



Ministry of Business,
Innovation & Employment

THE GUIDE FOR CANTERBURY BUILDERS

ABOVE-FLOOR WORK

[Your new best friend]



About this booklet

This booklet, *Above-Floor Work*, and its companion booklet *Below-Floor Work*, are for builders and others wanting an overview of requirements for repairing and rebuilding houses in the Canterbury Green Zone. They outline the regulatory requirements for builders, and highlight special issues for working in the Canterbury Green Zone.

These booklets are an introduction to the more detailed guidance published by the Ministry of Business, Innovation and Employment (MBIE): *Repairing and rebuilding houses affected by the Canterbury earthquakes* (MBIE Guidance).

Links are provided to the MBIE Guidance, which should be referred to for more detailed information.



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CANTERBURY | The groundwork
for good decisions.

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ABOVE-FLOOR WORK:

REPAIRING TIMBER STRUCTURES

If you're building in Canterbury...this is important!

Repairing a post-earthquake building is different from carrying out day-to-day repairs. Floor structures may have been twisted, wrenched, cracked or tilted so much that their repair, releveling or replacement must be considered before any other repairs are done.

In most cases, decisions regarding any earthquake repairs on houses in Canterbury will be made by a Project Management Office (PMO), designer, or engineer.

They will engage builders on behalf of the building's insurers or owners to undertake those repairs – under usual building contract terms and conditions.

This booklet, *Above-Floor Work*, is an introduction to MBIE's guidance for repairs to the framework above floor, including chimneys and retaining walls, and gives links to more detailed information. MBIE published the guidance *Repairing and rebuilding houses affected by the Canterbury earthquakes* to support a quality rebuild in Canterbury. It is available at www.dbh.govt.nz/guidance-on-repairs-after-earthquake



The MBIE Guidance can be viewed online

What this booklet covers

This booklet sets the scene for building in Canterbury's Green Zone and gives an overview of the 'nuts and bolts' of above-floor work.

It covers the repair and replacement of structural framing, bracing, chimneys and fireplaces, and retaining walls for buildings in the Canterbury Green Zone.



Refer to MBIE Guidance Introduction, and Part C, section 11 – Introduction to TC3.

While it is mainly concerned with one or two storey timber-framed dwellings (i.e. houses built to NZS 3604:2011 Timber framed buildings), it also comments on other building types, covers garages and outbuildings, and gives tips for installing new services.

ALERT: THE COMPANION GUIDE, *BELOW-FLOOR WORK*, COVERS REPAIRS TO FOUNDATIONS. IT IS IMPORTANT THAT FOUNDATIONS AND GROUND FLOORS ARE REPAIRED OR REPLACED, BEFORE STARTING ANY ABOVE-FLOOR REPAIR OR REBUILDING.

ALERT: REPAIRING OR REBUILDING EARTHQUAKE-DAMAGED HOUSES MAY INVOLVE SPECIFIC ENGINEERING DESIGN. THERE IS MORE INFORMATION IN THIS BOOKLET UNDER SPECIFIC ENGINEERING DESIGN - WHEN IT IS REQUIRED, AND THERE IS MORE DETAIL PROVIDED IN THE MBIE GUIDANCE.

CONTENTS

SETTING THE SCENE

Building in the Canterbury Green Zone	5
NZ Regulations	9

THE NUTS AND BOLTS

Above-floor work	14
Structural frame connections and bracing	16
Wall framing	16
Roof framing	17
Bracing	17
Repairs to plaster-board or plywood braced panels	19
Other construction types	21
Chimneys and fireplaces	22
Retaining walls	27
Preventing falls	30
Other useful information	32



SETTING THE SCENE.



BUILDING IN THE CANTERBURY GREEN ZONE

Lessons learned from building performance in the Canterbury earthquakes have led to some improvements in the way houses are designed and constructed.

Generally, house framing and bracing performed well; especially for housing sites on the flat. In most cases there was only minor structural damage, along with damage to finishes, services, and site works.

However, the performance of some house foundations on flat sites was less successful, mainly due to liquefaction, stretching over the building footprints (lateral spreading), and tilting of floors (differential ground settlement). So, more attention is being paid to ground conditions and foundation design.

The Technical Categories – or “TCs”

The main changes that affect repairing and rebuilding houses damaged in the Canterbury earthquakes relate to the land’s Technical Category.

Flat areas of the Canterbury Green Zone are divided into three Technical Categories, or TCs.

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NOTE: THESE CATEGORIES PROVIDE A GUIDE TO THE LEVEL OF SITE INVESTIGATION REQUIRED AND THE APPROPRIATE FOUNDATIONS FOR THE HOUSE.
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Each property is listed in one of the following:

- **TC1** is where land damage from liquefaction is unlikely in future large earthquakes. Standard residential foundation assessment and construction is appropriate.
- **TC2** is where liquefaction damage is possible in future large earthquakes. Shallow ground investigations may be required when repairing or replacing foundations. There are foundation repair and rebuild options in the MBIE Guidance.
- **TC3** is where liquefaction damage is possible in future large earthquakes. Geotechnical engineering assessment may be required to select the appropriate foundation repair or rebuild.



For more about the TCs, see MBIE Guidance section 1.4.3 – Technical scope, and Part C, section 12 – Future land performance in TC3.

Confirming the TC is an important starting point before doing repairs, especially for foundations. The TC will indicate which recommendations in the MBIE Guidance are best suited for the site.



Helpful tip: Find out the Technical Category and other land information for residential sites at the CERA website www.landcheck.org.nz



It is important to repair or replace foundations and ground floors before doing any above-floor repair or rebuilding. Check out the companion guide to repairs *Below-Floor Work*.

Specific Engineering Design – when it is required

Specific engineering design is when the design or design method is non-standard (i.e. outside the Acceptable Solution or Verification Method).

See page 9 *The Building Code and Building Consents*.

Specific engineering design will usually be done by a Chartered Professional Engineer (CPEng).

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NOTE: IF A BUILDING NEEDS EXTENSIVE REPAIRS – ESPECIALLY IF REPAIRS ARE TO ITS STRUCTURE, ROOF, WALL CLADDING, WINDOWS OR DOORS – A PROFESSIONAL ENGINEER, ARCHITECT OR DESIGNER WILL GENERALLY BE INVOLVED.
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ALERT: REPAIRING OR REBUILDING A TIMBER-FRAMED HOUSE GENERALLY NEEDS SPECIFIC ENGINEERING DESIGN IF:

- THE BUILDING IS MORE THAN TWO STOREYS HIGH (I.E. MORE THAN 10 METRES ABOVE GROUND)
- THE BUILDING WORK INVOLVES FOUNDATIONS FOR SITES IN THE TC3 ZONE.

Some useful links:

- **Concrete or concrete block construction:** refer to NZS 4229 *Concrete masonry buildings not requiring specific engineering design*, and to the Cement and Concrete Association of New Zealand's Code of Practice CCANZ CP 01:2011, available at www.ccanz.org.nz
- **Steel stud construction:** refer to the National Association of Steel-framed Housing Handbook – *Best practice for design and construction of residential and low-rise steel framing*, available at www.nash.asn.au



NZ REGULATIONS

The Building Code and Building Consents

The Building Act 2004 (Building Act) contains provisions that are designed to ensure buildings are safe and healthy to live in.

The Building Code (established under the Building Act) sets the performance standards that all building work must meet.

The Building Code is divided into clauses (sections) covering each aspect of a building, such as structure, fire and weathertightness.

Each clause of the Building Code has at least one Acceptable Solution or Verification Method (see www.dbh.govt.nz/compliance-documents).

These are 'ready-made' design solutions that you can use to comply with the Building Code. However, these solutions are not mandatory and following them is only one way of complying with the Building Code.

ALL building work MUST comply with the Building Code, whether or not it requires a building consent.



For more information on the regulatory context for Canterbury earthquake repairs, refer MBIE Guidance Part B, section 8.2 – Regulatory requirements.

Work that MUST HAVE a Building Consent

All new building work will need a building consent, except the minor work covered by Schedule 1 of the Building Act (see next page).

Work that must have a Building Consent includes:

- Repairs or replacement of structural components (however, some minor structural repairs may not need a building consent – check with the local building consent authority)
- Repairs or replacement of fire safety parts of a building

- Replacing materials that have failed to meet the durability requirements of the Building Code, such as a leaking roof or wall cladding that is less than 15 years old.

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NOTE: REPAIRS OR MAINTENANCE OF MATERIALS SUCH AS CLADDINGS THAT HAVE FAILED DUE TO EARTHQUAKE DAMAGE, DO NOT REQUIRE A BUILDING CONSENT.

Work that DOES NOT require a Building Consent

Some minor building work does not require a building consent – this is known as ‘exempt building work’. A list of exempt work is contained in Schedule 1 of the Building Act (for more details see below).

For building repairs, exempt work generally includes:

- Repair or replacement of building components or building services using materials that are the same, or comparable, to existing materials
- Construction, repair or replacement of walls with less than 1.5 metres of retained ground, that are (1) back-filled no higher than the wall, and (2) do not support loads other than the backfilling. See *Retaining Walls*
- Construction, repairs or replacement of a deck which is less than 1.5 metres from the ground at any point
- Installation, replacement, or removal of a door or window
- Non-structural internal alterations and repairs (repairs to internal wall lining used for bracing do not need a building consent)
- Any other building work which the territorial authority (local council) considers to be exempt (these can be general or case-by-case exemptions under Schedule 1(k) of the Building Act).

ALERT: FOR A COMPLETE LIST OF WORK THAT DOES NOT REQUIRE A BUILDING CONSENT REFER TO:

- WWW.LEGISLATION.GOV.T.NZ (BUILDING ACT SCHEDULE 1)
- WWW.DBH.GOV.T.NZ/BC-NO-CONSENT
- WWW.CCC.GOV.T.NZ/HOMELIVING/BUILDINGPLANNING/BUILDINGCONSENTS/EXEMPTION.ASPX

REMEMBER THAT, EVEN WHEN A BUILDING CONSENT IS NOT REQUIRED, ALL BUILDING WORK MUST STILL COMPLY WITH THE BUILDING ACT AND THE BUILDING CODE.

What you are legally responsible for

If you are carrying out residential building repairs or new building work under a building contract, you are legally responsible for ensuring that the work:

- Is properly carried out and completed
- Complies with the agreed contract terms
- Is suitable for its intended purpose.

ALERT: THESE ARE KNOWN AS IMPLIED WARRANTIES FOR THE QUALITY OF YOUR WORK. YOU CANNOT CONTRACT OUT OF THESE (SEE SECTIONS 397 AND 399 OF THE BUILDING ACT).

If you are designing or giving advice on building work, you are also legally responsible for that advice. Builders who both design and carry out repairs to buildings are therefore legally responsible for the work complying with the Building Code.

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NOTE: IT IS IMPORTANT FOR BUILDERS TO BE AWARE OF THEIR LEGAL RESPONSIBILITIES, ESPECIALLY IF DOING REPAIRS WITHOUT A BUILDING CONSENT. REFER TO WORK THAT DOES NOT REQUIRE A BUILDING CONSENT.

GETTING A BUILDING CONSENT IS ONE WAY OF MAKING SURE THE WORK COMPLIES WITH THE BUILDING CODE.

Restricted Building Work and Licensed Building Practitioners

Restricted Building Work is building work that **MUST** be carried out by a Licensed Building Practitioner (LBP). It only applies to houses or apartment buildings up to 10 metres in height and excludes mixed-use apartments.

If you are an LBP

You can do Restricted Building Work you are licensed for, relating to:

- The dwelling's structure, such as work on foundations, framing and bracing
- Its weathertightness, such as building work relating to windows, doors, roofing, cladding
- Some fire safety design work.



Helpful tip: Go to www.dbh.govt.nz/builditright for more about Restricted Building Work and Licensed Building Practitioners.

LBPs, once they have completed their part of the Restricted Building Work, must provide a "Record of work" form, confirming which parts of the Restricted Building Work they carried out or supervised. LBPs must give this form to homeowners and the territorial authority (local council).

If you're NOT an LBP

If you are not an LBP, you can carry out Restricted Building Work **UNDER THE SUPERVISION OF AN LBP** licensed for the work.

You can also carry out:

- Work not considered Restricted Building Work
- Work that does not require a building consent
- Any work on buildings that are not used for living in, such as sheds, stand-alone garages and carports.

THE NUTS AND BOLTS.



ABOVE-FLOOR WORK

Buildings covered in the MBIE Guidance

This booklet, and the MBIE Guidance, is for repairing residential properties in Canterbury's Green Zone that are one or two storey, timber framed, dwellings (i.e. houses built to NZS 3604).

There are also some useful tips for repairing other building types (i.e. masonry houses built to NZS 4229).

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NOTE: MOST OFTEN, DECISIONS FOR THE REPAIRS WILL BE MADE BY A PROJECT MANAGEMENT OFFICE (PMO), DESIGNERS, OR ENGINEERS. THEY WILL ENGAGE BUILDERS, UNDER USUAL BUILDING CONTRACT TERMS AND CONDITIONS, TO UNDERTAKE THE WORK ON BEHALF OF INSURERS OR OWNERS.
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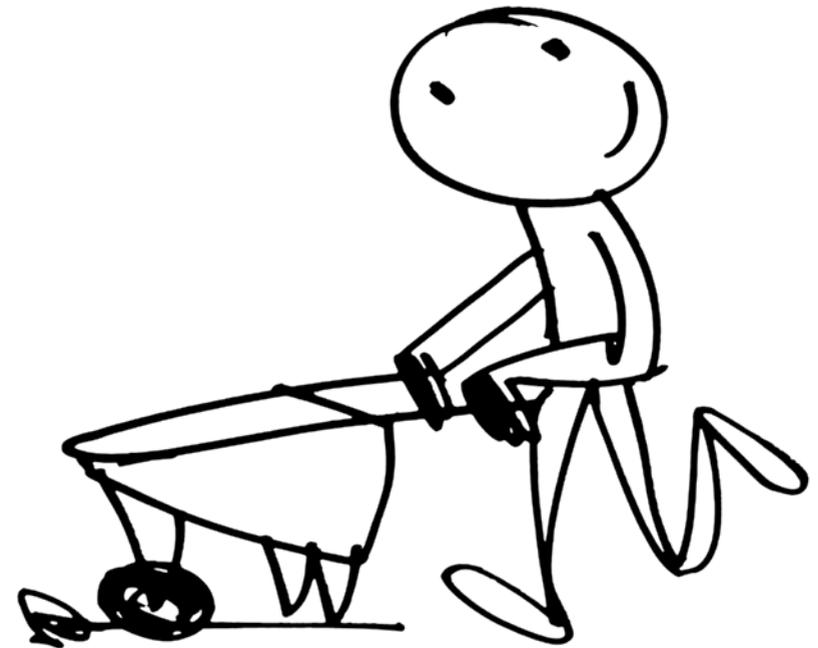
Where extensive repairs are required, especially repairs to the structure, roof, wall cladding, windows or doors, it is recommended that a professional engineer, architect or designer is consulted.

ALERT: REPAIRING OR REBUILDING THE ABOVE-FLOOR SECTION OF A TIMBER-FRAMED HOUSE GENERALLY NEEDS SPECIFIC ENGINEERING DESIGN IF:

- THE BUILDING IS MORE THAN TWO STOREYS HIGH OR MORE THAN 10 METRES ABOVE GROUND
- THE BUILDING WORK INVOLVES FOUNDATIONS FOR SITES IN THE TC3 ZONE.

If the house is not timber framed, these may be useful:

- **Concrete or concrete blocks** – NZS 4229, and the Cement and Concrete Association – *Code of Practice for Weathertightness Design*.
- **Steel stud construction** – the NASH Handbook – *Best practice for design and construction of residential and low-rise steel framing*, see www.nash.asn.au.



STRUCTURAL FRAME CONNECTIONS AND BRACING

Wall framing

Where wall frame damage has occurred because of the earthquakes, it is possible that frame joints have pulled apart, structural fixings have become loose, or that whole walls have become dislodged or moved out of plumb.

Because bottom plates may have lifted and resettled, floor coverings and lower wall linings may need to be removed to allow proper inspection if damage is suspected to 'hold-down' fixings.

Typical framing damage (and associated repairs) will include:

- Broken framing – replace broken framing and fixings
- Framing joints that have separated – pull back into line and refix
- Bottom plates either separated from floors or with broken fixings – refix bottom plates to floors and replace 'shot' fixings to concrete slabs with bolt anchors
- Damaged brace connections (e.g. nail straps)– replace structural connectors (these are especially important to the overall stiffness and strength of the house).



Refer to MBIE Guidance Table 7.1 for recommended bracing repairs.



Refer to *Below-Floor Work*, when considering re-cladding options.
Refer also to MBIE Guidance section 7.9 and Table 7.2 for more on cladding weights.

Roof framing

If house foundations and wall frames are damaged, it's also possible that the roof framing has been affected. Gable-end roofs may have been damaged more than hip roofs, which are self-bracing.

Most likely roof framing damage (and associated repairs) will include:

- Broken roof framing – replace broken framing and fixings
- Broken bracing strap connections – replace broken straps and re-tighten existing strapping with tensioning inserts.

If it's difficult to access roof spaces, especially where top plate fixings need to be inspected, it may be necessary to remove parts of the ceiling or soffit linings to check the roof properly.

Bracing

Most timber-framed houses built before 1978 (the first publication of NZS 3604) had their wall bracing provided by either flush timber braces or solid timber braces.

Houses built after 1978 generally used sheet bracing, sometimes in combination with steel angle or strap bracing. This is usually paper-faced plaster-board, fibre cement sheet, or plywood. Fibrous plaster sheets were also commonly used for bracing in the 1980s and 1990s.

Houses generally have braced walls evenly placed across their width and length.

Not all walls in these homes are braced walls. **However, it is safer to treat all lining repairs as if they are bracing elements.**

Ways to repair or replace paper-faced plaster-board and plywood braced panels are set out in the Table – *Repairs to plaster-board lined walls* on page 19.



For information on the following structural systems, see the MBIE Guidance section 7:

- Fibrous plaster walls
- Buildings with concrete or concrete block walls
- Older buildings with solid timber cut-between or cut-in bracing.

Bracing repairs to buildings with steel portal frame bracing or other proprietary bracing systems will require specific engineering design.

Lathe and plaster interior wall linings don't provide bracing, but are often the first line of resistance during an earthquake and therefore are usually damaged.



See MBIE Guidance Part A, section 7.2 for common damage and repairs.



Helpful tip: For further information on bracing and fixings, refer to manufacturer and supplier information and websites.

Repairs to plaster-board lined walls



For a more complete list of possible damage and recommended repairs, refer to section 7.2 and Table 7.1 of the MBIE Guidance

Refer also to BRANZ Bulletin 548 – www.branz.co.nz

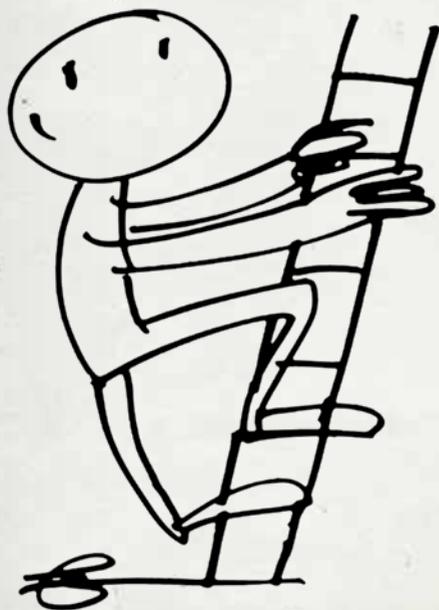
Damage	Repairs
<p>Minor damage</p> <p>Lining joint cracks less than 0.5mm wide</p> <p>No signs of wall movement</p>	<p>Re-stop cracking in plaster panels</p> <p>Refix along stud lines where sheets sound or feel 'drummy' or where existing fixings have popped</p>
<p>Moderate damage</p> <p>Lining joint cracks more than 0.5mm wide</p> <p>Minor perimeter movement at sheet edges and skirting</p>	<p>Refix sheets adjacent to existing fixings (may involve removal of skirtings and cornices)</p> <p>Where sheet edges are too damaged – replace sheets and fix as for bracing elements</p>
<p>Significant damage</p> <p>Lining separation from wall</p> <p>Wall out of plumb by more than 10mm over its height</p> <p>Bottom plates out of position</p>	<p>Refix sheets if:</p> <ul style="list-style-type: none"> • diagonal cracks at opening corners are less than 50mm long and • there is only moderate damage (see above). <p>Otherwise, repair wall framing and fixings and replace sheets as for bracing elements</p>

Consult sheet manufacturer's data for bracing sheet fixing information and the bracing capacities (bracing units/metre) of each product type.



Helpful tip: Fibrous plaster walls, if damaged, will show irregular cracking along fixing lines rather than the 'straight line' cracking typical of paper-faced plaster linings.

When repairing masonry veneer walls, check for bracing panels (e.g. behind underlays) and re-fix as required.



OTHER CONSTRUCTION TYPES

Masonry walls

Repairs to damaged concrete block and brick masonry walls will depend on whether / how the walls are reinforced and the amount of grouting used (some block walls may be only partially filled and double skin brick masonry is usually unfilled).

Specific engineering advice is required for assessing damage to unreinforced brick or block masonry walls. Minor cracking in reinforced (two-way reinforced) concrete block walls, that are well attached to the surrounding structure, can usually be repaired by grout or epoxy injection and repointing without specific engineering design.

More extensive cracking in reinforced and unreinforced walls usually means repairs are not practical and replacement is probably the only option.

Refer to the MBIE Guidance for more about:

- Unreinforced brick masonry walls (Part A section 7.7)
- Concrete block masonry walls (section 7.8).

Light gauge steel framing

For light gauge steel wall and roof framing, damaged lining sheets should be removed and bent structural members replaced. Re-fix torn or detached rivet/screw connections, or replace framing assemblies.



Refer MBIE Guidance Part A, section 7.5

Pole frame structures

Pole frame houses generally rely on cross-bracing to stiffen pole structures.



Refer MBIE Guidance Part A, section 7.6 for more on where to check for damage.

CHIMNEYS AND FIREPLACES

Following the Canterbury earthquakes, masonry chimney flues and fire boxes should be inspected by a bricklayer or engineer and any repairs carried out BEFORE they are reused.

ALERT: MASONRY CHIMNEYS ARE OFTEN THE FIRST THINGS TO BE DAMAGED IN AN EARTHQUAKE.

The requirements for repairing chimneys and fireplaces apply to:

- Open fires
- Enclosed solid fuel burners
- Flued gas fires.

Most fireplaces have:

- Chimneys constructed of masonry, metal or a combination of both
- Fire boxes, made of either masonry or steel, and are either (1) enclosed (with timber framing or masonry surrounds) or (2) free-standing (generally steel fire boxes only).

 Refer MBIE Guidance Part A, section 7.1, and Appendix A3.

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NOTE: MBIE GUIDANCE APPENDIX A3 EXPLAINS HOW TO RECOGNISE CHIMNEY CONSTRUCTION TYPES BY THE NATURE OF ANY DAMAGE, ESPECIALLY CRACKING, SEEN ON THE OUTSIDE.

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Clean Air Requirements

ALERT: ENVIRONMENT CANTERBURY HAS RULES ABOUT THE TYPE AND USE OF FIRES FOR HOME HEATING. THESE COVER CHRISTCHURCH, KAIAPOI, RANGIORA, AND ASHBURTON. SEARCH "CHRISTCHURCH HOME HEATING RULES" AND GO TO THE ECAN WEBSITE WWW.ECAN.GOV.TZ FOR MAPS AND ADVICE.

ALERT: IF REPAIRS OR REPLACEMENTS ARE REQUIRED TO FIRE BOXES, ESPECIALLY FOR OLDER FIREPLACES, THE ENERGY EFFICIENCY AND CONSERVATION AUTHORITY (EECA) RECOMMENDS ENERGY EFFICIENT WOOD, PELLET OR GAS BURNERS ARE INSTALLED, OR HEAT PUMPS CONSIDERED. SEE WWW.EECA.GOV.TZ



Inspecting flues for damage

Parts of the wall linings around flues and fireboxes may need to be removed for proper inspection – especially if flues and fireboxes are constructed from masonry and appear unstable.

If the flue or firebox is out of alignment or ‘tilting’ from vertical, it is a sign of significant damage and should be replaced.

MBIE Guidance Appendix A3, Figures A3.3, A3.4, and A3.5 give suggested options for either:

- Repairing brick chimneys, or
- Inserting lightweight stainless steel flues within brick chimneys (for use with solid fuel burners).

FIGURE: 1

CLEARANCES FOR MASONRY FIREPLACES

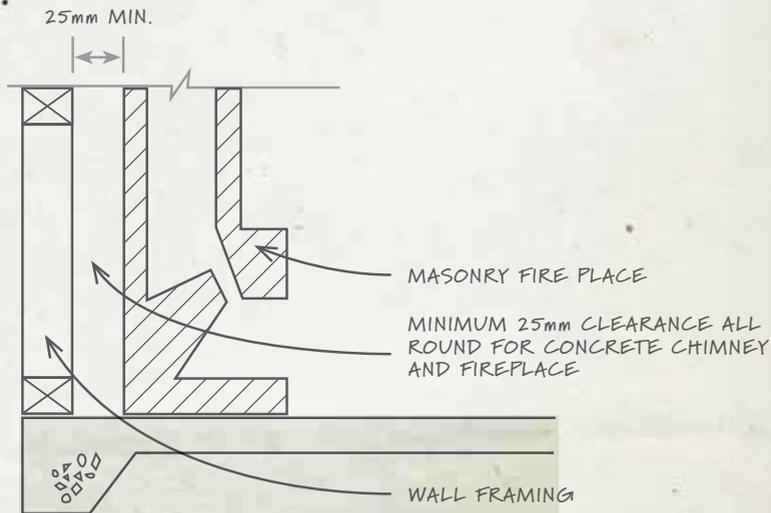
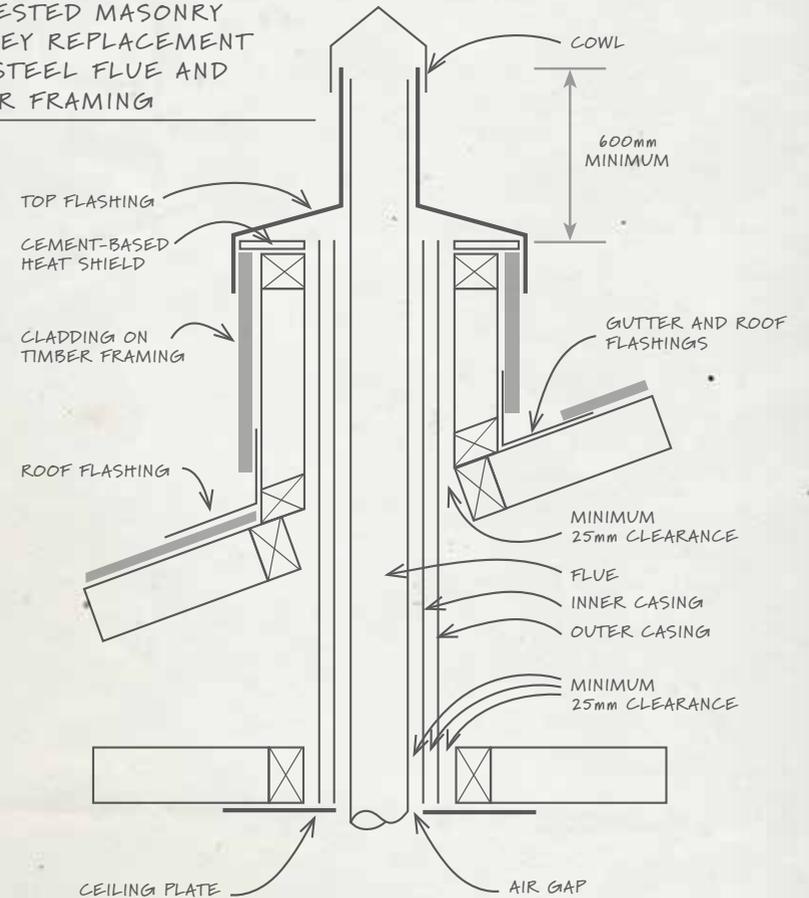


Figure 2 shows the suggested replacement of an internal masonry chimney with a steel flue and framing assembly. This can be used where the appearance of a ‘chimney stack’ above the roof is preferred.

FIGURE: 2

STEEL FLUE DETAIL

SUGGESTED MASONRY CHIMNEY REPLACEMENT WITH STEEL FLUE AND TIMBER FRAMING



Chimney and fireplace repairs

Damage	Repair
Damage to: <ul style="list-style-type: none"> • Roof flashings around the flue • Cowls • External 'anti-sway' ties 	Replace damaged units and fixings, including any associated damage to flues or surrounding roofing.
Dislodged chimney pots	Replace with lightweight metal cowls.
Blocked clearways between flue and surrounding timber or other combustible material	<p>Important: Maintain a minimum of 25 mm clear space between a masonry flue or fire box and combustible materials such as timber framing (See Figure 1).</p> <p>For clear spaces around metal flues or fireboxes, consult manufacturer's installation recommendations or see Acceptable Solution C/AS1.</p>
Broken or missing structural ties supporting masonry flues or outer casing to frames	Replace broken ties and tie fixings. For masonry flue repair options, see Figure 1 <i>Clearances for masonry fireplaces</i> , Figure 2 <i>Steel flue detail</i> , and MBIE Guidance Figure A3.3-A3.5.
Cracked plaster around masonry flues or missing mortar from flue joints	If the inspection report indicates damage, consider replacement of masonry flue with a stainless steel flue.
Dislodged masonry units. Cracking to flue, especially where flue joins the breastwork	Recommend replacement of masonry flue with a stainless steel flue.

RETAINING WALLS

Retaining walls on hillside properties involve a range of problems and can be difficult to repair. If a retaining wall has been damaged and the surrounding ground and landscape appears unstable, it's important that the site is assessed by a professional engineer as being safe to work on before any repair work goes ahead.

Specialist engineering advice

In most cases, specialist engineering advice will be required before undertaking any substantial repairs or replacements to retaining walls. Damage to retaining walls caused by the earthquakes can be difficult to assess and may be invisible if below ground or behind the wall.

Obvious signs of damage include:

- Loss of ground support or undermining
- Forward tilting or 'rotation'
- Broken wall units
- Dislodged wall units.



For a detailed description of possible damage and repair options for retaining walls, refer MBIE Guidance Part A, section 6.2 and Table 6.1.

Walls less than 1.5 metres high

Walls retaining less than 1.5 metres* of ground may not require a building consent (refer to *Work that does not require a building consent*).

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 * **NOTE:** IN RURAL AREAS, THIS LIMIT IS EXTENDED TO 3 METRES WHERE WALLS ARE DESIGNED BY CPENGI QUALIFIED ENGINEERS.

ALERT: REMEMBER THAT EVEN WHEN A BUILDING CONSENT IS NOT REQUIRED, ALL BUILDING WORK MUST STILL COMPLY WITH THE BUILDING ACT AND THE BUILDING CODE.

Before doing repairs:

- Check the site's Project Information Memorandum (PIM) for records of underground services
- Make sure there are no indications of ground slip or ground movement in the area of the wall (see MBIE Guidance, section 6.1)
- Test that there is 'good ground' beneath the footing (see MBIE Guidance section 3.4 for ways to determine 'good ground').

Surcharge loadings

Before repairing or rebuilding a retaining wall, get specific engineering advice if the wall has surcharge loadings (see Figures 3A, 3B, and 3C) such as:

- Retained ground higher than the wall, or
- Roadways, buildings, other retaining walls, swimming pools or other structures above the wall.

FIGURE: 3A

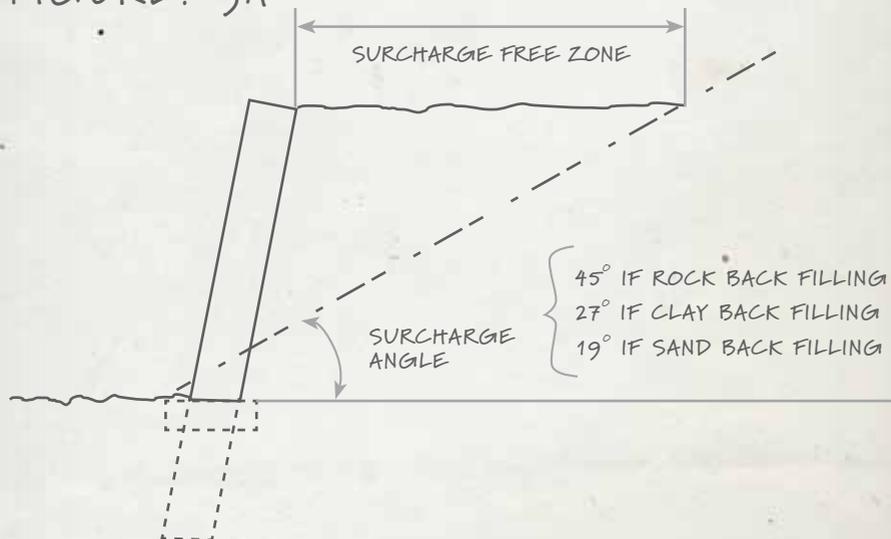


FIGURE: 3B

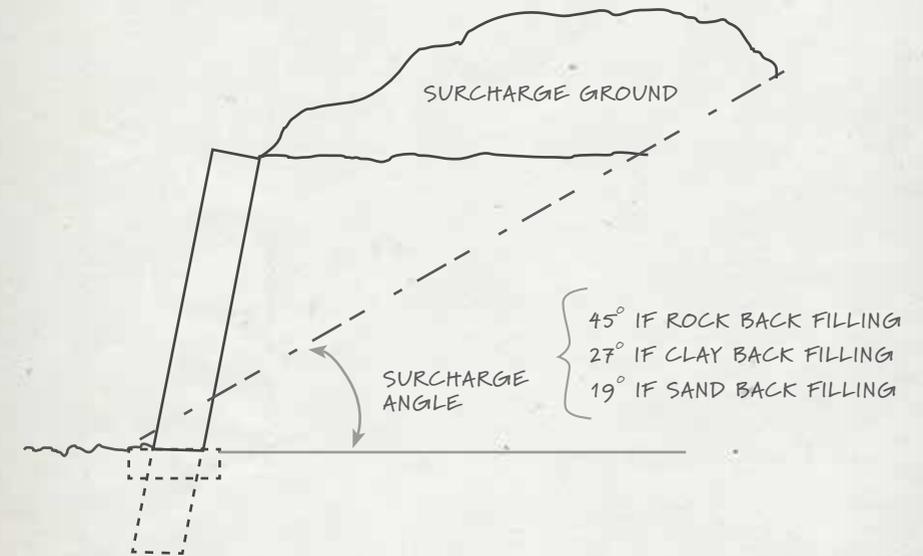
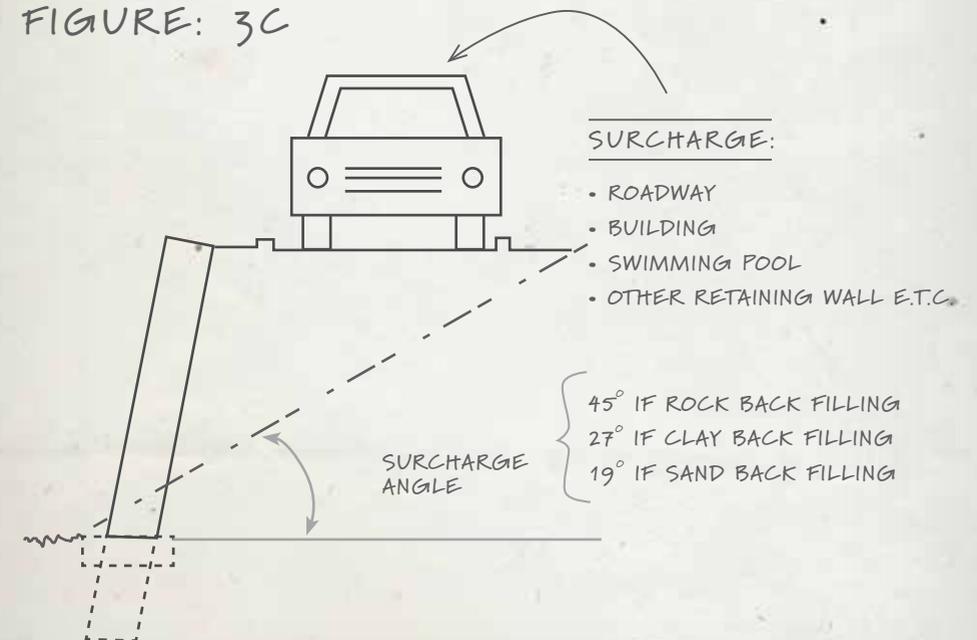


FIGURE: 3C



A SERIOUS FALL FROM HEIGHT COULD COST YOU YOUR LIFE.

YOU CAN'T PUT A PRICE ON THAT.

Dangerous activities such as walking the top plate are not 'part of the job'. It recently cost an apprentice his legs, and changed his life forever.

If current construction industry injury rates continue during the Canterbury rebuild, we estimate one to two people will die each year on Canterbury work sites.

If you run a construction business, using height safety equipment makes good financial sense.

Some businesses report a lift in productivity and a reduction in build time through the use of height safety equipment.

"WALKING AROUND SCAFFOLDING IS QUICKER FOR THE GUYS, RATHER THAN HAVING TO WALK AROUND THE TOP PLATE AND STEPPING OVER TRUSSES EVERY FIVE SECONDS TO GET TO THE OTHER SIDE."

STEVE TITMUSS, HAWKINS PROJECT MANAGER

PLUS if something goes wrong and a worker has an accident:

- You lose productivity
- You risk your reputation, and
- You risk a serious fine.

How to make your site safer

A safe site starts with safe attitudes to work. At the end of the day, everyone has the right to return home safely from work.

Three ways you can make a difference are:

- 1** Look out for yourself, your workers, and your mates. If you see unsafe working conditions, speak up.
- 2** Check out the site before work starts. Think about the tasks you might be doing – identify and address any hazards.
- 3** Make sure you and your workers have the right training to complete the job.



Helpful tip:

Visit www.dol.govt.nz/prevent-falls to find out more about:

- Preventing falls from height and keeping your site safe
- AND
- Identifying site hazards.



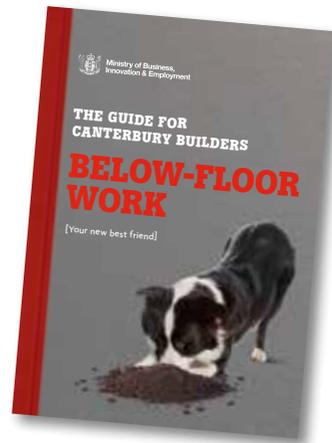
OTHER USEFUL INFORMATION

MBIE's guidance, *Repairing and rebuilding houses affected by the Canterbury earthquakes*, contains detailed information about the topics discussed in this booklet and also repair and rebuilding work to the house's foundations. See www.dbh.govt.nz/guidance-on-repairs-after-earthquake

Other useful information in the MBIE Guidance includes:

- "Insurance and Regulatory requirements"
– MBIE Guidance section 8
- "Assessment and repair options for chimneys"
– MBIE Guidance Appendix A3
- "Basis for confirming compliance with the Building Code" – MBIE Guidance Appendix C1

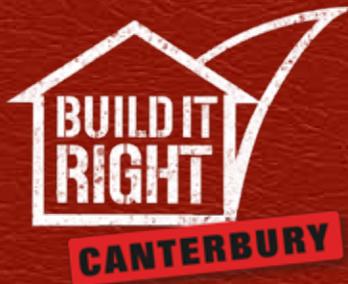
The companion to this booklet, *Below-Floor Work*, is also based on the MBIE Guidance.



Other relevant publications and links include:

- "Disaster Recovery – Asbestos Management"
– www.dol.govt.nz/quake/asbestos-management.pdf
- "Canterbury Home heating rules"
– www.ecan.govt.nz/advice/your-home/home-heating/pages/Default.aspx
- "Repair approaches" – BRANZ Bulletin 548 – www.branz.co.nz
- "Guidance on garage classification" – www.dbh.govt.nz/codewords-35-1
- "Updates to guidance on foundation repairs in TC3 zone"
– www.dbh.govt.nz/guidance-on-repairs-after-earthquakes
- Building consent exemptions –
www.ccc.govt.nz/homeliving/buildingplanning/buildingconsents/exemption.aspx

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