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Christchurch foundation technical categories TC1, TC2 and TC3

The Christchurch Green Zone is divided into three technical categories with the purpose of establishing the amount of subsoil investigation required to determine the most appropriate foundation repair or rebuild:

- TC1 – future land damage from liquefaction unlikely. NZS 3604:2011 *Timber-framed buildings* foundations can be used for NZS 3604 houses with reinforced concrete slabs and suspended timber floors.
- TC2 – damage from liquefaction is possible in future large earthquakes. Shallow geotechnical investigations may be required, depending on damage. Standard repairs or standard enhanced foundations are suitable in TC2 areas. Recommended foundations include:
    - enhanced concrete slab foundations
    - standard timber foundations for houses with lightweight cladding and timber floors.
- TC3 – damage from liquefaction is possible in future large earthquakes. Deep geotechnical information will be required, depending on the degree of building damage and land performance in the earthquake series. Foundations will often need to be designed by a Chartered Professional Engineer.

Information about repairing houses affected by the Canterbury earthquakes

There are a number of sources of information relating to the repair of houses damaged by the Canterbury earthquakes.

The most important source is the MBIE publication *Guidance on repairing and rebuilding houses* affected by the Canterbury earthquakes (published in December 2012) The document is in four parts:

- www.dbh.govt.nz/UserFiles/File/Publications/Building/Guidance-information/pdf/canterbury-technical-guidance-technical-guidance-part-a.pdf
- http://www.dbh.govt.nz/UserFiles/File/Publications/Building/Guidance-information/pdf/canterbury-technical-guidance-technical-information-part-b.pdf
- www.dbh.govt.nz/UserFiles/File/Publications/Building/Guidance-information/pdf/canterbury-technical-guidance-foundations-part-c.pdf
- www.dbh.govt.nz/UserFiles/File/Publications/Building/Guidance-information/pdf/canterbury-technical-guidance-subdivisions-part-d.pdf.

Part A of the document covers the following:

- Section 2 – foundation assessment criteria and approaches.
- Section 3 – technical categorisation of the Green Zone on the flat
- Section 4 – repairing house foundations in TC1 and TC2
- Section 5 – new foundations in TC 1 and TC2
- Section 6 – hillside properties and retaining walls
- Section 7 – the repair and/or rebuild recommendations for the superstructure. Table 7.1 has a summary of actions required, relative to damage, for repair/replacement of plasterboard linings that includes a measure to quantify how out of plumb a wall needs to be to trigger a repair.

Table 2.3 of the publication (on page 2.6) has an indicator table to give the criteria to assess whether a foundation or floor can be repaired or re-levelled or must be rebuilt (explanatory notes given on page 2.7).

The repair options covered in section 7 include:

- 7.1 – chimneys
- 7.2 – wall bracing
- 7.3 – lath and plaster interior walls
- 7.4 – wall and roof frame connections
- 7.5 – light gauge steel framing
- 7.6 – pole houses
- 7.7 – unreinforced brick masonry walls
- 7.8 – concrete block masonry
- 7.8 – rebuild cladding and roofing recommendations.

In the Appendices of Part A:

- Appendix A1 covers relevelling systems and outline method statements for relevelling and repairing foundations and floors in TC1 and TC2
- Appendix A2 covers outline method statements for replacing foundations and slabs on ground in TC1 and TC2
- Appendix A3 has information on the assessment and repair of earthquake-damaged chimneys, while Appendix A 3.7 on page A3.7 includes a flow chart to help with repair decision making
- Appendix A4 covers the assessment and repair options for concrete floor slabs and perimeter foundation walls damaged in the Canterbury earthquake sequence.

Other repair information is also given in BRANZ Bulletin 548 *Repairing plasterboard after an earthquake*.

Simple explanations of terms used to describe earthquakes and their impacts on buildings are given in the upcoming BRANZ Bulletin 558 *Earthquake terminology*.

New Building Code clause C *Protection from fire* Acceptable Solutions

The Acceptable Solutions that support Building Code clause C *Protection from fire* have changed. There are now seven Acceptable Solutions – C/AS1 to C/AS7. Each document applies to a risk group based on the intended use and activities carried out in a building or part of a building.

From 10 April 2013, only the new version of the Acceptable Solutions (with the new Building Code C clauses) can be used in new consent applications. The previous Acceptable Solution cannot be used.

Timber joinery details

A common question received by BRANZ is: ‘Where can I obtain details for timber window installations to support their use as an alternative method when applying for a building consent?’ BRANZ has a suite of Weathertight Solutions Details (available as hard copies or as CAD files on a disc or available for individual

purchase through the BRANZ website), which include construction details for timber joinery for use with timber bevel-back and rusticated (cavity and direct-fixed) weatherboards, stucco, brick veneer, solid masonry and both vertical and horizontal profiled metal. Timber sections are based on the profiles given in NZS 3610:1979 *Specification for profiles of mouldings and joinery*. Users can view the details online before purchase. To access the details, see www.branz.co.nz/WSD.

Compliance with H1 using the BRANZ ALF 3.2 custom R-value option

When proposing to use materials or construction options that are not given in the menu options in ALF 3.2, construction R-values for the floor type, wall cladding or ceiling construction can be used provided they can be verified. These are entered into the programme using the custom R-value option in the drop-down menus. Supporting technical information, such as manufacturers' specifications, must be included in the consent application documentation.

Barriers to decks

In *Codewords 54*, MBIE (Building and Housing) modified/corrected a number of the aspects of the details given in NZS 3604:2011 Figure 7.10(c) relating to decks that are to have face-fixed cantilevered barrier support posts. *Codewords 54* states that barriers for domestic decks that comply with clause 4.2.7.2 of the MBIE document *Guidance on barrier design* comply with the Building Code and that there is no need for specific engineering design. There will be an article on the topic in the soon to be released *Build* 135.

Maintenance for tiled areas

No aspect of a completed building is maintenance free, but you have heard that before. One area that is often not considered high priority is the maintenance of tiled surfaces, particularly those in wet areas.

When carrying out any work around tiled finishes, it is important to check:

- the condition of the sealant-filled joints that should be installed to all tiled wall/wall and wall/floor junctions
- signs of dampness in adjacent spaces or if accessible under the floor – both of which may indicate that the water is getting through the tiles
- that the tiles are undamaged and the grout is sound.

Tiles may be damaged where they are the wrong tile for the area they are used in (for example, lower-strength wall tiles used on a floor or the tiles are too absorbent for use in a wet area) or they have been subject to movement or deflection. Grout that was not well installed may start to crumble or it could also be affected by movement. Where water is leaking from a shower, it may be necessary to remove all existing tiles to allow access to replace or repair the waterproofing membrane that should be installed before the tiles are installed to give the impervious surface required by E3/AS1.

Garages – fire rating of boundary walls

In general, garage walls within 1 m of the boundary require a 30/30/30 fire rating. That is a wall system that has been tested or assessed to provide a minimum of 30/30/30 fire rating by a recognised authority. There is no specific requirement within the new NZBC clause C *Protection from fire* Acceptable Solutions with

respect to either risk of roof collapse or direction of wall collapse as stated in paragraph 4.4.1 of Bulletin 557 *Timber-framed garages*. Also B1/VM1 paragraph 2.2.4 modifies clause 4.2.4 of AS/NZS 1170 for specific design by stating that 'after a fire a wall must be designed to withstand the most critical of the two situations listed in b(ii) and b(iii) – typically this is b(iii) a uniformly distributed horizontal face load of 0.5 kPa in any direction.

Garages – structural design

The focus of Bulletin 557 *Timber-framed garages* is on using NZS 3604 as the design standard. As such, the solution is conservative because NZS 3604 is for the design of importance level 2 (IL2) structures, and stand-alone unoccupied garages are IL1 structures. The design loads for IL1 structures are less than those for IL2 structures. Designers always have the option of using specific engineering design.

Painting stainless steel

Stainless steel is known for its corrosion resistance because exposure of the surface to atmosphere allows a thin oxide (passive) film to form on the surface that provides the protection. Sanding or roughening of stainless steel surface to give a paint key removes this protective oxide film that will have formed naturally. Further, the stainless steel surface can be contaminated by iron if improper blasting or sanding equipment or media were used. Before coating or painting stainless steel, a specialised pre-treatment system should be employed to promote self-healing of the passive film on a dry, clean and iron-free surface. Appropriate coating systems should also be obtained and applied following the manufacturer's instructions.

BRANZ 2013 Seminars: *Beyond BRANZFIRE – Introducing B-RISK*

Beyond BRANZFIRE is a full-day workshop specifically for fire engineers and building officials working in the performance-based fire safety arena to introduce the new B-RISK software tool developed by BRANZ and the University of Canterbury to analyse the fire safety risk in buildings in line with the new C/VM2. Key outcomes from attending include:

- learning about the capabilities and limitations of B-RISK
- gaining experience in using the programme
- developing an understanding of how to determine the appropriateness of a fire model for use in specific design.

You will need to bring a laptop with the software already installed – a link to download it will be provided when you complete your registration.

Monday 25 March	Hamilton	Claudelands Conference & Exhibition Centre
Tuesday 26 March	Auckland	Crowne Plaza Hotel
Wednesday 27 March	Christchurch	Chateau on the Park
Thursday 28 March	Wellington	Amora Hotel

The full-day training sessions start at 9 am. More details and online registration are available on the BRANZ website.