THE BRIDGE SUPERSTRUCTURE CROSS-SECTION COMPUTER PROGRAM

USER'S MANUAL

PRESENTED BY THE

GEORGIA DEPARTMENT OF TRANSPORTATION

OFFICE OF BRIDGE DESIGN

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1.0 DESCRIPTION OF PROGRAM BRDECK

The "Deck Section" program generates the following bridge superstructure cross-sections:

A. Half section thru slab
B. Half section at diaphragm (For AASHTO or Steel beams)
C. Half section at midspan (For T-beams)
D. Half section at endwall
E. Half section at edge beam
F. Half section thru slab at intermediate bent

The above sections correspond to the cells illustrated in Section 6.0 page 34.

2.0 INPUT DESCRIPTION OF PROGRAM BRDECK

The input file should be created in node CCC.
The input data cards MUST be in the following order:

1) "0" - data - comments/description
2) "1" - data - slab data and type of barrier
3) "2" - data - beam data
4) "3" - data - beam spacings
5) "4" - data - number of width ranges and C.L. location
6) "5" - data - width range data
7) "6" - data - cross slope data
8) "7" - data - steel data
9) "8" - data - quantity data
10) "9" - data - span quantity data

A. INDENTIFICATION (0 in cc 1)

1.) IDENTIFICATION AND COMMENTS (cc 3-70)
The identification consists of one line of input data containing pertinent identifying remarks.

B. SLAB DATA (1 in cc 1)

The number one (1) in card column one is for identification of the Slab Data.

1.) SCA (cc 4) Form: x
Enter the scale of the drawing. Choose from the following (No Default) :

TYPE	SCALE SIZE
1	1/2 IN/FT
2	3/8 IN/FT
3	1/4 IN/FT

2.) VC (cc 6) Form: x
Enter the number 0 if the bridge is in a vertical curve or enter the number 1 if the bridge is on a straight grade. This data will allow the "D" dimension note to be modified accordingly.

3.) QUAN (cc 8) Form: x
Enter the number 0 if concrete and rebar quantities are to be calculated or enter the number 1 if no quantities are to be calculated. The default is that the quantities will be calculated.

B. SLAB DATA cont.

4.) SLAB T (cc 9-13) Form: xx.xxx inches
Enter the slab thickness in inches (No Default).

5.) INT. D (cc 14-18) Form: xx.xxx inches
Enter the dimension from the top of the slab to the top of an interior beam in inches (No Default).

6.) O.H. T (cc 19-23) Form: xx.xxx inches
Enter the overhang slab thickness in inches. The default is the SLAB T dimension if no data is input.

7.) EXT. D (cc 24-28) Form: xx.xxx inches
Enter the dimension from the top of the slab to the top of an outside beam in inches. The default is the INT. D dimension if no data is input.

8.) LEFT (cc 32) Form: x
Enter the type of barrier or parapet for the left of the bridge. Choose from the following (the default is the barrier selection):

TYPE	DESCRIPTION
1	Barrier
2	Parapet with sidewalk

9.) RIGHT (cc 36) Form: x
Enter the type of barrier or parapet for the right of the bridge. Choose from the above list (the default is the barrier selection).

C. BEAM DATA (2 in cc 1)

The number two (2) in card column one is for identification of the Beam Data.

1.) TYP (cc 3-4) Form: xx
Enter the type of beam as follows (No Default):

TYPE	BEAM	TYPE	BEAM
1	PSC I-mod	7	Steel W30
2	PSC II	8	Steel W33
3	PSC III	9	Steel W36
4	PSC IV	10	Plate Girder
5	PSC V	11	27" T-Beam
6	Steel W27	12	33" T-Beam

2.) NO (cc 5-6) Form: x

Enter the number of beams. The maximum number is 20. (No Default).

3.) EQS (cc 8) Form: x

Enter the number 1 for equal beam spacing or enter the number 0 for varied beam spacing. The default is varied beam spacing.

4.) FIX (cc 10) Form: x

Enter the number 0 for fixed end bents or enter the the number 1 for expansion end bents. The default is varied beam spacing.

5.) G. DEPTH (cc 11-15) Form: xx.xxx inches

Enter the depth of the non-standard steel girder in inches. Input required only if the number 10 in TYP (type of beam input) was selected.

6.) G. WIDTH (cc 16-20) Form: xx.xxx inches

Enter the flange width of the non-standard steel girder in inches. Input required only if the number 10 in TYP was selected.

D. BEAM SPACING DATA (3 in cc 1)

The number three (3) in card column one is for identification of the Beam Spacing Data.

1.) OH DIST (cc 3-7) Form: xx.xxx feet

Enter the distance from the left edge of slab to the centerline of the first beam in feet (No Default).

2.) SPAC 1 ... 14 (cc 8-77) Form: xx.xxx feet
SPAC 15 ... 20 (cc 3-33)

For equally spaced beams, enter the constant spacing in the first data field only. For variable spacing, enter each dimension in feet (No Default).

E. CENTER LINE AND NUMBER OF WIDTH RANGES (4 in cc 1)

The number four (4) in card column one is for identification of the C.L. Data and Number of Width Ranges Data.

2.) N.W.R. (cc 3-4) Form: xx

Enter the number of width ranges of different cross slopes on the bridge deck. There must be at least 2 width ranges even for a superelevated bridge (No Default).

1.) C.L. LOCATION (cc 5-9) Form: xx.xxx feet

Enter the distance from the left gutterline to the designated center line of the cross-section in feet. This has no bearing to the cross slope of the bridge (No Default). This is the location from where the cross sections are drawn.

F. WIDTH RANGE DATA (5 in cc 1)

The number five (5) in card column one is for identification of the Width Range Data.

1.) W.R. 1 ... 6 (cc 3-7, 8-12, 13-17, 18-22, 23-27, 28-32)Form: xx.xxx feet

Enter the width ranges of the different cross slopes on the bridge deck in feet. The sum of these should be the gutter to gutter dimension (No Default).

G. CROSS SLOPE DATA (6 in cc 1)

The number six (6) in card column one is for identification of the Cross Slope Data.

1.) R. 1 ..... 6 (cc 3-7, 8-12, 13-17, 18-22, 23-27, 28-32)Form: xx.xxx inches/ft

Enter the different slopes of the deck for the corresponding width ranges in inches/ft (No Default).

Use + for slope rising to the right
Use - for slope falling to the right

H. STEEL DATA (7 in cc 1)

The number seven (7) in card column one is for identification of the Steel Data.

1.) TOP CL. (cc 3-7) Form: xx.xxx inches
Enter the clearance from the top of the slab to the top main reinforcement (No Default).

2.) M SPAC. (cc 8-12) Form: xx.xxx inches
Enter the bar spacing of the top main steel in inches (No Default).

3.) TR (cc 14) Form: x
Enter the number 1 if truss bars are to be used with the main slab bars. Enter the number 0 if no truss bars are to be used. The default is that no truss bars will be used.

4.) N.M.H. (cc 16-17) Form: xx
Enter the number of bottom distribution bars in the midhalf of the beam spacing (No Default).

5.) N.O.Q. (cc 19-20) Form: xx
Enter the number of bottom distribution bars in the outer quarters of the beam spacing (No Default).

6.) BAR (cc 22-23) Form: xx
Enter the bar size to be used for the top negative moment steel at the intermediate bent. If this data is left blank then no half section thru the slab at the intermediate bent will be drawn.

7.) NUM (cc 25) Form: x
Enter the number of negative moment bars that are to be placed between each bar of the temperature steel bars. If this data is left blank then no half section thru the slab at the intermediate bent will be drawn.

I. QUANTITY DATA (8 in cc 1)

The number eight (8) in card column one is for identification of the Quantity Data.

1.) NSPAN (cc 4-5) Form: xx
Enter the number of spans that have the same cross section as has been described in the previous input. The concrete and rebar quantities shall be computed for each of the spans (No Default).

I. QUANTITY DATA Cont.

2.) CAP WIDTH (cc 6-10) Form: xx.xxx feet
Enter the end bent cap width in feet (No Default).

3.) END POST LENGTH (cc 11-15) Form: xx.xxx feet
Enter the end post length in feet (No Default).

4.) END POST HEIGHT (cc 16-20) Form: xx.xxx feet
Enter the end post height in feet (No Default).

J. SPAN QUANTITY DATA (9 in cc 1)

The number nine (9) in card column one is for identification of the Span Quantity Data. This card must be input for every span.

1.) S.N. (cc 3-4) Form: xx
Enter the span number for which quantities are to be calculated (No Default).

2.) R.S. (cc 4-6) Form: xx
When the span being defined (S.N.) is identical to some previously defined span, the Recall Span (R.S.) code can be used. In such a case enter the number of the previously defined span in the R.S. code (No Default). If the R.S. code is used, the remaining span quantitiy data for that span is not required.

3.) SPAN L. (cc 7-12) Form: xxx.xxx feet
Enter the span length of the span being defined in feet (No Default).

4.) N.D. (cc 13-14) Form: xx
Enter the number of diaphragms in the span being defined. The default is zero.

5.) END BENT BK. (cc 15-16) Form: xx
Enter the number one if the back bent of the span is an end bent. If the data is left blank then the program will assume that the back bent is an intermediate bent.

6.) END BENT AH. (cc 17-18) Form: xx
Enter the number one if the ahead bent of the span is an end bent. If the data is left blank then the program will assume that the ahead bent is an intermediate bent.

J. SPAN QUANTITY DATA Cont.

7.) SPAN ANGLE (cc 19-26) Form: xxx deg., xx min., xx.x sec.

Enter the span angle which is the angle between the centerline of the bents to a line parallel to the mainline. The default is 90 degrees.

8.) CONT. STEEL LENGTH (cc 27-31) Form: xx.xxx feet

Enter the length of the negative moment steel for that span in feet (No Default).

3.0 How to Run BRDECK

Before you attempt to run the program, insure that the input file has been created in node CCC as required. The program BRDECK will run only in node CCC.

- To run the program (BRDECK) in node CCC the user must be out of the graphics mode.

- When the user is in the dollar prompt mode, he may start the deck section program by typing

  BRDECK

  - The program will prompt

    Enter Input File:
    Enter Intergraph Output File:__.INT

    The Intergraph Output File must have the INT trailer so that the graphics conversion program can be run.

  - If quantities are to be calculated the program will then prompt

    Enter Output Name For Concrete Quantities:
    Enter Output Name For Rebar Quantities:

    - The Concrete quantities will be per span
    - The Output for the Rebar quantities is actually the input for the RBAR Quantities program (BRRBAR).
      See the Quantity Discussion on page 11.

  - When the program is completed the dollar prompt will appear.

- Run the conversion program that takes the INT File and creates the Graphics Design File (DGN) by typing

  GATRANS

  - The program will prompt

    Enter INT file for graphics translation : filename.INT

    This is a batch job and will take some time to create a graphics file called filename.DGN.

    To check on the completion of the GATRANS program, type SH QUE to see if the batch job is completed.

4.0 Quantity Discussion

A.) Concrete Quantities

The Concrete Quantity output will include the following:

- A listing of the input data.
- The Concrete Quantities per span broken down with the following data:
  - slab
  - coping
  - overhang slab
  - barrier or parapet
  - T-beams (if selected)
  - sidewalk
  - diaphragm
  - edge beam
  - endwall
- A summary of the quantities per span with a quantity summary.

b.) Steel Quantities

The output file for the steel quantities is actually the input for the Rebar Quantities Program (BRRBAR). This file can be edited to make modifications or it can be used as is for the BRRBAR program. Since this file is in Node CCC the user must NET over the file to Node BBB so that BRRBAR can be run. The steel quantities are listed per span.

On certain cases, the quantities that are calculated will be incomplete. For a discussion on these cases see Special Considerations on page 12.

5.0 Special Considerations

When running BRDECK, the following special considerations need to be addressed :

1.) Quantities will be incomplete if a Plate Girder is selected for the beam type. No Endwall, Edge beam or Diaphragm quantities will be calculated.

2.) For the Plate Girder beam types, the cross sections will consist of the outline and some of the steel reinforcement. The Endwall, Edge Beam and Diaphragm sections will be incomplete (See Example 5).

3.) For any of the Steel beam or T-beam types with an expansion Endwall selection, there will be no Endwall steel drawn and no corresponding Endwall quantities given.

4.) When the 1/4 in/ft scale is used or if the beam spacing is less than 5 feet some of the text and dimension lines will be overlapped.

5.) For The diaphragm quantities when using the PSC beam types, the program assumes that the diaphragms are perpendicular to the beams.

6.) The stirrups for the endwall and edge beam sections are assumed to be parrallel to the centerline of the bridge. Therefore, the stirrup widths and the number of stirrups are dependent on the skew of the bents. The program uses the first span angle in calculating the number and dimensions of the stirrups. If no span angle is given for the first span the program assumes it to be 90 degrees.

7.) Edge beams are not designed. Main bar reinforcement consists of No. 8 bars and stirrups consist of No. 4 bars spaced at 12 inches. This steel needs to be investigated by the engineer and modified as necessary.

GEORGIA DEPARTMENT OF TRANSPORTATION - OFFICE OF BRIDGE DESIGN

BRIDGE SUPERSTRUCTURE CROSS-SECTION

PROJECT NO., COUNTY, NAME, DATE, REMARKS, ETC.

	1	3	10	20	30	40	50	60	66
0									

SLAB DATA

	1	3	7	14	19	24	29	33	37
		SCA	VC	QUAN	SLAB T (IN)	INT. D (IN)	O.H. T (IN)	EXT. D (IN)	BARRIER LEFT	BARRIER RIGHT
1										

BEAM DATA

	1	3	10	21
		TYP	NO	EQS	FIX	G. DEPTH(IN)	G. WIDTH(IN)
2							

BEAM SPACING (FT.)

	1	3	13	23	33	43	53	63	66
		OH DIST	SPAC 1	SPAC 2	SPAC 3	SPAC 4	SPAC 5	SPAC 6	SPAC 7	SPAC 8	SPAC 9	SPAC 10	SPAC 11	SPAC 12
3														

C.L. DATA AND NUMBER OF WIDTH RANGES

	1	3	10
		NWR	C.L. LOC. (FT)
4			

WIDTH RANGE AND CROSS SLOPE DATA

	1	3	13	23
		W.R.1 (FT)	W.R.2 (FT)	W.R.3 (FT)	W.R.4 (FT)
5					
	1	3	13	23
		R.1 (IN/FT)	R.2 (IN/FT)	R.3 (IN/FT)	R.4 (IN/FT)
6					

STEEL DATA

	1	3	8	13	15		21	26
			MAIN STEEL		DIST. STEEL		CONT. STEEL	
		TOP CL. (IN)	M SPAC. (IN)	TR	N.M.H.	N.O.Q.	BAR	NUM
7								

DETAILING OPTIONS

SCALE	VC	QUAN	BARRIER
1 = ½"/FT.	0 = YES	0 = YES	1 = BARRIER
2 = ⅜"/FT.	1 = NO	1 = NO	2 = PARAPET & SDWLK.
3 = ¼"/FT.			

BEAM TYPE

TYP

1 - 5 = AASHTO 1 THRU 5

6 - 9 = W27 THRU W36

10 = PLATE GIRDER

11 - 12 = T-BEAMS

BEAM SPACING

EQS

1 = EQUAL SP.

BLANK = VARIABLE SP.

END BENT

FIX

0 = FIX

1 = EXP

NWR = NUMBER WIDTH RANGES

CROSS-SLOPE

BRIDGE SUPERSTRUCTURE CROSS-SECTION

MISC. QUANTITY DATA

		CAP	END POST	
	NSPAN	WIDTH (FT)	LENGTH (FT)	HEIGHT (FT)
	1 3	6	11	16 21
8	XX			

SLAB QUANTITY DATA

					END BENT		SPAN ANGLE			CONT. STEEL
	S. N.	R. S.	SPAN L. (FT)	N. D.	BK.	AH.	DEG.	MIN.	SEC.	LENGTH (FT)
	1 3		7	13			19			27 32
9	X				X	X				
9	X				X	X				
9	X				X	X				
9	X				X	X				
9	X				X	X				

END BENT

BK. = BACK BENT

1 - FOR END BENT

BLANK FOR INTERMEDIATE BENT

AH. = AHEAD BENT

1 - FOR END BENT

BLANK FOR INTERMEDIATE BENT

S.N. = SPAN NUMBER

R.S. (RECALL SPAN) = WHEN THE SPAN BEING DEFINED IS IDENTICAL TO A PREVIOUS SPAN, ENTER THE PREVIOUS SPAN NUMBER.

N.D. = NUMBER OF DIAPHRAGMS

7.0 Example Problems

The example problems consist of the following options:

1.) Example Problem 1 ..... page 16
- Type III PSC Beam
- Expansion End Bent
- Continuous Deck Steel
- Superelevated Deck
- Quantities

2.) Example Problem 2 ..... page 26
- Type V PSC Beam
- Fixed End Bent
- Crown Deck

3.) Example Problem 3 ..... page 28
- Steel W30 Type Beam
- Fixed End Bent
- Crown Deck

4.) Example Problem 4 ..... page 30
- 27" T-Beam
- Crown Deck

5.) Example Problem 5 ..... page 32
- Plate Girder
- Superelevated Deck

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BRIDGE SUPERSTRUCTURE CROSS-SECTION

PROJECT NO., COUNTY, NAME, DATE, REMARKS, ETC.

0	EXAMPLE PROBLEM 2, PSC 3 BEAM, EXPANSION END BENT, CONTINUOUS

SLAB DATA

	SCA	VC	QUAN	SLAB T (IN)	INT. D (IN)	O.H. T (IN)	EXT. D (IN)	BARRIER LEFT	BARRIER RIGHT
1	2	1	0	8.250	10.500	8.750	11.250	1	1

DETAILING OPTIONS

SCALE	VC	QUAN	BARRIER
1 = ½"/FT.	0 = YES	0 = YES	1 = BARRIER
2 = ⅜"/FT.	1 = NO	1 = NO	2 = PARAPET & SDWLK.
3 = ¼"/FT.			

BEAM DATA

	TYP	NO	EQS	FIX	G. DEPTH(IN)	G. WIDTH(IN)
2	3	6	1	1		

BEAM TYPE — TYP

1 - 5 = AASHTO 1 THRU 5
6 - 9 = W27 THRU W36
10 = PLATE GIRDER
11 - 12 = T-BEAMS

BEAM SPACING — EQS

1 = EQUAL SP.
BLANK = VARIABLE SP.

END BENT — FIX

0 = FIX
1 = EXP

BEAM SPACING (FT.)

	OH DIST	SPAC 1	SPAC 2	SPAC 3	SPAC 4	SPAC 5	SPAC 6	SPAC 7	SPAC 8	SPAC 9	SPAC 10	SPAC 11	SPAC 12
3	3.375	6.500											

C.L. DATA AND NUMBER OF WIDTH RANGES

	NWR	C.L. LOC. (FT)
4	2	18.000

NWR = NUMBER WIDTH RANGES

WIDTH RANGE AND CROSS SLOPE DATA

	W.R.1 (FT)	W.R.2 (FT)	W.R.3 (FT)	W.R.4 (FT)
5	18.000	18.000		
	R.1 (IN/FT)	R.2 (IN/FT)	R.3 (IN/FT)	R.4 (IN/FT)
6	2.40	2.40		

CROSS-SLOPE

STEEL DATA

		MAIN STEEL		DIST. STEEL		CONT. STEEL	
	TOP CL. (IN)	M SPAC. (IN)	TR	N. M. H.	N. O. Q.	BAR	NUM
7	2.500	5.750	0	5	4	7	2

BRIDGE SUPERSTRUCTURE CROSS-SECTION

MISC. QUANTITY DATA

	NSPAN	CAP WIDTH (FT)	END POST LENGTH (FT)	END POST HEIGHT (FT)
8	4	3.000	4.000	2.667

SLAB QUANTITY DATA

	S.N.	R.S.	SPAN L. (FT)	N.D.	END BENT BK.	END BENT AH.	SPAN ANGLE DEG.	SPAN ANGLE MIN.	SPAN ANGLE SEC.	CONT. STEEL LENGTH (FT)
9	1		40.000	1	1		90	00	00.0	140.000
9	2		80.000	2			70	00	00.0	170.000
9	3		80.000	2			90	00	00.0	170.000
9	4	1								
9										

END BENT

BK. = BACK BENT

1 - FOR END BENT

BLANK FOR INTERMEDIATE BENT

AH. = AHEAD BENT

1 - FOR END BENT

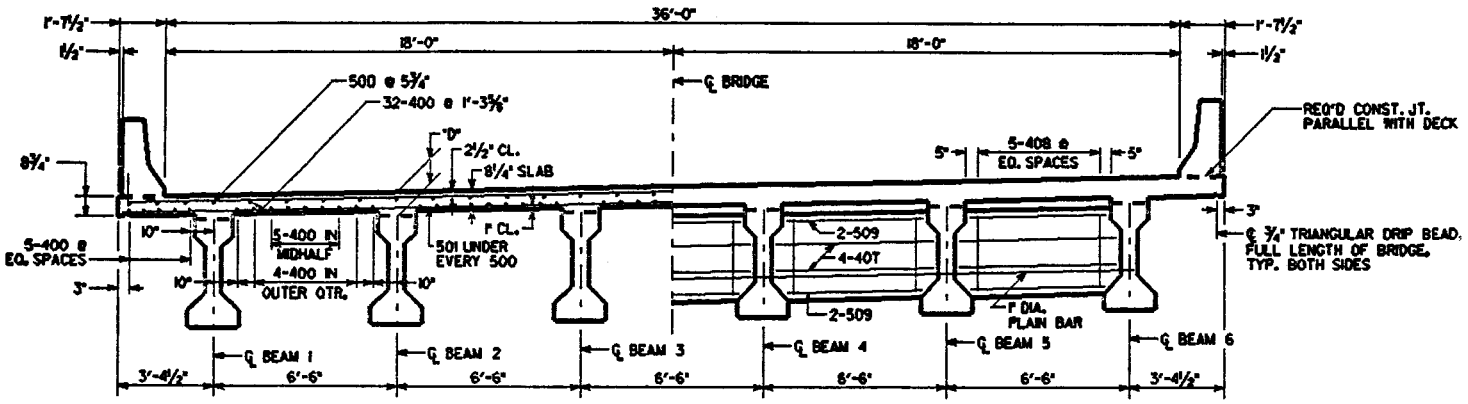
BLANK FOR INTERMEDIATE BENT

S.N. = SPAN NUMBER

R.S. (RECALL SPAN) = WHEN THE SPAN BEING DEFINED IS IDENTICAL TO A PREVIOUS SPAN, ENTER THE PREVIOUS SPAN NUMBER.

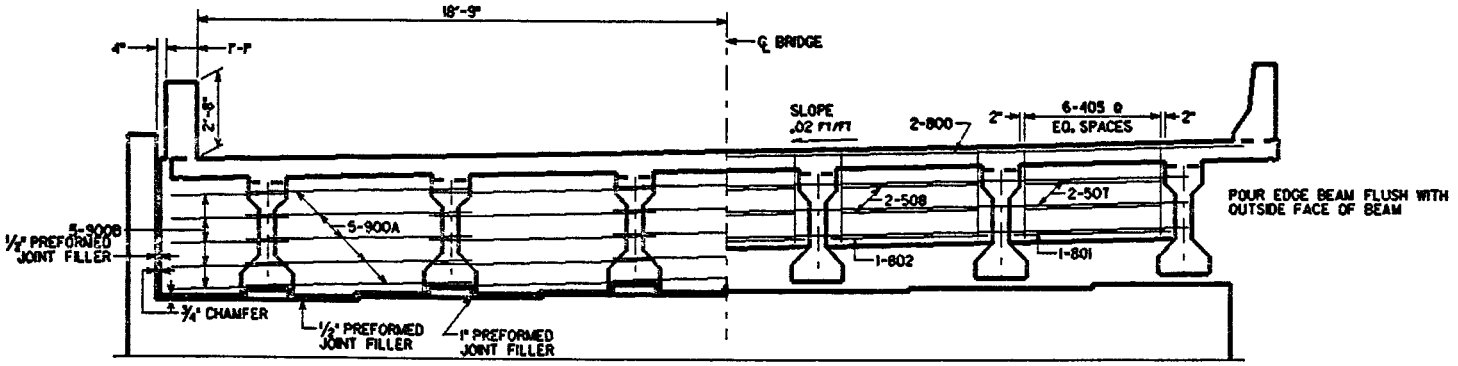
N.D. = NUMBER OF DIAPHRAGMS

DIMENSION "D" IS MEASURED FROM TOP OF SLAB TO TOP OF BEAMS AT CENTERLINE BEARING. VARY "D" BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTION. MAINTAIN A CONSTANT SLAB THICKNESS OF 8¼" BETWEEN BEAMS AND 8¾" AT THE OVERHANGS.
"D"= 10½" FOR INTERIOR BEAMS
"D"= 11¼" FOR EXTERIOR BEAMS



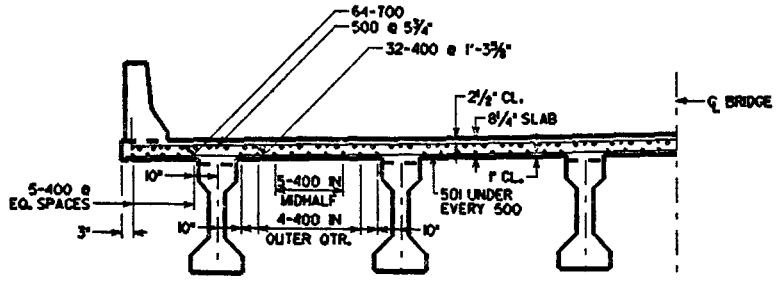
HALF SECTION THRU SLAB

HALF SECTION AT DIAPHRAGM



HALF SECTION AT ENDWALL

HALF SECTION AT EDGE BEAM



HALF SECTION THRU SLAB AT INTER. BENT

EXAMPLE PROBLEM 1, PSC 3 BEAM, EXPANSION END BENT, CONTINUOUS

SLAB DATA

SCALE	VERTICAL CURVE	QUANTITY	LEFT BARRIER	RIGHT BARRIER
2	1	0	1	1

SLAB THICKNESS (IN)	INTERIOR D (IN)	O.H. SLAB THICK (IN)	EXTERIOR D (IN)
8.250	10.500	8.750	11.250

BEAM DATA

BEAM TYPE	NUMBER OF BEAMS	EQUAL SPACING	FIX	GIRDER DEPTH (IN)	GIRDER WIDTH (IN)
3	6	1	1	0.000	0.000

BEAM SPACING (FT)

OH DIST	SPAC1	SPAC2	SPAC3	SPAC4	SPAC5	SPAC6	SPAC7	SPAC8	SPAC9	SPAC10
3.375	6.500	6.500	6.500	6.500	6.500	0.000	0.000	0.000	0.000	0.000

C.L. DATA AND NUMBER OF WIDTH RANGES

# OF WIDTH RANGES	C.L. LOCATION (FT)
2	18.000

WIDTH RANGE AND CROSS SLOPE DATA

W.R. 1 (FT)	W.R. 2 (FT)	W.R. 3 (FT)	W.R. 4 (FT)	W.R. 5 (FT)	W.R. 6 (FT)
18.000	18.000				

C.S. 1 (IN/FT)	C.S. 2 (IN/FT)	C.S. 3 (IN/FT)	C.S. 4 (IN/FT)	C.S. 5 (IN/FT)	C.S. 6 (IN/FT)
0.240	0.240				

STEEL DATA

	MAIN STEEL		DIST. STEEL		CONT. STEEL	
TOP CLEAR (IN)	M SPAC. (IN)	TR	N.M.H.	N.O.Q.	BAR	N SPAC.
2.500	5.750	0	5	4	7	2

MISC. QUANTITY DATA

NUMBER OF SPANS	END BENT CAP WIDTH (FT)	END POST LENGTH (FT)	END POST HEIGHT (FT)
4	3.000	4.000	2.667

SLAB QUANTITY DATA

SPAN #	RS	SPAN L (FT)	END BENT ND	END BENT BK	END BENT AH	SPAN ANGLE DEG	SPAN ANGLE MIN	SPAN ANGLE SEC	CONT. STEEL LENGTH
1	0	40.000	1	1	0	90	0	0.0	14.000
2	0	80.000	2	0	0	70	0	0.0	17.000
3	0	80.000	2	0	0	90	0	0.0	0.000
4	1	40.000	1	1	0	90	0	0.0	0.000

-------- CONCRETE QUANTITY OUTPUT --------

SPAN 1 QUANTITIES

SLAB	=	893.75 CU. FT.
COPING	=	48.88 CU. FT.
O.H. SLAB	=	196.88 CU. FT.
BARRIER OR PARAPET	=	188.85 CU. FT.
SIDEWALK	=	0.00 CU. FT.
DIAPHRAGM	=	70.44 CU. FT.
EDGE BEAM	=	77.11 CU. FT.
END POST	=	22.98 CU. FT.
ENDWALL	=	313.06 CU. FT.
SPAN TOTAL	=	1811.95 CU. FT.
		67.11 CU. YD.

SPAN 2 QUANTITIES

SLAB	=	1787.50 CU. FT.
COPING	=	97.76 CU. FT.
O.H. SLAB	=	393.75 CU. FT.
BARRIER OR PARAPET	=	432.22 CU. FT.
SIDEWALK	=	0.00 CU. FT.
DIAPHRAGM	=	140.89 CU. FT.
EDGE BEAM	=	164.11 CU. FT.
END POST	=	0.00 CU. FT.
ENDWALL	=	0.00 CU. FT.
SPAN TOTAL	=	3016.22 CU. FT.
		111.71 CU. YD.

-------- CONCRETE QUANTITY OUTPUT --------

SPAN 3 QUANTITIES

SLAB	=	1787.50 CU. FT.
COPING	=	97.76 CU. FT.
O.H. SLAB	=	393.75 CU. FT.
BARRIER OR PARAPET	=	432.22 CU. FT.
SIDEWALK	=	0.00 CU. FT.
DIAPHRAGM	=	140.89 CU. FT.
EDGE BEAM	=	154.21 CU. FT.
END POST	=	0.00 CU. FT.
ENDWALL	=	0.00 CU. FT.
SPAN TOTAL	=	3006.33 CU. FT.
		111.35 CU. YD.

SPAN 4 QUANTITIES

SLAB	=	893.75 CU. FT.
COPING	=	48.88 CU. FT.
O.H. SLAB	=	196.88 CU. FT.
BARRIER OR PARAPET	=	188.85 CU. FT.
SIDEWALK	=	0.00 CU. FT.
DIAPHRAGM	=	70.44 CU. FT.
EDGE BEAM	=	77.11 CU. FT.
END POST	=	22.98 CU. FT.
ENDWALL	=	313.06 CU. FT.
SPAN TOTAL	=	1811.95 CU. FT.
		67.11 CU. YD.

SUMMARY OF CONCRETE QUANTITIES

SPAN NUMBER	1 =	67.11	CU. YD.
SPAN NUMBER	2 =	111.71	CU. YD.
SPAN NUMBER	3 =	111.35	CU. YD.
SPAN NUMBER	4 =	67.11	CU. YD.
TOTAL	=	357.28	CU. YD.

```
*B06    1000  EXAMPLE PROBLEM 1, PSC 3 BEAM, EXPANSION END BENT, CONTINUOUS
USPAN  1& 4       21000
W               1 27905
  400  39 8  85       1
  401  18 1  24       1
  404  39 3   5       1
  405         30      3144 0 900 21112 21112
S 407   5 6  20       1
S 408        25      2544 0 7   2 9
K 2
S 500        84       2  38 8   010   010
S 501  3811  84       1
S 502        80      23   0 9   2 3   2 3                                    96
S 503        80      23   0 5   2 4   2 4                                    84
  504        27      46   3 5   110   0 4   0 8   0 8
  505  37 6   1       1
  506        55       3   4 4   1 3
  506A       26       6   1 218 1 0   0 0   1 0                          45 45
  507  32 9   2       1
  508   4 7  10       1
S 509   4 7  20       1
K 2
  700  14 0  62       1
K 2
  800  37 6   2       1
  801  32 9   1       1
  802   5 6   5       1
K 2
  900A       25      1666 3 0   0 8   0 8   2 2   2 2
  900B       10      346  111   0 8   2 2   0 8
K 2
USPAN  2          11000
  400  40 5 170       1
  401  19 7  48       1
  405         60      3144 0 900 21112 21112
R 407         40
R 408         50
K 2
R 500       168
R 501       168
R 502       176
R 503       176
  507  3410   4       1
  508   411  20       1
R 509         40
K 2
  700  17 0  62       1
K 2
  800  3910   4       1
  801  3410   2       1
  802   510  10       1
K 2
USPAN  3          11000
  400  40 5 170       1
  401  19 7  48       1
  405         60      3144 0 900 21112 21112
R 407         40
R 408         50
K 2
R 500       168
R 501       168
R 502       176
R 503       176
  507  32 9   4       1
  508   4 7  20       1
R 509         40
```

```
K 2
K 2
   800   37 6    4         1
   801   32 9    2         1
   802    5 6   10         1
Z
```

BRIDGE SUPERSTRUCTURE CROSS-SECTION

PROJECT NO., COUNTY, NAME, DATE, REMARKS, ETC.

0	EXAMPLE PROBLEM 2, PSC 5 BEAM, FIXED END BENT

SLAB DATA

	SCA	VC	QUAN	SLAB T (IN)	INT. D (IN)	O.H. T (IN)	EXT. D (IN)	BARRIER LEFT	BARRIER RIGHT
1	2	0	1	8.250	10.500			1	1

BEAM DATA

	TYP	NO	EQS	FIX	G. DEPTH(IN)	G. WIDTH(IN)
2	5	5	1	0		

BEAM SPACING (FT.)

	OH DIST	SPAC 1	SPAC 2	SPAC 3	SPAC 4	SPAC 5	SPAC 6	SPAC 7	SPAC 8	SPAC 9	SPAC 10	SPAC 11	SPAC 12
3	3.625	8.000											

C.L. DATA AND NUMBER OF WIDTH RANGES

	NWR	C.L. LOC. (FT)
4	2	18.000

WIDTH RANGE AND CROSS SLOPE DATA

	W.R.1 (FT)	W.R.2 (FT)	W.R.3 (FT)	W.R.4 (FT)
5	18.000	18.000		
	R.1 (IN/FT)	R.2 (IN/FT)	R.3 (IN/FT)	R.4 (IN/FT)
6	2.50	-2.50		

STEEL DATA

		MAIN STEEL		DIST. STEEL		CONT. STEEL	
	TOP CL. (IN)	M SPAC. (IN)	TR	N. M. H.	N. O. Q.	BAR	NUM
7	2.500	5.750	1	5	6		

DETAILING OPTIONS

SCALE	VC	QUAN	BARRIER
1 = 1/2"/FT.	0 = YES	0 = YES	1 = BARRIER
2 = 3/8"/FT.	1 = NO	1 = NO	2 = PARAPET & SDWLK.
3 = 1/4"/FT.			

BEAM TYPE (TYP)

1 - 5 = AASHTO 1 THRU 5

6 - 9 = W27 THRU W36

10 = PLATE GIRDER

11 - 12 = T-BEAMS

BEAM SPACING (EQS)

1 = EQUAL SP.

BLANK = VARIABLE SP.

END BENT (FIX)

0 = FIX

1 = EXP

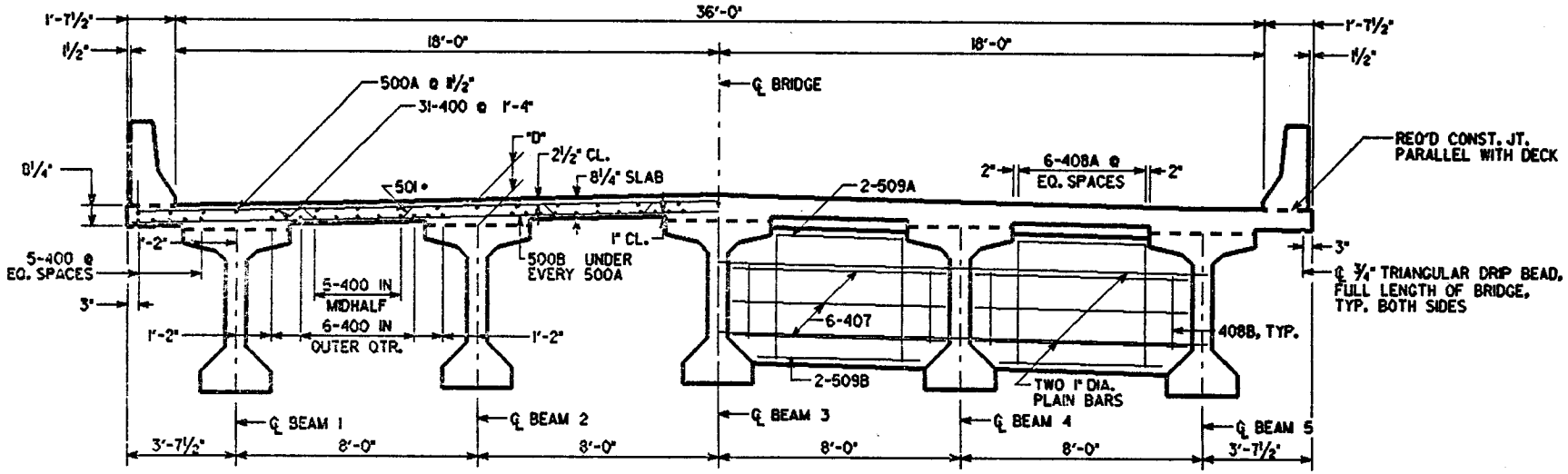
NWR = NUMBER WIDTH RANGES

CROSS-SLOPE

+ SLOPE - SLOPE

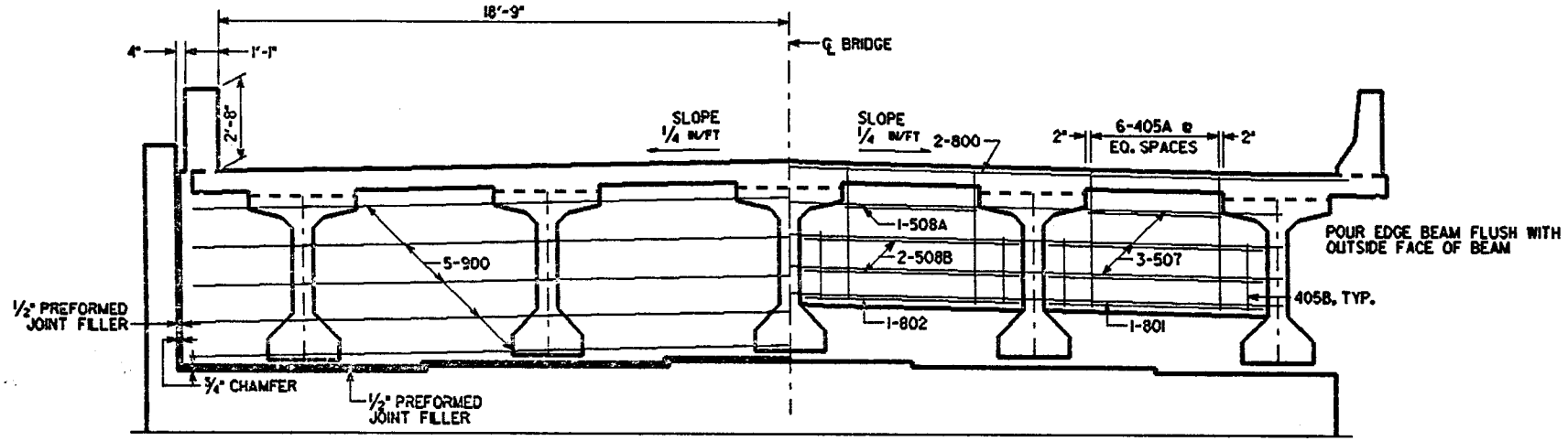
DIMENSION "D" IS MEASURED FROM TOP OF SLAB TO TOP OF BEAMS AT CENTERLINE BEARING. VARY "D" BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTION AND VERTICAL CURVE. MAINTAIN A CONSTANT SLAB THICKNESS OF 8¼"
"D" = 10½"

• 501 @ 11½", ALT. WITH 500A & 500B TO GIVE 11½" SPACING.



HALF SECTION THRU SLAB

HALF SECTION AT DIAPHRAGM



HALF SECTION AT ENDWALL

HALF SECTION AT EDGE BEAM

GEORGIA DEPARTMENT OF TRANSPORTATION - OFFICE OF BRIDGE DESIGN

BRIDGE SUPERSTRUCTURE CROSS-SECTION

PROJECT NO., COUNTY, NAME, DATE, REMARKS, ETC.

0	EXAMPLE PROBLEM 3, W 30 STEEL BEAM, FIXED END BENTS, NON-COMP.

SLAB DATA

	SCA	VC	QUAN	SLAB T (IN)	INT. D (IN)	O.H. T (IN)	EXT. D (IN)	BARRIER LEFT	BARRIER RIGHT
1	2	0	1	8.250	10.500	8.750	12.250	2	2

DETAILING OPTIONS

SCALE	VC	QUAN	BARRIER
1 = 1/2"/FT.	0 = YES	0 = YES	1 = BARRIER
2 = 3/8"/FT.	1 = NO	1 = NO	2 = PARAPET & SDWLK.
3 = 1/4"/FT.			

BEAM DATA

	TYP	NO	EQS	FIX	G. DEPTH(IN)	G. WIDTH(IN)
2	7	8	1	0		

BEAM TYPE — TYP

1 - 5 = AASHTO 1 THRU 5
6 - 9 = W27 THRU W36
10 = PLATE GIRDER
11 - 12 = T-BEAMS

BEAM SPACING — EQS

1 = EQUAL SP.
BLANK = VARIABLE SP.

END BENT — FIX

0 = FIX
1 = EXP

BEAM SPACING (FT.)

	OH DIST	SPAC 1	SPAC 2	SPAC 3	SPAC 4	SPAC 5	SPAC 6	SPAC 7	SPAC 8	SPAC 9	SPAC 10	SPAC 11	SPAC 12
3	3.458	6.786											

C.L. DATA AND NUMBER OF WIDTH RANGES

	NWR	C.L. LOC.(FT)
4	2	20.000

NWR = NUMBER WIDTH RANGES

WIDTH RANGE AND CROSS SLOPE DATA

	W.R.1 (FT)	W.R.2 (FT)	W.R.3 (FT)	W.R.4 (FT)
5	20.000	20.000		
	R.1 (IN/FT)	R.2 (IN/FT)	R.3 (IN/FT)	R.4 (IN/FT)
6	.187	-.197		

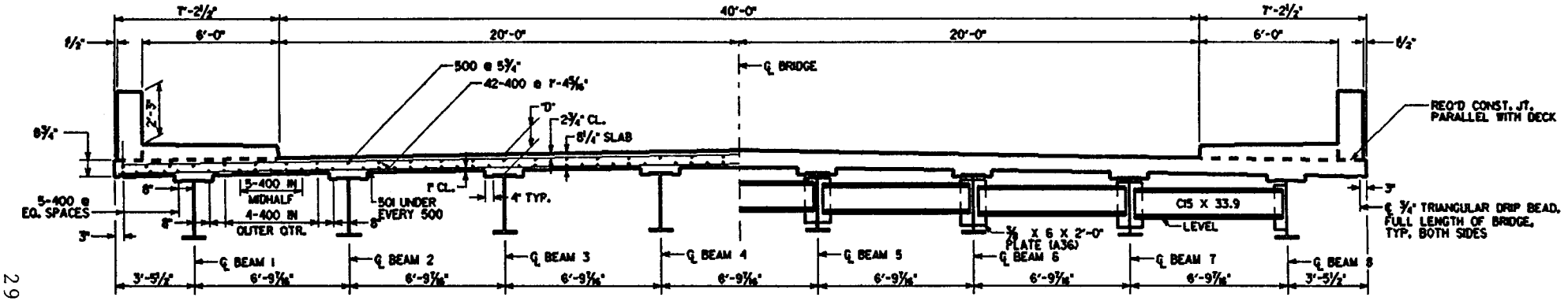
CROSS-SLOPE

+ SLOPE — - SLOPE

STEEL DATA

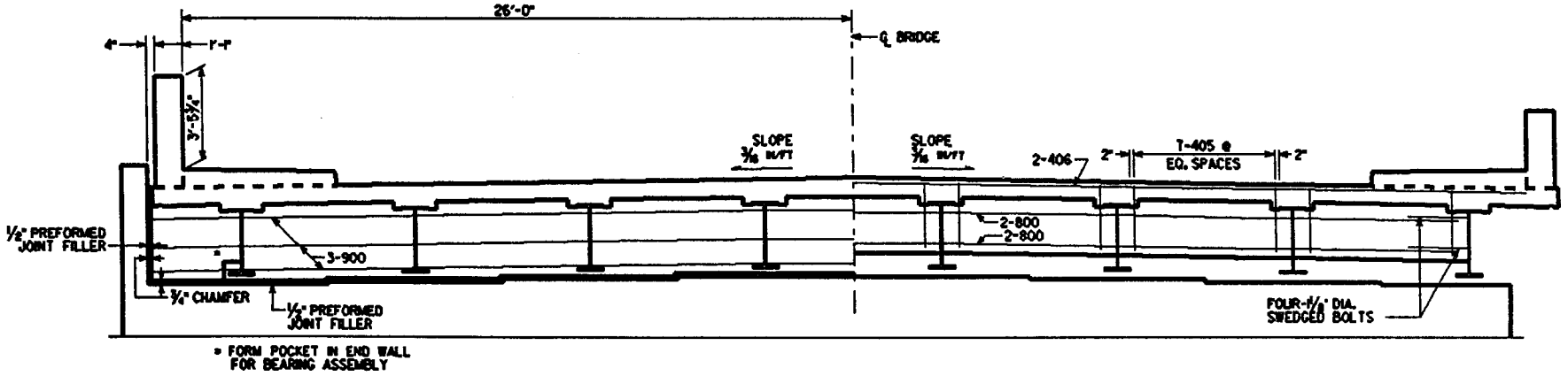
		MAIN STEEL		DIST. STEEL		CONT. STEEL	
	TOP CL.(IN)	M SPAC.(IN)	TR	N.M.H.	N.O.Q.	BAR	NUM
7	2.750	5.750	0	5	4		

DIMENSION "D" IS MEASURED FROM TOP OF SLAB TO TOP OF BEAMS AT CENTERLINE BEARING. VARY "D" BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTION AND VERTICAL CURVE. MAINTAIN A CONSTANT SLAB THICKNESS OF 8¼" BETWEEN BEAMS AND 8¾" AT THE OVERHANGS.
"D" = 10½" FOR INTERIOR BEAMS
"D" = 11¼" FOR EXTERIOR BEAMS



HALF SECTION THRU SLAB

HALF SECTION AT DIAPHRAGM



HALF SECTION AT ENDWALL

HALF SECTION AT EDGE BEAM

GEORGIA DEPARTMENT OF TRANSPORTATION - OFFICE OF BRIDGE DESIGN

BRIDGE SUPERSTRUCTURE CROSS-SECTION

PROJECT NO., COUNTY, NAME, DATE, REMARKS, ETC.

0	EXAMPLE PROBLEM 4, 27" T-BEAM, FIXED, NON-CONT-NUO03

SLAB DATA

	SCA	VC	QUAN	SLAB T (IN)	INT. D (IN)	O.H. T (IN)	EXT. D (IN)	BARRIER LEFT	BARRIER RIGHT
1	2	0	1	8.250	8.250	9.000	9.000	1	1

BEAM DATA

	TYP	NO	EQS	FIX	G. DEPTH(IN)	G. WIDTH(IN)
2	1.1	5				

BEAM SPACING (FT.)

	OH DIST	SPAC 1	SPAC 2	SPAC 3	SPAC 4	SPAC 5	SPAC 6	SPAC 7	SPAC 8	SPAC 9	SPAC 10	SPAC 11	SPAC 12
3	2.625	8.250	8.500	8.500	8.750								

C.L. DATA AND NUMBER OF WIDTH RANGES

	NWR	C.L. LOC. (FT)
4	2	18.000

WIDTH RANGE AND CROSS SLOPE DATA

	W.R.1 (FT)	W.R.2 (FT)	W.R.3 (FT)	W.R.4 (FT)
5	18.000	18.000		

	R.1 (IN/FT)	R.2 (IN/FT)	R.3 (IN/FT)	R.4 (IN/FT)
6	2.50	-2.50		

STEEL DATA

	MAIN STEEL			DIST. STEEL		CONT. STEEL	
	TOP CL. (IN)	M SPAC. (IN)	TR	N. M. H.	N. O. Q.	BAR	NUM
7	2.500	5.750	X	5	6		

DETAILING OPTIONS

SCALE	VC	QUAN	BARRIER
1 = 1/2"/FT.	0 = YES	0 = YES	1 = BARRIER
2 = 3/8"/FT.	1 = NO	1 = NO	2 = PARAPET & SDWLK.
3 = 1/4"/FT.			

BEAM TYPE (TYP)

1 - 5 = AASHTO 1 THRU 5
6 - 9 = W27 THRU W36
10 = PLATE GIRDER
11 - 12 = T-BEAMS

BEAM SPACING (EQS)

1 = EQUAL SP.
BLANK = VARIABLE SP.

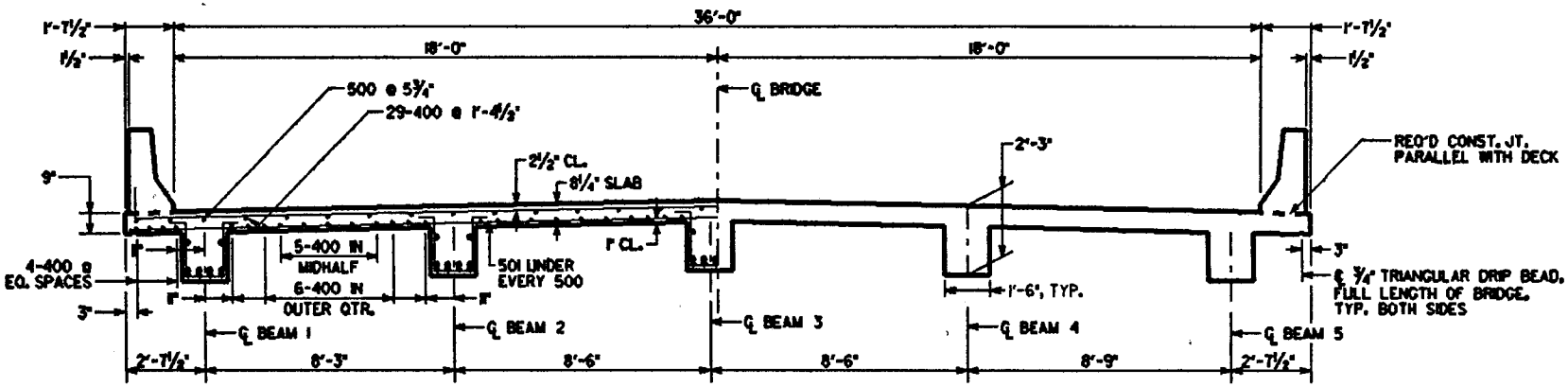
END BENT (FIX)

0 = FIX
1 = EXP

NWR = NUMBER WIDTH RANGES

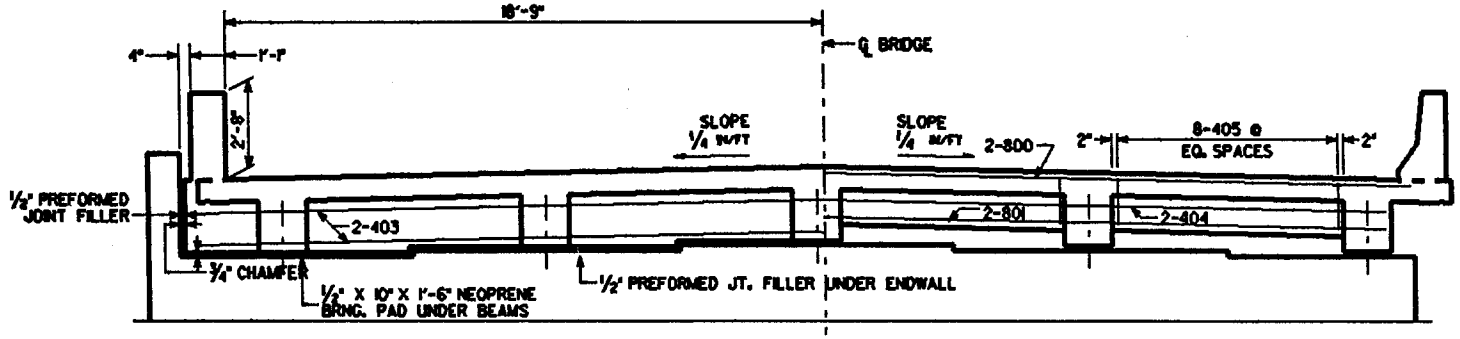
CROSS-SLOPE

+ SLOPE - SLOPE



HALF SECTION THRU SLAB

HALF SECTION AT MIDSPAN



HALF SECTION AT ENDWALL

HALF SECTION AT EDGE BEAM

GEORGIA DEPARTMENT OF TRANSPORTATION - OFFICE OF BRIDGE DESIGN

BRIDGE SUPERSTRUCTURE CROSS-SECTION

PROJECT NO., COUNTY, NAME, DATE, REMARKS, ETC.

0	EXAMPLE PROBLEM 5, STEEL GIRDER

SLAB DATA

	SCA	VC	QUAN	SLAB T (IN)	INT. D (IN)	O.H. T (IN)	EXT. D (IN)	BARRIER LEFT	BARRIER RIGHT
1	2	0	1	9.50	11.50	9.75	11.75	1	1

BEAM DATA

	TYP	NO	EQS	FIX	G. DEPTH(IN)	G. WIDTH(IN)
2	10	5	1		60.90	18.00

BEAM SPACING (FT.)

	OH DIST	SPAC 1	SPAC 2	SPAC 3	SPAC 4	SPAC 5	SPAC 6	SPAC 7	SPAC 8	SPAC 9	SPAC 10	SPAC 11	SPAC 12
3	3.625	9.000											

C.L. DATA AND NUMBER OF WIDTH RANGES

	NWR	C.L. LOC. (FT)
4	2	20.000

WIDTH RANGE AND CROSS SLOPE DATA

	W.R.1 (FT)	W.R.2 (FT)	W.R.3 (FT)	W.R.4 (FT)
5	21.000	20.000		

	R.1 (IN/FT)	R.2 (IN/FT)	R.3 (IN/FT)	R.4 (IN/FT)
6	3.60	3.60		

STEEL DATA

	MAIN STEEL			DIST. STEEL		CONT. STEEL	
	TOP CL. (IN)	M SPAC. (IN)	TR	N. M. H.	N. O. Q.	BAR	NUM
7	2.750	5.250	1	7	6		

DETAILING OPTIONS

SCALE	VC	QUAN	BARRIER
1 = 1/2"/FT.	0 = YES	0 = YES	1 = BARRIER
2 = 3/8"/FT.	1 = NO	1 = NO	2 = PARAPET & SDWLK.
3 = 1/4"/FT.			

BEAM TYPE (TYP)

1 - 5 = AASHTO 1 THRU 5
6 - 9 = W27 THRU W36
10 = PLATE GIRDER
11 - 12 = T-BEAMS

BEAM SPACING (EQS)

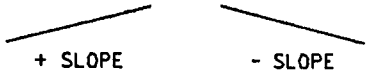
1 = EQUAL SP.
BLANK = VARIABLE SP.

END BENT (FIX)

0 = FIX
1 = EXP

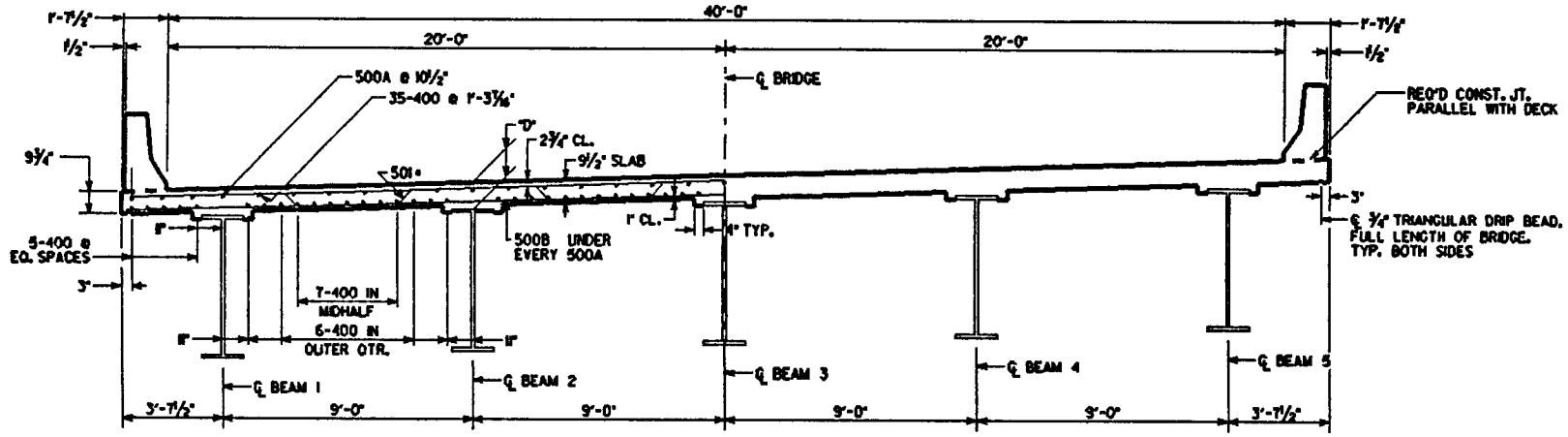
NWR = NUMBER WIDTH RANGES

CROSS-SLOPE



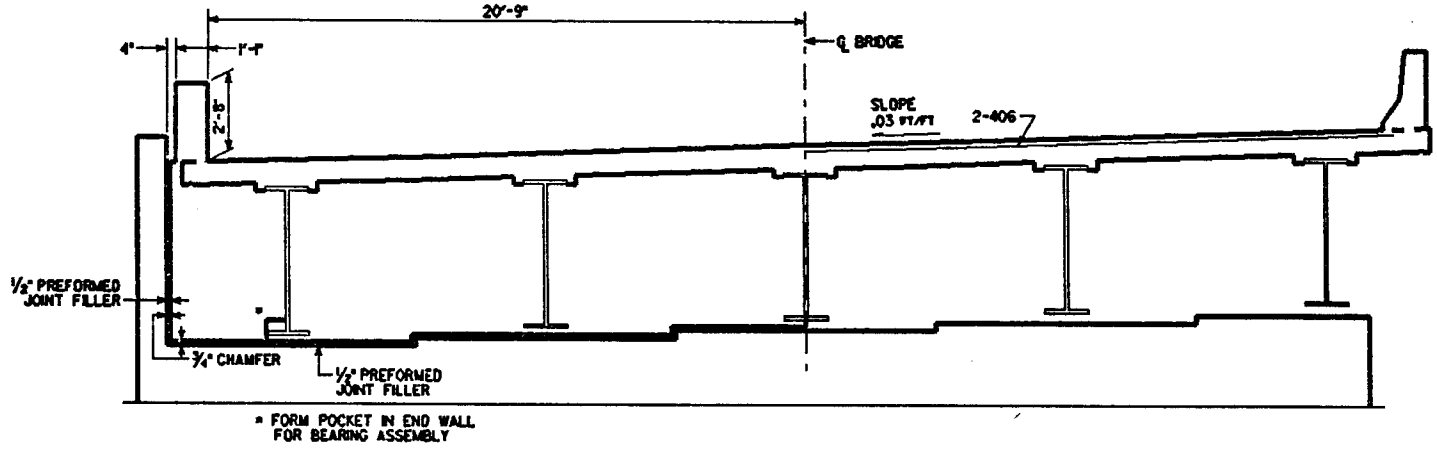
DIMENSION "D" IS MEASURED FROM TOP OF SLAB TO TOP OF BEAMS AT CENTERLINE BEARING. VARY "D" BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTION AND VERTICAL CURVE. MAINTAIN A CONSTANT SLAB THICKNESS OF 9½" BETWEEN BEAMS AND 9¾" AT THE OVERHANGS.
"D" = 8½" FOR INTERIOR BEAMS
"D" = 11¾" FOR EXTERIOR BEAMS

* 501@ 10½", ALT. WITH 500A & 500B TO GIVE 10½" SPACING.



HALF SECTION THRU SLAB

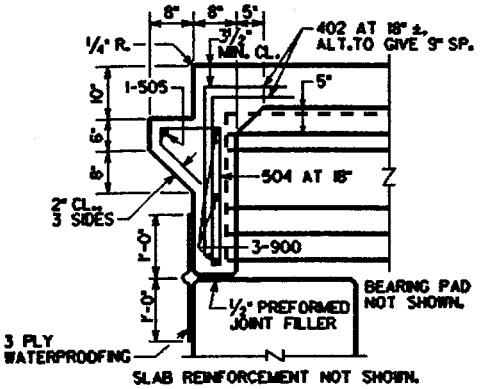
HALF SECTION AT DIAPHRAGM



HALF SECTION AT ENDWALL

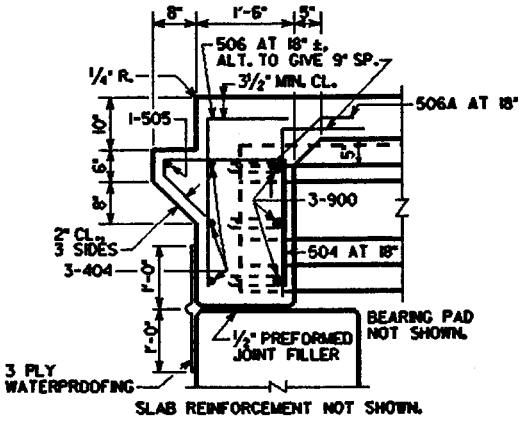
HALF SECTION AT EDGE BEAM

8.0 Cells that correspond to BRDECK



SECTION AT ENDWALL

PIFIX



SECTION AT ENDWALL

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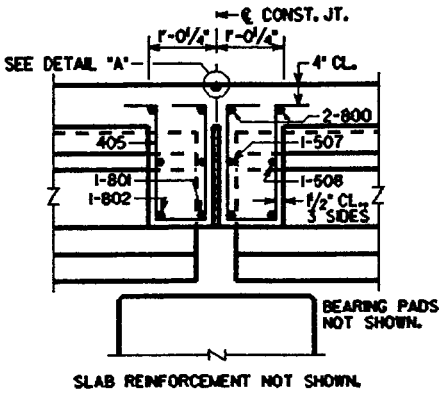
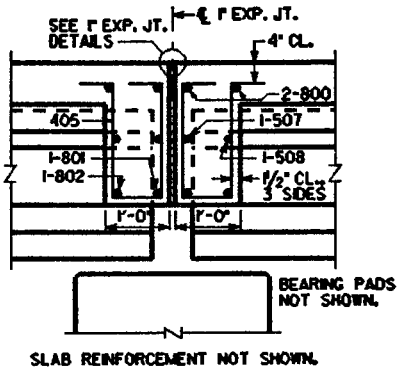


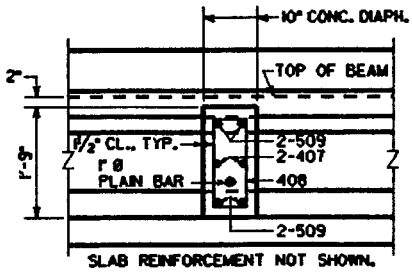
SECTION THRU EDGE BEAM

PICEB



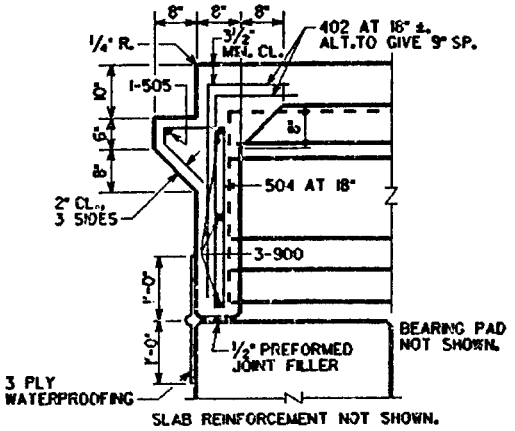
SECTION THRU EDGE BEAM

PINEB



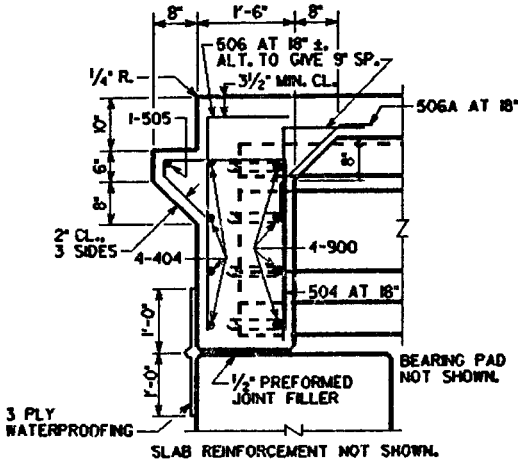
SECTION THRU DIAPHRAGM

PIDIA



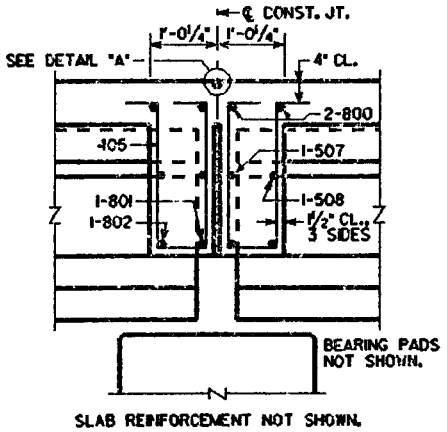
SECTION AT ENDWALL

P2FIX



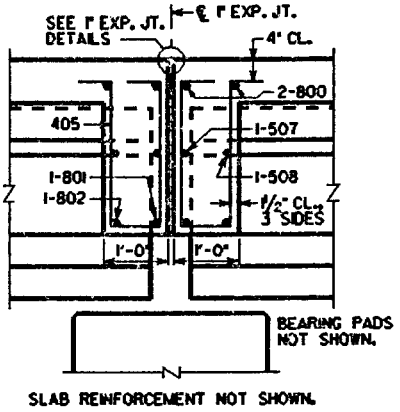
SECTION AT ENDWALL

P2EXP



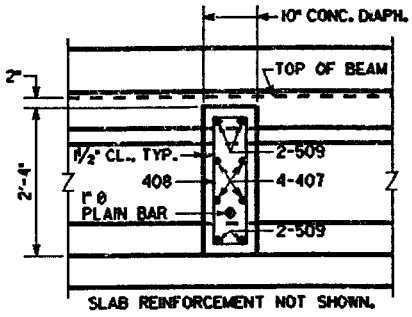
SECTION THRU EDGE BEAM

P2CEB



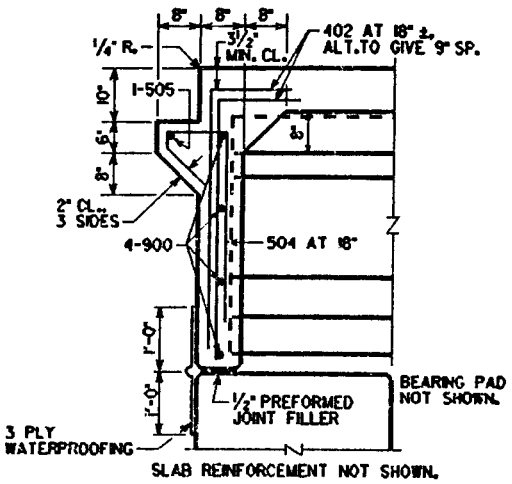
SECTION THRU EDGE BEAM

P2NEB



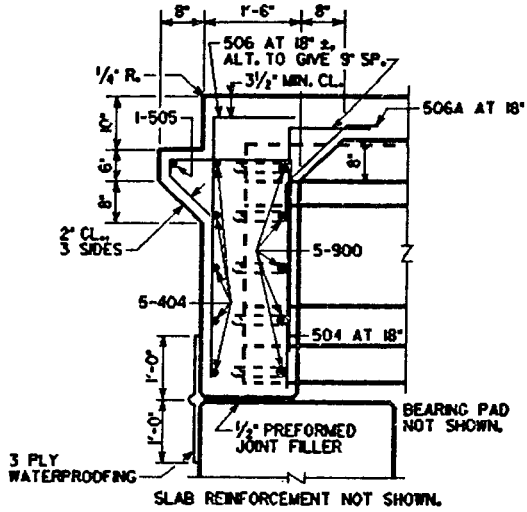
SECTION THRU DIAPHRAGM

P2DIA



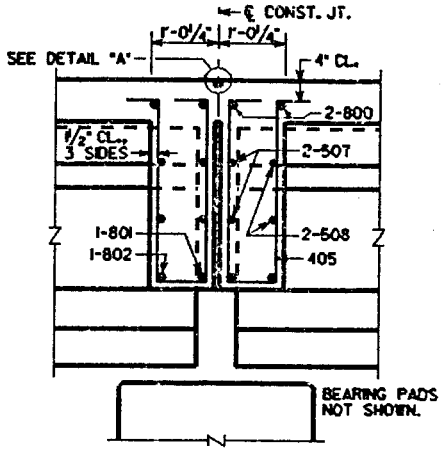
SECTION AT ENDWALL

P3FIX



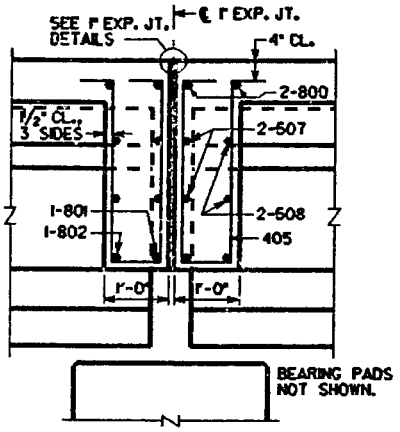
SECTION AT ENDWALL

P3EXP



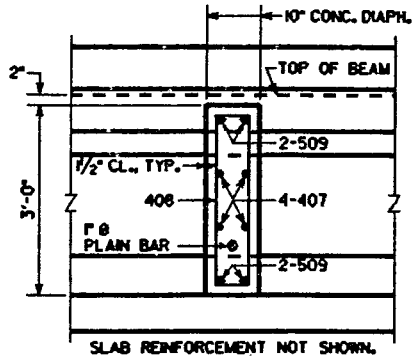
SECTION THRU EDGE BEAM

P3CEB



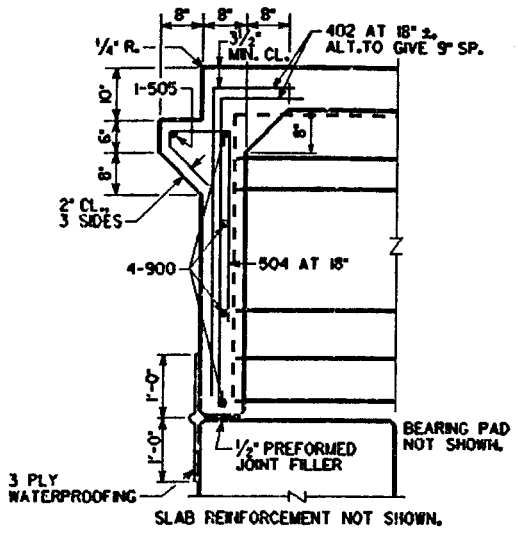
SECTION THRU EDGE BEAM

P3NEB



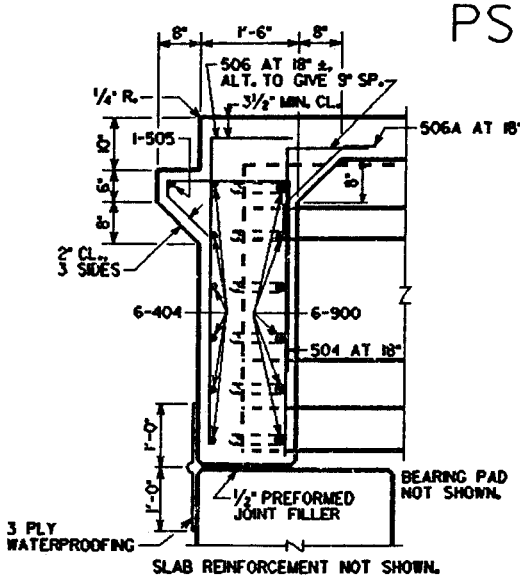
SECTION THRU DIAPHRAGM

P3DIA



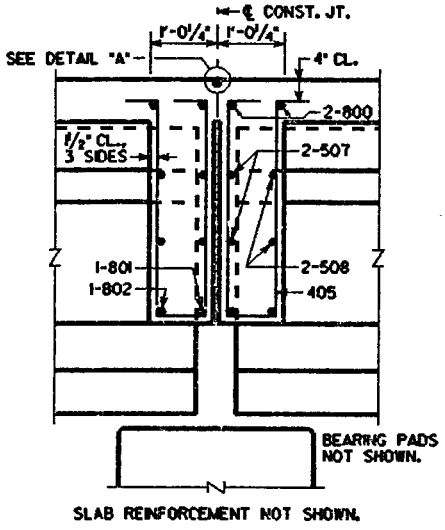
SECTION AT ENDWALL

P4FIX



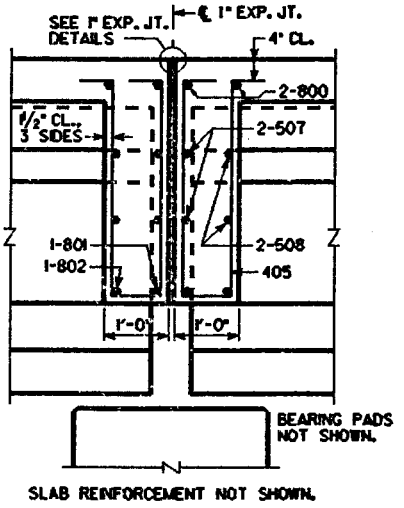
SECTION AT ENDWALL

P4EXP



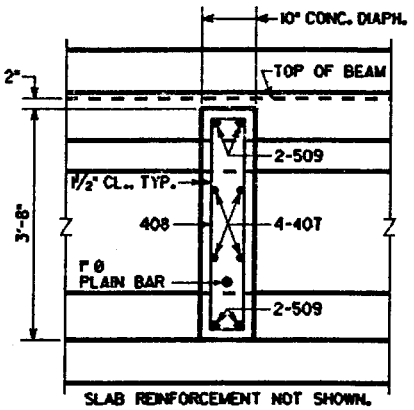
SECTION THRU EDGE BEAM

P4CEB



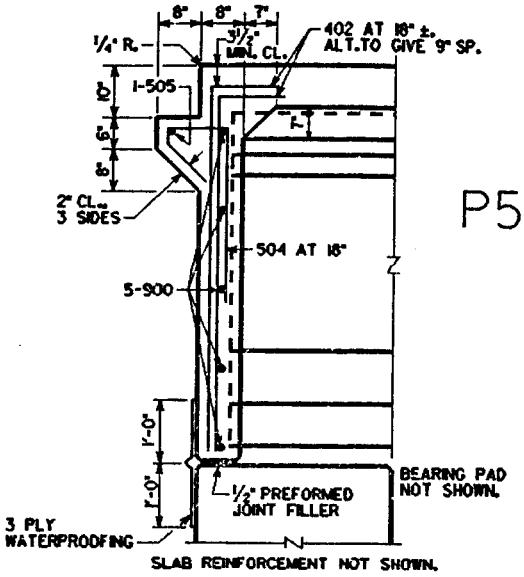
SECTION THRU EDGE BEAM

P4NEB



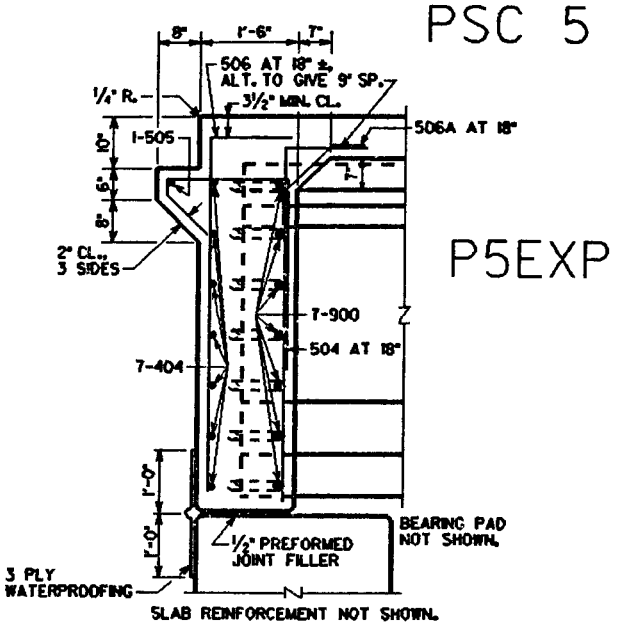
SECTION THRU DIAPHRAGM

P4DIA



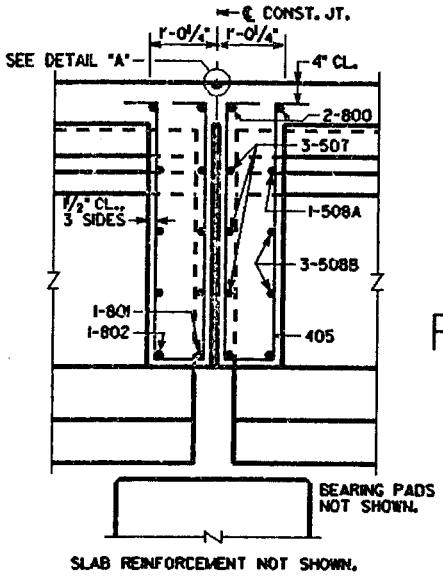
P5FIX

SECTION AT ENDWALL



P5EXP

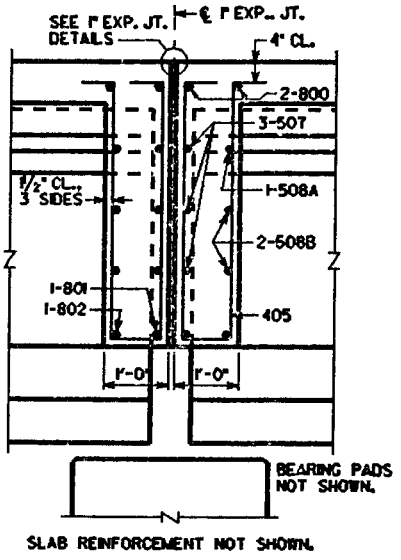
SECTION AT ENDWALL



P5CEB

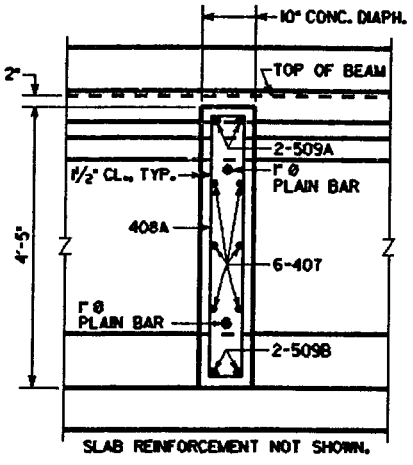
SECTION THRU EDGE BEAM

P5NEB

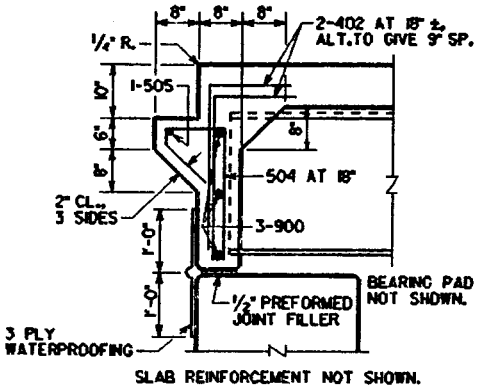


SECTION THRU EDGE BEAM

P5DIA

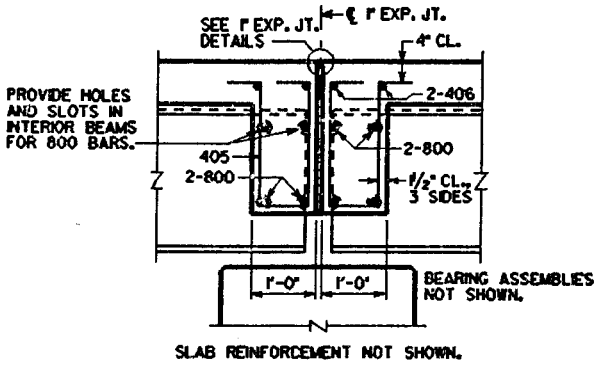


SECTION THRU DIAPHRAGM



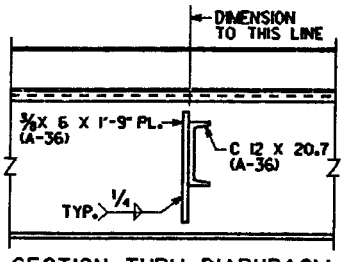
SECTION AT ENDWALL

W27FIX



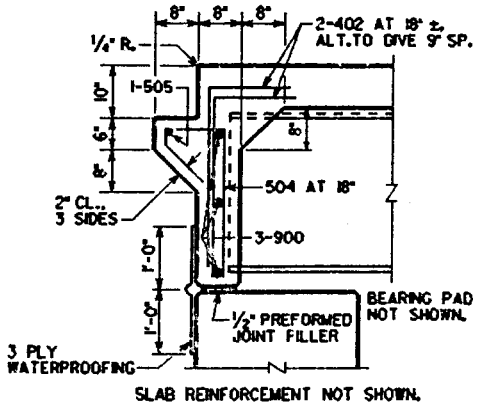
SECTION THRU EDGE BEAM

W27NEB



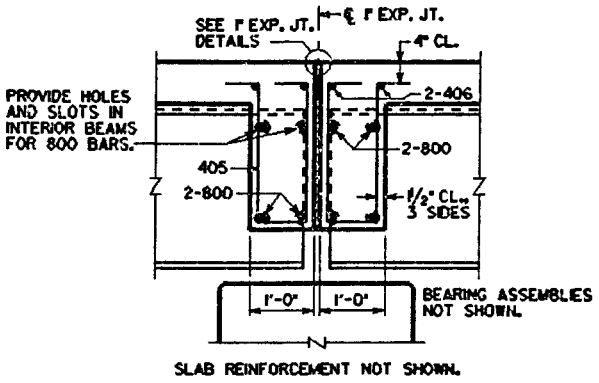
SECTION THRU DIAPHRAGM

W27DIA



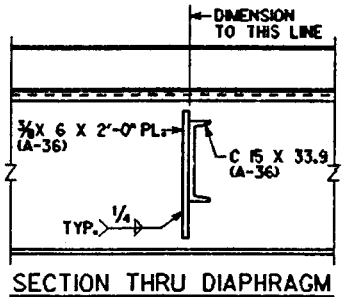
SECTION AT ENDWALL

W30FIX



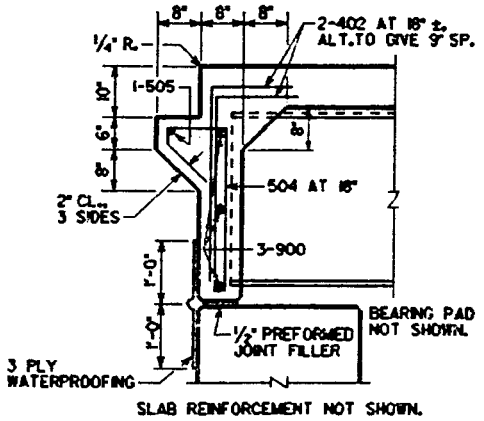
SECTION THRU EDGE BEAM

W30NEB



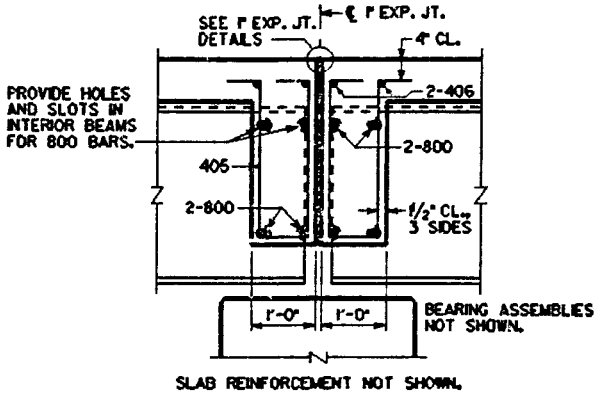
SECTION THRU DIAPHRAGM

W30DIA



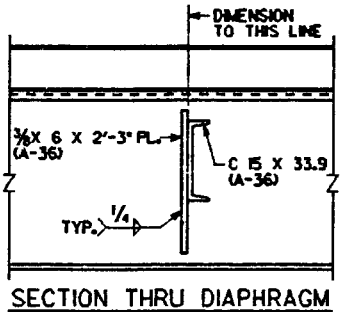
SECTION AT ENDWALL

W33FIX



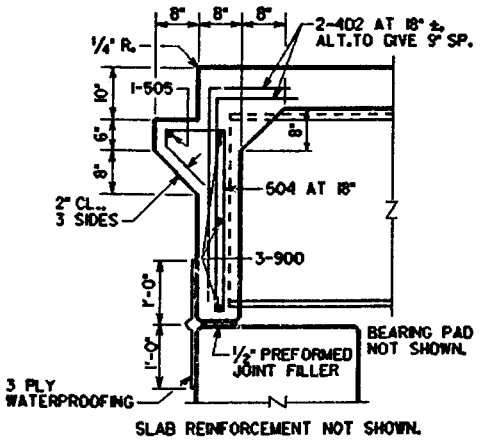
SECTION THRU EDGE BEAM

W33NEB



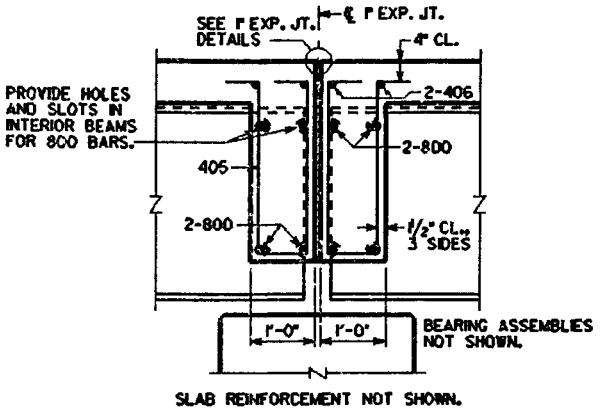
SECTION THRU DIAPHRAGM

W33DIA



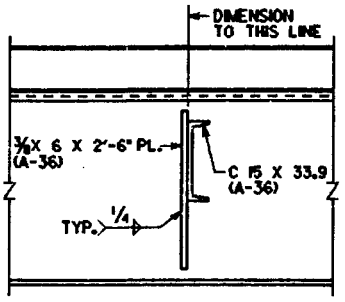
SECTION AT ENDWALL

W36FIX



SECTION THRU EDGE BEAM

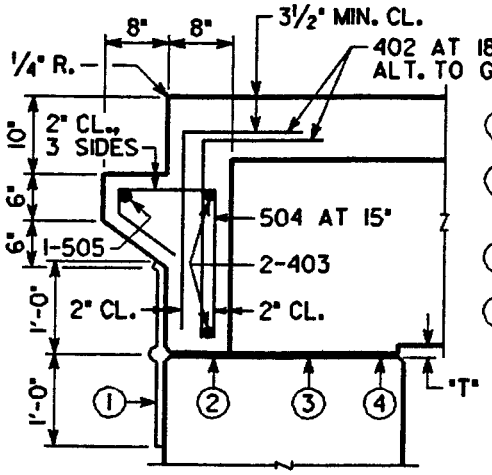
W36NEB



SECTION THRU DIAPHRAGM

W36DIA

TBMEND



① 3 PLY WATERPROOFING

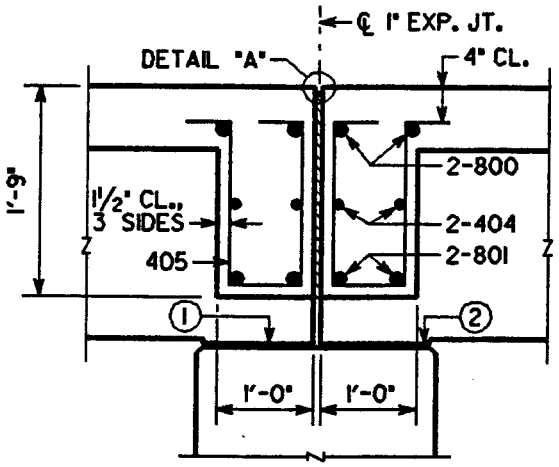
② ½" PREFORMED JOINT FILLER UNDER ENDWALL AND BEAM.

③ NEOPRENE BEARING PAD, TYP.

④ ½" PREFORMED JOINT FILLER UNDER BEAM.

SECTION AT ENDWALL

TBMEBI

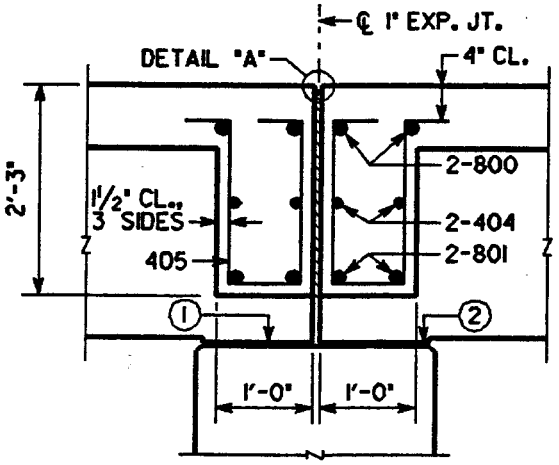


① NEOPRENE BEARING PAD, TYP.

② ½" PREFORMED JOINT FILLER.

SECTION AT EDGE BEAM

TBMEB2



① NEOPRENE BEARING PAD, TYP.

② ½" PREFORMED JOINT FILLER.

SECTION AT EDGE BEAM

9.0 Deck Program Bar Listing

Below is a listing of the bar designation the program uses:

BAR	DESCRIPTION
400	SLAB BAR
401	BARRIER BAR
402	ENDWALL STIRRUP - FIXED END
403	ENDWALL BAR - TBEAM
404	EDGE BEAM BAR - TBEAM ENDWALL BAR - P.S.C. BEAM
405	EDGE BEAM STIRRUP
406	EDGE BEAM BAR - STEEL BEAM
407	DIA. BAR - P.S.C. BEAM
408	DIA. STIRRUP - P.S.C. BEAM
409	SIDEWALK BAR
500	TOP SLAB BAR
501	BOTTOM SLAB BAR
502	BOTTOM N.J. BARRIER STIRRUP PARAPET STIRRUP
503	TOP N.J. BARRIER STIRRUP
504	PAVING REST STIRRUP
505	PAVING REST BAR
506	ENDWALL STIRRUP - EXP. END P.S.C. BEAM
507	LONG EDGE BEAM BAR - P.S.C. BEAM
508	SHORT EDGE BEAM BAR - P.S.C. BEAM
509	DIA. BAR - P.S.C. BEAM
800	EDGE BEAM BAR - STEEL BEAM EDGE BEAM TOP BAR - P.S.C. BEAM
801	LONG EDGE BEAM BOTTOM BAR - P.S.C. BEAM
802	SHORT EDGE BEAM BOTTOM BAR - P.S.C. BEAM
900	ENDWALL BAR

10.0 Error Messages

The program checks the validity of the input data to the extent possible and will list the following message when an error is detected:

Line 1 (SLAB DATA)
- The number 1 was not entered in card column 1.
- Scale size (SCA) was not entered.
- Slab thickness (SLAB T) was not entered.
- D dimension (INT. D) was not entered.

Line 2 (BEAM DATA)
- The number 2 was not entered in card column 1.
- Beam type (TYP) was not entered.
- Number of beams (NO) was not entered.
- Number of beams (NO) cannot be greater than 20.
- Girder depth (G. DEPTH) was not entered.
- Girder width (G. WIDTH) was not entered.

Line 3 (BEAM SPACING DATA)
- The number 3 was not entered in card column 1.
- Overhang distance (OH DIST) was not entered.
- Beam spacing data (SPAC X) is incomplete.

Line 4 (CENTER LINE AND NUMBER OF WIDTH RANGES)
- The number 4 was not entered in card column 1.
- There is not at least 2 number of width ranges (N.W.R.) entered.

Line 5 (WIDTH RANGE DATA)
- The number 6 was not entered in card column 1.
- Width range data (W.R. X) is incomplete.

LINE 6 (CROSS SLOPE DATA)
- The number 6 was not entered in card column 1.
- Cross slope data (R. X) is incomplete.

Line 7 (STEEL DATA)
- The number 7 was not entered in card column 1.
- Top Clearance (TOP CL.) was not entered.
- Bar spacing for top main steel (M. SPAC) was not entered.
- Number of bottom distribution bars in midhalf of beam spacing (N.M.H.) was not entered.
- Number of bottom distribution bars in outerquarters of beam spacing (N.O.Q.) was not entered.
- Bar size for negative moment steel (BAR) was not entered.
- Number of negative moment steel bars (NUM) was not entered.

Line 8 (QUANTITY DATA)
- The number 8 was not entered in card column 1.
- Number of spans (NSPAN) was not entered.
- End bent cap width (CAP WIDTH) was not entered.
- End post length (END POST LENGTH) was not entered.
- End post height (END POST HEIGHT) was not entered.

Line 9 (SPAN QUANTITY DATA)
- The number 9 was not entered in card column 1.
- Span number (S.N.) was not entered.
- Span length (SPAN L.) was not entered.
- Continuous steel length (CONT. STEEL LENGTH) was not entered.