



Update Forum

Briefings for Engineers, PMOs and Insurers – 20 April 2016

Speakers note: The session is primarily aimed at Chartered Professional Engineers and to increase the wider audiences knowledge of the role of CP Engineers



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Just a reminder...



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Why are we here?

- More complex damaged properties still to be resolved
- Technical issues raised – do repairs have to comply with NZ Standards, e.g. NZS 3604?
- Concerns about obligations as a professional engineer

- to your client
- as a professional





What's today about?

- **Welcome – 3.30 pm**
- Regulatory context – Mike Stannard, MBIE
- Technical issues – Graeme Beattie, MBIE Engineering Advisory Group
- RAS reviews – William Whewell, MBIE
- Professional Practice Engineering Obligations – Andrew Read, IPENZ
- General Discussion – Dave Brunsdon, EAG + panel
 - Your issues and learning needs
 - Future forums?
- **Close – 5.30 pm**





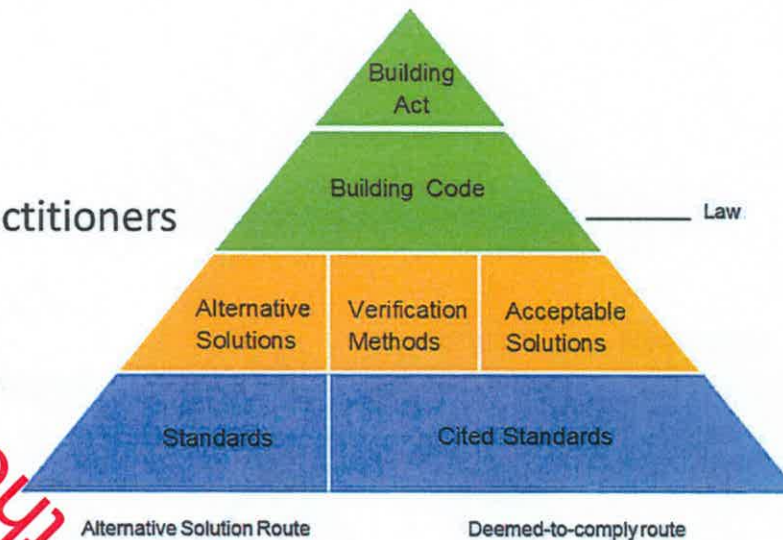
Building Act

Provides for:

- Regulation of building work
- Establishment licensing regime for building practitioners
- Setting performance standards for buildings

Purpose:

- Use of buildings without endangering health
- Buildings contribute to the health, physical independence, and well-being of users
- Escape from fire
- Promote sustainable development





NZ Building Code

(Performance standards that all building work must meet)



General



Stability



Protection from Fire



Access



Moisture



Safety of Users



Services and Facilities



Energy Efficiency

16 Building Regulations 1992 1992/1
 FIRST SCHEDULE—structure

Clause B1—STRUCTURE

Provisions Limits on application

OBJECTIVE
 B1.1 The objective of this provision is to:

- (a) Safeguard people from injury caused by structural failure,
- (b) Safeguard people from loss of amenity caused by structural behaviour, and
- (c) Protect other property from physical damage caused by structural failure.

FUNCTIONAL REQUIREMENT
 B1.2 Buildings, building elements and streets shall withstand the combination of loads that they are likely to experience during construction or alteration and throughout their lives.

PERFORMANCE
 B1.2.1 Buildings, building elements and streets shall have a low probability of rupturing, becoming unstable, losing equilibrium, or collapsing during construction or alteration and throughout their lives.
 B1.2.2 Buildings, building elements and streets shall have a low probability of causing loss of amenity through undue deformation, vibratory response.

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
 HONOURABLE MINISTER

Acceptable Solutions and Verification Methods
 For New Zealand Building Code Clause B1 Structure

B1

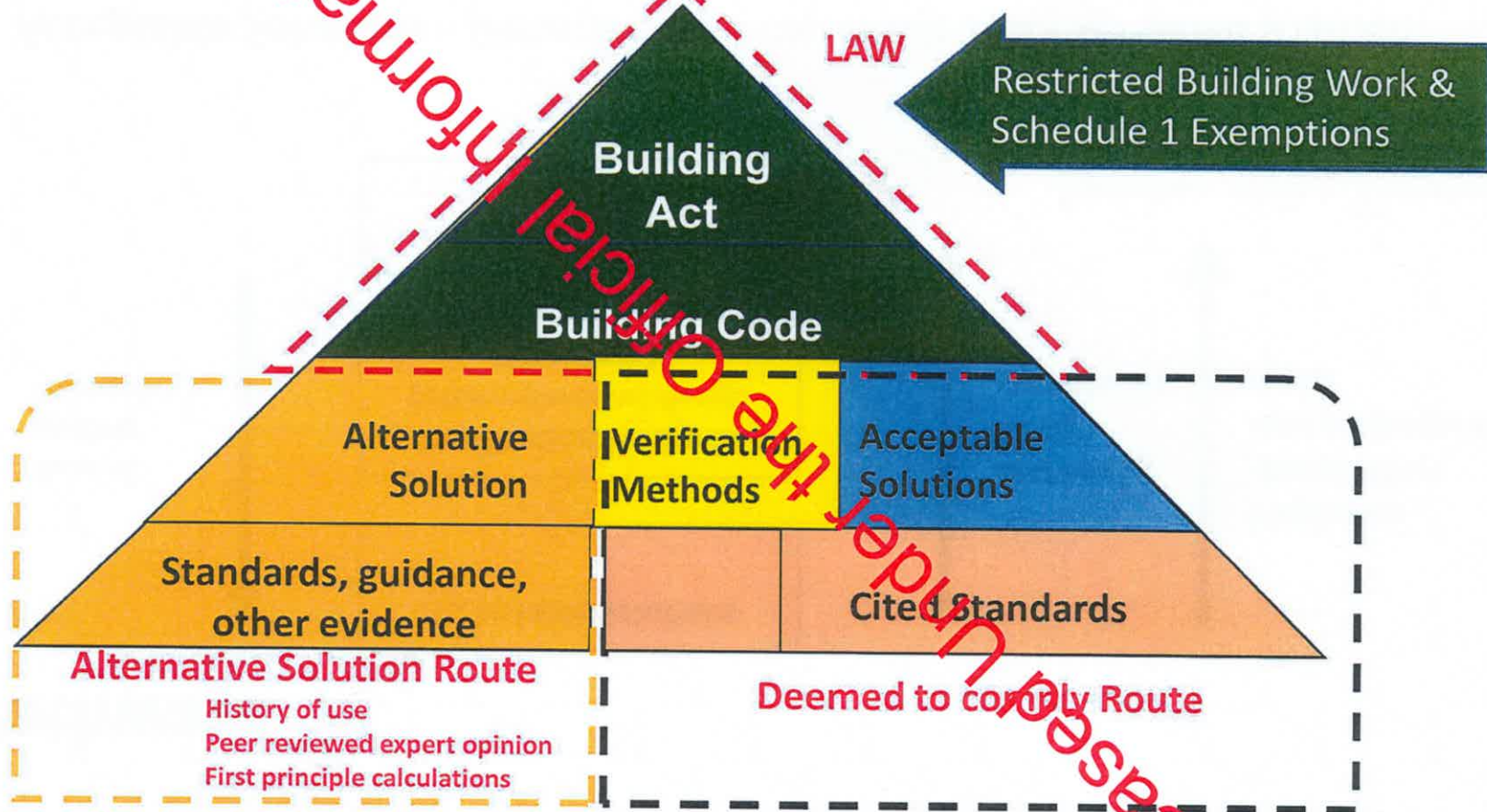
www.building.govt.nz

New Zealand Government

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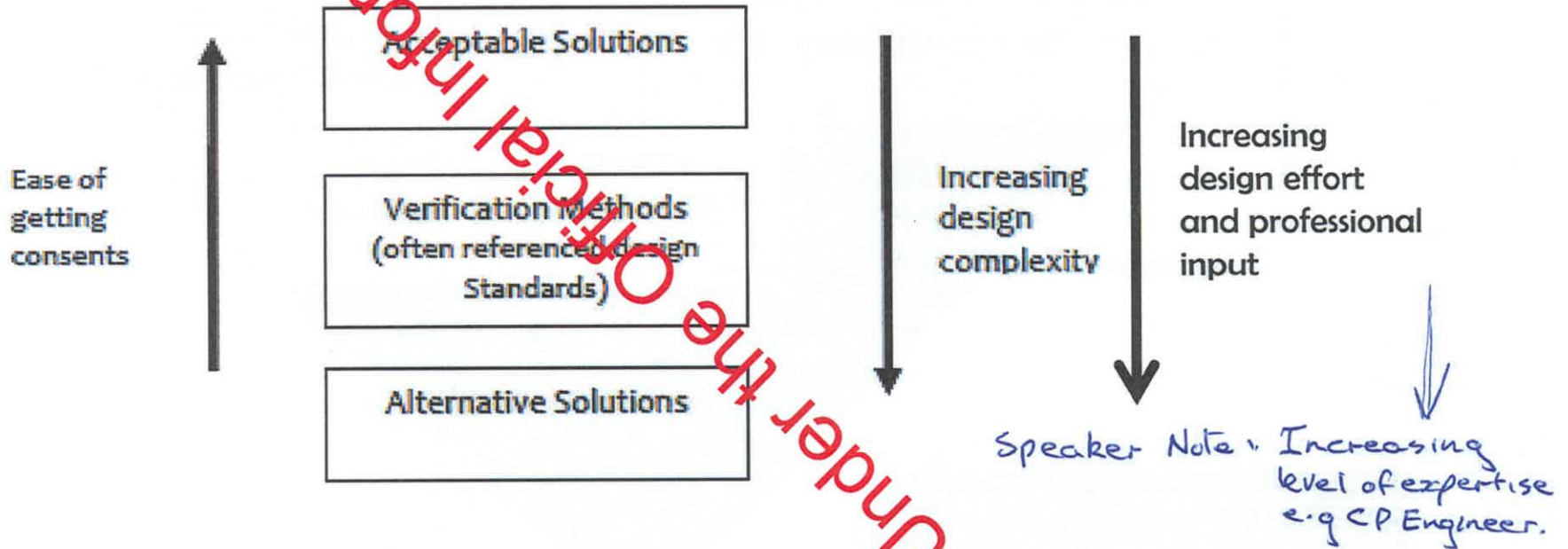


Multiple routes to compliance





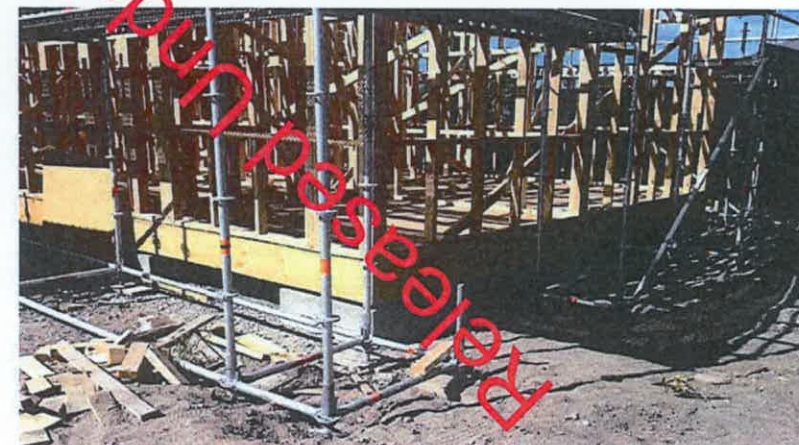
Pathways



- **Acceptable Solutions** – General case – can result in conservative solution
- **Alternative solutions** – Case specific – more refined design possible

**BUILDING
PERFORMANCE**

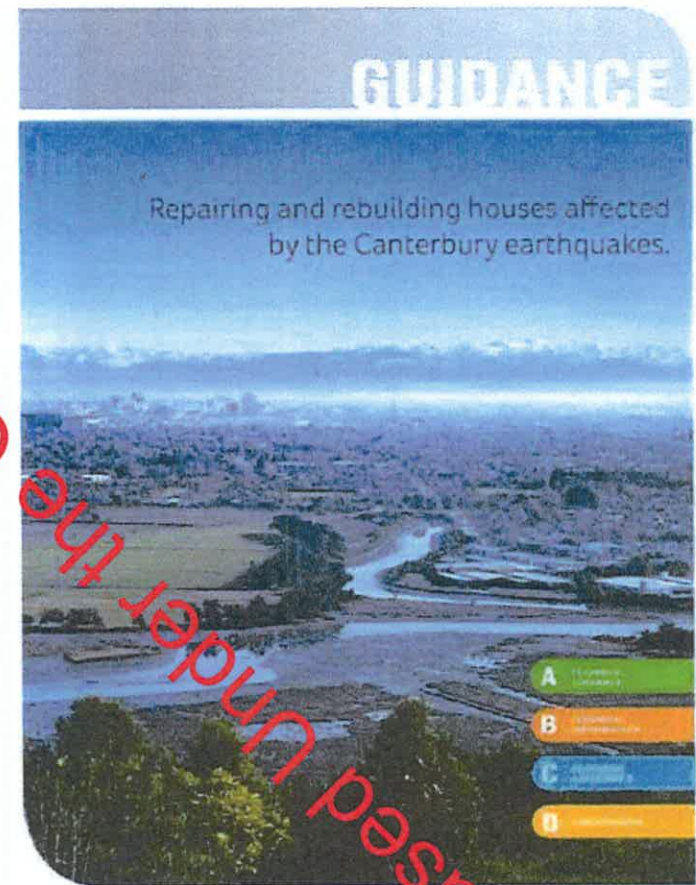
Tested - 14 February 2016





MBIE Guidance

- **Filling a gap** – good practice repair and rebuild solutions
- **Evolving** – as new information available
- **Code compliant** – recognised by Canterbury Councils





Repair solutions

- Scope of work depends on **insurance obligations** unless dangerous or insanitary (note: MBIE 29 Jan 2016 clarification)
 - **Pre-existing conditions**
- Work done needs to be in accordance with sound **engineering principles**, i.e. – what is appropriate using good engineering judgement
 - Details – load paths, in-service performance
- Building work complies with Code and the building complies at least to the same extent as before (s 112, s 42a)
- Make sure assessment, repair details, inspection requirements, etc., **adequately documented**. What has been considered, what hasn't.
- Alternative solution pathway, should have proper engineering assessment, judgement and inspection (**recommend CPERs or equiv.**)



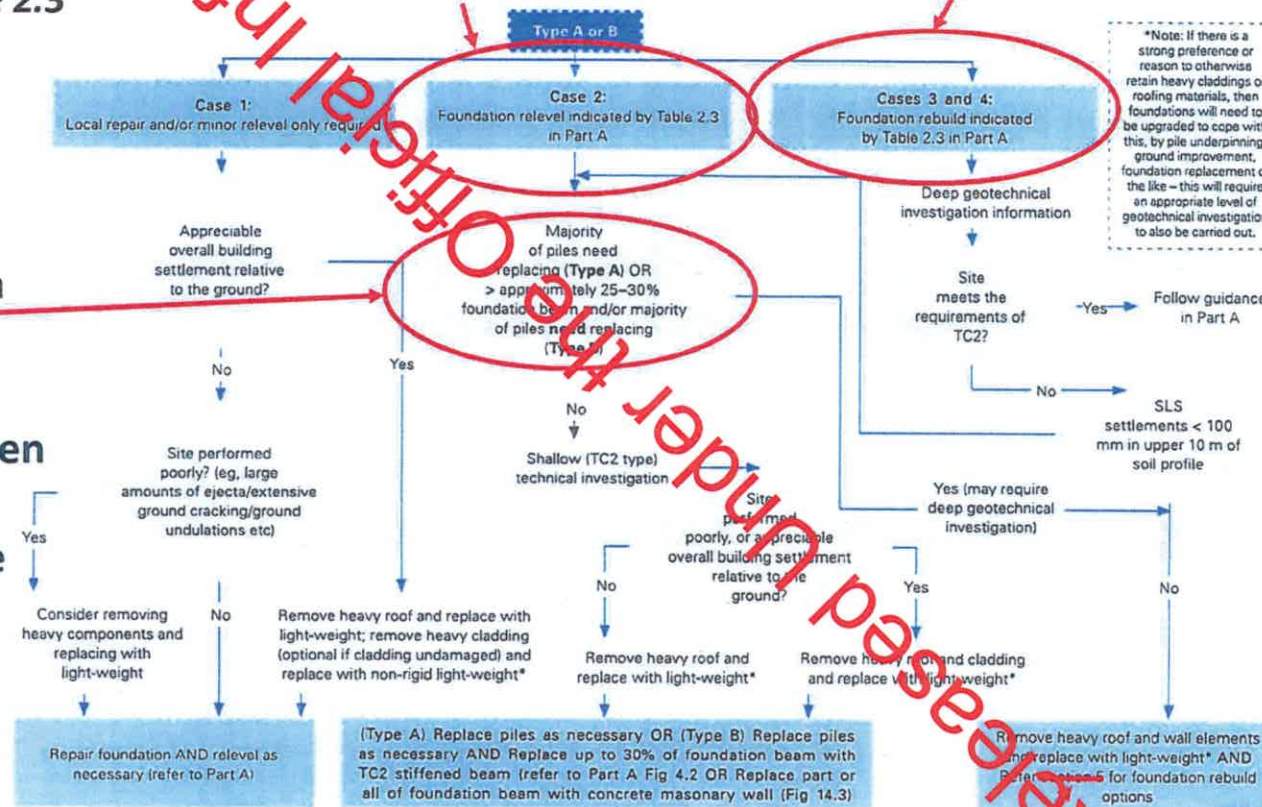
Repairs to Type B Foundations in TC3

Refer Figure 14.1 of Guidance

Requires start at Table 2.3

Relevel and partial replacement

Full foundation rebuild



*Note: If there is a strong preference or reason to otherwise retain heavy claddings or roofing materials, then foundations will need to be upgraded to cope with this, by pile underpinning, ground improvement, foundation replacement or the like – this will require an appropriate level of geotechnical investigation to also be carried out.

>25-30% of foundation needs replacing

NOT because it has been broken back in the repair process to more than 30%



Type B foundation old/new interface



Poor concrete quality? – may not be possible to install starters

Option:

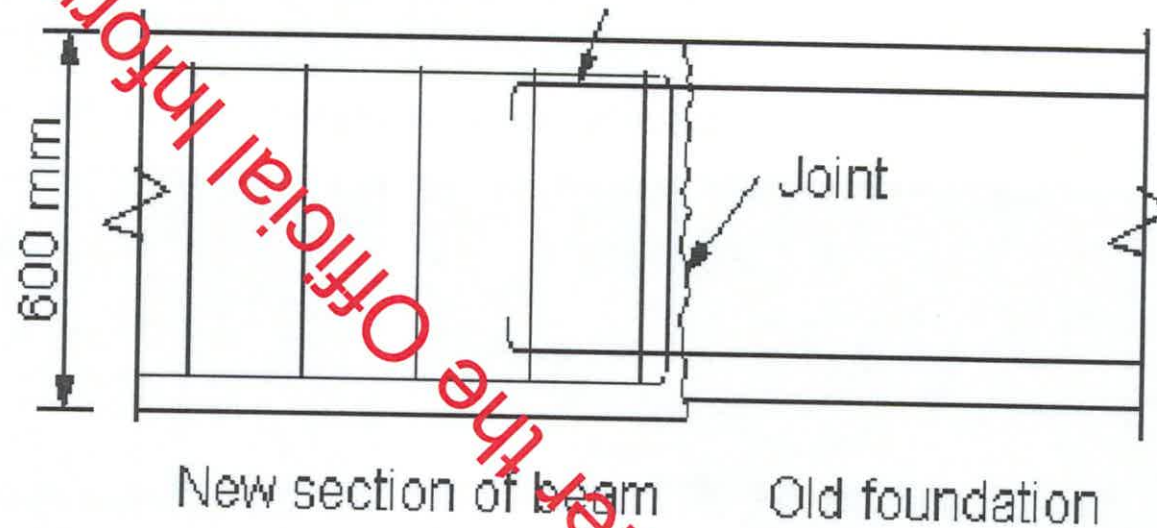
- coat the existing surface with proprietary compound
- pour new concrete against this

Foundation still supporting dwelling –at least to the same extent as before repair



Type B foundation old/new interface

Suggested joint
between old
and new
foundation
sections Figure
4.2a and
section 4.2



Lap to existing steel
No existing steel → epoxy/grout in new starters



Pile-bearer connection repairs in Type B Foundations- to tie or not to tie?

Packing pile

1. Fix packer to bearer – prevents slip out
2. Tying bearer to existing packed pile

Q: What is the scope of Building work?

If it only relates to the bearer

and there has never been a tie

and there have been no signs of relative horizontal movement

→ no new tie required in order to comply with the basic requirements of the Building Code

Speakers note: A Chartered Professional Engineer is required for this decision and supporting documentation

Note: The insurance obligation may exceed these requirements



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Pile-bearer connection repairs in Type B Foundations - to tie or not to tie? (contd)

Key Points

1. If the pile requires building work then tie the bearer to the pile
2. If the pile does not require building work, a decision not to tie on basis of in-service performance requires engineer inspection and documentation
3. This scenario only applies to Type B foundations where the perimeter foundations have prevented bearer movement

Note: The insurance obligation may exceed these requirements

4. For Type A foundations – bearers should connect to piles



Pile to bearer connections – Type B Foundations - to tie or not to tie?

Stone piles

- Packing of bearer

Fix packer to bearer – prevents slip out

Tying bearer to **existing** packed pile

- Never been a tie → no tie required

Building work only related to bearer

However – are you confident bearing area between packer and stone pile top is sufficient?

Guide: 1 storey → 100mm x 50mm (along grain)

2 storey → 100mm x 100mm



Speakers Note: Chartered Professional Engineer is required

This is a CP Engineer Decision



Pile to bearer connections – Type B Foundations - tie durability

Bearer/pile connection

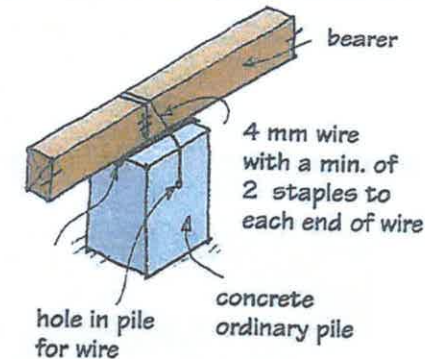
- Original tie in place and galvanised

When tie replaced, options for replacement are:

- 1) Grade 304 stainless steel in Zone 1 (NZS 3604 Table 4.1)
- 2) Galvanised steel wire if “proof of performance” can be confirmed e.g. in-service history (see section 1 of B2/VM1).

Expect to provide engineer sign-off, particularly for exempt work.

- 3) Alternative brackets/etc. (Alternative solution)



BRANZ House Building Guide



RAS now part of MBIE

- Funded by ICANZ, CCC, EOC
- Technical panel Crown funded
- 400 cases referred
- Technical panel reviews engineering with reference to Residential Guidance
- RAS Independent Advisors and engineers meet monthly
- Claim concerns about adequacy of cash settlements vs technical solution proposals
- More cases where information required from property owner





Results from the last 200 cases

- 55% cases tech panel did not accept engineering solution
- House assessment reports often not comprehensive
- Multiple professional reports do not lead to one clear strategy
- Differing opinions on historic versus earthquake damage
- Second and third visit repairs not to acceptable standard
- Cash settlements have been prepared off incomplete scope





Professional Practice Engineering Obligations – Andrew Read, IPENZ



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General Discussion

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To close

- Engineers play a key role in achieving a quality repair, particularly in the more complex cases
- The Building Act and Building Code are performance based, which enables good historical performance to be taken into account in some situations
- This does however require a greater level of professional input and clear documentation to justify and support decisions
- And insurance contract obligations may require more comprehensive repairs

The role of MBIE's residential guidance and insurance policies can be found at:

<http://www.building.govt.nz/about-building-performance/news-and-updates/all-news-and-updates/clarification-of-the-role-of-the-mbie-residential-guidance-and-homeowner-insurance-policies>





Possible additional topics for discussion

- The status of the guide to tolerances in new construction
- When is deep geotech required – refer to the flow charts
- Do you need to replace sound bluestone piles because packing and fixing is not to NZS3604

Not used on
20 April.

