

3.12 Design Aids

Design Aid 3.12.1 Design Strength Interaction Curves for Precast, Prestressed Concrete Columns

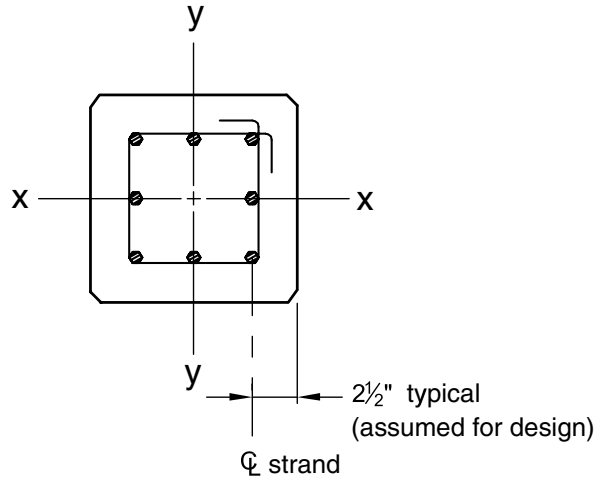
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CRITERIA

1. $f'_c = 5000$ psi, normalweight
2. Minimum prestress = 225 psi
3. All strand assumed $1/2$ in. diameter, $f_{pu} = 270$ ksi
4. Curves shown for partial development of strand near member end where $f_{pu} \approx f_{se}$
5. Horizontal portion of curve is the maximum for tied columns = $0.80\phi P_o$
6. Varies linearly from 0.9 for tension-controlled sections to 0.65 for compression-controlled sections in accordance with ACI 318-05 Section 9.3.2

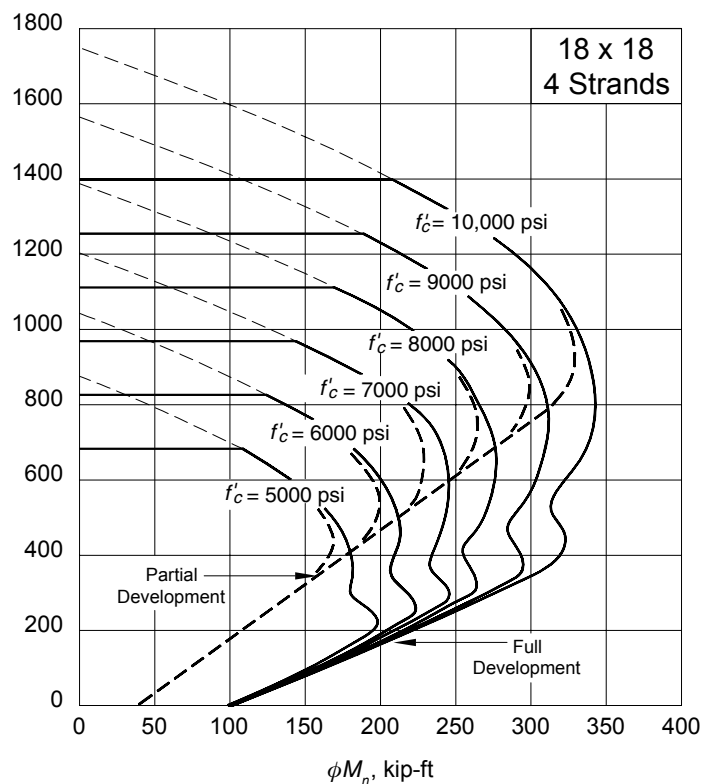
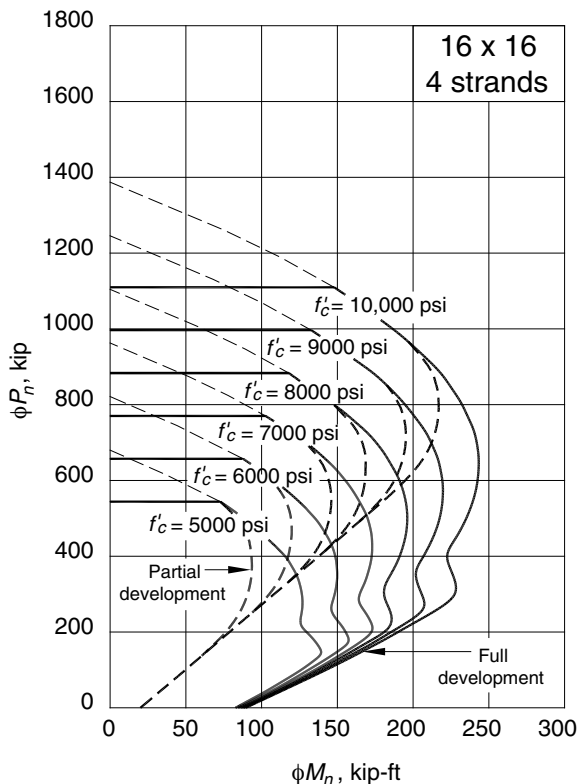
USE OF CURVES

1. Enter at left with applied factored axial load P_o
2. Enter at bottom with applied magnified factored moment δM_u
3. Intersection point must be to the left of curve indicating required concrete strength.



NOTATION

- ϕP_n = design axial strength
- ϕM_n = design flexural strength
- ϕP_o = design axial strength at zero eccentricity
- A_g = gross area of the column
- δ = moment magnifier (ACI 318-05, Section 10.11–10.13)



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