Supporting heavy windows

Heavier windows and drained and vented wall cavities mean loadings from windows are often offset from the timber framing. Recent BRANZ research checked that a modified support bar system can transfer the load back to the framing to prevent problems.

By Stuart Thurston, BRANZ Timber and Earthquake Engineer

The New Zealand trend for building on more exposed sites and using larger windows has resulted in thicker glass being used. Higher insulation demands also mean that double glazing is now common. Hence, the weight of glazing has increased.

Window glazing (and the accompanying loads) are often offset from the face of the wall framing due to the use of drained and vented wall cavities – typically 20 mm wide cavities for light claddings and 50 mm wide for brick veneer – between the framing and wall cladding. Cavities have always been used with brick veneer construction, but for other claddings, this requirement was introduced with changes to E2/AS1 in response to leaky buildings.

If insufficient vertical support is provided, this eccentric load from heavy windows can cause problems such as twisting of sill trimmers and windows sagging, causing the joinery to leak.

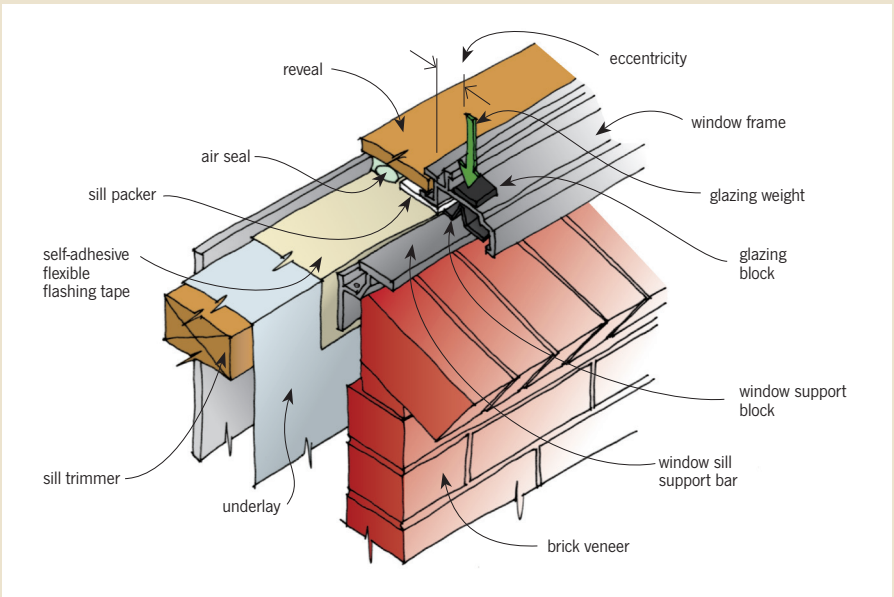

Figure 1: Cross-sectional elevation of a window in a brick veneer wall.

WANZ support bars

Installation of domestic windows is not covered by any nationally recognised standard.

Recognising the possible problems, the Window Association of New Zealand (WANZ) markets a window sill support bar to carry the window weight back to the timber framing. BRANZ investigated whether their new modified support bar system is able to transfer the load back to the timber sill trimmer and whether the sill trimmer will undergo excessive twist due to this loading (see Figure 1).

A cross-section of the WANZ system tested in the research is shown in Figure 2. The WANZ bar is an aluminium extrusion that must be continuous across the full window width. It needs to be screwed to the sill trimmer as per the installation instructions. Window glazing is supported on glazing blocks at ¼ and ¾ of the

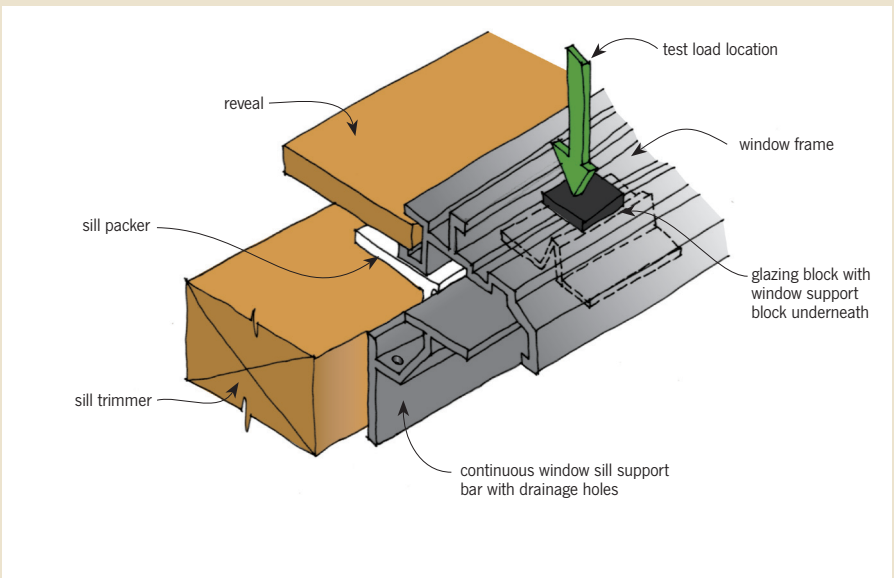

Figure 2: Cross-sectional elevation of test specimen.

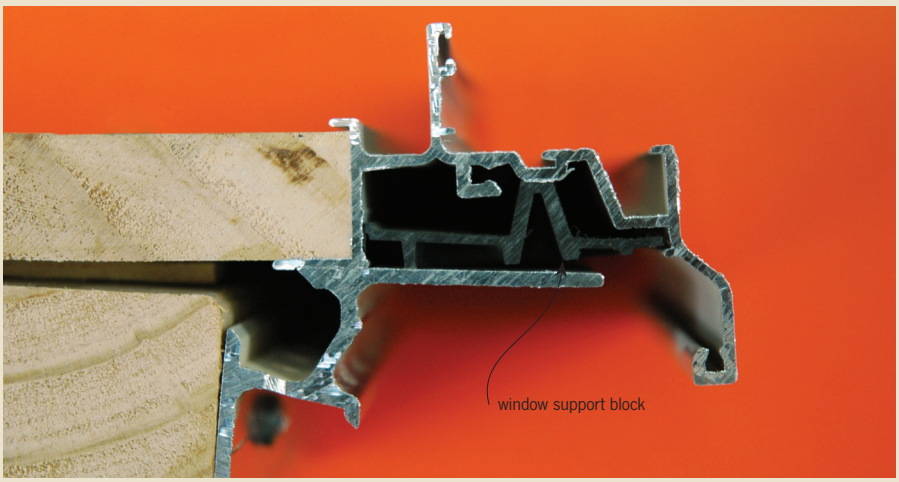

Figure 3: WANZ window sill support bar with support block (black) after extreme testing.

width of individual glazing units. Hence, the total weight of the glazing is transferred to the window frame at these locations.

Window support blocks (see Figure 3) are used directly beneath the glazing blocks. These transfer the glazing load to the bar. Sill packers (see Figure 4) are used at 450 mm centres.

Support bar does the job

The testing used framing for a 1750 mm wide window complete with window trimming studs, sill trimmer, lintel, jack studs and top and bottom plates constructed to NZS 3604:1999 *Timber framed buildings*. A partial elevation of the test set-up is shown in Figure 5.

The test results indicated that the WANZ bar, its screw fixings and the timber framing will remain intact when carrying a 150 kg window (for example, 2.5 m long × 2 m high double-glazed window with 6 mm panes). For construction complying with NZS 3604:1999, the twist of the sill trimmer was satisfactory for this loading.

This study did not consider weathertightness issues.

What about suction pressure?

BRANZ has also examined the strength of the windows to resist face load wind suction pressure. In particular, tests were carried out to measure the strength of the stapled connection between window frame and reveal and the nailed connection between reveal and window trimmers. Work is on-going, and results should be available shortly.

Other proprietary support systems are also available, but these were not assessed as part of this project.

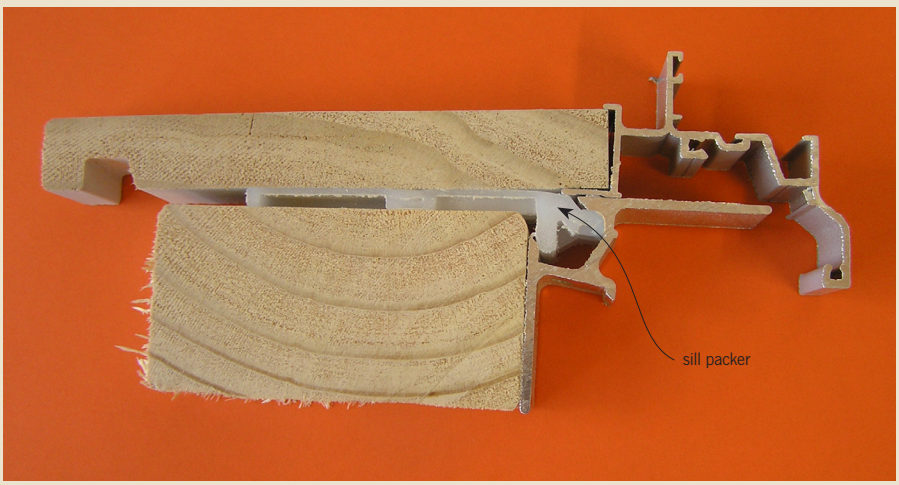

Figure 4: Sill packer (white) after extreme testing.

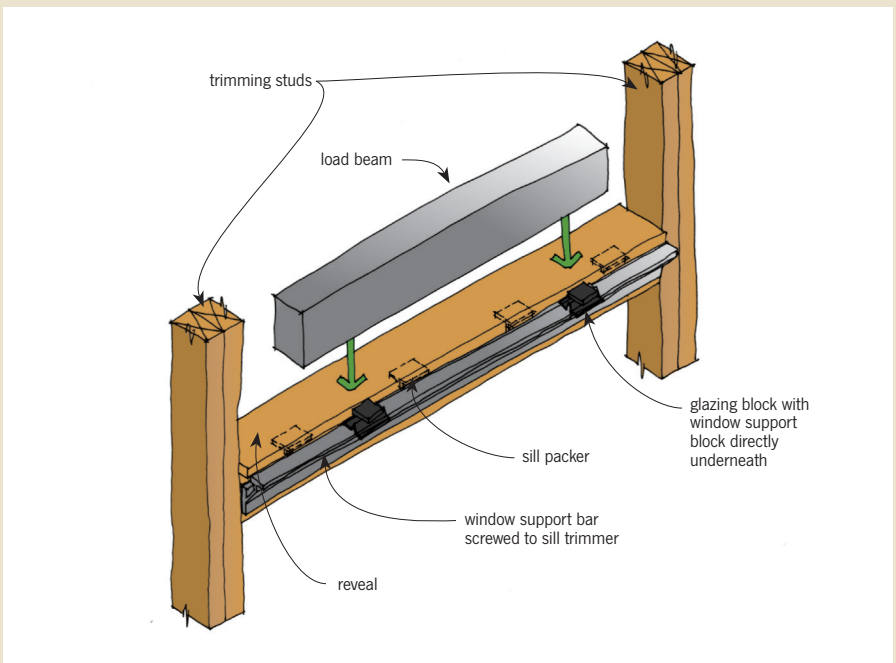

Figure 5: Partial elevation of the test set-up.