Find max axial force: M=0 stand. Spec. 8.16.4.2.1

ΦPo = Φ[0.85*f'c(Ag-Ast)+Ast*fy]

Ag = 1017.9 in^2
Ast = 8.1 in^2

ΦPo = 3058.6 kip Mn = 0

Find axial and moment capacity at balanced strain condition: Stand. Spec 8.16.4.2.3

ΦPb = Φ[0.85*f'c*b*ab+A's*f's-As*fy]

ΦMb = Φ[0.85*f'c*b*ab(d-d"-ab/2)+A'sf's(d-d'-d")+As*fy*d"]

d = 26.86 (in) dist from extreme compression fiber to centroid of tension steel
d' = 9.14 (in) dist from extreme compression fiber to centroid of comp. steel
d" = 8.86 (in) dist from centroid of gross section to centroid of tension steel
ab = 14.31 in
β1 = 0.9
f's = 36.97 ksi
b = 35.23 in
A's = 3.72 in^2 As = 3.72 in^2

ΦPb = 1199.76 kip

ΦMb = 17138.38 in-kip = 1428.20 ft-kip

Find Moment Capacity of Section: P=0

Note: neglect compression steel

c = 5.64 (in) with a % error of 0.06 % OK
b = 25.06
θ = 88.22

Reinforcement Ratio: Used to check if fs=fy
p = 0.005527
pb = 0.022638
Is p<.75pb ? OK

ΦMn = As*fy(d-a/2)
5428.57 in-kip = 452.38 ft-kip Pn = 0

Determine if section is adequate for loads applied

Mu = 149.57266 ft-kips
Pu = 4.0300609 kips

Points for interaction diagram: Note: points are connected with straight lines

Article 8.15.4 Stand. Spec. The combined flexural and axial load capacity of compression members shall be taken as 35% of that from 8.16.4

	P	M	
1	1070.5	0	
2	419.91	499.87	
3	0	158.33	
4	4.0300609	149.5727	Point 4 is from actual loads

Linear Interpolation Program #1 (upper line)

Are you in upper region? No

	Pu		Mu	
Value Below	1070.52		0.00	
Value at desired Loc.	4.03	x =	819.399	Max
Value Above	419.91		499.87	

Linear Interpolation Program #2 (lower line)

Are you in lower region? Yes

	Pu		Mu	
Value Below	419.91		499.87	
Value at desired Loc.	4.03	x =	161.611	Max
Value Above	0.00		158.33	

Circular Stem

183-Sign-e