Project: Woodstock Railing

Location: COL3, Woodstock Bridge Railing Post
Column
[2015 International Building Code(AISC 14th Ed ASD)]
HSS 2.375 x 0.218 x 3.5 FT /ASTM A501-36
Section Adequate By: 99.9%

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**DEFLECTIONS**

| | | |
|---|---|---|
| Deflection due to lateral loads only: | Defl = 0 | IN = L/Infinity |
| Live Load Deflection Criteria: | | L/120 |

**VERTICAL REACTIONS**

| | | |
|---|---|---|
| Live Load: | Vert-LL-Rxn = | 0 lb |
| Dead Load: | Vert-DL-Rxn = | 18 lb |
| Total Load: | Vert-TL-Rxn = | 18 lb |

**HORIZONTAL REACTIONS**

| | | |
|---|---|---|
| Total Reaction at Top of Column: | TL-Rxn-Top = | 446 lb |
| Total Reaction at Bottom of Column: | TL-Rxn-Bottom = | 0 lb |

**COLUMN DATA**

| | |
|---|---|
| Total Column Length: | 3.5 ft |
| Unbraced Length (X-Axis) Lx: | 3.5 ft |
| Unbraced Length (Y-Axis) Ly: | 3.5 ft |
| Column End Condition-K (e): | 2 |

**COLUMN PROPERTIES**
HSS 2.375 x 0.218 - Round

| | | | | |
|---|---|---|---|---|
| Steel Yield Strength: | Fy = | 36 ksi | | |
| Modulus of Elasticity: | E = | 29000 ksi | | |
| Column Section: | dx = | 2.38 in | dy = | 2.38 in |
| Column Wall Thickness: | t = | 0.203 in | | |
| Area: | A = | 1.39 in | | |
| Moment of Inertia (deflection): | Ix = | 0.82 in4 | Iy = | 0.82 in4 |
| Section Modulus: | Sx = | 0.69 in3 | Sy = | 0.69 in3 |
| Plastic Section Modulus: | Zx = | 0.96 in3 | Zy = | 0.96 in3 |
| Rad. of Gyration: | rx = | 0.77 in | ry = | 0.77 in |

**Column Compression Calculations:**

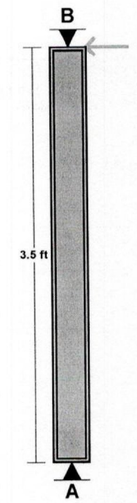
| | | |
|---|---|---|
| KL/r Ratio: | KLx/rx = 108.95 | KLy/ry = 108.95 |
| Controlling Direction for Compr. Calcs: (Y-Y Axis) | | |
| Flexural Buckling Stress: | Fcr = 19.27 ksi | |
| Controlling Equation | F8-1 | |
| Nominal Compressive Strength: | Pc = 16 kip | |

**Column Bending Calculations per AISC 14th Edition Steel Manual:**

| | | | | |
|---|---|---|---|---|
| Controlling Load Case: Axial Total Load (D + L) | | | | |
| Eccentricity Moment: | Mx-ex = | 0 ft-lb | My-ey = | 0 ft-lb |
| Lateral Moment + Eccentricity: | Mrx = | 0 ft-lb | Mry = | 0 ft-lb |
| Flange Buckling Ratio: | FBR = | 11.7 | | |
| Allow. Flange Buckling Ratio: | AFBR = | 56.39 | | |
| Allow. FBR for Non-Compact: | NC = | 249.72 | | |
| Nmnl. Flex. Str. w/ Sfty Factor: | Mcx = | 1.7 ft-kip | Mcy = | 1.7 ft-kip |
| Controlling Equation | F8-1 | | | |

**Combined Stress Calculations:**
H1-1b Controls : 0.00
**Controlling Combined Stress Factor: 0**

**LOADING DIAGRAM**




**AXIAL LOADING**

| | | |
|---|---|---|
| Live Load: | PL = | 0 lb |
| Dead Load: | PD = | 0 lb |
| Column Self Weight: | CSW = | 18 lb |
| Total Axial Load: | PT = | 18 lb |

**LATERAL LOADING** (Dy Face)

| | |
|---|---|
| Uniform Lateral Load: | wL-Lat = 0 plf |
| Point Load: | One |
| Live Load: | 445.5 lb |
| Location: | 0 ft |

**NOTES**

Post, 2 inch sch 80 pipe,

Load = 200# + 50L, where L is post spacing in feet.

200+ 50(7.3 ft) = 565#