

Chapter 10, Problem 22RQ

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Problem

Determine the amount of rebar needed for the continuous footings shown in Figures 1 and 2. Allow for 2 inches of cover and extend the dowels 15 inches into the wall. Add 10 percent for lap and waste to the continuous bars.

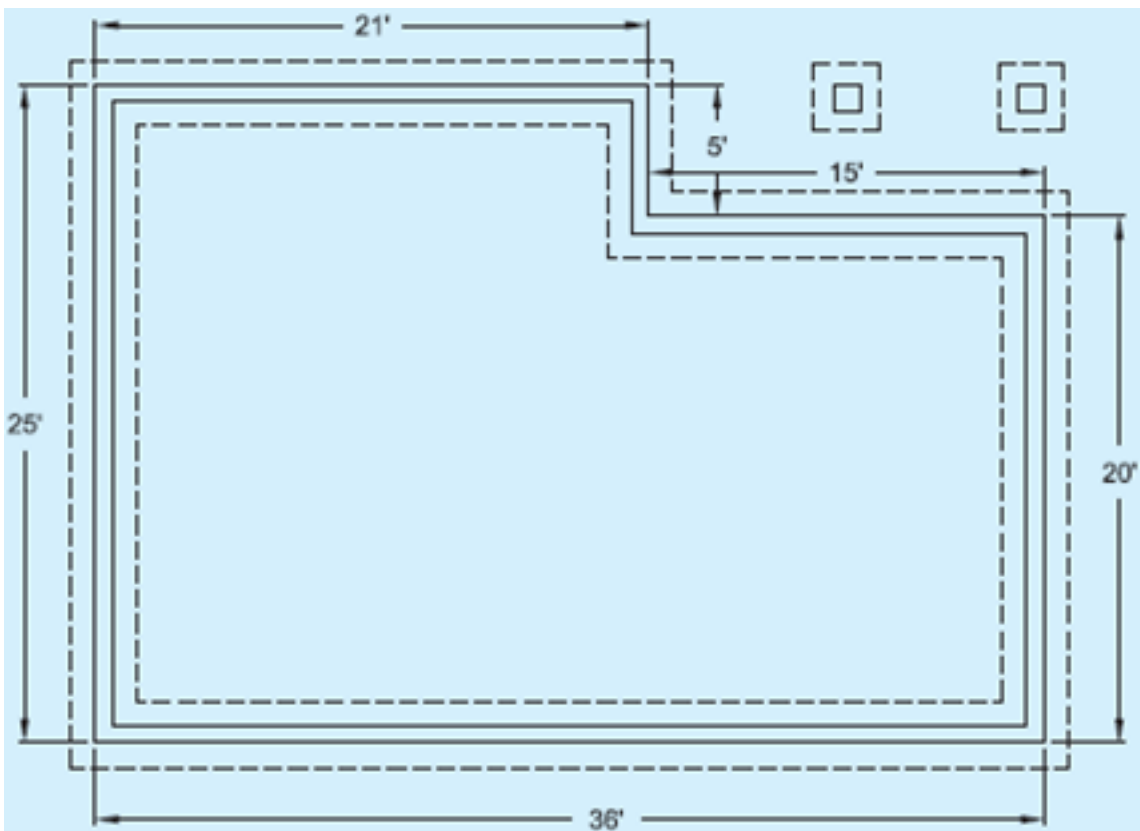


Figure 1. Foundation Plan.

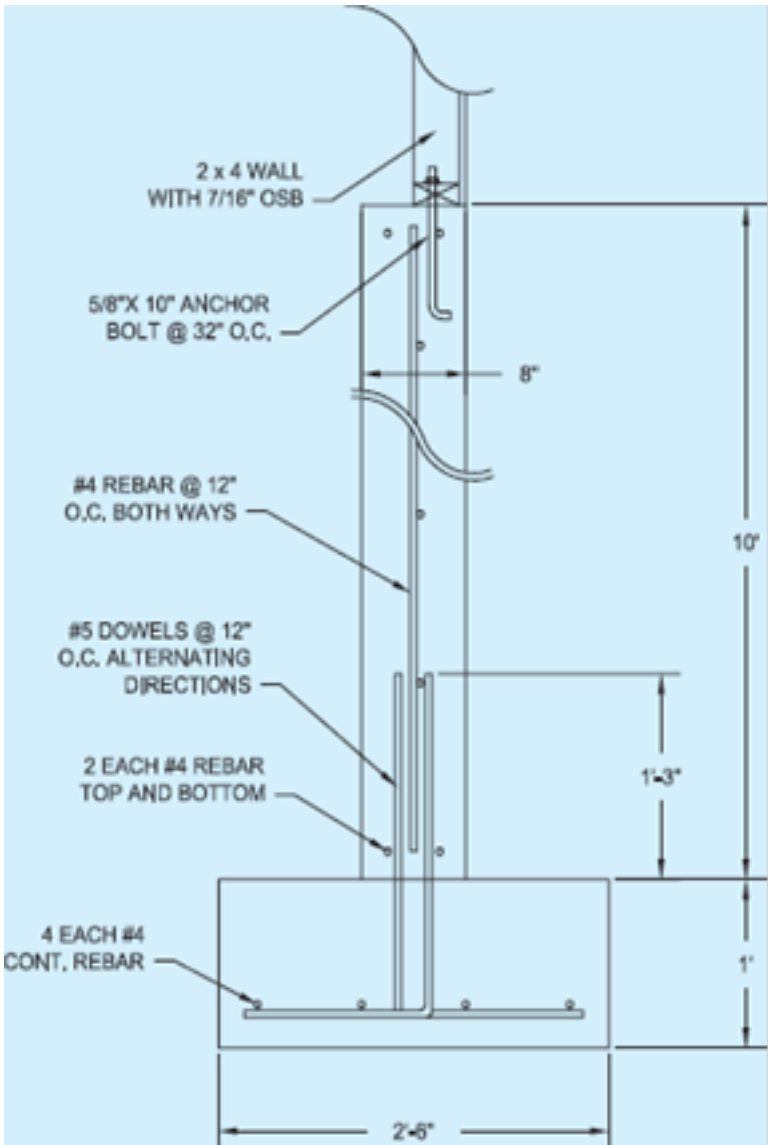


Figure 2. Foundation Section.

Step-by-step solution

Step 1 of 4

List the rebar and dowels used in the continuous footing.

- 4 EACH #4 CONT. REBAR
- #5 DOWELS @12" O.C ALTERNATING DIRECTIONS

Comment

Step 2 of 4

Calculate the value of rebar required for the foundation section of building using the formula,

$$\text{Rebar} = n_1 L + \left(n_2 \frac{L}{s} \times L_d \right) \dots\dots (1)$$

Here, n_1 is the number of rebar, n_2 is the number of dowels, s is the spacing of dowels, and L_d is the length of the dowel.

Calculate the perimeter of the building using the formula,

$$L = 2(l_1 + l_2)$$

Here, l_1 and l_2 are the length and width of the foundation plan.

Substitute 36' for l_1 and 25' for l_2 .

$$\begin{aligned} L &= 2 \times (36 + 25) \\ &= 122' \end{aligned}$$

Comment

Step 3 of 4

Calculate the length of the dowel using the formula,

$$L_d = L_w + B_f - C$$

Here, L_w is the length of dowels into the wall, B_f in the width of the footing, and C is the cover.

Substitute 15" for L_w , 1' for B_f , and 2" for C.

$$\begin{aligned} L_d &= 15 + (1 \times 12) - 2 \\ &= 25" \\ &= 2'1" \end{aligned}$$

Substitute 4 for n_1 , 122' for L, 5 for n_2 , 12" for s, and 2'1" for L_d in equation (1).

$$\begin{aligned} \text{Rebar} &= n_1 L + \left(n_2 \frac{L}{s} \times L_d \right) \\ &= (4 \times 122) + \left(5 \times \frac{122}{(12/12)} \times 2'1" \right) \\ &= 1,758.83 \text{ ft} \end{aligned}$$

Comment

Step 4 of 4

Calculate the total required rebar for the completion of the foundation of building using the formula,

$$\text{Total rebar} = \text{Rebar} + (\text{Lap and Waste})$$

Substitute 10% of Rebar for Lap and Waste and 1,758.83 ft for Rebar.

$$\begin{aligned} \text{Total rebar} &= \text{Rebar} + (10\% \text{ of Rebar}) \\ &= 1,758.83 + \left(\frac{10}{100} \times 1,758.83 \right) \\ &= 1,934.72 \text{ ft} \end{aligned}$$

Therefore, the required value of REBAR for the continuous footings is **1,934.72 ft**.

Comments (1)

Was this solution helpful?



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Chapter 10, Problem 23RQ

Determine the number of linear feet of forms needed for the continuous footings shown in Figures 1 and 2. Figure 1. Foundation Plan. Figure 2. Foundation Section.

See solution

Chapter 10, Problem 6RQ

Where would the estimator most likely find the strength of the concrete required?

See solution

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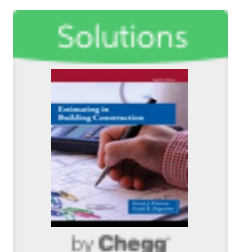
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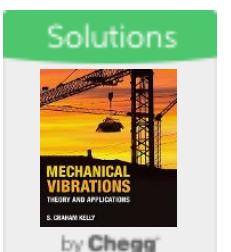
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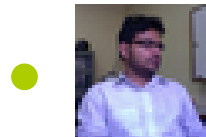
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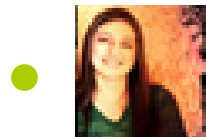
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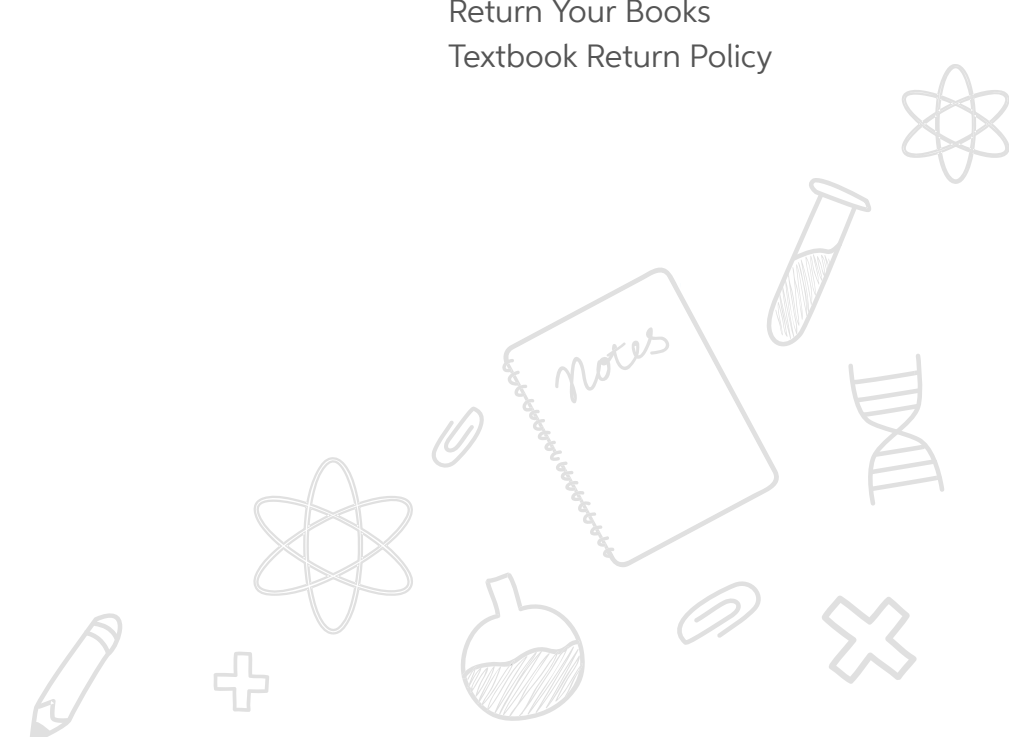
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