

DESIGN DATA

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 Section Type: General

Ttop = 2.00 in      H = 12.00 in      Tbot = 0.00 in  
 Btop = 48.00 in      Bweb = 4.50 in      Bbot = 0.00 in  
  
 Area = 146.00 in^2      Ytop = 3.00 in      Stop = 522.0 in^3  
 I = 1566 in^4      Ybot = 9.00 in      Sbot = 174.0 in^3  
 r = 3.28 in

Concrete:

f'c = 5.00 ksi      wc = 150.0 pcf      lambda = 1.00  
 Ec = 4287 ksi      ecu = 0.0030      B1 = 0.80  
 crkg = 12.0

P/S Steel:

fpu = 270.0 ksi      Eps = 28500 ksi      epsy = 0.0086  
 fse = 154.0 ksi      ese = 0.0054      epf = 0.0450

Using ACI 318-05:

Comp. controlled phi = 0.650      Tens. controlled phi = 0.900

Reinforcing Data:

Depth (in)	Area (in^2)	Prestressed Strand or Mild Steel
2.00	0.153	1.00 x 0.500 in. P/S
10.00	0.084	0.55 x 0.500 in. P/S

Aps/Ag (P/S) = 0.002

WARNING: Longitudinal reinforcement does not meet limits in ACI 318 Sect. 10.9.1 (for columns only).

\*\*\*\*\* OUTPUT \*\*\*\*\*

FACTORED LOADS

Nom. zero moment axial strength: phi\*Po = 378.3 kips  
 Max. design axial load strength: phi\*Pn(max) = 302.6 kips, Par. 10.3.6.3  
  
 Max. design axial load strength: phi\*Pn(max) = -46.0 kips  
 Nom. zero moment axial strength: phi\*Po = -57.4 kips

0.1\*f'c\*Area = 73.0 kips

Balanced condition: phi\*Pn = 264.3 kips      phi\*Mn = 615 k-in (+M)  
                          phi\*Pn = 17.8 kips      phi\*Mn = -323 k-in (-M)  
  
 Maximum moment:      phi\*Pn = 348.1 kips      phi\*Mn = 864 k-in (+M)  
                          phi\*Pn = 92.5 kips      phi\*Mn = -485 k-in (-M)

MOMENT MAGNIFICATION

kLu (ft)	Cm	Bd	M1/M2	App. Pu (k)	App. Mu (k-in)	Mom. Magn.	Mc (k-in)	phi	phi*Mn (k-in)
19.00	1.00	0.60	0.00	38.8	272	1.19	325	0.90	368

In determining the moment magnifier, the flexural stiffness of the member was determined using ACI Eq. 10-12.

FACTORED LOAD INTERACTION DIAGRAM

Positive			Negative		Positive			Negative	
phi*Pn (k)	phi*Mn (k-in)	Ecc. (in)	phi*Mn (k-in)	Ecc. (in)	phi*Pn (k)	phi*Mn (k-in)	Ecc. (in)	phi*Mn (k-in)	Ecc. (in)
0.0	269	---	269	---	55.0	406	7.4	-438	8.0
5.0	282	56.4	-348	69.7	60.0	418	7.0	-449	7.5
10.0	295	29.5	-363	36.3	65.0	429	6.6	-459	7.1
15.0	308	20.5	-367	24.5	70.0	441	6.3	-467	6.7
20.0	321	16.0	-371	18.5	75.0	452	6.0	-474	6.3
25.0	333	13.3	-372	14.9	80.0	463	5.8	-480	6.0
30.0	346	11.5	-373	12.4	85.0	474	5.6	-483	5.7
35.0	358	10.2	-382	10.9	90.0	484	5.4	-484	5.4
40.0	371	9.3	-398	9.9	95.0	494	5.2	-484	5.1
45.0	383	8.5	-412	9.2	100.0	504	5.0	-482	4.8
50.0	395	7.9	-426	8.5					

SERVICE LOAD STRESSES

Final Prestress:      ft = 122 psi      fb = 636 psi

P (k)	M (k-in)	w/o Prestress		Total w/ P/S	
		ft (psi)	fb (psi)	ft (psi)	fb (psi)
25.5	179	517	-851	638	-215

SERVICE LOAD INTERACTION DIAGRAMS - as defined by the lines below:

- Line 1: Controlled by allowable tension in the top (ftop)
- Line 2: Controlled by allowable compression in top (ftop)
- Line 3: Controlled by allowable tension in the bottom (fbot)
- Line 4: Controlled by allowable compression in bottom (fbot)

Stress in top due to final P/S = 122 psi (ftop)  
 Stress in bottom due to final P/S = 636 psi (fbot)

Case 1 - Assigned parameters:  
 Allowable tension = -212 psi  
 Allowable compression = 2250 psi

Intersection of		P	M	ftop	fbot
Line	& Line	(k)	(k-in)	(psi)	(psi)
1	3	-67.5	67	-212	-212
1	4	22.4	-254	-212	2250
2	3	202.1	388	2250	-212
2	4	292.0	67	2250	2250

NOTE: Above four points are diagram corners

1	P=0	0.0	-174	-212	1637
2	P=0	0.0	1111	2250	-5749
3	P=0	0.0	148	404	-212
4	P=0	0.0	-281	-416	2250
1	M=0	-48.7	0	-212	303
2	M=0	310.7	0	2250	2765
3	M=0	-123.9	0	-727	-212
4	M=0	235.6	0	1735	2250

NOTE: Above eight points are intersection points w/ P & M axes