



Building consent authority update

August 2011



CONTENTS

Building Controls Update No 116: Changes to Structure and External Moisture Building Code Documents.....	1
Revised Timber-Framed Buildings Standard - NZS 3604:2011 Available Now.....	2
Estimated Building Costs Latest Figures as at July 2011.....	2
Recent Queries from International Accreditation New Zealand (IANZ).....	4
Update on the National Competency Assessment System for BCAs.....	5
Code Compliance Certificate Application.....	7
Waivers and Modifications Form.....	7
Upcoming Guidance on Section 112: Alterations to Existing Buildings.....	8
New Guides for Fixing Leaky Homes.....	8
Restricted Building Work.....	8
Nationally Consistent Building Consent Delivery System.....	8
Simpler System for Structural Timber Framing.....	8
Earthquake Prone Buildings.....	9
Temporary Housing in Christchurch.....	9
Technical Investigation into Christchurch Building Performance.....	10
Canterbury Seismic Mix.....	10
Subscribe to BCA Update.....	12

BUILDING CONTROLS UPDATE NO 116: CHANGES TO STRUCTURE AND EXTERNAL MOISTURE BUILDING CODE DOCUMENTS

On 1 August, 2011, the Department introduced changes to key Building Code documents dealing with Structure (Code clause B1) and External Moisture (Code clause E2). The changes bring the documents in line with the latest Standards, reflect the latest studies and research, respond to changes in building practices and broaden the range of solutions available.

Important documents that the majority of designers and builders use on a day-to-day basis, like NZS 3604 and Acceptable Solution E2/AS1, are affected by the changes, which address foundations, structure and the building envelope.

Other documents relate to steel-framed housing, seismic performance of engineering systems in buildings, barriers, and the weathertightness of concrete and concrete masonry construction.

If you work with any of these materials or building elements, you need to be informed about these changes. Please read the questions and answers section of our website which can be found at www.dbh.govt.nz/changes-to-b1-e2-faq.

During the transition period from 1 August, 2011 until 31 January, 2012, there will be two Acceptable Solutions or Verification Methods - the old document and the revised one. From 1 February, 2012 only the new versions will be treated as acceptable solutions.

The Department delivered training on the changes during July.

Acceptable Solutions and Verification Methods can be downloaded at www.dbh.govt.nz/compliance-documents. The barrier guidance document will also be available shortly on the Department's website (www.dbh.govt.nz).

E2 and B1 Effective Dates

E2/AS1 Am5 (new)	Aug, 2011 and ongoing →
E2/AS1 Am4	until 31 Jan, 2012
E2/AS3 (new)	Aug, 2011 and ongoing →
E2/VM1 (new)	Aug, 2011 and ongoing →
E2/VM1 (current certificates)	until June, 2013
B1/AS1 (NZS 3604:2011)	Aug, 2011 and ongoing →
B1/AS1 (NZS 3604:1999)	until 31 Jan, 2012
B1/AS2 (Barriers)	until 31 Jan, 2012
Barrier Guide (via DBH website)	Guidance, based on NZS 1170 loadings
B1/VM1 (NZS 4219:2009)	Aug, 2011 and ongoing →
B1/VM1 (Nash Standard, design)	Aug, 2011 and ongoing →

REVISED TIMBER-FRAMED BUILDINGS STANDARD - NZS 3604:2011 AVAILABLE NOW

Standards New Zealand has published NZS 3604:2011 Timber-framed buildings. NZS 3604:2011 reflects the current and future needs of industry, changes in materials and industry practice, and the changes in related Standards since the last revision in 1999, including those Standards that set requirements for loadings.

“Building Standards have a proud history in New Zealand and they have recently been challenged by nature and confirmed.” says Derek Baxter, NZS 3604 leadership group Chair and Chief Executive Officer, Certified Builders’ Association.

“Throughout the NZS 3604 review there were parallel work streams occurring elsewhere, including the review of the New Zealand Building Code, changes to E2/AS1, and matters arising from the Canterbury earthquake. Outputs from these work streams needed to be considered and kept in context, and aligned to the revision of NZS 3604. For the first time, Standards New Zealand used a leadership group to help keep us in touch with all of the parallel work stream activity and to allow the work groups to do their specialist work.” Baxter said.

A technical committee was also formed to focus on the technical review and to update content in NZS 3604. The technical committee included 22 people representing organisations from across the building industry. Five industry-specific work groups reviewed specific sections of NZS 3604 and developed the revised Standard.

“While the project was described as a ‘limited technical review’, the word ‘limited’ describes the breadth rather than the depth of issues addressed.” says Don Bunting, Chair of the Technical Committee. “Aligning NZS 3604 with AS/NZS 1170 Structural design actions, reflecting current industry knowledge on soil bearing capacity, bracing, durability, and the use of new building techniques, were all significant tasks.”

Since the Canterbury earthquake last year there has been much discussion on ground prone to liquefaction and lateral spread. The Department of Building and Housing (the Department) and Standards New Zealand have agreed to consider amendments to NZS 3604:2011 or other documents when information and evidence about liquefaction and lateral spread is clear.

For more information about the changes to NZS 3604 visit www.standards.co.nz and click on the NZS 3604:2011 banner in the middle of the page.

ESTIMATED BUILDING COSTS LATEST FIGURES AS AT JULY 2011

The latest estimated building costs by building type can be found at www.dbh.govt.nz/bofficials-estimated-building-costs. The costs include all necessary internal and external finishes to achieve compliance with the Building Code, all services and provision of standard appliances, and site works. To work out an estimated value, use our quick calculator. www.dbh.govt.nz/quick-calculator.

The costs for houses are provided for one-off speculative houses. These costs do not reflect the economies that may be gained by builders of group houses, or reflect the additional costs normally associated with architecturally designed houses. To differentiate, group houses have been assessed as being, on average, 21 percent cheaper than speculative houses, while architecturally designed houses are assessed as being 20 percent more expensive.

The cost of the speculative house can be used as a base cost on which to establish the cost of group and architecturally designed homes. For example, cost per square metre of small group houses in the Auckland region at July 2011:

$$\begin{aligned}
 &= \text{Auckland base cost less 21\%} \\
 &= \$1,787 - [\$1,787 \times 21\%] \\
 &= \$1,787 - \$375 = \$1,412/m^2
 \end{aligned}$$

Disclaimer: The unit construction costs are built up from current commercial prices of materials and labour along with current allowances for contractors' overheads and margins. Pricing is based on a model building for the region and consequently allowances will need to be made where recognition is deemed necessary for particular and specific

conditions. The rates per square metre of gross floor area for each building type include GST (at the rate of 15%). Unit construction costs are provided as a guide to territorial authorities in assessing building consent fees. They are not intended as a definitive cost for actual buildings and are not to be used for such a purpose.

BUILDING DESCRIPTIONS

Below are descriptions of the building types the cost estimates on our website are based on. Floorplans for these types can also be found at www.dbh.govt.nz/bofficials-estimated-building-costs.

Small house: 145 m²

Single-storey house on a flat site including internal double garage, three bedrooms, open-plan kitchen, dining and lounge, bathroom, separate toilet, en-suite, and separate laundry. Constructed of reinforced concrete slab, laser frame walls and trusses, brick veneer external cladding, aluminium external joinery, pre-finished steel roof, and plasterboard linings. Carpet is excluded.

Large house: 202 m²

Single-storey house on a flat site including internal double garage, four bedrooms, open-plan kitchen and family room, open-plan dining and lounge, bathroom, separate toilet, ensuite, separate dressing room, separate laundry. Constructed of reinforced concrete slab, laser frame walls and trusses, brick veneer external cladding, aluminium external joinery, pre-finished steel roof, plasterboard linings, and intruder alarm in addition to standard services. Carpet is excluded.

Retirement home: 394 m²

Single-storey building on a flat site, including 12 residential bedrooms with washbasins, separate sanitary facilities, dining and lounge, commercial kitchen and laundry, staff accommodation, and office. Constructed of reinforced concrete slab, timber-framed walls and prefabricated timber-trussed roof, external cladding of fibrecement with textured coating, aluminium external joinery, pre-finished steel roof, and plasterboard linings. Siteworks and carpet are excluded.

Note: The estimated building cost for the retirement home specified includes H1.2 treatment of external wall framings in line with Acceptable Solution B2/AS1 (Durability). It is the only building in this article affected by this change as it is clad with fibre cement sheet and falls within the category of buildings requiring H1.2 timber to its exterior wall framing. (The two remaining houses are of simple design, clad with brick veneer, where

no treatment is required. Both commercial buildings have external walls of precast concrete).

Light commercial or Industrial Building: 414 m²

Single-storey warehouse with mezzanine on a flat site accommodating warehouse, office accommodation, reception and display area, staff lunchroom, kitchen, and toilet facilities. Constructed of reinforced slab, reinforced concrete columns, tilt-up precast concrete external walls, powder-coated external aluminium joinery, roller shutter doors, Colorsteel roof, timber-framed internal partitions with painted plasterboard linings. Siteworks, security and carpet are excluded.

Commercial (bulk retail): 896 m²

Single-storey building on a flat site with two retail units: one comprising retail area, two offices, kitchen, and toilet facilities; the other containing retail and toilet facilities. Constructed of reinforced slab, driven timber piles, steel columns, tilt-up precast concrete external walls, powder-coated external aluminium joinery, automatic sliding doors, Colorsteel roof, timber-framed internal partitions with painted plasterboard linings, suspended ceiling to all but warehouse areas, and steel-framed fire wall between retail units. The unit construction costs include all necessary internal and external finishes to achieve compliance with the New Zealand Building Code, all services, and provision of standard appliances. Siteworks, security and carpet are excluded.

RECENT QUERIES FROM INTERNATIONAL ACCREDITATION NEW ZEALAND (IANZ)

FREQUENCY OF COMPETENCY ASSESSMENT

Q: Does the Competence Assessment system require BCAs to go through the documented procedure every year or was it the intention to use the system only to establish competence and then use a reduced system to review competence on subsequent years where the person hasn't changed?

A: The intention is that there is an annual review of competence. BCAs should review training completed during the year and reconfirm current competence. Because the levels are incremental where there is a step change in competency, it may only be necessary to review evidence against the additional requirements as the base level requirements should already have been assessed. For residential 1 and residential 2 the performance indicators for Building (Accreditation of Building Consent Authorities) Regulations 2006 10(3) (a-c) are the same for both levels, so no new assessment is needed (apart from a currency check e.g. changes to the Building Act). There are some incremental steps for processing and inspections relating to the difference between single storey and two storey construction. It is expected that the assessment would focus on those incremental differences.

BUILDING CODE NON-COMPLIANCE

Q: If a Building Consent has been issued by a BCA that contains details that if constructed will not comply with the code, what is expected of the inspector (can he only inspect against the issued building consent?) and of the BCA (can they issue a CCC knowing that the work does not comply with the code?).

A: An inspector should use his or her own skills and knowledge when carrying out inspections and always be alert for any mistakes in a building consent. If an inspector thinks that some aspect of a building consent is not correct the inspector should follow the matter up and confirm whether a mistake has been made. If an inspector confirms that there is a mistake in a building consent, then an amendment to the consent should be sought as soon as possible to correct the mistake.

It would be completely inappropriate for a BCA to issue a CCC knowing that the building work does not comply with the building code. A BCA would not be acting in good faith if it issued a CCC knowing there was a mistake in the building consent, and that as a result, the building work did not comply with the building code.

SPECIFIED SYSTEMS

Q: If a building has one or more air conditioning units installed e.g. window mounted units (supplying outdoor air to occupants of one or more spaces that cannot be provided with adequate outdoor air from natural ventilation), each of which is to service a discrete space, does the Compliance Schedule need to incorporate Specified System 9 - Mechanical Ventilation – or would this only apply to ducted air conditioning?

A: The Building (Specified Systems, Change the Use and Earthquake-Prone Buildings) Regulations 2005 lists 'Mechanical ventilation or air conditioning systems' as a system which must be included on a building's compliance schedule. A strict interpretation of this would suggest any/all mechanical ventilation air conditioning systems need to be included on a building's compliance schedule. However, the Department's interpretation of this requirement can be seen on page 38 of the Compliance Schedule Handbook. The scope on page 38 shows four key areas that would separately trigger the need for the system to be included on the building's compliance schedule. These are the requirement to be installed by the Building Code, the fact that air from the outside is introduced, the function of the system as a control or collector of potentially harmful material, and finally the system relates to fire or smoke control. Looking at Part A.2.1 of the scope and the examples on page 38 of the Handbook, it would appear your example of window mounted units introducing fresh air would need to be included on the compliance schedule. While considering whether the system is ducted or not is important (see A.4.1), it is not the only consideration when it comes to determining if the system should be included on the compliance schedule.

Q: Section 92 of the Building Act states that "an owner must apply to a BCA for a CCC after all building work to be carried out under a building consent, granted to that owner, is completed." Form 6 allows for an owner or agent to apply for a CCC. Could you please clarify that an agent may legally apply for a CCC? (This could be an issue if the builder (agent) thinks the work is complete but the owner doesn't and the builder relies on the issue of CCC as a trigger to require payment).

A: Form 6 does provide for an agent to apply for a CCC with the authority of the owner. If the person applying for the CCC did not have the owners permission it would be an offence under Section 369 of the Building Act. Incidentally forms 2,6,8,11,12 and 15 all provide for an applicant to be the owners agent also.

UPDATE ON THE NATIONAL COMPETENCY ASSESSMENT SYSTEM FOR BCAS

WHAT IS THE NATIONAL COMPETENCY ASSESSMENT SYSTEM?

The National Competency Assessment System (NCAS) is a framework to assist BCAs to assess the competency of their technical building control staff. The NCAS uses a national set of performance indicators to define a building official's competency. Developed by the Department, with significant input from the building control sector, the NCAS is set to improve consistency, create efficiency and reduce duplication of effort amongst BCAs.

The framework includes six competency levels (three residential and three commercial) that are modular in design and based on the risk and complexity of typical types of building work encountered by BCAs across the country.

ASSESSOR TRAINING

The success of the NCAS hinges upon how well BCA staff (or their contractors) assess competency. Consequently, alongside the technical detail, the Department developed a training course for BCA assessors in the methodology of competency assessment.

The roll-out of training across the country is now complete with an excess of 100 senior building officials completing the two day training course.

IMPLEMENTING AND USING THE SYSTEM

In order to satisfy BCA accreditation requirements that relate to establishing and assessing technical staff for competence (Regulation 10 of the Building (Accreditation of Building Consent Authorities) Regulations 2006), many Councils are now actively using the NCAS.

The third round of IANZ accreditation assessments is now well underway and those BCAs who have adopted the NCAS have been asked to validate the decision-making surrounding the transition from their old competency assessment system to the new NCAS.

Feedback from BCAs who are using the NCAS has generally been positive and all those using the system have agreed that the guidance is very useful although, greater detail could have been provided about transitioning from the old to the new system. Information covering the four step transition process is currently captured on page 21 of the NCAS manual which can be found at: www.dbh.govt.nz/UserFiles/File/Building/Building%20law%20and%20compliance/NBCA-Competency-Assessment-System.pdf.

FEEDBACK FROM SOME BCAS IMPLEMENTING AND USING THE NCAS

Auckland Council is amongst those BCAs using the NCAS and, as part of their adoption process, has elected to reassess all of their technical building control staff. Amalgamating seven BCAs into one means Auckland Council is now responsible for the on-going assessment of some 500 building control staff who, historically, had been assessed under several quite different competency assessment systems.

Auckland Council reported building control staff are now familiar with the system and are actively using the six competency levels. Their recent accreditation assessment had not highlighted any significant issues around Regulation 10 of the Building (Accreditation of Building Consent Authorities) Regulations 2006.

Hastings District Council (HDC) is another BCA that is well on it's way to implementing the NCAS although in contrast to Auckland Council, HDC has 22 technical staff undertaking a building control function. HDC sought Department guidance at various stages during their transition process which has helped them to arrive at a straightforward and uncomplicated transition pathway to NCAS.

Both Auckland Council and HDC have chosen to implement a moderation process as part of their competency assessment system. This has been undertaken to try and achieve consistency in decision-making and fair and accurate outcomes for their staff. HDC were happy to provide some of their transition data for the NCAS manual so that other BCAs might benefit from their experiences.

The illustration on page 6 provides information about HDC's mapping and transition process.

The Department would like to thank both Auckland Council and HDC for their help and cooperation in developing the NCAS manual.

WHERE TO FROM HERE?

Further information on the national competency assessment system (including copies of tools and resources) can be found at: www.dbh.govt.nz/bca-competency-assessment-system-update.

The Department will update each of the competency levels in coming months so they are current and reflect recent and upcoming changes to the compliance documents and other building control legislation. Work is also underway on moderation guidance for BCAs using the NCAS.

HDCs TRANSITION MAP WHICH ILLUSTRATES THE MOVE FROM THEIR OLD CATEGORISATION SYSTEM TO THE NCAS

Comparison Mapping of the NCA System from the Current HDC Building Categories.												Category Descriptions and Mapping Commentary				
Building Project Type	NCA BCA Categories level	Current HDC building Categories										NCA BCA Category Description	HDC Category Description.	Commentary for mapping from HDC to NCA system		
		1.i	1.ii	1.iii	2.i	2.ii	3.i	3.ii	3.iii	3.iv						
Residential	Residential 1	1.i	1.ii									<p>Res 1: Residential outbuildings and ancillary buildings as defined by the building regulations 1992. Detached dwellings (SH) designed to a common standard (eg NZS 3604, NZS 4229) that are single story and have an E2/AS1 risk matrix score less than or equal to 6</p>	<p>Category 1.i: Ancillary buildings, out buildings, Farm buildings, conservatories, retaining walls (not retaining surcharge). Fences >2m and any alterations relating to these. Swimming pools and solid fuel heating appliances.</p>	<p>Category 1.i currently deals solely with non habitable Ancillary and Outbuildings as described in the classified uses of Clause A1 of the building regulations and maps directly into the Residential 1 category of the NCA system.</p>		
	Residential 2			1.iii								<p>Res 2: Detached dwellings (SH) designed to a common standard (eg NZS 3604, NZS 4229) that are less than or equal to two stories and have an E2/AS1 risk matrix score less than or equal to 12.</p>	<p>Category 1.ii: Simple single floor residential detached dwelling with 600mm soffits, single cladding systems and any alterations to these.</p> <p>Category 1.iii: Simple residential detached dwellings up to 2 floors or part of floors with soffits 450mm - 600mm, single cladding systems and any alterations to these. Low - Medium weather tightness risk.</p>	<p>Category 1.ii fits neatly within the Res 1 building category due to its description of a low risk single story building that matches the NCA description.</p> <p>Category 1.iii of the current HDC building categories spans both Res 1 and Res 2 of the NCA system due to the allowance for double story dwellings and a medium weather tightness risk within the category.</p>		
	Residential 3					2.i							<p>Res 3: Detached dwellings (SH) or other dwellings (SR) that are less than or equal to three stories but limited to vertical plane fire separation and direct egress to the outside. E2/AS1 risk matrix score of 13 - 20.</p>	<p>Category 2.i: Complex residential dwellings up to 3 floors or multi unit apartments up to 2 floors with monolithic or multi cladding systems. Enclosed decks soffits less than 600mm, higher weather tightness risk and any alterations to these. Dwellings of complex or unusual design and not detailed in Cat 2. Small alterations to a commercial building that does not alter fire safety.</p>	<p>Category 2.i spans two of the NCA building categories due to its description of building works varying from complex high risk residential dwellings, multi unit dwellings with vert and Hor. fire separation and commercial alterations.</p>	
Commercial	Commercial 1				2.i	2.ii					3.i		<p>Com 1: Commercial, industrial and communal non-residential buildings and there associated outbuildings and ancillary buildings equal to or less than two stories and an occupant load equal to or less than 100 people or SR or SA residential buildings up to two stories with horizontal fire separation.</p>	<p>Category 2.ii: Light industrial or small commercial buildings up to one floor above ground and accommodating up to 100 people (CS or WL) and any alterations to these.</p>	<p>Category 2.ii fits neatly within the proposed Com 1 building category with occupant loads, purpose groups and floor levels falling within its described limitations.</p>	
	Commercial 2											3.ii	3.iii	<p>Com 2: Commercial, industrial and communal residential and communal non-residential buildings equal to or less than four story and an occupant load of equal to or less than 500 people or SC or SD that are single story.</p>	<p>Category 3.ii: Buildings containing sleeping purpose groups excluding SH and SR and crowd assembly buildings up to 3 floors above ground or accommodate 501-5000 people</p>	<p>Category 3.ii buildings appear to map to the Commercial 2 category within the NCA system as they are limited to 3 stories although the occupant load is greater than that within Com 2 they are not deemed to match the added risks associated with Com 3 buildings.</p>
	Commercial 3												3.iv	<p>Com 3: All uses of buildings that are over four stories high, or contain over 500 occupants or SC or SD greater than single story.</p>	<p>Category 3.iii: Large multi story buildings in excess of three floors above the ground or accommodate <5000 people or more or have a gross floor area less than 20 000m2 that are of a simple design.</p> <p>Category 3.iv: Large multi story building in excess of 4 floors above ground or accommodates >5000 people or more or have a gross floor area more than 20 000m2 that are of a complex or unusual design. Structures that have special functions or whose failure poses catastrophic risk to a large area, or a large number of people.</p>	<p>Category 3.iii buildings fit within the Com 2 categories as there are still limitations set out within there description and would not fit the intended risk associations allocated to a Com 3 building.</p> <p>Category 3.iv fits the Com 3 model as there are no limitations associated with the description and it appears this category is designed to assess the same risk associated factors.</p>

CODE COMPLIANCE CERTIFICATE APPLICATION

BACKGROUND

Building consent authorities (BCAs) often receive requests for a final inspection from the owner following completion of the building work but seldom do they also receive an application for a code compliance certificate (CCC). This is also confirmed by International Accreditation New Zealand (IANZ), which, during recent accreditation assessments, have come across a number of BCAs that do not require applications at all. This practice is not in accordance with the requirements under the Building Act 2004 (the Act).

The purpose of this article is to provide guidance to BCAs on what the Act requirements are for owners and BCAs with regard to CCC applications. In addition, a number of recommended processes are provided for BCAs.

LEGISLATIVE REQUIREMENTS

Section 92 of the Act requires the owner to apply for a CCC as soon as practicable after all the work set out in the approved building consent has been completed. This application must be in the prescribed form using Form 6 of the Building (Forms) Regulations 2004, which the owner must complete and submit to the BCA.

If no application is made, the BCA must decide whether to issue a CCC within two years of granting building consent. However, the owner and the BCA can negotiate an extension to this period.

If an application for a CCC is made, the BCA has 20 working days to decide whether to issue the CCC.

Following are a number of recommended processes for BCAs to consider.

Advisory note. Adding an advisory note to the approved building consent reminding the owner of their responsibility under the Act to apply for a CCC following completion of the building work.

Reminder letters. Sending a reminder letter to the owner before the expiry of the two-year timeframe provided for under section 93 of the Act, advising the owner of their Act requirements to apply for a CCC and that the Council will proceed to make a decision in the absence of such application.

Site inspection. When carrying out the final inspection, the inspector could hand out a blank CCC application form to the owner or whoever is on site, which the owner must complete.

WAIVERS AND MODIFICATIONS FORM

The Department has recently completed developing a standard waivers and modifications form. This is to enable local councils to properly notify waivers and modifications to the Chief Executive, as required under section 68 of the Building Act 2004 (the Act). The form was developed as a result of a number of enquiries that the Department has recently received from councils on waivers and modifications, in particular, on how to notify these to the Chief Executive. For an electronic copy of the form, please see: www.dbh.govt.nz/building-code-waiver.

It would also appear that a number of councils, when considering Code Compliance Certificate (CCC) applications for old building consents, seek agreement from the owner to modify, or in some cases, even waive Building Code Clause B2 (Durability). The Department does not consider this process appropriate. Instead, councils should make an amendment to the original building consent modifying Clause B2.3.1. This is provided for under section 67 of the Act.

To help councils review their processes, following is a link to a Codewords article titled 'Modification of the durability periods described in Clause B2.3.1' that the Department published in August 2009 providing guidance on this issue: www.dbh.govt.nz/codewords-39-9. While the article focuses on a situation where the Department has issued a determination on the matter, we consider that it provides some good guidance on the process to follow when considering a modification to the durability periods. The recommendation is to amend the original building consent.

The Department also recommends that any waivers or modifications granted under section 67 should always be recorded on the property file and any land information memorandum issued for the property.

In addition, depending on how old the building work is another issue for councils to consider is whether there are other aspects of the work that might need to be reassessed before issuing the CCC such as:

- the complexity of the design
- the materials used
- inspections already carried out
- any outstanding matters, for example energy work certificates that need to be provided, installation certificates that may be required, or any development contributions that need to be paid.

UPCOMING GUIDANCE ON SECTION 112: ALTERATIONS TO EXISTING BUILDINGS

The Department is developing guidance on the provisions under section 112 Alterations to Existing Buildings of the Building Act 2004 (the Act). The purpose of this document is to provide guidance for Building Consent Authorities and Territorial Authorities on how to correctly apply section 112 and what to consider when approving applications for alterations to existing buildings. In addition, this document also aims to provide guidance to architects, designers and consent applicants on their roles and responsibilities under the Act and what to consider when presenting a case for upgrading means of escape from fire, and access and facilities for persons with disabilities.

It is anticipated this guidance will be ready in the next 3 months.

NEW GUIDES FOR FIXING LEAKY HOMES

Two new, practical guides have been published to help assessors and designers diagnose and repair leaky homes.



Weather-tightness: Guide to the Diagnosis of Leaky Buildings and Weather-tightness: Guide to Remediation Design, provide high-level processes and advice to ensure remediation of leaky homes is efficient and cost-effective. The guides were developed by the Department of Building and Housing and BRANZ.

View the guidance documents at www.dbh.govt.nz/weather-tightness-guides.

RESTRICTED BUILDING WORK

Draft regulations on restricted building work are currently being developed for approval by the Government. Following approval, the Department intends to develop guidance on how to interpret the regulations. In addition, training will be provided for BCAs, designers, and builders.

NATIONALLY CONSISTENT BUILDING CONSENT DELIVERY SYSTEM

As part of the Building Act review, the Department is investigating how best to move to a nationally consistent and efficient consent delivery system. An important part of that investigation is the role that an online system can play in streamlining the consenting process.

It is looking to work with local government and the wider sector on an approach that meets everyone's needs but it's critical that we see improvements in this area given the importance of the building and construction sector to the economic and social welfare of New Zealand.

The sector employs 8 per cent of the workforce and contributes 4.2 per cent of GDP. The building sector is also an important enabler of wider economic activity.

However, it is among the lowest performing sectors in New Zealand in improving productivity and lags behind its international counterparts in Australia, the United Kingdom and France, and the OECD as a whole.

Any system must support improved productivity and that is what the changes to the consenting system and to the Building Act as a whole are about.

New Zealand is operating its consenting system through 69 local Building Consent Authorities and we need to consider whether that is the most efficient way to run a nationally consistent and streamlined consent system. Especially when taking into account that, in 2010, 75% of commercial consents were processed by the five largest regions and only half of BCAS issued more than two consents per day.

SIMPLER SYSTEM FOR STRUCTURAL TIMBER FRAMING



A simpler system for structural timber framing which protects timber against decay, and is time and cost effective, came into effect on 4 April. This replaces the previous system, which could only be used to 30 June 2011, allowing a transition period for industry.

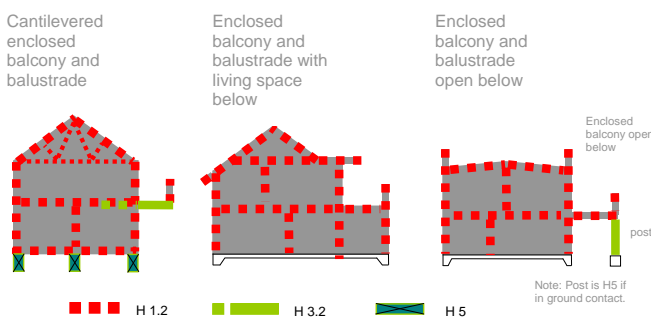
The key change is that there will be a single class of timber treatment, H1.2, for enclosed radiata pine and Douglas fir framing. Currently there are as many as four different classes of timber, including untreated timber, which can be used to frame a building.

The changes are contained in Acceptable Solution B2/AS1, which sets out one way of complying with the durability clause of the Building Code. They follow years of work with the sector and a

consultation process which resulted in almost 240 submissions, with strong support for the proposed changes.

Acceptable Solution B2/AS1 was introduced in 2004 and both building practices and knowledge of timber treatment have changed and improved since then. The Department of Building and Housing worked with the timber industry for several years to develop a system that was simpler and clearer, and that maintained the current level of protection against fungal decay and insect attack.

“The use of four different classes of timber treatment for framing inside the building envelope was complex and could lead to mistakes on site,” the Department’s Chief Engineer Mike Stannard says. “The new system offers potential cost savings by simplifying inventories and reducing the likelihood of mistakes that can lead to rework. It is expected to make the consent and inspection process more straightforward”.



The exception to the new single treatment class is the use of H3.2 for cantilevered deck joists and framing as illustrated above, the same level of treatment as timber that is exposed to weather. ‘Cantilevered decks depend on a single point of support and there is less chance that leaks will be discovered and repaired. This indicates a need for a higher level of treatment.’ Mr Stannard said.

The new system also allows untreated Douglas fir to be used for framing in simple houses of low-risk design. The Department has defined the low risk conditions in which Douglas fir can be used.

“Timber must be adequately protected against damage from moisture and insect attack so that buildings are durable and comply with the Building Code.” Mr Stannard said.

At the same time, there are consumers who want the option of chemical-free framing in their home. Research shows that untreated Douglas fir is more resistant to decay than untreated radiata pine and both science and expert opinion support the use of Douglas fir in low-risk buildings. Other species such as Macrocarpa, Eucalyptus, Larch and heart

Rimu, Matai and Beech can also be used untreated in certain situations, as described in New Zealand Standard 3602.

The revised Acceptable Solution is available in the B2 Durability Compliance Document. www.dbh.govt.nz/compliance-documents#B2.

BCAs should ensure they reference the most up to date version of the compliance documents.

EARTHQUAKE PRONE BUILDINGS

At this time there are no plans to amend the Building Act 2004 in respect to these policies. However, as you will be aware, the Royal Commission of Inquiry into Building Failure Caused by the Canterbury Earthquakes is currently underway.

The Royal Commission is expected to report back to the Government with recommendations by 11 April 2012, and some of the recommendations may relate to earthquake-prone buildings and the timeframes for their review and strengthening. Any recommendations will then have to be considered by the Department and Territorial Authorities alike.

In the meantime, the current Building Act provisions apply, which means that reviews should be completed within five years of the previous policy, and a copy provided to the Department. Territorial Authorities may decide to roll-over their current policy if they deem this to be appropriate.

TEMPORARY HOUSING IN CHRISTCHURCH

Work continues to supply additional temporary housing for Christchurch residents whose homes have been severely damaged by the quakes.

This is a major undertaking in an environment where there is a lot of uncertainty. Some people are staying in their earthquake damaged houses until they have all the information they need to make decisions about their future housing needs. Our job is to make sure homes are available if and when people need them.

In July, we completed our first temporary accommodation village at Kaiapoi Domain. This site has 22 accommodation units – a mix of one, two, three and four bedroom units – and our first village residents moved in on 8 July.

Work is nearing completion on the Linwood Park village site. The site will have 41 temporary accommodation units – a mix of two, three and four bedroom homes.

Site works won’t start on Rawhiti Domain until we have a clearer idea of demand. This site would be

similar to Linwood Park and if required could have up to 70 temporary accommodation units.

Predicting exact demand for temporary housing across Canterbury is an on-going challenge. Temporary housing takes time to establish, so we have to take decisions ahead of having absolute clarity around demand.

Through our Canterbury Earthquake Temporary Accommodation Service (CETAS), a joint venture between the Department and the Ministry of Social Development, we are currently working with 356 households whose homes have been badly damaged by the quakes (as at 17 August).

CETAS works with households to assess their accommodation needs and matches and places them with the best available accommodation. This includes homes in the private rental market and other accommodation options such as portable homes and villages.

TECHNICAL INVESTIGATION INTO CHRISTCHURCH BUILDING PERFORMANCE



The Department is undertaking a technical investigation into the performance of key buildings and the reasons that some of them collapsed, so it can better understand what has happened.

The investigation is being carried out by expert engineers. The Department will be provided with a report based on the engineers' findings with input from a wider panel of experts.

The purpose of this investigation is to establish and report on:

- The original design and construction of the buildings.
- The impact of any alterations to the buildings.
- How the buildings performed in the 4 September 2010 earthquake, in particular the impact of the earthquake on the building.
- What assessments - including the issuing of green stickers and any further structural assessments - were made about the buildings' stability / safety following the 4 September 2010 earthquake.

- Why these buildings collapsed or suffered serious damage after the February 2011 earthquake.

The buildings specified for detailed analysis include: Pyne Gould Corporation; CTV; Forsyth Barr and the Hotel Grand Chancellor buildings. Others may be specified for detailed analysis as information comes to hand during the investigation. The investigation will take into consideration:

- Design codes, construction methods, and building controls in force at the time the buildings were designed and constructed and changes over time as they applied to these buildings.
- Knowledge of seismic hazard and ground conditions when these buildings were designed.
- Changes over time to knowledge in these areas.
- Any policies or requirements of any agency to upgrade the structural performance of the buildings.

CANTERBURY SEISMIC MIX

Scientists studying the wealth of data collected during the magnitude 6.3 earthquake on 22 February in Christchurch have found four seismic effects, including one that is rarely documented, combined to produce unusually strong ground-shaking.

The largest vertical acceleration in Christchurch during the 22 February earthquake was just over twice the acceleration of gravity. The vertical accelerations, which were the largest ever recorded for a New Zealand earthquake, were about four times higher than the highest vertical accelerations measured in the magnitude 9.0 earthquake off the east coast of Japan on 11 March.

To appreciate the unusual nature of the earthquake, it is worth remembering that the two tectonic plates under the South Island are converging at 38 millimetres per year. About 75 per cent of the stress from this convergence is being stored in the Alpine Fault. A further 20 per cent is taken up by the Canterbury foothills. The remaining five per cent is spread across the Canterbury Plains. This helps to explain why the recent focus for earthquake research in the South Island has been on the Alpine Fault and the major faults that branch from it, such as the Hope Fault.

Another parameter to factor into the mix is the type of crust Canterbury sits on. It is hard and brittle rock down to a depth of about 30 kilometres. This very hard crust is thicker than in other parts of New Zealand where the brittle-ductile transition occurs at a much shallower level.

In other parts of New Zealand softer, more ductile rock is much shallower and can dampen some of the seismic energy of earthquakes. This dampening feature is absent in Canterbury, meaning a larger portion of seismic energy from any earthquake reaches the surface in Canterbury. This also helps to explain the frequent aftershock sequences following the September and February earthquakes.

Seismologist Bill Fry, of GNS Science, says the earthquakes were so well documented by a network of strong-motion instruments around the greater Christchurch area they have provided many fresh insights that will change global scientific thinking about seismic events. Most of the instruments in the Christchurch seismic network have been in place for a number of years.

"It's rare to have such a large amount of high quality data from a network of instruments so close to the epicentre of a damaging urban earthquake." Dr Fry says.

The data from these instruments has deepened seismologists' understanding of the mechanics of this particular earthquake. In time, this new knowledge will feed into a range of mitigation measures that will help New Zealand communities become more resilient to earthquakes. This includes the Building Code, city planning, infrastructure design, retrofitting, societal risk mitigation and preparedness measures.

The data has also enabled seismologists to clearly see that the Christchurch earthquake was an extremely complex event. The exact combination of seismic effects in Christchurch is unlikely to happen again in New Zealand for a long time. The stress that was released on that particular fault on 22 February 2011 could take up to 10,000 years before it builds up to a similar level where it triggers another failure.

Dr Fry says the four dominant factors that contributed to the intense shaking in Christchurch were: the high amount of energy released in the rupture of the fault; the direction of the energy that was released; a recently discovered trampoline-like interaction between geological layers under the city; and the closeness of the quake epicentre to the city.

The faults that failed in both the September magnitude 7.1 and February magnitude 6.3 earthquakes were very strong, with high amounts of friction holding the two sides together.

When a strong fault breaks, it releases more energy than an equal-sized weak fault would. It is like the difference between breaking a one centimetre-thick sheet of Styrofoam and a one centimetre-thick sheet of plywood, and the amount of jarring you would feel in your hands. The

Canterbury crust is analogous to the plywood, but most earthquakes are more like breaking the Styrofoam.

In addition, seismologists have discovered that the earthquake rupture was faster than most earthquakes of this magnitude.

"In fact, the rupture travelled at about the same speed as some of the waves that were generated by it. This implies that as the waves from the first second or so of the rupture were travelling toward Christchurch, new energy was being released during the next couple of seconds, and these were added together to make the shaking particularly 'punchy'. This resulted in something analogous to the supersonic boom of a jet aircraft." Dr Fry says.

The previously unknown fault that ruptured under the northern edge of the Port Hills was sloping back like the back of a south-east facing lounge suite and pointing straight at Christchurch. When it ruptured, most of the energy was directed north-west toward the city.

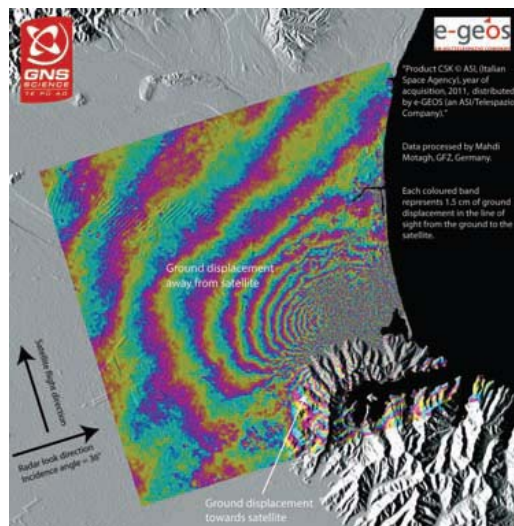
Seismic recordings show the dominant ground acceleration in Christchurch was oriented vertically. A recently discovered physical phenomenon explains this observation. As the huge early pulses of energy travelled through horizontal layers of the earth beneath Christchurch, the weaker upper layers travelled farther upward than the stronger lower ones, separating from them. When these upper layers fell back under gravity, they "slapped" against the lower layers coming up again, producing very high impacts.

These "slapping" impacts generate energy that travels back up towards the surface, magnifying the whole process. This effect also helped to explain the widespread liquefaction that occurred in Christchurch. As the layers of strata under the city separated, water became less bound in soils. When the layers slapped together, large amounts of water was forced up to the surface. Dr Fry says there had been isolated recordings of the trampoline effect in other parts of the world, but the data from Christchurch was unprecedented for its quality.

The Christchurch earthquake occurred within kilometres of the central business district, leaving little time or distance for the seismic energy to attenuate before impacting on the city.

"We know that the top few metres of the ground in Christchurch played an important role in the shaking. But by studying the physics of the fault rupture, we now know that the intensity of the shaking was exacerbated by processes that occurred on the fault itself," Dr Fry says.

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Radar image from the Italian Space Agency's Cosmo-SkyMed satellite showing both the permanent ground displacement caused by the earthquake, and areas of ground and/or building damage due to the quake. The image, or "interference pattern", is created by combining a radar image taken on 19 February before the quake with one taken on 23 February following the quake. In regions where there was not major damage, the coloured bands show the amount the ground was displaced from just before the earthquake started to just after it finished. Each coloured band represents an additional 1.5 centimetres of ground displacement, giving a total of about 22 centimetres from the left edge of the image to where the coloured bands can no longer be followed near central Christchurch. The image becomes speckled and the coloured bands are no longer clear in central and eastern Christchurch. This is evidence for regions of ground damage due to liquefaction, lateral spreading or compaction, and/or regions of building damage. Image courtesy of GNS Science.

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