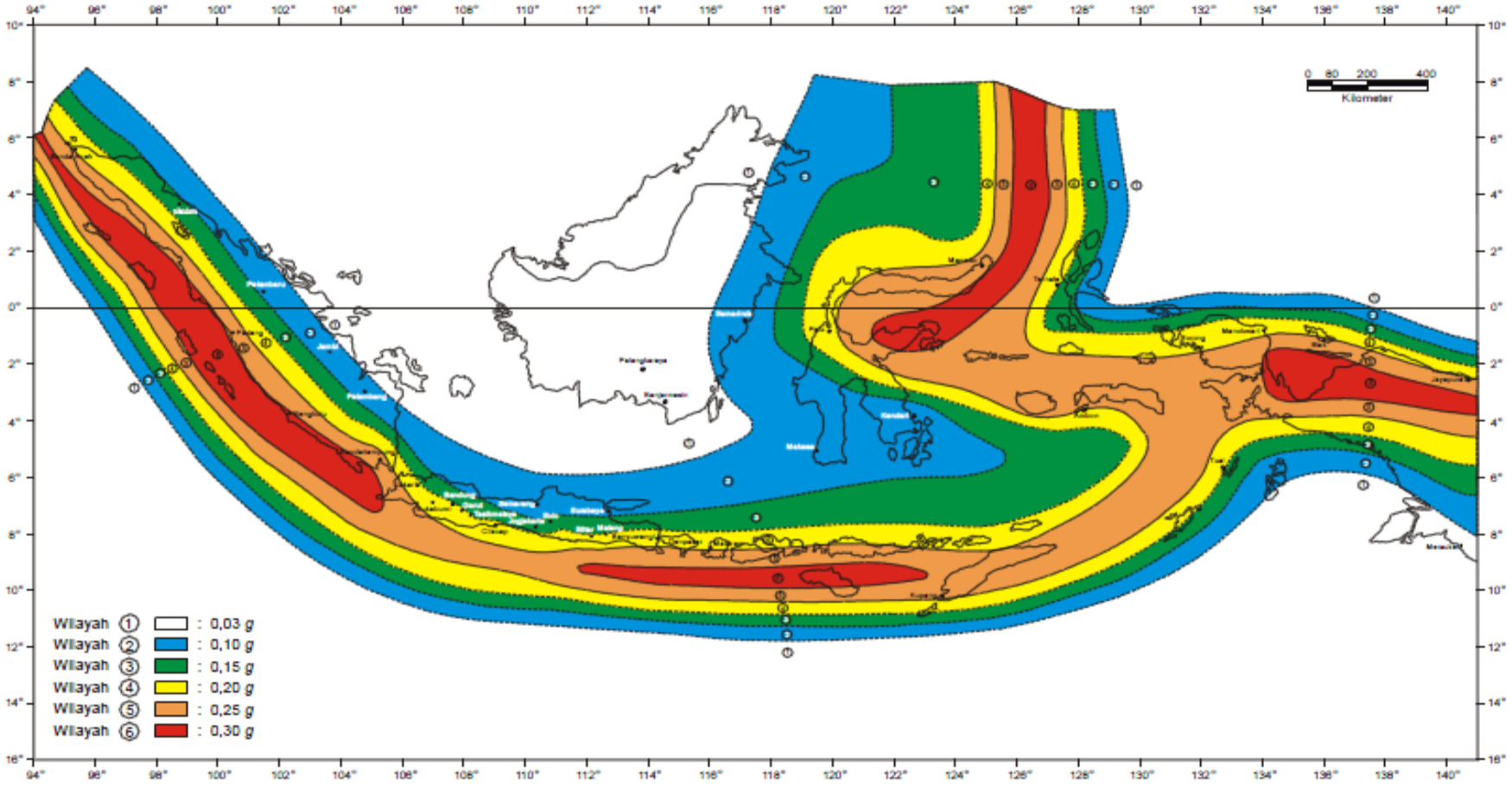
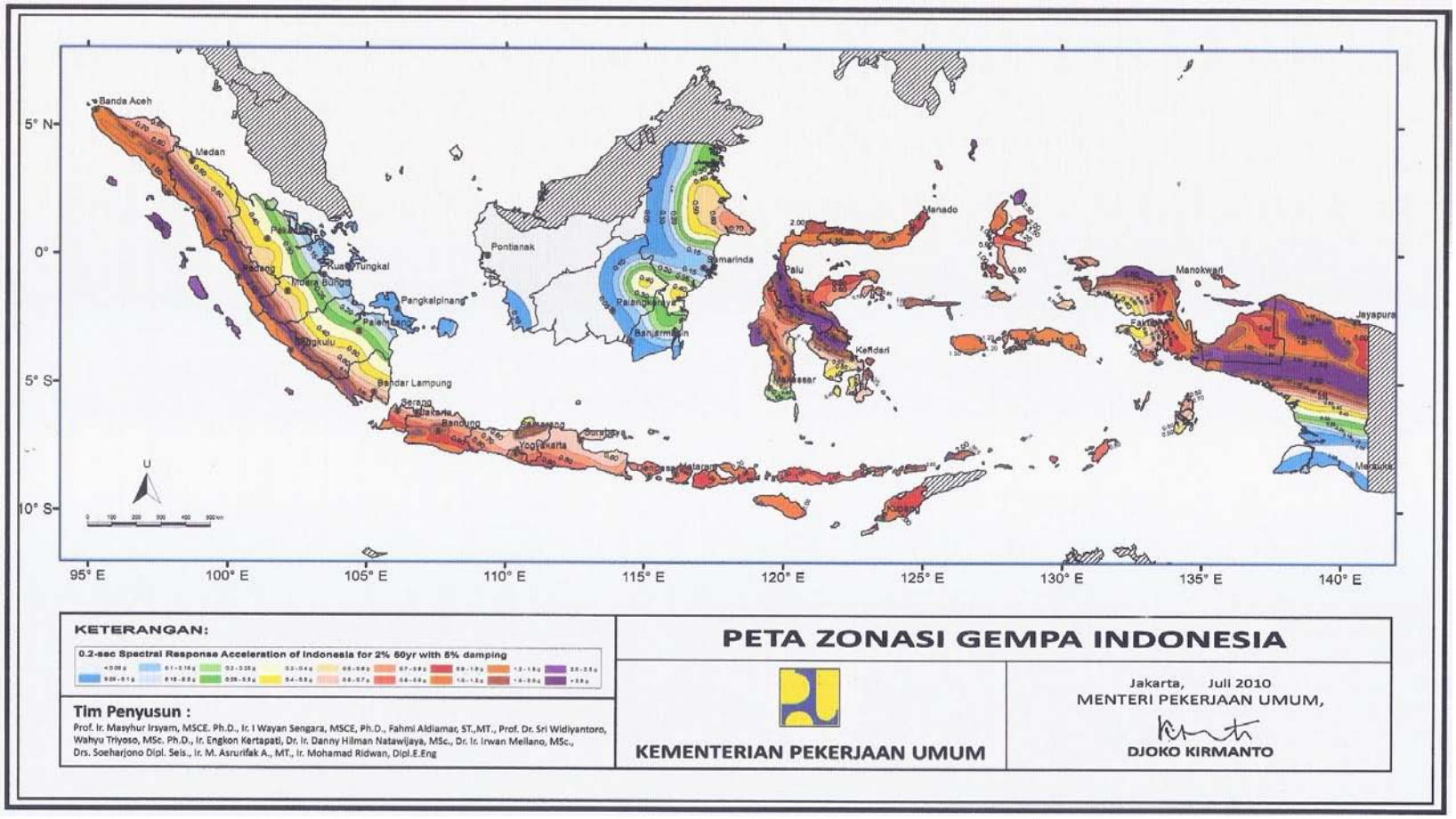
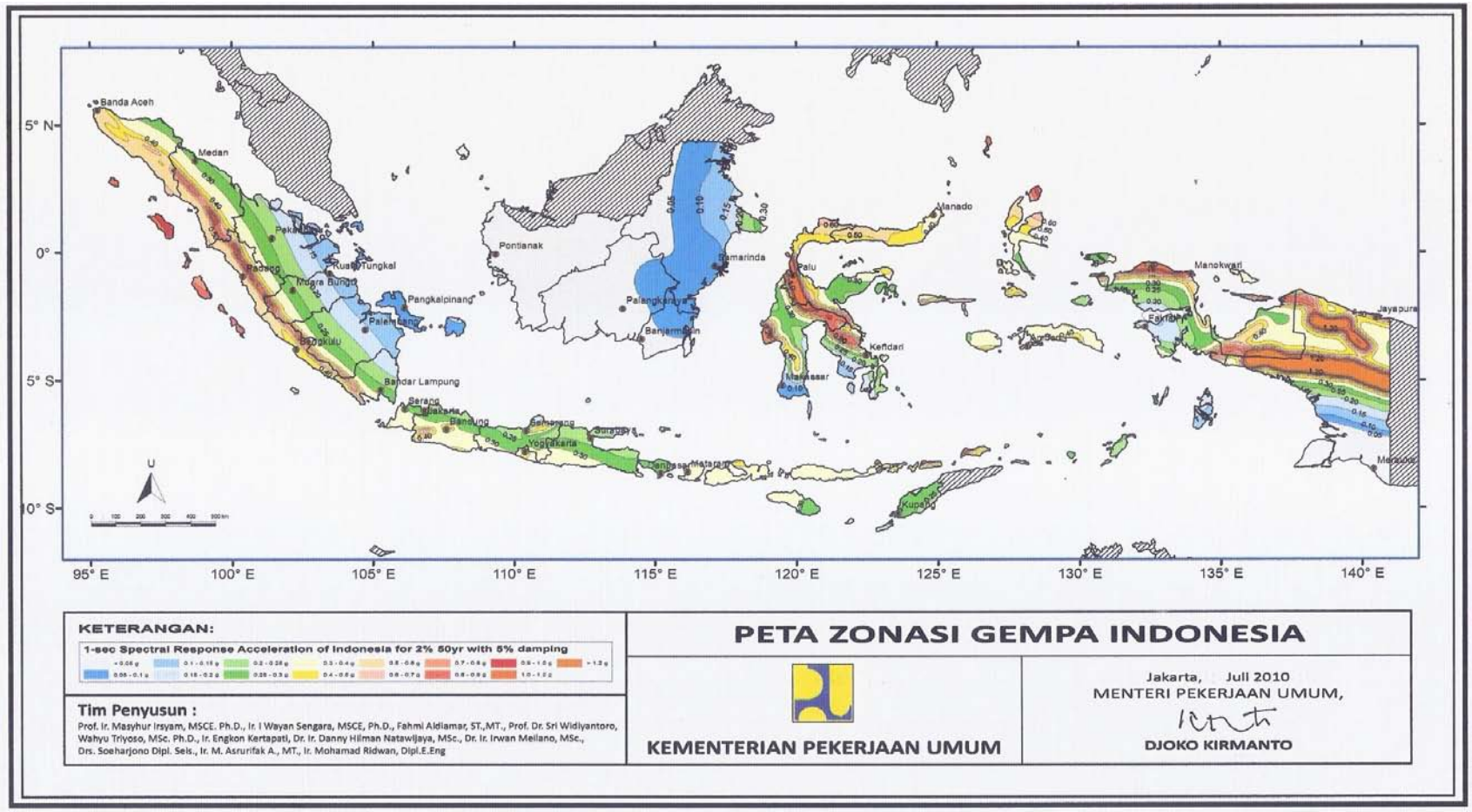
LAMPIRAN 1
PETA WILAYAH GEMPA



Gambar L1.1Wilayah Gempa Indonesia dengan Percepatan Puncak Batuan Dasar dengan Perioda Ulang 500 Tahun [SNI-1726-2002]



Gambar L1.2 Peta Respons Spektra Percepatan 0,2 detik di Batuan Dasar S_B untuk Probabilitas Terlampaui 2% dalam 50 Tahun (redaman 5%) Berdasarkan RSNI 03-1726-201x



Gambar L1.3 Peta Respons Spectra Percepatan 1 detik di Batuan Dasar S_B untuk Probabilitas Terlampaui 2% dalam 50 Tahun (redaman 5%) Berdasarkan RSNI 03-1726-201x

LAMPIRAN 2
SPESIFIKASI VSL

VSL MULTISTRAND SYSTEMS:

Strand and Tendon Properties

Strand Properties

Strand Type		0.5" (13 mm)	0.6" (15 mm)
Nominal diameter	inch	0.5	0.6
Nominal area	inch^2	0.153	0.217
Nominal weight/mass	lbs/ft	0.53	0.74
Tensile strength	ksi	270	270
Min. breaking load	kips	41.3	58.6
Young's modulus	ksi	approx. 28,500	
Relaxation	%	max 2.5	

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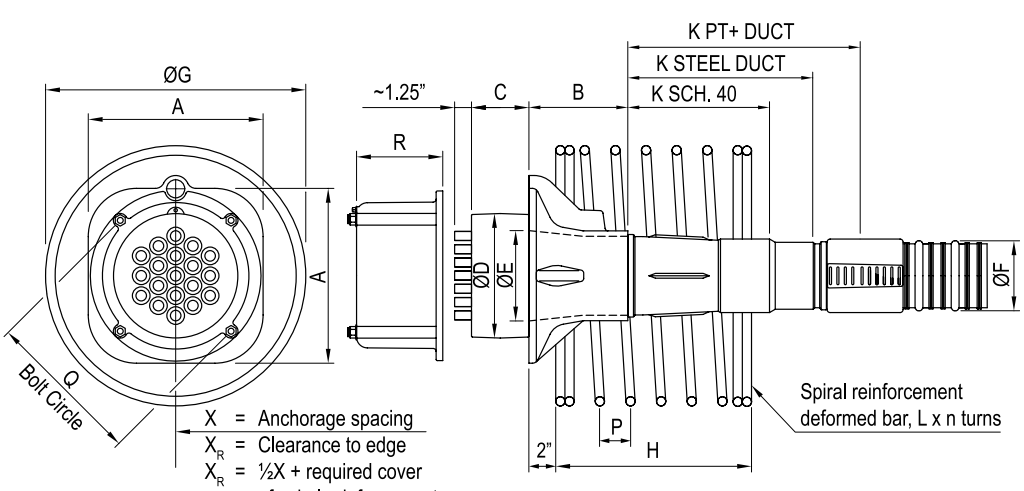
Tendon Properties

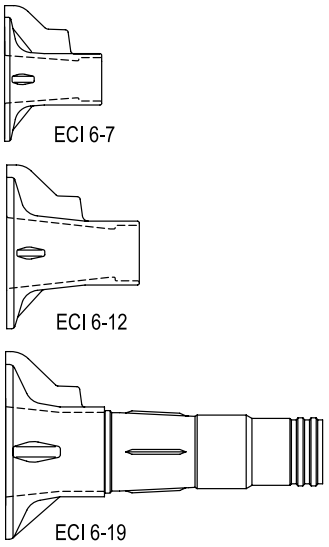
Strands Type 0.5" (270 ksi)		
Number of Strands Per Tendon	Area of tendon inch^2	Min breaking load kips
1	0.15	41.3
2	0.31	82.6
3	0.46	123.9
4	0.61	165.2
5	0.77	206.5
6	0.92	247.8
7	1.07	289.1
8	1.22	330.4
9	1.38	371.7
10	1.53	413.0
11	1.68	454.3
12	1.84	495.6
13	1.99	536.9
14	2.14	578.2
15	2.30	619.5
16	2.45	660.8
17	2.60	702.1
18	2.75	743.4
19	2.91	784.7
20	3.06	826.0
21	3.21	867.3
22	3.37	908.6
23	3.52	949.9
24	3.67	991.2
25	3.83	1032.5
26	3.98	1073.8
27	4.13	1115.1
28	4.28	1156.4
29	4.44	1197.7
30	4.59	1239.0
31	4.74	1280.3
32	4.90	1321.6
33	5.05	1362.9
34	5.20	1404.2
35	5.36	1445.5
36	5.51	1486.8
37	5.66	1528.1
38	5.81	1569.4
39	5.97	1610.7
40	6.12	1652.0
41	6.27	1693.3
42	6.43	1734.6
43	6.58	1775.9
44	6.73	1817.2
45	6.89	1858.5
46	7.04	1899.8
47	7.19	1941.1
48	7.35	1982.4
49	7.50	2023.7
50	7.65	2065.0
51	7.80	2106.3
52	7.96	2147.6
53	8.11	2188.9
54	8.26	2230.2
55	8.42	2271.5

Strands Type 0.6" (270 ksi)		
Number of Strands Per Tendon	Area of tendon inch^2	Min breaking load kips
1	0.22	58.6
2	0.43	117.2
3	0.65	175.8
4	0.87	234.4
5	1.09	293.0
6	1.30	351.6
7	1.52	410.2
8	1.74	468.8
9	1.95	527.4
10	2.17	586.0
11	2.39	644.6
12	2.60	703.2
13	2.82	761.8
14	3.03	820.4
15	3.26	879.0
16	3.47	937.6
17	3.69	996.2
18	3.91	1054.8
19	4.12	1113.4
20	4.34	1172.0
21	4.56	1230.6
22	4.78	1289.2
23	4.99	1347.8
24	5.21	1406.4
25	5.43	1465.0
26	5.64	1523.6
27	5.86	1582.2
28	6.08	1640.8
29	6.29	1699.4
30	6.51	1758.0
31	6.73	1816.6
32	6.94	1875.2
33	7.16	1933.8
34	7.38	1992.4
35	7.60	2051.0
36	7.81	2109.6
37	8.03	2168.2
38	8.25	2226.8
39	8.46	2285.4
40	8.68	2344.0
41	8.90	2402.6
42	9.11	2461.2
43	9.33	2519.8
44	9.55	2578.4
45	9.77	2637.0
46	9.98	2695.6
47	10.20	2754.2
48	10.42	2812.8
49	10.63	2871.4
50	10.85	2930.0
51	11.07	2988.6
52	11.28	3047.2
53	11.50	3105.8
54	11.72	3164.4
55	11.94	3223.0

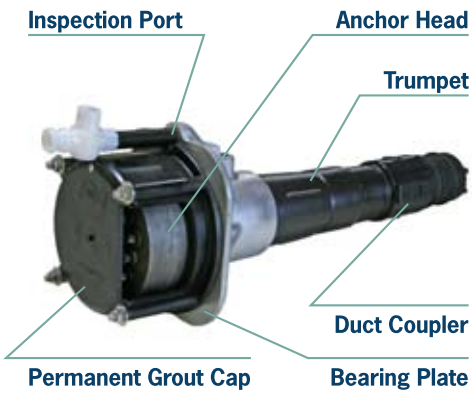
VSL MULTISTRAND SYSTEMS:

Type ECI Stressing Anchorage





Tendon Unit	f'ci (psi)	Dimensions (Inches)																	
		A	B	C	øD	øE	øF PT+ Duct	øF Steel Duct	øF SCH 40 Pipe	øG	H	K PT+ Duct	K Steel Duct	K SCH 40 Pipe	L	n	P	Q	R	X
6-7	3500	8.54	6.69	2.37	5.33	3.31	2.87	2.88	3.00	11.00	12.00	No Trumpet on 6-7			#4	6.50	3.00	7.40	4.17	13.00
6-7	5500	8.54	6.69	2.37	5.33	3.31	2.87	2.88	3.00	11.00	12.00				#4	6.50	3.00	7.40	4.17	13.00
6-12	3500	9.88	8.66	3.00	6.85	4.62	3.58	3.24	3.50	13.00	14.00	No Trumpet on 6-12			#5	7.00	3.00	8.66	4.90	15.00
6-12	5500	9.88	8.66	3.00	6.85	4.62	3.58	3.24	3.50	13.00	13.50				#4	7.00	3.00	8.66	4.90	15.00
6-19	3500	11.42	6.91	3.75	8.13	5.90	4.57	4.10	4.50	17.00	19.00	15.19	12.09	9.29	#5	11.50	2.00	10.24	5.63	19.00
6-19	5500	11.42	6.91	3.75	8.13	5.90	4.57	4.10	4.50	15.00	17.00	15.19	12.09	9.29	#5	10.50	2.00	10.24	5.63	17.00



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Notes:

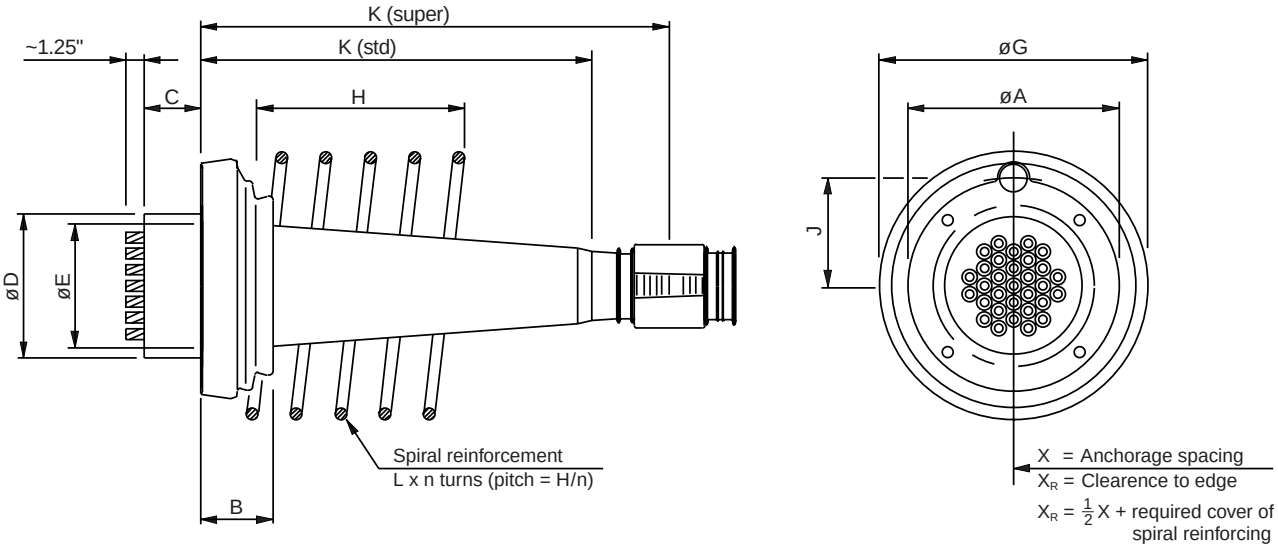
Anchorage spacings are in accordance with test requirement of AASHTO (The Special Anchorage Device Acceptance Test Procedure, AASHTO 2000).

For proper design and detailing of anchorage zones and related reinforcement, refer to the VSL Publication Detailing for Post-Tensioning.

Dimensions are valid for:

- f'ci (psi) is the nominal minimum concrete cylinder strength at the time of stressing.
- Maximum prestressing force may be applied when concrete reaches a cylinder strength of 3,500 psi (24 MPa) and 5,500 psi (38 MPa) respectively.
- Temporary overstressing to 80% of Guaranteed Ultimate Tensile Strength.
- Yield strength of spiral reinforcement: Grade 60 (400 MPa).
- Tie one and one-half turns of spiral at both ends.
- Additional orthogonal reinforcement may be required in the local anchorage zone as determined by design.
- Spirals may be replaced by suitable orthogonal reinforcement.
- Information for other concrete strengths and conditions is available from your local VSL Representative.
- Spiral reinforcement shall be centered on the anchorage assembly and be placed directly behind the bearing plate as indicated above.

Stressing Anchorage VSL Type ES



Drawings not to scale

Tendon Unit		Dimensions Inches												
		øA	B	C	øD	øE	øG	H	J	K (std)	K (super)	L	n	X
Strand Type 0.5"	5-12	8.74	2.36	2.38	6.00	4.06	10.50	10.00	4.33	13.00	16.38	#4	5	12.50
	5-19	10.16	3.15	3.00	7.00	5.13	13.75	14.00	4.82	16.93	20.22	#5	7	15.75
	5-31	12.60	3.94	4.00	9.00	6.59	18.00	18.00	5.91	19.69	23.86	#5	9	20.50
	5-43	15.35	4.72	5.20	11.10	8.57	21.75	20.00	7.24	28.75	NA	#5	10	23.75
	5-55	16.54	5.12	5.50	12.00	9.01	24.75	22.50	7.80	27.55	NA	#6	10	26.75
Strand Type 0.6"	6-7	8.74	2.36	2.38	6.00	4.06	10.50	10.00	4.33	13.00	16.38	#4	5	12.50
	6-12	10.16	3.15	3.25	7.00	5.13	13.75	14.00	4.82	16.93	20.22	#5	7	15.75
	6-19	11.81	3.54	3.75	8.25	5.88	17.00	18.00	5.61	19.69	22.13	#5	9	19.00
	6-22	12.60	3.94	4.00	9.00	6.59	18.00	18.00	5.91	19.69	23.86	#5	9	20.50
	6-31	15.35	4.72	5.20	11.10	8.57	21.75	20.00	7.24	28.75	NA	#5	10	23.75
	6-37	16.54	5.12	5.50	12.00	9.01	24.75	22.50	7.80	27.55	NA	#6	10	26.75

Other sizes available on request

Subject to modification

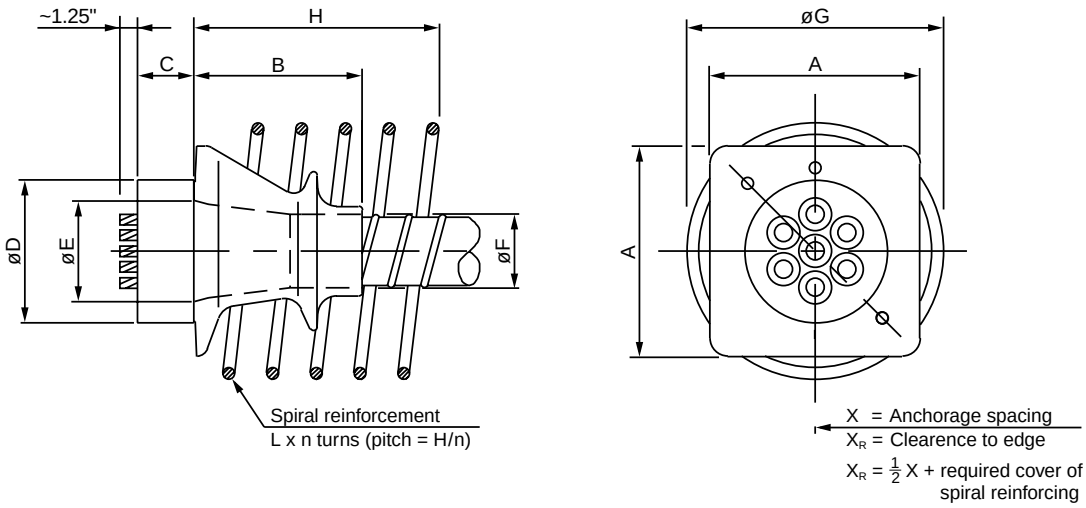
Anchorage spacings are in accordance with test requirements of FIP (Recommendations for Acceptance of Post-Tensioning Systems: March 1992). For proper design and detailing of anchorage zones and related reinforcement, refer to the VSL Publication "Detailing for Post-Tensioning".

Dimensions are valid for:

- *Nominal concrete cylinder strength at 28 days: 4,000 psi (28 MPa).*
- *Maximum prestressing force may be applied when concrete reaches a cylinder strength of 3,500 psi (24 MPa).*
- *Temporary overstressing to 80% of Guaranteed Ultimate Tensile Strength.*
- *Yield strength of spiral reinforcement: Grade 60 (400 MPa).*
- *Additional orthogonal reinforcement may be required in the local anchorage zone as determined by design.*
- *Spirals may be replaced by suitable orthogonal reinforcement.*
- *Information for other concrete strengths and conditions are available from your local VSL Representative.*

Spiral reinforcement shall be centered on the anchorage assembly and be placed directly behind the bearing plate.

Stressing Anchorage VSL Type EC



Tendon Unit		Dimensions Inches										
		A	B	C	øD	øE	øF	øG	H	L	n	X
Strand Type 0.5"	5-7	6.50	5.25	2.38	4.50	2.91	2.50	9.00	12.00	#4	6	9.50
	5-12	8.88	7.06	2.38	6.00	4.31	3.13	11.75	16.00	#4	8	12.50
	5-19	11.00	10.25	3.00	7.00	5.56	3.75	15.00	18.00	#5	8	15.75
	5-27	12.38	13.63	4.00	9.00	7.00	4.75	18.00	18.00	#6	8	18.75
	5-31	14.00	13.63	4.00	9.00	7.00	4.75	19.00	20.25	#6	9	20.00

Other sizes available on request

Subject to modification

Anchorage spacings are in accordance with test requirements of FIP (Recommendations for Acceptance of Post-Tensioning Systems: March 1992). For proper design and detailing of anchorage zones and related reinforcement, refer to the VSL Publication "Detailing for Post-Tensioning".

Dimensions are valid for:

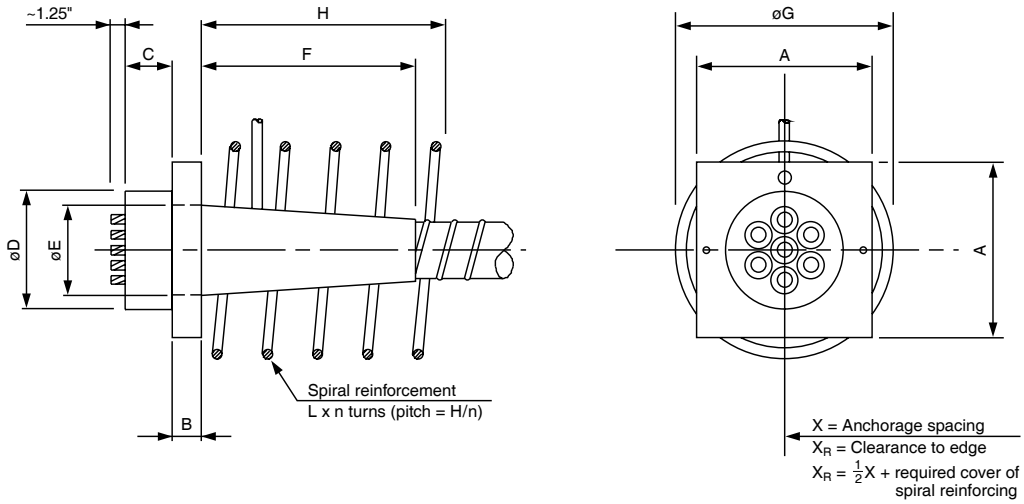
- *Nominal concrete cylinder strength at 28 days: 4,000 psi (28 MPa).*
- *Maximum prestressing force may be applied when concrete reaches a cylinder strength of 3,500 psi (24 MPa).*
- *Temporary overstressing to 80% of Guaranteed Ultimate Tensile Strength.*
- *Yield strength of spiral reinforcement: Grade 60 (400 MPa).*
- *Spirals may be replaced by suitable orthogonal reinforcement.*
- *Information for other concrete strengths and conditions are available from your local VSL Representative.*

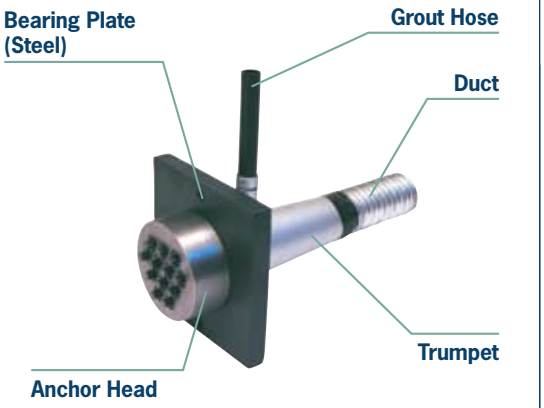
Spiral reinforcement shall be centered on the anchorage assembly and be placed directly behind the bearing plate.

Additional orthogonal reinforcement may be required in the local anchorage zone as determined by design.

VSL MULTISTRAND SYSTEMS:

Type E Stressing Anchorage





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Tendon Unit		Dimensions (Inches) A	B	C	øD	øE	F	øG	H	J	J [2]	L	n	X
0.5" Strand	5-1	2.76	0.59	1.77	1.65	0.59	2.76	3.15	3.54	0.98	1.18	#3	2	3.54
	5-3	4.53	0.79	1.97	3.54	1.97	7.48	5.12	5.91	1.57	1.17	#4	3	6.10
	5-4	5.12	0.79	1.97	3.74	2.17	7.48	6.30	5.91	1.77	1.97	#4	3	7.09
	5-7	6.89	0.98	2.17	4.33	2.91	7.48	8.07	7.87	2.17	2.36	#4	4	9.25
	5-12	9.06	1.38	2.36	5.91	4.09	14.57	11.22	9.84	2.56	2.83	#4	5	12.01
	5-19	11.42	1.57	2.95	7.09	5.31	18.50	14.37	11.81	3.15	3.43	#5	6	15.16
	5-22	12.40	1.77	3.35	7.48	5.91	18.90	15.55	14.17	3.35	3.62	#6	6	16.34
	5-31	14.57	2.17	3.74	9.06	6.77	21.65	18.50	15.75	3.94	4.21	#5	8	19.29
	5-37	15.94	2.36	4.13	9.45	7.40	22.44	20.08	16.54	4.72	5.00	#7	7	21.06
	5-43	17.32	2.36	4.33	10.24	8.50	26.77	21.65	18.90	5.12	5.39	#7	8	22.83
	5-55	19.69	2.76	5.12	11.42	9.06	26.77	24.41	21.26	5.51	5.91	#7	9	25.79
0.6" Strand	6-1	2.95	0.59	1.97	2.09	0.71	2.76	3.15	3.54	1.18	1.38	#3	2	4.13
	6-2	4.33	0.59	1.97	3.54	1.97	7.48	5.12	5.91	1.77	1.97	#4	3	5.91
	6-3	5.31	0.79	1.97	3.74	2.20	7.48	6.30	5.91	1.77	1.97	#4	3	7.28
	6-4	6.30	0.98	2.17	4.33	2.56	7.48	7.48	7.87	1.97	2.17	#4	4	8.27
	6-7	8.07	1.38	2.36	5.31	3.31	11.42	10.24	9.84	2.36	2.64	#4	5	11.02
	6-12	10.63	1.57	2.95	6.69	4.65	18.11	13.58	11.81	3.15	3.43	#5	6	14.37
	6-19	13.39	1.97	3.74	7.87	5.91	23.23	17.32	13.78	3.74	4.02	#5	9	18.11
	6-22	14.57	2.17	3.94	8.66	6.77	27.17	18.50	15.75	4.33	4.61	#6	8	19.49
	6-31	17.13	2.56	4.72	10.24	7.56	27.17	22.05	18.90	5.12	5.39	#7	8	23.23
	6-37	18.90	2.76	5.31	11.02	8.46	32.68	24.02	21.26	5.51	5.91	#7	9	25.20
	6-43	20.47	2.95	5.71	11.81	9.69	37.40	25.59	25.20	5.91	6.30	#8	8	27.17
	6-55	22.83	3.54	6.30	13.39	10.04	37.40	29.13	24.80	6.69	7.09	#8	9	30.71

Notes:

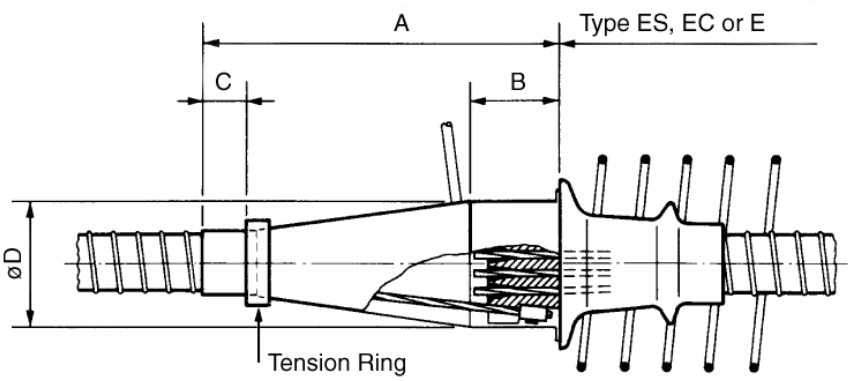
- Other sizes available on request.
- Anchorage spacings are in accordance with test requirements of FIP (Recommendations for Acceptance of Post-Tensioning Systems: March 1992). For proper design and detailing of anchorage zones and related reinforcement, refer to the VSL Publication *Detailing for Post-Tensioning*.

Dimensions are valid for:

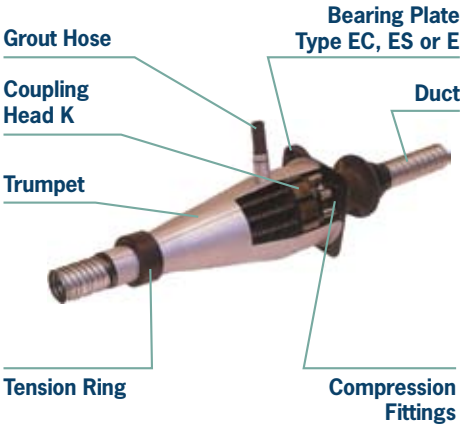
- Nominal minimum concrete cylinder strength at 28 days: 4000 psi (28 MPa).
- Maximum prestressing force may be applied when concrete reaches a cylinder strength of 3,500 psi (24 MPa).
- Temporary overstressing to 80% of Guaranteed Ultimate Tensile Strength.
- Yield strength of spiral reinforcement: Grade 60 (400 MPa).
- Information for other concrete strength and conditions are available from your local VSL Representative.
- Large bearing plates are available where bearing stress is arbitrarily limited to 3,000 psi (21 MPa) with the tendon locked off at 70% Guaranteed Ultimate Tensile Strength.
- Spiral reinforcement shall be centered on the anchorage assembly and be placed directly behind the bearing plate.
- Additional orthogonal reinforcement may be required in the local anchorage zone as determined by design.

VSL MULTISTRAND SYSTEMS:

Type K Coupler



Tendon Unit		Dimensions (Inches)			
		A	B	C	øD
0.5" Strand	5-3	16.93	5.51	1.57	5.12
	5-7	21.65	5.51	2.36	6.69
	5-12	25.59	5.51	2.36	7.87
	5-19	29.13	5.51	3.15	9.45
	5-22	32.68	5.51	3.54	10.24
	5-31	44.88	5.51	3.54	13.78
	5-37	51.97	7.09	4.72	15.35
	5-42	50.79	7.09	5.12	15.55
	5-55	53.94	7.87	5.91	16.54
0.6" Strand	6-2	14.96	5.91	1.18	5.51
	6-3	19.29	6.30	2.36	5.91
	6-4	20.47	6.30	2.36	6.30
	6-7	24.80	6.30	2.76	7.48
	6-12	28.74	6.30	3.15	9.45
	6-19	33.86	6.30	3.54	11.02
	6-22	36.61	6.30	3.54	12.20
	6-31	42.91	7.09	5.12	14.17
	6-37	54.72	7.87	5.12	16.93



Notes:

- Tension ring required as shown.
- Refer to applicable systems data sheet for bearing plate data and dimensions.
- Use of couplers requires special procedures and detailing. Contact your local VSL Representative.

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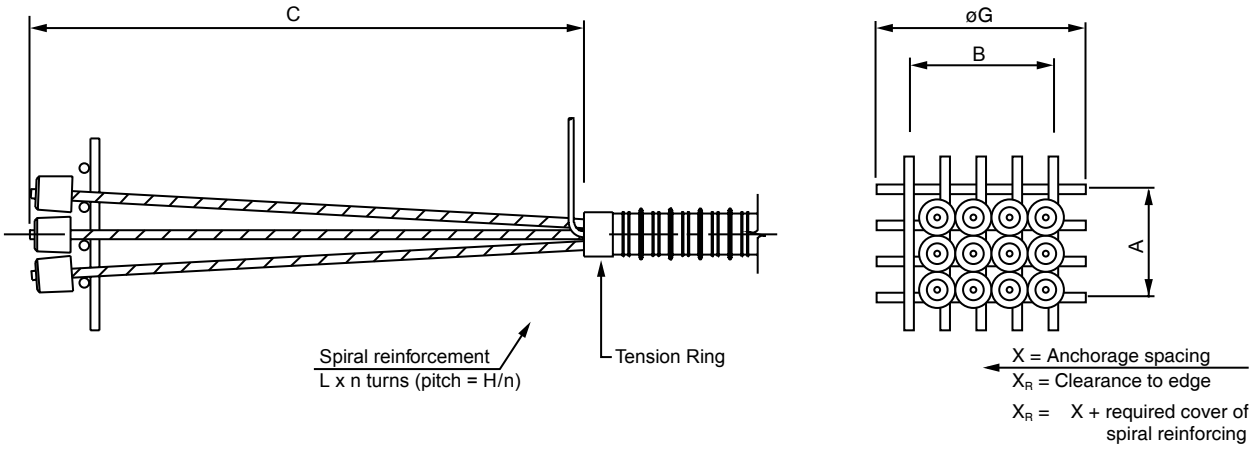
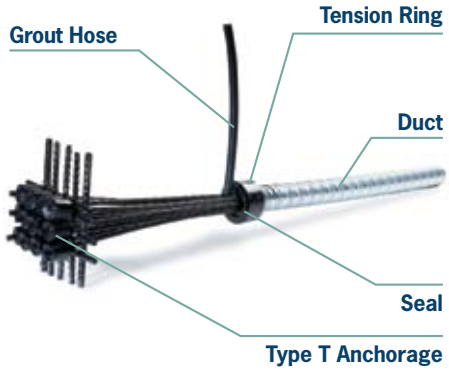
VSL MULTISTRAND SYSTEMS:

Type T Dead-End Anchorage



Tendon Unit		Dimensions (Inches)				
		A	B	C	øG	X
0.5" Strand	5-12	6.60	8.80	36.00	11.75	12.50
	5-19	11.00	11.00	36.00	15.00	15.75
	5-31	16.00	11.00	36.00	19.00	20.00
0.6" Strand	6-7	6.75	6.75	36.00		12.50
	6-12	6.75	6.00	36.00		15.75
	6-19	9.00	11.25	36.00		20.00



Notes:

- Anchorage spacings are in accordance with test requirement of AASHTO (The Special Anchorage Device Acceptance Test Procedure, AASHTO 2000).
- For proper design and detailing of anchorage zones and related reinforcement, refer to the VSL Publication *Detailing for Post-Tensioning*.

Dimensions are valid for:

- Nominal minimum concrete cylinder strength at 28 days: 4000 psi (28 MPa).
- Maximum prestressing force may be applied when concrete reaches a cylinder strength of 3,500 psi (24 MPa).
- Temporary overstressing to 80% of Guaranteed Ultimate Tensile Strength.
- Information for other concrete strength and conditions are available from your local VSL Representative.

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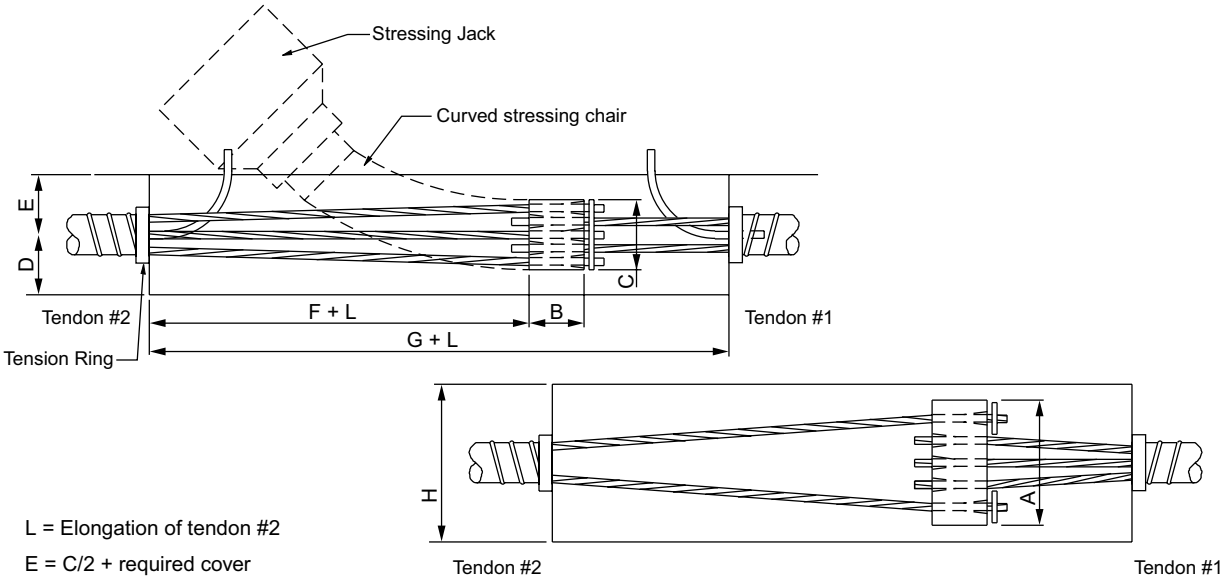
VSL MULTISTRAND SYSTEMS:

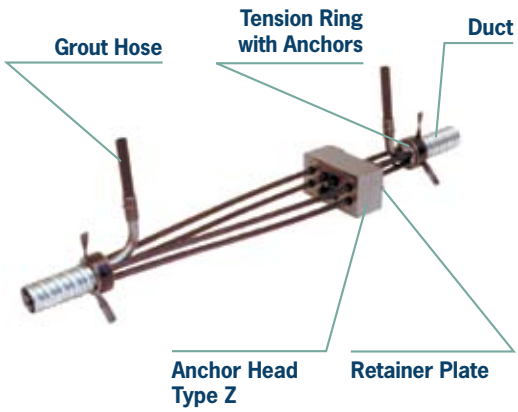
Type Z Intermediate Anchorage



L = Elongation of tendon #2

E = C/2 + required cover

Tendon Unit		Dimensions (Inches)						
		A	B	C	D	F [2]	G [2]	H
0.5" Strand	5-2 [1]	5.12	2.36	3.15	2.36	15.75	22.05	6.69
	5-4 [1]	6.30	2.76	3.54	2.56	19.69	28.35	7.87
	5-6	7.87	3.54	5.12	3.35	23.62	35.04	9.45
	5-8	8.62	4.12	4.50	3.00	29.50	46.38	10.25
	5-12	11.02	5.51	5.51	3.54	39.37	56.69	12.60
	5-22	13.78	6.69	7.87	4.72	57.09	81.50	15.35
0.6" Strand	6-2 [1]	5.51	2.76	3.54	2.56	17.72	24.41	7.09
	6-4 [1]	6.69	3.15	3.94	2.76	35.43	44.49	8.27
	6-6	8.27	3.94	5.51	3.54	39.37	51.97	9.84
	6-12	11.81	6.30	6.30	3.94	53.15	75.20	13.39
	6-22	15.75	7.48	9.84	5.71	59.06	90.16	17.32



Notes:

- Tension ring required on #2 side of the anchorage.
- Blockout dimensions dependent upon the shape of the concrete surface and the tendon elongation.
- The values stated apply for surfaces which are not curved.

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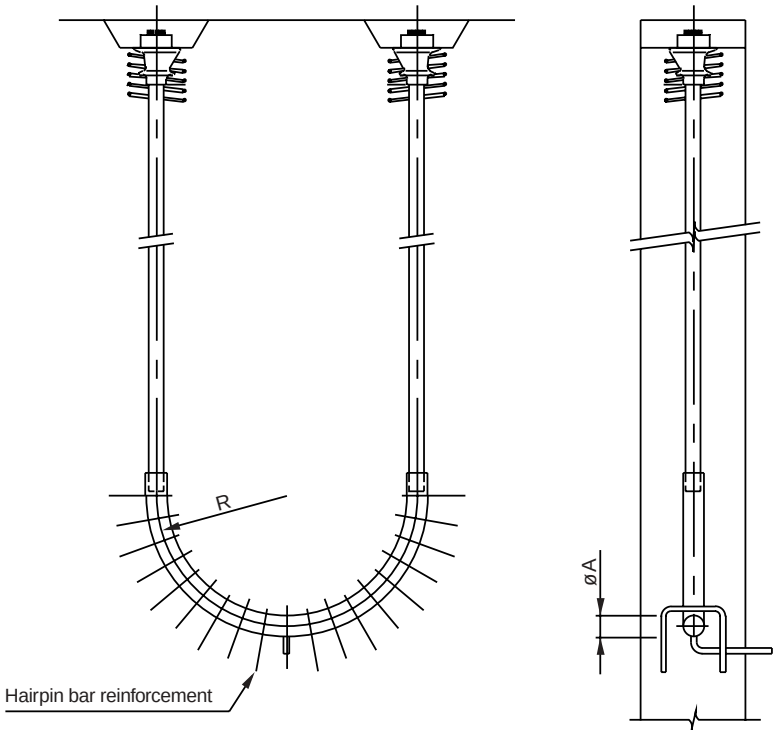
Dead-End Anchorage VSL Type L



Tendon Unit		Dimensions Inches		
		øA Internal	øA External	R min.
Strand Type 0.5"	5-7	2.62	2.88	24.00
	5-12	3.50	3.75	36.00
	5-19	3.94	4.19	36.00
	5-31	5.75	6.00	36.00

Other sizes available on request

Subject to modification

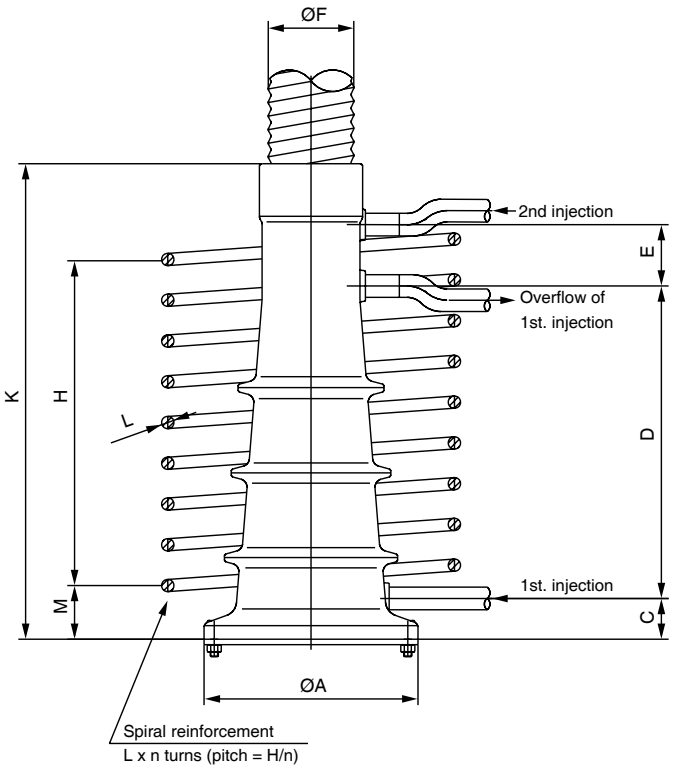
For proper design and detailing of anchorage zones and related reinforcement, refer to the VSL Publication "Detailing for Post-Tensioning".

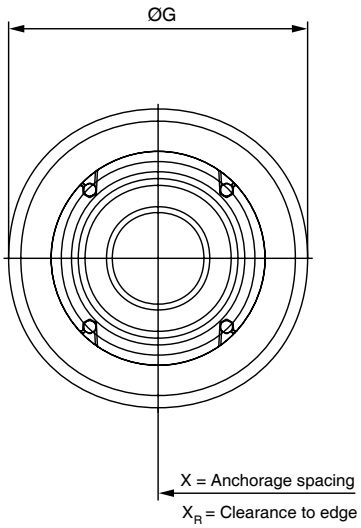
Dimensions are valid for:

- *Nominal concrete cylinder strength at 28 days: 4,000 psi (28 MPa).*
- *Maximum prestressing force may be applied when concrete reaches a cylinder strength of 3,500 psi (24 MPa).*
- *Temporary overstressing to 80% of Guaranteed Ultimate Tensile Strength.*
- *Yield strength of spiral reinforcement: Grade 60 (400 MPa).*
- *Custom size VSL Loops are available.*
- *Information for other concrete strengths and conditions are available from your local VSL Representative.*
- *Simultaneous stressing of both tendon ends is necessary.*

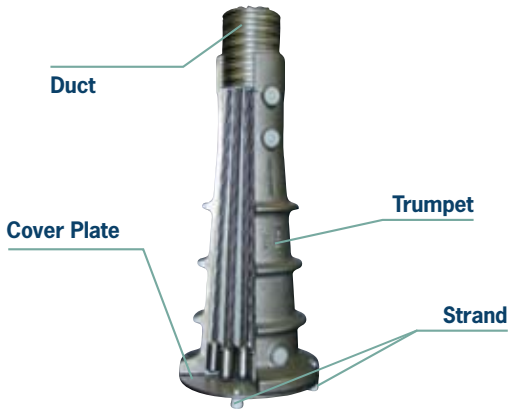
VSL MULTISTRAND SYSTEMS:

Type AF Dead-End Anchorage





Tendon Unit		Dimensions (Inches)												
		øA	C	D	E	øF Int.	øF (2) Ext.	øG	H	K	øL	n	M	X
0.6" Strand	6-12	10.43	2.36	18.11	3.54	3.74	4.02	14.96	17.72	27.56	#5	9.00	2.36	16.00
	6-19	12.40	2.36	18.11	3.54	4.72	5.00	18.90	21.26	27.56	#6	9.00	2.36	20.00
	6-31	14.76	2.36	25.98	3.54	5.91	6.18	24.41	25.98	35.43	#7	12.00	3.15	26.00



Notes:

- Anchorage spacings are in accordance with test requirement of AASHTO (The Special Anchorage Device Acceptance Test Procedure, AASHTO 2000).
- For proper design and detailing of anchorage zones and related reinforcement, refer to the VSL Publication *Detailing for Post-Tensioning*.

Dimensions are valid for:

- Nominal minimum concrete cylinder strength at 28 days: 4000 psi (28 MPa).
- Maximum prestressing force may be applied when concrete reaches a cylinder strength of 3,500 psi (24 MPa).
- Temporary overstressing to 80% of Guaranteed Ultimate Tensile Strength.
- Yield strength of spiral reinforcement: Grade 60 (400 MPa).
- Spirals may be replaced by suitable orthogonal reinforcement.
- Information for other concrete strength and conditions are available from your local VSL Representative.

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VSL MULTISTRAND SYSTEMS:

PT-Plus™ Duct

Ducts PT-Plus™ System

Polypropylene (PP) Plastic Duct

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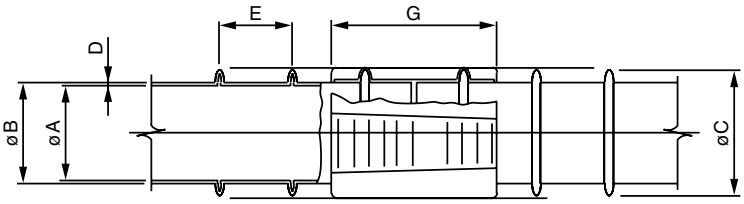
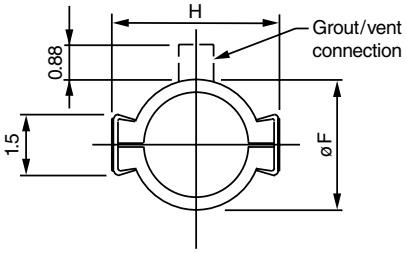
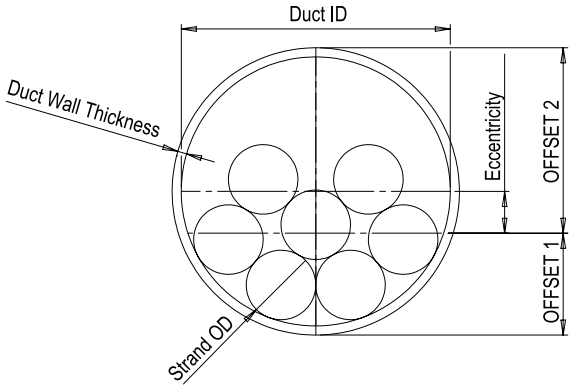




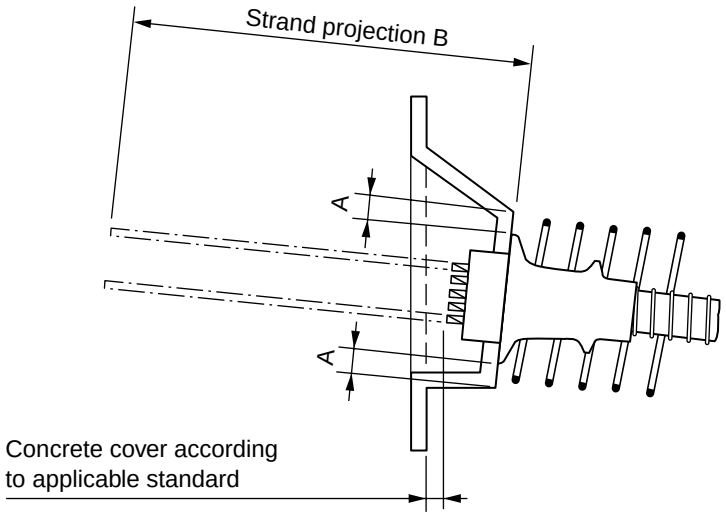
Type	Unit	Dimensions (Inches)							
	0.6"	ØA	ØB	ØC	D	E	F	G	H
59mm	6-7	2.28	2.48	2.87	0.10	1.65	3.23	4.25	4.17
76mm	6-12	2.99	3.19	3.58	0.10	2.00	3.94	4.57	4.88
100mm	6-19 / 22	3.94	4.17	4.57	0.12	2.00	4.84	4.96	5.79
115mm	6-27	4.53	4.76	5.16	0.12	2.36	5.43	5.00	5.83
130mm	6-31 / 37	5.12	5.35	5.75	0.12	2.00	6.14	5.47	6.97
150mm	6-43 / 55	5.91	6.18	6.57	0.14	2.36	6.89	4.96	7.28

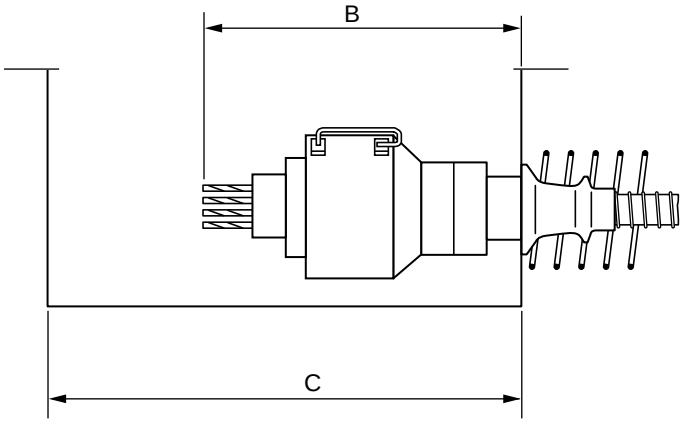
Eccentricity of the Center of Gravity of Strands

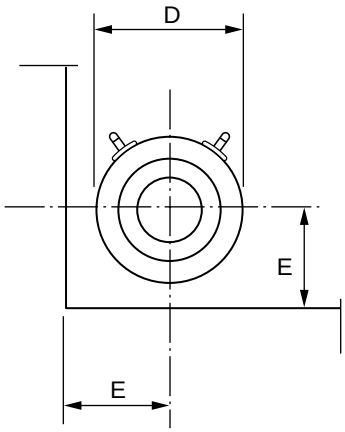
Duct	System	Eccentricity	Offset 1	Offset 2
59mm	6-7	0.36	0.88	1.60
76mm	6-12	0.48	1.11	2.08
100mm	6-19	0.72	1.37	2.81
100mm	6-22	0.57	1.51	2.66
115mm	6-27	0.75	1.63	3.13
130mm	6-31	0.99	1.73	3.71
130mm	6-37	0.77	1.95	3.48
150mm	6-43	1.11	1.99	4.20
150mm	6-55	0.72	2.37	3.82



Block Out Dimensions and Clearance Requirement







Jack Type	A min.	B	C	D	E
ZPE-23FJ	-	12.00	47.25	4.57	3.50
ZPE-30	1.18	24.00	43.50	5.51	4.00
ZPE-3	1.18	22.00	39.50	7.87	6.00
ZPE-60	1.18	26.00	43.50	7.09	5.50
ZPE-7A	1.18	32.00	47.25	11.81	8.00
ZPE-12St2	1.97	28.00	51.25	12.20	8.00
ZPE-200	1.97	44.00	82.75	12.99	8.25
ZPE-19	1.97	34.00	59.25	15.35	10.00
ZPE-460/31	2.36	28.00	59.25	19.09	12.00
ZPE-500	3.15	46.00	78.75	23.03	13.00
ZPE-750	3.15	54.00	90.75	22.44	14.50
ZPE-1000	3.15	52.00	86.75	31.10	17.75
ZPE-1250	3.54	54.00	88.75	25.98	14.75

Dimensions in inches.

Stressing Jack Data

Type I (ZPE-23FJ)

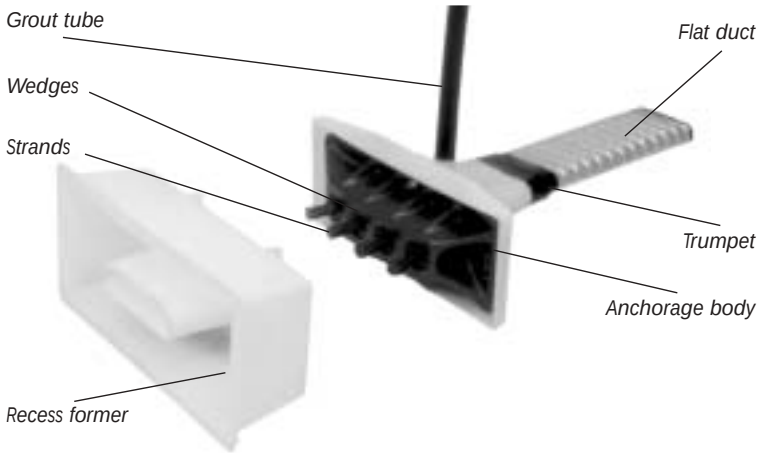
Type II (ZPE-19)

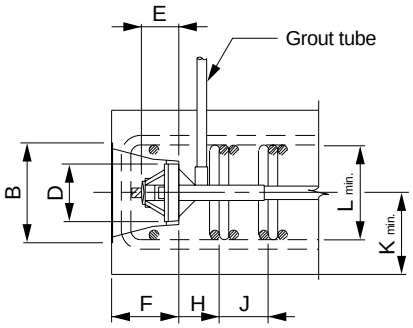
Type III (ZPE-500)

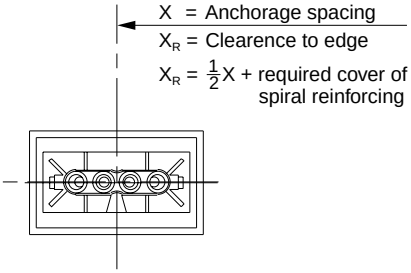
Designation	ZPE-23FJ	ZPE-30	ZPE-3	ZPE-60	ZPE-7A	ZPE-12St2	ZPE-200	ZPE-19	ZPE-460/31	ZPE-500	ZPE-750	ZPE-1000
Type	I	III	III	III	III	II	III	II	II	III	II	III
Length (in)	31.10	28.35	18.70	24.21	27.17	21.65	37.80	29.53	22.83	39.37	46.65	47.24
Diameter (in)	4.57	5.51	7.87	7.09	11.02	12.20	12.40	15.35	19.09	21.65	20.47	31.10
Stroke (in)	7.87	9.84	6.30	9.84	6.30	3.94	11.81	3.94	3.94	7.87	5.91	7.87
Piston area (in^²)	7.30	9.04	16.06	19.59	31.56	47.96	50.48	77.55	124.62	138.66	193.29	280.47
Capacity (kips)	52	72	112	142	239	416	450	652	1048	1124	1686	2248
Pressure (psi)	7078	7963	7005	7252	7585	8673	8905	8412	8412	8108	8717	8021
Weight (lb)	51	62	104	163	254	333	672	648	959	2346	2425	5049
Used for 13 mm (0.5") tendon types	5-1	5-1	5-2, 5-3	5-2 to 5-4	5-6, 5-7	5-12	5-12	5-18 5-19	5-22 5-31	5-22 5-31	5-31 5-37	5-37 to 5-55
Used for 15 mm (0.6") tendon types	6-1	6-1	6-2	6-2, 6-3	6-4	6-6, 6-7	6-6, 6-7	6-12	6-18, 6-19	6-18 to 6-22	6-31	6-31 to 6-43

Other sizes available on request

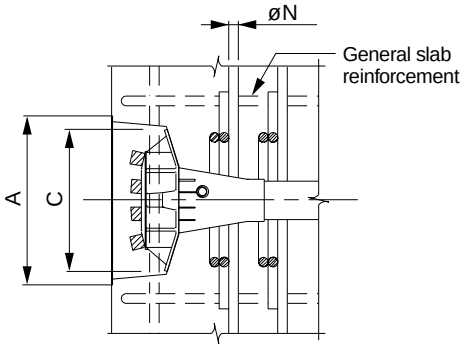
Stressing Anchorage VSL Type SO

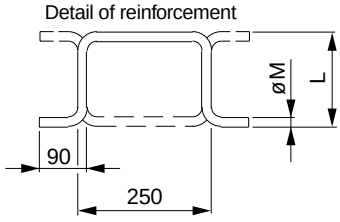






For proper design and detailing of anchorage zones and related reinforcement, refer to the VSL Publication "Detailing for Post-Tensioning". The arrangement shown here is common for slabs in buildings.





Type	A	B	C	D	E	F	H[2]	J	K_{min}	L_{min}[3]	M	N	X
6-4[1]	13.00	6.62	11.25	4.90	3.00	5.00	K-1.2	3.00	4.75	1.5 x K	#4	#5	13.88

Other sizes available on request

Subject to modification

For proper design and detailing of anchorage zones and related reinforcement, refer to the VSL Publication "Detailing for Post-Tensioning".

Dimensions in inches.

Dimensions are valid for:

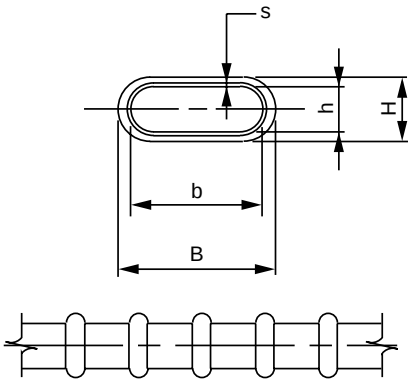
- *Nominal concrete cylinder strength at 28 days: 4,000 psi (28 MPa).*
- *Maximum prestressing force may be applied when concrete reaches a cylinder strength of 80% of its nominal strength or 3,500 psi (24 MPa) whichever is less.*
- *Temporary overstressing to 80% of Guaranteed Ultimate Tensile Strength.*
- *Information for other concrete strengths and conditions are available from your local VSL Representative.*

1) Anchorage may be used with 0.5" (12.7 mm) or 6" (15.2 mm) strand.

2) Use actual K when calculating H.

3) L shall be the maximum permitted by the slab thickness and cover, whereas L_{mm} = 1.5 x K.

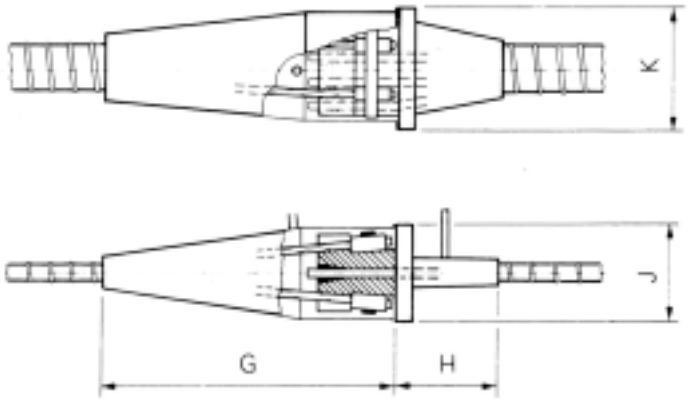
Dimensions of Ducts



	Tendon unit	h	H	b	B	s
Plastic duct PT-PLUS™	5-2, 6-2	0.75	1.18	1.65	2.09	0.08
Plastic duct PT-PLUS™	5-4, 6-4	0.83	1.38	2.83	3.39	0.08
Steel duct	5-4, 6-4	0.71	0.83	2.83	2.95	0.01

Dimensions in inches.

Coupler VSL Type SK

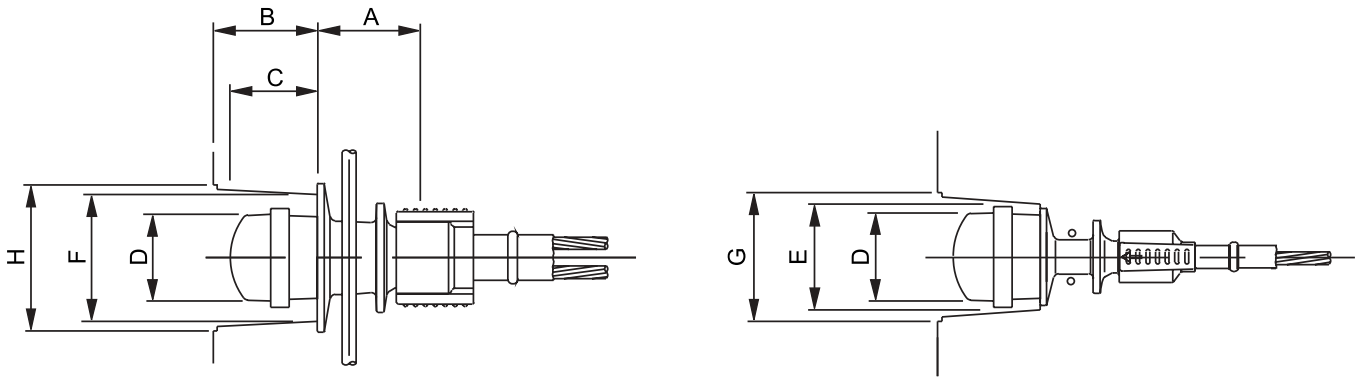


Type	G	H	J	K
SK 5-4	16.06	5.91	5.51	6.69

Dimensions in inches.

Dimensions are valid for nominal concrete strength: 20 MPa (cube), 16 MPa (cylinder), at the time of stressing, for a maximum stressing force of 80% of the tendon breaking load.

VSLAB®+ Stressing Anchorage

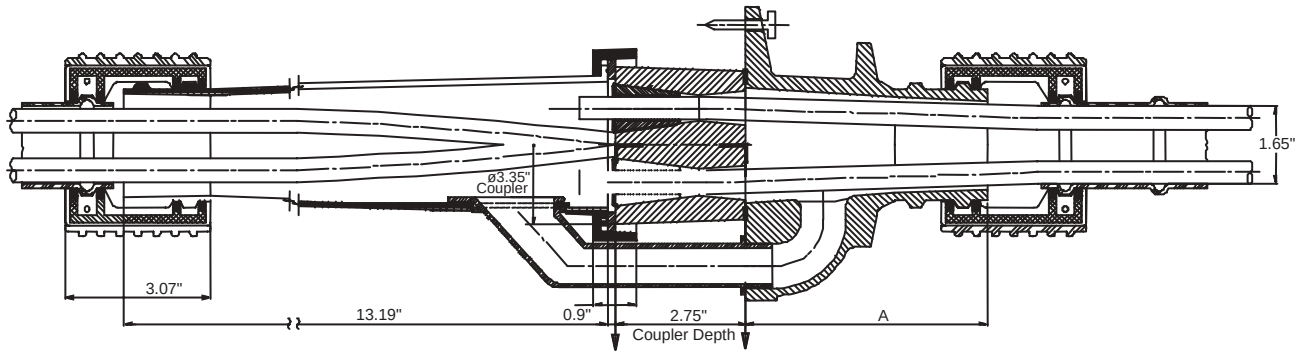


Type	A	B	C	D	E	F	G	H
VSLAB	5.12	4.13	3.27	3.07	4.02	5.63	4.72	6.42

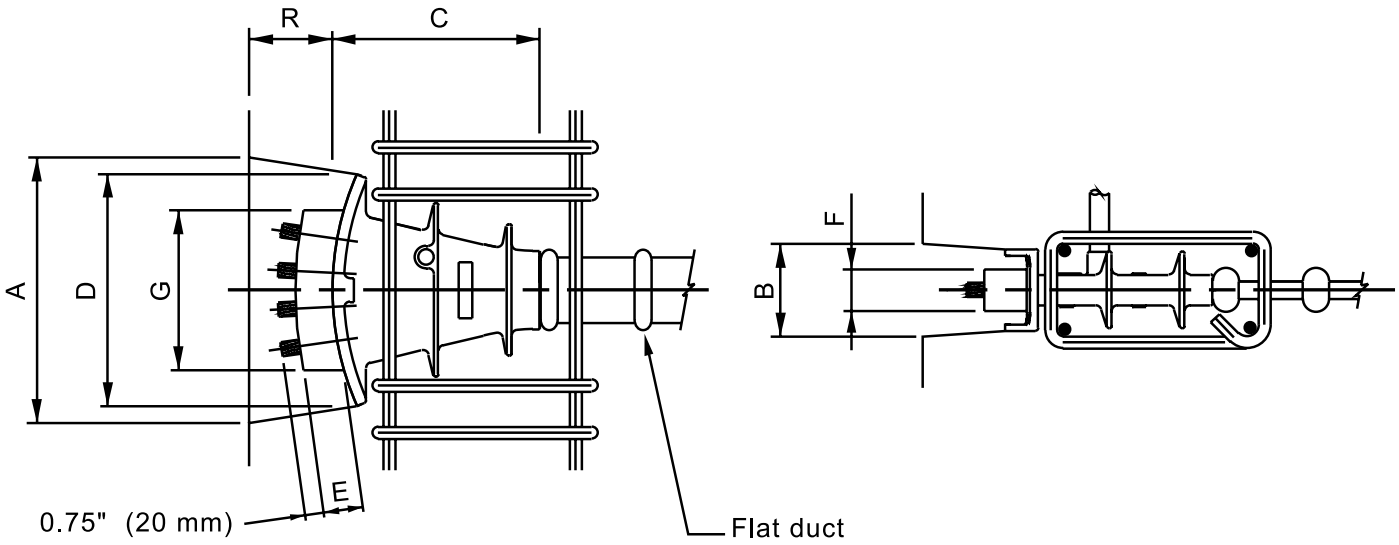
Dimensions in inches.

Dimensions are valid for nominal concrete strength: 3,000 psi (20 MPa) cylindrical strength, at the time of stressing, for a maximum stressing force of 80% of the tendon breaking load.

VSLAB®+ Intermediate Anchorage



Stressing Anchorage VSL Type SA



Type	A	B	C	D	E	F	G	R
SA5-4	10.42	3.70	8.50	9.75	1.75	1.96	6.75	4.33
SA5-5	10.42	3.70	8.50	9.75	1.75	1.96	8.25	4.33
SA6-4	10.42	3.70	8.50	9.75	2.24	2.64	7.51	4.33

Other sizes available on request

Subject to modification

For proper design and detailing of anchorage zones and related reinforcement, refer to the VSL Publication "Detailing for Post-Tensioning".

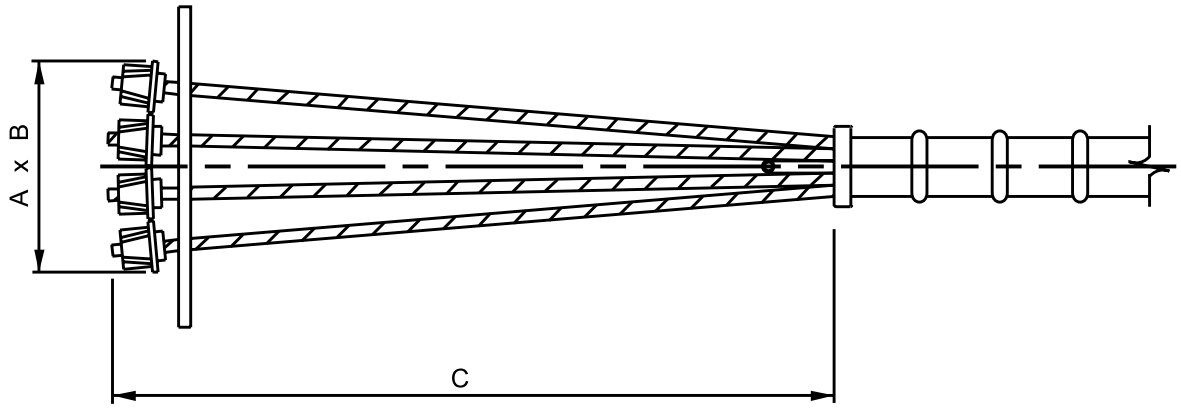
Dimensions in inches.

Dimensions are valid for:

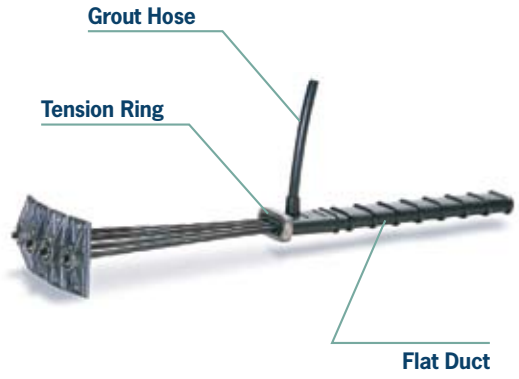
- *Nominal concrete cylinder strength at 28 days: 4,000 psi (28 MPa).*
- *Maximum prestressing force may be applied when concrete reaches a cylinder strength of 80% of its nominal strength or 3,000 psi (20 MPa) whichever is less.*
- *Temporary overstressing to 80% of Guaranteed Ultimate Tensile Strength.*
- *Information for other concrete strengths and conditions are available from your local VSL Representative.*

VSL BONDED SLAB POST-TENSIONING SYSTEMS:

Type N Stressing Anchorage



Type	Dimensions (Inches)		
	Vertical		
	A	B	C
N 5-4	9.75	5	36
N 5-5	12.25	5	36
N 6-4	14.00	6	36



Notes:

- Other sizes available on request.
- For proper design and detailing of anchorage zones and related reinforcements, refer to the VSL Publication *Detailing for Post-Tensioning*.
- Tension ring required.

Dimensions are valid for:

- Nominal concrete cylinder strength at 28 days: 4000 psi (28 MPa).
- Maximum prestressing force may be applied when concrete reaches a cylinder strength of 80% of its nominal strength or 3,000 psi (20 MPa) whichever is less.
- Temporary overstressing to 80% of Guaranteed Ultimate Tensile Strength.
- Information for other concrete strength and conditions are available from your local VSL Representative.

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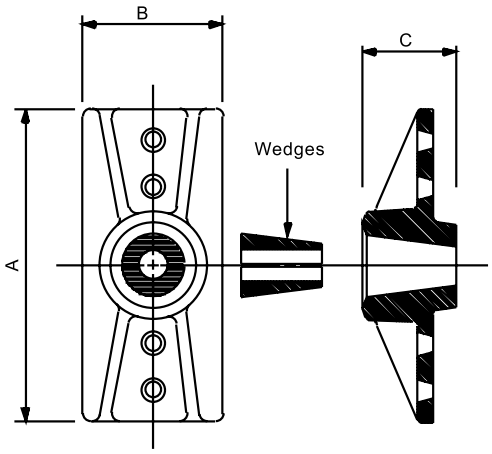
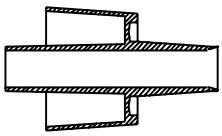
Type S5N / S6N Anchorages

Anchorages

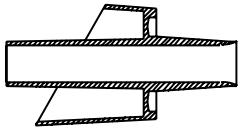
Type	Dimensions (Inches)		
	A	B	C
S5N	5.00	2.25	1.50
S6N	4.63	3.50	1.88



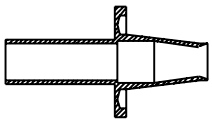
Standard Pocket Formers



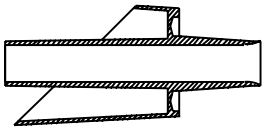
Standard



30°

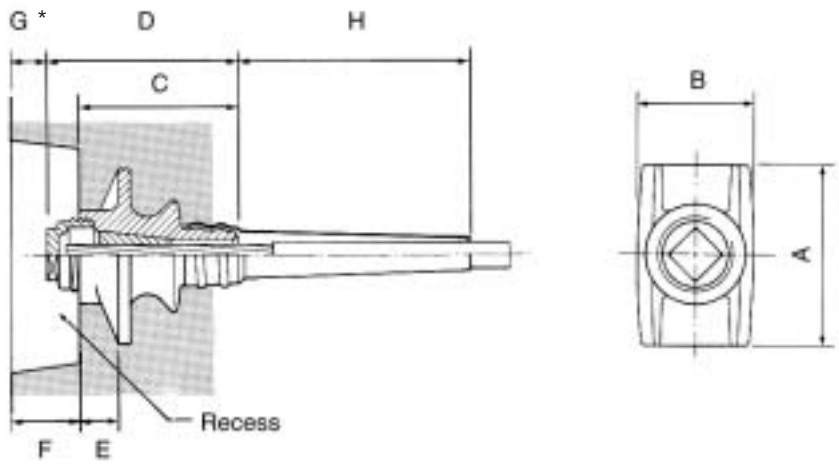


Split



45°

Stressing Anchorage VSL Type S-6



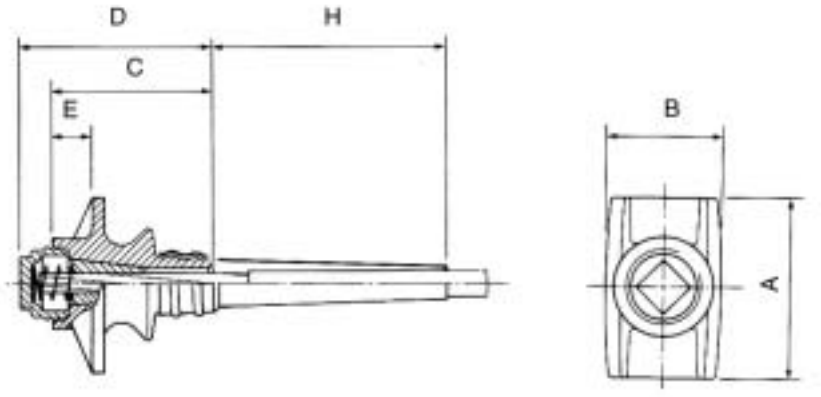
Type	A	B	C	D	E	F	G	H
S-6	4.13	2.95	4.33	4.53	0.91	1.57	0.79	6.25

** for 0.79" cover, to be adjusted for other values as needed.*

Dimensions in inches.

Dimensions are valid for nominal concrete strength: 3,000 psi (20 MPa), at the time of stressing, for a maximum stressing force of 80% of the tendon breaking load.

Dead-End Anchorage VSL Type SF-6

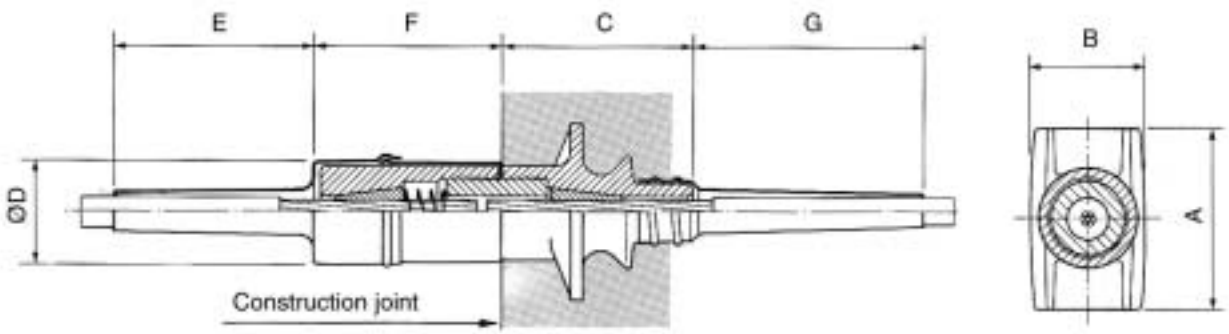


Type	A	B	C	D	E	H
SF-6	4.13	2.95	3.74	4.53	0.91	6.25

Dimensions in inches.

Dimensions are valid for nominal concrete strength: 3,000 psi (20 MPa), at the time of stressing, for a maximum stressing force of 80% of the tendon breaking load.

Coupler VSL Type SK-6

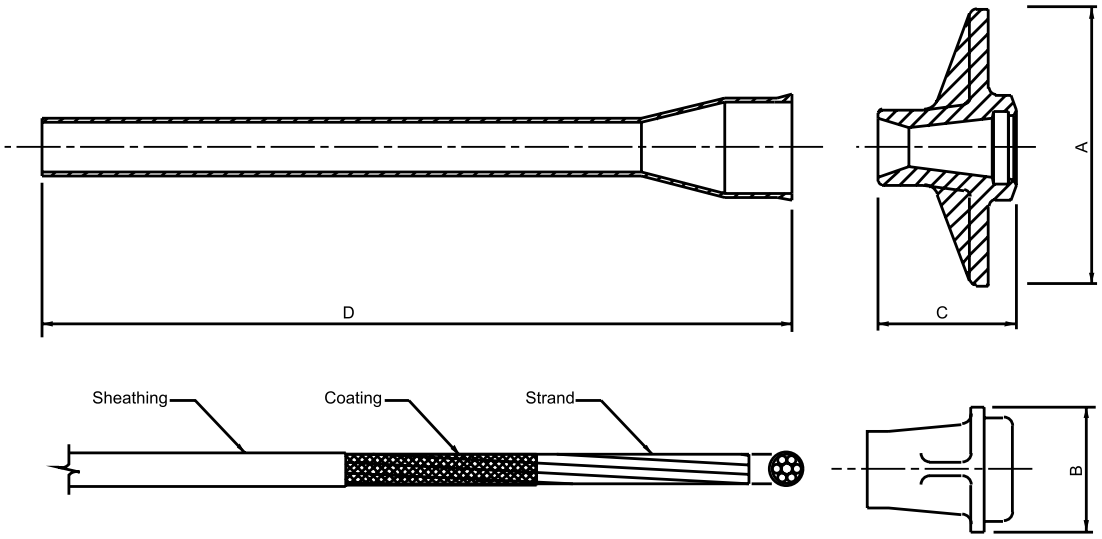


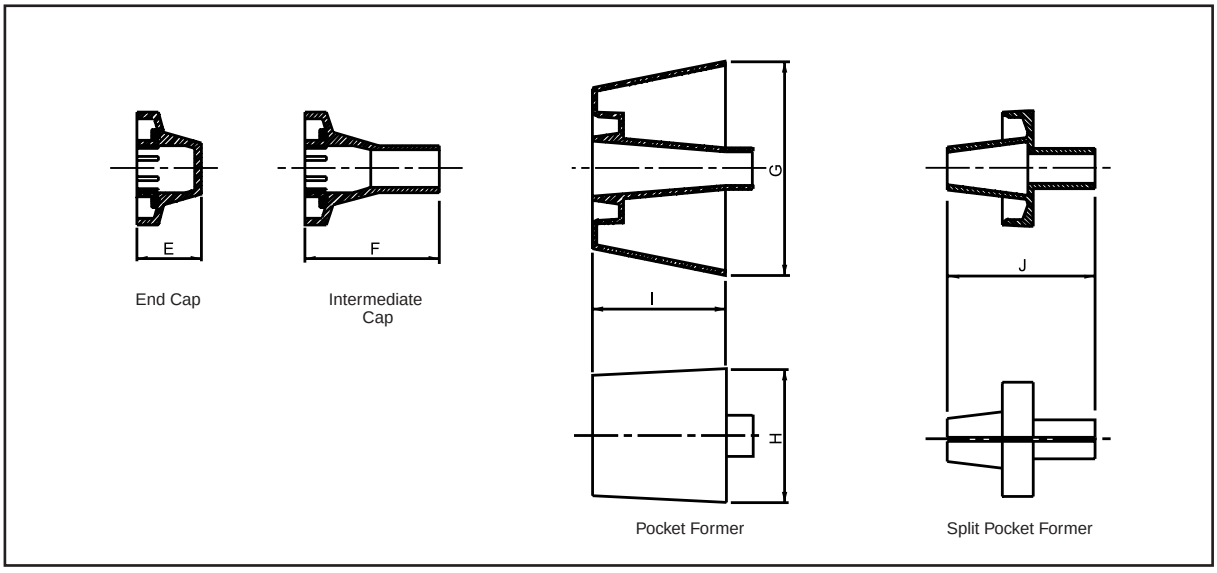
Type	A	B	C	øD	E	F	G
SK-6	4.13	2.95	4.33	2.56	4.53	4.53	6.25

Dimensions in inches.

Dimensions are valid for nominal concrete strength: 3,000 psi (20 MPa), at the time of stressing, for a maximum stressing force of 80% of the tendon breaking load.

Anchorage VSL Type S5CP+





Type	A	B	C	D	E	F	G	H	I	J
CP+	5.00	2.25	2.50	15	1.50	2.5	4	2.5	2.5	2.81

LAMPIRAN 3

HASIL *OUTPUT* PROGRAM ADAPT-PT UNTUK BALOK INDUK BETON PRATEGANG

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| ADAPT CORPORATION |
| STRUCTURAL CONCRETE SOFTWARE SYSTEM |
| 1733 Woodside Road, Suite 220, Redwood City, California 94061 |

| ADAPT-PT FOR POST-TENSIONED BEAM/SLAB DESIGN |
| Version 7.10 AMERICAN (ACI 318-02/IBC-03) |
| ADAPT CORPORATION - Structural Concrete Software System |
| 1733 Woodside Road, Suite 220, Redwood City, California 94061 |
| Phone: (650)306-2400, Fax: (650)364-4678 |
| Email: Support@AdaptSoft.com, Web site: http://www.AdaptSoft.com |

DATE AND TIME OF PROGRAM EXECUTION: Feb 15,2013 At Time: :29
PROJECT FILE: perhitungan balok prategang dengan gempa

P R O J E C T T I T L E:
Balok Beton Prategang Lantai 2
As 5B-5C

1 - USER SPECIFIED G E N E R A L D E S I G N P A R A M E T E R S

CONCRETE:

STRENGTH at 28 days, for BEAMS/SLABS	35.00	N/mm^2
for COLUMNS	45.00	N/mm^2
MODULUS OF ELASTICITY for BEAMS/SLABS	27806.00	N/mm^2
for COLUMNS	31529.00	N/mm^2
CREEP factor for deflections for BEAMS/SLABS	2.00	
CONCRETE WEIGHT	NORMAL	
SELF WEIGHT	2400.00	Kg/m^3

TENSION STRESS limits (multiple of (f'c)1/2)

At Top	.500
At Bottom	.500

COMPRESSION STRESS limits (multiple of (f'c))

At all locations	.450

REINFORCEMENT:

YIELD Strength	400.00	N/mm^2
Minimum Cover at TOP	120.00	mm
Minimum Cover at BOTTOM	120.00	mm

POST-TENSIONING:

SYSTEM	BONDED	
Ultimate strength of strand	1860.00	N/mm^2

Average effective stress in strand (final)	1200.00	N/mm^2

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.....	98.700 mm^2
.....	160.00 mm
for INTERIOR spans..	160.00 mm
Min CGS of tendon from BOTTOM for EXTERIOR spans..	160.00 mm
Min average precompression	.85 N/mm^2
Max spacing between strands (factor of slab depth)	8.00
Tendon profile type and support widths.....	(see section 9)

ANALYSIS OPTIONS USED:

Structural system	BEAM
Moment of Inertia over support is	NOT INCREASED
Effective flange width consideration	YES
Effective flange width implementation method	ACI-318

2 - I N P U T G E O M E T R Y

2.1.1 PRINCIPAL SPAN DATA OF UNIFORM SPANS

SPAN	FORM	LENGTH	WIDTH	DEPTH	TOP FLANGE width	TOP FLANGE thick.	BOTTOM/MIDDLE FLANGE width	BOTTOM/MIDDLE FLANGE thick.	REF HEIGHT	MULTIPLIER left	MULTIPLIER right
		m	mm	mm	mm	mm	mm	mm	mm		
1	1	20.00	600	1200					1200	.50	.50

LEGEND:

1 - SPAN
C = Cantilever

3 - FORM
1 = Rectangular section
2 = T or Inverted L section
3 = I section
4 = Extended T or L section
7 = Joist
8 = Waffle

11 - Top surface to reference line

2.2 - S U P P O R T W I D T H A N D C O L U M N D A T A

JOINT	SUPPORT WIDTH	LOWER COLUMN LENGTH	LOWER COLUMN B(DIA)	LOWER COLUMN D	LOWER COLUMN CBC*	UPPER COLUMN LENGTH	UPPER COLUMN B(DIA)	UPPER COLUMN D	UPPER COLUMN CBC*
	mm	m	mm	mm		m	mm	mm	
1	0	8.00	1500	1500	(1)	8.00	1500	1500	(1)
2	0	8.00	1500	1500	(1)	8.00	1500	1500	(1)

*THE COLUMN BOUNDARY CONDITION CODES (CBC)

Fixed at both ends ...(STANDARD)	= 1
Hinged at near end, fixed at far end	= 2

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ar end ..... = 3
rotational fixity at far end .. = 4

3 - I N P U T A P P L I E D L O A D I N G

<---CLASS---> <----------TYPE---------->
D = DEAD LOAD U = UNIFORM P = PARTIAL UNIFORM
L = LIVE LOAD C = CONCENTRATED M = APPLIED MOMENT
Li= LINE LOAD
SW= SELF WEIGHT Computed from geometry input and treated as dead loading
Unit selfweight W = 2400.0 Kg/m^3

SPAN	CLASS	TYPE	Intensity kN/m^2	(From ... m	To) m	(M or C ...At) (kN-m or kN...m)	Total on Trib kN/m
1	L	Li		.00	20.00		20.000
1	D	Li		.00	20.00		5.800
1	SW	U		.00	20.00		16.952

NOTE: LIVE LOADING is SKIPPED with a skip factor of 1.00

3.1 - LOADING AS APPEARS IN USER`S INPUT SCREEN PRIOR TO PROCESSING

SPAN	CLASS	TYPE	UNIFORM (kN/m^2), LINE(kN/m)	(CON. or PART.) (kN@m or m-m)	(M O M E N T) (kN-m @ m)	
1	L	L	20.000	.00	20.00	
1	D	L	5.800	.00	20.00	

NOTE: SELFWEIGHT INCLUSION REQUIRED
LIVE LOADING is SKIPPED with a skip factor of 1.00

4 - C A L C U L A T E D S E C T I O N P R O P E R T I E S

4.1 For Uniform Spans and Cantilevers only

SPAN	<------ Tributary Width ------> AREA	Yb	Yt	<---------- Effective Width ----------> b_eff	I	Yb	Yt

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	mm	mm	mm^4	mm	mm
	500.00	.00	.8640E+11	600.00	600.00

Note:
--- = Span/Cantilever is Nonuniform, see block 4.2

5 - D E A D L O A D M O M E N T S, S H E A R S & R E A C T I O N S

SPAN	< 5.1 S P A N M O M E N T S (kNm) > M(l)*	Midspan	M(r)*	< 5.2 SPAN SHEARS (kN) > SH(l)	SH(r)
1	-744.47	393.11	-744.47	-227.52	227.52

Note:
* = Centerline moments

JOINT	< 5.3 REACTIONS (kN) >	<- 5.4 COLUMN MOMENTS (kNm) -> Lower columns	Upper columns
1	227.52	-372.24	-372.24
2	227.52	372.24	372.24

6 - L I V E L O A D M O M E N T S, S H E A R S & R E A C T I O N S

<-- 6.1 L I V E L O A D SPAN MOMENTS (kNm) and SHEAR FORCES (kN) -->

	<----- left* ----->		<--- midspan --->		<---- right* ----->		<--SHEAR FORCE-->	
SPAN	max	min	max	min	max	min	left	right
1	-654.43	.00	345.57	.00	-654.43	.00	-200.00	200.00

Note:
* = Centerline moments

	<- 6.2 REACTIONS (kN) ->		<-------- 6.3 COLUMN MOMENTS (kNm) --------> <--- LOWER COLUMN --->		<--- UPPER COLUMN --->	
JOINT	max	min	max	min	max	min
1	200.00	.00	.00	-327.22	.00	-327.22
2	200.00	.00	327.22	.00	327.22	.00

Note: Block 6.1 through 6.3 values are maxima of all skipped loading cases

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ENTS (kNm)

Maxima of dead load and live load span moments combined
for serviceability checks (1.00DL + 1.00LL)

SPAN	<----- left* ------> max	min	<---- midspan ----> max	min	<----- right* -----> max	min
1	-1398.90	-744.50	738.70	393.10	-1398.90	-744.50

Note:
* = Centerline

8 - SUM OF DEAD AND LIVE MOMENTS (kNm)

Maxima of dead load and live load span moments combined
for serviceability checks (1.00DL + 1.00LL)

SPAN	<----- left* ------> max	min	<---- midspan ----> max	min	<----- right* -----> max	min
1	-1398.90	-744.50	738.70	393.10	-1398.90	-744.50

Note:
* = Centerline

9 - SELECTED POST-TENSIONING FORCES AND TENDON PROFILES

9.1 PROFILE TYPES AND PARAMETERS
LEGEND:
For Span:
1 = reversed parabola
2 = simple parabola with straight portion over support
3 = harped tendon

For Cantilever:
1 = simple parabola
2 = partial parabola
3 = harped tendon

9.2

	T E N D O N TYPE	P R O F I L E X1/L	X2/L	X3/L	A/L
1	1	.100	.500	.100	.000

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FORCES AND TENDON DRAPE
==========

Tendon editing mode selected: TENDON SELECTION

SPAN	SELECTED VALUES FORCE (kN/-)	DISTANCE OF CGS (mm) Left	Center	Right	CALCULATED VALUES P/A (N/mm^2)	Wbal (kN/-)	Wbal (%DL)
1	2450.214	600.00	160.00	600.00	3.40	21.562	95

Approximate weight of strand ..... 325.5 Kg

9.35 - TENDON SELECTION DATA:

TYPE	SEL.	FORCE (kN)	TENDON EXTENTS <1>
B	10	118.15	<=====|
C	10	118.15	|=====>

9.5 R E Q U I R E D MINIMUM P O S T - T E N S I O N I N G FORCES (kN)

SPAN	BASED ON STRESS CONDITIONS LEFT*	CENTER	RIGHT*	BASED ON MINIMUM P/A LEFT	CENTER	RIGHT
1	2007.59	821.49	2007.60	612.00	612.00	612.00

Note:
* = Centerline

9.6 S E R V I C E S T R E S S E S (N/mm^2) (tension shown positive)

	L E F T *				R I G H T *			
	TOP		BOTTOM		TOP		BOTTOM	
	max-T	max-C	max-T	max-C	max-T	max-C	max-T	max-C
1	2.20	-2.34	-----	-8.40	2.20	-2.34	-----	-8.40

Note:
* = Centerline

	C E N T E R			
	TOP		BOTTOM	
	max-T	max-C	max-T	max-C
1	-----	-5.46	-----	-3.75

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A N C E D M O M E N T S, SHEARS & REACTIONS

N T S (kNm) --> <-- SPAN SHEARS (kN) -->

SPAN	left*	midspan	right*	SH(l)	SH(r)
1	635.40	-442.70	635.40	.00	.00

Note:
* = Centerline

joint	<--REACTIONS (kN)--> 2	<-- COLUMN MOMENTS (kNm) --> Lower columns	Upper columns
1	.000	317.700	317.700
2	.000	-317.700	-317.700

10 - F A C T O R E D M O M E N T S & R E A C T I O N S

Calculated as (1.00D + 1.00L + 1.00 secondary moment effects)

10.1 FACTORED DESIGN MOMENTS (kNm)

SPAN	<----- left* ------> max	min	<---- midspan ----> max	min	<----- right* -----> max	min
1	-763.50	-109.10	1374.08	1028.51	-763.50	-109.10

Note:
* = Centerline

10.2 SECONDARY MOMENTS (kNm)

SPAN	<-- left* -->	<- midspan ->	<-- right* -->
1	635.40	635.40	635.40

Note:
* = Centerline

10.3 FACTORED REACTIONS (kN) — 10.4 FACTORED COLUMN MOMENTS (kNm)

JOINT	max	min	<-- LOWER column --> max	min	<-- UPPER column --> max	min
1	427.50	227.50	-54.50	-381.70	-54.50	-381.70
2	427.50	227.50	381.70	54.50	381.70	54.50

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SPECIFIC CRITERIA for ONE-WAY or BEAM SYSTEM
- Minimum steel 0.004A
- Moment capacity > factored (design) moment

Support cut-off length for minimum steel(length/span) ... .17
Span cut-off length for minimum steel(length/span) ... .33
Top bar extension beyond where required ..... 300.00 mm

Bottom bar extension beyond where required ..... 300.00 mm

REINFORCEMENT based on NO REDISTRIBUTION of factored moments

11.1 TOTAL WEIGHT OF REBAR = .0 Kg AVERAGE = .0 Kg/m^2
TOTAL AREA COVERED = 12.00 m^2

11.2.1 S T E E L A T M I D - S P A N

	TOP					BOTTOM				
SPAN	As (mm^2)	DIFFERENT REBAR CRITERIA <---ULT	MIN	D+.25L->		As (mm^2)	DIFFERENT REBAR CRITERIA <---ULT	MIN	D+.25L->	
1	0	(0	0	0)		0	(0	0	0)	

11.3.1 S T E E L A T S U P P O R T S

	TOP					BOTTOM				
JOINT	As (mm^2)	DIFFERENT REBAR CRITERIA <---ULT	MIN	D+.25L->		As (mm^2)	DIFFERENT REBAR CRITERIA <---ULT	MIN	D+.25L->	
1	0	(0	0	0)		0	(0	0	0)	
2	0	(0	0	0)		0	(0	0	0)	

12 - S H E A R D E S I G N FOR BEAMS AND ONE-WAY SLAB SYSTEMS

No shear reinforcement required

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13 - MAXIMUM S P A N D E F L E C T I O N S

Concrete`s modulus of elasticity ..... Ec = 27806 N/mm^2
Creep factor ..... K = 2.00
Ieffective/Igross...(due to cracking)..... K = 1.00

Where stresses exceed 0.5(fc`)^1/2 cracking of section is allowed for.
Values in parentheses are (span/max deflection) ratios

<.....DEFLECTION ARE ALL IN mm , DOWNWARD POSITIVE.....>

SPAN	DL	DL+PT	DL+PT+CREEP	LL	DL+PT+LL+CREEP
1	4.2	.3	.9(22256)	3.7(5421)	4.6(4359)

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16 - FRICTION, ELONGATION AND LONG TERM STRESS LOSSES

16.6 LONG TERM STRESS LOSS CALCULATIONS

16.6.1 INPUT PARAMETERS :

Type of strand	LOW LAX	
Modulus of elasticity of strand	189610.00	N/mm^2
Average weight of concrete	NORMAL	
Estimate age of concrete at stressing	5	days
Modulus of elasticity of concrete at stressing	21538.00	N/mm^2
Modulus of elasticity of concrete at 28 days	27806.00	N/mm^2
Estimate of average relative humidity	80.00	%
Volume to surface ratio of member	200.00	mm

16.6.2 CALCULATED LONG-TERM STRESS LOSS(average of all tendons) :

SPAN	<----- STRESS (N/mm^2) -----> start	center	right
1	78.21	97.39	78.21

16.7 FRICTION AND ELONGATION CALCULATIONS

16.7.1 INPUT PARAMETERS :

Coefficient of angular friction (meu)	.250	/rad
Coefficient of wobble friction (K)	.0066	/m
Ultimate strength of strand	1860.0	N/mm^2
Ratio of jacking stress to strand's ultimate strength	.800	
Anchor set	6.000	mm
Cross-sectional area of strand	98.700	mm^2

16.7.2 CALCULATED STRESSES(average of all tendons) :

SPAN	LENGTH m	P	<TENDON HEIGHT(mm)> start	center	right	Horizontal ratios X1/L	X2/L	X3/L	<-- STRESS(N/mm^2)--> start	center	right
1	20.00	1	600.	160.	600.	.10	.50	.10	1130.85	1241.24	1130.85

Note: P= tendon profile (refer to legend of data block 9)
Stresses at each location are the average of strands after anchor set, and after long-term losses

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16.8 TENDON SELECTION AND DATA:

TYPE	OFF	FORCE	<------ TENDON EXTENTS ------> CAN<------ S P A N S -----> CAN <1>	ELONGATION LEFT (mm)	ELONGATION RIGHT (mm)	Stress ratios Anch.	Stress ratios Max.
B	10	118.15	<===|	135.	0.	.65	.73
C	10	118.15	|===>	0.	135.	.65	.73

Note: Force is the average value per strand (kN)
Stress ratios are at anchorage (7) and maximum along tendon (8)

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==========

----------TYPE---------->
1 = UNIFORM 3 = PARTIAL UNIFORM
2 = CONCENTRATED 4 = APPLIED MOMENT

SPAN	CLASS	TYPE	(Uniform) (kN/m)	(Con. or part.) (kN@m or m-m)	(M o m e n t) (kN-m @ m)
1	1	3	107.809	.00	2.00
1	1	3	107.809	18.00	20.00
1	1	3	-26.952	2.00	10.00
1	1	3	-26.952	10.00	18.00

ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 15,2013 TIME: 00:29
Data ID: perhitun Output File ID: PTCGS.DAT

==========

SUMMARY OF TENDON HEIGHTS AT 1/20TH POINTS. Heights in each span are measured from the reference point. Negative number = below reference point

CGS = Centroid of tendon

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meter

X/L	X m	CGS mm
.00	.00	600.00
.05	1.00	578.00
.10	2.00	512.00
.15	3.00	429.50
.20	4.00	358.00
.25	5.00	297.50
.30	6.00	248.00
.35	7.00	209.50
.40	8.00	182.00
.45	9.00	165.50
.50	10.00	160.00
.55	11.00	165.50
.60	12.00	182.00
.65	13.00	209.50
.70	14.00	248.00
.75	15.00	297.50
.80	16.00	358.00
.85	17.00	429.50
.90	18.00	512.00
.95	19.00	578.00
1.00	20.00	600.00

ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 15,2013 TIME: 00:29
Data ID: perhitun Output File ID: MOMENTS.DAT

SUMMARY OF BENDING SPAN MOMENTS AT 1/20TH POINTS
UNITS ARE ALL IN (kNm)

Note: for LEFT CANTILEVER (if any) X/L= 0.00 is at tip of cantilever,
and X/L= 1.00 is at first support

SPAN = 1 LENGTH = 20.00 meter

X/L	X	DL	LL(min)	LL(max)	PT	SECONDARY
.00	.00	-.74447E+03	-.65443E+03	.00000E+00	.63538E+03	.63540E+03
.05	1.00	-.52833E+03	-.46443E+03	.00000E+00	.58148E+03	.63540E+03

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			29443E+03	.00000E+00	.41977E+03	.63540E+03
			14443E+03	.00000E+00	.21762E+03	.63540E+03
			14434E+02	.00000E+00	.42433E+02	.63540E+03
.25	5.00	.10871E+03	.00000E+00	.95566E+02	-.10581E+03	.63540E+03
.30	6.00	.21110E+03	.00000E+00	.18557E+03	-.22709E+03	.63540E+03
.35	7.00	.29073E+03	.00000E+00	.25557E+03	-.32142E+03	.63540E+03
.40	8.00	.34761E+03	.00000E+00	.30557E+03	-.38880E+03	.63540E+03
.45	9.00	.38173E+03	.00000E+00	.33557E+03	-.42923E+03	.63540E+03
.50	10.00	.39311E+03	.00000E+00	.34557E+03	-.44271E+03	.63540E+03
.55	11.00	.38173E+03	.00000E+00	.33557E+03	-.42923E+03	.63540E+03
.60	12.00	.34761E+03	.00000E+00	.30557E+03	-.38880E+03	.63540E+03
.65	13.00	.29073E+03	.00000E+00	.25557E+03	-.32142E+03	.63540E+03
.70	14.00	.21110E+03	.00000E+00	.18557E+03	-.22709E+03	.63540E+03
.75	15.00	.10871E+03	.00000E+00	.95565E+02	-.10581E+03	.63540E+03
.80	16.00	-.16420E+02	-.14435E+02	.00000E+00	.42433E+02	.63540E+03
.85	17.00	-.16431E+03	-.14443E+03	.00000E+00	.21762E+03	.63540E+03
.90	18.00	-.33494E+03	-.29443E+03	.00000E+00	.41977E+03	.63540E+03
.95	19.00	-.52833E+03	-.46443E+03	.00000E+00	.58148E+03	.63540E+03
1.00	20.00	-.74447E+03	-.65443E+03	.00000E+00	.63538E+03	.63540E+03

ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 15,2013 TIME: 00:29
Data ID: perhitun Output File ID: SHEARS.DAT

SUMMARY OF SHEAR FORCES ALONG SPANS AT 1/20TH POINTS
UNITS ARE ALL IN (kN)

Note: for LEFT CANTILEVER (if any) X/L= 0.00 is at tip of cantilever,
and X/L= 1.00 is at first support

SPAN = 1 LENGTH = 20.00 meter

X/L	X	DL	LL(pos)	LL(neg)	PT	SECONDARY
.00	.00	-.22752E+03	.00000E+00	-.20000E+03	.19906E-04	.00000E+00
.05	1.00	-.20477E+03	.00000E+00	-.18000E+03	.10781E+03	.00000E+00
.10	2.00	-.18201E+03	.00000E+00	-.16000E+03	.21562E+03	.00000E+00
.15	3.00	-.15926E+03	.00000E+00	-.14000E+03	.18867E+03	.00000E+00
.20	4.00	-.13651E+03	.00000E+00	-.12000E+03	.16171E+03	.00000E+00
.25	5.00	-.11376E+03	.00000E+00	-.10000E+03	.13476E+03	.00000E+00
.30	6.00	-.91007E+02	.00000E+00	-.80000E+02	.10781E+03	.00000E+00
.35	7.00	-.68255E+02	.00000E+00	-.60000E+02	.80857E+02	.00000E+00

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			00000E+00	-.40000E+02	.53905E+02	.00000E+00
			00000E+00	-.20000E+02	.26952E+02	.00000E+00
			50800E-04	.00000E+00	.16000E-04	.00000E+00
.55	11.00	.22752E+02	.20000E+02	.00000E+00	-.26952E+02	.00000E+00
.60	12.00	.45503E+02	.40000E+02	.00000E+00	-.53905E+02	.00000E+00
.65	13.00	.68255E+02	.60000E+02	.00000E+00	-.80857E+02	.00000E+00
.70	14.00	.91007E+02	.80000E+02	.00000E+00	-.10781E+03	.00000E+00
.75	15.00	.11376E+03	.10000E+03	.00000E+00	-.13476E+03	.00000E+00
.80	16.00	.13651E+03	.12000E+03	.00000E+00	-.16171E+03	.00000E+00
.85	17.00	.15926E+03	.14000E+03	.00000E+00	-.18867E+03	.00000E+00
.90	18.00	.18201E+03	.16000E+03	.00000E+00	-.21562E+03	.00000E+00
.95	19.00	.20477E+03	.18000E+03	.00000E+00	-.10781E+03	.00000E+00
1.00	20.00	.22752E+03	.20000E+03	.00000E+00	.11850E-04	.00000E+00

ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 15,2013 TIME: 00:29
Data ID: perhitun Output File ID: STRESSES.DAT

SUMMARY OF BENDING STRESSES AT 1/20TH POINTS
UNITS ARE ALL IN (N/mm^2)

NOTE: stresses at centerlines, or next to centerline points may not be of practical significance if these points fall over the supports. Use the stresses which fall within the net span length as given at top of each table below. Where applicable, reduced moments are used.
If live load (LL) is included, its maximum value at any point is used.
Tension is shown positive.
Stress COMBINATION used is .... (1.00DL + 1.00LL + 1.00PT)

SPAN = 1 LENGTH = 20.00 meter (Net span from .00 to 20.00 m)

		<--- D L --->		<---------- L L ----------> top		<---------- L L ----------> bottom		<--- P T --->	
X/L	X	top	bottom	max-T	max-C	max-T	max-C	top	bottom
.00	.00	5.17	-5.17	4.54	.00	.00	-4.54	-7.51	1.31
.05	1.00	3.67	-3.67	3.23	.00	.00	-3.23	-7.19	.89
.10	2.00	2.33	-2.33	2.04	.00	.00	-2.04	-6.12	-.29
.15	3.00	1.14	-1.14	1.00	.00	.00	-1.00	-4.74	-1.72
.20	4.00	.11	-.11	.10	.00	.00	-.10	-3.56	-2.97
.25	5.00	-.75	.75	.00	-.66	.66	.00	-2.56	-4.02

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				.00	-1.29	1.29	.00	-1.74	-4.89
				.00	-1.77	1.77	.00	-1.11	-5.57
				.00	-2.12	2.12	.00	-.67	-6.07
.45	9.00	-2.65	2.65	.00	-2.33	2.33	.00	-.42	-6.38
.50	10.00	-2.73	2.73	.00	-2.40	2.40	.00	-.33	-6.48
.55	11.00	-2.65	2.65	.00	-2.33	2.33	.00	-.42	-6.38
.60	12.00	-2.41	2.41	.00	-2.12	2.12	.00	-.67	-6.07
.65	13.00	-2.02	2.02	.00	-1.77	1.77	.00	-1.11	-5.57
.70	14.00	-1.47	1.47	.00	-1.29	1.29	.00	-1.74	-4.89
.75	15.00	-.75	.75	.00	-.66	.66	.00	-2.56	-4.02
.80	16.00	.11	-.11	.10	.00	.00	-.10	-3.56	-2.97
.85	17.00	1.14	-1.14	1.00	.00	.00	-1.00	-4.74	-1.72
.90	18.00	2.33	-2.33	2.04	.00	.00	-2.04	-6.12	-.29
.95	19.00	3.67	-3.67	3.23	.00	.00	-3.23	-7.19	.89
1.00	20.00	5.17	-5.17	4.54	.00	.00	-4.54	-7.51	1.31

SPAN = 1 LENGTH = 20.00 meter (Net span from .00 to 20.00 m)

		<--------- COMBINED -------->			
		top		bottom	
X/L	X	max-T	max-C	max-T	max-C

.00	.00	2.20	-2.34	-----	-8.40
.05	1.00	-----	-3.52	-----	-6.00
.10	2.00	-----	-3.79	-----	-4.66
.15	3.00	-----	-3.60	-----	-3.87
.20	4.00	-----	-3.44	-----	-3.18
.25	5.00	-----	-3.97	-----	-3.27
.30	6.00	-----	-4.49	-----	-3.43
.35	7.00	-----	-4.90	-----	-3.56
.40	8.00	-----	-5.21	-----	-3.66
.45	9.00	-----	-5.40	-----	-3.73
.50	10.00	-----	-5.46	-----	-3.75
.55	11.00	-----	-5.40	-----	-3.73
.60	12.00	-----	-5.21	-----	-3.66
.65	13.00	-----	-4.90	-----	-3.56
.70	14.00	-----	-4.49	-----	-3.43
.75	15.00	-----	-3.97	-----	-3.27
.80	16.00	-----	-3.44	-----	-3.18
.85	17.00	-----	-3.60	-----	-3.87
.90	18.00	-----	-3.79	-----	-4.66
.95	19.00	-----	-3.52	-----	-6.00
1.00	20.00	2.20	-2.34	-----	-8.40

STRESSES AT FACES OF SUPPORTS

SPAN = 1 LENGTH = 20.00 meter (Net span from .00 to 20.00 m)

				<---------- L L ---------->					
		<--- D L --->		top		bottom		<--- P T -->	
X/L	X	top	bottom	max-T	max-C	max-T	max-C	top	bottom
face of support at left									

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				4.54	.00	.00	-4.54	-7.51	1.31
1.00	20.00	5.17	-5.17	4.54	.00	.00	-4.54	-7.51	1.31

		<--------- COMBINED -------->			
		top		bottom	
X/L	X	max-T	max-C	max-T	max-C
face of support at left					
.00	.00	2.20	-2.34	-----	-8.40
face of support at right					
1.00	20.00	2.20	-2.34	-----	-8.40

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ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 15,2013 TIME: 00:29
Data ID: perhitun Output File ID: PTREQ.DAT

SUMMARY OF POST-TENSIONING REQUIRED AT 1/20TH POINTS FOR THE ENTIRE TRIBUTARY
UNITS ARE ALL IN (kN)

Note: for LEFT CANTILEVER (if any) X/L= 0.00 is at tip of cantilever,
and X/L= 1.00 is at first support

SPAN = 1 LENGTH = 20.00 meter

X/L	X	PT
.00	.00	.2008E+04
.05	1.00	.1241E+04
.10	2.00	.5323E+03
.15	3.00	.0000E+00
.20	4.00	.0000E+00
.25	5.00	.0000E+00
.30	6.00	.0000E+00
.35	7.00	.3608E+03
.40	8.00	.6308E+03
.45	9.00	.7759E+03
.50	10.00	.8215E+03
.55	11.00	.7759E+03
.60	12.00	.6308E+03
.65	13.00	.3608E+03
.70	14.00	.0000E+00
.75	15.00	.0000E+00
.80	16.00	.0000E+00
.85	17.00	.0000E+00
.90	18.00	.5323E+03
.95	19.00	.1241E+04
1.00	20.00	.2008E+04

SUMMARY OF POST-TENSIONING REQUIRED AT FACES OF SUPPORTS

SPAN = 1 LENGTH = 20.00 meter

X/L	X	PT

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face of support at right
1.00 20.00 .2008E+04

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ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 15,2013 TIME: 00:29
Data ID: perhitun Output File ID: REBAR.DAT

SUMMARY OF REBAR REQUIRED AT 1/20TH POINTS

Note: for LEFT CANTILEVER (if any) X/L= 0.00 is at tip of cantilever,
and X/L= 1.00 is at first support

SPAN = 1 LENGTH = 20.00 meter; CLEAR from .00 to 20.00 m

X/L	X m	<--Factored moments (kNm)--> MAXIMUM	MINIMUM	<--Reinforcement (mm^2)--> TOP	BOTTOM
.00	.00	-109.070	-763.500	.00	.00
.05	1.00	107.070	-357.360	.00	.00
.10	2.00	300.460	6.030	.00	.00
.15	3.00	471.090	326.660	.00	.00
.20	4.00	618.980	604.546	.00	.00
.25	5.00	839.676	744.110	.00	.00
.30	6.00	1032.070	846.500	.00	.00
.35	7.00	1181.700	926.130	.00	.00
.40	8.00	1288.580	983.010	.00	.00
.45	9.00	1352.700	1017.130	.00	.00
.50	10.00	1374.080	1028.510	.00	.00
.55	11.00	1352.700	1017.130	.00	.00
.60	12.00	1288.580	983.010	.00	.00
.65	13.00	1181.700	926.130	.00	.00
.70	14.00	1032.070	846.500	.00	.00
.75	15.00	839.675	744.110	.00	.00
.80	16.00	618.980	604.545	.00	.00
.85	17.00	471.090	326.660	.00	.00
.90	18.00	300.460	6.030	.00	.00
.95	19.00	107.070	-357.360	.00	.00
1.00	20.00	-109.070	-763.500	.00	.00

REBAR REQUIRED AT FACES OF SUPPORTS

SPAN = 1 LENGTH = 20.00 meter; CLEAR from .00 to 20.00 m

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		<--Factored moments (kNm)-->		<--Reinforcement (mm^2)-->	
		MAXIMUM	MINIMUM	TOP	BOTTOM
face of support at left					
.00	.00	-109.070	-763.500	.00	.00
face of support at right					
1.00	20.00	-109.070	-763.500	.00	.00

LAMPIRAN 4

HASIL *OUTPUT* PROGRAM ADAPT-PT UNTUK BALOK ANAK BETON PRATEGANG

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ADAPT CORPORATION
STRUCTURAL CONCRETE SOFTWARE SYSTEM
1733 Woodside Road, Suite 220, Redwood City, California 94061

ADAPT-PT FOR POST-TENSIONED BEAM/SLAB DESIGN
Version 7.10 AMERICAN (ACI 318-02/IBC-03)

ADAPT CORPORATION - Structural Concrete Software System
1733 Woodside Road, Suite 220, Redwood City, California 94061
Phone: (650)306-2400, Fax: (650)364-4678
Email: Support@AdaptSoft.com, Web site: http://www.AdaptSoft.com

DATE AND TIME OF PROGRAM EXECUTION: Feb 14,2013 At Time: 9:22
PROJECT FILE: perhitungan balok anak beton prategang

P R O J E C T T I T L E:
Balok Beton Prategang Lantai 2
As 5B-5C

1 - USER SPECIFIED G E N E R A L D E S I G N P A R A M E T E R S

CONCRETE:

STRENGTH at 28 days, for BEAMS/SLABS	35.00	N/mm^2
for COLUMNS	45.00	N/mm^2
MODULUS OF ELASTICITY for BEAMS/SLABS	27806.00	N/mm^2
for COLUMNS	31529.00	N/mm^2
CREEP factor for deflections for BEAMS/SLABS	2.00	
CONCRETE WEIGHT	NORMAL	
SELF WEIGHT	2400.00	Kg/m^3

TENSION STRESS limits (multiple of (f'c)1/2)

At Top	.500	
At Bottom	.500	

COMPRESSION STRESS limits (multiple of (f'c))

At all locations	.450	

REINFORCEMENT:

YIELD Strength	400.00	N/mm^2
Minimum Cover at TOP	120.00	mm
Minimum Cover at BOTTOM	120.00	mm

POST-TENSIONING:

SYSTEM	BONDED	
Ultimate strength of strand	1860.00	N/mm^2

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Average effective stress in strand (final)	1200.00 N/mm^2
Strand area.....	98.700 mm^2
Min CGS of tendon from TOP.....	160.00 mm
Min CGS of tendon from BOTTOM for INTERIOR spans..	160.00 mm
Min CGS of tendon from BOTTOM for EXTERIOR spans..	160.00 mm
Min average precompression	.85 N/mm^2
Max spacing between strands (factor of slab depth)	8.00
Tendon profile type and support widths.....	(see section 9)

ANALYSIS OPTIONS USED:

Structural system	BEAM
Moment of Inertia over support is	NOT INCREASED
Effective flange width consideration	YES
Effective flange width implementation method	ACI-318

2 - I N P U T G E O M E T R Y

2.1.1 PRINCIPAL SPAN DATA OF UNIFORM SPANS

SPAN	FORM	LENGTH	WIDTH	DEPTH	TOP FLANGE width	TOP FLANGE thick.	BOTTOM/MIDDLE FLANGE width	BOTTOM/MIDDLE FLANGE thick.	REF HEIGHT	MULTIPLIER left	MULTIPLIER right
		m	mm	mm	mm	mm	mm	mm	mm		
1	1	20.00	600	1200					1200	.50	.50

LEGEND:

1 - SPAN
C = Cantilever

3 - FORM
1 = Rectangular section
2 = T or Inverted L section
3 = I section
4 = Extended T or L section
7 = Joist
8 = Waffle

11 - Top surface to reference line

2.2 - S U P P O R T W I D T H A N D C O L U M N D A T A

JOINT	SUPPORT WIDTH	LOWER COLUMN LENGTH	LOWER COLUMN B(DIA)	LOWER COLUMN D	LOWER COLUMN CBC*	UPPER COLUMN LENGTH	UPPER COLUMN B(DIA)	UPPER COLUMN D	UPPER COLUMN CBC*
	mm	m	mm	mm		m	mm	mm	

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```
--1-------2---------3-------4-------5-----6---------7-------8-------9----10---
   1         0      8.00    1500    1500  (1)         .00       0       0  (1)
   2         0      8.00    1500    1500  (1)         .00       0       0  (1)

*THE COLUMN BOUNDARY CONDITION CODES (CBC)
Fixed at both ends ...(STANDARD) ............................. = 1
Hinged at near end, fixed at far end ......................... = 2
Fixed at near end, hinged at far end ......................... = 3
Fixed at near end, roller with rotational fixity at far end .. = 4
```

3 - I N P U T A P P L I E D L O A D I N G

```
<---CLASS--->                <--------------TYPE------------------->
D = DEAD LOAD                U = UNIFORM         P = PARTIAL UNIFORM
L = LIVE LOAD                C = CONCENTRATED    M = APPLIED MOMENT
                             Li= LINE LOAD
SW= SELF WEIGHT Computed from geometry input and treated as dead loading
    Unit selfweight  W = 2400.0 Kg/m^3

                   Intensity  ( From ...  To ) ( M   or C ...At) Total on Trib
SPAN  CLASS  TYPE    kN/m^2   (  m        m  ) (kN-m or kN...m )      kN/m
-1-----2------3--------4----------5--------6---------7-------8---------9------

 1     L      Li                  .00    20.00                         20.000
 1     D      Li                  .00    20.00                          5.800
 1     SW     U                   .00    20.00                         16.952

 NOTE: LIVE LOADING is SKIPPED with a skip factor of    1.00
```

3.1 - LOADING AS APPEARS IN USER`S INPUT SCREEN PRIOR TO PROCESSING

```
                   UNIFORM
                   (kN/m^2),     ( CON. or PART. )     ( M O M E N T )
SPAN  CLASS  TYPE  LINE(kN/m)    ( kN@m or  m-m  )     ( kN-m  @  m  )
-1-----2------3---------4------------5-------6-----------7-------8------------

 1     L      L       20.000          .00   20.00
 1     D      L        5.800          .00   20.00
```

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QUIRED
LIVE LOADING is SKIPPED with a skip factor of 1.00

4 - C A L C U L A T E D S E C T I O N P R O P E R T I E S

4.1 For Uniform Spans and Cantilevers only

SPAN	<------ Tributary Width ------> AREA mm^2	Yb mm	Yt mm	<---------- Effective Width ----------> b_eff mm	I mm^4	Yb mm	Yt mm
1	720000.00	600.00	600.00	.00	.8640E+11	600.00	600.00

Note:
--- = Span/Cantilever is Nonuniform, see block 4.2

5 - D E A D L O A D M O M E N T S, S H E A R S & R E A C T I O N S

SPAN	< 5.1 S P A N M O M E N T S (kNm) > M(l)*	Midspan	M(r)*	< 5.2 SPAN SHEARS (kN) > SH(l)	SH(r)
1	-731.50	406.09	-731.50	-227.52	227.52

Note:
* = Centerline moments

JOINT	< 5.3 REACTIONS (kN) >	<- 5.4 COLUMN MOMENTS (kNm) -> Lower columns	Upper columns
1	227.52	-731.49	.00
2	227.52	731.49	.00

6 - L I V E L O A D M O M E N T S, S H E A R S & R E A C T I O N S

<-- 6.1 L I V E L O A D SPAN MOMENTS (kNm) and SHEAR FORCES (kN) -->

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```
                                    dspan ---> <---- right* -----> <--SHEAR FORCE-->
                                           min       max       min     left    right
-1-------2---------3--------4--------5---------6---------7--------8--------9--
 1   -643.03       .00    356.97       .00   -643.03       .00  -200.00   200.00

Note:
   * = Centerline moments


      <- 6.2 REACTIONS (kN) -> <-------- 6.3  COLUMN MOMENTS (kNm)  -------->
                                <--- LOWER COLUMN --->  <--- UPPER COLUMN --->
JOINT        max         min          max         min          max         min
--1----------2----------3-----------4----------5-----------6----------7----
  1        200.00        .00          .00    -643.02          .00         .00
  2        200.00        .00       643.02        .00          .00         .00

Note:  Block 6.1 through 6.3 values are maxima of all skipped loading cases


8 -   SUM OF DEAD AND LIVE MOMENTS (kNm)
================================================================================
Maxima of dead load and live load span moments combined
for serviceability checks   (  1.00DL +  1.00LL )

      <----- left* ------>   <---- midspan  ---->   <----- right* ----->
SPAN       max         min         max         min         max         min
-1---------2----------3----------4---------5----------6----------7-----
 1     -1374.50    -731.50      763.10     406.10    -1374.50    -731.50

Note:
   * = Centerline


8 -   SUM OF DEAD AND LIVE MOMENTS (kNm)
================================================================================
Maxima of dead load and live load span moments combined
for serviceability checks   (  1.00DL +  1.00LL )

      <----- left* ------>   <---- midspan  ---->   <----- right* ----->
SPAN       max         min         max         min         max         min
-1---------2----------3----------4---------5----------6----------7-----
 1     -1374.50    -731.50      763.10     406.10    -1374.50    -731.50

Note:
   * = Centerline
```

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9.1 PROFILE TYPES AND PARAMETERS

LEGEND:

For Span:

1 = reversed parabola
2 = simple parabola with straight portion over support
3 = harped tendon

For Cantilever:

1 = simple parabola
2 = partial parabola
3 = harped tendon

9.2 T E N D O N P R O F I L E

TYPE	X1/L	X2/L	X3/L	A/L
1	1	.100	.500	.100	.000

9.3 - SELECTED POST-TENSIONING FORCES AND TENDON DRAPE

Tendon editing mode selected: TENDON SELECTION

SPAN	SELECTED VALUES: FORCE (kN/-)	SELECTED VALUES: DISTANCE OF CGS (mm) -> Left	Center	Right	CALCULATED VALUES: P/A (N/mm^2)	Wbal (kN/-)	Wbal (%DL)
1	2450.396	600.00	160.00	600.00	3.40	21.563	95

Approximate weight of strand ..... 325.5 Kg

9.35 - TENDON SELECTION DATA:

TYPE	SEL. FORCE (kN)	TENDON EXTENTS
B	10 118.16	<=====|
C	10 118.16	|=====>

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P O S T - T E N S I O N I N G FORCES (kN)

SPAN	LEFT*	CENTER	RIGHT*	<- BASED ON MINIMUM P/A -> LEFT	CENTER	RIGHT
1	1977.41	875.15	1977.41	612.00	612.00	612.00

Note:
* = Centerline

9.6 S E R V I C E S T R E S S E S (N/mm^2) (tension shown positive)

	L E F T *				R I G H T *			
	TOP		BOTTOM		TOP		BOTTOM	
	max-T	max-C	max-T	max-C	max-T	max-C	max-T	max-C
1	2.11	-2.36	-----	-8.31	2.11	-2.36	-----	-8.31

Note:
* = Centerline

	C E N T E R			
	TOP		BOTTOM	
	max-T	max-C	max-T	max-C
1	-----	-5.55	-----	-3.73

9.7 POST-TENSIONING B A L A N C E D M O M E N T S, SHEARS & REACTIONS

	<-- S P A N M O M E N T S (kNm) -->			<-- SPAN SHEARS (kN) -->	
SPAN	left*	midspan	right*	SH(l)	SH(r)
1	624.40	-453.80	624.40	.00	.00

Note:
* = Centerline

	<--REACTIONS (kN)-->	<-- COLUMN MOMENTS (kNm) -->	
joint	2	Lower columns	Upper columns
1	.000	624.400	.000
2	.000	-624.400	.000

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N T S & R E A C T I O N S

Calculated as (1.00D + 1.00L + 1.00 secondary moment effects)

10.1 FACTORED DESIGN MOMENTS (kNm)

	<----- left* ------>		<---- midspan ---->		<----- right* ----->	
SPAN	max	min	max	min	max	min
1	-750.10	-107.10	1387.46	1030.49	-750.10	-107.10

Note:
  * = Centerline

10.2 SECONDARY MOMENTS (kNm)

SPAN	<-- left* -->	<- midspan ->	<-- right* -->
1	624.40	624.40	624.40

Note:
  * = Centerline

10.3 FACTORED REACTIONS (kN)

10.4 FACTORED COLUMN MOMENTS (kNm)

			<-- LOWER column -->		<-- UPPER column -->	
JOINT	max	min	max	min	max	min
1	427.50	227.50	-107.10	-750.10	.00	.00
2	427.50	227.50	750.10	107.10	.00	.00

11 - M I L D S T E E L

SPECIFIC CRITERIA for ONE-WAY or BEAM SYSTEM
  - Minimum steel 0.004A
  - Moment capacity > factored (design) moment

Support cut-off length for minimum steel(length/span) ... .17
Span cut-off length for minimum steel(length/span) ... .33
Top bar extension beyond where required ..... 300.00 mm

Bottom bar extension beyond where required ..... 300.00 mm

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NO REDISTRIBUTION of factored moments

= .0 Kg AVERAGE = .0 Kg/m^2

TOTAL AREA COVERED = 12.00 m^2

11.2.1 S T E E L A T M I D - S P A N

SPAN	As (mm^2)	TOP DIFFERENT REBAR CRITERIA <---ULT-----MIN--D+.25L->			As (mm^2)	BOTTOM DIFFERENT REBAR CRITERIA <---ULT-----MIN--D+.25L->		
1	0	(0	0	0)	0	(0	0	0)

11.3.1 S T E E L A T S U P P O R T S

JOINT	As (mm^2)	TOP DIFFERENT REBAR CRITERIA <---ULT-----MIN--D+.25L->			As (mm^2)	BOTTOM DIFFERENT REBAR CRITERIA <---ULT-----MIN--D+.25L->		
1	0	(0	0	0)	0	(0	0	0)
2	0	(0	0	0)	0	(0	0	0)

12 - S H E A R D E S I G N FOR BEAMS AND ONE-WAY SLAB SYSTEMS

No shear reinforcement required

13 - MAXIMUM S P A N D E F L E C T I O N S

Concrete`s modulus of elasticity ..... Ec = 27806 N/mm^2

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..... K = 2.00
racking)..... K = 1.00

Where stresses exceed 0.5(fc`)^1/2 cracking of section is allowed for.
Values in parentheses are (span/max deflection) ratios

<.....DEFLECTION ARE ALL IN mm , DOWNWARD POSITIVE.....>

SPAN	DL	DL+PT	DL+PT+CREEP	LL	DL+PT+LL+CREEP
1	4.5	.3	.9(22894)	3.9(5094)	4.8(4166)

16 - FRICTION, ELONGATION AND LONG TERM STRESS LOSSES

16.6 LONG TERM STRESS LOSS CALCULATIONS

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.....	LOW LAX	
Modulus of elasticity of strand	189610.00	N/mm^2
Average weight of concrete	NORMAL	
Estimate age of concrete at stressing	5	days
Modulus of elasticity of concrete at stressing	21538.00	N/mm^2
Modulus of elasticity of concrete at 28 days	27806.00	N/mm^2
Estimate of average relative humidity	80.00	%
Volume to surface ratio of member	200.00	mm

16.6.2 CALCULATED LONG-TERM STRESS LOSS(average of all tendons) :

SPAN	<----- STRESS (N/mm^2) -----> start	center	right
1	78.21	97.30	78.21

16.7 FRICTION AND ELONGATION CALCULATIONS

16.7.1 INPUT PARAMETERS :

Coefficient of angular friction (meu)	.250	/rad
Coefficient of wobble friction (K)	.0066	/m
Ultimate strength of strand	1860.0	N/mm^2
Ratio of jacking stress to strand's ultimate strength	.800	
Anchor set	6.000	mm
Cross-sectional area of strand	98.700	mm^2

16.7.2 CALCULATED STRESSES(average of all tendons) :

SPAN	LENGTH m	P	<TENDON HEIGHT(mm)> start	center	right	Horizontal ratios X1/L	X2/L	X3/L	<-- STRESS(N/mm^2)--> start	center	right
1	20.00	1	600.	160.	600.	.10	.50	.10	1130.85	1241.34	1130.85

Note: P= tendon profile (refer to legend of data block 9)
Stresses at each location are the average of strands after anchor set, and after long-term losses

16.8 TENDON SELECTION AND DATA:

TYPE	OFF	FORCE	CAN	<------ TENDON EXTENTS ------> <------ S P A N S -----> <1>	CAN	ELONGATION LEFT (mm)	RIGHT (mm)	Stress ratios Anch.	Max.

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```
                                                          135.      0.     .65    .73
                                                            0.    135.     .65    .73
                                    ue per strand (kN)
          Stress ratios are at anchorage (7) and maximum along tendon (8)
```



```
ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM   DATE: Feb 14,2013      TIME: 09:22
Data ID: perhitun                           Output File ID:        WBAL.DAT
POST-TENSIONING BALANCED LOADING
```

```
                          <--------------TYPE------------------->
                          1 = UNIFORM         3 = PARTIAL UNIFORM
```

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= CONCENTRATED 4 = APPLIED MOMENT

SPAN	CLASS	TYPE	(kN/m)	(Con. or part.) (kN@m or m-m)	(M o m e n t) (kN-m @ m)
1	1	3	107.817	.00	2.00
1	1	3	107.817	18.00	20.00
1	1	3	-26.954	2.00	10.00
1	1	3	-26.954	10.00	18.00

ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 14,2013 TIME: 09:22
Data ID: perhitun Output File ID: PTCGS.DAT

SUMMARY OF TENDON HEIGHTS AT 1/20TH POINTS. Heights in each span are measured from the reference point. Negative number = below reference point

CGS = Centroid of tendon

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SPAN = 1 LENGTH = 20.00 meter

X/L	X m	CGS mm
.00	.00	600.00
.05	1.00	578.00
.10	2.00	512.00
.15	3.00	429.50
.20	4.00	358.00
.25	5.00	297.50
.30	6.00	248.00
.35	7.00	209.50
.40	8.00	182.00
.45	9.00	165.50
.50	10.00	160.00
.55	11.00	165.50
.60	12.00	182.00
.65	13.00	209.50
.70	14.00	248.00
.75	15.00	297.50
.80	16.00	358.00
.85	17.00	429.50
.90	18.00	512.00
.95	19.00	578.00
1.00	20.00	600.00

ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 14,2013 TIME: 09:22
Data ID: perhitun Output File ID: MOMENTS.DAT

SUMMARY OF BENDING SPAN MOMENTS AT 1/20TH POINTS
UNITS ARE ALL IN (kNm)

Note: for LEFT CANTILEVER (if any) X/L= 0.00 is at tip of cantilever,
and X/L= 1.00 is at first support

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20.00 meter

		LL(min)	LL(max)	PT	SECONDARY
.00	.00	-.73150E+03	-.64303E+03	.00000E+00	.62435E+03	.62440E+03
.05	1.00	-.51536E+03	-.45303E+03	.00000E+00	.57045E+03	.62440E+03
.10	2.00	-.32197E+03	-.28303E+03	.00000E+00	.40872E+03	.62440E+03
.15	3.00	-.15133E+03	-.13303E+03	.00000E+00	.20656E+03	.62440E+03
.20	4.00	-.34427E+01	-.30259E+01	.00000E+00	.31359E+02	.62440E+03
.25	5.00	.12169E+03	.00000E+00	.10697E+03	-.11689E+03	.62440E+03
.30	6.00	.22407E+03	.00000E+00	.19697E+03	-.23818E+03	.62440E+03
.35	7.00	.30371E+03	.00000E+00	.26697E+03	-.33252E+03	.62440E+03
.40	8.00	.36058E+03	.00000E+00	.31697E+03	-.39991E+03	.62440E+03
.45	9.00	.39471E+03	.00000E+00	.34697E+03	-.44034E+03	.62440E+03
.50	10.00	.40609E+03	.00000E+00	.35697E+03	-.45382E+03	.62440E+03
.55	11.00	.39471E+03	.00000E+00	.34697E+03	-.44034E+03	.62440E+03
.60	12.00	.36058E+03	.00000E+00	.31697E+03	-.39991E+03	.62440E+03
.65	13.00	.30371E+03	.00000E+00	.26697E+03	-.33252E+03	.62440E+03
.70	14.00	.22407E+03	.00000E+00	.19697E+03	-.23818E+03	.62440E+03
.75	15.00	.12169E+03	.00000E+00	.10697E+03	-.11689E+03	.62440E+03
.80	16.00	-.34422E+01	-.30266E+01	.00000E+00	.31360E+02	.62440E+03
.85	17.00	-.15133E+03	-.13303E+03	.00000E+00	.20656E+03	.62440E+03
.90	18.00	-.32197E+03	-.28303E+03	.00000E+00	.40872E+03	.62440E+03
.95	19.00	-.51535E+03	-.45303E+03	.00000E+00	.57045E+03	.62440E+03
1.00	20.00	-.73150E+03	-.64303E+03	.00000E+00	.62436E+03	.62440E+03

ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 14,2013 TIME: 09:22
Data ID: perhitun Output File ID: SHEARS.DAT

SUMMARY OF SHEAR FORCES ALONG SPANS AT 1/20TH POINTS
UNITS ARE ALL IN (kN)

Note: for LEFT CANTILEVER (if any) X/L= 0.00 is at tip of cantilever,
and X/L= 1.00 is at first support

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20.00 meter

			LL(pos)	LL(neg)	PT	SECONDARY
.00	.00	-.22752E+03	.00000E+00	-.20000E+03	.25512E-04	.00000E+00
.05	1.00	-.20477E+03	.00000E+00	-.18000E+03	.10782E+03	.00000E+00
.10	2.00	-.18201E+03	.00000E+00	-.16000E+03	.21563E+03	.00000E+00
.15	3.00	-.15926E+03	.00000E+00	-.14000E+03	.18868E+03	.00000E+00
.20	4.00	-.13651E+03	.00000E+00	-.12000E+03	.16173E+03	.00000E+00
.25	5.00	-.11376E+03	.00000E+00	-.10000E+03	.13477E+03	.00000E+00
.30	6.00	-.91007E+02	.00000E+00	-.80000E+02	.10782E+03	.00000E+00
.35	7.00	-.68255E+02	.00000E+00	-.60000E+02	.80863E+02	.00000E+00
.40	8.00	-.45503E+02	.00000E+00	-.40000E+02	.53909E+02	.00000E+00
.45	9.00	-.22752E+02	.00000E+00	-.20000E+02	.26954E+02	.00000E+00
.50	10.00	-.50670E-04	.60800E-04	.00000E+00	-.56519E-04	.00000E+00
.55	11.00	.22752E+02	.20000E+02	.00000E+00	-.26954E+02	.00000E+00
.60	12.00	.45503E+02	.40000E+02	.00000E+00	-.53909E+02	.00000E+00
.65	13.00	.68255E+02	.60000E+02	.00000E+00	-.80863E+02	.00000E+00
.70	14.00	.91007E+02	.80000E+02	.00000E+00	-.10782E+03	.00000E+00
.75	15.00	.11376E+03	.10000E+03	.00000E+00	-.13477E+03	.00000E+00
.80	16.00	.13651E+03	.12000E+03	.00000E+00	-.16173E+03	.00000E+00
.85	17.00	.15926E+03	.14000E+03	.00000E+00	-.18868E+03	.00000E+00
.90	18.00	.18201E+03	.16000E+03	.00000E+00	-.21563E+03	.00000E+00
.95	19.00	.20477E+03	.18000E+03	.00000E+00	-.10782E+03	.00000E+00
1.00	20.00	.22752E+03	.20000E+03	.00000E+00	-.12817E-03	.00000E+00

ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 14,2013 TIME: 09:22
Data ID: perhitun Output File ID: STRESSES.DAT

SUMMARY OF BENDING STRESSES AT 1/20TH POINTS
UNITS ARE ALL IN (N/mm^2)

NOTE: stresses at centerlines, or next to centerline points may not be of practical significance if these points fall over the supports. Use the stresses which fall within the net span length as given at top of each table below. Where applicable, reduced moments are used.

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luded, its maximum value at any point is used.
e.
is .... (1.00DL + 1.00LL + 1.00PT)

SPAN = 1 LENGTH = 20.00 meter (Net span from .00 to 20.00 m)

		<--- D L --->		<---------- L L ---------->				<--- P T -->	
				top		bottom			
X/L	X	top	bottom	max-T	max-C	max-T	max-C	top	bottom
.00	.00	5.08	-5.08	4.47	.00	.00	-4.47	-7.44	1.24
.05	1.00	3.58	-3.58	3.15	.00	.00	-3.15	-7.11	.81
.10	2.00	2.24	-2.24	1.97	.00	.00	-1.97	-6.04	-.36
.15	3.00	1.05	-1.05	.92	.00	.00	-.92	-4.67	-1.80
.20	4.00	.02	-.02	.02	.00	.00	-.02	-3.48	-3.04
.25	5.00	-.85	.85	.00	-.74	.74	.00	-2.48	-4.10
.30	6.00	-1.56	1.56	.00	-1.37	1.37	.00	-1.66	-4.97
.35	7.00	-2.11	2.11	.00	-1.85	1.85	.00	-1.03	-5.65
.40	8.00	-2.50	2.50	.00	-2.20	2.20	.00	-.59	-6.15
.45	9.00	-2.74	2.74	.00	-2.41	2.41	.00	-.34	-6.45
.50	10.00	-2.82	2.82	.00	-2.48	2.48	.00	-.25	-6.55
.55	11.00	-2.74	2.74	.00	-2.41	2.41	.00	-.34	-6.45
.60	12.00	-2.50	2.50	.00	-2.20	2.20	.00	-.59	-6.15
.65	13.00	-2.11	2.11	.00	-1.85	1.85	.00	-1.03	-5.65
.70	14.00	-1.56	1.56	.00	-1.37	1.37	.00	-1.66	-4.97
.75	15.00	-.85	.85	.00	-.74	.74	.00	-2.48	-4.10
.80	16.00	.02	-.02	.02	.00	.00	-.02	-3.48	-3.04
.85	17.00	1.05	-1.05	.92	.00	.00	-.92	-4.67	-1.80
.90	18.00	2.24	-2.24	1.97	.00	.00	-1.97	-6.04	-.36
.95	19.00	3.58	-3.58	3.15	.00	.00	-3.15	-7.11	.81
1.00	20.00	5.08	-5.08	4.47	.00	.00	-4.47	-7.44	1.24

SPAN = 1 LENGTH = 20.00 meter (Net span from .00 to 20.00 m)

		<--------- COMBINED -------->			
		top		bottom	
X/L	X	max-T	max-C	max-T	max-C

.00	.00	2.11	-2.36	-----	-8.31
.05	1.00	-----	-3.53	-----	-5.91
.10	2.00	-----	-3.80	-----	-4.56
.15	3.00	-----	-3.62	-----	-3.77
.20	4.00	-----	-3.46	-----	-3.09
.25	5.00	-----	-4.07	-----	-3.26
.30	6.00	-----	-4.58	-----	-3.41
.35	7.00	-----	-5.00	-----	-3.54
.40	8.00	-----	-5.30	-----	-3.64
.45	9.00	-----	-5.49	-----	-3.71
.50	10.00	-----	-5.55	-----	-3.73

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				-----	-3.71
				-----	-3.64
				-----	-3.54
.70	14.00	-----	-4.58	-----	-3.41
.75	15.00	-----	-4.07	-----	-3.26
.80	16.00	-----	-3.46	-----	-3.09
.85	17.00	-----	-3.62	-----	-3.77
.90	18.00	-----	-3.80	-----	-4.56
.95	19.00	-----	-3.53	-----	-5.91
1.00	20.00	2.11	-2.36	-----	-8.31

STRESSES AT FACES OF SUPPORTS

SPAN = 1 LENGTH = 20.00 meter (Net span from .00 to 20.00 m)

		<--- D L --->		<---------- L L ----------> top		bottom		<--- P T -->	
X/L	X	top	bottom	max-T	max-C	max-T	max-C	top	bottom
face of support at left									
.00	.00	5.08	-5.08	4.47	.00	.00	-4.47	-7.44	1.24
face of support at right									
1.00	20.00	5.08	-5.08	4.47	.00	.00	-4.47	-7.44	1.24

		<--------- COMBINED --------> top		bottom	
X/L	X	max-T	max-C	max-T	max-C
face of support at left					
.00	.00	2.11	-2.36	-----	-8.31
face of support at right					
1.00	20.00	2.11	-2.36	-----	-8.31

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ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 14,2013 TIME: 09:22
Data ID: perhitun Output File ID: PTREQ.DAT

SUMMARY OF POST-TENSIONING REQUIRED AT 1/20TH POINTS FOR THE ENTIRE TRIBUTARY
UNITS ARE ALL IN (kN)

Note: for LEFT CANTILEVER (if any) X/L= 0.00 is at tip of cantilever,
and X/L= 1.00 is at first support

SPAN = 1 LENGTH = 20.00 meter

X/L	X	PT
.00	.00	.1977E+04

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.20	4.00	.0000E+00
.25	5.00	.0000E+00
.30	6.00	.0000E+00
.35	7.00	.4280E+03
.40	8.00	.6897E+03
.45	9.00	.8308E+03
.50	10.00	.8751E+03
.55	11.00	.8308E+03
.60	12.00	.6897E+03
.65	13.00	.4280E+03
.70	14.00	.0000E+00
.75	15.00	.0000E+00
.80	16.00	.0000E+00
.85	17.00	.0000E+00
.90	18.00	.4744E+03
.95	19.00	.1201E+04
1.00	20.00	.1977E+04

SUMMARY OF POST-TENSIONING REQUIRED AT FACES OF SUPPORTS

SPAN = 1 LENGTH = 20.00 meter

X/L	X	PT
face of support at left		
.00	.00	.1977E+04

face of support at right		
1.00	20.00	.1977E+04

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ADAPT STRUCTURAL CONCRETE SOFTWARE SYSTEM DATE: Feb 14,2013 TIME: 09:22
Data ID: perhitun Output File ID: REBAR.DAT

SUMMARY OF REBAR REQUIRED AT 1/20TH POINTS

Note: for LEFT CANTILEVER (if any) X/L= 0.00 is at tip of cantilever,
and X/L= 1.00 is at first support

SPAN = 1 LENGTH = 20.00 meter; CLEAR from .00 to 20.00 m

X/L	X m	<--Factored moments (kNm)--> MAXIMUM	MINIMUM	<--Reinforcement (mm^2)--> TOP	BOTTOM

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		100	-750.130	.00	.00
		040	-343.990	.00	.00
		430	19.400	.00	.00
.15	3.00	473.070	340.040	.00	.00
.20	4.00	620.957	617.931	.00	.00
.25	5.00	853.060	746.090	.00	.00
.30	6.00	1045.440	848.470	.00	.00
.35	7.00	1195.080	928.110	.00	.00
.40	8.00	1301.950	984.980	.00	.00
.45	9.00	1366.080	1019.110	.00	.00
.50	10.00	1387.460	1030.490	.00	.00
.55	11.00	1366.080	1019.110	.00	.00
.60	12.00	1301.950	984.980	.00	.00
.65	13.00	1195.080	928.110	.00	.00
.70	14.00	1045.440	848.470	.00	.00
.75	15.00	853.060	746.090	.00	.00
.80	16.00	620.958	617.931	.00	.00
.85	17.00	473.070	340.040	.00	.00
.90	18.00	302.430	19.400	.00	.00
.95	19.00	109.050	-343.980	.00	.00
1.00	20.00	-107.100	-750.130	.00	.00

REBAR REQUIRED AT FACES OF SUPPORTS

SPAN = 1 LENGTH = 20.00 meter; CLEAR from .00 to 20.00 m

X/L	X m	<--Factored moments (kNm)--> MAXIMUM	MINIMUM	<--Reinforcement (mm^2)--> TOP	BOTTOM
face of support at left					
.00	.00	-107.100	-750.130	.00	.00
face of support at right					
1.00	20.00	-107.100	-750.130	.00	.00