Buildings Traffic Check

6th July, 1939

Fernleigh Park Extension
BROOKMAN'S PARK

Prof. Meal.  Ref. Redpath, Brown's
Drawing No. 1.

Roof load. = 8" Ashid R.C. roof slabs.
8" R.C. roof. = 9.6 lb. per ft.²
Roofing and load = 50 lb. per ft.²

Beam 1. Effective span = 40 ft.

w = load per ft. = 146 x 15
   = 2190 lb. per ft.

\[ Z = \frac{6w^2}{L^4} = \frac{2190 \times 40^2 \times 12}{64 \times 2200} \]

Beam = 29.3 in. with 3 in. wide.

\[ M = \frac{6wL^2}{8} = \frac{2190 \times 40^2}{8 \times 2200} \]

Knee rebars 3 in. 19/16" 11/16" x 17/2 #

\[ I = 22527 \]
Load carried on beam = \( \frac{2190 \times 40}{2 \times 2240} = 39.1 \text{ ton} \)

Equal reaction = \( \frac{39.1}{2} = 19.6 \text{ ton} \) neglecting the end of the beam.

Beam 2.

Effective span = 18 ft.

\[ M = \frac{wL^2}{8} = \frac{2190 \times 18^2}{8 \times 2240} = 39.4 \text{ ton - ft} \]

Result: 15" x 6" x 45" \( \left[ Z = 6.5 \text{ in.}^3 \right] \).

\[ Z = \frac{wL^2}{6b} = \frac{39.4 \times 18^3}{6 \times 15} = \frac{118.2}{5} \]

= 59.1 in. \text{ cub. in.}

Total load = \( \frac{2190 \times 18}{2 \times 240} = 17.6 \text{ ton} \).

Equal reaction = 8.8T neglecting the end of the beam.
Beam 3.

Effective span = 30 ft.

This beam is loaded with a central point load. Taking Red. Bourn's value for this load, which is too high, we have:

\[ P_2 \]

\[ \frac{P_2}{2} \]

\[ \frac{M_0 + \frac{P_2}{2} \cdot \frac{L}{2}}{2} = \frac{P_2}{4} = \frac{2}{3} \times 30 = 21.5 \text{ tons} \]

The lightest beam for this is 2 3/4" x 12" x 14 5/8".

\[ \text{I} \]

\[ \frac{1}{12} \times \frac{7}{8} \times 93 \text{ ft} \]

\[ \frac{2}{12} \times \frac{7}{8} \times 93 \text{ ft} \]

Taking long values for the central load, we have:

\[ P = 8.8 \text{ tons} \]

\[ M = \frac{2.2}{3.8 \times 30} = 6.6 \text{ tons} \]

The required section would be 15" x 9" x 73. To satisfy (beam 2 in view):

\[ \text{AREA} = 15 \times 9 \times 73 = 101.7 \]

\[ 15 \times 9 \times 73 = 101.7 \]
Any value for the central load is:

\[ \frac{(2140 \times 12.5)}{2 	imes 24} + 8.5 = 6.1 + 8.8 = 14.9 \]

\[ \frac{M}{4} = \frac{14.9 \times 30}{4} = 111.8 \text{ tons} \]

To match beam 2, the depth must be 15".

Select 19\(\frac{1}{4}\)" x 10" x 100".

i.e. beam a. 111 19\(\frac{1}{4}\)" x 10" x 100" \[Z = 181.6\]

\[ \frac{3}{4} \times 10 \times 100 \times 15 = 2240 \text{ ft-lbs.} \]

Ref. B.S. Part B. Beam in Section W.E. 2.

Beam 1.

\[ \text{Effective span} = 20' \]

\[ \text{Load} = 220 \text{ lb. per ft.} \]

\[ w = 22 \times 15 = 330 \text{ lb. per ft.} \]

\[ M = \frac{wL^2}{8} = \frac{330 \times 20^2}{8 	imes 2240} = 7.5 \text{ tons} \]

The lightest available section is 20" x 6\(\frac{1}{2}\)" x 65

\[ Z = 122.6 \]

Total load = \[w = \frac{330 \times 20}{2240} = 30 \text{ tons}\]

Each reaction is 15 tons each.
Every I has been clone to justify in asking Robert Brown to design its cabinet. It was just put on any custom that's heavy.