

MANSFIELD ASSOCIATES
Structural Design Consultants

Contract **21 CHESTER TERRACE**

Job No. **06485**

Sheet No **R/1**

RECENTS ROAD, LONDON

Date **Feb '07**

Prepared by **PMM.**

Ground Floor Loading

$U = 1.50 \text{ kN/m}^2$

ROOF LEVEL
NEW TERRACE

$U = \text{Decking} = 0.100$

$\text{Asph/Flt} = 0.020$

$\text{Insulation} = 0.060$

$\text{Plg} = 0.150$

$\text{Gravel} = 0.160$

$\text{Conc} = 0.150$ / 1.00 kN/m^2

$U + U = 2.50 \text{ kN/m}^2$

Roof Deck

$\text{Vertical slab deck} = 0.50$

$\text{Bottom} = 0.05$

$\text{Felt} = 0.03$

$\text{12mm Plg} = 0.13$

$\text{Steel} = 0.10$

$\text{Insulation} = 0.05$ / 0.87 kN/m^2

Clayed concrete (over steel deck)

Roof $U = 0.75 \text{ kN}$

$\text{Clay} = 0.5 \text{ kN/m}^2$

$\text{Felt} = 0.25 \text{ kN/m}^2$ / 0.75 kN/m^2

$\text{Total} = 1.50 \text{ kN/m}^2$

Clayed roof $= 0.75 \text{ kN/m}^2$

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Sheet No 2/2

REGENTS PARK, LONDON

Date. Feb '07

Prepared by. AM

$$= 2.30 \text{ m Spacing}$$

$$\therefore \text{Load/foot} = 0.4 \times 2.54 = 1.016 \text{ kN}$$

$$\therefore \text{TL} = 2.30 \times 1.016 = 2.33 \text{ kN loads } 1.17 \text{ m}$$

$$\text{M} = 2.33 \times 2.3 / 8 = 0.669 \text{ kNm}$$

$$\text{TL} = 0.669 \times 10^6 / 7.8 = 89316 \text{ mm}^2 \quad \text{Use } 180 \times 180$$

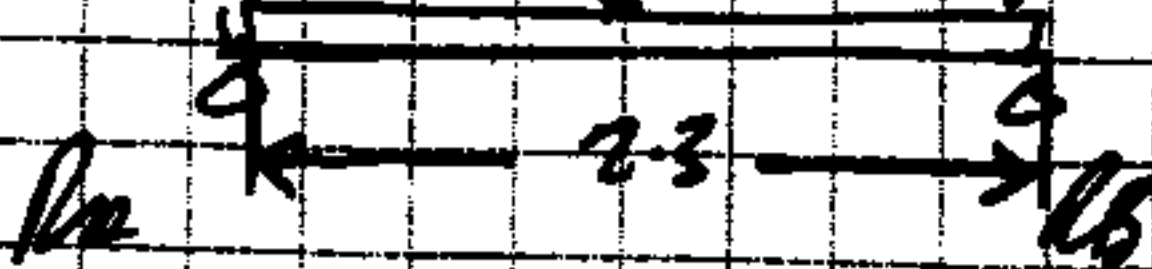
[Turnover to left half] 1.8 m

$$\therefore \text{Load} = 1.8 \times 0.5 \times 2.54 = 1.83 \text{ kN loads } 0.92 \text{ m}$$

$$\text{M} = 1.83 \times 1.8 / 8 = 0.414 \text{ kNm}$$

Spent load L m

$$1.8 \times 1.016 = 1.8288 \text{ kN}$$



$$\text{RA} = 1.026 \times 1.95 + 0.92 \times \frac{1.8}{2.3} = 1.179 + 0.72 = 1.499 \text{ kN}$$

$$\text{RA} = 1.179 + 0.6 = 1.779 \text{ kN}$$

$$\therefore \text{P2 RA} = 1.495 / 1.016 = 1.37 \text{ kN}$$

$$\therefore \text{M} = 1.37 \times 1.016 = 0.84 \text{ kNm}$$

$$\text{TL} = 0.84 \times 10^6 / 7.8 = 112683 \text{ mm}^2$$

2 < R.2 > 4.1 m: TL = 2.54 x 4.1 = 10.514 m

$$\text{M} = 10.514 \times 4.1 / 8 = 10.82 \text{ kNm}$$

$$\text{TL} = 10.82 \times 4.1^2 / 8 = 223.16 \text{ mm}^2$$

$$\text{TL} = 152 \times 152 \times 2.3 \text{ (Applied M} = 20.82 \times 4.1 / 8 = 10.67 \text{ kNm)}$$

$$\text{TL} = 4.1 \times 3.7 = 410 / 3.7 = 110 \text{ mm} \quad \text{TL} = 152 / 6.8 = 223.16 \text{ mm}^2$$

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Sheet No **R/3**

REGENTS PARK, LONDON

Date. **Aug '07**

Prepared by. **AM**

Beam R/2 (outlet)

$$M_R = 126 \times 16.8 \times 10^{-3} = 10.66 \text{ kNm} > 10.67$$

Use

182x152x28 UC

B. R/4

$$load = 2.54 \times 3/2 = 3.81 \text{ kN/m}$$

$$\therefore TL = 4.1 \times 3.81 = 15.62 \text{ kN} \quad RA = RB = 7.81 \text{ kN}$$

$$\therefore \text{Applied M} = 15.62 \times 4.1/8 = 8.005 \text{ kNm}$$

B. R/2

Use 152x152x23 UC

Beam <R.1>

$$load = 2.54 \times 2.54 = 2.921$$

Span 4.1

$$\text{Coln. side} = 2.3 \times 0.78 = 1.725$$

$$\text{Ref} = 1.5 \times 1.5/2 = 1.125$$

$$\text{Staircase} = 2.54 \times 1.0 (\text{avg}) = 2.54$$

$$\therefore \text{Total load} = 8.31 \times 4.1 = 34.07 \text{ kN} \quad \text{Total load/m} = 8.31 \text{ kN/m}$$

$$RA = RB = 17.04 \text{ kN}$$

$$\therefore M = 34.07 \times 4.1/8 = 17.43 \text{ kNm}$$

$$\text{Reqd} = 34.07 \times 4.1^2 \times 2.23 = 1277 \text{ Nm}^4 \quad \text{Use } 152 \times 152 \times 30 \text{ UC}$$

$$M_R = 1.4 \times 10 \times 3.83 \times 107.04 \text{ Nm} = 16.7$$

$$\therefore M = 136 \times 202 \times 10^{-3} = 30.192 \text{ kNm} \quad 136 \text{ N/m} > 17.43$$

Use

152x152x30 UC

Clear span beams <R.5> <R.3>

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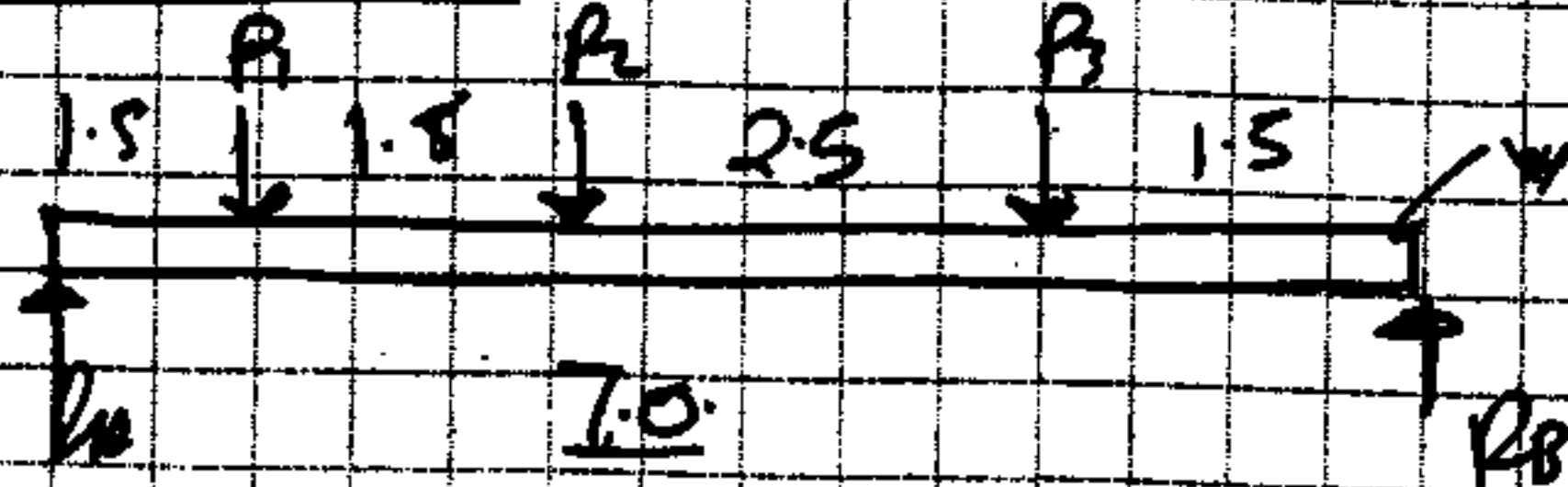
Sheet No R/d

REGENTS PARK, LONDON.

Date. FEB '07

Prepared by. AM.

Beam CD37



$$P_1 = 7.81 \text{ kN} \quad P_2 = 10.4 \text{ kN}$$

$$P_3 = 17.04 \text{ kN}$$

$$w = \text{UDL} = 0.87 \times 1.5 = 1.305 \text{ kN}$$

$$w = \text{UDL} = 0.26 \times 1.5 = 0.39 \text{ kN}$$

$$1.305 + 0.39 = 1.695 \text{ kN}$$

$$R_1 = 2 \times 1.305 + \frac{7.81 \times 5.5}{7.0} + \frac{10.4 \times 4}{7.0} + \frac{17.04 \times 1.5}{7.0}$$

$$= 2 + 6.14 + 5.94 + 3.64 = 22.78 \text{ kN}$$

$$R_2 = 7 + 1.67 + 4.46 + 13.39 = 26.52 \text{ kN}$$

$$\text{Check } R_1 + R_2 = 22.78 + 26.52 = 49.3 \text{ kN}$$

$$\text{Total Load} = 7.81 + 10.4 + 17.04 + 1.695 = 46.945 \text{ kN}$$

$$\text{Difference} = 49.3 - 46.945 = 2.355 \text{ kN}$$

$$M = 22.78 \times 1.5 - 6 \times 1.5 - 7.81 \times 1.5 = 68.25 - 9 - 11.71$$

$$Q_{UDL} = 47.54 \times 8/7 = 54.33 \text{ kN}$$

$$\therefore I_{R1} = 54.33 \times 7^2 \times 2.23 = 5936 \text{ cm}^4$$

$$\text{Ch. Lef. 250} \quad 305 \times 102 \times 33 \text{ UB}$$

$$L = 250 \text{ mm} \times 215 = 116 \text{ DIT. 28.8} \quad R_1 = 110 \text{ N/mm}^2$$

$$\therefore M = 416 \times 10 \times 10^{-3} = 45.76 \text{ kNm}$$

$$\therefore I_{R2} = 305 \times 127 \times 37 \text{ UB}$$

$$M = 132 \times 471 \times 10^{-3} = 62.17 \text{ kNm} > 47.54 \text{ kNm}$$

OK.

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$$R_1 = 250/267.8 = 28.2 \text{ N/mm}^2$$

$$R_2 = 132 \text{ N/mm}^2$$