

UNIT 2 - DIAPHRAGMSSTIFFENERS - RFI 1 1/2" x 3" J-clip

→ Check weld from flange of girder to stiffener for couple-force due to moment transferring through stiffener.

→ Moment transferring through Exterior girder stiffeners will control

I-stringer Standard

$$M_{diaph} = 1500 \text{ k}\cdot\text{ft}$$

$$D_{girder} = 96''$$

Resisting force at Girder bottom flange:

$$F = \frac{M_{diaph}}{D_{girder}} = \frac{(1500 \text{ k}\cdot\text{ft})(12 \text{ in}/\text{ft})}{(96'')} \\ F = 187.5 \text{ k}$$

$$\text{weld } L = 10.0''$$

$$\text{weld size} = \frac{187.5 \text{ k}}{10.0''} = 18.75 \text{ k/in}$$

stress ✓

→ Use a 7/16" weld

Strength of weld 5/16" weld:

$$\phi R_r = \phi 0.6 F_{exx} (0.707)(5/16'')(2 \text{ sides})$$

$$\phi R_r = (0.8)(0.6)(70 \text{ ksi})(0.707)(5/16'')(2)$$

$$\phi R_r = 14.85 \text{ k/in.}$$

Strength of 3/8" weld:

$$\phi R_r = 17.81 \text{ k/in.}$$

Strength of 7/16" weld:

$$\phi R_r = 20.8 \text{ k/in.}$$

2-Stringer Standard

$$M_{diaph} = 1800 \text{ k}\cdot\text{ft}$$

$$D_{girder} = 114''$$

$$F = \frac{M_{diaph}}{D_{girder}} = \frac{(1800 \text{ k}\cdot\text{ft})(12 \text{ in}/\text{ft})}{(114'')} \\ F = 189.5 \text{ k}$$

$$\text{weld } L = 10.0''$$

$$\text{weld size} = \frac{189.5 \text{ k}}{10.0''} = 18.95 \text{ k/in}$$

→ Use 7/16" weld

UNIT 2 - DIAPHRAGMS STIFFENERS

Delta + modified Delta

$$M_{diaph} = 3250 \text{ k}\cdot\text{ft}$$

$$D_{girder} = 96'' \quad (\text{mod. } 8' \text{ region})$$

$$F = \frac{M}{D} = \frac{(3250 \text{ k}\cdot\text{ft})(12 \text{ in/ft})}{96''}$$

$$F = 406.3 \text{ k}$$

$$\text{weld } L = 16.0'' \quad \text{weld size} = \frac{406.3 \text{ k}}{16.0''} = 25.4 \frac{\text{k}}{\text{in}}$$

→ Use $\frac{9}{16}''$ weld ✓

$$M_{diaph} = 3250 \text{ k}\cdot\text{ft}$$

$$D_{girder} = 12' = 144''$$

$$F = \frac{M}{D} = \frac{(3250 \text{ k}\cdot\text{ft})(12 \text{ in/ft})}{144''}$$

$$F = 270.8 \text{ k}$$

$$\text{weld } L = 16.0''$$

$$\text{weld size} = \frac{270.8 \text{ k}}{16.0''} = 16.9 \frac{\text{k}}{\text{in}}$$

→ Use $\frac{3}{8}''$ weld ✓

Note: 12' is the cut-off girder depth for a required weld size of $\frac{9}{16}''$ for strength forces.

Strength of $\frac{9}{16}''$ weld:

$$\phi R_n = \phi 0.6 F_{exx} (0.707) (\frac{9}{16}'') (2 \text{ sides})$$

$$\phi R_n = (0.8)(0.6)(70 \text{ ksi})(0.707)(\frac{9}{16}'')(2)$$

$$\phi R_n = 26.7 \text{ k/in.}$$