Deflection due to side load $\Delta 2 := \frac{Ph \cdot (La \cdot 12)^2 \cdot L \cdot 12}{3 \cdot E \cdot I}$ $\Delta 2 = 2.2347$ inch

Deflection due to top moment $\Delta 3 := \frac{Ma \cdot La \cdot 12}{6 \cdot E \cdot I} \cdot (2 \cdot Lb \cdot 12 + 3 \cdot La \cdot 12)$ $\Delta 3 = 3.172$ inch

Total deflection at top $\Delta t := \Delta 1 + \Delta 2 + \Delta 3$ $\Delta t = 6.105$ inch

Calculate the vertical force at bridle support

Weight at bridle $Wpa := Pv + Wr + \frac{Wtp \cdot La}{1000}$ $Wpa = 23.695$ kips

Computed axial stress, in leg due to weight $fa := \frac{Wpa}{Atot}$ $fa = 2.428$ ksi

Ratio of fa / Fa $\frac{fa}{Fap} = 0.381$ (If fa/Fa <= 0.15 Then ASD Eq. H1-3)

Euler stress allowed $F'e := \frac{12 \cdot \pi^2 \cdot E}{23 \cdot KLrp^2}$ (ASD H1) $F'e = 6.37$ ksi

Bending coefficient (TIA B2.3b) $Cm := 1.0$

Wind load from calculations $w := 5 \cdot 0.001$ kip/ft

Moment at bridel point $Mb := Ma + Ph \cdot La \cdot 12 + Pv \cdot \Delta t + w \cdot La \cdot \frac{La \cdot 12}{2}$ $Mb = 904.2$ inch-kip

Bending stress due to moment $fb := \frac{Mb \cdot c}{I}$ $fb = 6.863$ ksi

Adding in the Impact Factor $fa := fa \cdot 1.20$ $fb := fb \cdot 1.20$

Allowable bending stress $Fb := Fa$ (TIA B2.3d) $Fb = 28.199$ ksi

Combined stress equation H1-1 $\frac{fa}{Fap} + \frac{Cm \cdot fb}{\left(1 - \frac{fa}{F'e}\right) \cdot Fb} = 0.995$

Combined stress equation H1-2 $\frac{fa}{0.60 \cdot Fy} + \frac{fb}{Fb} = 0.389$

Combined stress equation H1-3 $\frac{fa}{Fap} + \frac{fb}{Fb} = 0.749$

Since the combined stress ratios are less than 1.0 for all equations the gin pole capacity OK.

REGISTERED PROFESSIONAL ENGINEER LEO L. ROBERTS 10469

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