

$$\rho_c = \frac{14 \cdot 30000}{1429 \cdot 20 \cdot 46^2} \Rightarrow \boxed{\rho_c = 0,694}$$

(6)

$$\rho_{cw} = \rho_c - \rho_{cf} \Rightarrow \rho_{cw} = 0,694 - 0,329 \Rightarrow \boxed{\rho_{cw} = 0,365}$$

$$\rho_{cw} > \rho_{cwm}^{0,32} \Rightarrow \text{armadura dupla} \Rightarrow$$

$$w_w = 0,85 - \sqrt{0,7225 - 1,7 \cdot \rho_{cwm}} + \frac{(\rho_{cw} - \rho_{cwm})}{(1 - 2/46)} \Rightarrow$$

$$w_w = 0,85 - \sqrt{0,7225 - 1,7 \cdot 0,32} + \frac{(0,365 - 0,32)}{(1 - 3/46)} \Rightarrow$$

$$w_w = 0,476$$

$$w = w_f + w_w \Rightarrow w = 0,369 + 0,476 \Rightarrow \boxed{w = 0,845}$$

$$A_s = \frac{0,845 \cdot 20 \cdot 46 \cdot 1429}{43,478} \Rightarrow \boxed{A_s = 25,551 \text{ cm}^2}$$

$$\epsilon'_{sc} = \left(1 - \frac{2/46}{12 \cdot 0,6283}\right) \cdot 3,5 \Rightarrow \epsilon'_{sc} = \left(1 - \frac{3/46}{0,6283}\right) \cdot 3,5 \Rightarrow \epsilon'_{sc} = 3,137\%$$

$$\epsilon'_{sc} > \epsilon_{yd} \Rightarrow \sigma_{sc} = f_{yd}$$

$$w_w' = \frac{(\rho_{cw} - \rho_{cwm})}{(1 - 3/46)} \Rightarrow w_w' = \frac{(0,365 - 0,32)}{(1 - 3/46)} \Rightarrow w_w' = 0,048$$

$$A'_s = \frac{0,048 \cdot 20 \cdot 46 \cdot 1429}{43,478} \Rightarrow \boxed{A'_s = 1,456}$$