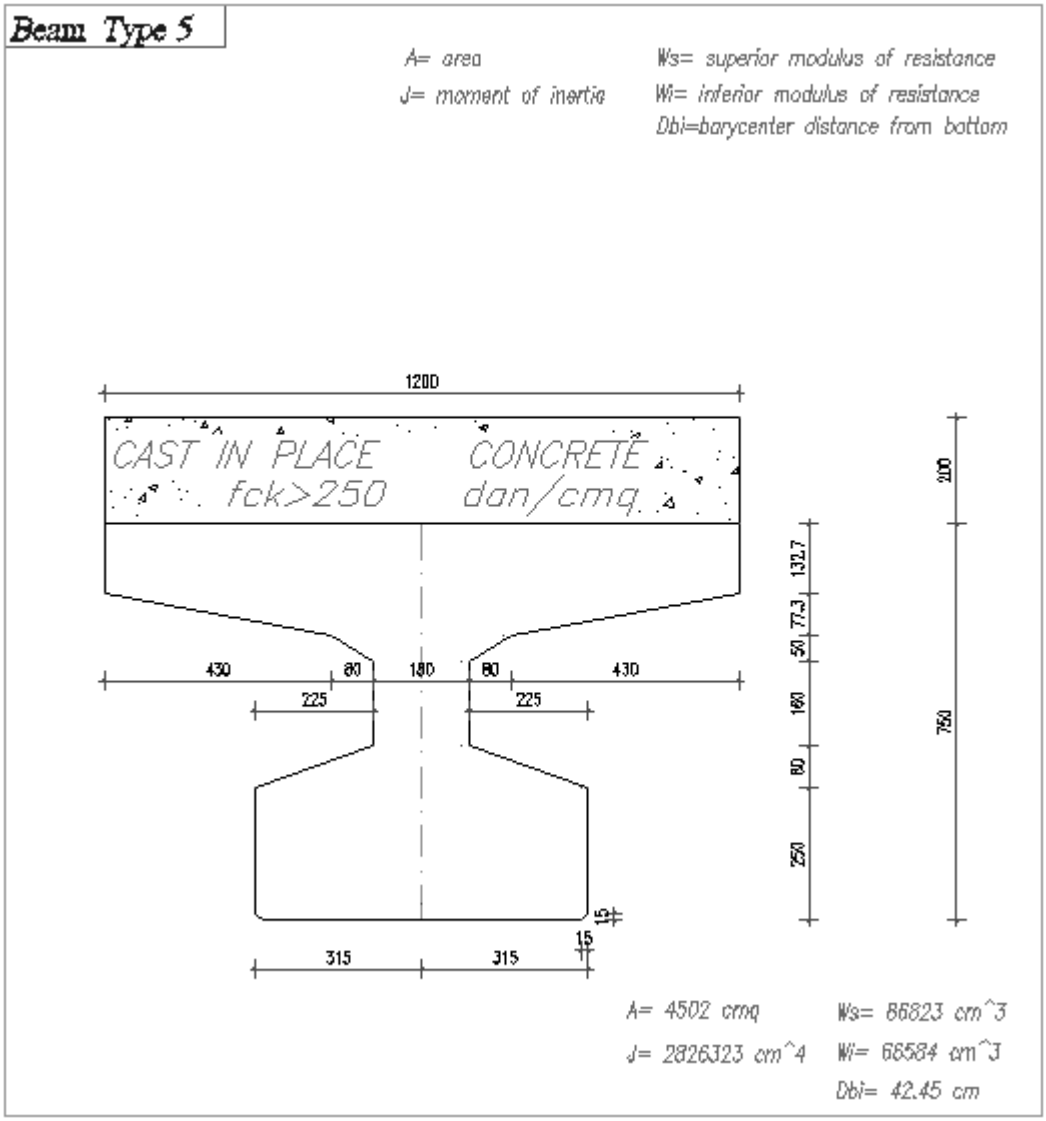

LENGTH 1350-1500-1650 cm
LOADS :Variable 800+ Permanent 1200 = 2000 Dan/ml
Cast in place concrete and self-weigth excluded

LENGTH
1650 cm

```
..T_RCAEC2            ENGISOFT-ing.F.PINARDI-DESENZANO(BS)     tel 030-9912152
.DATE (mm-gg-aa)    09-24-2008
..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
.HEIGTH Cast in place concrete              20
.Charact.Cubic Strength. in place concrete  300
.WIDTH (Cast in place concrete)             120
.DESIGN LENGHT                              1620
.EFFECTIVE LENGHT                           1650
.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          100

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


.
.
.
.       750+
.      1000+       O 20
.       950+       O 19
.       900+       O 18
.       850+       O 17
.       800+       O 16
.       750+       O 15
.       700+       O 14
.       650+       O 13
.       600+       O 12
.       550+       O 11
.       500+       O 10
.       450+       O 9
.       400+       O 8
.       350+       O 7
.       300+       O 6
.       250+      OOO 5
.       200+   OOO***OOO 4
.       150+   ********* 3
.       100+   OOO***OOO 2
.        50+        1
.
.
.           @@@  THEORETICAL BARYCENTRE.......     15
.           @@@  EFFECTIVE BARYCENTRE  .......     15
.           @@@  NUMBER OF Prest. steel.......     15
.
.           TOTAL WEIGHT ..............DaN..     18572.24
.           UNIT WEIGHT ..............DaN/cm     11.2559
.           FILE STRUCTURE...................    bia6375
.           FILE PRETENSION..................    bia63135
.T_RCAEC2            ENGISOFT-ing.F.PINARDI-DESENZANO(BS)     tel 030-9912152
.
```

BENDING verifications

INITIAL MOMENT

STRESS MAX.=	.6*Fckj= 199.20		.7*Ftk= 3771.41		
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS sup	BENDING
825.00	17.39	114.06	139.03	620.21	0.10	3.691E+06
715.00	16.83	114.73	136.25	623.57	0.10	3.642E+06
605.00	14.73	117.26	125.80	636.14	0.10	3.456E+06
495.00	11.09	121.63	107.69	657.95	0.10	3.134E+06
385.00	5.89	127.87	81.82	689.00	0.57	2.676E+06
360.00	4.49	129.55	74.82	697.36	1.04	2.553E+06
250.00	2.47	115.48	58.37	620.89	2.21	1.928E+06
235.00	1.38	116.80	52.94	627.48	2.65	1.832E+06
125.00	-4.39	106.98	17.68	572.10	6.58	1.052E+06
110.00	-5.71	108.61	11.16	580.22	7.56	9.348E+05
100.00	-6.60	109.72	6.75	585.73	8.23	8.554E+05

HOISTING AND TRANSPORT

STRESS MAX.=	.6*Fckj= 199.20		.7*Ftk= 3771.41		
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS sup	BENDING
825.00	13.39	118.87	119.11	644.19	0.10	3.337E+06
715.00	12.50	119.94	114.71	649.49	0.10	3.259E+06
605.00	9.85	123.13	101.49	665.41	0.10	3.024E+06
495.00	5.42	128.46	79.46	691.93	0.10	2.632E+06
385.00	-0.79	135.92	48.57	729.07	0.57	2.084E+06
360.00	-2.45	137.91	40.29	738.99	1.04	1.938E+06
250.00	-5.77	125.53	17.41	671.00	2.21	1.197E+06
235.00	-7.05	127.09	11.06	678.77	2.65	1.084E+06
125.00	-14.32	119.31	-31.55	633.59	6.58	1.658E+05
110.00	-15.84	121.21	-39.09	643.11	7.56	2.848E+04
100.00	-16.87	122.50	-44.19	649.55	8.23	-6.472E+04

rare load condition = Gk + Qk

STRESS MAX.=	0.5*Fck=228.25		.7*Ftk=3771.41		
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS inf.	MOMENT
825.00	70.00	-7.63	322.46	-7.07	0.10	1.222E+07
715.00	68.36	-5.17	315.68	3.56	0.10	1.200E+07
605.00	63.46	2.21	295.37	35.37	0.10	1.132E+07
495.00	55.29	14.50	261.50	88.36	0.10	1.019E+07
385.00	43.80	31.71	213.90	162.55	0.10	8.615E+06
360.00	40.71	36.31	201.06	182.40	0.10	8.194E+06

```
.    250.00     28.83     44.51    148.60    215.18    0.10    6.063E+06
.    235.00     26.44     48.13    138.70    230.81    0.10    5.737E+06
.    125.00      9.27     63.41     64.09    293.89    0.10    3.094E+06
.    110.00      6.40     67.88     52.21    313.22    0.10    2.699E+06
.    100.00      4.45     70.92     44.18    326.33    0.10    2.430E+06
.-------------------------------------------------
.| DISTANCE   |first PHASE(place concrete+1øper.)|
.-------------------------------------------------
.|           | STRESS SUP. | STRESS INF.|  MOMENT    |
.-------------------------------------------------
.  8.2500E+02  4.4015E+01  5.7841E+01  5.6608E+06
.  7.1500E+02  4.2859E+01  5.9099E+01  5.5564E+06
.  6.0500E+02  3.9393E+01  6.2854E+01  5.2432E+06
.  4.9500E+02  3.3618E+01  6.9103E+01  4.7212E+06
.  3.8500E+02  2.5497E+01  7.7861E+01  3.9904E+06
.  3.6000E+02  2.3306E+01  8.0208E+01  3.7952E+06
.  2.5000E+02  1.5961E+01  7.7201E+01  2.8082E+06
.  2.3500E+02  1.4267E+01  7.9069E+01  2.6574E+06
.  1.2500E+02  2.7339E+00  8.0202E+01  1.4331E+06
.  1.1000E+02  6.9685E-01  8.2530E+01  1.2500E+06
.  1.0000E+02 -6.8015E-01  8.4107E+01  1.1257E+06
.
.-------------------------------------------------------------------------
.| DISTANCE   |second PHASE (2øper+var.)|                          |
.-------------------------------------------------------------------------
.|           | STRESS SUP. |STRESS INF|St.place concr.|  MOMENT    |
.-------------------------------------------------------------------------
.  8.2500E+02  2.5980E+01 -6.5472E+01  3.7199E+01  6.5610E+06
.  7.1500E+02  2.5501E+01 -6.4265E+01  3.6513E+01  6.4400E+06
.  6.0500E+02  2.4064E+01 -6.0643E+01  3.4455E+01  6.0770E+06
.  4.9500E+02  2.1668E+01 -5.4605E+01  3.1025E+01  5.4720E+06
.  3.8500E+02  1.8307E+01 -4.6153E+01  2.6216E+01  4.6250E+06
.  3.6000E+02  1.7405E+01 -4.3895E+01  2.4927E+01  4.3988E+06
.  2.5000E+02  1.2864E+01 -3.2692E+01  1.8473E+01  3.2548E+06
.  2.3500E+02  1.2169E+01 -3.0937E+01  1.7477E+01  3.0800E+06
.  1.2500E+02  6.5406E+00 -1.6794E+01  9.4261E+00  1.6610E+06
.  1.1000E+02  5.7001E+00 -1.4647E+01  8.2172E+00  1.4488E+06
.  1.0000E+02  5.1307E+00 -1.3191E+01  7.3977E+00  1.3048E+06
.
.-------------------------------------------------------------------------
.|           | quasi-permanent load =  Gk + Qk * .6 |
.-------------------------------------------------------------------------
.|           |               CONCRETE     |             |
..|STRESS MAX.= .4 *Fck= 182.6
.-------------------------------------------------
.|  DISTANCE  |  STRESS |  STRESS |  MOMENT |  STRANDS|
.|            |   SUP.  |   INF.  |         |  APPLIED|
.-------------------------------------------------
.    825.00     63.76      8.08    1.065E+07  15
.    715.00     62.24     10.26    1.045E+07  15
.    605.00     57.68     16.77    9.862E+06  15
.    495.00     50.09     27.60    8.880E+06  15
.    385.00     39.41     42.79    7.505E+06  15
.    360.00     36.53     46.85    7.138E+06  15
.    250.00     25.74     52.35    5.282E+06  13
.    235.00     23.52     55.56    4.998E+06  13
.    125.00      7.70     67.44    2.695E+06  11
.    110.00      5.03     71.40    2.351E+06  11
.    100.00      3.22     74.08    2.117E+06  11
```

DISTANCE	first PHASE(place concrete+1øper.)		
	STRESS SUP.	STRESS INF.	MOMENT
8.2500E+02	4.4015E+01	5.7841E+01	5.6608E+06
7.1500E+02	4.2859E+01	5.9099E+01	5.5564E+06
6.0500E+02	3.9393E+01	6.2854E+01	5.2432E+06
4.9500E+02	3.3618E+01	6.9103E+01	4.7212E+06
3.8500E+02	2.5497E+01	7.7861E+01	3.9904E+06
3.6000E+02	2.3306E+01	8.0208E+01	3.7952E+06
2.5000E+02	1.5961E+01	7.7201E+01	2.8082E+06
2.3500E+02	1.4267E+01	7.9069E+01	2.6574E+06
1.2500E+02	2.7339E+00	8.0202E+01	1.4331E+06
1.1000E+02	6.9685E-01	8.2530E+01	1.2500E+06
1.0000E+02	-6.8015E-01	8.4107E+01	1.1257E+06

DISTANCE	second PHASE (2øper+var.)			
	STRESS SUP.	STRESS INF	St.place concr.	MOMENT
8.2500E+02	1.9745E+01	-4.9759E+01	2.8271E+01	4.9864E+06
7.1500E+02	1.9381E+01	-4.8841E+01	2.7750E+01	4.8944E+06
6.0500E+02	1.8288E+01	-4.6088E+01	2.6186E+01	4.6185E+06
4.9500E+02	1.6468E+01	-4.1500E+01	2.3579E+01	4.1587E+06
3.8500E+02	1.3913E+01	-3.5076E+01	1.9924E+01	3.5150E+06
3.6000E+02	1.3227E+01	-3.3360E+01	1.8944E+01	3.3431E+06
2.5000E+02	9.7769E+00	-2.4846E+01	1.4040E+01	2.4736E+06
2.3500E+02	9.2485E+00	-2.3512E+01	1.3282E+01	2.3408E+06
1.2500E+02	4.9708E+00	-1.2763E+01	7.1638E+00	1.2624E+06
1.1000E+02	4.3321E+00	-1.1132E+01	6.2451E+00	1.1011E+06
1.0000E+02	3.8993E+00	-1.0026E+01	5.6223E+00	9.9161E+05

CRACKING VERIFICATION Exposure Class XD3

Decompression: COMPRESSED SECTION LEVEL (Respect bottom)

DISTANCE	TRANSPORT		MOMENT FINAL	
	LEVEL SUP.	LEVEL INF.	LEVEL SUP.	LEVEL INF.
825.00	75.00	0.00	75.00	7.37
715.00	75.00	0.00	75.00	5.27
605.00	75.00	0.00	75.00	0.00
495.00	75.00	0.00	75.00	0.00
385.00	74.57	0.00	75.00	0.00
360.00	73.69	0.00	75.00	0.00
250.00	71.71	0.00	75.00	0.00
235.00	71.06	0.00	75.00	0.00
125.00	66.96	0.00	75.00	0.00
110.00	66.33	0.00	75.00	0.00
100.00	65.92	0.00	75.00	0.00

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

VERIFICATION STRESS BARS FOR CRACKING								
	TRANSPORT				MOMENT FINAL			
DISTANCE	BORDER	AREA MIN.	AREA EFFECT.	STRESS	LEMBO	AREA MIN.	AREA EFFECT.	STRESS
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	SUP.	0.23	0.57	2008.20	SEC.COMPRESSED			
360.00	SUP.	0.43	1.04	1991.39	SEC.COMPRESSED			
250.00	SUP.	0.90	2.21	1982.20	SEC.COMPRESSED			
235.00	SUP.	1.08	2.65	1980.90	SEC.COMPRESSED			
125.00	SUP.	2.64	6.58	1945.78	SEC.COMPRESSED			
110.00	SUP.	3.01	7.56	1927.08	SEC.COMPRESSED			
100.00	SUP.	3.28	8.23	1933.41	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.
825.00	13347.96	100.51	11164.38	29.52	15.00	15
715.00	13344.75	100.96	11144.04	31.32	15.00	15
605.00	13332.71	102.66	11081.30	36.70	15.00	15
495.00	13311.83	105.61	10976.18	45.66	15.00	15
385.00	13282.10	109.80	10828.63	58.19	15.00	15
360.00	13274.10	110.93	10789.16	61.54	15.00	15
250.00	13351.24	97.72	10996.29	61.18	15.77	13
235.00	13344.82	98.60	10965.02	63.79	15.77	13
125.00	13406.45	88.43	11088.11	69.04	15.91	11
110.00	13398.54	89.52	11049.60	72.25	15.91	11
100.00	13393.19	90.25	11023.47	74.42	15.91	11

PRESTRESSING LOSSES						
DISTANCE	Immediate	shrinkage	creep	relaxation	Comb.tot.	Loads
825.00	300.09	815.34	1294.86	163.94	2253.30	391.20
715.00	300.09	815.34	1310.99	163.94	2269.29	382.97
605.00	300.09	815.34	1359.06	163.94	2316.91	360.31
495.00	300.09	815.34	1439.06	163.94	2396.18	323.22
385.00	300.09	815.34	1551.01	163.94	2507.10	271.71
360.00	300.09	815.34	1580.91	163.94	2536.73	257.99
250.00	300.09	815.34	1439.82	163.94	2399.86	190.17
235.00	300.09	815.34	1463.20	163.94	2423.06	179.54

```
.    125.00    300.09    815.34   1382.02    163.94   2345.40     93.99
.    110.00    300.09    815.34   1410.74    163.94   2373.92     81.01
.    100.00    300.09    815.34   1430.22    163.94   2393.28     72.20
.
.
.-------------------------------------------------------------------------
.|                         BOW HEIGHT                                    |
.-------------------------------------------------------------------------
.|           MOMENT   INITIAL      |                 MOMENT  FINAL        |
.-------------------------------------------------------------------------
.| self-weight | prestress | TOTAL.|PERM.+s-weight | VARIABLE |  TOTAL    |
.-------------------------------------------------------------------------
.
. -9.5805E-01  2.3642E+00  1.4062E+00  4.4547E-01 -4.7733E-01  1.2126E+00
. Kvisc= 3.793463
Length/Bow Ist.= 51797.66  >=1000 Length/Bow inf.= 1077.891  >=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
.
.  825.000    0.579   14.939    3.500   -0.185    9.969    3.788    1.212
.  715.000    0.578   14.921    3.500   -0.185    9.960    3.785    1.236
.  605.000    0.592   14.795    3.500   -0.165    9.860    3.911    1.334
.  495.000    0.571   14.776    3.500   -0.188    9.894    3.763    1.461
.  385.000    0.575   14.603    3.500   -0.176    9.790    3.826    1.752
.  360.000    0.567   14.596    3.500   -0.185    9.803    3.771    1.832
.  250.000    0.565   14.634    3.500   -0.182    9.733    3.783    2.491
.  235.000    0.558   14.629    3.500   -0.188    9.743    3.739    2.620
.  125.000    0.540   14.651    3.500   -0.202    9.701    3.639    4.818
.  110.000    0.536   14.630    3.500   -0.206    9.698    3.612    5.508
.  100.000    0.537   14.596    3.500   -0.203    9.676    3.631    6.132
.
.
.***  Geometric mechanical properties sections with steel
.
.Perimeter 443.789           Equivalent area 20.29054      Min.Width 18
.
.SEC. dist.   Area      Dist.Bar.   Mom.In.   Mod.Res.   Mod.Res.   Mod.Res.
. support       A         Dbi        J n-n       Wi         Ws         Wsc
.   825.00  6.401E+03  5.369E+01  5.381E+06  1.002E+05  2.525E+05  1.303E+05
.   715.00  6.401E+03  5.369E+01  5.381E+06  1.002E+05  2.525E+05  1.303E+05
.   605.00  6.401E+03  5.369E+01  5.381E+06  1.002E+05  2.525E+05  1.303E+05
.   495.00  6.401E+03  5.369E+01  5.381E+06  1.002E+05  2.525E+05  1.303E+05
.   385.00  6.403E+03  5.370E+01  5.381E+06  1.002E+05  2.526E+05  1.303E+05
.   360.00  6.406E+03  5.371E+01  5.382E+06  1.002E+05  2.527E+05  1.303E+05
.   250.00  6.395E+03  5.382E+01  5.358E+06  9.956E+04  2.530E+05  1.301E+05
.   235.00  6.397E+03  5.383E+01  5.359E+06  9.956E+04  2.531E+05  1.302E+05
.   125.00  6.400E+03  5.398E+01  5.339E+06  9.891E+04  2.540E+05  1.301E+05
.   110.00  6.405E+03  5.399E+01  5.340E+06  9.891E+04  2.542E+05  1.302E+05
.   100.00  6.408E+03  5.400E+01  5.341E+06  9.891E+04  2.543E+05  1.303E+05
.
.
```

```
*** SHEAR ULTIMATE LIMIT STATES
.
.                in SUPPORT (simple reiforced concrete)
.Vsd (shear design) = 43220.19          Vrd1 (concrete)= 10354.44
.Vrd2 (crushing) = 98536.06          SPREAD STIRRUPS =         10.19441
.STIRRUPS TOTAL/ML      =      20.67574     loops place concr/ML =  .7355803
.
.
.BARS SUPPORT (BENDS+LOOPS)             8.345062 shear from head   cm 15
.STRESS BARS inferior Td/As            1141.066
.
.
.FIRST PRECOMPRESSED SECTION             90            from support
.
.Vsd (shear design) = 38417.95          Vrd1 (concrete)= 17235.01
.Vrd2 (crushing) = 109696.9          TOTAL STIRRUPS/ML     = 7.840144
 LOOPS place concr /ML = .9385801
.
.T_RCAEC2            E-MAIL  studio@engisoft.org     WEB  www.engisoft.org
.ENGI-Newpage
```

LENGTH
1500 cm

```
.
.T_RCAEC2            ENGISOFT-ing.F.PINARDI-DESENZANO(BS)     tel 030-9912152
.DATE (mm-gg-aa)    09-24-2008
..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
.HEIGTH Cast in place concrete              20
.Charact.Cubic Strength. in place concrete  300
.WIDTH (Cast in place concrete)             120
.DESIGN LENGHT                              1470
.EFFECTIVE LENGHT                           1500
.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          100

.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

TRACING Prestressing steel 0.6" diam.

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

@@@ THEORETICAL BARYCENTRE..... 14.5
@@@ EFFECTIVE BARYCENTRE 14.58333
@@@ NUMBER OF Prest. steel..... 12

TOTAL WEIGHT .....DaN.. 16883.85
UNIT WEIGHT .....DaN/cm 11.2559
FILE STRUCTURE..... bia6375
FILE PRETENSION..... bia63135

BENDING verifications

	INITIAL MOMENT					
	CONCRETE		BARS			
STRESS MAX.=	.6*Fckj= 199.20		.7*Ftk= 3771.41			
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS sup	BENDING
750.00	13.53	93.56	110.03	508.39	0.10	3.039E+06
640.00	12.97	94.24	107.24	511.81	0.10	2.990E+06
530.00	10.86	96.81	96.79	524.62	0.10	2.804E+06
420.00	7.21	101.27	78.66	546.82	0.10	2.482E+06
310.00	1.98	107.62	52.61	578.49	2.03	2.024E+06
210.00	1.11	91.54	41.64	491.78	3.22	1.489E+06
200.00	3.63	70.79	47.31	381.61	2.58	1.429E+06
110.00	-3.06	79.15	14.12	423.32	8.00	8.419E+05
100.00	-3.86	80.15	10.17	428.34	8.80	7.710E+05

	HOISTING AND TRANSPORT					
	CONCRETE		BARS			
STRESS MAX.=	.6*Fckj= 199.20		.7*Ftk= 3771.41			
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS sup	BENDING
750.00	9.34	98.67	89.23	533.87	0.10	2.670E+06
640.00	8.45	99.75	84.82	539.27	0.10	2.591E+06
530.00	5.79	103.00	71.59	555.48	0.10	2.357E+06
420.00	1.35	108.42	49.54	582.48	0.10	1.965E+06
310.00	-4.87	116.01	18.58	620.32	2.03	1.417E+06
210.00	-6.87	101.44	2.06	541.17	3.22	7.825E+05
200.00	-4.50	80.98	7.00	432.49	2.58	7.119E+05
110.00	-12.28	90.79	-31.53	481.53	8.00	1.877E+04
100.00	-13.20	91.97	-36.09	487.42	8.80	-6.472E+04

	rare load condition = Gk + Qk					
	CONCRETE		BARS			
STRESS MAX.=	0.5*Fck=228.25		.7*Ftk=3771.41			
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS inf.	MOMENT
750.00	56.74	-5.63	261.56	-3.21	0.10	1.006E+07
640.00	55.07	-2.91	254.71	8.59	0.10	9.838E+06
530.00	50.05	5.26	234.14	43.98	0.10	9.162E+06
420.00	41.85	17.86	200.24	98.42	0.10	8.035E+06
310.00	30.25	35.53	152.22	174.67	0.10	6.457E+06
210.00	20.87	38.99	109.81	186.77	0.10	4.631E+06
200.00	22.18	22.42	110.40	111.42	0.10	4.428E+06
110.00	7.31	46.86	49.50	217.36	0.10	2.433E+06
100.00	5.54	49.79	42.24	230.10	0.10	2.193E+06

```
.-------------------------------------------------
.| DISTANCE   |first PHASE(place concrete+1øper.)|
.-------------------------------------------------
.|           | STRESS SUP. | STRESS INF.|  MOMENT    |
.-------------------------------------------------
.  7.5000E+02  3.5354E+01  4.8768E+01  4.6610E+06
.  6.4000E+02  3.4162E+01  5.0272E+01  4.5566E+06
.  5.3000E+02  3.0585E+01  5.4786E+01  4.2434E+06
.  4.2000E+02  2.4779E+01  6.1300E+01  3.7215E+06
.  3.1000E+02  1.6549E+01  7.0439E+01  2.9907E+06
.  2.1000E+02  1.1051E+01  6.4200E+01  2.1451E+06
.  2.0000E+02  1.2787E+01  4.6683E+01  2.0511E+06
.  1.1000E+02  2.1780E+00  6.0189E+01  1.1270E+06
.  1.0000E+02  9.1553E-01  6.1810E+01  1.0157E+06
.
.-------------------------------------------------------------------------------
.| DISTANCE   |second PHASE (2øper+var.)|                            |
.-------------------------------------------------------------------------------
.|           | STRESS SUP. |STRESS INF|St.place concr.|  MOMENT    |
.-------------------------------------------------------------------------------
.  7.5000E+02  2.1383E+01 -5.4402E+01  3.0718E+01  5.4023E+06
.  6.4000E+02  2.0904E+01 -5.3184E+01  3.0030E+01  5.2813E+06
.  5.3000E+02  1.9467E+01 -4.9528E+01  2.7966E+01  4.9183E+06
.  4.2000E+02  1.7072E+01 -4.3436E+01  2.4525E+01  4.3133E+06
.  3.1000E+02  1.3698E+01 -3.4906E+01  1.9689E+01  3.4663E+06
.  2.1000E+02  9.8147E+00 -2.5206E+01  1.4146E+01  2.4863E+06
.  2.0000E+02  9.3890E+00 -2.4266E+01  1.3562E+01  2.3773E+06
.  1.1000E+02  5.1359E+00 -1.3333E+01  7.4304E+00  1.3063E+06
.  1.0000E+02  4.6256E+00 -1.2016E+01  6.6938E+00  1.1773E+06
.
.-------------------------------------------------------------------------------
.|           | quasi-permanent load =  Gk + Qk * .6 |
.-------------------------------------------------------------------------------
.|           |               CONCRETE     |             |
..|STRESS MAX.= .4 *Fck= 182.6
.-------------------------------------------------
.|  DISTANCE  |  STRESS |  STRESS |  MOMENT |  STRANDS|
.|            |   SUP.  |   INF.  |         |  APPLIED|
.-------------------------------------------------
.    750.00     51.61      7.42    8.767E+06  12
.    640.00     50.05      9.85    8.570E+06  12
.    530.00     45.38     17.14    7.981E+06  12
.    420.00     37.75     28.29    7.000E+06  12
.    310.00     26.96     43.91    5.625E+06  12
.    210.00     18.51     45.04    4.035E+06  10
.    200.00     19.92     28.24    3.858E+06   8
.    110.00      6.08     50.06    2.120E+06   8
.    100.00      4.43     52.68    1.910E+06   8
.-------------------------------------------------
.| DISTANCE   |first PHASE(place concrete+1øper.)|
.-------------------------------------------------
.|           | STRESS SUP. | STRESS INF.|  MOMENT    |
.-------------------------------------------------
.  7.5000E+02  3.5354E+01  4.8768E+01  4.6610E+06
.  6.4000E+02  3.4162E+01  5.0272E+01  4.5566E+06
.  5.3000E+02  3.0585E+01  5.4786E+01  4.2434E+06
.  4.2000E+02  2.4779E+01  6.1300E+01  3.7215E+06
.  3.1000E+02  1.6549E+01  7.0439E+01  2.9907E+06
.  2.1000E+02  1.1051E+01  6.4200E+01  2.1451E+06
```

```
.  2.0000E+02  1.2787E+01  4.6683E+01  2.0511E+06
.  1.1000E+02  2.1780E+00  6.0189E+01  1.1270E+06
.  1.0000E+02  9.1553E-01  6.1810E+01  1.0157E+06
.
.-------------------------------------------------------------------------
.| DISTANCE   |second PHASE (2øper+var.)|                          |
.-------------------------------------------------------------------------
.|          | STRESS SUP. |STRESS INF|St.place concr.|  MOMENT    |
.-------------------------------------------------------------------------
.  7.5000E+02  1.6251E+01 -4.1346E+01  2.3345E+01  4.1057E+06
.  6.4000E+02  1.5887E+01 -4.0420E+01  2.2822E+01  4.0138E+06
.  5.3000E+02  1.4795E+01 -3.7642E+01  2.1254E+01  3.7379E+06
.  4.2000E+02  1.2975E+01 -3.3011E+01  1.8639E+01  3.2781E+06
.  3.1000E+02  1.0410E+01 -2.6528E+01  1.4963E+01  2.6344E+06
.  2.1000E+02  7.4591E+00 -1.9157E+01  1.0751E+01  1.8896E+06
.  2.0000E+02  7.1357E+00 -1.8442E+01  1.0307E+01  1.8067E+06
.  1.1000E+02  3.9033E+00 -1.0133E+01  5.6471E+00  9.9275E+05
.  1.0000E+02  3.5155E+00 -9.1322E+00  5.0873E+00  8.9471E+05
.
.
.-------------------------------------------------------------
.|   CRACKING VERIFICATION            Exposure Class    XD3
.-------------------------------------------------------------
.-------------------------------------------------------------
. Decompression: COMPRESSED SECTION LEVEL  (Respect bottom )
.-------------------------------------------------------------
.| DISTANCE   |        TRANSPORT       |       MOMENT  FINAL   |
.-------------------------------------------------------------
.|            | LEVEL SUP. | LEVEL INF.| LEVEL SUP.| LEVEL INF.|
.-------------------------------------------------------------
.      750.00       75.00        0.00       75.00        6.78
.      640.00       75.00        0.00       75.00        3.77
.      530.00       75.00        0.00       75.00        0.00
.      420.00       75.00        0.00       75.00        0.00
.      310.00       71.98        0.00       75.00        0.00
.      210.00       70.24        0.00       75.00        0.00
.      200.00       71.05        0.00       75.00        0.00
.      110.00       66.07        0.00       75.00        0.00
.      100.00       65.59        0.00       75.00        0.00
.
.   .   PRESTRESSING STEEL MUST REMAIN FOR 2.5 cm
.          INSIDE   COMPRESSED ZONE
.          SATIFIED VERIFICATION
.-------------------------------------------------------------------------
.|     VERIFICATION    STRESS     BARS       FOR   CRACKING               |
.-------------------------------------------------------------------------
.|          |         TRANSPORT               |    MOMENT FINAL          |
.-------------------------------------------------------------------------
.|DISTANCE   |BORDER    AREA     AREA  STRESS |LEMBO    AREA     AREA  STRESS
|
.|DISTANCE   |          MIN.     EFFECT.      |         MIN.     EFFECT.
.-------------------------------------------------------------------------
.    750.00   SEC.COMPRESSED               SEC.COMPRESSED
.    640.00   SEC.COMPRESSED               SEC.COMPRESSED
.    530.00   SEC.COMPRESSED               SEC.COMPRESSED
.    420.00   SEC.COMPRESSED               SEC.COMPRESSED
.    310.00  SUP.     0.83     2.03  1982.80   SEC.COMPRESSED
.    210.00  SUP.     1.32     3.22  1979.30   SEC.COMPRESSED
.    200.00  SUP.     1.05     2.58  1981.09   SEC.COMPRESSED
```

```
.    110.00  SUP.     3.19     8.00  1929.82   SEC.COMPRESSED
.    100.00  SUP.     3.53     8.80  1947.33   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.|
.-------------------------------------------------------------------------
.     750.00   13469.12      81.87   11416.87      23.10      14.58   12
.     640.00   13465.88      82.34   11415.26      24.95      14.58   12
.     530.00   13453.70      84.08   11410.42      30.47      14.58   12
.     420.00   13432.60      87.10   11303.74      39.67      14.58   12
.     310.00   13402.52      91.41   11152.60      52.55      14.58   12
.     210.00   13488.14      76.96   11386.02      49.36      15.50   10
.     200.00   13601.84      59.61   11393.89      34.09      15.63    8
.     110.00   13561.44      65.21   11376.21      50.71      15.63    8
.     100.00   13556.58      65.89   11374.09      52.71      15.63    8
.
.-------------------------------------------------------------------------
.|                    PRESTRESSING      LOSSES                            |
.-------------------------------------------------------------------------
.| DISTANCE  |Immediate| shrinkage| creep |relaxation |Comb.tot.|Loads|
.-------------------------------------------------------------------------
.    750.00    300.09    815.34   1060.57    163.94   2024.63    329.36
.    640.00    300.09    815.34   1077.18    163.94   2041.11    320.94
.    530.00    300.09    815.34   1126.72    163.94   2090.28    297.77
.    420.00    300.09    815.34   1209.19    163.94   2172.14    259.84
.    310.00    300.09    815.34   1324.64    163.94   2286.72    207.17
.    210.00    300.09    815.34   1151.59    163.94   2117.60    147.59
.    200.00    300.09    815.34    879.62    163.94   1849.63    141.88
.    110.00    300.09    815.34   1029.25    163.94   1998.51     74.74
.    100.00    300.09    815.34   1047.26    163.94   2016.43     66.66
.
.
.-------------------------------------------------------------------------
.|                        BOW HEIGHT                                       |
.-------------------------------------------------------------------------
.|           MOMENT   INITIAL      |                MOMENT  FINAL         |
.-------------------------------------------------------------------------
.| self-weight | prestress | TOTAL.|PERM.+s-weight | VARIABLE |  TOTAL    |
.-------------------------------------------------------------------------
.
. -6.5284E-01  1.6138E+00  9.6098E-01  3.0557E-01 -3.2576E-01  8.3341E-01
. Kvisc= 3.793463
Length/Bow Ist.= 74282.14  >=1000 Length/Bow inf.= 1427.775  >=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
.
.  750.000    0.036   17.285    3.500   -0.857   12.291    0.204    1.255
.  640.000    0.037   17.270    3.500   -0.855   12.276    0.206    1.285
.  530.000    0.035   17.241    3.500   -0.855   12.248    0.194    1.383
.  420.000    0.034   17.130    3.500   -0.851   12.187    0.194    1.582
.  310.000    0.347   15.644    3.500   -0.454   10.709    2.164    1.883
.  210.000    0.346   15.708    3.500   -0.451   10.652    2.172    2.636
.  200.000    0.351   15.709    3.500   -0.446   10.650    2.201    2.771
.  110.000    0.358   15.563    3.500   -0.429   10.505    2.274    5.089
.  100.000    0.355   15.563    3.500   -0.432   10.506    2.255    5.622
.
.
.***  Geometric mechanical properties sections with steel
.
.Perimeter 443.789           Equivalent area 20.29054      Min.Width 18
.
.SEC. dist.   Area     Dist.Bar.   Mom.In.   Mod.Res.   Mod.Res.   Mod.Res.
. support       A        Dbi        J n-n       Wi         Ws         Wsc
.   750.00  6.376E+03  5.384E+01  5.346E+06  9.930E+04  2.526E+05  1.299E+05
.   640.00  6.376E+03  5.384E+01  5.346E+06  9.930E+04  2.526E+05  1.299E+05
.   530.00  6.376E+03  5.384E+01  5.346E+06  9.930E+04  2.526E+05  1.299E+05
.   420.00  6.376E+03  5.384E+01  5.346E+06  9.930E+04  2.526E+05  1.299E+05
.   310.00  6.386E+03  5.386E+01  5.349E+06  9.930E+04  2.531E+05  1.300E+05
.   210.00  6.375E+03  5.398E+01  5.325E+06  9.864E+04  2.533E+05  1.298E+05
.   200.00  6.355E+03  5.408E+01  5.298E+06  9.797E+04  2.532E+05  1.295E+05
.   110.00  6.382E+03  5.414E+01  5.305E+06  9.797E+04  2.543E+05  1.298E+05
.   100.00  6.386E+03  5.415E+01  5.306E+06  9.797E+04  2.545E+05  1.299E+05
.
.
*** SHEAR ULTIMATE LIMIT STATES
.
.                in SUPPORT (simple reiforced concrete)
.Vsd (shear design) = 39218.32          Vrd1 (concrete)= 10056.09
.Vrd2 (crushing) = 98536.06          SPREAD STIRRUPS =         7.641543
.STIRRUPS TOTAL/ML      =      16.73597     loops place concr/ML =  .694413
.
.
.BARS SUPPORT (BENDS+LOOPS)             8.073717 shear from head   cm 15
.STRESS BARS inferior Td/As            1301.868
.
.
.FIRST PRECOMPRESSED SECTION             90            from support
.
.Vsd (shear design) = 34416.08          Vrd1 (concrete)= 14346.92
.Vrd2 (crushing) = 109696.9          TOTAL STIRRUPS/ML     = 7.504696
 LOOPS place concr /ML = .8280339
.
.T_RCAEC2            E-MAIL  studio@engisoft.org     WEB  www.engisoft.org
.ENGI-Newpage
```

LENGTH
1350 cm

```
.T_RCAEC2            ENGISOFT-ing.F.PINARDI-DESENZANO(BS)     tel 030-9912152
.DATE (mm-gg-aa)    09-24-2008
..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
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.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.
.
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.LOAD 2ø PHASE  (perm.)                     8
.LOAD 2ø PHASE (var.)                       12
.HEIGTH Cast in place concrete              20
.Charact.Cubic Strength. in place concrete  300
.WIDTH (Cast in place concrete)             120
.DESIGN LENGHT                              1320
.EFFECTIVE LENGHT                           1350
.SUPERIOR CONVENTIONAL REINFORCING BARS     5
.SUPERIOR BARS DISTANCE FORM SUP. BORDER    5
.INFERIOR CONVENTIONAL REINFORCING BARS     8
.INFERIOR BARS DISTANCE FORM INF. BORDER    6

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.MAX CANTILEVER TRANSPORT-HOISTING          100

.MAX STRESS BARS  CRACKING    (1600-4500)   2200
.like previewed by UNI ENV 1992-1-1 table   4.11
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.
.                                Materials properties
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.Rck=     550.00    Rckj=    400.00    Fck=     456.50    Fckj=    332.00
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.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

TRACING Prestressing steel 0.6" diam.

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

@@@ THEORETICAL BARYCENTRE..... 14
@@@ EFFECTIVE BARYCENTRE 14
@@@ NUMBER OF Prest. steel..... 10

TOTAL WEIGHT .....DaN.. 15195.47
UNIT WEIGHT .....DaN/cm 11.2559
FILE STRUCTURE..... bia6375
FILE PRETENSION..... bia63135

BENDING verifications

	INITIAL MOMENT					
	CONCRETE		BARS			
STRESS MAX.=	.6*Fckj= 199.20		.7*Ftk= 3771.41			
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS sup	BENDING
675.00	8.93	81.89	80.46	443.65	0.10	2.450E+06
565.00	8.37	82.58	77.67	447.10	0.10	2.401E+06
455.00	6.26	85.18	67.21	460.06	0.10	2.215E+06
345.00	2.57	89.70	48.88	482.57	1.67	1.893E+06
310.00	1.08	91.53	41.45	491.73	2.45	1.762E+06
210.00	-0.90	76.41	24.80	409.65	4.73	1.312E+06
200.00	1.76	55.01	30.95	296.03	4.19	1.261E+06
110.00	-4.03	62.35	2.29	332.72	10.26	7.491E+05
100.00	-4.73	63.24	-1.16	337.18	10.56	6.866E+05

	HOISTING AND TRANSPORT					
	CONCRETE		BARS			
STRESS MAX.=	.6*Fckj= 199.20		.7*Ftk= 3771.41			
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS sup	BENDING
675.00	4.67	87.14	59.33	469.82	0.10	2.075E+06
565.00	3.78	88.23	54.91	475.29	0.10	1.997E+06
455.00	1.12	91.52	41.68	491.68	0.10	1.762E+06
345.00	-3.34	97.00	19.54	519.02	1.67	1.370E+06
310.00	-5.12	99.20	10.69	530.01	2.45	1.213E+06
210.00	-8.07	85.41	-10.70	454.59	4.73	6.757E+05
200.00	-5.54	64.27	-5.19	342.33	4.19	6.149E+05
110.00	-12.28	72.92	-38.52	385.61	10.26	9.061E+03
100.00	-13.10	73.97	-42.56	390.88	10.56	-6.472E+04

	rare load condition = Gk + Qk					
	CONCRETE		BARS			
STRESS MAX.=	0.5*Fck=228.25		.7*Ftk=3771.41			
DISTANCE	STRESS SUP.	STRESS INF.	STRESS SUP.	STRESS INF.	BARS inf.	MOMENT
675.00	44.16	0.04	205.07	17.76	0.10	8.114E+06
565.00	42.49	2.78	198.21	29.63	0.10	7.889E+06
455.00	37.48	10.99	177.65	65.23	0.10	7.213E+06
345.00	29.02	24.71	142.94	124.66	0.10	6.086E+06
310.00	25.63	30.23	129.01	148.55	0.10	5.633E+06
210.00	16.88	30.06	88.36	144.31	0.10	4.087E+06
200.00	18.42	12.94	89.80	66.55	0.10	3.911E+06
110.00	5.47	34.41	36.80	159.68	0.10	2.168E+06
100.00	3.92	37.02	30.46	171.00	0.10	1.955E+06

DISTANCE	first PHASE(place concrete+1øper.)		
	STRESS SUP.	STRESS INF.	MOMENT
6.7500E+02	2.6929E+01	4.4165E+01	3.7583E+06
5.6500E+02	2.5736E+01	4.5678E+01	3.6539E+06
4.5500E+02	2.2156E+01	5.0216E+01	3.3407E+06
3.4500E+02	1.6111E+01	5.7807E+01	2.8188E+06
3.1000E+02	1.3686E+01	6.0858E+01	2.6089E+06
2.1000E+02	8.2371E+00	5.2439E+01	1.8928E+06
2.0000E+02	1.0136E+01	3.4509E+01	1.8117E+06
1.1000E+02	9.0179E-01	4.6367E+01	1.0041E+06
1.0000E+02	-2.0256E-01	4.7805E+01	9.0572E+05

DISTANCE	second PHASE (2øper+var.)			
	STRESS SUP.	STRESS INF	St.place concr.	MOMENT
6.7500E+02	1.7234E+01	-4.4125E+01	2.4813E+01	4.3560E+06
5.6500E+02	1.6756E+01	-4.2899E+01	2.4124E+01	4.2350E+06
4.5500E+02	1.5319E+01	-3.9222E+01	2.2056E+01	3.8720E+06
3.4500E+02	1.2909E+01	-3.3093E+01	1.8594E+01	3.2670E+06
3.1000E+02	1.1940E+01	-3.0629E+01	1.7202E+01	3.0238E+06
2.1000E+02	8.6462E+00	-2.2377E+01	1.2495E+01	2.1938E+06
2.0000E+02	8.2797E+00	-2.1569E+01	1.1994E+01	2.0998E+06
1.1000E+02	4.5659E+00	-1.1954E+01	6.6256E+00	1.1638E+06
1.0000E+02	4.1176E+00	-1.0783E+01	5.9756E+00	1.0498E+06

quasi-permanent load = Gk + Qk * .6				
CALCESTRUZZO				

STRESS MAX.= .4 *Fck= 182.6

DISTANCE	STRESS SUP.	STRESS INF.	MOMENT	STRANDS APPLIED
675.00	40.03	10.63	7.069E+06	10
565.00	38.47	13.07	6.873E+06	10
455.00	33.80	20.41	6.283E+06	10
345.00	25.92	32.66	5.302E+06	10
310.00	22.76	37.58	4.907E+06	10
210.00	14.81	35.43	3.560E+06	8
200.00	16.43	18.12	3.407E+06	6
110.00	4.37	37.28	1.889E+06	6
100.00	2.93	39.61	1.704E+06	6

DISTANCE	first PHASE(place concrete+1øper.)		
	STRESS SUP.	STRESS INF.	MOMENT
6.7500E+02	2.6929E+01	4.4165E+01	3.7583E+06
5.6500E+02	2.5736E+01	4.5678E+01	3.6539E+06
4.5500E+02	2.2156E+01	5.0216E+01	3.3407E+06
3.4500E+02	1.6111E+01	5.7807E+01	2.8188E+06
3.1000E+02	1.3686E+01	6.0858E+01	2.6089E+06
2.1000E+02	8.2371E+00	5.2439E+01	1.8928E+06

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.  2.0000E+02  1.0136E+01  3.4509E+01  1.8117E+06
.  1.1000E+02  9.0179E-01  4.6367E+01  1.0041E+06
.  1.0000E+02 -2.0256E-01  4.7805E+01  9.0572E+05
.
.-------------------------------------------------------------------------
.| DISTANCE   |second PHASE (2øper+var.)|                          |
.-------------------------------------------------------------------------
.|          | STRESS SUP. |STRESS INF|St.place concr.|  MOMENT    |
.-------------------------------------------------------------------------
.  6.7500E+02  1.3098E+01 -3.3535E+01  1.8858E+01  3.3106E+06
.  5.6500E+02  1.2734E+01 -3.2603E+01  1.8334E+01  3.2186E+06
.  4.5500E+02  1.1643E+01 -2.9809E+01  1.6762E+01  2.9427E+06
.  3.4500E+02  9.8107E+00 -2.5151E+01  1.4131E+01  2.4829E+06
.  3.1000E+02  9.0743E+00 -2.3278E+01  1.3073E+01  2.2981E+06
.  2.1000E+02  6.5711E+00 -1.7006E+01  9.4966E+00  1.6673E+06
.  2.0000E+02  6.2926E+00 -1.6392E+01  9.1151E+00  1.5958E+06
.  1.1000E+02  3.4701E+00 -9.0848E+00  5.0355E+00  8.8445E+05
.  1.0000E+02  3.1294E+00 -8.1948E+00  4.5415E+00  7.9781E+05
.
.
.-------------------------------------------------------------
.|   CRACKING VERIFICATION            Exposure Class    XD3
.-------------------------------------------------------------
.-------------------------------------------------------------
. Decompression: COMPRESSED SECTION LEVEL  (Respect bottom )
.-------------------------------------------------------------
.| DISTANCE   |        TRANSPORT       |       MOMENT  FINAL   |
.-------------------------------------------------------------
.|            | LEVEL SUP. | LEVEL INF.| LEVEL SUP.| LEVEL INF.|
.-------------------------------------------------------------
.      675.00       75.00        0.00       75.00        0.00
.      565.00       75.00        0.00       75.00        0.00
.      455.00       75.00        0.00       75.00        0.00
.      345.00       72.50        0.00       75.00        0.00
.      310.00       71.32        0.00       75.00        0.00
.      210.00       68.53        0.00       75.00        0.00
.      200.00       69.04        0.00       75.00        0.00
.      110.00       64.19        0.00       75.00        0.00
.      100.00       63.72        0.00       75.00        0.00
.
.   .   PRESTRESSING STEEL MUST REMAIN FOR 2.5 cm
.          INSIDE   COMPRESSED ZONE
.          SATIFIED VERIFICATION
.-------------------------------------------------------------------------
.|     VERIFICATION    STRESS     BARS       FOR   CRACKING               |
.-------------------------------------------------------------------------
.|          |         TRANSPORT               |    MOMENT FINAL          |
.-------------------------------------------------------------------------
.|DISTANCE   |BORDER    AREA     AREA  STRESS |LEMBO    AREA     AREA  STRESS
|
.|DISTANCE   |          MIN.     EFFECT.      |         MIN.     EFFECT.
.-------------------------------------------------------------------------
.    675.00   SEC.COMPRESSED               SEC.COMPRESSED
.    565.00   SEC.COMPRESSED               SEC.COMPRESSED
.    455.00   SEC.COMPRESSED               SEC.COMPRESSED
.    345.00  SUP.     0.68     1.67  1984.46   SEC.COMPRESSED
.    310.00  SUP.     1.00     2.45  1981.46   SEC.COMPRESSED
.    210.00  SUP.     1.92     4.73  1971.25   SEC.COMPRESSED
.    200.00  SUP.     1.71     4.19  1975.39   SEC.COMPRESSED
```

```
.    110.00  SUP.      4.48    10.26  2116.53   SEC.COMPRESSED
.    100.00  SUP.      4.64    10.56  2132.08   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.|
.-------------------------------------------------------------------------
.     675.00   13539.36      71.17   11408.12      22.97      14.00   10
.     565.00   13536.09      71.64   11406.71      24.87      14.00   10
.     455.00   13523.83      73.44   11402.47      30.54      14.00   10
.     345.00   13502.54      76.55   11395.38      40.00      14.00   10
.     310.00   13493.88      77.81   11392.53      43.80      14.00   10
.     210.00   13581.95      64.09   11390.05      39.75      13.75    8
.     200.00   13698.12      46.23   11395.46      23.67      13.33    6
.     110.00   13664.53      51.24   11386.28      38.59      13.33    6
.     100.00   13660.44      51.86   11385.17      40.41      13.33    6
.
.-------------------------------------------------------------------------
.|                    PRESTRESSING      LOSSES                            |
.-------------------------------------------------------------------------
.| DISTANCE  |Immediate| shrinkage| creep |relaxation |Comb.tot.|Loads|
.-------------------------------------------------------------------------
.    675.00    300.09    815.34    942.33    163.94   1909.36    271.78
.    565.00    300.09    815.34    959.41    163.94   1926.34    263.16
.    455.00    300.09    815.34   1010.43    163.94   1977.03    239.44
.    345.00    300.09    815.34   1095.41    163.94   2061.47    200.62
.    310.00    300.09    815.34   1129.56    163.94   2095.40    185.10
.    210.00    300.09    815.34    957.78    163.94   1927.17    133.39
.    200.00    300.09    815.34    673.44    163.94   1646.39    128.38
.    110.00    300.09    815.34    808.11    163.94   1780.54     68.19
.    100.00    300.09    815.34    824.50    163.94   1796.87     60.87
.
.
.-------------------------------------------------------------------------
.|                        BOW HEIGHT                                       |
.-------------------------------------------------------------------------
.|           MOMENT   INITIAL      |                MOMENT  FINAL         |
.-------------------------------------------------------------------------
.| self-weight | prestress | TOTAL.|PERM.+s-weight | VARIABLE |  TOTAL    |
.-------------------------------------------------------------------------
.
. -4.2512E-01  1.1208E+00  6.9568E-01  2.5824E-01 -2.1267E-01  7.6697E-01
. Kvisc= 3.793463
Length/Bow Ist.= 29623.4  >=1000 Length/Bow inf.= 1485.563  >=500
.
```

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.*** 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
.
.  675.000   -0.556   19.714    3.500   -1.591   14.838   -2.687    1.374
.  565.000   -0.559   19.714    3.500   -1.594   14.838   -2.702    1.413
.  455.000   -0.568   19.714    3.500   -1.602   14.840   -2.747    1.545
.  345.000   -0.583   19.714    3.500   -1.617   14.843   -2.823    1.796
.  310.000   -0.589   19.714    3.500   -1.622   14.844   -2.853    1.921
.  210.000   -0.603   19.714    3.500   -1.635   14.844   -2.919    2.571
.  200.000   -0.597   19.714    3.500   -1.630   14.842   -2.894    2.706
.  110.000   -0.620   19.714    3.500   -1.651   14.845   -3.009    4.490
.  100.000   -0.623   19.714    3.500   -1.654   14.846   -3.023    4.955
.
.
.***  Geometric mechanical properties sections with steel
.
.Perimeter 443.789           Equivalent area 20.29054      Min.Width 18
.
.SEC. dist.   Area      Dist.Bar.   Mom.In.   Mod.Res.   Mod.Res.   Mod.Res.
. support       A         Dbi        J n-n       Wi         Ws         Wsc
.   675.00  6.359E+03  5.393E+01  5.324E+06  9.872E+04  2.528E+05  1.297E+05
.   565.00  6.359E+03  5.393E+01  5.324E+06  9.872E+04  2.528E+05  1.297E+05
.   455.00  6.359E+03  5.393E+01  5.324E+06  9.872E+04  2.528E+05  1.297E+05
.   345.00  6.367E+03  5.395E+01  5.326E+06  9.872E+04  2.531E+05  1.298E+05
.   310.00  6.371E+03  5.396E+01  5.327E+06  9.872E+04  2.532E+05  1.298E+05
.   210.00  6.366E+03  5.410E+01  5.304E+06  9.804E+04  2.537E+05  1.297E+05
.   200.00  6.346E+03  5.420E+01  5.276E+06  9.735E+04  2.536E+05  1.293E+05
.   110.00  6.376E+03  5.427E+01  5.284E+06  9.736E+04  2.549E+05  1.297E+05
.   100.00  6.378E+03  5.427E+01  5.284E+06  9.736E+04  2.549E+05  1.297E+05
.
.
*** SHEAR ULTIMATE LIMIT STATES
.
.                in SUPPORT (simple reiforced concrete)
.Vsd (shear design) = 35216.45          Vrd1 (concrete)= 9774.565
.Vrd2 (crushing) = 98536.06          SPREAD STIRRUPS =         5.731157
.STIRRUPS TOTAL/ML      =      13.50811     loops place concr/ML =  .6512918
.
.
.BARS SUPPORT (BENDS+LOOPS)             7.550006 shear from head   cm 15
.STRESS BARS inferior Td/As            1398.419
.
.
.FIRST PRECOMPRESSED SECTION             90            from support
.
.Vsd (shear design) = 30414.21          Vrd1 (concrete)= 12007.79
.Vrd2 (crushing) = 109696.9          TOTAL STIRRUPS/ML     = 7.00391
 LOOPS place concr /ML = .7203323
.
.T_RCAEC2            E-MAIL  studio@engisoft.org     WEB  www.engisoft.org
.ENGI-Newpage
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