

| Load Type | Magnitude of Load (k) | Distance From Left End (ft) | Eccent. (in) |
|---------------------|-----------------------|-----------------------------|--------------|
| Non-comp. Dead Load | 10.74 | 2.00 | 10.000 |
| Live Load | 6.00 | 2.00 | 10.000 |
| Non-comp. Dead Load | 10.74 | 6.00 | 10.000 |
| Live Load | 6.00 | 6.00 | 10.000 |
| Non-comp. Dead Load | 10.74 | 10.00 | 10.000 |
| Live Load | 6.00 | 10.00 | 10.000 |
| Non-comp. Dead Load | 10.74 | 14.00 | 10.000 |
| Live Load | 6.00 | 14.00 | 10.000 |
| Non-comp. Dead Load | 10.74 | 18.00 | 10.000 |
| Live Load | 6.00 | 18.00 | 10.000 |
| Non-comp. Dead Load | 10.74 | 22.00 | 10.000 |
| Live Load | 6.00 | 22.00 | 10.000 |
| Non-comp. Dead Load | 10.74 | 26.00 | 10.000 |
| Live Load | 6.00 | 26.00 | 10.000 |

NOTE: 0.00% of all distributed and concentrated live loads are sustained.

Additional Printout Points

From Left(ft): 1.00

Loading Eccentricities and Distribution Lengths for Ledge and Hanger Steel

NOTE: Assigned Wu and Pu will override distributed and concentrated loads listed above for ledge and hanger steel design.
 Assigned Wu = 0.000 k/ft Ecc. for Wu =+ 0.00 in (Right Side)
 Assigned Pu = 0.00 kips Ecc. for Pu =+ 0.00 in (Right Side)
 Nu/Wu, Nu/Pu = 0.20
 Distribution: Interior= 0.00 ft End = 0.00 ft
 Hanger Steel Additive -> YES Ledge Fully Supported -> NO
 Width, Bt = 0.000 in Spacing, S = 0.00 in Dist., De = 0.00 in

Miscellaneous Torsion Parameters

Assigned Dimensions of the Closed Stirrups (c. to c., in)
 Horizontal Vertical
 Top Flange : 0.000 0.000
 Web : 5.500 72.500
 Bottom Flange : 0.000 0.000
 dw = 0.000 in hs = 0.00 in
 Zia-Hsu method Sum X^2Y = 0.0 in^3 (See Summary of Web Reinforcement for calculated values.)

Bearing Plates

Nu = 0.20*Pu Height= 0.00 in Bearing Pad Thickness = 0.250 in
 Eff. Brg. Surface: Width = 0.00 in Length = 0.000 in
 Plate Rebar: Angle = 10.00 deg fy = 60.00 ksi
 Confinement for non-debonded prestressing strand assumed -> NO

***** OUTPUT *****

STRAND STRESSES (Based on f'ci=3.500 ksi, f'c=6.000 ksi, Assigned by user)

at at
 X(ft) from Tensioning Release Final P/S loss P/S loss

| Left End | ksi | ksi | ksi | ksi | % |
|----------|-------|-------|-------|--------|--------|
| 0.00 | 189.0 | 177.7 | 0.0 | 189.00 | 100.00 |
| 2.80 | 189.0 | 177.7 | 139.0 | 50.00 | 26.46 |
| 5.60 | 189.0 | 177.7 | 139.0 | 50.00 | 26.46 |
| 8.40 | 189.0 | 177.7 | 139.0 | 50.00 | 26.46 |
| 11.20 | 189.0 | 177.7 | 139.0 | 50.00 | 26.46 |
| 14.00 | 189.0 | 177.7 | 139.0 | 50.00 | 26.46 |
| 16.80 | 189.0 | 177.7 | 139.0 | 50.00 | 26.46 |
| 19.60 | 189.0 | 177.7 | 139.0 | 50.00 | 26.46 |
| 22.40 | 189.0 | 177.7 | 139.0 | 50.00 | 26.46 |
| 25.20 | 189.0 | 177.7 | 139.0 | 50.00 | 26.46 |
| 28.00 | 189.0 | 177.7 | 0.0 | 189.00 | 100.00 |

VERTICAL SHEAR REINFORCING

| X(ft) Left End | From Left End | D in. | Vu kips | Tu k-in | Vci kips | Vcw kips | -- Required Reinforcing -- | | |
|-------------------|------------------|----------|------------|------------|-------------|-------------|------------------------------------|------------------------------------|-------------------------------------|
| | | | | | | | for Avci in ² /ft | for Avcw in ² /ft | for Avmin in ² /ft |
| 0.50 | 72.00 | 90.45 | 787.1 | 535 | 164 | 0.000 | 0.000 | 0.093(1a)*** | |
| 1.00 | 72.00 | 90.02 | 787.1 | 535 | 171 | 0.000 | 0.000 | 0.093(1a)*** | |
| 1.40 | 72.00 | 89.67 | 787.1 | 535 | 177 | 0.000 | 0.000 | 0.093(1a)*** | |
| 2.80 | 72.00 | 65.96 | 562.2 | 283 | 188 | 0.000 | 0.000 | 0.000*** | |
| 4.20 | 72.00 | 64.75 | 562.2 | 209 | 188 | 0.000 | 0.000 | 0.000*** | |
| 5.60 | 72.00 | 63.53 | 562.2 | 168 | 188 | 0.000 | 0.000 | 0.026(2)*** | |
| 7.00 | 72.00 | 39.82 | 337.3 | 102 | 188 | 0.000 | 0.000 | 0.026(2)*** | |
| 8.40 | 72.00 | 38.60 | 337.3 | 93 | 188 | 0.000 | 0.000 | 0.026(2)*** | |
| 9.80 | 72.00 | 37.39 | 337.3 | 85 | 188 | 0.000 | 0.000 | 0.026(2)*** | |
| 11.20 | 72.00 | 13.68 | 112.4 | 76 | 188 | 0.000 | 0.000 | 0.000 | |
| 12.60 | 72.00 | 12.46 | 112.4 | 76 | 188 | 0.000 | 0.000 | 0.000 | |
| 14.00 | 72.00 | 11.24 | 112.4 | 76 | 188 | 0.000 | 0.000 | 0.000 | |
| 15.40 | 72.00 | -12.46 | -112.4 | 76 | 188 | 0.000 | 0.000 | 0.000 | |
| 16.80 | 72.00 | -13.68 | -112.4 | 76 | 188 | 0.000 | 0.000 | 0.000 | |
| 18.20 | 72.00 | -37.39 | -337.3 | 85 | 188 | 0.000 | 0.000 | 0.026(2)*** | |
| 19.60 | 72.00 | -38.60 | -337.3 | 93 | 188 | 0.000 | 0.000 | 0.026(2)*** | |
| 21.00 | 72.00 | -39.82 | -337.3 | 102 | 188 | 0.000 | 0.000 | 0.026(2)*** | |
| 22.40 | 72.00 | -63.53 | -562.2 | 168 | 188 | 0.000 | 0.000 | 0.026(2)*** | |
| 23.80 | 72.00 | -64.75 | -562.2 | 209 | 188 | 0.000 | 0.000 | 0.000*** | |
| 25.20 | 72.00 | -65.96 | -562.2 | 283 | 188 | 0.000 | 0.000 | 0.000*** | |
| 26.60 | 72.00 | -89.67 | -787.1 | 535 | 177 | 0.000 | 0.000 | 0.093(1a)*** | |
| 27.50 | 72.00 | -90.45 | -787.1 | 535 | 164 | 0.000 | 0.000 | 0.093(1a)*** | |

(1a): Minimum based on ACI Eq. 11-13. (prestress < 40% tensile strength)
 (2) : Minimum based on ACI Eq. 11-14. (prestress > 40% tensile strength)
 NOTE: Req'd. reinf. does not include suspension steel for ledges & pockets.
 NOTE: Req'd. reinf. is based on a total web width = 8.000 in.
 *NOTE: Spacing must not exceed the lesser of 24(in) or 3/4*h= 56.25(in).
 ***NOTE: Tu > Tumin (Eq. 4.4.1), therefore torsion reinforcement required.
 NOTE: Design assumes web reinforcing is carried as close to compression
 and tension surfaces as possible per ACI 12.13.1.

COMBINED TORSION AND SHEAR REINFORCEMENT (Zia-Hsu)

| X(ft) Left End | From Left End | fpc psi | Gamma | Kt | Ct /in | Vc k | Tc k-in | ----- Required ----- | | |
|-------------------|------------------|------------|-------|--------|-----------|---------|------------|------------------------------|-------------------------------|-----------------------|
| | | | | | | | | Asmin in ² /ft | Av+2At in ² /ft | Al in ² |
| 0.50 | 44.0 | 1.036 | 12.4 | 0.0909 | 47.1 | 410 | 0.086 | 0.632 | 2.780** | |
| 1.00 | 88.0 | 1.071 | 12.7 | 0.0909 | 50.5 | 442 | 0.092 | 0.600 | 2.642** | |
| 1.40 | 123.2 | 1.098 | 12.9 | 0.0909 | 53.1 | 466 | 0.096 | 0.575 | 2.535** | |
| 2.80 | 183.3 | 1.143 | 13.4 | 0.0909 | 59.3 | 505 | 0.104 | 0.243 | 1.062** | |

| | | | | | | | | | |
|-------|-------|-------|------|--------|------|-----|-------|-------|---------|
| 4.20 | 183.3 | 1.143 | 13.4 | 0.0909 | 58.3 | 506 | 0.104 | 0.241 | 1.058** |
| 5.60 | 183.3 | 1.143 | 13.4 | 0.0909 | 56.7 | 501 | 0.104 | 0.244 | 1.079** |
| 7.00 | 183.3 | 1.143 | 13.4 | 0.0909 | 53.5 | 454 | 0.104 | 0.000 | 0.000 |
| 8.40 | 183.3 | 1.143 | 13.4 | 0.0909 | 51.0 | 445 | 0.104 | 0.004 | 0.019** |
| 9.80 | 183.3 | 1.143 | 13.4 | 0.0909 | 48.6 | 438 | 0.104 | 0.011 | 0.050** |
| 11.20 | 183.3 | 1.143 | 13.4 | 0.0909 | 49.3 | 405 | 0.000 | 0.000 | 0.000 |
| 12.60 | 183.3 | 1.143 | 13.4 | 0.0909 | 46.6 | 420 | 0.000 | 0.000 | 0.000 |
| 14.00 | 183.3 | 1.143 | 13.4 | 0.0909 | 43.6 | 436 | 0.000 | 0.000 | 0.000 |
| 15.40 | 183.3 | 1.143 | 13.4 | 0.0909 | 46.6 | 420 | 0.000 | 0.000 | 0.000 |
| 16.80 | 183.3 | 1.143 | 13.4 | 0.0909 | 49.3 | 405 | 0.000 | 0.000 | 0.000 |
| 18.20 | 183.3 | 1.143 | 13.4 | 0.0909 | 48.6 | 438 | 0.104 | 0.011 | 0.050** |
| 19.60 | 183.3 | 1.143 | 13.4 | 0.0909 | 51.0 | 445 | 0.104 | 0.004 | 0.019** |
| 21.00 | 183.3 | 1.143 | 13.4 | 0.0909 | 53.5 | 454 | 0.104 | 0.000 | 0.000 |
| 22.40 | 183.3 | 1.143 | 13.4 | 0.0909 | 56.7 | 501 | 0.104 | 0.244 | 1.079** |
| 23.80 | 183.3 | 1.143 | 13.4 | 0.0909 | 58.3 | 506 | 0.104 | 0.241 | 1.058** |
| 25.20 | 183.3 | 1.143 | 13.4 | 0.0909 | 59.3 | 505 | 0.104 | 0.243 | 1.062** |
| 26.60 | 123.2 | 1.098 | 12.9 | 0.0909 | 53.1 | 466 | 0.096 | 0.575 | 2.535** |
| 27.50 | 44.0 | 1.036 | 12.4 | 0.0909 | 47.1 | 410 | 0.086 | 0.632 | 2.780** |

Vc, Tc = Calculated concrete shear and torsional strength for combined loads.
 Asmin = Minimum web reinforcing to ensure reasonable ductility (Eq 4.4.7).
 Av+2At = Total reinforcing (both legs) as required for shear and torsion.
 Al = Total long. reinforcing distributed around perimeter of stirrups.
 *NOTE: Spacing of stirrups not to exceed $3/4 \cdot h < 24(\text{in})$.
 **NOTE: Spacing of stirrups not to exceed $(x1 + y1)/4 \leq 12(\text{in})$.
 NOTE: Spacing of longitudinal bars not to exceed 12(in).

SUMMARY OF MINIMUM VERTICAL AND LONGITUDINAL WEB REINFORCEMENT REQUIREMENTS

For Vertical Reinf, select from columns (1), (2), (3) or (4)
 For Longitudinal Reinf, select from columns (A) or (B)

| X From Left End ft | X^2Y in^3 | (1) Ash<1> in^2 | (2) Av/2+At in^2/ft | (3) Av/2+Ash<1> in^2 | (4) Av/2+Awv in^2/ft | (A) Al/2 in^2 | (B) Awl in^2 |
|--------------------------|--------------|-----------------------|---------------------------|----------------------------|----------------------------|---------------------|--------------------|
| 0.50 | 6336 | 0.996 | 0.316 | 1.098 | 0.326 | 1.390 | 1.345 |
| 1.00 | 6336 | 0.996 | 0.300 | 1.092 | 0.321 | 1.321 | 1.345 |
| 1.40 | 6336 | 0.996 | 0.287 | 1.088 | 0.317 | 1.267 | 1.345 |
| 2.80 | 6336 | 0.996 | 0.121 | 1.036 | 0.264 | 0.531 | 1.345 |
| 4.20 | 6336 | 0.996 | 0.120 | 1.035 | 0.263 | 0.529 | 1.345 |
| 5.60 | 6336 | 0.996 | 0.122 | 1.035 | 0.263 | 0.539 | 1.345 |
| 7.00 | 6336 | 0.996 | 0.000 | 0.996 | | 0.000 | |
| 8.40 | 6336 | 0.996 | 0.002 | 0.997 | | 0.010 | |
| 9.80 | 6336 | 0.996 | 0.006 | 0.998 | | 0.025 | |
| 11.20 | | 0.996 | 0.000 | 0.996 | | 0.000 | |
| 12.60 | | 0.996 | 0.000 | 0.996 | | 0.000 | |
| 14.00 | | 0.996 | 0.000 | 0.996 | | 0.000 | |
| 15.40 | | 0.996 | 0.000 | 0.996 | | 0.000 | |
| 16.80 | | 0.996 | 0.000 | 0.996 | | 0.000 | |
| 18.20 | 6336 | 0.996 | 0.006 | 0.998 | | 0.025 | |
| 19.60 | 6336 | 0.996 | 0.002 | 0.997 | | 0.010 | |
| 21.00 | 6336 | 0.996 | 0.000 | 0.996 | | 0.000 | |
| 22.40 | 6336 | 0.996 | 0.122 | 1.035 | 0.263 | 0.539 | 1.345 |
| 23.80 | 6336 | 0.996 | 0.120 | 1.035 | 0.263 | 0.529 | 1.345 |
| 25.20 | 6336 | 0.996 | 0.121 | 1.036 | 0.264 | 0.531 | 1.345 |
| 26.60 | 6336 | 0.996 | 0.287 | 1.088 | 0.317 | 1.267 | 1.345 |
| 27.50 | 6336 | 0.996 | 0.316 | 1.098 | 0.326 | 1.390 | 1.345 |

Awv = Awl = 1.345(left), 1.345(right) = Vertical and long. web reinf.
 for bending due to torsional equil. reactions (ledge face, in^2),

based on: $T_u = 787.1$ k-in at Left End, $= 787.1$ k-in at Right End
 $d_s = 6.500$ in $H_s = 72.000$ in

Ash = Hanger reinforcement (ledge face only).

NOTE: The above values for steel are for one face only. Columns (2) & (A) should be applied to both faces. All other columns need only be applied to the ledge face.

NOTE: Ash includes contribution from P_u only.

NOTE: This analysis for hanger steel assumes the beam to be full depth at the support. If the beam is dapped, user must determine the proper dap and hanger reinforcement near the end.

<1>NOTE: End distribution not assigned, total vertical reinforcement near the ends may be reduced by an appropriate distribution length.

MISC. PRODUCTION INFORMATION

Initial prestress force = 174 kips Final prestress force = 128 kips
Concrete strengths used in design:
Release strength $f'_{ci} = 3500$ psi Final strength $f'_c = 6000$ psi
Beam is NORMAL WEIGHT concrete. Piece weight = 20.30 kips.

Estimated shortening between supports at erection time :

| | Curvature | | | |
|-----|-----------|--------|-------|---|
| | at C.G. | Effect | Total | |
| Top | 0.08 | -0.06 | 0.02 | <<<Length correction not to exceed this value |
| C.G | 0.08 | 0.00 | 0.08 | |
| Bot | 0.08 | 0.05 | 0.13 | |