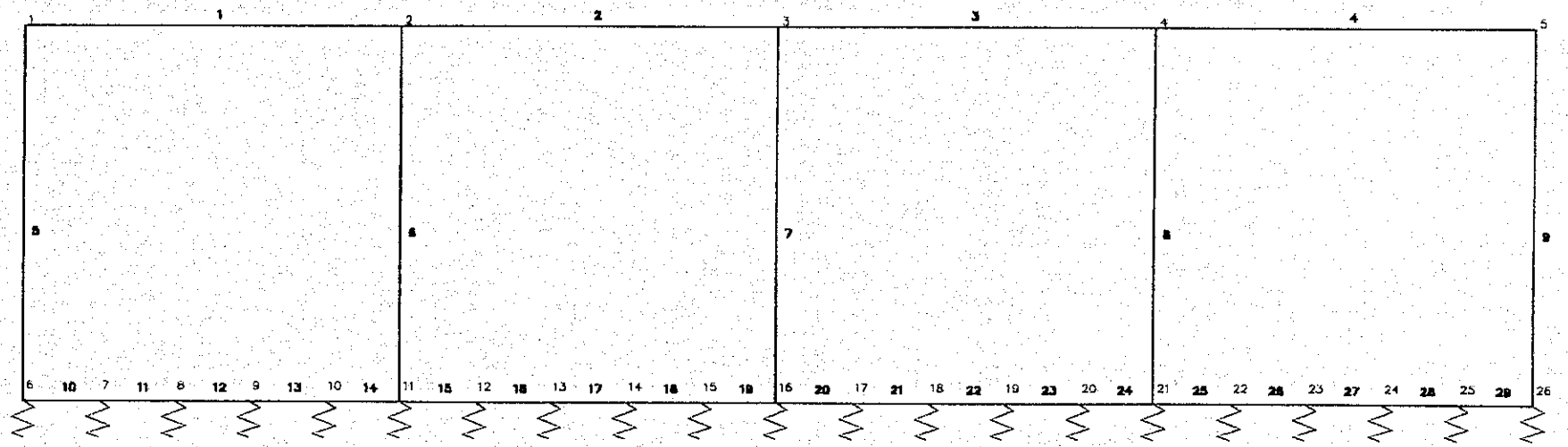
2-1-3 BOX CULVERT AT CH.4+660

(1) BOX CULVERT

BOX CULVERT AT CH. 3+660



2 = JOINT NUMBER
4 = MEMBER NUMBER

001-11

```
 ****************************************************
 *                                                  *
 *           S T A A D - III                        *
 *           Revision 22.3a                         *
 *           Proprietary Program of                 *
 *           Research Engineers, Inc.               *
 *           Date=    JAN 30, 2000                  *
 *           Time=    11:36:56                      *
 *                                                  *
 *      USER ID: Development Design Consultants L *
 ****************************************************

 1. STAAD PLANE DESIGN OF BOX CULVERT AT CH. 3+660 (4 X 4.75 X 4.75)
 2. UNIT METER KNS
 3. PAGE EJE
 4. PAGE LEN 80
 5. JOINT COORD
 6.  1   0.00  5.16  0.00
 7.  2   4.98  5.16  0.00
 8.  3   9.96  5.16  0.00
 9.  4  14.94  5.16  0.00
10.  5  19.92  5.16  0.00
11.  6   0.00  0.00  0.00   11    4.98  0.00  0.00
12. 12   5.97  0.00  0.00   16    9.96  0.00  0.00
13. 17  10.95  0.00  0.00   21   14.94  0.00  0.00
14. 22  15.93  0.00  0.00   26   19.92  0.00  0.00
15. MEMBER INCI
16.   1     1     2     4
17.   5     1     6
18.   6     2    11
19.   7     3    16
20.   8     4    21
21.   9     5    26
22.  10     6     7    29
23. MEMBER PROPERTY
24.  1 TO  4  PRIS    YD    0.400 ZD 1.0
25.  5  9     PRIS    YD    0.400 ZD 1.0
26.  6  7  8  PRIS    YD    0.300 ZD 1.0
27. 10 TO 29  PRIS    YD    0.400 ZD 1.0
29. CONSTANT
30. E 23.667E6 ALL
31. DENSITY 23.56 ALL
32. SUPPORT
33. *7 TO 25 FIXED BUT MZ  KFY  1990
34. *6    26 FIXED BUT MZ  KFY   995
35. *
36. 6   7  8   FIXED BUT MZ  KFY  3500
37. 9  TO 23   FIXED BUT MZ  KFY  1990
38. 24 25 26   FIXED BUT MZ  KFY  3500
40. *
41. LOAD  1  : SELFWEIGHT
42. SELFWEIGHT  Y  -1
43. LOAD  2  : FILL WEIGHT
44. MEMBER LOAD
45. 1  TO  3  UNI    GY   -13.95
46. LOAD  3  : BACK FILL (MINIMUM)
47. MEMBER LOAD
48.  5 TRAP    GX   28.83   4.44
49.  9 TRAP    GX  -28.83  -4.44
50. LOAD  4  : BACK FILL (MAXIMUM)
51. MEMBER LOAD
52.  5 TRAP    GX   31.61  12.71  3.16  5.16
53.  5 TRAP    GX   71.46  31.61  0.00  3.16
54.  9 TRAP    GX  -31.61 -12.71  3.16  5.16
55.  9 TRAP    GX  -71.46 -31.61  0.00  3.16
56. LOAD 5   : LL IN ADJACENT SPANS
57. MEMBER LOAD
58.  1 UNI     GY  -56.84   1.84  3.14
59.  2 UNI     GY  -56.84   1.84  3.14
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60. LOAD 6    : LL IN ALTERNATE SPAN
61. MEMBER LOAD
62.  1 UNI      GY  -56.84    1.84  3.14
63.  3 UNI      GY  -56.84    1.02  2.32
64. LOAD 7    : LL IN SPAN 1
65. MEMBER LOAD
66.  1 UNI      GY  -56.84    1.84  3.14
67. LOAD 8    : LL IN SPAN 2
68. MEMBER LOAD
69.  2 UNI      GY  -56.84    1.84  3.14
70. LOAD 9    : LL IN MIDDLE OF CULVERT
71. MEMBER LOAD
72.  2 UNI      GY  -35.34    2.46  3.72
73.  2 UNI      GY  -35.34    3.72  4.98
74. LOAD 10   : MILITARY LOADING IN SPAN 1
75. MEMBER LOAD
76.  1 UNI      GY  -35.34    1.23  2.49
77.  1 UNI      GY  -35.34    2.49  3.75
78. LOAD 11   : MILITARY LOADING IN SPAN 2
79. MEMBER LOAD
80.  2 UNI      GY  -35.34    1.23  2.49
81.  2 UNI      GY  -35.34    2.49  3.75
82. LOAD 12   : LL IN SPAN 1 FOR MAX. SHEAR
83. MEMBER LOAD
84.  1 UNI      GY  -56.84    0.00  1.30
85. LOAD 13   : MILITARY LOADING IN SPAN 1 FOR MAX. SHEAR
86. MEMBER LOAD
87.  1 UNI      GY  -35.34    0.00  1.26
88.  1 UNI      GY  -35.34    1.26  2.52
89. *
90. LOAD COMB 14
91. 1  1.3  2  1.3  4  1.3  12  2.171
92. LOAD COMB 15
93. 1  1.3  2  1.3  4  1.3  13  2.171
94. *
95. LOAD COMB 16
96. 1  1.3  2  1.3  4  1.3  5  2.171
97. LOAD COMB 17
98. 1  1.3  2  1.3  4  1.3  6  2.171
99. LOAD COMB 18
100. 1  1.3  2  1.3  4  1.3  7  2.171
101. LOAD COMB 19
102. 1  1.3  2  1.3  4  1.3  8  2.171
103. LOAD COMB 20
104. 1  1.3  2  1.3  4  1.3  9  2.171
105. LOAD COMB 21
106. 1  1.3  2  1.3  4  1.3  10 2.171
107. LOAD COMB 22
108. 1  1.3  2  1.3  4  1.3  11  2.171
109. *
110. LOAD COMB 23
111. 1  1.3  2  1.3  3  1.3  5  2.171
112. LOAD COMB 24
113. 1  1.3  2  1.3  3  1.3  6  2.171
114. LOAD COMB 25
115. 1  1.3  2  1.3  3  1.3  7  2.171
116. LOAD COMB 26
117. 1  1.3  2  1.3  3  1.3  8  2.171
118. LOAD COMB 27
119. 1  1.3  2  1.3  3  1.3  9  2.171
120. LOAD COMB 28
121. 1  1.3  2  1.3  3  1.3  10  2.171
122. LOAD COMB 29
123. 1  1.3  2  1.3  3  1.3  11  2.171
124. LOAD COMB 30
125. 1  1.3   4  1.3
126. *
```

127. PERFORM ANALYSIS

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 26/ 29/ 21
ORIGINAL/FINAL BAND-WIDTH = 21/ 5
TOTAL PRIMARY LOAD CASES = 13, TOTAL DEGREES OF FREEDOM = 57
SIZE OF STIFFNESS MATRIX = 741 DOUBLE PREC. WORDS
REQRD/AVAIL. DISK SPACE = 12.07/ 217.3 MB, EXMEM = 1960.5 MB

++ Processing Element Stiffness Matrix. 11:36:56
++ Processing Global Stiffness Matrix. 11:36:56
++ Processing Triangular Factorization. 11:36:56
++ Calculating Joint Displacements. 11:36:56
++ Calculating Member Forces. 11:36:56

128. LOAD LIST 14 TO 30
129. PRINT MAXFORCE ENVELOP LIST 1 2 4 5 8 TO 17

MEMBER FORCE ENVELOPE

ALL UNITS ARE KNS METE

MAX AND MIN FORCE VALUES AMONGST ALL SECTION LOCATIONS

MEMB		FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
1	MAX	226.81	.00	15	219.30	.00	16			
		.00	.00	14	.00	.00	14	201.54 C	.00	16
	MIN	-165.50	4.98	28	-146.78	2.49	25			
		.00	4.98	30	.00	4.98	30	88.34 C	4.98	25
2	MAX	182.50	.00	29	152.08	.00	23			
		.00	.00	14	.00	.00	14	232.73 C	.00	22
	MIN	-202.25	4.98	20	-174.40	2.49	22			
		.00	4.98	30	.00	4.98	30	89.85 C	4.98	28
4	MAX	23.49	.00	28	141.32	4.98	20			
		.00	.00	14	.00	.00	14	187.40 C	.00	17
	MIN	-59.05	4.98	20	-6.10	.83	30			
		.00	4.98	30	.00	4.98	30	74.59 C	4.98	28
5	MAX	106.03	5.16	14	82.77	2.15	30			
		.00	.00	14	.00	.00	14	290.03 C	5.16	15
	MIN	-201.54	.00	16	-219.30	.00	16			
		.00	5.16	30	.00	5.16	30	50.59 C	4.73	30
8	MAX	32.99	.00	20	88.47	.00	20			
		.00	.00	14	.00	.00	14	204.87 C	5.16	24
	MIN	5.44	5.16	14	-83.48	5.16	27			
		.00	5.16	30	.00	5.16	30	41.15 C	4.73	30
9	MAX	187.40	.00	17	141.32	.00	20			
		.00	.00	14	.00	.00	14	122.27 C	5.16	20
	MIN	-99.23	5.16	14	-84.69	2.15	15			
		.00	5.16	30	.00	5.16	30	37.52 C	.00	28
10	MAX	-64.89	.00	30	119.19	1.00	23			
		.00	.00	14	.00	.00	14	.00	.00	14
	MIN	-180.09	1.00	15	-140.20	.00	14			
		.00	1.00	30	.00	1.00	30	.00	1.00	30
11	MAX	-4.84	.00	29	145.25	1.00	23			
		.00	.00	14	.00	.00	14	.00	.00	14

MEMB		FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
	MIN	-78.78	1.00	14	-10.27	.00	30			
		.00	1.00	30	.00	1.00	30	.00	1.00	30
12	MAX	78.09	.00	23	145.25	.00	23			
		.00	.00	14	.00	.00	14	.00	.00	14
	MIN	-1.61	1.00	30	18.47	.83	30			
		.00	1.00	30	.00	1.00	30	.00	1.00	30
13	MAX	130.44	.00	23	87.20	.00	24			
		.00	.00	14	.00	.00	14	.00	.00	14
	MIN	15.17	1.00	30	-54.41	1.00	29			
		.00	1.00	30	.00	1.00	30	.00	1.00	30
14	MAX	185.59	.00	23	18.34	.00	14			
		.00	.00	14	.00	.00	14	.00	.00	14
	MIN	32.66	1.00	30	-229.07	1.00	23			
		.00	1.00	30	.00	1.00	30	.00	1.00	30
15	MAX	-25.58	.00	30	4.36	.99	30			
		.00	.00	14	.00	.00	14	.00	.00	14
	MIN	-127.87	.99	23	-175.47	.00	23			
		.00	.99	30	.00	.99	30	.00	.99	30
16	MAX	-7.17	.00	30	37.23	1.00	14			
		.00	.00	14	.00	.00	14	.00	.00	14
	MIN	-71.45	1.00	23	-54.89	.00	23			
		.00	1.00	30	.00	1.00	30	.00	1.00	30
17	MAX	30.43	.00	20	37.23	.00	14			
		.00	.00	14	.00	.00	14	.00	.00	14
	MIN	-20.14	1.00	28	-1.33	1.00	27			
		.00	1.00	30	.00	1.00	30	.00	1.00	30

********** END OF FORCE ENVELOPE FROM INTERNAL STORAGE **********

```
130. START CONC DESIGN
131. FC 25000.0
132. TRACK 2
133. MAXMAIN 20.
134. CLEAR  0.05
135. DESIGN BEAM 1 2 3
```

B E A M N O. 1 D E S I G N R E S U L T S - FLEXURE

LEN - 4980. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	73.	4 - 20MM	27.	4980.	NO	YES
	CRITICAL POS MOMENT= 148.75 KN-MET AT 2490.MM, LOAD 25					
	REQD STEEL= 1252.MM2, ROW= .0038, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 878./ 45./ 293. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 493./ 596. MMS					
2	331.	17 - 12MM	0.	3371.	YES	NO
	CRITICAL NEG MOMENT= 219.30 KN-MET AT 0.MM, LOAD 16					
	REQD STEEL= 1895.MM2, ROW= .0058, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 55. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					
3	331.	10 - 12MM	3061.	4980.	NO	YES
	CRITICAL NEG MOMENT= 110.81 KN-MET AT 4980.MM, LOAD 28					
	REQD STEEL= 1104.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	0./	1937.	0./	219.	0/	16
415.	0./	1269.	0./	147.	0/	16
830.	112./	884.	13./	104.	14/	22
1245.	471./	610.	56./	72.	15/	22
1660.	885./	384.	104./	46.	28/	22
2075.	1155./	205.	134./	25.	28/	22
2490.	1287./	86.	149./	10.	25/	30
2905.	1206./	26.	140./	3.	28/	30
3320.	985./	0.	115./	0.	28/	0
3735.	607./	18.	72./	2.	28/	14
4150.	160./	228.	19./	27.	21/	14
4565.	41./	539.	5./	64.	30/	15
4980.	14./	948.	2./	111.	30/	28

B E A M N O. 1 D E S I G N R E S U L T S - SHEAR

```
AT START SUPPORT - Vu=  192.05 KNS  Vc=  269.53 KNS  Vs=     .00 KNS
                   PROVIDE 12 MM BARS AT 162. MM  C/C FOR 1037. MM
AT END   SUPPORT - Vu=  155.64 KNS  Vc=  269.53 KNS  Vs=     .00 KNS
                   PROVIDE 12 MM BARS AT 162. MM  C/C FOR 1452. MM
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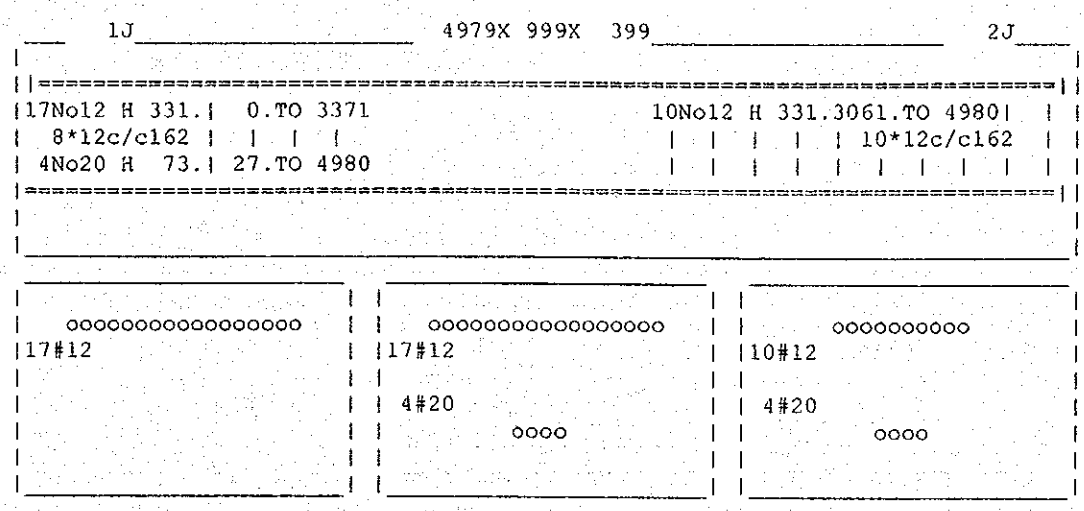


B E A M N O. 2 D E S I G N R E S U L T S - FLEXURE

LEN - 4980. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

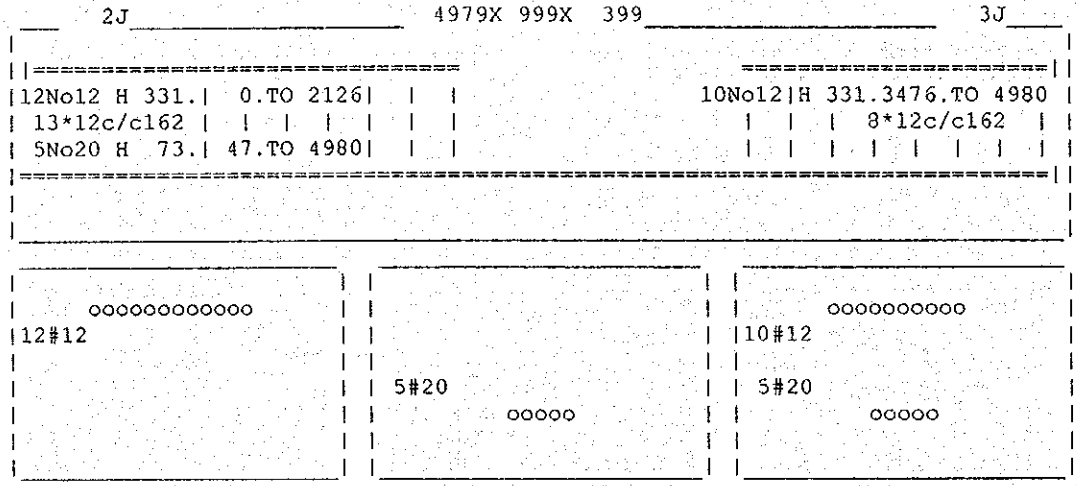
LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	73.	5 - 20MM	47.	4980.	NO	YES
	CRITICAL POS MOMENT= 175.88 KN-MET AT 2540.MM, LOAD 22					
	REQD STEEL= 1511.MM2, ROW= .0046, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 878./ 45./ 220. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 493./ 575. MMS					
2	331.	12 - 12MM	0.	2126.	YES	NO
	CRITICAL NEG MOMENT= 152.08 KN-MET AT 0.MM, LOAD 23					
	REQD STEEL= 1281.MM2, ROW= .0039, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 81. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					
3	331.	10 - 12MM	3476.	4980.	NO	YES
	CRITICAL NEG MOMENT= 91.91 KN-MET AT 4980.MM, LOAD 16					
	REQD STEEL= 1104.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	0./	1317.	0./	152.	0/	23
415.	0./	786.	0./	92.	0/	24
830.	173./	512.	21./	61.	22/	24
1245.	698./	286.	82./	34.	22/	24
1660.	1131./	108.	131./	13.	22/	24
2075.	1408./	0.	162./	0.	22/	0
2490.	1533./	0.	176./	0.	22/	0
2905.	1463./	0.	168./	0.	22/	0
3320.	1369./	0.	158./	0.	27/	0
3735.	1157./	0.	134./	0.	27/	0
4150.	833./	39.	98./	5.	27/	21

B E A M N O. 2 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 172.64 KNS Vc= 269.53 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 162. MM C/C FOR 1867. MM
AT END SUPPORT - Vu= 167.48 KNS Vc= 269.53 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 162. MM C/C FOR 1037. MM



B E A M N O. 3 D E S I G N R E S U L T S - FLEXURE

LEN - 4980. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	73.	5 - 20MM	0.	4716.	YES	NO
	CRITICAL POS MOMENT= 173.20 KN-MET AT 1892.MM, LOAD 17					
	REQD STEEL= 1487.MM2, ROW= .0045, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 878./ 45./ 220. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 493./ 566. MMS					
2	331.	10 - 12MM	0.	881.	YES	NO
	CRITICAL NEG MOMENT= 66.10 KN-MET AT 0.MM, LOAD 17					
	REQD STEEL= 1104.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					
3	331.	10 - 12MM	3061.	4980.	NO	YES
	CRITICAL NEG MOMENT= 113.89 KN-MET AT 4980.MM, LOAD 24					
	REQD STEEL= 1104.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

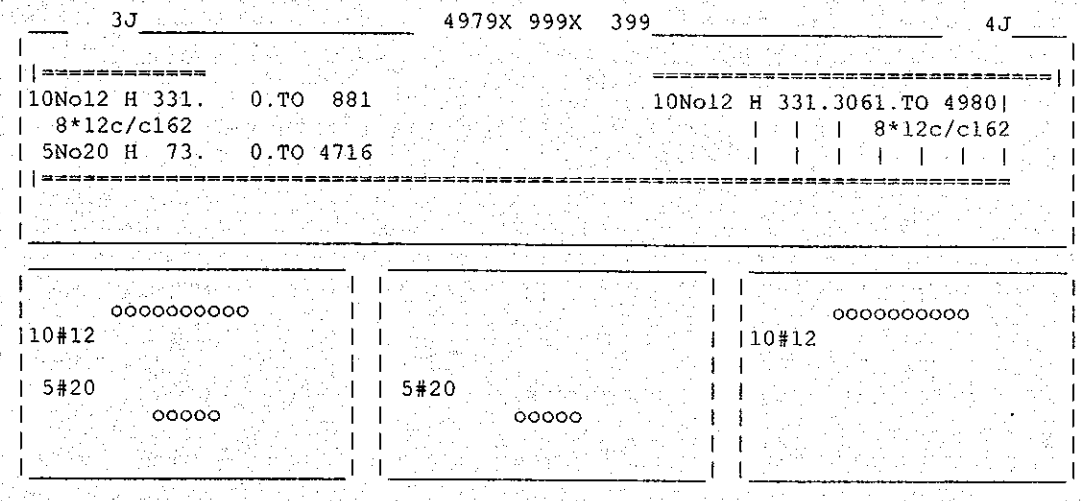
REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)	MOMENTS(+VE/-VE) (KNS-MET)	LOAD(+VE/-VE)
0.	46./ 559.	6./ 66.	27/ 17
415.	215./ 198.	26./ 24.	27/ 14
830.	593./ 0.	70./ 0.	24/ 0

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
1245.	1075./	0.	125./	0.	24/	0
1660.	1359./	0.	157./	0.	17/	0
2075.	1509./	0.	173./	0.	17/	0
2490.	1237./	0.	143./	0.	17/	0
2905.	986./	0.	115./	0.	17/	0
3320.	694./	0.	82./	0.	17/	0
3735.	363./	26.	43./	3.	17/	29
4150.	154./	236.	18./	28.	14/	27
4565.	0./	509.	0./	60.	0/	27
4980.	0./	976.	0./	114.	0/	24

B E A M N O. 3 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 164.84 KNS Vc= 269.53 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 162. MM C/C FOR 1037. MM
AT END SUPPORT - Vu= 129.97 KNS Vc= 269.53 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 162. MM C/C FOR 1037. MM



136. CLEAR 0.065
137. DESIGN BEAM 5 TO 8 10 TO 22

B E A M N O. 5 D E S I G N R E S U L T S - FLEXURE

LEN - 5160. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

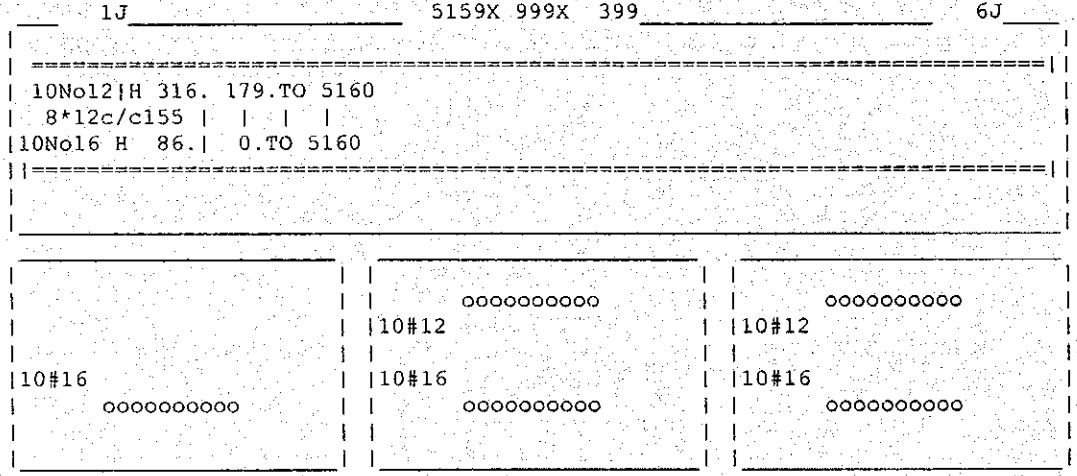
LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	86.	10 - 16MM	0.	5160.	YES	YES
	CRITICAL POS MOMENT= 219.30 KN-MET AT 0.MM, LOAD 16					
	REQD STEEL= 1983.MM2, ROW= .0063, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 882./ 41./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 316./ 472. MMS					
2	316.	10 - 12MM	179.	5160.	NO	YES
	CRITICAL NEG MOMENT= 82.77 KN-MET AT 2150.MM, LOAD 30					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	2044./	0.	219./	0.	16/	0
430.	1281./	0.	141./	0.	16/	0
860.	889./	144.	99./	16.	23/	30
1290.	636./	455.	72./	51.	23/	30
1720.	427./	651.	48./	73.	23/	30
2150.	270./	739.	31./	83.	28/	30
2580.	209./	728.	24./	82.	28/	30
3010.	178./	633.	20./	71.	28/	30
3440.	180./	566.	21./	64.	28/	22
3870.	211./	445.	24./	50.	28/	22
4300.	499./	271.	56./	31.	14/	22
4730.	863./	206.	96./	23.	14/	29
5160.	1274./	165.	140./	19.	14/	29

B E A M N O. 5 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 175.00 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 1075. MM
AT END SUPPORT - Vu= 99.81 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.



B E A M N O. 6 D E S I G N R E S U L T S - FLEXURE

LEN - 5160. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 300. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	12 - 12MM	0.	2916.	YES	NO

CRITICAL POS MOMENT= 96.43 KN-MET AT 0.MM, LOAD 20
REQD STEEL= 1270.MM2, ROW= .0059, ROWMX= .0194 ROWMN= .0033
MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 81. MMS
BASIC/REQD. DEVELOPMENT LENGTH = 177./ 336. MMS

2	214.	6 - 16MM	0.	5160.	YES YES

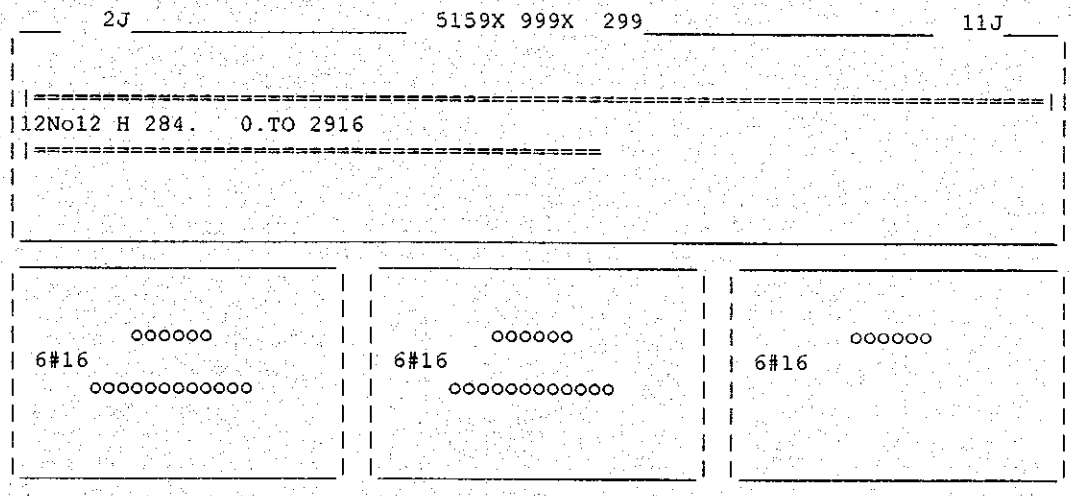
CRITICAL NEG MOMENT= 88.55 KN-MET AT 5160.MM, LOAD 27
REQD STEEL= 1160.MM2, ROW= .0054, ROWMX= .0194 ROWMN= .0033
MAX/MIN/ACTUAL BAR SPACING= 882./ 41./ 176. MMS
BASIC/REQD. DEVELOPMENT LENGTH = 316./ 478. MMS

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	1328./	104.	96./	8.	20/	28
430.	1105./	112.	81./	9.	20/	28
860.	888./	120.	66./	9.	20/	28
1290.	681./	128.	51./	10.	22/	28
1720.	483./	136.	37./	11.	22/	28
2150.	289./	145.	22./	11.	22/	28
2580.	98./	153.	8./	12.	22/	28
3010.	0./	238.	0./	18.	0/	24
3440.	0./	365.	0./	28.	0/	27
3870.	0./	570.	0./	43.	0/	27
4300.	0./	779.	0./	58.	0/	27
4730.	0./	993.	0./	73.	0/	27
5160.	0./	1212.	0./	89.	0/	27

B E A M N O. 6 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 35.52 KNS Vc= 174.04 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.
AT END SUPPORT - Vu= 35.52 KNS Vc= 174.04 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.



B E A M N O. 7 D E S I G N R E S U L T S - FLEXURE

LEN - 5160. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 300. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	END
1	84.	7 - 12MM	0.	5160.	YES	YES

CRITICAL POS MOMENT= 41.60 KN-MET AT 5160.MM, LOAD 16
REQD STEEL= 721.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033
MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 148. MMS
BASIC/REQD. DEVELOPMENT LENGTH = 177./ 327. MMS

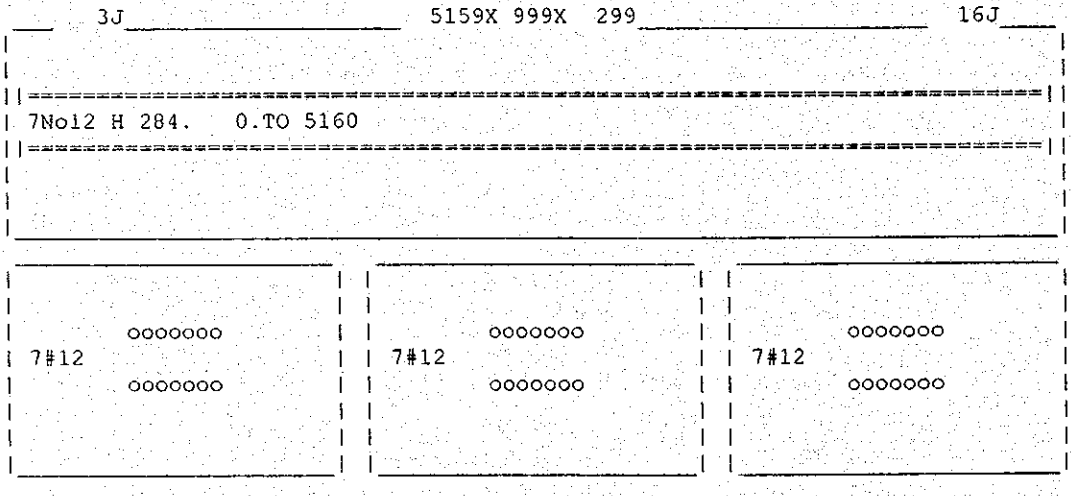
```
  2        216.     7 - 12MM          0.          5160.         YES  YES
|-------------------------------------------------------------------------|
|   CRITICAL NEG MOMENT=      53.08 KN-MET  AT      0.MM, LOAD  22 |
|   REQD STEEL=   721.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033 |
|   MAX/MIN/ACTUAL BAR SPACING=   886./   37./  148. MMS          |
|   BASIC/REQD. DEVELOPMENT LENGTH =   177./   359. MMS          |
|-------------------------------------------------------------------------|
```

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	404./	709.	31./	53.	24/	22
430.	355./	603.	27./	45.	24/	22
860.	307./	498.	23./	38.	24/	22
1290.	259./	395.	20./	30.	24/	22
1720.	211./	292.	16./	22.	24/	22
2150.	164./	190.	13./	15.	24/	22
2580.	117./	90.	9./	7.	17/	29
3010.	70./	20.	5./	2.	17/	14
3440.	141./	57.	11./	4.	16/	14
3870.	242./	93.	19./	7.	16/	14
4300.	344./	130.	26./	10.	16/	14
4730.	447./	167.	34./	13.	16/	14
5160.	551./	204.	42./	16.	16/	14

B E A M N O. 7 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 17.89 KNS Vc= 174.04 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.
AT END SUPPORT - Vu= 17.89 KNS Vc= 174.04 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.



B E A M N O. 8 D E S I G N R E S U L T S - FLEXURE

LEN - 5160. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 300. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	10 - 12MM	2446.	5160.	NO	YES

```
|-------------------------------------------------------------------------|
|   CRITICAL POS MOMENT=      83.48 KN-MET  AT  5160.MM, LOAD  27 |
|   REQD STEEL=  1101.MM2, ROW= .0051, ROWMX= .0194 ROWMN= .0033 |
|   MAX/MIN/ACTUAL BAR SPACING=   886./   37./   98. MMS          |
|   BASIC/REQD. DEVELOPMENT LENGTH =   177./   349. MMS          |
|-------------------------------------------------------------------------|
```

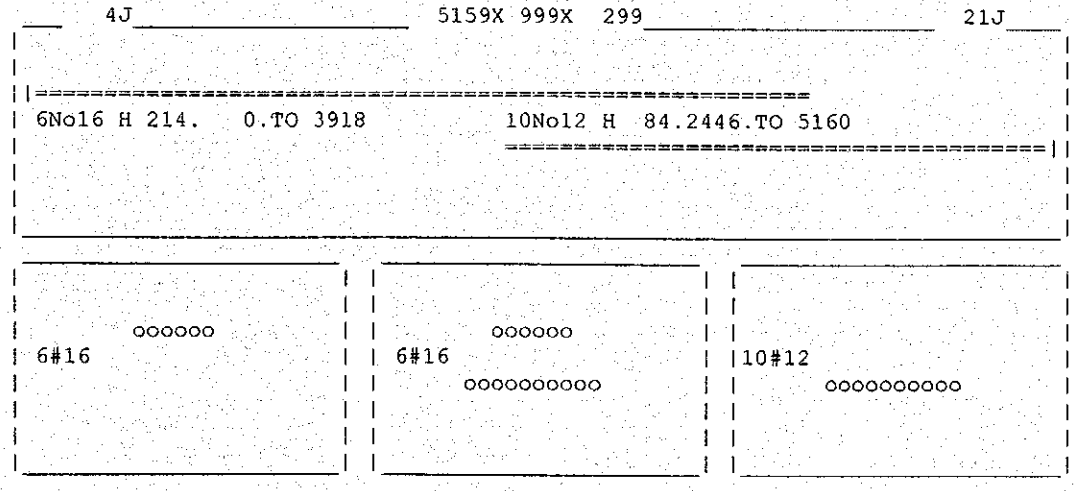
```
  2        214.     6 - 16MM          0.          3918.          YES  NO
|-------------------------------------------------------------------|
|   CRITICAL NEG MOMENT=     88.47 KN-MET  AT      0.MM, LOAD  20 |
|   REQD STEEL=  1159.MM2, ROW= .0054, ROWMX= .0194 ROWMN= .0033 |
|   MAX/MIN/ACTUAL BAR SPACING=   882./   41./  176. MMS         |
|   BASIC/REQD. DEVELOPMENT LENGTH =   316./   478. MMS          |
|-------------------------------------------------------------------|
```

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)	MOMENTS(+VE/-VE) (KNS-MET)	LOAD(+VE/-VE)
0.	0./ 1211.	0./ 88.	0/ 20
430.	0./ 1011.	0./ 75.	0/ 17
860.	0./ 828.	0./ 62.	0/ 17
1290.	0./ 648.	0./ 49.	0/ 17
1720.	0./ 471.	0./ 36.	0/ 17
2150.	0./ 298.	0./ 23.	0/ 17
2580.	0./ 127.	0./ 10.	0/ 17
3010.	168./ 32.	13./ 2.	27/ 14
3440.	355./ 2.	27./ 0.	27/ 14
3870.	545./ 0.	41./ 0.	27/ 0
4300.	739./ 0.	55./ 0.	27/ 0
4730.	937./ 0.	69./ 0.	27/ 0
5160.	1139./ 0.	83./ 0.	27/ 0

B E A M N O. 8 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 32.99 KNS Vc= 174.04 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.
AT END SUPPORT - Vu= 32.99 KNS Vc= 174.04 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.



B E A M N O. 10 D E S I G N R E S U L T S - FLEXURE

LEN - 996. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	11 - 12MM	0.	996.	YES	YES

```
|-------------------------------------------------------------------|
|   CRITICAL POS MOMENT=    140.20 KN-MET  AT      0.MM, LOAD  14 |
|   REQD STEEL=  1238.MM2, ROW= .0039, ROWMX= .0194 ROWMN= .0033 |
|   MAX/MIN/ACTUAL BAR SPACING=   886./   37./   89. MMS          |
|   BASIC/REQD. DEVELOPMENT LENGTH =   177./   357. MMS           |
|-------------------------------------------------------------------|

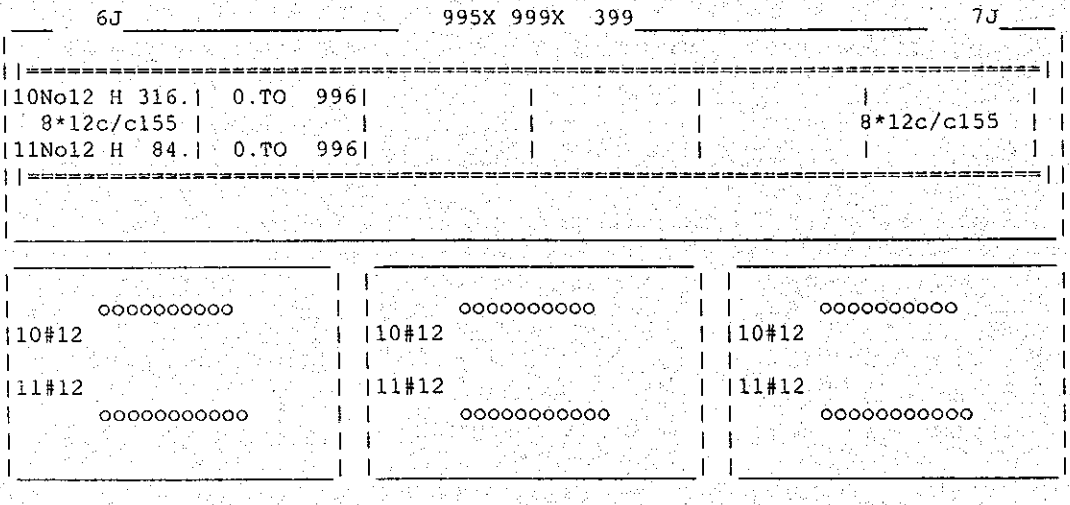
  2        316.    10 - 12MM         0.          996.        YES  YES
|-------------------------------------------------------------------|
|   CRITICAL NEG MOMENT=    119.19 KN-MET  AT    996.MM, LOAD  23 |
|   REQD STEEL=  1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033 |
|   MAX/MIN/ACTUAL BAR SPACING=   886./   37./   98. MMS          |
|   BASIC/REQD. DEVELOPMENT LENGTH =   177./   466. MMS           |
|-------------------------------------------------------------------|
```

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)
0.	1274./	165.	140./	19.	14/ 29
83.	1144./	222.	126./	25.	14/ 29
166.	1014./	279.	113./	32.	14/ 29
249.	885./	337.	99./	38.	14/ 29
332.	756./	396.	85./	45.	14/ 29
415.	628./	456.	71./	52.	14/ 29
498.	499./	517.	56./	58.	14/ 29
581.	371./	586.	42./	66.	14/ 23
664.	310./	681.	35./	76.	30/ 23
747.	256./	778.	29./	87.	30/ 23
830.	201./	876.	23./	98.	30/ 23
913.	146./	975.	17./	108.	30/ 23
996.	90./	1076.	10./	119.	30/ 23

B E A M N O. 10 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 171.68 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 996. MM
AT END SUPPORT - Vu= 176.30 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 996. MM



B E A M N O. 11 D E S I G N R E S U L T S - FLEXURE

LEN - 996. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END

```
  1         84.    10 - 12MM          0.          666.         YES  NO
|-------------------------------------------------------------------|
|   CRITICAL POS MOMENT=      10.27 KN-MET  AT    996.MM, LOAD  30 |
|   REQD STEEL=  1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033 |
|   MAX/MIN/ACTUAL BAR SPACING=   886./   37./    98. MMS        |
|   BASIC/REQD. DEVELOPMENT LENGTH =   177./   334. MMS          |
|-------------------------------------------------------------------|

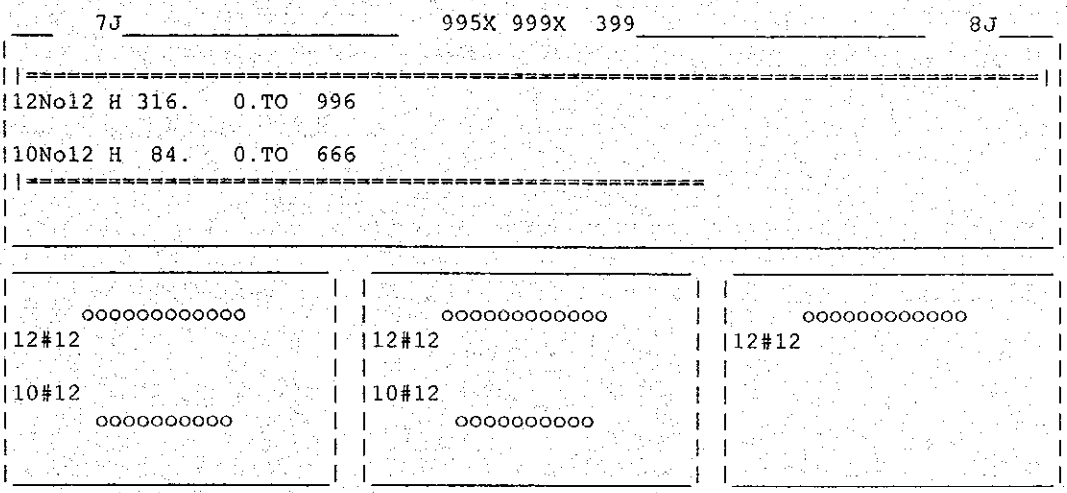
  2        316.    12 - 12MM          0.          996.         YES  YES
|-------------------------------------------------------------------|
|   CRITICAL NEG MOMENT=     145.25 KN-MET  AT    996.MM, LOAD  23 |
|   REQD STEEL=  1284.MM2, ROW= .0041, ROWMX= .0194 ROWMN= .0033 |
|   MAX/MIN/ACTUAL BAR SPACING=   886./   37./    81. MMS        |
|   BASIC/REQD. DEVELOPMENT LENGTH =   177./   466. MMS          |
|-------------------------------------------------------------------|
```

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)
0.	90./	1076.	10./	119.	30/ 23
83.	70./	1092.	8./	121.	30/ 23
166.	49./	1109.	6./	123.	30/ 23
249.	27./	1126.	3./	125.	30/ 23
332.	5./	1145.	1./	127.	30/ 23
415.	0./	1164.	0./	129.	0/ 23
498.	0./	1184.	0./	131.	0/ 23
581.	0./	1205.	0./	133.	0/ 23
664.	0./	1227.	0./	135.	0/ 23
747.	0./	1249.	0./	138.	0/ 23
830.	0./	1272.	0./	140.	0/ 23
913.	0./	1297.	0./	143.	0/ 23
996.	0./	1322.	0./	145.	0/ 23

B E A M N O. 11 D E S I G N R E S U L T S - SHEAR

```
 AT START SUPPORT - Vu=   70.37 KNS  Vc=  257.07 KNS  Vs=     .00 KNS
                    STIRRUPS ARE NOT REQUIRED.
 AT END   SUPPORT - Vu=   74.98 KNS  Vc=  257.07 KNS  Vs=     .00 KNS
                    STIRRUPS ARE NOT REQUIRED.
```



B E A M N O. 12 D E S I G N R E S U L T S - FLEXURE

LEN - 996. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	316.	12 - 12MM	0.	996.	YES	YES

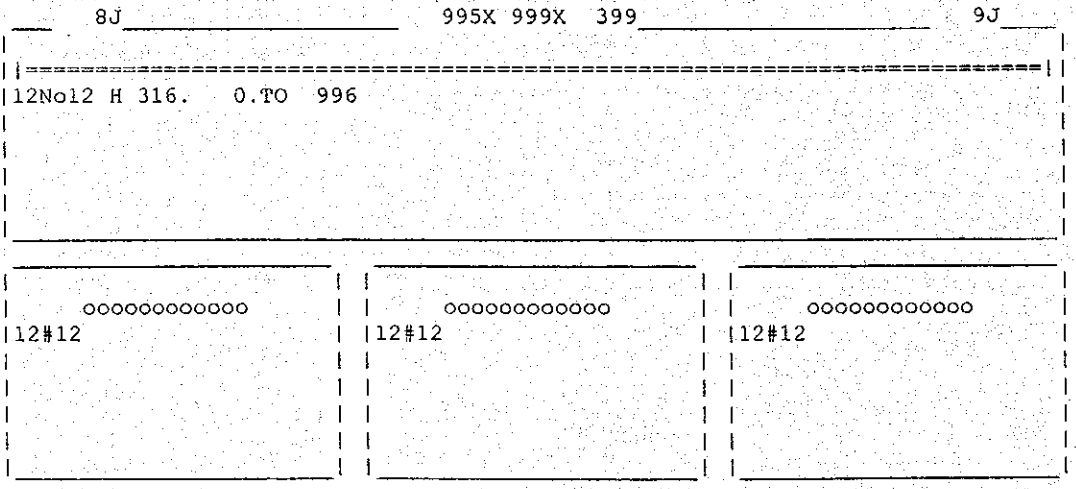
CRITICAL NEG MOMENT= 145.25 KN-MET AT 0.MM, LOAD 23
REQD STEEL= 1284.MM2, ROW= .0041, ROWMX= .0194 ROWMN= .0033
MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 81. MMS
BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)	MOMENTS(+VE/-VE) (KNS-MET)	LOAD(+VE/-VE)
0.	0./ 1322.	0./ 145.	0/ 23
83.	0./ 1261.	0./ 139.	0/ 23
166.	0./ 1201.	0./ 132.	0/ 23
249.	0./ 1141.	0./ 126.	0/ 23
332.	0./ 1083.	0./ 120.	0/ 23
415.	0./ 1040.	0./ 115.	0/ 24
498.	0./ 1000.	0./ 111.	0/ 24
581.	0./ 961.	0./ 107.	0/ 24
664.	0./ 923.	0./ 103.	0/ 24
747.	0./ 886.	0./ 99.	0/ 24
830.	0./ 850.	0./ 95.	0/ 24
913.	0./ 814.	0./ 91.	0/ 24
996.	0./ 780.	0./ 87.	0/ 24

B E A M N O. 12 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 74.30 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.
AT END SUPPORT - Vu= 69.69 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.



B E A M N O. 13 D E S I G N R E S U L T S - FLEXURE

LEN - 996. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	10 - 12MM	122.	996.	NO	YES
	CRITICAL POS MOMENT= 54.41 KN-MET AT 996.MM, LOAD 29					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 334. MMS					
2	316.	10 - 12MM	0.	996.	YES	YES
	CRITICAL NEG MOMENT= 87.20 KN-MET AT 0.MM, LOAD 24					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

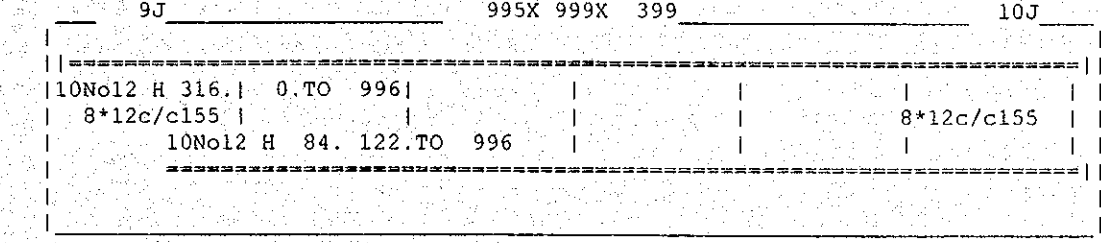
REQUIRED REINF. STEEL SUMMARY :

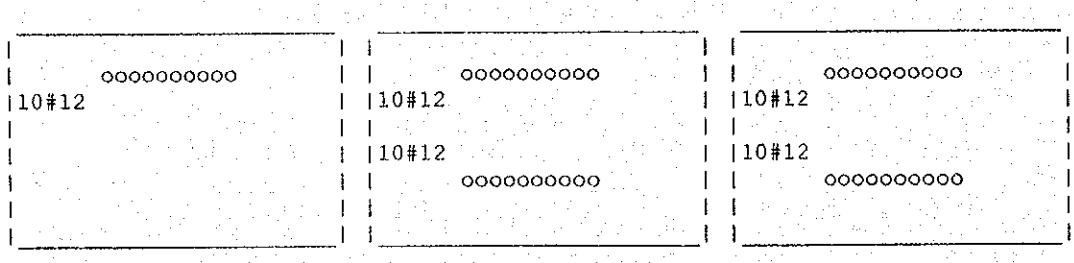
SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	0./	780.	0./	87.	0/	24
83.	0./	704.	0./	79.	0/	15
166.	0./	644.	0./	72.	0/	15
249.	0./	586.	0./	66.	0/	15
332.	0./	534.	0./	60.	0/	14
415.	0./	484.	0./	55.	0/	14
498.	60./	435.	7./	49.	22/	14
581.	128./	387.	15./	44.	22/	14
664.	195./	340.	22./	39.	22/	14
747.	262./	294.	30./	33.	29/	14
830.	336./	249.	38./	28.	29/	14
913.	409./	204.	46./	23.	29/	14
996.	482./	161.	54./	18.	29/	14

B E A M N O. 13 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 126.64 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 996. MM

AT END SUPPORT - Vu= 122.03 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 996. MM





B E A M N O. 14 D E S I G N R E S U L T S - FLEXURE

LEN - 996. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

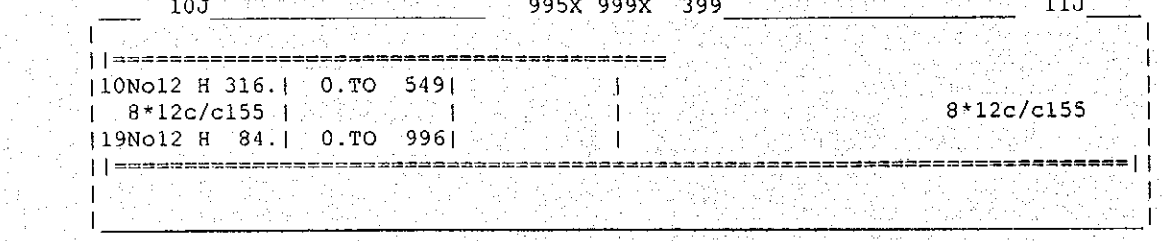
LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	19 - 12MM	0.	996.	YES	YES
	CRITICAL POS MOMENT= 229.07 KN-MET AT 996.MM, LOAD 23					
	REQD STEEL= 2078.MM2, ROW= .0066, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 49. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 347. MMS					
2	316.	10 - 12MM	0.	549.	YES	NO
	CRITICAL NEG MOMENT= 18.34 KN-MET AT 0.MM, LOAD 14					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

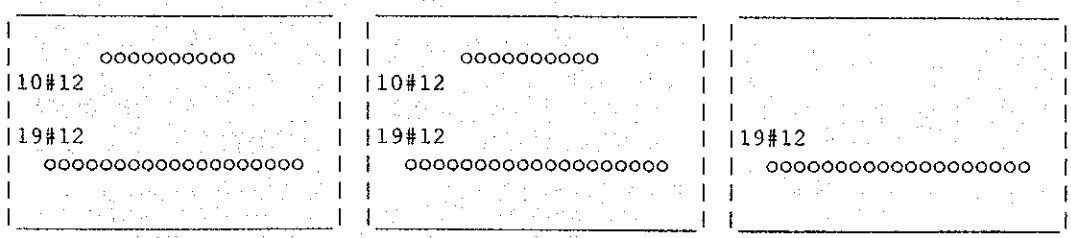
REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	482./	161.	54./	18.	29/	14
83.	597./	77.	67./	9.	29/	14
166.	722./	0.	81./	0.	23/	0
249.	862./	0.	96./	0.	23/	0
332.	1002./	0.	111./	0.	23/	0
415.	1142./	0.	126./	0.	23/	0
498.	1283./	0.	141./	0.	23/	0
581.	1425./	0.	156./	0.	23/	0
664.	1567./	0.	171./	0.	23/	0
747.	1710./	0.	186./	0.	23/	0
830.	1854./	0.	200./	0.	23/	0
913.	1998./	0.	215./	0.	23/	0
996.	2143./	0.	229./	0.	23/	0

B E A M N O. 14 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 181.80 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 996. MM
AT END SUPPORT - Vu= 177.19 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 996. MM





B E A M N O. 15 D E S I G N R E S U L T S - FLEXURE

LEN - 990. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

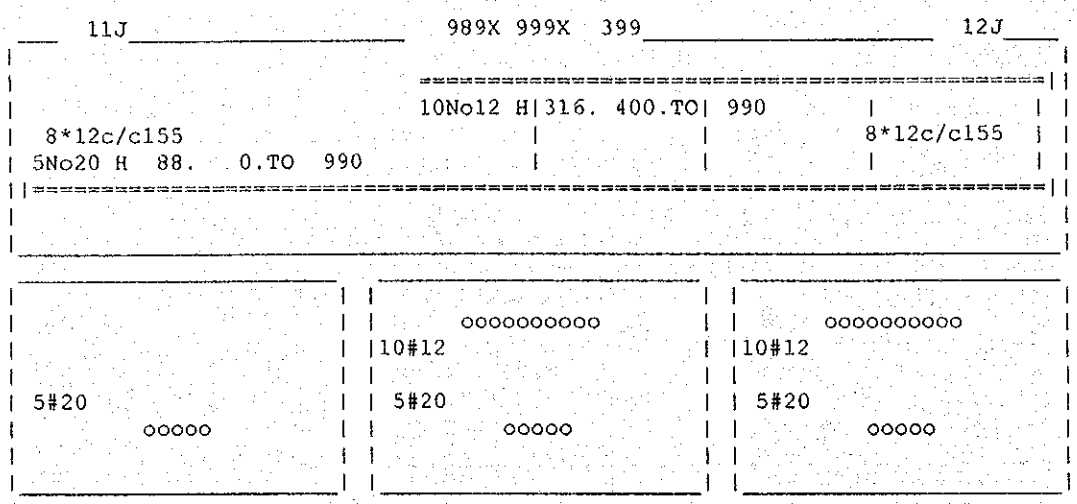
LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	88.	5 - 20MM	0.	990.	YES	YES
	CRITICAL POS MOMENT= 175.47 KN-MET AT 0.MM, LOAD 23					
	REQD STEEL= 1565.MM2, ROW= .0049, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 878./ 45./ 220. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 493./ 596. MMS					
2	316.	10 - 12MM	400.	990.	NO	YES
	CRITICAL NEG MOMENT= 4.36 KN-MET AT 990.MM, LOAD 30					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	1612./	0.	175./	0.	23/	0
82.	1519./	0.	166./	0.	23/	0
165.	1426./	0.	156./	0.	23/	0
247.	1333./	0.	146./	0.	23/	0
330.	1240./	0.	137./	0.	23/	0
412.	1146./	0.	127./	0.	23/	0
495.	1052./	0.	117./	0.	23/	0
577.	959./	0.	107./	0.	23/	0
660.	864./	0.	96./	0.	23/	0
742.	770./	0.	86./	0.	23/	0
825.	676./	0.	76./	0.	23/	0
907.	581./	11.	65./	1.	23/	30
990.	486./	38.	55./	4.	23/	30

B E A M N O. 15 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 119.53 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 990. MM
AT END SUPPORT - Vu= 124.07 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 990. MM



B E A M N O. 16 D E S I G N R E S U L T S - FLEXURE

LEN - 997. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

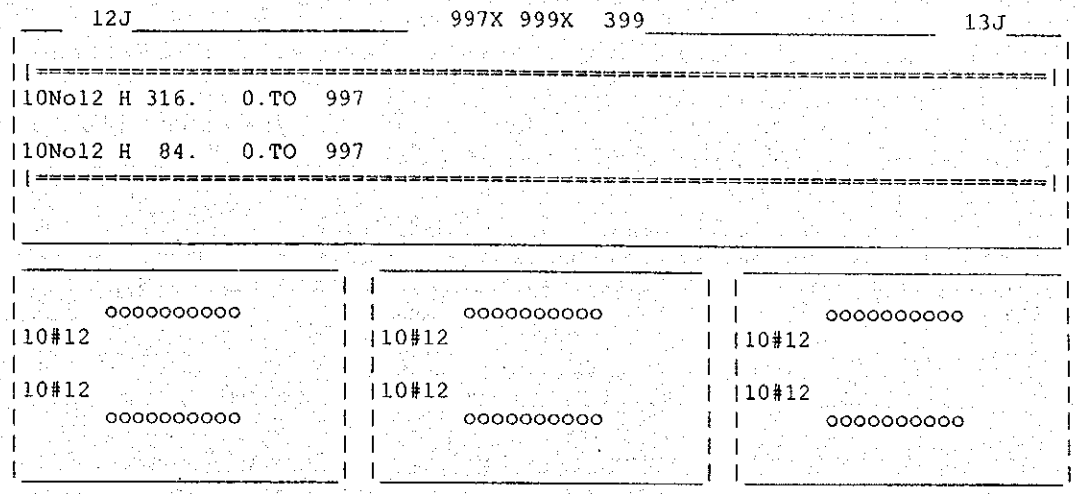
LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	10 - 12MM	0.	997.	YES	YES
	CRITICAL POS MOMENT= 54.89 KN-MET AT 0.MM, LOAD 23					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 334. MMS					
2	316.	10 - 12MM	0.	997.	YES	YES
	CRITICAL NEG MOMENT= 37.23 KN-MET AT 997.MM, LOAD 14					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	486./	38.	55./	4.	23/	30
83.	441./	50.	50./	6.	23/	14
166.	396./	71.	45./	8.	23/	14
249.	350./	93.	40./	11.	23/	14
332.	304./	116.	35./	13.	23/	14
416.	257./	140.	29./	16.	23/	14
499.	209./	164.	24./	19.	23/	14
582.	161./	190.	18./	22.	23/	14
665.	112./	216.	13./	25.	23/	14
748.	62./	243.	7./	28.	23/	14
831.	12./	270.	1./	31.	23/	14
914.	0./	299.	0./	34.	0/	14
997.	0./	328.	0./	37.	0/	14

B E A M N O. 16 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 63.02 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.
AT END SUPPORT - Vu= 67.66 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.



B E A M N O. 17 D E S I G N R E S U L T S - FLEXURE

LEN - 997. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	10 - 12MM	538.	997.	NO	YES
	CRITICAL POS MOMENT= 1.33 KN-MET AT 997.MM, LOAD 27					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 334. MMS					
2	316.	10 - 12MM	0.	997.	YES	YES
	CRITICAL NEG MOMENT= 37.23 KN-MET AT 0.MM, LOAD 14					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

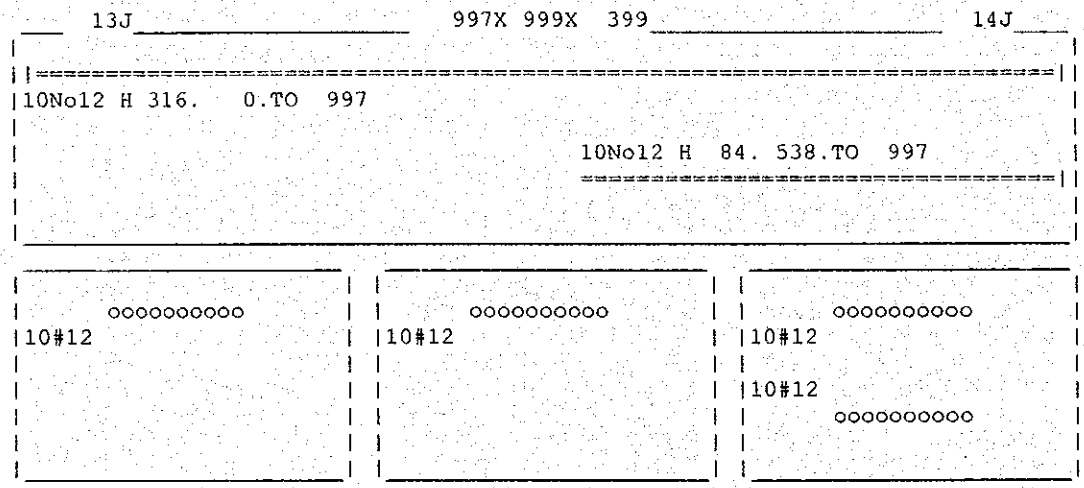
REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)	MOMENTS(+VE/-VE) (KNS-MET)	LOAD(+VE/-VE)
0.	0./ 328.	0./ 37.	0/ 14
83.	0./ 319.	0./ 36.	0/ 14
166.	0./ 311.	0./ 35.	0/ 14
249.	0./ 304.	0./ 35.	0/ 14
332.	0./ 298.	0./ 34.	0/ 14
416.	0./ 292.	0./ 33.	0/ 14
499.	0./ 287.	0./ 33.	0/ 14
582.	0./ 283.	0./ 32.	0/ 14
665.	0./ 280.	0./ 32.	0/ 14
748.	0./ 280.	0./ 32.	0/ 15
831.	0./ 283.	0./ 32.	0/ 15

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)
914.	0./	287.	0./	33.	27/ 15
997.	12./	291.	1./	33.	27/ 15

B E A M N O. 17 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 26.64 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.
AT END SUPPORT - Vu= 16.35 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.



B E A M N O. 18 D E S I G N R E S U L T S - FLEXURE

LEN - 997. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	10 - 12MM	0.	997.	YES	YES
	CRITICAL POS MOMENT= 73.92 KN-MET AT 997.MM, LOAD 20					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 334. MMS					
2	316.	10 - 12MM	0.	997.	YES	YES
	CRITICAL NEG MOMENT= 33.04 KN-MET AT 0.MM, LOAD 15					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

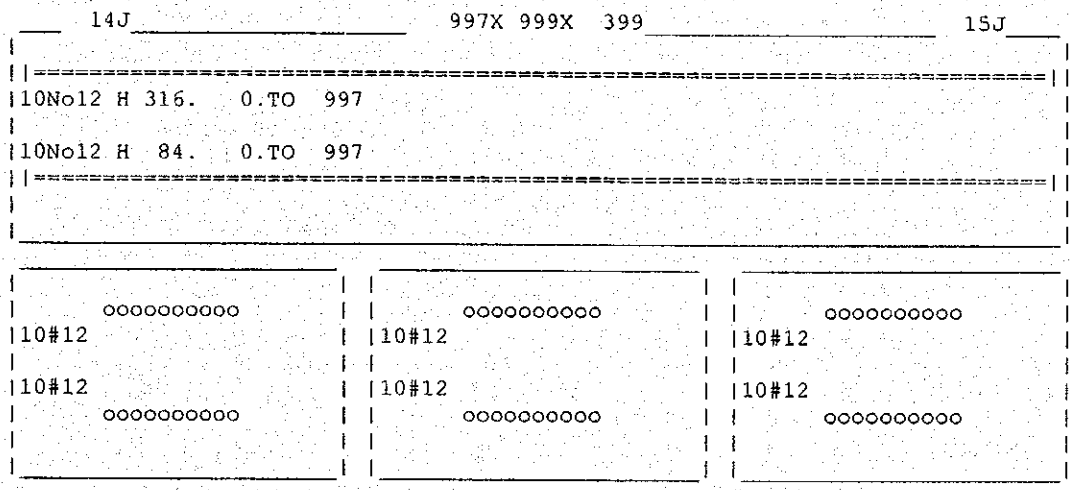
REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)
0.	12./	291.	1./	33.	27/ 15
83.	67./	257.	8./	29.	27/ 15
166.	123./	223.	14./	25.	20/ 15

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)
249.	179./	191.	20./	22.	20/ 15
332.	234./	160.	27./	18.	20/ 15
416.	289./	134.	33./	15.	20/ 28
499.	344./	113.	39./	13.	20/ 28
582.	398./	92.	45./	11.	20/ 28
665.	451./	72.	51./	8.	20/ 28
748.	504./	53.	57./	6.	20/ 28
831.	556./	35.	63./	4.	20/ 28
914.	607./	17.	68./	2.	20/ 28
997.	658./	0.	74./	0.	20/ 28

B E A M N O. 18 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 75.40 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.
AT END SUPPORT - Vu= 70.77 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.



B E A M N O. 19 D E S I G N R E S U L T S - FLEXURE

LEN - 997. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	16 - 12MM	0.	997.	YES	YES
	CRITICAL POS MOMENT= 196.99 KN-MET AT 997.MM, LOAD 20					
	REQD STEEL= 1795.MM2, ROW= .0057, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 59. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 356. MMS					
2	316.	10 - 12MM	0.	466.	YES	NO
	CRITICAL NEG MOMENT= .03 KN-MET AT 0.MM, LOAD 28					
	REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033					
	MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS					
	BASIC/REQD. DEVELOPMENT LENGTH = 177./ 466. MMS					

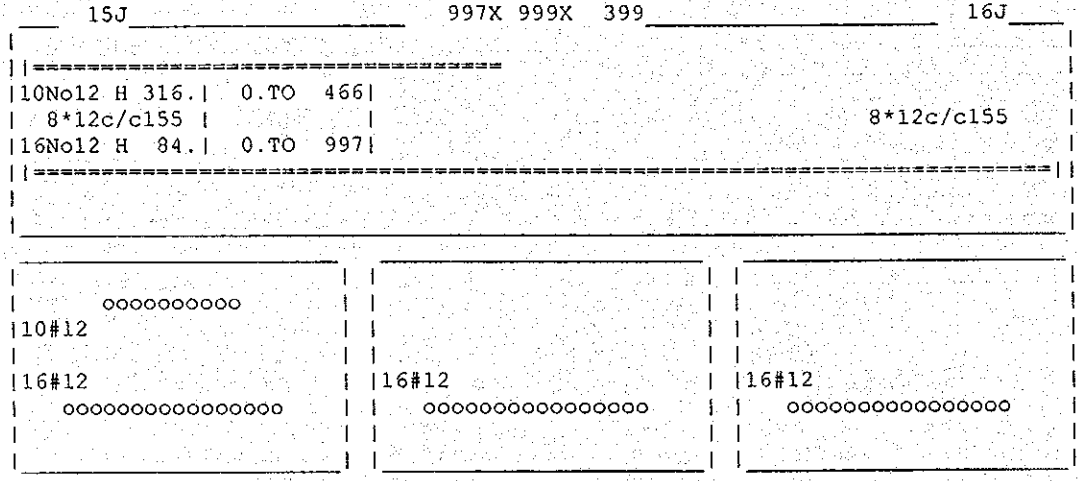
REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	658./	0.	74./	0.	20/	28
83.	756./	0.	85./	0.	20/	0
166.	854./	0.	95./	0.	20/	0
249.	951./	0.	106./	0.	20/	0
332.	1049./	0.	116./	0.	20/	0
416.	1146./	0.	127./	0.	20/	0
499.	1243./	0.	137./	0.	20/	0
582.	1340./	0.	147./	0.	20/	0
665.	1437./	0.	157./	0.	20/	0
748.	1534./	0.	167./	0.	20/	0
831.	1630./	0.	177./	0.	20/	0
914.	1727./	0.	187./	0.	20/	0
997.	1823./	0.	197./	0.	20/	0

B E A M N O. 19 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 125.70 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 997. MM

AT END SUPPORT - Vu= 121.06 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 997. MM



B E A M N O. 20 D E S I G N R E S U L T S - FLEXURE

LEN - 990. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	86.	10 - 16MM	0.	990.	YES	YES

CRITICAL POS MOMENT= 221.50 KN-MET AT 0.MM, LOAD 20
REQD STEEL= 2005.MM2, ROW= .0063, ROWMX= .0194 ROWMN= .0033
MAX/MIN/ACTUAL BAR SPACING= 882./ 41./ 98. MMS
BASIC/REQD. DEVELOPMENT LENGTH = 316./ 477. MMS

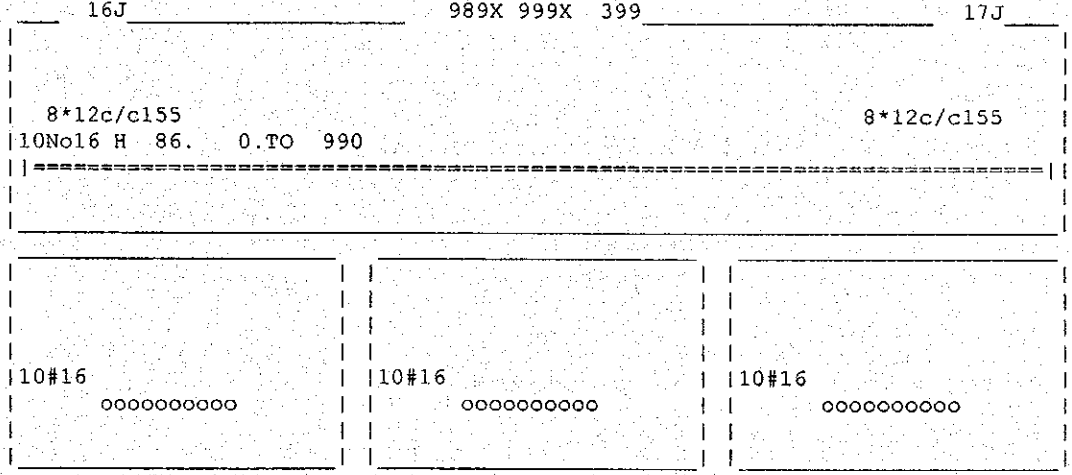
REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	2066./	0.	221./	0.	20/	0
82.	1961./	0.	211./	0.	20/	0
165.	1856./	0.	200./	0.	20/	0
247.	1750./	0.	190./	0.	20/	0
330.	1645./	0.	179./	0.	20/	0
412.	1539./	0.	168./	0.	20/	0
495.	1434./	0.	157./	0.	20/	0
577.	1328./	0.	146./	0.	20/	0
660.	1222./	0.	135./	0.	20/	0
742.	1117./	0.	124./	0.	20/	0
825.	1011./	0.	112./	0.	20/	0
907.	905./	0.	101./	0.	20/	0
990.	800./	0.	89./	0.	20/	0

B E A M N O. 20 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 131.17 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 990. MM

AT END SUPPORT - Vu= 135.71 KNS Vc= 257.07 KNS Vs= .00 KNS
PROVIDE 12 MM BARS AT 155. MM C/C FOR 990. MM



B E A M N O. 21 D E S I G N R E S U L T S - FLEXURE

LEN - 997. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	10 - 12MM	0.	997.	YES	YES

CRITICAL POS MOMENT= 89.40 KN-MET AT 0.MM, LOAD 20
REQD STEEL= 1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033
MAX/MIN/ACTUAL BAR SPACING= 886./ 37./ 98. MMS
BASIC/REQD. DEVELOPMENT LENGTH = 177./ 334. MMS

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  2        316.    10 - 12MM          0.          997.        YES  YES
|-------------------------------------------------------------------|
|   CRITICAL NEG MOMENT=      29.67 KN-MET  AT   997.MM, LOAD  21 |
|   REQD STEEL=  1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033 |
|   MAX/MIN/ACTUAL BAR SPACING=   886./   37./   98. MMS         |
|   BASIC/REQD. DEVELOPMENT LENGTH =   177./   466. MMS          |
|-------------------------------------------------------------------|
```
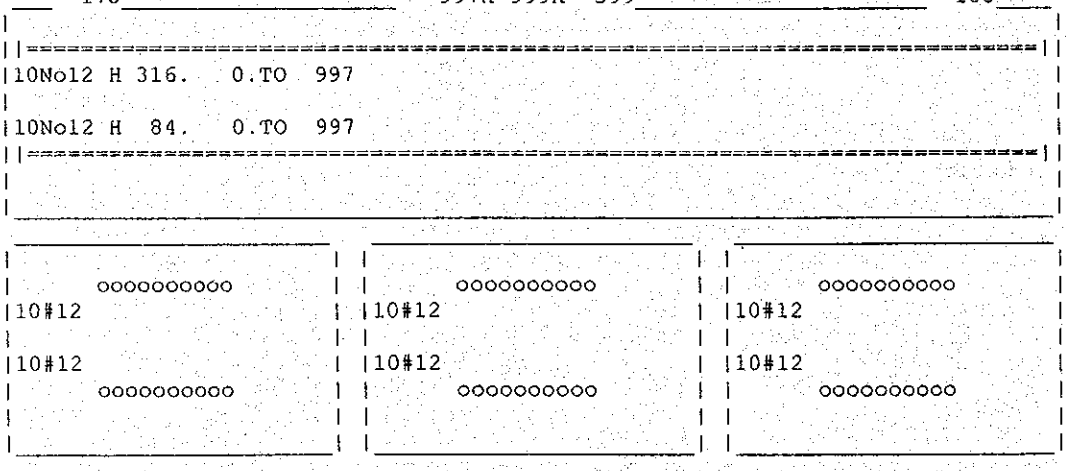

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)	
0.	800./	0.	89./	0.	20/	0
83.	739./	0.	83./	0.	20/	0
166.	678./	0.	76./	0.	20/	0
249.	616./	2.	69./	0.	20/	28
332.	554./	27.	62./	3.	20/	28
416.	491./	53.	55./	6.	20/	28
499.	428./	80.	48./	9.	20/	28
582.	364./	108.	41./	12.	20/	28
665.	299./	136.	34./	16.	20/	28
748.	235./	166.	27./	19.	20/	28
831.	169./	196.	19./	22.	20/	28
914.	104./	227.	12./	26.	27/	21
997.	40./	261.	5./	30.	27/	21

B E A M N O. 21 D E S I G N R E S U L T S - SHEAR

AT START SUPPORT - Vu= 83.01 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.
AT END SUPPORT - Vu= 87.64 KNS Vc= 257.07 KNS Vs= .00 KNS
STIRRUPS ARE NOT REQUIRED.



B E A M N O. 22 D E S I G N R E S U L T S - FLEXURE

LEN - 997. MM FY - 414. FC - 25. MPA, SIZE - 1000. X 400. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA	ANCHOR END
1	84.	10 - 12MM	0.	418.	YES	NO

```
|-------------------------------------------------------------------|
|   CRITICAL POS MOMENT=       4.57 KN-MET  AT   997.MM, LOAD  27 |
|   REQD STEEL=  1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033 |
|   MAX/MIN/ACTUAL BAR SPACING=   886./   37./   98. MMS         |
|   BASIC/REQD. DEVELOPMENT LENGTH =   177./   334. MMS          |
|-------------------------------------------------------------------|
```

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  2        316.    10 - 12MM          0.          997.        YES  YES
|-------------------------------------------------------------------|
|   CRITICAL NEG MOMENT=      46.69 KN-MET  AT   997.MM, LOAD  16 |
|   REQD STEEL=  1054.MM2, ROW= .0033, ROWMX= .0194 ROWMN= .0033 |
|   MAX/MIN/ACTUAL BAR SPACING=   886./   37./   98. MMS         |
|   BASIC/REQD. DEVELOPMENT LENGTH =   177./   466. MMS          |
|-------------------------------------------------------------------|
```

REQUIRED REINF. STEEL SUMMARY :

SECTION (MM)	REINF STEEL(+VE/-VE) (SQ. MM)		MOMENTS(+VE/-VE) (KNS-MET)		LOAD(+VE/-VE)
0.	40./	261.	5./	30.	27/ 21
83.	16./	262.	2./	30.	27/ 21
166.	0./	263.	0./	30.	0/ 21
249.	0./	266.	0./	30.	0/ 21
332.	0./	269.	0./	31.	0/ 21
416.	0./	273.	0./	31.	0/ 21
499.	0./	278.	0./	32.	0/ 16
582.	0./	299.	0./	34.	0/ 16
665.	0./	320.	0./	36.	0/ 16
748.	0./	342.	0./	39.	0/ 16
831.	0./	365.	0./	41.	0/ 16
914.	0./	388.	0./	44.	0/ 16
997.	0./	413.	0./	47.	0/ 16

B E A M N O. 22 D E S I G N R E S U L T S - SHEAR

```
 AT START SUPPORT - Vu=   38.93 KNS  Vc=  257.07 KNS  Vs=     .00 KNS
                    STIRRUPS ARE NOT REQUIRED.
 AT END   SUPPORT - Vu=   43.57 KNS  Vc=  257.07 KNS  Vs=     .00 KNS
                    STIRRUPS ARE NOT REQUIRED.
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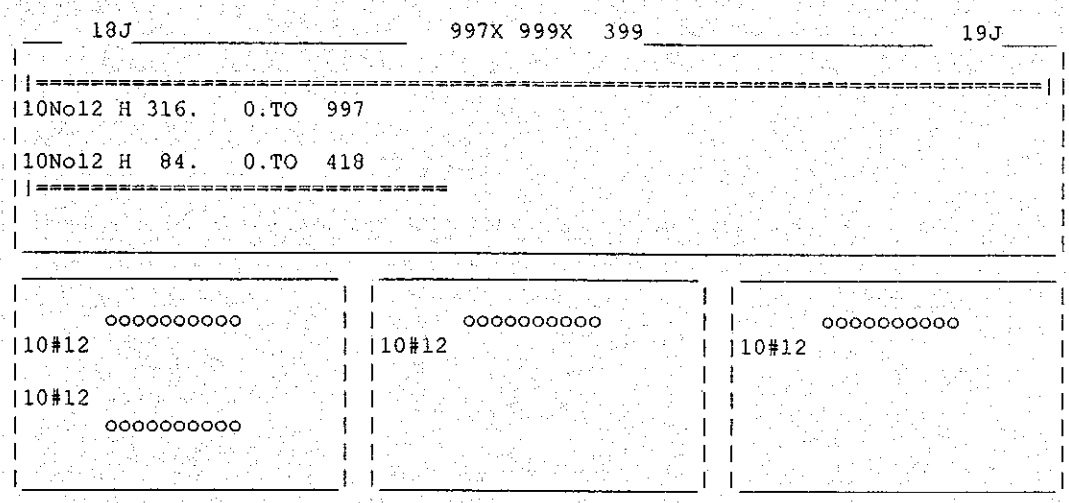


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 **********END OF BEAM DESIGN**********
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138. END CONC DESIGN
139. FINISH

          ********** END OF STAAD-III **********

            **** DATE= JAN 30,2000   TIME= 11:36:58 ****

       ************************************************************
       *        For questions on  STAAD-III,   contact:           *
       *             Research Engineers, Inc at                   *
       *  West Coast: Ph- (714) 974-2500  Fax- (714) 921-2543     *
       *  East Coast: Ph- (508) 688-3626  Fax- (508) 685-7230     *
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