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Find the Reinforcement Details Having the Diameter of 3 m Providing Main Reinforcement 10 mm Diameter and Distributor 8 mm Diameter at Spacing 200 mm and Nominal Cover Is 25 mm.

ANSWER

In Circular Slab Reinforcement Length Is Changed Due To Spacing Of the Reinforcement.

For This Cause Using Pythagoras Theorem to Find Out the Length Of each Reinforcement.

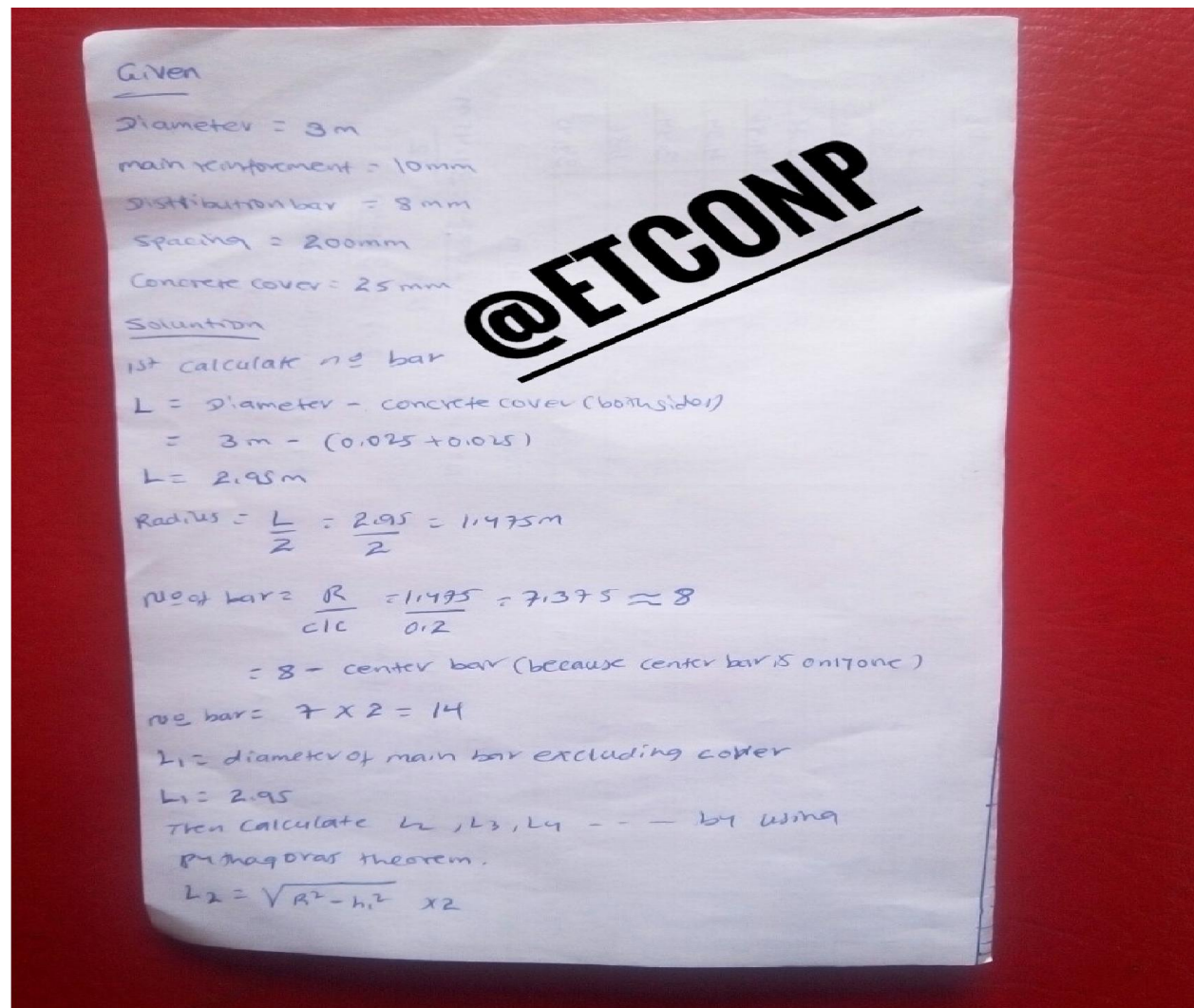


FIG1. የ እህታችን የ@zebuu1028 ሞልስ

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Pythagoras theorem

$$R^2 = h^2 + L^2$$

$$L^2 = R^2 - h^2$$

$$L = \sqrt{R^2 - h^2}$$

$L_1 = 2.95$

$L_2 = \sqrt{R^2 - h_2^2} \times 2$
 $= \sqrt{1.475^2 - 0.2^2} \times 2 = 2.92m$

$L_3 = \sqrt{R^2 - h_3^2} \times 2 = \sqrt{1.475^2 - 0.4^2} \times 2$
 $L_3 = 2.84m$

$L_4 = \sqrt{R^2 - h_4^2} \times 2 = \sqrt{1.475^2 - 0.6^2} \times 2 = 2.69m$

$L_5 = \sqrt{R^2 - h_5^2} \times 2 = \sqrt{1.475^2 - 0.8^2} \times 2 = 2.48m$

$L_6 = \sqrt{R^2 - h_6^2} \times 2 = \sqrt{1.475^2 - 1^2} \times 2 = 2.17m$

$L_7 = \sqrt{R^2 - h_7^2} \times 2 = \sqrt{1.475^2 - 1.2^2} \times 2 = 1.72m$

$L_8 = \sqrt{R^2 - h_8^2} \times 2 = \sqrt{1.475^2 - 1.4^2} \times 2 = 0.93m$

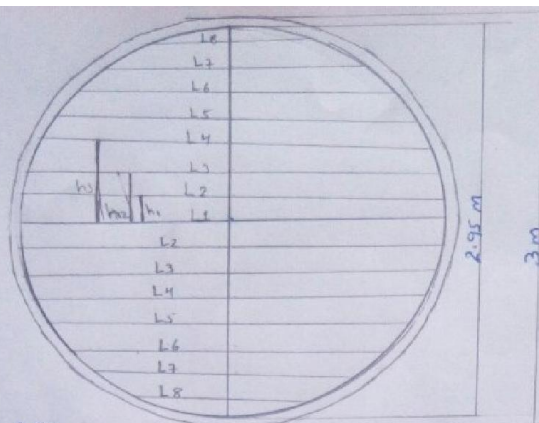
for main bar

Location	Dia	Length	no bar	Φ10
L1	10	2.95	1	2.95
L2	10	2.92	2	5.84
L3	10	2.84	2	5.68
L4	10	2.69	2	5.38
L5	10	2.48	2	4.96
L6	10	2.17	2	4.34
L7	10	1.72	2	3.44
L8	10	0.93	2	1.86
Total Length				34.45

Total length = 34.45m

no of barga = $\frac{\text{Total length}}{12m} = \frac{34.45m}{12m}$
 $= 2.87 \approx 3 \text{ barga}$

kg = Total length X index
 $= 34.45 \times 0.617$
 $= 21.26 \text{ kg}$



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for distribution bar

Location	Dia	Length	no bar	Φ8
L1	8	2.95	1	2.95
L2	8	2.92	2	5.84
L3	8	2.84	2	5.68
L4	8	2.69	2	5.38
L5	8	2.48	2	4.96
L6	8	2.17	2	4.34
L7	8	1.72	2	3.44
L8	8	0.93	2	1.86
Total Length				34.45

Total length = 34.45m

no of barga = $\frac{\text{Total length}}{12m} = \frac{34.45m}{12m}$
 $= 2.87 \approx 3 \text{ barga}$

kg = Total length X index
 $= 34.45 \times 0.395$
 $= 13.61 \text{ kg}$

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$L = \text{Diameter of Slab} - \text{Nominal Cover}$

For Pythagoras Theorem $L_1 = (\sqrt{R^2 - H^2}) \times 2$ $H_1, H_2, H_3 = \text{Spacing Of Reinforcement}$

$L_2 = (\sqrt{R^2 - H^2}) \times 2$ $R = \text{Radius of Slab (Excluding Nominal Slab)}$

Same Steps for Other Reinforcements

Example for Circular Slab Reinforcement Calculation

Find the Reinforcement Details Having the Diameter of 3 m Providing

Main Reinforcement 10 mm Diameter and Distributor 8 mm Diameter at Spacing 200 mm and Nominal Cover Is 25 mm

$$L = 3 - 2(0.05)$$

$$L = 2.95 \text{ m}$$

$$L_1 = (\sqrt{R^2 - H^2}) \times 2$$

$$L_1 = (\sqrt{1.475^2 - 0.2^2}) \times 2$$

$$L_1 = 2.92 \text{ M}$$

$$L_2 = (\sqrt{R^2 - H^2}) \times 2$$

$$L_2 = (\sqrt{1.475^2 - 0.4^2}) \times 2$$

$$L_2 = 2.84 \text{ M}$$

$$L_3 = (\sqrt{R^2 - H^2}) \times 2$$

$$L_3 = (\sqrt{1.475^2 - 0.6^2}) \times 2$$

$$L_3 = 2.70 \text{ M}$$

$$L_4 = (\sqrt{R^2 - H^2}) \times 2$$

$$L_4 = (\sqrt{1.475^2 - 0.8^2}) \times 2$$

$$L_4 = 2.48 \text{ M}$$

$$L_5 = (\sqrt{R^2 - H^2}) \times 2$$

$$L_5 = 2.16 \text{ M}$$

$$L_6 = (\sqrt{R^2 - H^2}) \times 2$$

$$L_6 = (\sqrt{1.475^2 - 1.2^2}) \times 2$$

$$L_6 = 1.72 \text{ M}$$

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$$\blacklozenge L7 = (\sqrt{R^2 - H^2}) \times 2$$

$$L7 = (\sqrt{1.475^2 - 1.4^2}) \times 2$$

$$L7 = 0.93 \text{ M}$$

Total length of Main and Distribution Reinforcements

$$= L + 2(L1) + 2(L2) + 2(L3) + 2(L4) + 2(L5) + 2(L6) + 2(L7)$$

$$= 2.95 + 2(2.92) + 2(2.84) + 2(2.70) + 2(2.48) + 2(2.16) + 2(1.72) + 2(0.93)$$

$$= 34.45 \text{ M}$$

Total Weight of 10 Mm Diameter Main Reinforcement

Weight of 10 Mm Bar Per Meter Length = 0.617 Kg /M

$$\text{Weight} = 34.45 \times 0.617 = 21.26 \text{ Kg}$$

Total Weight of 8 Mm Diameter Main Reinforcement

Weight of 8 Mm Bar Per Meter Length = 0.395 Kg /M

$$\text{Weight} = 34.45 \times 0.395$$

$$= 13.60 \text{ Kg}$$

Total Weight of Reinforcement for This Slab = 21.26 + 13.60

$$= 34.88 \text{ Kg}$$

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