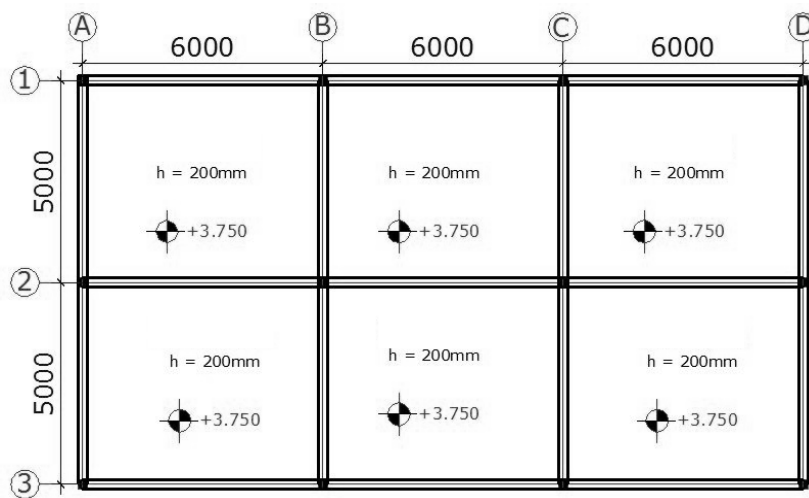


ΑΣΚΗΣΗ 2 (Παράδοση 19 Νοεμβρίου 2024)

Στο Σχήμα 1 φαίνεται η κάτοψη του πρώτου ορόφου πολυώροφης κατασκευής. Όλες οι δοκοί έχουν διατομή 230/450mm. Οι διαστάσεις του σχήματος δίνονται σε mm.

Ζητείται το συνεργαζόμενο πλάτος της πλακοδοκού για καθεμιά από τις παρακάτω περιπτώσεις:

- α) Δοκός A:1-2 ή D:1-2.
- β) Δοκός B:2-3 ή C:2-3.
- γ) Δοκός 1:A-B.
- δ) Δοκός 3:B-C.
- ε) Δοκός 2:A-B.
- στ) Δοκός 2:B-C.



Σχήμα 1: Κάτοψη ορόφου.

Λύση

α) Δοκός A:1-2 ή D:1-2

$$b_1 = (6000 - 230)/2 = 2885 \text{ mm}$$

$$l_o = (0.85 \times 5000) = 4250 \text{ mm}$$

$$b_{\text{eff},1} = 0.2b_1 + 0.1l_o = 0.2(2885) + 0.1(4250) = 577 + 425 = 1002 \text{ mm} < (0.2 \times 4250 = 850 \text{ mm}) \rightarrow b_{\text{eff},i} = 850 \text{ mm}$$

$$b_{\text{eff}} = \sum b_{\text{eff},i} + b_w \leq b = 850 \text{ mm} + 230 \text{ mm} = 1080 \text{ mm} < 3000 \text{ mm} \rightarrow \mathbf{b_{\text{eff}} = 1080 \text{ mm}}$$

β) Δοκός B:2-3 ή C:2-3

$$b_1 = (6000 - 230)/2 = 2885 \text{ mm}$$

$$b_2 = (6000 - 230)/2 = 2885 \text{ mm}$$

$$l_o = (0.85 \times 5000) = 4250 \text{ mm}$$

$$b_{\text{eff},1} = 0.2b_1 + 0.1l_o = 0.2(2885) + 0.1(4250) = 577 + 425 = 1002 \text{ mm} < (0.2 \times 4250 = 850 \text{ mm})$$

$$b_{\text{eff},2} = 0.2b_2 + 0.1l_o = 0.2(2885) + 0.1(4250) = 577 + 425 = 1002 \text{ mm} < (0.2 \times 4250 = 850 \text{ mm})$$

$$\text{Συνεπώς, } b_{\text{eff},1} = b_{\text{eff},2} = 850 \text{ mm}$$

$$b_{eff} = \Sigma b_{eff,i} + b_w \leq b = 850 + 850 + 230 = 1930 \text{ mm} < 6000 \text{ mm} \rightarrow \mathbf{b_{eff} = 1930 \text{ mm}}$$

γ) Δοκός 1:A-B

$$b_1 = (5000 - 230)/2 = 2385 \text{ mm}$$

$$l_o = (0.85 \times 6000) = 5100 \text{ mm}$$

$$b_{eff,1} = 0.2b_1 + 0.1l_o = 0.2(2385) + 0.1(5100) = 477 + 510 = 987 \text{ mm} < (0.2 \times 5100 = 1020 \text{ mm}) \rightarrow$$

$$b_{eff,i} = 987 \text{ mm}$$

$$b_{eff} = \Sigma b_{eff,i} + b_w \leq b = 987 \text{ mm} + 230 \text{ mm} = 1217 \text{ mm} < 2500 \text{ mm} \rightarrow \mathbf{b_{eff} = 1217 \text{ mm}}$$

δ) Δοκός 3:B-C

$$b_1 = (5000 - 230)/2 = 2385 \text{ mm}$$

$$l_o = (0.7 \times 6000) = 4200 \text{ mm}$$

$$b_{eff,1} = 0.2b_1 + 0.1l_o = 0.2(2385) + 0.1(4200) = 477 + 420 = 897 \text{ mm} < (0.2 \times 4200 = 840 \text{ mm}) \rightarrow$$

$$b_{eff,i} = 840 \text{ mm}$$

$$b_{eff} = \Sigma b_{eff,i} + b_w \leq b = 840 \text{ mm} + 230 \text{ mm} = 1070 \text{ mm} < 2500 \text{ mm} \rightarrow \mathbf{b_{eff} = 1070 \text{ mm}}$$

ε) Δοκός 2:A-B

$$b_1 = (5000 - 230)/2 = 2385 \text{ mm}$$

$$b_2 = (5000 - 230)/2 = 2385 \text{ mm}$$

$$l_o = (0.85 \times 6000) = 5100 \text{ mm}$$

$$b_{eff,1} = 0.2b_1 + 0.1l_o = 0.2(2385) + 0.1(5100) = 477 + 510 = 987 \text{ mm} < (0.2 \times 5100 = 1020 \text{ mm})$$

$$b_{eff,2} = 0.2b_2 + 0.1l_o = 0.2(2385) + 0.1(5100) = 477 + 510 = 987 \text{ mm} < (0.2 \times 5100 = 1020 \text{ mm})$$

$$\text{Συνεπώς, } b_{eff,1} = b_{eff,2} = 987 \text{ mm}$$

$$b_{eff} = \Sigma b_{eff,i} + b_w \leq b = 987 + 987 + 230 \text{ mm} = 2204 \text{ mm} < 5000 \text{ mm} \rightarrow \mathbf{b_{eff} = 2204 \text{ mm}}$$

στ) Δοκός 2:B-C

$$b_1 = (5000 - 230)/2 = 2385 \text{ mm}$$

$$b_2 = (5000 - 230)/2 = 2385 \text{ mm}$$

$$l_o = (0.7 \times 6000) = 4200 \text{ mm}$$

$$b_{eff,1} = 0.2b_1 + 0.1l_o = 0.2(2385) + 0.1(4200) = 477 + 420 = 897 \text{ mm} < (0.2 \times 4200 = 840 \text{ mm})$$

$$b_{eff,2} = 0.2b_2 + 0.1l_o = 0.2(2385) + 0.1(4200) = 477 + 420 = 897 \text{ mm} < (0.2 \times 4200 = 840 \text{ mm})$$

$$\text{Συνεπώς, } b_{eff,1} = b_{eff,2} = 840 \text{ mm}$$

$$b_{eff} = \Sigma b_{eff,i} + b_w \leq b = 840 + 840 + 230 = 1910 \text{ mm} < 5000 \text{ mm} \rightarrow \mathbf{b_{eff} = 1910 \text{ mm}}$$