3.13 Design Aids

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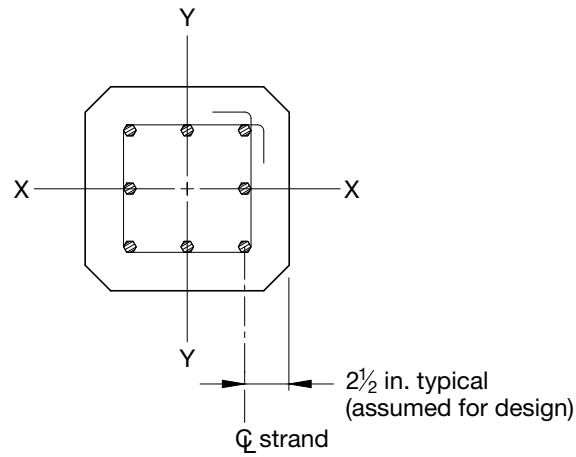
Design Aid 3.13.1. Design Strength Interaction Curves for Precast, Prestressed Concrete Columns

CRITERIA

1. Concrete f'_c = 5000 to 10,000 psi, normalweight
2. Minimum prestress = 225 psi
3. All strand assumed ½ 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. ϕ varies linearly from 0.9 for tension-controlled sections to 0.65 for compression-controlled sections in accordance with ACI 318-14 Section 21.2

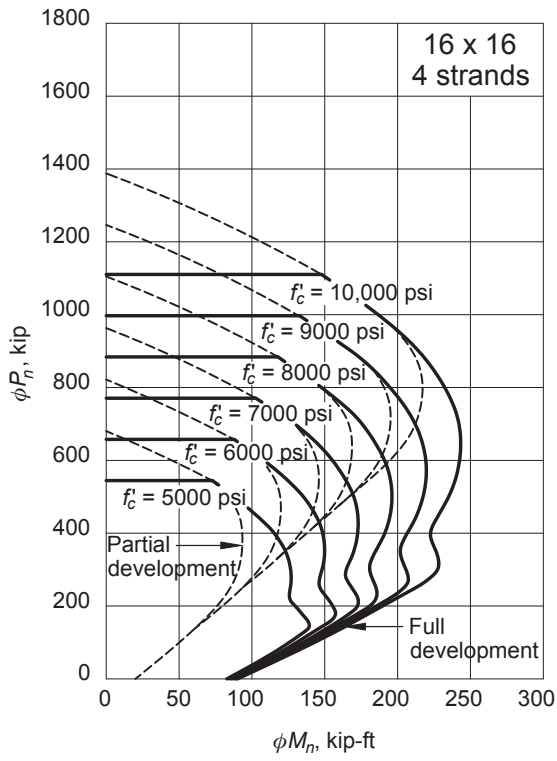


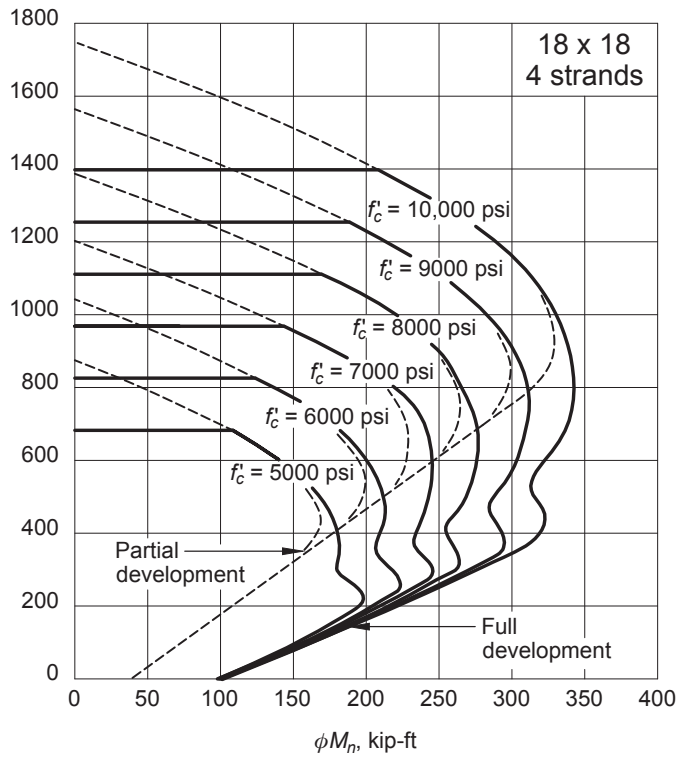
USE OF CURVES

1. Enter at left with applied factored axial load P_u
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_0 = design axial strength at zero eccentricity
A_g = gross area of the column
δ = moment magnifier (ACI 318-14 Section 6.6.4)





Design Aid 3.13.1. Design Strength Interaction Curves for Precast, Prestressed Concrete Columns (cont.)