

Design for As_4

$$Rn4 := \frac{Md \cdot 12}{\phi f \cdot b \cdot dw^2} \quad Rn4 = -14.1 \text{ psi}$$

$$\rho4 := \frac{.85 \cdot fc}{fy} \cdot \left(1 - \sqrt{1 - \frac{2 \cdot Rn4}{.85 \cdot fc}} \right) \quad \rho4 = -0.00024$$

$$As4 := \rho4 \cdot b \cdot dw \quad As4 = -0.0220 \text{ in}^2$$

$$\text{ShearT} := \left[\frac{W \cdot \left(s - \frac{dst}{12} \right)}{2} \right] \quad \text{In the Top Slab} \quad \text{ShearT} = 11012.7 \text{ lb}$$

$$\text{ShearB} := \left[\frac{Wb \cdot \left(s - \frac{dsb}{12} \right)}{2} \right] \quad \text{In the Bottom Slab} \quad \text{ShearB} = 11423.7 \text{ lb}$$

Shear Check - Bottom Slab

$$vub := \frac{\text{ShearB}}{\phi s \cdot b \cdot dsb} \quad vub = 143.4 \text{ psi} \quad \text{sec 2.35.1a}$$

Permissible Shear Stress sec 2.35.2e

$$vc1b := 4 \cdot \sqrt{fc} \quad vc1b = 282.8 \text{ psi max}$$

$$\text{termB} := \frac{\text{ShearB} \cdot dsb}{Mf \cdot 12} \quad \text{termB} = 0.9 \quad \text{if greater than 1.0 use 1.0}$$

$$vc2b := 2.14 \cdot \sqrt{fc} + 4600 \rho1b \cdot 1.0 \quad vc2b = 163.4 \text{ psi}$$

but need not be taken less than;

$$vc3b := 3 \cdot \sqrt{fc} \quad vc3b = 212.1 \text{ psi}$$

Shear Check -Top Slab

$$v_{ut} := \frac{\text{ShearT}}{\phi_s \cdot b \cdot d_{st}} \quad v_{ut} = 138.2 \text{ psi} \quad \text{sec 2.35.1a}$$

Permissible Shear Stress sec 2.35.2e

$$v_{c1t} := 4 \cdot \sqrt{f_c} \quad v_{c1t} = 282.8 \text{ psi max}$$

$$\text{termT} := \frac{\text{ShearT} \cdot d_{st}}{M_a \cdot 12} \quad \text{termT} = 0.9 \quad \text{if greater than 1.0 use 1.0}$$

$$v_{c2t} := 2.14 \cdot \sqrt{f_c} + 4600 \rho_{1t} \cdot 1 \quad v_{c2t} = 163.0 \text{ psi}$$

but need not be taken less than;

$$v_{c3t} := 3 \cdot \sqrt{f_c} \quad v_{c3t} = 212.1 \text{ psi}$$

Longitudinal Reinforcement required in each face sec 16.5.4a&b

Top Slab $As_{lt} := .002 \cdot t_t \cdot b \quad As_{lt} = 0.2400 \text{ in}^2$

Bottom Slab $As_{lb} := .002 \cdot t_b \cdot b \quad As_{lb} = 0.2400 \text{ in}^2$

Wall Slab $As_{lw} := .002 \cdot w \cdot b \quad As_{lw} = 0.2400 \text{ in}^2$

Top Slab Deflection Deflection Limit $def := \frac{12 \cdot b}{800} \quad def = 0.1800 \text{ in}$

$$E := 150^{1.5} \cdot 33 \cdot \sqrt{f_c} \quad E = 4286825.7 \text{ psi}$$

$$\Delta t := \frac{\frac{W}{12} \cdot (s \cdot 12)^4}{384 \cdot E \cdot I_{st}} \quad \Delta t = 0.0056 \text{ in}$$

Equation for Fixed Ends -
Uniformly Dist. Load

Bottom Slab Deflection

$$\Delta b := \frac{\frac{W_b}{12} \cdot (s \cdot 12)^4}{384 \cdot E \cdot I_{sb}} \quad \Delta b = 0.0058 \text{ in}$$

Equation for Fixed Ends -
Uniformly Dist. Load