STRENGTH REQUIREMENT – PRESTRESSING STEEL

The following values are to be used in design, and also in checking shop plans, unless other values are approved by the Transportation Laboratory.

High Tensile Strength Alloy Bars (ASTM A-722)

	Type I (Plain Bar)	Type II (Deformed Bar)
Ultimate Tensile Strength (psi)	150,000	150,000
Yield Strength @ 0.7% Extension (psi)	127,500	120,000

Grade 250 Prestressing Wire Strand (ASTM A-416)

	7/16"	1/2"	0.6"
Ultimate Tensile Strength (lb)	27,000	36,000	54,000
Yield Strength @ 1% Extension (lb)			
Low Relaxation	24,300	32,400	48,600
Normal	23,000	30,600	45,900

Grade 270 Prestressing Wire Strand (ASTM A-416)

	7/16"	1/2"	0.6"
Ultimate Tensile Strength (lb)	31,000	41,300	58,600
Yield Strength @ 1% Extension (lb)			
Low Relaxation	27,900	37,170	52,740
Normal	26,350	35,100	49,800

Supersedes Memo to Designers 11-21 dated June 3, 1981

Prestressing Wire (ASTM A-421)

	1/4" Type BA Wire	0.276" Type WA Wire
Ultimate Tensile (psi)	240,000	235,000
Yield Strength @ 1% Extension (psi)	204,000	199,750

Modulus of Elasticity

Prestressing Bars	28 to 34 x 10^6 psi
Prestressing Strand	27.5 x 10^6 psi
Prestressing Wire	28 to 29 x 10^6 psi

Philip C Warriner

Guy D. Mancarti

AWD:dn

11-21 STRENGTH REQUIREMENT – PRESTRESSING STEEL

The following values are to be used in design, and also in checking shop plans, unless other values are approved by the Transportation Laboratory.

High Tensile Strength Alloy Bars (ASTM A-722)

	Type I (Plain Bar)	Type II (Deformed Bar)
Ultimate Tensile Stress (MPa)	1 035	1 035
Yield Stress @ 0.7% Extension (MPa)	880	828

1 725 MPa Prestressing Wire Strand (ASTM A-416)

	11.11 mm	12.70 mm	15.24 mm
Ultimate Tensile Strength (kN)	120	160	240
Yield Strength @ 1% Extension (kN)			
Low Relaxation	108	144	216
Stress-Relieved	102	136	204

1 860 MPa Prestressing Wire Strand (ASTM A-416)

	11.11 mm	12.70 mm	15.24 mm
Ultimate Tensile Strength (kN)	138	184	261
Yield Strength @ 1% Extension (kN)			
Low Relaxation	124	165	235
Stress-Relieved	117	156	222

Memo converted to metric.

Prestressing Wire (ASTM A-421)

	6.35 mm Type BA Wire	7.01 mm Type WA Wire
Ultimate Tensile Stress (MPa)	1 655	1 620
Yield Stress @ 1% Extension (MPa)	1 407	1 377

Modulus of Elasticity

Prestressing Bars	200 000 MPa to 214 000 MPa
Prestressing Strand	193 000 MPa to 200 000 MPa
Prestressing Wire	193 000 MPa to 203 000 MPa

Richard D. Land

Shannon H. Post

EKT/FH:jgf/jlw