

APPROVED CALCULATIONS.

BEAM CALCULATIONS FOR 30 VALLEY CRESCENT WORKINGHAM

SPAN OF BEAM 4.00 METRES.

AREA CARRIED

$$\text{FLOOR} - 4.00 \times 1.90 = 7.60 \text{ m}^2$$

$$\text{CEILING} - 4.00 \times 1.90 = 7.60 \text{ m}^2$$

$$\text{ROOF} - 4.00 \times 2.50 = 10.00 \text{ m}^2$$

$$\text{WALL} - 4.00 \times 2.60 = 10.40 \text{ m}^2$$

$$\text{L.L. ROOF} - 4.00 \times 1.20 = 4.80 \text{ m}^2$$

$$\text{FLAT ROOF} - 4.00 \times 1.30 = 5.20 \text{ m}^2$$

LOAD CARRIED

$$\text{FLOOR} - 7.60 \times 1.89 = 14.36 \text{ KN}$$

$$\text{CEILING} - 7.60 \times 0.74 = 5.62 \text{ KN}$$

$$\text{ROOF} - 10.00 \times 1.36 = 13.60 \text{ KN}$$

$$\text{WALL} - 10.40 \times 3.51 = 36.50 \text{ KN}$$

$$\text{L.L. ROOF} - 4.80 \times 1.36 = 6.53 \text{ KN}$$

$$\text{FLAT ROOF} - 5.20 \times 1.35 = 7.02 \text{ KN}$$

$$\text{TOTAL LOAD} = 83.63 \text{ KN}$$

$$\text{BM (MAX) UDL} = \frac{wL^2}{8}$$

$$\frac{(83.63 \times 10^3)(4.00 \times 10^3)}{8} = 41.82 \times 10^6 \text{ N/mm}^2$$

TRY 203 x 89 x 29.78 CHANNEL

$$\frac{D}{T} = 15.75 \quad r_y = 2.54 \quad \frac{L}{r_y} = \frac{400}{2.54} = 157$$

FROM TABLE 3A $\sigma/\text{STRESS} = 112$

$$\therefore Z = \frac{41.82 \times 10^3}{112} = 373 \text{ cm}^3$$

FROM TABLES $Z = 245 \text{ cm}^3$

ASSUME TWO CHANNELS BOLTED TOGETHER EQUAL ONE CHANNEL WITH TWICE THE MODULUS OF ELASTICITY

$$I_{2Z} = 245 \times 2 = 490 \text{ cm}^3$$

AS $490 > 245$ BEAM OK IN SHEAR

$$\text{DEFLECTION (MAX) } \text{WDL} = \frac{5}{384} \frac{WL^3}{EI}$$

$$\frac{5 \times 83.63 \times 400^3}{384 \times 21000 \times 2490 \times 2} = 0.67 \text{ cm.}$$

$$PD = \frac{400}{360} = 1.11 \text{ cm.}$$

AS $1.11 > 0.67$ BEAM OK IN DEFLECTION
STRESS UNDER PADSTONES.

$$\begin{aligned} \text{SIZE OF PADSTONES } 300 \text{ L} \times 150 \text{ W} \times 150 \text{ T.} \\ = \frac{41.82 \times 1000}{150 \times 150} = 1.86 \text{ N/mm}^2. \end{aligned}$$

L. WT BLOCK (THERMALITE) WILL SUPPORT 2.90 N/mm^2 SO PADSTONES SUITABLE
USE 2 NO. $203 \times 89 \times 29.78$ CHANNELS BOLTED TOGETHER WITH M12 BOLTS, NUTS & SPACERS AT 900MM C/Cs
CLAD BEAM WITH TWO LAYER OF 12.7 PL BOARD AND GIVE TWO COAT LIGHTWEIGHT PLASTER FINISH.