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PROJECT 67 FORTESS ROAD, LONDON NW5

All Structural Aspects/Construction to Comply with the CDM Regulations

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THESE CALCULATIONS HAVE BEEN PREPARED IN CONJUNCTION WITH DRAWINGS N°. FORTESS, J001, 02, F1 & SEC. PROVIDED BY RINGLEY CHARTERED SURVEYORS

REFER TO DRAWINGS 05/81/01 & 02 FOR STRUCTURAL LAYOUT PLANS AND LOCATION OF BEAMS etc.

RAFTERS

MAX SPAN 4.0m

USE 150 x 50 x 400 c/c C24 SAWN TIMBERS.

FLAT ROOF

MAX SPAN 3.5m

USE 150 x 50 x 400 c/c C24 SAWN TIMBERS.

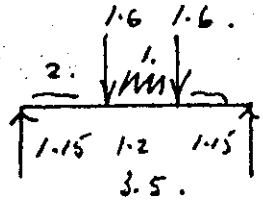
TRIMMERS.

T1. LOAD ROOF $1.5\ kN/m^2 \times 1.75 = 2.6\ kN/m$.

$BM = 2.6 \times 1.2^2/8 = 0.5\ kNm$, $R = 1.6\ kN$.

USE 2 N° 150 x 50 C24 SAWN TIMBERS.

T2.



UDL 1.) ROOF $1.5\ kN/m^2 \times 0.8 = 1.2\ kN/m$.

2.) " 1.5 " $\times 0.4 = 0.6$ ".

$R = 1.6 + 0.6 \times 1.15 + 1.2 \times 1.2/2 = 3\ kN$.

$BM = 3 \times 1.75 - 1.6 \times .6 - 0.6 \times 1.15 \times 1.175 - 1.2 \times .6^2/2 = 3.3\ kNm$.

TRY 2 N° 150 x 50 C24 SAWN TIMBERS.

$$\sigma_{m,a} = \frac{3.3 \times 10^6 \times 6}{50 \times 150^2 \times 3} = 5.8\ N/mm^2 < PERM\ (7.5+)$$

$$DEF. \simeq \frac{2 \times 1.6 \times 3.5^3 \times 10^{12} \times 12}{7200 \times 1.21 \times 50 \times 150^3 \times 3} \times \frac{.33^2}{3}(1-.33)^2$$

$$+ \frac{5 \times 2.8 \times 3.5^3 \times 10^{12} \times 12}{384 \times 10800 \times 50 \times 150^3 \times 3} = 9.6mm < PERM$$

$\therefore$ OK.

TRIMMERS.

T3.

Max LOAD ROOF $1.5\,kN/m^2 \times 1.3m$ + SW = $2\,kN/m$.

BM = $2 \times 2^2/8 = 1\,kNm$.

USE 2 N° 150 × 50 C24 SAWN TIMBERS.

T4, 5, 6. NOM LOAD.

USE 2 N° 100 × 50 C24 SAWN TIMBERS.

ROOF STEEL 'R'

LOAD Max ROOF $1.5\,kN/m^2 \times 3.7$ + SW = $6\,kN/m$ ($\delta = 3.7$)

BM = $6 \times 5^2/8 = 18.8\,kNm$. $R = 15\,kN$.

TRY 152 × 152 UC 30 kg.

$l/r = \dfrac{500 \times 1.2}{3.82} = 157$ $p_{bc} = 105\,N/mm^2$.

$f_{bc} = \dfrac{18.8}{\cdot 221} = 85\,N/mm^2$ ∴ ok.

$DEFL = \dfrac{5 \times 3.7 \times 5.0^4 \times 10^{12}}{384 \times 2.1 \times 10^5 \times 1740 \times 10^4}$

$= 8.2\,mm <$ PERM.

∴ ok.

NEW FLOOR JOISTS. Max SPAN 4·4 m.

TRY 175 × 75 × 400% C24 SAWN TIMBERS.

BM $(2.0\ kN/m^2 \times 0.4) \times 4.4^2/8 = 1.9\ kNm$.

$\sigma_{m,a} = \frac{1.9 \times 10^6 \times 6}{75 \times 175^2} = 5\ N/mm^2 <$ PERM.

DEFL. $= \frac{5 \times 0.8 \times 4.4^4 \times 10^{12} \times 12}{384 \times 10800 \times 75 \times 175^3} = 10.8\ mm <$ PERM.

∴ ok.

FLOOR STEELS 'F'

LOAD FLOOR $2.0\ kN/m^2 \times 4\ m + SW = 8.5\ kN/m$ (Δ = 7)

BM $= 8.5 \times 5^2/8 = 26.6\ kNm$. R = 21.3 kN.

TRY 152 × 152 UC 37 kg.

$l/r = \frac{500 + 2 \times 15.2}{3.87} = 137$ $p_{bc} = 120\ N/mm^2$.

$f_{bc} = \frac{26.6}{.274} = 97\ N/mm^2$ ∴ ok.

DEFL. $= \frac{5 \times 7 \times 5^4 \times 10^{12}}{384 \times 2.1 \times 10^5 \times 2220 \times 10^4} = 12.3\ mm <$ PERM.

∴ ok

CHECK EX. LINTOLS 'E'

LOAD (Max)
ROOF $1.5\ kN/m^2 \times 2.0 = 3.0$
WALL (INNER) 2.5 " × 0.6 = 1.5
FLOOR 2.0 " × 2.2 = 4.4
9 kN/m.

BM $= 9 \times 1.1^2/8 = 1.4\ kNm$, R = 5 kN.

OK IF 75 DEEP P.C. LINTOL
OR 150 × 100W. TIMBER.
