



Project: Angle Design	Contract: 1472-2
Subject: DESIGN A – 500x500mm	Sheet No. 0
Date: 19/10/2021	By: A.N

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Angle Design
1472-2
DESIGN A – 500x500mm
6mm Angle

Analysis By	Checked By
A.N	T.S.

1	06/12/2021	T.S	Amended
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Project: Angle Design	Contract: 1472-2
Subject: DESIGN A – 500x500mm	Sheet No. 1
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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 500x500 Glass Floor.

Actions:

Load = 4kN/m²

(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:

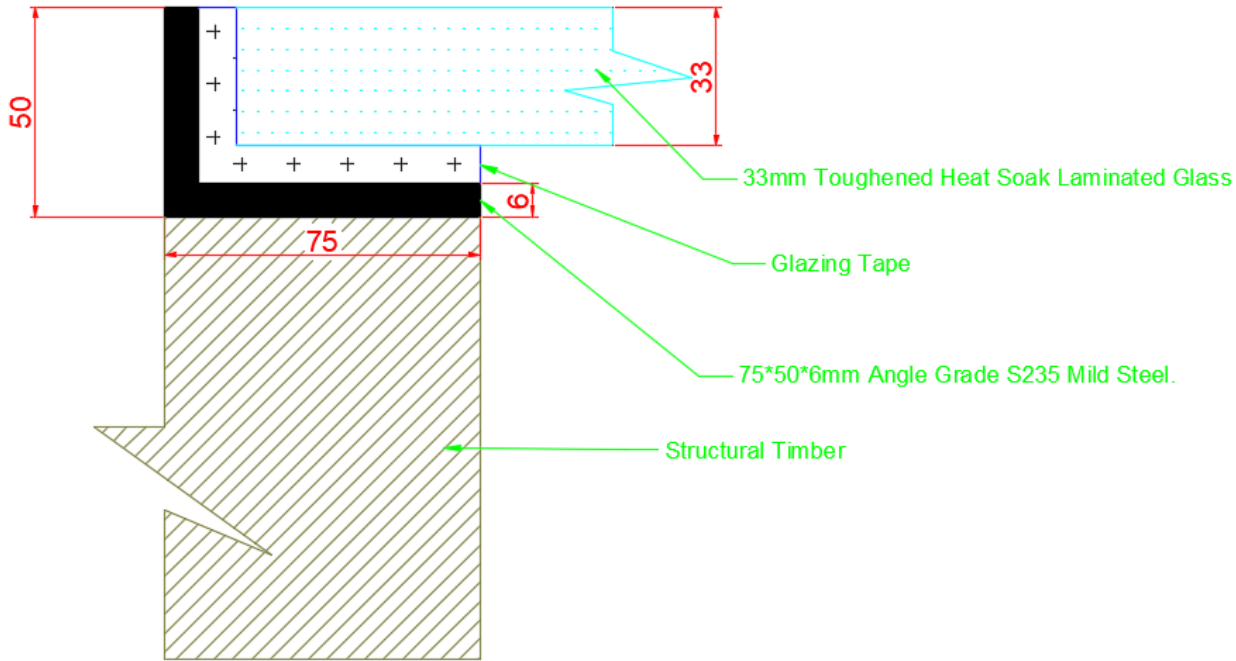


FIGURE 1 SHOWS THE ELEVATION VIEW

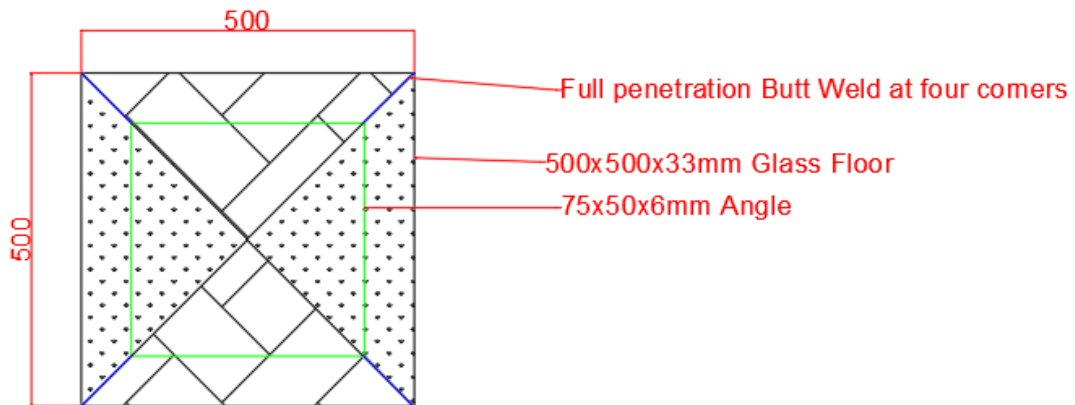


FIGURE 2 SHOWS THE PATTERN OF THE LOAD DISTRIBUTED ON THE GLASS FLOOR

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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:

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

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

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

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

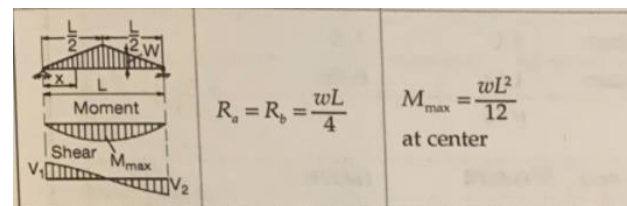
$$\gamma_Q = 1.5 \quad (\text{Table 6.10 EN 1991-1-1:2002})$$

$$\text{Maximum Moment} = \frac{\frac{7.11\text{kN}}{\text{m}^2} \times 0.25\text{m} \times 0.5^2\text{m}}{12} = 0.04\text{kNm}$$

Maximum Stress:

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

$$\sigma_{\max} = \frac{0.04 \times 10^6}{8010} = 5 \frac{\text{N}}{\text{mm}^2} < 235 \frac{\text{N}}{\text{mm}^2} \quad \text{Okay}$$



Maximum Deflection:

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

$$w = 4.825\text{kN/m}^2 \times 0.25\text{m} = 1.21\text{kN/m}$$

$$\alpha_{\max} = \frac{1.21\text{N/mm} \times 500^4\text{mm}}{120 \times 210000\text{N/mm}^2 \times 405000\text{mm}^4} = 0.007\text{mm} < 2.5\text{mm} \left(\frac{500}{200}\right) \quad \text{Okay}$$

Therefore, use 75x50x6mm Grade S235 Mild Steel Angle.