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11 GROVE ROAD, WREXHAM

STEEL BEAM DESIGN TO BS 5950

Summary of Design Data

Notes All dimensions are in mm and all forces are per metre run
Steel grade S275 to BSEN 10025

Loading Factors

Imposed Load : 1.6 {Table 2}
Dead Load : 1.4 {Table 2}

Beam Over Living Room Opening

Clear span 2700 mm.

Supporting wall over height 3.0m, floor load width $4.1/2 = 2.1$ m and roof load width $4.2/4 + 4.4/2 = 3.3$ m.

Dead load wall	= 4.8×3.0	= 14.4×1.4	= 20.2 kN/m (fact)
Dead load floor	= 0.5×2.1	= 1.1×1.4	= 1.5 kN/m (fact)
Dead load roof	= 1.3×3.3	= 4.3×1.4	= 6.0 kN/m (fact)

Total dead load = 19.8 kN/m (unf) 27.7 kN/m (fact)

Live load floor	= 1.5×2.1	= 3.2×1.6	= 5.0 kN/m (fact)
Live load roof	= 0.85×3.3	= 2.8×1.6	= 4.5 kN/m (fact)

Total live load = 6.0 kN/m (unf) 9.5 kN/m (fact)

Total load = 25.8 kN/m (unf) 37.2 kN/m (fact)

$$M = 37.2 \times 2.9^2 / 8 = 39.1 \text{ kNm}$$

Use two number 203x102x23 UC Mb = $35 \times 2 = 70$ kNm Satis.

$$\delta = \frac{5 \times 25.8 \times 2900^4}{384 \times 205 \times 10^3 \times 2105 \times 10^4 \times 2} = 2.8 \text{ mm Satis.}$$

Beams do not require bolting together.

$$R = 25.8 \times 2.9/2 = 37.4 \text{ kN. (unf)}$$

Use 225 x 100 x 215 dp C20 concrete padstones under each beam bearing.

Beam to be two number 203x102x23 UB's each on 225 x 100 x 215 dp C20 concrete padstone bearings at each end. Beams do not require bolting together.