DAMMON ENGINEERING, INC.
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ARCHITECTS ENGINEERS
CONSULTING DESIGN STUDIES EXPERT WITNESS
554 Old Spanish Trail
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Project: Casey Civil, Owens & Minor Tenant BO 2700 Britmore Rd. Houston, TX 77043
Opening Reinforcement design.

Assumptions:
- 8" thk. concrete tilt-up wall panels, width of each panel unknown
- concrete rein. & placement unknown
- wall panels are non-loadbearing, self support & wind only.
- Limestone agg w/ portland cement $1cf \approx 145\,lb$

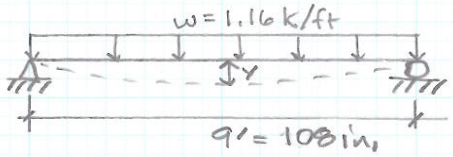
Opening #1: Storefront glazing 8'H x 9'W

Loads –
- $DL = 9' \times 6' \times 8'' \times 145 \frac{lb}{ft^3} = 5220\,lbs$
  $w = 580\,plf$
- LL = wind 110 mph $\Rightarrow$ $A_{eff} = (4'+6'+5')(9') = 135$
  $P_{net30} = 20.2\,psf$ [ASCE 7-05]
  $w = 135(20.2) = 2727\,lb = 303\,plf$

Try HSS 10x8x5/16 $I_{xx} = 145\,in^4$ $I_{y-y} = 103\,in^4$

$\Delta max = L/180 = 0.225\,in$

$\Delta_{DL} = \frac{5(0.68)(108^4)}{384\,E\,145} = 0.244$ NO GOOD



Try HSS 10x8x3/8 $I_{xx} = 169\,in^4$ $I_{yy} = 120\,in^4$

$\Delta_{DL} = \frac{5(0.58)(108)^4}{384\,E\,(169)} = 0.21\,in$ OK

$\Delta_{WL} = \frac{5(0.303)(108^4)}{384\,E\,(120)} = 0.15\,in$ OK

use HSS 10x8x3/8 ASTM A36 BEAM

Opening #2: Storefront glazing 6'H x 8'W

Loads –
- $DL = 8' \times 6' \times 8'' \times 145 \frac{lb}{ft^3} = 4640\,lb$
  $w = 580\,plf$
- $LL \Rightarrow w = 303\,plf$

use similar beams HSS 10x8x3/8 ASTM 36 BEAM

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Column design: based on opening #1 load conditions

$K = 1.0 \quad L = 8' \quad KL = 8' \quad P_u = 5220/2 = 2.61\ k$

Try HSS 8x4x1/8 (due to ease of const.)

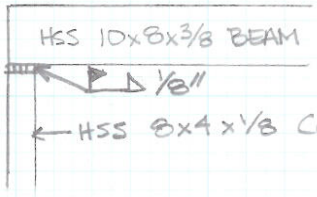
Avail. Str in axial comp. [AISC Tbl 4-3] = 49.2k OK

Use HSS 8x4x1/8 for all openings

Welds: 1/8" fillet weld, 3 loc. per conn, min 4" weld, E70 electrodes

$A_w = 0.707(0.125)4'' = 0.35\ in^2$

1/8" weld = 2 x 1/16 units



$\frac{r_n}{\Omega} = 4in\ (2\ units)(0.928\ k) = 7.342\ k$

$\frac{R_n}{\Omega} = 3(7.342k) = 22k \qquad R_u = 2.727k \qquad \frac{R_n}{\Omega} > R_u$ OK

Use 1/8" fillet @ 3 loc. per conn.

Anchorage to foundation/bottom of opening

Provide a 8x4x1/2" stl. plate @ base of each new column.

Provide 2 Titan HD A.B. (or equiv) @ each base plate location.