000
2	0.0000	0.000
3	0.5000	27.500
4	1.0000	55.000
5	1.3333	73.333
6	1.1667	64.167
7	1.1667	64.167
8	0.8333	45.833

LIVE LOAD CASE # 8 4 TRUCKS

```

*   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *
*** *** *** *** *** *** ***
*   *   *   *   *   *   *   *

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I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I

```

BEAM	WHEEL FRACTION	P-LOAD
1	0.1667	9.167
2	1.0000	55.000
3	1.3333	73.333
4	1.0000	55.000
5	1.3333	73.333
6	1.1667	64.167
7	1.1667	64.167
8	0.8333	45.833

LIVE LOAD CASE # 9 1 TRUCKS

* *
 * *
 * *
 *** ***
 * *

I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I

BEAM	WHEEL FRACTION	P-LOAD
1	0.0000	0.000
2	0.0000	0.000
3	0.5000	27.500
4	1.0000	55.000
5	0.5000	27.500
6	0.0000	0.000
7	0.0000	0.000
8	0.0000	0.000

LIVE LOAD CASE # 10 2 TRUCKS

* * * *
 * * * *
 * * * *
 *** *** *** ***
 * * * *

I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I

BEAM	WHEEL FRACTION	P-LOAD
1	0.1667	9.167
2	1.0000	55.000
3	1.3333	73.333
4	1.0000	55.000
5	0.5000	27.500
6	0.0000	0.000
7	0.0000	0.000
8	0.0000	0.000

LIVE LOAD CASE # 11 3 TRUCKS

```

*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*** *** *** *** *** ***
*   *   *   *   *   *

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I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I

```

BEAM	WHEEL FRACTION	P-LOAD
1	0.1667	9.167
2	1.0000	55.000
3	1.3333	73.333
4	1.0000	55.000
5	1.3333	73.333
6	1.0000	55.000
7	0.1667	9.167
8	0.0000	0.000

LIVE LOAD CASE # 12 4 TRUCKS

```

*   *   *   *   *   *   *
*   *   *   *   *   *   *
*   *   *   *   *   *   *
*** *** *** *** *** *** ***
*   *   *   *   *   *   *

```

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I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I

```

BEAM	WHEEL FRACTION	P-LOAD
1	0.1667	9.167
2	1.0000	55.000
3	1.3333	73.333
4	1.0000	55.000
5	1.3333	73.333
6	1.1667	64.167
7	1.1667	64.167
8	0.8333	45.833

LIVE LOAD CASE # 13 2 TRUCKS

```

*   *   *   *
*   *   *   *
*   *   *   *
*** *** *** ***
*   *   *   *

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I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I

BEAM	WHEEL FRACTION	P-LOAD
1	0.0000	0.000
2	0.0000	0.000
3	0.8333	45.833
4	1.1667	64.167
5	1.1667	64.167
6	0.8333	45.833
7	0.0000	0.000
8	0.0000	0.000

LIVE LOAD CASE # 14 3 TRUCKS

```

*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*** *** *** *** *** ***
*   *   *   *   *   *

```

I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I

BEAM	WHEEL FRACTION	P-LOAD
1	0.5000	27.500
2	1.0000	55.000
3	1.3333	73.333
4	1.1667	64.167
5	1.1667	64.167
6	0.8333	45.833
7	0.0000	0.000
8	0.0000	0.000

LIVE LOAD CASE # 15 4 TRUCKS

```

*   *   *   *   *   *   *
*   *   *   *   *   *   *
*   *   *   *   *   *   *
*** *** *** *** *** *** ***
*   *   *   *   *   *   *

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```

I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I

```

BEAM	WHEEL FRACTION	P-LOAD
1	0.5000	27.500
2	1.0000	55.000
3	1.3333	73.333
4	1.1667	64.167
5	1.1667	64.167
6	1.3333	73.333
7	1.0000	55.000
8	0.5000	27.500

LIVE LOAD CASE # 16 2 TRUCKS

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*   *
*   *
*   *
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*   *

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I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I

```

BEAM	WHEEL FRACTION	P-LOAD
1	0.8333	45.833
2	1.0000	55.000
3	0.1667	9.167
4	0.0000	0.000
5	0.0000	0.000
6	0.1667	9.167
7	1.0000	55.000
8	0.8333	45.833

LIVE LOAD CASE # 17

3 TRUCKS

```

*   *   *   *           *   *
*   *   *   *           *   *
*   *   *   *           *   *
*** *** *** ***       *** ***
*   *   *   *           *   *

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```

I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I

```

BEAM	WHEEL FRACTION	P-LOAD
1	0.8333	45.833
2	1.1667	64.167
3	1.1667	64.167
4	0.8333	45.833
5	0.0000	0.000
6	0.1667	9.167
7	1.0000	55.000
8	0.8333	45.833

LIVE LOAD CASE # 18

4 TRUCKS

```

*   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *
*** *** *** *** *** *** *** ***
*   *   *   *   *   *   *   *

```

```

I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I

```

BEAM	WHEEL FRACTION	P-LOAD
1	0.8333	45.833
2	1.1667	64.167
3	1.1667	64.167
4	0.8333	45.833
5	0.8333	45.833
6	1.1667	64.167
7	1.1667	64.167
8	0.8333	45.833

17-APR-91

GEORGIA DEPARTMENT OF TRANSPORTATION

09:58:12

SUMMARY OF THE LIVE LOAD CASE PROGRAM

PROB. NO. 0000

TEST

BRIDGE WIDTH	X1	X2	CENTER LINE DISTANCE	# OF BEAMS	REACTION FORCE	MAXIMUM # OF TRUCKS	# OF COLUMNS	COLUMN WIDTH	SKEW ANGLE
47.250	3.625	3.625	23.625	8	55.000	4	3	3.000	16

D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
2.625	6.000	6.000	6.000	6.000	6.000	6.000	6.000												

XCOL1	XCOL2	XCOL3	XCOL4	XCOL5
5.577	19.000	19.000		

		NO. OF TRUCKS	BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7	BEAM 8	BEAM 9	BEAM 10
LL CASE 1	1	1	45.833	55.000	9.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LL CASE 2	2	2	45.833	64.167	64.167	45.833	0.000	0.000	0.000	0.000	0.000	0.000
LL CASE 3	3	3	45.833	64.167	64.167	73.333	55.000	27.500	0.000	0.000	0.000	0.000
LL CASE 4	4	4	45.833	64.167	64.167	73.333	55.000	73.333	55.000	9.167	0.000	0.000
LL CASE 5	5	1	0.000	0.000	0.000	0.000	0.000	9.167	55.000	45.833	0.000	0.000
LL CASE 6	6	2	0.000	0.000	0.000	0.000	45.833	64.167	64.167	45.833	0.000	0.000
LL CASE 7	7	3	0.000	0.000	27.500	55.000	73.333	64.167	64.167	45.833	0.000	0.000
LL CASE 8	8	4	9.167	55.000	73.333	55.000	73.333	64.167	64.167	45.833	0.000	0.000
LL CASE 9	9	1	0.000	0.000	27.500	55.000	27.500	0.000	0.000	0.000	0.000	0.000
LL CASE 10	10	2	9.167	55.000	73.333	55.000	27.500	0.000	0.000	0.000	0.000	0.000
LL CASE 11	11	3	9.167	55.000	73.333	55.000	73.333	55.000	9.167	0.000	0.000	0.000
LL CASE 12	12	4	9.167	55.000	73.333	55.000	73.333	64.167	64.167	45.833	0.000	0.000
LL CASE 13	13	2	0.000	0.000	45.833	64.167	64.167	45.833	0.000	0.000	0.000	0.000
LL CASE 14	14	3	27.500	55.000	73.333	64.167	64.167	45.833	0.000	0.000	0.000	0.000
LL CASE 15	15	4	27.500	55.000	73.333	64.167	64.167	73.333	55.000	27.500	0.000	0.000
LL CASE 16	16	2	45.833	55.000	9.167	0.000	0.000	9.167	55.000	45.833	0.000	0.000
LL CASE 17	17	3	45.833	64.167	64.167	45.833	0.000	9.167	55.000	45.833	0.000	0.000
LL CASE 18	18	4	45.833	64.167	64.167	45.833	45.833	64.167	64.167	45.833	0.000	0.000

FOR PIER PROGRAM INPUT

