October 2012

Repair options for plasterboard bracing after earthquakes or wind damage

Following the devastating Christchurch earthquakes, some house owners have reported that their houses were noisier than before when doors are slammed, people climb stairs and heavy vehicles drive by and during strong winds and aftershocks. Often these houses have had only minor apparent earthquake damage. It is possible that there is unseen damage such as loose framing connections or weakened wall lining fixings along sheet joints behind timber trims that has resulted in too much flexibility.

BRANZ conducted laboratory experiments to determine how much more flexible houses become following earthquake shaking and the effectiveness of different repair options. The tests also examined the effect on stiffness when the adhesive bond between the plasterboard and the framing fails, because this is believed to have happened with a number of houses in Christchurch. While houses can lose lateral strength and stiffness after an earthquake – how much depends on the earthquake size – the testing showed that loss of glue adhesion had little effect on lateral stiffness.

Full details of the tests and the results are given in BRANZ Study Report SR265 *Effect and remediation of the loss of building lateral stiffness caused by earthquake loading*, available for free download from our website.

It would appear that the BRANZ research has been misunderstood in some circles. After an earthquake, remediation of buildings always poses challenges, and focusing on plasterboard ignores the wider complexities associated with returning a building to its former level of safety and structural integrity. The BRANZ research highlighted the fact that a simple 'superficial/aesthetic' remediation of plasterboard-lined walls could miss the loss of bracing strength. Accordingly, the research recommended a more careful assessment is undertaken to ensure that, during the remediation process, the appropriate level of bracing strength is restored.

The second and equally important phase of the research was to evaluate repair options based on the observed damage to restore the lateral stiffness.

The BRANZ repair strategies adopted guidelines for repairing Gib plasterboard as published in a Winstone Wallboards Information Bulletin dated November 2011. Retesting of the repaired walls showed that the loss in house lateral stiffness and strength due to damage to bracing walls will largely be rectified if the correct repair is carried out. Repair options are outlined in BRANZ Bulletin 548 *Repairing plasterboard after an earthquake*, also available for free download from the BRANZ website.

In summary, plasterboard bracing in houses can lose lateral strength and stiffness after an earthquake but the strength and stiffness can be restored provided the level of damage is correctly assessed and the appropriate repair option chosen.

Flexible wall underlay – restraint within cavities

E2/AS1 requires that flexible wall underlay is restrained where the stud spacing is greater than 450 mm to prevent it being pushed into the cavity space when the bulk insulation is fitted into the wall framing. Options given in E2/AS1 are:

- 75 mm galvanised mesh or wire galvanised in accordance with AS/NZS 4534, or
- polypropylene tape or galvanised wire at 300 mm centres fixed horizontally and drawn taut, or
- vertical cavity battens at 300 mm centres maximum.

The polypropylene tape or galvanised wire at 300 mm centres must be installed horizontally – vertical installation of tape or galvanised wire is no longer included in the recently revised E2/AS1.

Using NZS 3604 framing tables

It has been pointed out to BRANZ that some in our industry are not clear how to use the framing tables in NZS 3604:2011 now that the provisions for masonry veneer construction have been moved into E2/AS1.

The simple answer is to use them exactly the same way that they have always been used. All the tables in NZS 3604 assume that the veneer is independently supported by the foundations and doesn't rely on the timber frame for vertical support. Thus in the case of a lintel in a brick veneer building, there is no cladding weight to support, and the 'light cladding' options in the lintel tables are appropriate. If a veneer is directly supported by a timber lintel (or a shelf angle) rather than a steel lintel bar, this situation is outside the scope of NZS 3604 and requires specific engineering design.

Fixings for asphalt shingles

Mechanical fixings used with asphalt shingle roofing must be either hot-dip galvanised to AS/NZS 4680 or stainless steel. Plated fixings such as those commonly used with nail guns are not suitable as they are not likely to meet minimum durability requirements.

Stand-alone garages – foundation and slab reinforcing

Given some uncertainties noted to BRANZ, we can clarify that Amendment 7 to B1/AS1 – which requires a concrete slab on ground to be reinforced with grade 500 E mesh and the tying of that mesh into the foundation wall – also applies to the construction of stand-alone garages.

Certificate of Work for design restricted building work (RBW)

A building consent application must include a Certificate of Work from either a licensed building practitioner design or from a registered architect or chartered professional engineer where the project has restricted building work (RBW) as part of its scope.

The Certificate of Work should include the following information:

- Identification of the RBW within the project.
- Whether or not the designer will supervise the RBW.
- A statement that the design of the restricted building work complies with the Building Code or, if waivers or modifications of the Building Code are needed, what they are.
- The designer's licence or registration number.

Design RBW is design work that is critical to the integrity of a building. In particular, it makes sure the building is structurally sound and weathertight. Design RBW includes:

- design of the primary structure – all the structural elements of the building that contribute to resisting vertical and horizontal loads
- design of external moisture management systems – the building elements and systems that prevent the ingress of external moisture and help control moisture within the building fabric
- design of fire safety systems – the overall fire safety design for the building, including those building elements that are intended to protect people and household units adjacent to the building or other property from fire or the effects of fire. The design of the fire safety system does not include manufacturer design (for example, the design of a proprietary alarm system) or specific fire design detail (for example, work that would usually be done by a fire protection provider and would not be included in consent documentation).

Standard forms (both PDF and MS Word files) are available from on the MBIE Building and Housing Group website page www.dbh.govt.nz/builditright-designers-process.

Restricted building work can only be supervised by an industry practitioner licensed to do that task, and the work being supervised should be within the competence of the practitioner. A licensed designer, registered architect or chartered professional engineer may observe construction on site and check that the work is being done in accordance with the building contract, but if they are not licensed to do that type of physical construction or alteration RBW, they are not able to supervise and sign for that work.

BRANZ seminars – *Residential Retrofit and Renovation*

Housing renovation is a significant part of the building industry's work in New Zealand as the housing stock ages. Large numbers of dwellings requiring renovation and repairs to extend their physical life or to be adapted to incorporate the amenities required by changing family types and lifestyles. Compliance is a major issue that needs addressing along with insulation, glazing, weathertightness, incorporating modern facilities, energy efficiency and incorporating the new with the old.

The seminar will give guidance on:

- what a good renovation incorporates
- energy efficiency in renovated houses
- eliminating existing building inefficiencies
- historical construction methods
- the renovation design and construction process to incorporate modern living
- what is involved in a residential renovation.

The seminar will be presented by Rosalie Stanley ANZIA alternating with Lloyd Macomber ANZIA, both directors of Salmond Reed Architects (a 20-strong architectural firm specialising in conservation, restoration and adaptive reuse and renovation of old buildings) and BRANZ resident architect Trevor Pringle ANZIA.

Seminar dates and locations:

23 October	Palmerston North	Travelodge Hotel
24 October	Wanganui	Kingsgate Hotel The Avenue
25 October	New Plymouth	Quality Hotel Plymouth International
29 October	Napier	War Memorial Conference Centre
30 October	Masterton	Copthorne Hotel & Resort Solway Park
31 October	Wellington	Macs Function Centre
5 November	Invercargill	Kelvin Hotel
6 November	Queenstown	The Heritage Hotel
7November	Dunedin	Forsyth Barr Stadium
12 November	Whangarei	Forum North
13 November	Mount Wellington	Waipuna Hotel & Conference Centre
14 November	North Shore	Millennium Institute of Sport & Health
15 November	Auckland City	Crowne Plaza
19 November	Nelson	The Rutherford Hotel
20 November	Blenheim	Marlborough Convention Centre
21 November	Upper Hutt	Silverstream Retreat
26 November	Timaru	The Function Centre
27 November	Hokitika	Beachfront Hotel
28 November	Christchurch	Christchurch Polytechnic and Institute of Technology (CPIT)
3 December	Hamilton	Claudelands Conference and Exhibition Centre
4 December	Rotorua	Rydges Hotel
5 December	**Tauranga***	Trinity Wharf

Seminars run from 1–4pm, except Tauranga, which will run from 12.30–3.30pm. Online registration and more content detail are available on the BRANZ website.