



DESIGN RIGHT



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Walls at angles to bracing lines

BRACING CALCULATIONS ARE A LITTLE DIFFERENT FOR WALLS THAT RUN AT ANGLES TO THE BRACING LINES, BUT IT'S STILL IMPORTANT TO KNOW WHAT THEY CONTRIBUTE TO THE BRACING OF THE BUILDING.

BRACING CALCULATIONS using NZS 3604:2011 can be done for walls that are under 6 m long that run at an angle to the bracing lines. If the wall is over 6 m, however, the section of the building needs to be calculated as a separate building.

Data for this example

The building for this example (see Figure 1) is single storey with a roof pitch below 25 degrees, so wall lengths have been used to calculate demand (see NZS 3604:2011 clause 5.2.6).

Wind zone: high, so use default values in NZS 3604:2011 Table 5.6.

H = 3 m

h = 1 m

Always use the higher bracing demand out of wind or earthquake. Calculations for this example determined wind is the higher bracing demand, so Table 5.6 is used.

Bracing demand across the ridge

Total bracing units required in lines at right angles to the ridge of the main body of the house

$$= \text{length of building (line A-B1)} \times 30 \text{ BU/m}$$

(from Table 5.6)

$$= 16 \text{ m} \times 30 \text{ BU/m} = 480 \text{ BUs.}$$

Bracing line at 90 degrees

In line AE, the full value of a proprietary bracing element can be used. For example, if Plaster 1 was rated at 100 BU/m and was 1.2 m long, it would achieve 120 BUs in the across direction.

Bracing line at angle

But in wall DH, the same bracing element type and length would be derated, as the line runs at 30 degrees to the brace lines.

Multiply the bracing element in the DH wall by 0.87 (see clause 5.4.4). This means a 1.2 m

bracing element (Plaster 1 rated at 100 BU/m) would be calculated at:

$$100 \text{ BUs} \times 0.87 \times 1.2 = 104.4 \text{ BUs.}$$

Bracing demand along the ridge

Total bracing units required in lines running parallel to the ridge of the main body of the house

$$= \text{width of building (line A-H1)} \times 35 \text{ BU/m}$$

(from Table 5.6)

$$= 9.5 \text{ m} \times 35 \text{ BU/m} = 332.5 \text{ BUs.}$$

Bracing line at 90 degrees

In Lines AB and EF, the full value of the bracing element can be claimed.

Bracing line at angle

Wall GH runs at 30 degrees to the brace lines, so multiply the bracing element in that wall by 0.87 (see clause 5.4.4). This means a 1.2 m bracing element (Plaster 1 rated at 100 BU/m) would be calculated at:

$$100 \text{ BUs} \times 0.87 \times 1.2 = 104.4 \text{ BUs.}$$

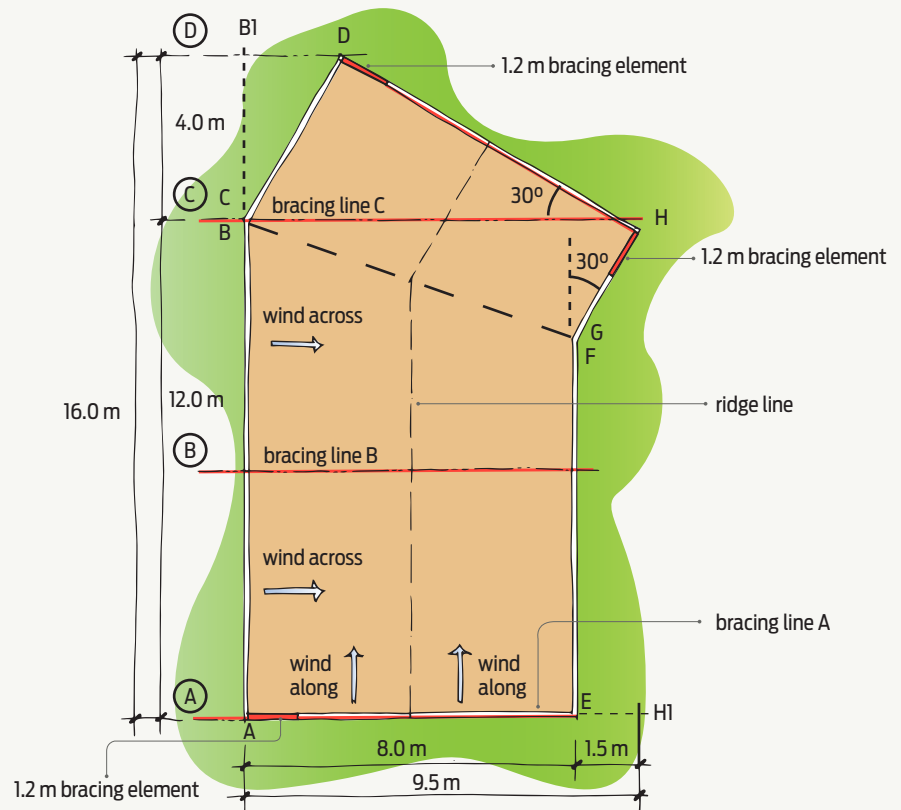


Figure 1 Bracing on single-storey example building.