

⑥ Check self wt.

$$\frac{12 \times 22 (150)}{144} = 275 \text{ \#/ft}$$

⑦ Calculate  $A_s = \rho b d = (0.0107)(12)(20)$   
 $= 2.568 \text{ in}^2$

Bars	$A_s (\text{in}^2)$	$b_{\text{required}} (\text{in})$
3 #9	3.00	9.8

⑧ Check Solution

$$d = h - c - \text{stirrup} - \frac{1}{2} d_{\text{bar}}$$
$$= 22 - 1.5 - \frac{4}{8} - \frac{1}{2} \left( \frac{9}{8} \right)$$
$$= 19.44 \text{ in}$$

$$\rho = \frac{A_s}{bd} = \frac{(3.00)}{(12)(19.44)} = 0.0129$$

$$\rho_{\min} = 0.0033$$

$$< \rho_{\max} = 0.0181$$

$$\therefore E_t > 0.005$$

$$\therefore \phi = 0.9$$

$$\text{for } \rho = 0.0129, \frac{m_u}{\phi b d} = 685.6$$

$$\phi M_n = m_u$$

$$\phi M_n = \phi 685.6 b d^2$$

$$m_n = 685.6 (12) (19.44)^2$$

$$\phi m_n \geq m_u$$

$$0.9(259) \geq 203.31$$

$$233 > 203.31 \quad \checkmark \text{ OK}$$