

 CONSTRUCTION DETAILING LIMITED	Project 82 Newtown Avenue Extension				Job no. AB/10023	
	Calcs for Mr & Mrs Dunderdale				Start page no./Revision 1 A	
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WALL LOAD CHASE DOWN (BS6399:PART1:1996)

TEDDS calculation version 1.1.00

Roof Loading - pitched tiled roof

Roof slope $\theta = 35.0^\circ$

Dead load

Tiles $\text{Roof}_{D1} = 0.45 \text{ kN/m}^2$
 Battens $\text{Roof}_{D2} = 0.05 \text{ kN/m}^2$
 Felt $\text{Roof}_{D3} = 0.05 \text{ kN/m}^2$
 Rafters $\text{Roof}_{D4} = 0.10 \text{ kN/m}^2$
 Dead load on slope $\text{Roof}_{DL_sroof} = \text{sum}(\text{Roof}_{D1}, \text{Roof}_{D2}, \text{Roof}_{D3}, \text{Roof}_{D4}) = 0.65 \text{ kN/m}^2$
 Ceiling joists $\text{Roof}_{D5} = 0.05 \text{ kN/m}^2$
 Insulation $\text{Roof}_{D6} = 0.05 \text{ kN/m}^2$
 Plasterboard and skim $\text{Roof}_{D7} = 0.14 \text{ kN/m}^2$
 Services $\text{Roof}_{D8} = 0.05 \text{ kN/m}^2$
 Dead load on plan $\text{Roof}_{DL_prooff} = \text{sum}(\text{Roof}_{D5}, \text{Roof}_{D6}, \text{Roof}_{D7}, \text{Roof}_{D8}) = 0.29 \text{ kN/m}^2$
 Total dead load on plan $\text{Roof}_{DL} = \text{Roof}_{DL_sroof} / \cos(\theta) + \text{Roof}_{DL_prooff} = 1.08 \text{ kN/m}^2$

Imposed load

Roof imposed load $\text{Roof}_{iL} = 0.75 \text{ kN/m}^2$ on plan

Total roof loads

Unfactored foundation design loads $W_{\text{roof}_u} = \text{Roof}_{DL} + \text{Roof}_{iL} = 1.83 \text{ kN/m}^2$
 Factored design loads $W_{\text{roof}_f} = 1.4 \times \text{Roof}_{DL} + 1.6 \times \text{Roof}_{iL} = 2.72 \text{ kN/m}^2$

Timber floor Loading - 1st floor

Dead load

Boards $\text{Floor}_{1_D1} = 0.15 \text{ kN/m}^2$
 Joists $\text{Floor}_{1_D2} = 0.15 \text{ kN/m}^2$
 Ceiling $\text{Floor}_{1_D3} = 0.14 \text{ kN/m}^2$
 Total dead load $\text{Floor}_{1_DL} = \text{sum}(\text{Floor}_{1_D1}, \text{Floor}_{1_D2}, \text{Floor}_{1_D3}) = 0.44 \text{ kN/m}^2$

Imposed load

Imposed load $\text{Floor}_{1_I1} = 1.50 \text{ kN/m}^2$
 Partitions $\text{Floor}_{1_I2} = 1.00 \text{ kN/m}^2$
 Total imposed load $\text{Floor}_{1_iL} = \text{sum}(\text{Floor}_{1_I1}, \text{Floor}_{1_I2}) = 2.50 \text{ kN/m}^2$

Total 1st floor loads

Unfactored foundation design loads $W_{\text{floor1}_u} = \text{Floor}_{1_DL} + \text{Floor}_{1_iL} = 2.94 \text{ kN/m}^2$
 Factored design loads $W_{\text{floor1}_f} = 1.4 \times \text{Floor}_{1_DL} + 1.6 \times \text{Floor}_{1_iL} = 4.62 \text{ kN/m}^2$

Insitu floor Loading - ground floor

Dead load

Finishes $\text{Floor}_{\text{grnd}_D1} = 1.50 \text{ kN/m}^2$
 False floor $\text{Floor}_{\text{grnd}_D2} = 0.20 \text{ kN/m}^2$
 Insitu slab $\text{Floor}_{\text{grnd}_D3} = 4.80 \text{ kN/m}^2$
 Decking $\text{Floor}_{\text{grnd}_D4} = 0.05 \text{ kN/m}^2$
 Services $\text{Floor}_{\text{grnd}_D5} = 0.15 \text{ kN/m}^2$
 Total dead load $\text{Floor}_{\text{grnd}_DL} = \text{sum}(\text{Floor}_{\text{grnd}_D1}, \text{Floor}_{\text{grnd}_D2}, \text{Floor}_{\text{grnd}_D3}, \text{Floor}_{\text{grnd}_D4}, \text{Floor}_{\text{grnd}_D5}) = 6.70 \text{ kN/m}^2$

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Imposed load

Imposed load

$$\text{Floor}_{\text{grnd_I1}} = 1.50 \text{ kN/m}^2$$

Partitions

$$\text{Floor}_{\text{grnd_I2}} = 1.00 \text{ kN/m}^2$$

Total imposed load

$$\text{Floor}_{\text{grnd_IL}} = \text{sum}(\text{Floor}_{\text{grnd_I1}}, \text{Floor}_{\text{grnd_I2}}) = 2.50 \text{ kN/m}^2$$

Total ground floor loads

Unfactored foundation design loads

$$W_{\text{grnd_u}} = \text{Floor}_{\text{grnd_DL}} + \text{Floor}_{\text{grnd_IL}} = 9.20 \text{ kN/m}^2$$

Factored design loads

$$W_{\text{grnd_f}} = 1.4 \times \text{Floor}_{\text{grnd_DL}} + 1.6 \times \text{Floor}_{\text{grnd_IL}} = 13.38 \text{ kN/m}^2$$

Cavity Wall Loading

Dead load

Masonry (outer leaf)

$$CW_{D1} = 2.25 \text{ kN/m}^2$$

Masonry (inner leaf)

$$CW_{D2} = 0.80 \text{ kN/m}^2$$

Plaster

$$CW_{D3} = 0.15 \text{ kN/m}^2$$

Total dead load

$$CW_{DL} = \text{sum}(CW_{D1}, CW_{D2}, CW_{D3}) = 3.20 \text{ kN/m}^2$$

Total cavity wall load

Unfactored foundation design loads

$$W_{\text{cw_u}} = CW_{DL} = 3.20 \text{ kN/m}^2$$

Factored design loads

$$W_{\text{cw_f}} = 1.4 \times CW_{DL} = 4.48 \text{ kN/m}^2$$

Cavity wall design loads - 2 storey building

Roof

Span of roof - one side of wall

$$\text{Span}_{\text{cw_roof_1}} = 2.64 \text{ m}$$

Other side

$$\text{Span}_{\text{cw_roof_2}} = 2.64 \text{ m}$$

Total span on both sides of wall

$$\text{Span}_{\text{cw_roof}} = \text{Span}_{\text{cw_roof_1}} + \text{Span}_{\text{cw_roof_2}} = 5.28 \text{ m}$$

Factored load on cavity wall from roof

$$W_{\text{cw_roof_f}} = W_{\text{roof_f}} \times \text{Span}_{\text{cw_roof}} / 2 = 7.2 \text{ kN/m}$$

Unfactored load on cavity wall from roof

$$W_{\text{cw_roof_u}} = W_{\text{roof_u}} \times \text{Span}_{\text{cw_roof}} / 2 = 4.8 \text{ kN/m}$$

1st floor

Height of the 1st floor

$$H_1 = 2.40 \text{ m}$$

Span of 1st floor - one side of wall

$$\text{Span}_{\text{cw_1_1}} = 2.64 \text{ m}$$

Other side of wall

$$\text{Span}_{\text{cw_1_2}} = 2.64 \text{ m}$$

Total span on both sides of wall

$$\text{Span}_{\text{cw_1}} = \text{Span}_{\text{cw_1_1}} + \text{Span}_{\text{cw_1_2}} = 5.28 \text{ m}$$

Factored load on cavity wall

Self weight from roof to 1st floor

$$W_{\text{cw1_f}} = W_{\text{cw_f}} \times H_1 = 10.8 \text{ kN/m}$$

Load from 1st floor

$$W_{\text{cw_floor1_f}} = W_{\text{floor1_f}} \times \text{Span}_{\text{cw_1}} / 2 = 12.2 \text{ kN/m}$$

Unfactored load on cavity wall

Self weight from roof to 1st floor

$$W_{\text{cw1_u}} = W_{\text{cw_u}} \times H_1 = 7.7 \text{ kN/m}$$

Load from 1st floor

$$W_{\text{cw_floor1_u}} = W_{\text{floor1_u}} \times \text{Span}_{\text{cw_1}} / 2 = 7.8 \text{ kN/m}$$

Ground floor

Height of the ground floor

$$H_{\text{grnd}} = 2.40 \text{ m}$$

Span of ground floor (one side of wall)

$$\text{Span}_{\text{cw_grnd_1}} = 2.64 \text{ m}$$

Other side

$$\text{Span}_{\text{cw_grnd_2}} = 2.64 \text{ m}$$

Total span on both sides of wall

$$\text{Span}_{\text{cw_grnd}} = \text{Span}_{\text{cw_grnd_1}} + \text{Span}_{\text{cw_grnd_2}} = 5.28 \text{ m}$$

Factored load on cavity wall

Self weight from 1st to ground floor

$$W_{\text{cwgrnd_f}} = W_{\text{cw_f}} \times H_{\text{grnd}} = 10.8 \text{ kN/m}$$

Load from ground floor

$$W_{\text{cw_grnd_f}} = W_{\text{grnd_f}} \times \text{Span}_{\text{cw_grnd}} / 2 = 35.3 \text{ kN/m}$$

Unfactored load on cavity wall

Self weight from 1st to ground floor

$$W_{\text{cwgrnd_u}} = W_{\text{cw_u}} \times H_{\text{grnd}} = 7.7 \text{ kN/m}$$

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Load from ground floor

$$W_{cw_grnd_u} = W_{grnd_u} \times \text{Span}_{cw_grnd} / 2 = \mathbf{24.3 \text{ kN/m}}$$

Below ground floor

Height of the cavity wall below ground floor

$$H_{below} = \mathbf{0.30 \text{ m}}$$

Factored load on cavity wall

Self weight below ground floor

$$W_{cwbelow_f} = W_{cw_f} \times H_{below} = \mathbf{1.3 \text{ kN/m}}$$

Unfactored load on cavity wall

Self weight below ground floor

$$W_{cwbelow_u} = W_{cw_u} \times H_{below} = \mathbf{1.0 \text{ kN/m}}$$

Factored design loads for walls - conservatively use factored loads at base of wall

Factored design load for 1st floor wall

$$W_{cw_1} = W_{cw1_f} + W_{cw_roof_f} = \mathbf{17.92 \text{ kN/m}}$$

Factored design load for ground floor wall

$$W_{cw_grnd} = W_{cw1_f} + W_{cwgrnd_f} + W_{cw_roof_f} + W_{cw_floor1_f} = \mathbf{40.84 \text{ kN/m}}$$

Total factored load on foundation of the cavity wall

$$W_{cw_f} = W_{cw1_f} + W_{cwgrnd_f} + W_{cwbelow_f} + W_{cw_roof_f} + W_{cw_floor1_f} + W_{cw_grnd_f} = \mathbf{77.48 \text{ kN/m}}$$

Total unfactored load on foundation of the cavity wall

$$W_{cw_u} = W_{cw1_u} + W_{cwgrnd_u} + W_{cwbelow_u} + W_{cw_roof_u} + W_{cw_floor1_u} + W_{cw_grnd_u} = \mathbf{53.18 \text{ kN/m}}$$