

Roof attachment design for Casey Civil

Assume all DL transfers to existing Vulcraft 20ga deck and str. stl. below.

Fasteners: (for z-shape to deck)

Try using 4'x10' Insul. panels oriented as shown

$$LL = 32.6 \text{ psf} [\sin 5^\circ] = 2.84 \text{ psf vert.}$$

$$P_u = [10' \times 4'] 2.84 \text{ psf} = 113.6 \text{ lbf. } \uparrow$$

r_n , pullout for #12 screw attached to 20ga. stl.

$$r_n = 93 \text{ lb/screw (AISI 2001, 2004 Supp.)}$$

$$R_n = 93 \text{ lb (6 screws)} = 558 \text{ lbf.}$$

$$P_u < R_n \quad \underline{OK} \quad \text{use } 2 \times \left[\#12 \times 16 - \frac{5}{8}'' \text{ HWH SD} \right] \text{ 24" o.c.}$$

$$F_y = 33 \quad F_u = 45$$

z-shape: (ASTM A653, gd. 33)

Try using z-shape @ 10' o.c. continuous and check for bolt tear-out failure of z-shape.

one bolt

$$R_n = 0.6 F_u (2L_c) t = 0.6 (45 \text{ ksi}) (2(1.25'')) (0.0474'') = 3.2 \text{ K}$$

$$P_u < R_n \quad \underline{OK} \quad \text{18ga. z-shape @ 10' o.c. acceptable}$$

Due to constructability use z-shape @ 5' o.c. max.

Lap Length 24" min.

