



Eaton Richards

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Job ref : 2128E
Sheet : B 2
Made By : SER
Date : May 11
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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 Under Kitchen Chimney Stack

Clear span 4500 mm.

Supporting wall and stack over height 6.8 m for 1.0 m and 3.0 for 1.7 m = 5.2 m high av for 1.7 m,
floor load width $2.6/2 = 1.3$ m and roof load width $2.6/2 = 1.3$ m.

Part udl:

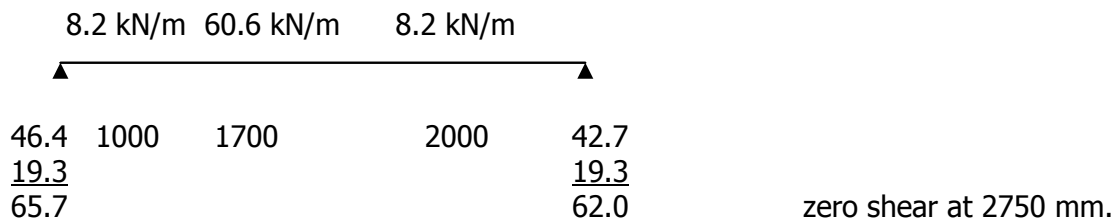
Dead load wall = $7.2 \times 5.2 = 37.4 \times 1.4 = 52.4$ kN/m (fact)

Full udl:

Dead load floor = $0.5 \times 1.3 = 0.7 \times 1.4 = 0.9$ kN/m (fact)
Dead load roof = $1.3 \times 1.3 = 1.7 \times 1.4 = 2.4$ kN/m (fact)
Total dead load = 2.4 kN/m (unf) 3.3 kN/m (fact)

Live load floor = $1.5 \times 1.3 = 2.0 \times 1.6 = 3.1$ kN/m (fact)
Live load roof = $0.85 \times 1.3 = 1.1 \times 1.6 = 1.8$ kN/m (fact)
Total live load = 3.1 kN/m (unf) 4.9 kN/m (fact)

Total load = 5.5 kN/m (unf) 8.2 kN/m (fact)



$$M = 62.0 \times 2.75 - 8.2 \times 2.75^2/2 - 52.4 \times 0.75^2/2 = 124.8 \text{ kNm}$$

Use three number 152x152x30 UC Mb = $45 \times 3 = 135$ kNm Satis.

Check single beam on outer edge supporting 1/3 of wall width:

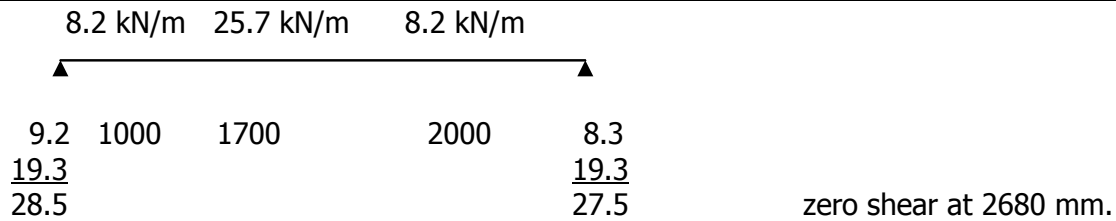


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$$M = 27.5 \times 2.68 - 8.2 \times 2.68^2/2 - 17.5 \times 0.68^2/2 = 40.2 \text{ kNm} \quad \text{Satis}$$

$$\delta = \frac{5 \times 15 \times 4500^4}{384 \times 205 \times 10^3 \times 1748 \times 10^4} = 22.3 \text{ mm} \quad \text{Not Satis.}$$

Use 3 no 152x152x37 UC δ outer beam = 17.7 mm Satis

Beams do not need bolting together.

Use 225 x 100 x 215 dp C20 concrete padstones under each beam bearing and connect to beam over kitchen with 2+2 M12 bolts.

Beam to be three number 152x152x37 UC's each on 225 x 100 x 215 dp C20 concrete padstone bearings at each end. Beams do not require bolting together.