



<b>Project:</b> Angle Design	<b>Contract:</b> 1472-2
<b>Subject:</b> DESIGN B – 1000x1000mm	<b>Sheet No.</b> 0
<b>Date:</b> 19/10/2021	<b>By:</b> A.N

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Angle Design  
1472-2  
DESIGN B – 1000x1000mm  
6mm Angle

Analysis By	Checked By
A.N	T.S.

1	06/12/2021	T.S	Amended
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### Actions/Result Summary:

#### Introduction:

T. Singleton & Associates Consulting Engineers (TSA) have been commissioned by Concorde Glass Ltd to carry out an Angle Design to support 1000×1000 Glass Floor.

#### Actions:

Load = 4kN/m<sup>2</sup>

(As per client instruction)

#### Assumption:

Steel Grade S235

#### Result Summary:

Angle: 75x50x6mm Grade S235 Mild Steel Angle.

Weld: Full Penetration Butt Weld at Four corners.

Note: To be fabricated in accordance with BS EN 1090 Execution Class 2

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Sketch of System:

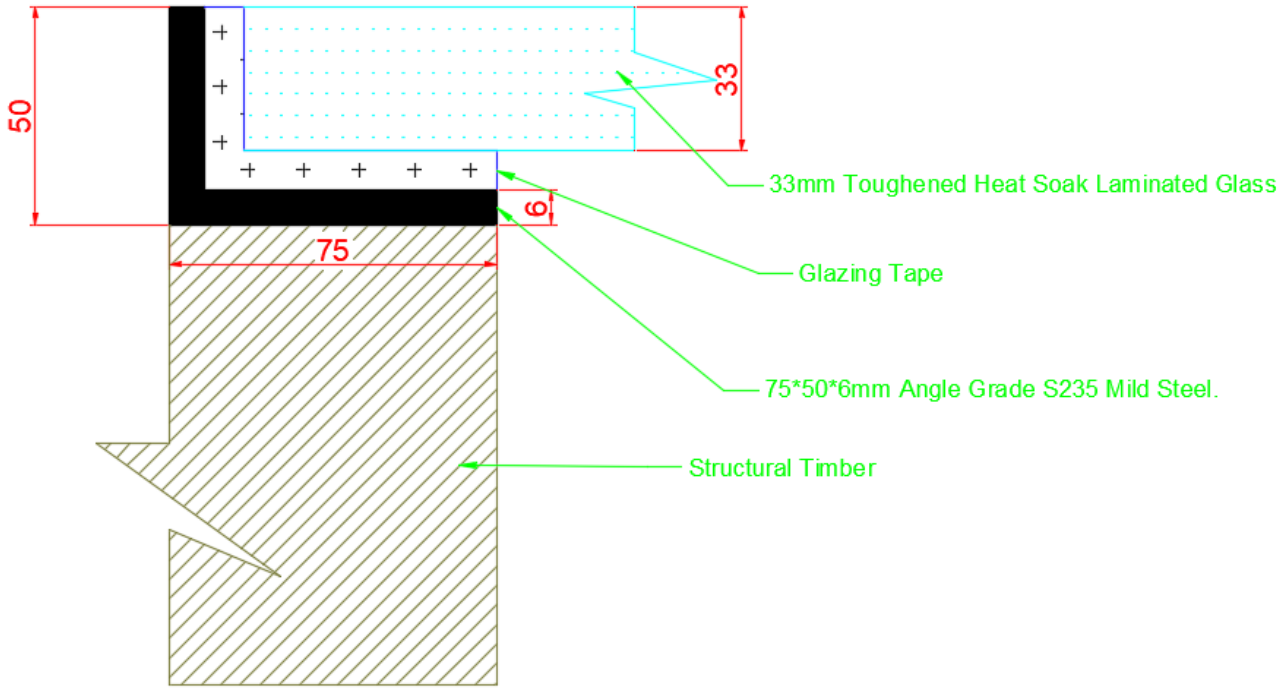


FIGURE 1 SHOWS ELEVATION VIEW

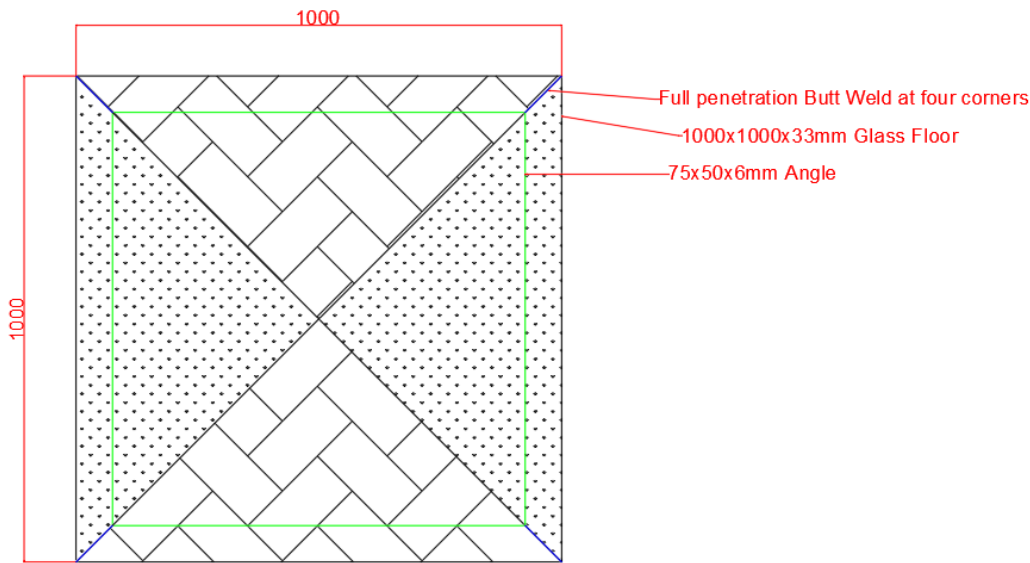


FIGURE 2 SHOWS THE PATTERN OF THE LOAD DISTRIBUTED ON THE GLASS FLOOR

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### Loading:

$$\text{Live load} = 4\text{kN/m}^2 \text{ (SLS)}$$

$$\text{Dead load (Self weight of glass)} = 0.033\text{m} \times 25\text{kN/m}^3 = 0.825\text{kN/m}^2 \text{ (SLS)}$$

$$\text{Total load} = (4\text{kN/m}^2 \times 1.5) + (0.825\text{kN/m}^2 \times 1.35) = 7.11\text{kN/m}^2 \text{ (ULS)}$$

### Capacity of 75x50x6mm Angle:

$$f_y = 235 \text{ MPa} \quad (\text{Grade S235 Mild Steel, Table 3.1 EN 1993-1-1:2005})$$

$$E = 210,000 \text{ MPa} \quad (\text{Grade S235 Mild Steel, Table 3.1 EN 1993-1-1:2005})$$

$$I = 405000\text{mm}^4 \quad (\text{75} \times \text{50} \times \text{6mm Angle})$$

$$Z = 8010\text{mm}^3 \quad (\text{75} \times \text{50} \times \text{6mm Angle})$$

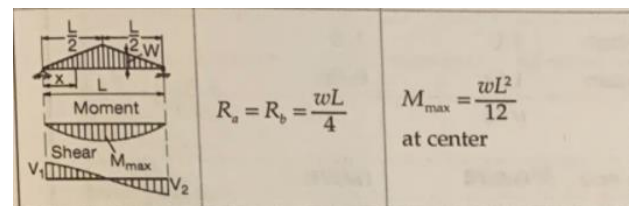
$$\gamma_Q = 1.5 \quad (\text{Table 6.10 EN 1991-1-1:2002})$$

$$\text{Maximum Moment} = \frac{\frac{7.11\text{kN}}{\text{m}^2} \times 0.5\text{m} \times 1^2\text{m}}{12} = 0.3\text{kNm}$$

### Maximum Stress:

$$\sigma_{\max} = \frac{M}{Z}$$

$$\sigma_{\max} = \frac{0.3 \times 10^6}{8010} = 38 \frac{\text{N}}{\text{mm}^2} < 235 \frac{\text{N}}{\text{mm}^2} \quad \text{Okay}$$



### Maximum Deflection:

$$\alpha_{\max} = \frac{wl^4}{120EI}$$

$$w = 4.825\text{kN/m}^2 \times 0.5\text{m} = 2.413\text{kN/m}$$

$$\alpha_{\max} = \frac{2.413\text{N/mm} \times 1000^4\text{mm}}{120 \times 210000\text{N/mm}^2 \times 405000\text{mm}^4} = 0.24\text{mm} < 5\text{mm} \left(\frac{1000}{200}\right) \quad \text{Okay}$$

**Therefore, use 75x50x6mm Grade S235 Mild Steel Angle.**