



**LENGTH 2500-2750-3000 cm**

**LOADS :Variable 800+ Permanent 1200 = 2000 Dan/ml**

**Cast in place concrete and self-weighth excluded**

**LENGTH**  
**3000 cm**

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T_RCAEC2                ENGISOFT-ing.F.PINARDI-DESENZANO(BS)        ITALY
.DATE (mm-gg-aa)        09-11-2008
.Prestressed concrete members pre-tensioned and bonded
.EUROCODE 2-DESIGN OF STRUCTURES UNI ENV 1992-1-1:
.General rules and rules for buildings Simple support Beam
.
.
.STANDARD GIRDERS
.P MAX 2000
.
.                                UNIT MEASURE
.                                UNIT FORCE      : daN
.                                UNIT LENGTH    : cm
.
. * Exposure Class      XD3 *
.  3 - Corrosion induced by chlorides
.    Cyclic wet and dry
.
.
. * Relative Humidity* 55 %
.
.
.                                Geometric mechanical properties.
.
.LOAD 1ø PHASE (Cast in place concrete)      6
.LOAD 2ø PHASE (perm.)                       8
.LOAD 2ø PHASE (var.)                       12
.HEIGHT Cast in place concrete              20
.Charact.Cubic Strength. in place concrete  300
.WIDTH (Cast in place concrete)            120
.DESIGN LENGHT                             2970
.EFFECTIVE LENGHT                          3000
.SUPERIOR CONVENTIONAL REINFORCING BARS     5
.SUPERIOR BARS DISTANCE FORM SUP. BORDER   5
.INFERIOR CONVENTIONAL REINFORCING BARS    8
.INFERIOR BARS DISTANCE FORM INF. BORDER   6
.CANTILEVER FINAL MOMENT                   15
.MAX CANTILEVER TRANSPORT-HOISTING         150
.MAX STRESS BARS CRACKING (1600-4500)      2200
.like previewed by UNI ENV 1992-1-1 table  4.11
.
.
.                                Materials properties
.
.Rck=      550.00    Rckj=      400.00    Fck=      456.50    Fckj=      332.00
.
.Fctmf=     46.72    Fctk=      50.62    Fctmi=     37.78    Fctkj=     40.93
.
.Fyk=     4290.23    Ftk=    5387.73    Fpk=   18629.19    Fp1k=   16665.08
.
. Jack tension = 14018.27 losses % 1000H = 2.20 losses % 5000H = 2.80
.
.
.T_RCAEC2                E-MAIL studio@engisoft.org        WEB www.engisoft.org

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.T\_RCAEC2                    ENGISOFT-ing.F.PINARDI-DESENZANO (BS)            ITALY

.

.

                                 TRACING Prestressing steel 0.6" diam.

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.

1350+

1000+            O 20

950+            O 19

900+            O 18

850+            O 17

800+            \* 16

750+            \* 15

700+            \* 14

650+            \* 13

600+            \* 12

550+            \* 11

500+            \* 10

450+            \* 9

400+            \* 8

350+            \* 7

300+            \* 6

250+            \*\*\* 5

200+            \*\*\*\*\* 4

150+            \*\*\*\*\* 3

100+            OOOOOOOO 2

50+             1

.

                         @@@ THEORETICAL BARYCENTRE.....            31.09375

                         @@@ EFFECTIVE BARYCENTRE            .....            31.09375

                         @@@ NUMBER OF Prest. steel.....            32

.

                         TOTAL WEIGHT .....DaN..            41867.7

                         FILE STRUCTURE.....            bia63135

                         FILE        PRESTRESSING.....            bia63135

.T\_RCAEC2                    ENGISOFT-ing.F.PINARDI-DESENZANO (BS)            ITALY

.

.

                                 BENDING verifications

-----							
INITIAL MOMENT							
-----							
	CONCRETE		BARS				
.. STRESS MAX.=	.6*Fckj= 199.20		.7*Ftk= 3771.41				
-----							
..  DISTANCE	STRESS	STRESS	STRESS	STRESS	BARS	BENDING	
..	SUP.	INF.	SUP.	INF.	sup		
-----							
..  1500.00	60.54	143.57	371.11	815.94	5.00	1.539E+07	
..  1390.00	60.27	143.86	369.66	817.51	5.00	1.532E+07	
..  1280.00	59.26	144.96	364.20	823.40	5.00	1.509E+07	
..  1170.00	57.50	146.88	354.73	833.60	5.00	1.470E+07	
..  1060.00	55.00	149.60	341.27	848.12	5.00	1.413E+07	
..  950.00	51.75	153.13	323.79	866.96	5.00	1.339E+07	

.	840.00	47.76	157.47	302.32	890.11	5.00	1.248E+07
.	730.00	43.03	162.61	276.84	917.58	5.00	1.141E+07
.	620.00	37.55	168.57	247.35	949.36	5.00	1.017E+07
.	510.00	31.33	175.34	213.87	985.46	5.00	8.755E+06
.	400.00	27.34	168.24	189.94	944.88	5.00	7.173E+06
.	310.00	21.08	175.10	156.26	981.46	5.00	5.754E+06
.	200.00	15.76	169.35	125.12	948.08	5.00	3.866E+06
.	150.00	11.72	173.80	103.41	971.83	5.00	2.952E+06
.	110.00	8.39	177.49	85.45	991.49	5.00	2.195E+06

-----  
| | HOISTING AND TRANSPORT |

..|STRESS MAX.= .6\*Fckj= 199.20 .7\*Ftk= 3771.41

-----  
| DISTANCE | STRESS | STRESS | STRESS | STRESS | BARS | MOMENT |  
| SUP. | INF. | SUP. | INF. | sup |

.	1500.00	56.39	148.08	348.78	840.02	5.00	1.444E+07
.	1390.00	55.97	148.54	346.48	842.50	5.00	1.435E+07
.	1280.00	54.68	149.94	339.57	849.95	5.00	1.406E+07
.	1170.00	52.55	152.27	328.06	862.36	5.00	1.357E+07
.	1060.00	49.55	155.52	311.94	879.73	5.00	1.289E+07
.	950.00	45.70	159.71	291.22	902.07	5.00	1.202E+07
.	840.00	41.00	164.82	265.90	929.37	5.00	1.095E+07
.	730.00	35.44	170.87	235.97	961.64	5.00	9.687E+06
.	620.00	29.02	177.85	201.43	998.87	5.00	8.230E+06
.	510.00	21.75	185.76	162.29	1041.06	5.00	6.579E+06
.	400.00	16.59	180.02	132.07	1007.73	5.00	4.735E+06
.	310.00	9.29	188.00	92.83	1050.36	5.00	3.081E+06
.	200.00	2.59	183.87	54.28	1025.60	5.00	8.827E+05
.	150.00	-2.10	189.05	29.03	1053.23	5.00	-1.806E+05
.	110.00	-1.73	188.64	31.01	1051.06	5.00	-9.710E+04

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| rare load condition = Gk + Qk |

..|STRESS MAX.= 0.5\*Fck=228.25 .7\*Ftk=3771.41

-----  
| DISTANCE | STRESS | STRESS | STRESS | STRESS | BARS | MOMENT |  
| SUP. | INF. | SUP. | INF. | inf. |

.	1500.00	137.98	-12.76	658.64	-30.13	8.00	4.406E+07
.	1390.00	137.19	-11.73	655.05	-25.43	8.00	4.381E+07
.	1280.00	134.83	-8.67	644.28	-11.41	8.00	4.309E+07
.	1170.00	130.88	-3.58	626.32	11.94	8.00	4.188E+07
.	1060.00	125.36	3.56	601.19	44.63	8.00	4.019E+07
.	950.00	118.26	12.73	568.88	86.64	8.00	3.801E+07
.	840.00	109.59	23.93	529.38	137.99	8.00	3.535E+07
.	730.00	99.33	37.17	482.70	198.67	8.00	3.221E+07
.	620.00	87.50	52.45	428.85	268.68	8.00	2.858E+07
.	510.00	74.10	69.77	367.81	348.02	8.00	2.448E+07
.	400.00	61.52	78.97	309.26	388.98	8.00	1.988E+07
.	310.00	48.06	96.49	248.02	469.31	8.00	1.577E+07
.	200.00	32.63	109.50	176.49	527.72	8.00	1.029E+07
.	150.00	23.97	120.88	137.08	579.91	8.00	7.646E+06
.	110.00	16.80	130.30	104.47	623.08	8.00	5.456E+06

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.| DISTANCE |first PHASE(place concrete+løper.)|
-----
.|          | STRESS SUP. | STRESS INF. | MOMENT      |
-----
.  1.5000E+03  9.0804E+01  7.8593E+01  2.2004E+07
.  1.3900E+03  9.0274E+01  7.9116E+01  2.1883E+07
.  1.2800E+03  8.8684E+01  8.0672E+01  2.1521E+07
.  1.1700E+03  8.6035E+01  8.3262E+01  2.0917E+07
.  1.0600E+03  8.2326E+01  8.6887E+01  2.0072E+07
.  9.5000E+02  7.7558E+01  9.1545E+01  1.8985E+07
.  8.4000E+02  7.1729E+01  9.7236E+01  1.7657E+07
.  7.3000E+02  6.4842E+01  1.0396E+02  1.6088E+07
.  6.2000E+02  5.6894E+01  1.1172E+02  1.4277E+07
.  5.1000E+02  4.7887E+01  1.2051E+02  1.2224E+07
.  4.0000E+02  4.0232E+01  1.2036E+02  9.9303E+06
.  3.1000E+02  3.1184E+01  1.2931E+02  7.8739E+06
.  2.0000E+02  2.1612E+01  1.3101E+02  5.1409E+06
.  1.5000E+02  1.5780E+01  1.3686E+02  3.8188E+06
.  1.1000E+02  1.0955E+01  1.4170E+02  2.7252E+06
.
-----
.| DISTANCE |second PHASE (2øper+var.)|
-----
.|          | STRESS SUP. |STRESS INF|St.place concr.|  MOMENT      |
-----
.  1.5000E+03  4.7177E+01 -9.1349E+01  4.9999E+01  2.2052E+07
.  1.3900E+03  4.6918E+01 -9.0847E+01  4.9725E+01  2.1931E+07
.  1.2800E+03  4.6141E+01 -8.9344E+01  4.8902E+01  2.1568E+07
.  1.1700E+03  4.4847E+01 -8.6838E+01  4.7530E+01  2.0963E+07
.  1.0600E+03  4.3035E+01 -8.3329E+01  4.5610E+01  2.0116E+07
.  9.5000E+02  4.0705E+01 -7.8818E+01  4.3140E+01  1.9027E+07
.  8.4000E+02  3.7858E+01 -7.3304E+01  4.0123E+01  1.7696E+07
.  7.3000E+02  3.4493E+01 -6.6788E+01  3.6556E+01  1.6123E+07
.  6.2000E+02  3.0610E+01 -5.9270E+01  3.2441E+01  1.4308E+07
.  5.1000E+02  2.6209E+01 -5.0749E+01  2.7777E+01  1.2251E+07
.  4.0000E+02  2.1288E+01 -4.1392E+01  2.2581E+01  9.9523E+06
.  3.1000E+02  1.6880E+01 -3.2820E+01  1.7904E+01  7.8913E+06
.  2.0000E+02  1.1019E+01 -2.1516E+01  1.1698E+01  5.1523E+06
.  1.5000E+02  8.1856E+00 -1.5982E+01  8.6898E+00  3.8273E+06
.  1.1000E+02  5.8415E+00 -1.1406E+01  6.2013E+00  2.7313E+06
.
-----
.|          | quasi-permanent load = Gk + Qk * .6 |
-----
.|          |          CONCRETE          |
..|STRESS MAX.= .4 *Fck= 182.6
-----
.| DISTANCE | STRESS | STRESS | MOMENT | STRANDS |
.|          | SUP.   | INF.   |        | APPLIED |
-----
.  1500.00  126.66   9.17   3.876E+07  32
.  1390.00  125.93  10.07  3.855E+07  32
.  1280.00  123.75  12.77  3.791E+07  32
.  1170.00  120.12  17.27  3.685E+07  32
.  1060.00  115.03  23.56  3.536E+07  32
.   950.00  108.49  31.64  3.345E+07  32
.   840.00  100.50  41.52  3.111E+07  32
.   730.00   91.06  53.20  2.834E+07  32
.   620.00   80.16  66.68  2.515E+07  32

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.	510.00	67.81	81.95	2.154E+07	32
.	400.00	56.41	88.90	1.749E+07	30
.	310.00	44.01	104.37	1.387E+07	30
.	200.00	29.99	114.66	9.057E+06	28
.	150.00	22.00	124.72	6.728E+06	28
.	110.00	15.39	133.03	4.801E+06	28

-----  
 .| DISTANCE |FIRST PHASE(place concrete+løper.) |

-----  
 .| | STRESS SUP. | STRESS INF. | MOMENT |

.	1.5000E+03	9.0804E+01	7.8593E+01	2.2004E+07
.	1.3900E+03	9.0274E+01	7.9116E+01	2.1883E+07
.	1.2800E+03	8.8684E+01	8.0672E+01	2.1521E+07
.	1.1700E+03	8.6035E+01	8.3262E+01	2.0917E+07
.	1.0600E+03	8.2326E+01	8.6887E+01	2.0072E+07
.	9.5000E+02	7.7558E+01	9.1545E+01	1.8985E+07
.	8.4000E+02	7.1729E+01	9.7236E+01	1.7657E+07
.	7.3000E+02	6.4842E+01	1.0396E+02	1.6088E+07
.	6.2000E+02	5.6894E+01	1.1172E+02	1.4277E+07
.	5.1000E+02	4.7887E+01	1.2051E+02	1.2224E+07
.	4.0000E+02	4.0232E+01	1.2036E+02	9.9303E+06
.	3.1000E+02	3.1184E+01	1.2931E+02	7.8739E+06
.	2.0000E+02	2.1612E+01	1.3101E+02	5.1409E+06
.	1.5000E+02	1.5780E+01	1.3686E+02	3.8188E+06
.	1.1000E+02	1.0955E+01	1.4170E+02	2.7252E+06

-----  
 .| DISTANCE |SECOND PHASE (2øper+var.) |

-----  
 .| | STRESS SUP. | STRESS INF. | St.place concr. | MOMENT |

.	1.5000E+03	3.5854E+01	-6.9425E+01	3.7999E+01	1.6760E+07
.	1.3900E+03	3.5658E+01	-6.9044E+01	3.7791E+01	1.6668E+07
.	1.2800E+03	3.5067E+01	-6.7901E+01	3.7165E+01	1.6392E+07
.	1.1700E+03	3.4084E+01	-6.5997E+01	3.6123E+01	1.5932E+07
.	1.0600E+03	3.2707E+01	-6.3330E+01	3.4663E+01	1.5288E+07
.	9.5000E+02	3.0936E+01	-5.9902E+01	3.2787E+01	1.4461E+07
.	8.4000E+02	2.8772E+01	-5.5711E+01	3.0493E+01	1.3449E+07
.	7.3000E+02	2.6215E+01	-5.0759E+01	2.7783E+01	1.2254E+07
.	6.2000E+02	2.3264E+01	-4.5045E+01	2.4655E+01	1.0874E+07
.	5.1000E+02	1.9919E+01	-3.8569E+01	2.1111E+01	9.3110E+06
.	4.0000E+02	1.6179E+01	-3.1458E+01	1.7161E+01	7.5637E+06
.	3.1000E+02	1.2829E+01	-2.4944E+01	1.3607E+01	5.9974E+06
.	2.0000E+02	8.3748E+00	-1.6352E+01	8.8906E+00	3.9157E+06
.	1.5000E+02	6.2210E+00	-1.2147E+01	6.6042E+00	2.9087E+06
.	1.1000E+02	4.4395E+00	-8.6683E+00	4.7130E+00	2.0758E+06

-----  
 .| CRACKING VERIFICATION Exposure Class XD3

-----  
 . Decompression: COMPRESSED SECTION LEVEL (Respect bottom )

-----  
 .| DISTANCE | TRANSPORT | MOMENT FINAL |

-----  
 .| | LEVEL SUP. | LEVEL INF. | LEVEL SUP. | LEVEL INF. |

.	1500.00	135.00	0.00	135.00	11.42
.	1390.00	135.00	0.00	135.00	10.63

.	1280.00	135.00	0.00	135.00	8.16
.	1170.00	135.00	0.00	135.00	3.59
.	1060.00	135.00	0.00	135.00	0.00
.	950.00	135.00	0.00	135.00	0.00
.	840.00	135.00	0.00	135.00	0.00
.	730.00	135.00	0.00	135.00	0.00
.	620.00	135.00	0.00	135.00	0.00
.	510.00	135.00	0.00	135.00	0.00
.	400.00	135.00	0.00	135.00	0.00
.	310.00	135.00	0.00	135.00	0.00
.	200.00	135.00	0.00	135.00	0.00
.	150.00	133.51	0.00	135.00	0.00
.	110.00	133.77	0.00	135.00	0.00

PRESTRESSING STEEL MUST REMAIN FOR 2.5 cm  
INSIDE COMPRESSED ZONE  
SATISFIED VERIFICATION

VERIFICATION		STRESS		BARS		FOR		CRACKING	
		TRANSPORT				MOMENT FINAL			
DISTANCE	BORDER	AREA	AREA	STRESS	LEMBO	AREA	AREA	STRESS	
DISTANCE		MIN.	EFFECT.			MIN.	EFFECT.		
.	1500.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	1390.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	1280.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	1170.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	1060.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	950.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	840.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	730.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	620.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	510.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	400.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	310.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	200.00	SEC.	COMPRESSED			SEC.	COMPRESSED		
.	150.00	SUP.	0.32	5.00	312.22	SEC.	COMPRESSED		
.	110.00	SUP.	0.26	5.00	254.87	SEC.	COMPRESSED		

see Table 4.11 and 4.12 point 4.4.2.3 EC2

PRESTRESSING STEEL								
	STRESS var.	bar.	Strands	STRESS var.	bar.	Str.	Dbi Str.	N.Str.
.	1500.00	13121.42	134.81	11426.15	45.84	31.09	32	
.	1390.00	13119.95	134.99	11419.44	46.50	31.09	32	
.	1280.00	13114.44	135.66	11398.64	48.48	31.09	32	
.	1170.00	13104.88	136.81	11363.76	51.77	31.09	32	
.	1060.00	13091.27	138.46	11314.79	56.37	31.09	32	
.	950.00	13073.63	140.59	11251.73	62.29	31.09	32	
.	840.00	13051.93	143.22	11174.58	69.52	31.09	32	
.	730.00	13026.20	146.33	11083.35	78.07	31.09	32	
.	620.00	12996.42	149.93	10978.02	87.93	31.09	32	



.	510.00	12962.59	154.02	10858.61	99.10	31.09	32
.	400.00	13004.54	146.28	10934.00	100.81	32.17	30
.	310.00	12969.76	150.40	10811.90	112.08	32.17	30
.	200.00	13003.10	143.51	10857.73	116.23	33.39	28
.	150.00	12980.13	146.18	10777.51	123.52	33.39	28
.	110.00	12961.12	148.39	10711.15	129.55	33.39	28

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PRETENSION LOSSES

DISTANCE	Immediate	shrinkage	creep	relaxation	Comb.tot.	Loads	
.	1500.00	300.09	494.00	1223.29	163.94	1862.47	471.61
.	1390.00	300.09	494.00	1227.68	163.94	1866.82	468.63
.	1280.00	300.09	494.00	1240.73	163.94	1879.74	460.46
.	1170.00	300.09	494.00	1262.43	163.94	1901.22	447.12
.	1060.00	300.09	494.00	1292.79	163.94	1931.27	428.61
.	950.00	300.09	494.00	1331.80	163.94	1969.90	404.92
.	840.00	300.09	494.00	1379.46	163.94	2017.09	376.06
.	730.00	300.09	494.00	1435.79	163.94	2072.85	342.02
.	620.00	300.09	494.00	1500.77	163.94	2137.18	302.81
.	510.00	300.09	494.00	1574.40	163.94	2210.08	258.42
.	400.00	300.09	494.00	1527.23	163.94	2164.73	209.86
.	310.00	300.09	494.00	1601.61	163.94	2238.42	165.24
.	200.00	300.09	494.00	1569.61	163.94	2208.09	106.50
.	150.00	300.09	494.00	1617.83	163.94	2255.89	77.71
.	110.00	300.09	494.00	1657.72	163.94	2295.43	53.90

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BOW HEIGHT

MOMENT INITIAL	MOMENT FINAL
self-weight	prestress
TOTAL	PERM.+s-weight
VARIABLE	TOTAL
-2.7743E+00	5.2334E+00
2.4590E+00	1.8177E-01
-1.3471E+00	-8.5635E-01
Kvisc= 2.7	
Length/Bow Ist.= 2574.3 >=1000 Length/Bow inf.= 71863.74 >=500	

\*\*\* BENDING ULTIMATE LIMIT STATES

DISTANCE	ELONG%. PRECAST	ELONG%. STRANDS	ELONG%. p.concr.	ELONG%. BARS SUP.	ELONG%. BARS INF.	DIST n-n SUP.BORDER	Mr/Md >1	
.	1500.000	1.664	16.571	3.500	1.142	11.797	15.946	1.202
.	1390.000	1.662	16.570	3.500	1.141	11.800	15.929	1.208
.	1280.000	1.657	16.568	3.500	1.136	11.808	15.878	1.226
.	1170.000	1.649	16.564	3.500	1.127	11.822	15.794	1.257
.	1060.000	1.638	16.558	3.500	1.115	11.841	15.675	1.304
.	950.000	1.644	16.406	3.500	1.126	11.712	15.875	1.391
.	840.000	1.626	16.397	3.500	1.108	11.742	15.688	1.485
.	730.000	1.625	16.241	3.500	1.112	11.623	15.824	1.640
.	620.000	1.601	16.227	3.500	1.087	11.664	15.568	1.830

.Md = 1.4 \* Mpp + 1.4 \* Mper + 1.5 \* Mvar

. 510.000	1.594	16.066	3.500	1.084	11.554	15.639	2.146
. 400.000	1.580	16.076	3.500	1.072	11.523	15.553	2.633
. 310.000	1.573	15.914	3.500	1.069	11.414	15.623	3.334
. 200.000	1.552	15.920	3.500	1.051	11.394	15.468	5.077
. 150.000	1.555	15.763	3.500	1.058	11.269	15.646	6.891
. 110.000	1.541	15.753	3.500	1.043	11.293	15.486	9.596

. Geometric mechanical properties sections with steel

. Perimeter 563.7889 Area equivalent 19.80301 Width min. 18

.Sec. dist.	Area A	Dist.Bar. Dbi	Mom.In. J n-n	Mod.Res. Wi	Mod.Res. Ws	Mod.Res. Wsc
.support						
. 1500.00	7.686E+03	8.902E+01	2.149E+07	2.414E+05	4.674E+05	3.257E+05
. 1390.00	7.686E+03	8.902E+01	2.149E+07	2.414E+05	4.674E+05	3.257E+05
. 1280.00	7.686E+03	8.902E+01	2.149E+07	2.414E+05	4.674E+05	3.257E+05
. 1170.00	7.686E+03	8.902E+01	2.149E+07	2.414E+05	4.674E+05	3.257E+05
. 1060.00	7.686E+03	8.902E+01	2.149E+07	2.414E+05	4.674E+05	3.257E+05
. 950.00	7.686E+03	8.902E+01	2.149E+07	2.414E+05	4.674E+05	3.257E+05
. 840.00	7.686E+03	8.902E+01	2.149E+07	2.414E+05	4.674E+05	3.257E+05
. 730.00	7.686E+03	8.902E+01	2.149E+07	2.414E+05	4.674E+05	3.257E+05
. 620.00	7.686E+03	8.902E+01	2.149E+07	2.414E+05	4.674E+05	3.257E+05
. 510.00	7.686E+03	8.902E+01	2.149E+07	2.414E+05	4.674E+05	3.257E+05
. 400.00	7.670E+03	8.915E+01	2.143E+07	2.404E+05	4.675E+05	3.255E+05
. 310.00	7.670E+03	8.915E+01	2.143E+07	2.404E+05	4.675E+05	3.255E+05
. 200.00	7.653E+03	8.928E+01	2.138E+07	2.395E+05	4.676E+05	3.253E+05
. 150.00	7.653E+03	8.928E+01	2.138E+07	2.395E+05	4.676E+05	3.253E+05
. 110.00	7.653E+03	8.928E+01	2.138E+07	2.395E+05	4.676E+05	3.253E+05

.\*\*\* SHEAR ULTIMATE LIMIT STATES

IN SUPPORT (SIMPLE REINFORCED CONCRETE.)

.Vsd (Shear design) = 84850.31 Vrd1 (concrete)= 19904.69  
.Vrd2 (crushing) = 171596.6 SPREAD STIRRUPS = 25.36031  
.STIRRUPS TOTAL/ML = 32.34525 LOOPS place concr /ML= .7283732

.BARS SUPPORT (BENDS+LOOPS) 15.34621 Shear from head cm 15  
.STRESS BARS inferior Td/As 966.0965

.FIRST PRECOMPRESSED SECTION 120 CM FROM SUPPORT

.Vsd (Shear design) = 77993.73 Vrd1 (concrete)= 45779.8  
.Vrd2 (crushing) = 183649.9 STIRRUPS TOTAL /ML = 7.941712  
LOOPS place concr /ML = .9411471

.T\_RCAEC2 E-MAIL studio@engisoft.org WEB www.engisoft.org

**LENGTH**  
**2750 cm**

```
.T_RCAEC2             ENGISOFT-ing.F.PINARDI-DESENZANO(BS)          tel 030-9912152
.DATE (mm-gg-aa)      09-12-2008
.Prestressed concrete members pre-tensioned and bonded
.EUROCODE 2-DESIGN OF STRUCTURES UNI ENV 1992-1-1:
.General rules and rules for buildings Simple support Beam
.
.STANDARD GIRDERS
.P MAX 2000
```

UNIT MEASURE

```
UNIT FORCE      : daN
UNIT LENGTH    : cm
```

```
*      Exposure Class    XD3 *
. 3 - Corrosion induced by chlorides
.      Cyclic wet and dry
```

```
* Relative Humidity* 55 %
```

Geometric mechanical properties.

```
.LOAD 1ø PHASE (Cast in place concrete)    6
.LOAD 2ø PHASE (perm.)                     8
.LOAD 2ø PHASE (var.)                     12
.HEIGHT Cast in place concrete            20
.Charact.Cubic Strength. in place concrete 300
.WIDTH (Cast in place concrete)          120
.DESIGN LENGHT                             2720
.EFFECTIVE LENGHT                          2750
.SUPERIOR CONVENTIONAL REINFORCING BARS    5
.SUPERIOR BARS DISTANCE FORM SUP. BORDER  5
.INFERIOR CONVENTIONAL REINFORCING BARS    8
.INFERIOR BARS DISTANCE FORM INF. BORDER   6
```

```
.CANTILEVER FINAL MOMENT                  15
.MAX CANTILEVER TRANSPORT-HOISTING        150
```

```
.MAX STRESS BARS CRACKING (1600-4500)     2200
.like previewed by UNI ENV 1992-1-1 table 4.11
```

Materials properties

```
.Rck=      550.00    Rckj=     400.00    Fck=       456.50    Fckj=      332.00
.
.Fctmf=     46.72    Fctk=     50.62    Fctmi=     37.78    Fctkj=     40.93
.
.Fyk=     4290.23    Ftk=     5387.73    Fpk=    18629.19    Fp1k=    16665.08
.
.Jack tension= 14018.27 losses % 1000H = 2.20 losses % 5000H = 2.80
```

```
.T_RCAEC2             E-MAIL studio@engisoft.org             WEB www.engisoft.org
```



.T\_RCAEC2

ENGISOFT-ing.F.PINARDI-DESENZANO (BS)

tel 030-9912152

BENDING verifications

-----							
INITIAL				MOMENT			
-----							
STRESS MAX.=		.6*Fckj=		199.20		.7*Ftk=	
		CONCRETE		BARS			
-----							
DISTANCE	STRESS	STRESS	STRESS	STRESS	BARS	BENDING	
	SUP.	INF.	SUP.	INF.	sup		
-----							
1375.00	48.94	116.38	300.04	661.39	0.10	1.290E+07	
1265.00	48.64	116.77	298.46	663.52	0.10	1.284E+07	
1155.00	47.60	117.95	292.89	669.82	0.10	1.261E+07	
1045.00	45.82	119.95	283.30	680.47	0.10	1.221E+07	
935.00	43.28	122.78	269.66	695.62	0.10	1.165E+07	
825.00	39.99	126.46	251.96	715.27	0.10	1.091E+07	
715.00	35.94	130.98	230.21	739.42	0.10	1.000E+07	
605.00	31.14	136.35	204.40	768.08	0.10	8.929E+06	
495.00	25.59	142.55	174.54	801.24	0.10	7.685E+06	
385.00	19.28	149.60	140.62	838.90	0.10	6.273E+06	
360.00	17.74	151.32	132.34	848.09	0.10	5.928E+06	
250.00	13.60	143.70	107.44	804.53	0.10	4.309E+06	
235.00	12.55	144.88	101.82	810.82	0.10	4.075E+06	
150.00	9.44	135.87	82.38	759.82	1.79	2.690E+06	
125.00	7.54	138.04	72.18	771.38	1.67	2.263E+06	
110.00	6.38	139.36	65.95	778.44	1.61	2.003E+06	

-----							
HOISTING				AND TRANSPORT			
-----							
STRESS MAX.=		.6*Fckj=		199.20		.7*Ftk=	
		CONCRETE		BARS			
-----							
DISTANCE	STRESS	STRESS	STRESS	STRESS	BARS	BENDING	
	SUP.	INF.	SUP.	INF.	sup		
-----							
1375.00	44.28	121.58	274.98	689.19	0.10	1.186E+07	
1265.00	43.82	122.16	272.54	692.29	0.10	1.176E+07	
1155.00	42.51	123.65	265.51	700.23	0.10	1.147E+07	
1045.00	40.34	126.07	253.85	713.18	0.10	1.099E+07	
935.00	37.30	129.46	237.52	731.30	0.10	1.031E+07	
825.00	33.40	133.82	216.53	754.61	0.10	9.434E+06	
715.00	28.63	139.16	190.88	783.09	0.10	8.366E+06	
605.00	22.99	145.46	160.57	816.75	0.10	7.104E+06	
495.00	16.48	152.73	125.59	855.59	0.10	5.647E+06	
385.00	9.11	160.97	85.94	899.61	0.10	3.996E+06	
360.00	7.31	162.98	76.28	910.34	0.10	3.594E+06	
250.00	1.95	156.81	44.86	874.58	0.10	1.705E+06	
235.00	0.73	158.18	38.30	881.91	0.10	1.433E+06	
150.00	-3.37	150.44	13.56	837.68	1.79	-1.806E+05	
125.00	-3.13	150.16	14.89	836.18	1.67	-1.254E+05	
110.00	-3.00	150.01	15.57	835.42	1.61	-9.710E+04	

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-----
.|          |          rare load condition = Gk + Qk          |
-----
.|          |          CONCRETE          |          BARS          |          |
.|STRESS MAX.=          0.5*Fck=228.25          .7*Ftk=3771.41          |
-----
.|  DISTANCE |  STRESS |  STRESS |  STRESS |  STRESS |  BARS |  MOMENT  ||
.|          |  SUP.  |  INF.  |  SUP.  |  INF.  |  inf. |          |
-----
.  1375.00   114.93   -18.51   547.16   -62.56   0.53   3.695E+07
.  1265.00   114.12   -17.36   543.50   -57.30   0.21   3.671E+07
.  1155.00   111.72   -13.91   532.61   -41.43   0.10   3.598E+07
.  1045.00   107.71    -8.16   514.47   -14.97   0.10   3.478E+07
.   935.00   102.10    -0.11   489.07    22.07   0.10   3.308E+07
.   825.00    94.88    10.25   456.42    69.70   0.10   3.091E+07
.   715.00    86.07    22.90   416.51   127.91   0.10   2.825E+07
.   605.00    75.65    37.86   369.35   196.70   0.10   2.511E+07
.   495.00    63.67    54.17   314.97   271.60   0.10   2.148E+07
.   385.00    50.11    72.29   253.37   354.72   0.10   1.737E+07
.   360.00    46.81    76.71   238.36   374.97   0.10   1.637E+07
.   250.00    33.83    85.97   177.90   416.16   0.10   1.167E+07
.   235.00    31.59    89.00   167.71   430.04   0.10   1.099E+07
.   150.00    20.85    95.05   117.42   456.42   0.10   6.972E+06
.   125.00    16.78   100.61    98.91   481.98   0.10   5.736E+06
.   110.00    14.29   104.01    87.62   497.57   0.10   4.982E+06
-----

```

```

-----
.|  DISTANCE | |first PHASE(place concrete+løper.)|
-----
.|          | |STRESS SUP. | |STRESS INF.| |MOMENT      |
-----
.  1.3750E+03  7.5087E+01  6.0434E+01  1.8455E+07
.  1.2650E+03  7.4534E+01  6.1119E+01  1.8334E+07
.  1.1550E+03  7.2907E+01  6.3037E+01  1.7972E+07
.  1.0450E+03  7.0203E+01  6.6205E+01  1.7369E+07
.  9.3500E+02  6.6417E+01  7.0640E+01  1.6523E+07
.  8.2500E+02  6.1549E+01  7.6342E+01  1.5437E+07
.  7.1500E+02  5.5600E+01  8.3312E+01  1.4109E+07
.  6.0500E+02  4.8568E+01  9.1548E+01  1.2539E+07
.  4.9500E+02  4.0501E+01  1.0011E+02  1.0728E+07
.  3.8500E+02  3.1376E+01  1.0944E+02  8.6758E+06
.  3.6000E+02  2.9152E+01  1.1171E+02  8.1757E+06
.  2.5000E+02  2.1248E+01  1.1103E+02  5.8269E+06
.  2.3500E+02  1.9737E+01  1.1260E+02  5.4879E+06
.  1.5000E+02  1.3349E+01  1.1008E+02  3.4821E+06
.  1.2500E+02  1.0601E+01  1.1298E+02  2.8647E+06
.  1.1000E+02  8.9250E+00  1.1475E+02  2.4883E+06
-----

```

```

-----
.|  DISTANCE | |second PHASE (2øper+var.)|
-----
.|          | |STRESS SUP. | |STRESS INF.| |St.place concr.| |MOMENT      |
-----
.  1.3750E+03  3.9844E+01 -7.8940E+01  4.2423E+01  1.8496E+07
.  1.2650E+03  3.9589E+01 -7.8481E+01  4.2157E+01  1.8375E+07
.  1.1550E+03  3.8809E+01 -7.6949E+01  4.1328E+01  1.8012E+07
.  1.0450E+03  3.7505E+01 -7.4364E+01  3.9940E+01  1.7407E+07
.  9.3500E+02  3.5680E+01 -7.0746E+01  3.7996E+01  1.6560E+07
.  8.2500E+02  3.3334E+01 -6.6094E+01  3.5498E+01  1.5471E+07
-----

```

```
. 7.1500E+02 3.0466E+01 -6.0407E+01 3.2444E+01 1.4140E+07
. 6.0500E+02 2.7077E+01 -5.3687E+01 2.8834E+01 1.2567E+07
. 4.9500E+02 2.3166E+01 -4.5934E+01 2.4670E+01 1.0752E+07
. 3.8500E+02 1.8734E+01 -3.7146E+01 1.9950E+01 8.6950E+06
. 3.6000E+02 1.7654E+01 -3.5005E+01 1.8800E+01 8.1938E+06
. 2.5000E+02 1.2581E+01 -2.5056E+01 1.3410E+01 5.8398E+06
. 2.3500E+02 1.1849E+01 -2.3598E+01 1.2630E+01 5.5000E+06
. 1.5000E+02 7.5056E+00 -1.5036E+01 8.0096E+00 3.4898E+06
. 1.2500E+02 6.1755E+00 -1.2370E+01 6.5901E+00 2.8710E+06
. 1.1000E+02 5.3644E+00 -1.0745E+01 5.7244E+00 2.4938E+06
```

```
-----
.|          | quasi-permanent load = Gk + Qk * .6 |
-----
```

```
.|          |          CONCRETE          |          |
..|STRESS MAX.= .4 *Fck= 182.6
```

```
-----
.| DISTANCE | STRESS | STRESS | MOMENT | STRANDS |
.|          | SUP.   | INF.   |         | APPLIED |
-----
```

```
. 1375.00 105.37 0.44 3.251E+07 25
. 1265.00 104.62 1.47 3.230E+07 25
. 1155.00 102.40 4.56 3.166E+07 25
. 1045.00 98.71 9.69 3.060E+07 25
. 935.00 93.53 16.87 2.911E+07 25
. 825.00 86.88 26.11 2.719E+07 25
. 715.00 78.75 37.40 2.486E+07 25
. 605.00 69.15 50.75 2.209E+07 25
. 495.00 58.11 65.20 1.890E+07 25
. 385.00 45.61 81.21 1.528E+07 25
. 360.00 42.57 85.11 1.440E+07 25
. 250.00 30.81 91.99 1.027E+07 23
. 235.00 28.74 94.66 9.668E+06 23
. 150.00 19.05 98.65 6.134E+06 21
. 125.00 15.29 103.58 5.047E+06 21
. 110.00 13.00 106.59 4.384E+06 21
```

```
-----
.| DISTANCE |first PHASE(place concrete+løper.)|
-----
```

```
.|          | STRESS SUP. | STRESS INF. | MOMENT |
-----
```

```
. 1.3750E+03 7.5087E+01 6.0434E+01 1.8455E+07
. 1.2650E+03 7.4534E+01 6.1119E+01 1.8334E+07
. 1.1550E+03 7.2907E+01 6.3037E+01 1.7972E+07
. 1.0450E+03 7.0203E+01 6.6205E+01 1.7369E+07
. 9.3500E+02 6.6417E+01 7.0640E+01 1.6523E+07
. 8.2500E+02 6.1549E+01 7.6342E+01 1.5437E+07
. 7.1500E+02 5.5600E+01 8.3312E+01 1.4109E+07
. 6.0500E+02 4.8568E+01 9.1548E+01 1.2539E+07
. 4.9500E+02 4.0501E+01 1.0011E+02 1.0728E+07
. 3.8500E+02 3.1376E+01 1.0944E+02 8.6758E+06
. 3.6000E+02 2.9152E+01 1.1171E+02 8.1757E+06
. 2.5000E+02 2.1248E+01 1.1103E+02 5.8269E+06
. 2.3500E+02 1.9737E+01 1.1260E+02 5.4879E+06
. 1.5000E+02 1.3349E+01 1.1008E+02 3.4821E+06
. 1.2500E+02 1.0601E+01 1.1298E+02 2.8647E+06
. 1.1000E+02 8.9250E+00 1.1475E+02 2.4883E+06
```



```

-----
.| DISTANCE |second PHASE (2øper+var.)|
-----
.|          | STRESS SUP. |STRESS INF|St.place concr.| MOMENT |
-----
. 1.3750E+03 3.0281E+01 -5.9994E+01 3.2242E+01 1.4057E+07
. 1.2650E+03 3.0088E+01 -5.9645E+01 3.2039E+01 1.3965E+07
. 1.1550E+03 2.9495E+01 -5.8481E+01 3.1409E+01 1.3689E+07
. 1.0450E+03 2.8504E+01 -5.6517E+01 3.0354E+01 1.3229E+07
. 9.3500E+02 2.7117E+01 -5.3767E+01 2.8877E+01 1.2586E+07
. 8.2500E+02 2.5334E+01 -5.0231E+01 2.6978E+01 1.1758E+07
. 7.1500E+02 2.3154E+01 -4.5910E+01 2.4657E+01 1.0746E+07
. 6.0500E+02 2.0579E+01 -4.0802E+01 2.1914E+01 9.5509E+06
. 4.9500E+02 1.7606E+01 -3.4910E+01 1.8749E+01 8.1715E+06
. 3.8500E+02 1.4238E+01 -2.8231E+01 1.5162E+01 6.6082E+06
. 3.6000E+02 1.3417E+01 -2.6603E+01 1.4288E+01 6.2273E+06
. 2.5000E+02 9.5619E+00 -1.9042E+01 1.0192E+01 4.4382E+06
. 2.3500E+02 9.0056E+00 -1.7935E+01 9.5987E+00 4.1800E+06
. 1.5000E+02 5.7042E+00 -1.1427E+01 6.0873E+00 2.6522E+06
. 1.2500E+02 4.6934E+00 -9.4013E+00 5.0085E+00 2.1820E+06
. 1.1000E+02 4.0769E+00 -8.1660E+00 4.3506E+00 1.8953E+06
.
.

```

```

-----
.| CRACKING VERIFICATION Exposure Class XD3
-----

```

Decompression: COMPRESSED SECTION LEVEL (Respect bottom )

```

-----
.| DISTANCE | TRANSPORT | MOMENT FINAL |
-----
.|          | LEVEL SUP. | LEVEL INF. | LEVEL SUP. | LEVEL INF. |
-----
. 1375.00 135.00 0.00 135.00 18.72
. 1265.00 135.00 0.00 135.00 17.83
. 1155.00 135.00 0.00 135.00 14.95
. 1045.00 135.00 0.00 135.00 9.51
. 935.00 135.00 0.00 135.00 0.14
. 825.00 135.00 0.00 135.00 0.00
. 715.00 135.00 0.00 135.00 0.00
. 605.00 135.00 0.00 135.00 0.00
. 495.00 135.00 0.00 135.00 0.00
. 385.00 135.00 0.00 135.00 0.00
. 360.00 135.00 0.00 135.00 0.00
. 250.00 135.00 0.00 135.00 0.00
. 235.00 135.00 0.00 135.00 0.00
. 150.00 132.04 0.00 135.00 0.00
. 125.00 132.25 0.00 135.00 0.00
. 110.00 132.35 0.00 135.00 0.00
.
.

```

```

. PRESTRESSING STEEL MUST REMAIN FOR 2.5 cm
. INSIDE COMPRESSED ZONE
. SATISFIED VERIFICATION

```

VERIFICATION		STRESS		BARS		FOR		CRACKING	
		TRANSPORT				MOMENT FINAL			
DISTANCE	BORDER	AREA	AREA	STRESS	LEMBO	AREA	AREA	STRESS	
DISTANCE		MIN.	EFFECT.			MIN.	EFFECT.		
1375.00	SEC.COMPRESSED			INF.	0.23	0.53	2078.87		
1265.00	SEC.COMPRESSED			INF.	0.09	0.21	2124.45		
1155.00	SEC.COMPRESSED			SEC.COMPRESSED					
1045.00	SEC.COMPRESSED			SEC.COMPRESSED					
935.00	SEC.COMPRESSED			SEC.COMPRESSED					
825.00	SEC.COMPRESSED			SEC.COMPRESSED					
715.00	SEC.COMPRESSED			SEC.COMPRESSED					
605.00	SEC.COMPRESSED			SEC.COMPRESSED					
495.00	SEC.COMPRESSED			SEC.COMPRESSED					
385.00	SEC.COMPRESSED			SEC.COMPRESSED					
360.00	SEC.COMPRESSED			SEC.COMPRESSED					
250.00	SEC.COMPRESSED			SEC.COMPRESSED					
235.00	SEC.COMPRESSED			SEC.COMPRESSED					
150.00	SUP.	0.71	1.79	1921.96	SEC.COMPRESSED				
125.00	SUP.	0.66	1.67	1925.51	SEC.COMPRESSED				
110.00	SUP.	0.64	1.61	1926.44	SEC.COMPRESSED				

see Table 4.11 and 4.12 point 4.4.2.3 EC2

PRESTRESSING			STEEL			
DISTANCE	MOMENT	INITIAL	RARE	LOAD	CONDITION	
	STRESS var.	bar.Strands	STRESS var.	bar.Str.	Dbi Str.	N.Str.
1375.00	13295.14	108.27	11482.96	31.74	30.00	25
1265.00	13293.09	108.53	11481.66	32.45	30.00	25
1155.00	13287.21	109.26	11477.75	34.56	30.00	25
1045.00	13277.30	110.50	11471.25	38.06	30.00	25
935.00	13263.20	112.25	11462.14	42.97	30.00	25
825.00	13244.91	114.52	11450.42	49.27	30.00	25
715.00	13222.42	117.32	11436.11	56.98	30.00	25
605.00	13195.75	120.64	11419.19	66.09	30.00	25
495.00	13164.88	124.47	11331.95	76.59	30.00	25
385.00	13129.82	128.83	11206.41	88.50	30.00	25
360.00	13121.27	129.89	11175.81	91.40	30.00	25
250.00	13164.28	121.86	11254.72	93.39	31.30	23
235.00	13158.31	122.58	11233.50	95.37	31.30	23
150.00	13206.94	113.73	11332.73	95.28	32.86	21
125.00	13195.74	115.06	11293.10	98.91	32.86	21
110.00	13188.91	115.88	11268.94	101.13	32.86	21

PRESTRESSING		LOSSES				
DISTANCE	Immediate	shrinkage	creep	relaxation	Comb.tot.	Loads
1375.00	300.09	494.00	976.69	163.94	1621.59	417.90
1265.00	300.09	494.00	981.95	163.94	1626.80	415.10
1155.00	300.09	494.00	996.11	163.94	1640.85	406.58
1045.00	300.09	494.00	1019.35	163.94	1663.91	392.47

.	935.00	300.09	494.00	1051.87	163.94	1696.17	372.89
.	825.00	300.09	494.00	1093.67	163.94	1737.63	347.83
.	715.00	300.09	494.00	1144.74	163.94	1788.30	317.30
.	605.00	300.09	494.00	1205.09	163.94	1848.17	281.29
.	495.00	300.09	494.00	1274.72	163.94	1917.24	239.81
.	385.00	300.09	494.00	1353.62	163.94	1995.51	192.86
.	360.00	300.09	494.00	1372.85	163.94	2014.58	181.43
.	250.00	300.09	494.00	1322.65	163.94	1966.04	128.40
.	235.00	300.09	494.00	1335.80	163.94	1979.09	120.62
.	150.00	300.09	494.00	1270.68	163.94	1915.68	74.98
.	125.00	300.09	494.00	1294.83	163.94	1939.67	60.74
.	110.00	300.09	494.00	1309.56	163.94	1954.29	52.06

-----							
.   BOW HEIGHT							
-----							
.		MOMENT	INITIAL		MOMENT	FINAL	
-----							
.		self-weight	prestress	TOTAL.	PERM.+s-weight	VARIABLE	TOTAL
-----							

. -1.9963E+00 3.7064E+00 1.7101E+00 8.0179E-02 -9.6945E-01 -7.5297E-01  
 . Kvisc= 2.7  
 Length/Bow Ist.= 3092.408 >=1000 Length/Bow inf.= 25781.07 >=500

\*\*\* BENDING ULTIMATE LIMIT STATES

-----									
.	DISTANCE	ELONG%.	ELONG%.	ELONG%.	ELONG%.	ELONG%.	DIST n-n	Mr/Md	
.		PRECAST	STRANDS	p.concr.	BARS SUP.	BARS INF.	SUP.BORDER	>1	
-----									

.Md = 1.4 \* Mpp + 1.4 \* Mper + 1.5 \* Mvar

.	1375.000	1.263	19.144	3.500	0.652	14.503	10.335	1.110
.	1265.000	1.262	19.144	3.500	0.651	14.504	10.324	1.116
.	1155.000	1.258	19.144	3.500	0.647	14.505	10.292	1.137
.	1045.000	1.251	19.144	3.500	0.640	14.508	10.239	1.173
.	935.000	1.241	19.144	3.500	0.631	14.512	10.164	1.229
.	825.000	1.229	19.144	3.500	0.619	14.517	10.068	1.309
.	715.000	1.234	19.000	3.500	0.629	14.371	10.203	1.446
.	605.000	1.216	19.000	3.500	0.612	14.378	10.063	1.616
.	495.000	1.212	18.853	3.500	0.612	14.267	10.101	1.897
.	385.000	1.203	18.704	3.500	0.607	14.174	10.090	2.349
.	360.000	1.195	18.703	3.500	0.599	14.188	10.025	2.484
.	250.000	1.182	18.706	3.500	0.588	14.149	9.945	3.474
.	235.000	1.177	18.706	3.500	0.583	14.159	9.900	3.680
.	150.000	1.168	18.710	3.500	0.576	14.109	9.864	5.819
.	125.000	1.180	18.565	3.500	0.592	13.975	10.041	7.151
.	110.000	1.174	18.563	3.500	0.587	13.987	9.991	8.210

\*\*\* Geometric mechanical properties sections with steel

SEC. dist.	Area	Dist.Bar.	Mom.In.	Mod.Res.	Mod.Res.	Mod.Res.
support	A	Dbi	J n-n	Wi	Ws	Wsc
1375.00	7.567E+03	8.972E+01	2.102E+07	2.343E+05	4.642E+05	3.220E+05
1265.00	7.565E+03	8.973E+01	2.101E+07	2.341E+05	4.641E+05	3.219E+05
1155.00	7.564E+03	8.974E+01	2.101E+07	2.341E+05	4.641E+05	3.219E+05
1045.00	7.564E+03	8.974E+01	2.101E+07	2.341E+05	4.641E+05	3.219E+05
935.00	7.564E+03	8.974E+01	2.101E+07	2.341E+05	4.641E+05	3.219E+05
825.00	7.564E+03	8.974E+01	2.101E+07	2.341E+05	4.641E+05	3.219E+05
715.00	7.564E+03	8.974E+01	2.101E+07	2.341E+05	4.641E+05	3.219E+05
605.00	7.564E+03	8.974E+01	2.101E+07	2.341E+05	4.641E+05	3.219E+05
495.00	7.564E+03	8.974E+01	2.101E+07	2.341E+05	4.641E+05	3.219E+05
385.00	7.564E+03	8.974E+01	2.101E+07	2.341E+05	4.641E+05	3.219E+05
360.00	7.564E+03	8.974E+01	2.101E+07	2.341E+05	4.641E+05	3.219E+05
250.00	7.548E+03	8.987E+01	2.095E+07	2.331E+05	4.642E+05	3.216E+05
235.00	7.548E+03	8.987E+01	2.095E+07	2.331E+05	4.642E+05	3.216E+05
150.00	7.539E+03	9.005E+01	2.090E+07	2.321E+05	4.650E+05	3.218E+05
125.00	7.539E+03	9.005E+01	2.090E+07	2.321E+05	4.649E+05	3.218E+05
110.00	7.539E+03	9.004E+01	2.090E+07	2.321E+05	4.649E+05	3.217E+05

\*\*\* SHEAR ULTIMATE LIMIT STATES

in SUPPORT (simple reinforced concrete)  
.Vsd (shear design) = 77708.03                      Vrd1 (concrete)= 19116.4  
.Vrd2 (crushing) = 171596.6                      SPREAD STIRRUPS = 19.96424  
.STIRRUPS TOTAL/ML = 26.71248                      loops place concr/ML = .6863229

.BARS SUPPORT (BENDS+LOOPS)                      14.97776 shear from head      cm 15  
.STRESS BARS inferior Td/As                      1136.518

.FIRST PRECOMPRESSED SECTION                      120                      from support

.Vsd (shear design) = 70851.45                      Vrd1 (concrete)= 40824.24  
.Vrd2 (crushing) = 183649.9                      TOTAL STIRRUPS/ML = 7.299263  
LOOPS place concr /ML = .8625622

.T\_RCAEC2                      E-MAIL    studio@engisoft.org                      WEB    www.engisoft.org  
.ENGI-Newpage

**LENGTH**  
**2500 cm**

.T\_RCAEC2                    ENGISOFT-ing.F.PINARDI-DESENZANO(BS)       tel 030-9912152  
.DATE (mm-gg-aa)           09-12-2008  
.Prestressed concrete members pre-tensioned and bonded  
.EUROCODE 2-DESIGN OF STRUCTURES UNI ENV 1992-1-1:  
.General rules and rules for buildings Simple support Beam  
.     
.STANDARD GIRDERS  
.P MAX 2000  
.     
.   UNIT MEASURE  
.     
.   UNIT FORCE         : daN  
.   UNIT LENGTH       : cm  
.     
. \*     Exposure Class    XD3 \*  
.  3  - Corrosion induced by chlorides  
.     Cyclic wet and dry  
.     
.     
. \* Relative Humidity\* 55 %  
.     
.     
.    Geometric mechanical properties.  
.     
.LOAD 1ø PHASE (Cast in place concrete)    6  
.LOAD 2ø PHASE (perm.)                       8  
.LOAD 2ø PHASE (var.)                        12  
.HEIGHT Cast in place concrete              20  
.Charact.Cubic Strength. in place concrete   300  
.WIDTH (Cast in place concrete)             120  
.DESIGN LENGHT                               2470  
.EFFECTIVE LENGHT                            2500  
.SUPERIOR CONVENTIONAL REINFORCING BARS     5  
.SUPERIOR BARS DISTANCE FORM SUP. BORDER   5  
.INFERIOR CONVENTIONAL REINFORCING BARS     8  
.INFERIOR BARS DISTANCE FORM INF. BORDER    6  
  
.CANTILEVER FINAL MOMENT                     15  
.MAX CANTILEVER TRANSPORT-HOISTING          150  
  
.MAX STRESS BARS CRACKING    (1600-4500)   2200  
.like previewed by UNI ENV 1992-1-1 table  4.11  
.     
.     
.     
.   Materials properties  
.     
.Rck=        550.00   Rckj=       400.00    Fck=        456.50    Fckj=       332.00  
.     
.Fctmf=      46.72    Fctk=       50.62    Fctmi=      37.78    Fctkj=      40.93  
.     
.Fyk=       4290.23   Ftk=       5387.73   Fpk=       18629.19   Fp1k=      16665.08  
.     
.Jack tension= 14018.27   losses % 1000H = 2.20    losses % 5000H = 2.80  
.     
.T\_RCAEC2                    E-MAIL   studio@engisoft.org        WEB   www.engisoft.org  
.ENGI-Newpage



.T\_RCAEC2                  ENGISOFT-ing.F.PINARDI-DESENZANO (BS)          tel 030-9912152

.  
.  
.                                  TRACING Prestressing steel 0.6" diam.  
.  
.  
.

.          1350+	
.          1000+	O 20
.          950+	O 19
.          900+	O 18
.          850+	O 17
.          800+	O 16
.          750+	O 15
.          700+	O 14
.          650+	* 13
.          600+	* 12
.          550+	* 11
.          500+	* 10
.          450+	* 9
.          400+	* 8
.          350+	* 7
.          300+	* 6
.          250+	*** 5
.          200+	***** 4
.          150+	OOO*OOO 3
.          100+	OOOOOOOO 2
.          50+	1

.                      @@@	THEORETICAL BARYCENTRE.....	31
.                      @@@	EFFECTIVE BARYCENTRE .....	30.95238
.                      @@@	NUMBER OF Prest. steel.....	21
.                      TOTAL WEIGHT .....	DaN..	34889.75
.                      UNIT WEIGHT .....	DaN/cm	13.9559
.                      FILE STRUCTURE.....		bia63135
.                      FILE PRETENSION.....		bia63135

.T\_RCAEC2                  ENGISOFT-ing.F.PINARDI-DESENZANO (BS)          tel 030-9912152

BENDING verifications

INITIAL MOMENT						
STRESS MAX.=		CONCRETE .6*Fckj=		BARS .7*Ftk=		
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS sup	BENDING
1250.00	41.69	99.37	255.68	564.70	0.10	1.064E+07
1140.00	41.41	99.71	254.16	566.54	0.10	1.058E+07
1030.00	40.38	100.88	248.63	572.80	0.10	1.035E+07
920.00	38.59	102.91	239.03	583.65	0.10	9.951E+06
810.00	36.05	105.80	225.37	599.09	0.10	9.383E+06
700.00	32.75	109.55	207.65	619.12	0.10	8.646E+06
590.00	28.70	114.15	185.87	643.73	0.10	7.740E+06
480.00	23.89	119.62	160.03	672.94	0.10	6.665E+06
410.00	20.43	123.54	141.48	693.92	0.10	5.894E+06
300.00	16.73	114.94	118.83	645.01	0.10	4.543E+06
260.00	14.35	117.67	106.00	659.62	0.10	4.010E+06
150.00	9.60	110.07	77.69	616.01	1.31	2.428E+06
110.00	6.84	113.25	62.91	633.04	1.09	1.811E+06

HOISTING AND TRANSPORT						
STRESS MAX.=		CONCRETE .6*Fckj=		BARS .7*Ftk=		
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS sup	BENDING
1250.00	36.72	105.02	228.94	594.92	0.10	9.529E+06
1140.00	36.27	105.55	226.56	597.74	0.10	9.432E+06
1030.00	34.97	107.03	219.56	605.66	0.10	9.141E+06
920.00	32.80	109.50	207.89	618.85	0.10	8.655E+06
810.00	29.75	112.95	191.54	637.33	0.10	7.976E+06
700.00	25.84	117.40	170.53	661.08	0.10	7.102E+06
590.00	21.06	122.83	144.85	690.11	0.10	6.034E+06
480.00	15.41	129.25	114.49	724.42	0.10	4.771E+06
410.00	11.36	133.84	92.75	749.00	0.10	3.867E+06
300.00	6.63	126.50	64.56	706.84	0.10	2.287E+06
260.00	3.84	129.69	49.58	723.91	0.10	1.664E+06
150.00	-2.07	123.54	15.04	688.09	1.31	-1.806E+05
110.00	-1.70	123.11	17.05	685.78	1.09	-9.710E+04

rare load condition = Gk + Qk						
STRESS MAX.=		CONCRETE 0.5*Fck=		BARS .7*Ftk=		
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS inf.	MOMENT
1250.00	96.01	-14.40	457.27	-47.20	0.23	3.047E+07



.	1140.00	95.20	-13.24	453.63	-41.87	0.10	3.023E+07
.	1030.00	92.80	-9.75	442.74	-25.84	0.10	2.950E+07
.	920.00	88.79	-3.94	424.59	0.88	0.10	2.830E+07
.	810.00	83.17	4.19	399.19	38.29	0.10	2.660E+07
.	700.00	75.95	14.64	366.53	86.39	0.10	2.443E+07
.	590.00	67.13	27.42	326.61	145.17	0.10	2.177E+07
.	480.00	56.70	42.52	279.44	214.65	0.10	1.863E+07
.	410.00	49.23	53.34	245.64	264.42	0.10	1.637E+07
.	300.00	38.19	58.18	193.69	285.03	0.10	1.244E+07
.	260.00	33.05	65.66	170.42	319.44	0.10	1.089E+07
.	150.00	19.78	73.76	108.37	355.02	0.10	6.298E+06
.	110.00	13.86	82.43	81.59	394.90	0.10	4.508E+06

-----

| DISTANCE |first PHASE(place concrete+løper.)|

-----

	STRESS SUP.	STRESS INF.	MOMENT	
.	1.2500E+03	6.3137E+01	5.1389E+01	1.5219E+07
.	1.1400E+03	6.2591E+01	5.2046E+01	1.5098E+07
.	1.0300E+03	6.0967E+01	5.3965E+01	1.4736E+07
.	9.2000E+02	5.8260E+01	5.7162E+01	1.4132E+07
.	8.1000E+02	5.4470E+01	6.1638E+01	1.3287E+07
.	7.0000E+02	4.9597E+01	6.7394E+01	1.2200E+07
.	5.9000E+02	4.3642E+01	7.4428E+01	1.0872E+07
.	4.8000E+02	3.6603E+01	8.2742E+01	9.3027E+06
.	4.1000E+02	3.1560E+01	8.8698E+01	8.1782E+06
.	3.0000E+02	2.4775E+01	8.5166E+01	6.2135E+06
.	2.6000E+02	2.1302E+01	8.9283E+01	5.4392E+06
.	1.5000E+02	1.3000E+01	8.7479E+01	3.1453E+06
.	1.1000E+02	9.0043E+00	9.2246E+01	2.2513E+06

-----

| DISTANCE |second PHASE (2øper+var.)|

-----

	STRESS SUP.	STRESS INF.	St.place concr.	MOMENT	
.	1.2500E+03	3.2871E+01	-6.5784E+01	3.5071E+01	1.5252E+07
.	1.1400E+03	3.2612E+01	-6.5282E+01	3.4796E+01	1.5131E+07
.	1.0300E+03	3.1829E+01	-6.3716E+01	3.3962E+01	1.4768E+07
.	9.2000E+02	3.0526E+01	-6.1106E+01	3.2570E+01	1.4163E+07
.	8.1000E+02	2.8700E+01	-5.7452E+01	3.0623E+01	1.3316E+07
.	7.0000E+02	2.6353E+01	-5.2753E+01	2.8118E+01	1.2227E+07
.	5.9000E+02	2.3484E+01	-4.7011E+01	2.5057E+01	1.0896E+07
.	4.8000E+02	2.0094E+01	-4.0224E+01	2.1440E+01	9.3233E+06
.	4.1000E+02	1.7665E+01	-3.5362E+01	1.8848E+01	8.1963E+06
.	3.0000E+02	1.3420E+01	-2.6981E+01	1.4332E+01	6.2273E+06
.	2.6000E+02	1.1747E+01	-2.3619E+01	1.2546E+01	5.4513E+06
.	1.5000E+02	6.7844E+00	-1.3715E+01	7.2535E+00	3.1523E+06
.	1.1000E+02	4.8570E+00	-9.8170E+00	5.1927E+00	2.2563E+06

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-----
.|          | quasi-permanent load = Gk + Qk * .6 |
-----
.|          |          CONCRETE          |          |
..|STRESS MAX.= .4 *Fck= 182.6
-----
.|  DISTANCE  |  STRESS  |  STRESS  |  MOMENT  |  STRANDS |
.|          |  SUP.    |  INF.    |          |  APPLIED |
-----
.  1250.00    88.12    1.39     2.681E+07  21
.  1140.00    87.38    2.43     2.660E+07  21
.  1030.00    85.16    5.54     2.596E+07  21
.   920.00    81.46   10.72     2.490E+07  21
.   810.00    76.28   17.98     2.341E+07  21
.   700.00    69.63   27.30     2.149E+07  21
.   590.00    61.49   38.70     1.915E+07  21
.   480.00    51.87   52.17     1.639E+07  21
.   410.00    44.99   61.82     1.441E+07  21
.   300.00    34.97   64.66     1.095E+07  19
.   260.00    30.23   71.33     9.582E+06  19
.   150.00    18.16   77.06     5.541E+06  17
.   110.00    12.70   84.79     3.966E+06  17
-----
.|  DISTANCE  |first PHASE(place concrete+løper.)|
-----
.|          |  STRESS SUP. |  STRESS INF. |  MOMENT  |
-----
.  1.2500E+03  6.3137E+01  5.1389E+01  1.5219E+07
.  1.1400E+03  6.2591E+01  5.2046E+01  1.5098E+07
.  1.0300E+03  6.0967E+01  5.3965E+01  1.4736E+07
.  9.2000E+02  5.8260E+01  5.7162E+01  1.4132E+07
.  8.1000E+02  5.4470E+01  6.1638E+01  1.3287E+07
.  7.0000E+02  4.9597E+01  6.7394E+01  1.2200E+07
.  5.9000E+02  4.3642E+01  7.4428E+01  1.0872E+07
.  4.8000E+02  3.6603E+01  8.2742E+01  9.3027E+06
.  4.1000E+02  3.1560E+01  8.8698E+01  8.1782E+06
.  3.0000E+02  2.4775E+01  8.5166E+01  6.2135E+06
.  2.6000E+02  2.1302E+01  8.9283E+01  5.4392E+06
.  1.5000E+02  1.3000E+01  8.7479E+01  3.1453E+06
.  1.1000E+02  9.0043E+00  9.2246E+01  2.2513E+06
.
-----
.|  DISTANCE  |second PHASE (2øper+var.)|
-----
.|          |  STRESS SUP. |  STRESS INF. | St.place concr. |  MOMENT  |
-----
.  1.2500E+03  2.4982E+01 -4.9996E+01  2.6654E+01  1.1592E+07
.  1.1400E+03  2.4785E+01 -4.9614E+01  2.6445E+01  1.1500E+07
.  1.0300E+03  2.4190E+01 -4.8424E+01  2.5811E+01  1.1224E+07
.  9.2000E+02  2.3199E+01 -4.6440E+01  2.4754E+01  1.0764E+07
.  8.1000E+02  2.1812E+01 -4.3663E+01  2.3273E+01  1.0120E+07
.  7.0000E+02  2.0028E+01 -4.0092E+01  2.1370E+01  9.2927E+06
.  5.9000E+02  1.7848E+01 -3.5728E+01  1.9044E+01  8.2812E+06
.  4.8000E+02  1.5271E+01 -3.0570E+01  1.6295E+01  7.0857E+06
.  4.1000E+02  1.3425E+01 -2.6875E+01  1.4325E+01  6.2292E+06
.  3.0000E+02  1.0199E+01 -2.0506E+01  1.0892E+01  4.7327E+06
.  2.6000E+02  8.9281E+00 -1.7951E+01  9.5347E+00  4.1430E+06
.  1.5000E+02  5.1561E+00 -1.0424E+01  5.5127E+00  2.3957E+06
.  1.1000E+02  3.6913E+00 -7.4609E+00  3.9464E+00  1.7148E+06

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-----
.| CRACKING VERIFICATION                               Exposure Class   XD3
-----
. Decompression: COMPRESSED SECTION LEVEL (Respect bottom )
-----
.| DISTANCE      |          TRANSPORT          |          MOMENT FINAL      |
-----
.|              | LEVEL SUP. | LEVEL INF. | LEVEL SUP. | LEVEL INF. |
-----
.      1250.00    135.00      0.00        135.00      17.60
.      1140.00    135.00      0.00        135.00      16.48
.      1030.00    135.00      0.00        135.00      12.84
.      920.00     135.00      0.00        135.00       5.74
.      810.00     135.00      0.00        135.00       0.00
.      700.00     135.00      0.00        135.00       0.00
.      590.00     135.00      0.00        135.00       0.00
.      480.00     135.00      0.00        135.00       0.00
.      410.00     135.00      0.00        135.00       0.00
.      300.00     135.00      0.00        135.00       0.00
.      260.00     135.00      0.00        135.00       0.00
.      150.00     132.77      0.00        135.00       0.00
.      110.00     133.16      0.00        135.00       0.00

```

. PRESTRESSING STEEL MUST REMAIN FOR 2.5 cm  
INSIDE COMPRESSED ZONE  
SATISFIED VERIFICATION

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-----
.| VERIFICATION      STRESS      BARS      FOR      CRACKING      |
-----
.|              |          TRANSPORT          |          MOMENT FINAL      |
-----
.|DISTANCE  |BORDER  AREA      AREA  STRESS |LEMBO  AREA      AREA  STRESS
|
.|DISTANCE  |          MIN.      EFFECT.      |          MIN.      EFFECT.
-----
.      1250.00  SEC.COMPRESSED                INF.      0.10      0.23  2116.91
.      1140.00  SEC.COMPRESSED                SEC.COMPRESSED
.      1030.00  SEC.COMPRESSED                SEC.COMPRESSED
.      920.00   SEC.COMPRESSED                SEC.COMPRESSED
.      810.00   SEC.COMPRESSED                SEC.COMPRESSED
.      700.00   SEC.COMPRESSED                SEC.COMPRESSED
.      590.00   SEC.COMPRESSED                SEC.COMPRESSED
.      480.00   SEC.COMPRESSED                SEC.COMPRESSED
.      410.00   SEC.COMPRESSED                SEC.COMPRESSED
.      300.00   SEC.COMPRESSED                SEC.COMPRESSED
.      260.00   SEC.COMPRESSED                SEC.COMPRESSED
.      150.00  SUP.      0.52      1.31  1931.86  SEC.COMPRESSED
.      110.00  SUP.      0.43      1.09  1937.20  SEC.COMPRESSED

```

. see Table 4.11 and 4.12 point 4.4.2.3 EC2

PRESTRESSING		STEEL					
DISTANCE	MOMENT	INITIAL	RARE	LOAD	CONDITION		
	STRESS var.	bar.Strands	STRESS var.	bar.Str.	Dbi Str.	N.Str.	
1250.00	13403.04	90.96	11472.28	29.01	30.95	21	
1140.00	13401.31	91.17	11470.88	29.71	30.95	21	
1030.00	13395.53	91.88	11466.71	31.81	30.95	21	
920.00	13385.51	93.10	11459.74	35.30	30.95	21	
810.00	13371.25	94.83	11450.00	40.19	30.95	21	
700.00	13352.76	97.08	11437.47	46.47	30.95	21	
590.00	13330.02	99.85	11422.15	54.15	30.95	21	
480.00	13303.04	103.13	11404.05	63.22	30.95	21	
410.00	13283.67	105.49	11391.09	69.72	30.95	21	
300.00	13332.79	97.04	11378.80	69.57	32.11	19	
260.00	13319.08	98.68	11369.21	74.08	32.11	19	
150.00	13361.77	90.86	11349.55	75.80	33.53	17	
110.00	13345.46	92.77	11337.53	81.04	33.53	17	

PRESTRESSING		LOSSES				
DISTANCE	Immediate	shrinkage	creep	relaxation	Comb.tot.	Loads
1250.00	300.09	494.00	837.00	163.94	1485.09	342.83
1140.00	300.09	494.00	841.87	163.94	1489.94	339.81
1030.00	300.09	494.00	855.82	163.94	1503.79	331.23
920.00	300.09	494.00	879.03	163.94	1526.85	317.21
810.00	300.09	494.00	911.50	163.94	1559.11	297.74
700.00	300.09	494.00	953.25	163.94	1600.58	272.83
590.00	300.09	494.00	1004.25	163.94	1651.25	242.49
480.00	300.09	494.00	1064.53	163.94	1711.13	206.70
410.00	300.09	494.00	1107.71	163.94	1754.02	181.09
300.00	300.09	494.00	1044.38	163.94	1692.18	137.08
260.00	300.09	494.00	1074.37	163.94	1721.98	119.39
150.00	300.09	494.00	1022.39	163.94	1671.37	67.36
110.00	300.09	494.00	1057.31	163.94	1706.10	46.86

BOW HEIGHT							
MOMENT		INITIAL			MOMENT		FINAL
self-weight	prestress	TOTAL.	PERM.+s-weight	VARIABLE	TOTAL		
-1.3656E+00	2.5637E+00	1.1982E+00	7.8636E-02	-6.6371E-01	-4.5140E-01		
Kvisc= 2.7							
Length/Bow Ist.= 4272.94 >=1000 Length/Bow inf.= 280253.3 >=500							

\*\*\* BENDING ULTIMATE LIMIT STATES

DISTANCE	ELONG%. PRECAST	ELONG%. STRANDS	ELONG%. p.concr.	ELONG%. BARS SUP.	ELONG%. BARS INF.	DIST n-n SUP.BORDER	Mr/Md >1
Md = 1.4 * Mpp + 1.4 * Mper + 1.5 * Mvar							
1250.000	0.962	20.000	3.325	0.327	15.406	7.581	1.120
1140.000	0.960	20.000	3.325	0.326	15.406	7.570	1.128
1030.000	0.956	20.000	3.325	0.322	15.408	7.539	1.153
920.000	0.949	20.000	3.325	0.315	15.412	7.486	1.199
810.000	0.970	20.000	3.360	0.335	15.418	7.633	1.295
700.000	0.957	20.000	3.360	0.322	15.424	7.539	1.403
590.000	0.942	20.000	3.360	0.307	15.431	7.423	1.563
480.000	0.954	20.000	3.395	0.319	15.442	7.507	1.848
410.000	0.941	20.000	3.395	0.306	15.448	7.409	2.090
300.000	0.924	20.000	3.395	0.290	15.453	7.281	2.730
260.000	0.945	20.000	3.430	0.310	15.460	7.434	3.168
150.000	0.924	20.000	3.430	0.289	15.469	7.274	5.436
110.000	0.914	20.000	3.430	0.279	15.475	7.194	7.555

\*\*\* Geometric mechanical properties sections with steel

SEC. dist.	Area	Dist.Bar.	Mom.In.	Mod.Res.	Mod.Res.	Mod.Res.
support	A	Dbi	J n-n	Wi	Ws	Wsc
1250.00	7.532E+03	9.002E+01	2.087E+07	2.319E+05	4.640E+05	3.212E+05
1140.00	7.531E+03	9.003E+01	2.087E+07	2.318E+05	4.640E+05	3.212E+05
1030.00	7.531E+03	9.003E+01	2.087E+07	2.318E+05	4.640E+05	3.212E+05
920.00	7.531E+03	9.003E+01	2.087E+07	2.318E+05	4.640E+05	3.212E+05
810.00	7.531E+03	9.003E+01	2.087E+07	2.318E+05	4.640E+05	3.212E+05
700.00	7.531E+03	9.003E+01	2.087E+07	2.318E+05	4.640E+05	3.212E+05
590.00	7.531E+03	9.003E+01	2.087E+07	2.318E+05	4.640E+05	3.212E+05
480.00	7.531E+03	9.003E+01	2.087E+07	2.318E+05	4.640E+05	3.212E+05
410.00	7.531E+03	9.003E+01	2.087E+07	2.318E+05	4.640E+05	3.212E+05
300.00	7.514E+03	9.016E+01	2.081E+07	2.308E+05	4.640E+05	3.209E+05
260.00	7.514E+03	9.016E+01	2.081E+07	2.308E+05	4.640E+05	3.209E+05
150.00	7.504E+03	9.032E+01	2.076E+07	2.298E+05	4.646E+05	3.210E+05
110.00	7.503E+03	9.032E+01	2.076E+07	2.298E+05	4.645E+05	3.209E+05

\*\*\* SHEAR ULTIMATE LIMIT STATES

in SUPPORT (simple reinforced concrete)  
.Vsd (shear design) = 70565.75      Vrd1 (concrete)= 18461.65  
.Vrd2 (crushing) = 171596.6      SPREAD STIRRUPS = 16.23828  
.STIRRUPS TOTAL/ML = 22.45003      loops place concr/ML = .6461704

.BARS SUPPORT (BENDS+LOOPS)      14.18408 shear from head      cm 15  
.STRESS BARS inferior Td/As      1243.135

.FIRST PRECOMPRESSED SECTION      120      from support

.Vsd (shear design) = 63709.16      Vrd1 (concrete)= 35784.92  
.Vrd2 (crushing) = 183649.9      TOTAL STIRRUPS/ML = 6.656815  
LOOPS place concr /ML = .7824763  
.T\_RCAEC2      E-MAIL studio@engisoft.org      WEB www.engisoft.org