

1-1. The floor of a heavy storage warehouse building is made of 6-in.-thick stone concrete. If the floor is a slab having a length of 15 ft and width of 10 ft, determine the resultant force caused by the dead load and the live load.

SOLUTION

From Table 1-3

$$DL = [12 \text{ lb/ft}^2 \cdot \text{in.}(6 \text{ in.})] (15 \text{ ft})(10 \text{ ft}) = 10,800 \text{ lb}$$

From Table 1-4

$$LL = (250 \text{ lb/ft}^2)(15 \text{ ft})(10 \text{ ft}) = 37,500 \text{ lb}$$

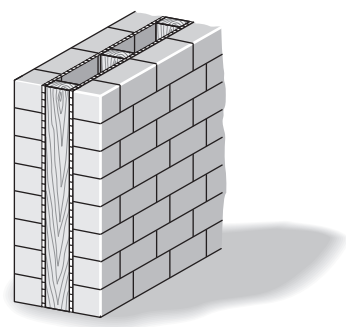
Total load

$$F = 48,300 \text{ lb} = 48.3 \text{ k}$$

Ans.

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1–2. The wall is 12-ft high and consists of 2×4 studs. On each side is acoustical fiberboard and 4-in. clay brick. Determine the average load in lb/ft of length of wall that the wall exerts on the floor.



SOLUTION

$$2 \times 4 \text{ wood studs : } (4 \text{ lb/ft}^2)(12 \text{ ft}) = 48 \text{ lb/ft}$$

$$\text{fiberboard : } (2)(1 \text{ lb/ft}^2)(12 \text{ ft}) = 24 \text{ lb/ft}$$

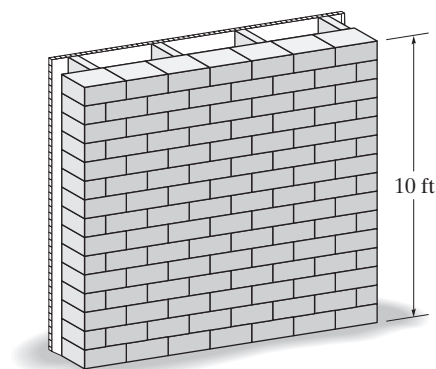
$$\text{Clay brick : } (2)(39 \text{ lb/ft}^2)(12 \text{ ft}) = 936 \text{ lb/ft}$$

$$\hline 1008 \text{ lb/ft}$$

Ans.

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1–3. A building wall consists of 12-in. clay brick and $\frac{1}{2}$ -in. fiberboard on one side. If the wall is 10 ft high, determine the load in pounds per foot that it exerts on the floor.



SOLUTION

From Table 1–3

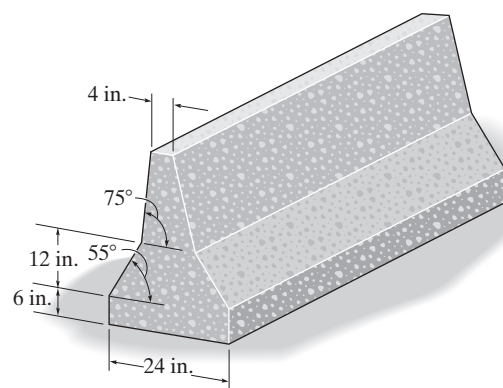
12 in. clay brick : $(115 \text{ lb/ft}^2)(10 \text{ ft}) = 1150 \text{ lb/ft}$

$\frac{1}{2}$ in. fiberboard : $(0.75 \text{ lb/ft}^2)(10 \text{ ft}) = 7.5 \text{ lb/ft}$

Total	<u>1157.5 lb/ft</u>	$= 1.16 \text{ k/ft}$	Ans.
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***1-4.** The “New Jersey” barrier is commonly used during highway construction. Determine its weight per foot of length if it is made from plain stone concrete.

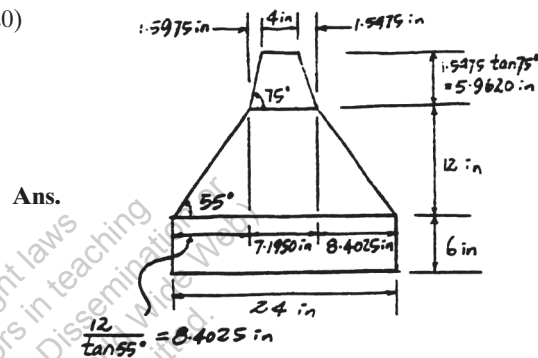


SOLUTION

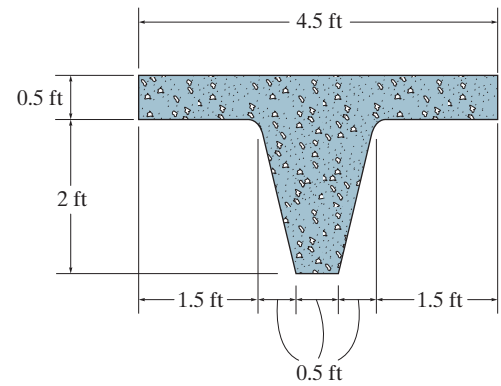
$$\begin{aligned} \text{Cross-sectional area} &= 6(24) + \left(\frac{1}{2}\right)(24 + 7.1950)(12) + \left(\frac{1}{2}\right)(4 + 7.1950)(5.9620) \\ &= 364.54 \text{ in}^2 \end{aligned}$$

Use Table 1-2

$$w = 144 \text{ lb/ft}^3 (364.54 \text{ in}^2) \left(\frac{1 \text{ ft}^2}{144 \text{ in}^2}\right) = 365 \text{ lb/ft}$$



1–5. The precast floor beam is made from concrete having a specific weight of 150 lb/ft^3 . If it is to be used for a floor in an office of an office building, calculate its dead and live loadings per foot length of beam.



SOLUTION

Dead load:

$$DL = 150 \text{ lb/ft}^3 \left[4.5(0.5) + 2(1.5) - 2\left(\frac{1}{2}\right)(0.5)(2) \right] \text{ft}^2 = 638 \text{ lb/ft}$$

Ans.

Live load: From Table 1–4

$$LL = (50 \text{ lb/ft}^2)(4.5 \text{ ft}) = 225 \text{ lb/ft}$$

Ans.

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