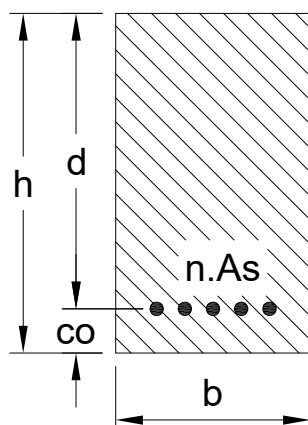


**Cracking Moment Strength for Prestressed Sections as per ACI 318-11 Chapter 18****System**

Width of Concrete Section, $b$ =	12.0 in
Depth of Concrete Section, $h$ =	24.0 in
Concrete Cover, $co$ =	2.0 in
Effective Depth of Concrete Section, $d = h - co = 24.0 - 2.0$	= 22.0 in
Number of Strands, $n$ =	6.0
Area of One Strand, $A_s$ =	0.153 in <sup>2</sup>

**Material Properties**

Concrete Strength, $f'_c$ =	5000 psi
Tensile Strength of Prestressed Steel, $f_{pu}$ =	270000 psi
Jacking Stress, $J_s = 0.7 * f_{pu}$	= 189000 psi
Percentage of Losses, $L_s$ =	20.00 %
Modification Factor for Lightweight Concrete, $\lambda$ =	1.00
Modulus of Rupture (According to Eq. 9-10 of ACI318), $f_r = 7.5 * \lambda * \sqrt{f'_c}$	= 530 psi

**Calculation of Cracking Moment Strength**

Area of Concrete, $A_c = b * h$	= 288.0 in <sup>2</sup>
Concrete Section Modulus, $S_b = b * h^2 / 6$	= 1152.0 in <sup>3</sup>
Eccentricity of Prestressing, $e = h/2 - co$	= 10.0 in
Effective Prestress Force, $P_{se} = (1 - L_s/100) * n * A_s * J_s / 1000$	= 138.8 kips
Cracking Moment Strength, $M_{cr} = \left( \frac{f_r}{1000} + \frac{P_{se}}{A_c} \right) * \frac{S_b}{12} + P_{se} * \frac{e}{12}$	= 212.8 kip*ft

**Calculation Summary**

Cracking Moment Strength, $M_{cr}$ =	$M_{cr}$	= 212.8 kip*ft
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