# STRAIGHT UP

BUILDING OFFICIALS INSTITIUTE OF NEW ZEALAND

**Progress**

Diversity in the Workplace

**Technical**

Using Bracing Units

**BOINZ**

Conference 2022 Wrap-up

SPRING 2022

INTERNATIONAL CODE COUNCIL

ICC ES

ICC EVALUATION SERVICE


**ICC Oceania** - The International Code Council is bringing its diverse services, skills and experience to Australia and New Zealand to help promote building safety, provide practical solutions for practitioners who work in the building sector and collaborate with local authorities in looking to address issues that are common to the sector internationally.

As part of this program, we are establishing an ICC Oceania office to help broaden the awareness, understanding of and access to the ICC Family of Solutions.

**Leading the World in Building Safety** - The International Code Council is the leading global source of building safety solutions that include product evaluation, certification, accreditation, and technology. The International Code Council's solutions are used to ensure safe, affordable, and sustainable community and buildings worldwide.

**What We Do** - Our experts can assist you with your building safety initiatives. Expert advice takes into account local building requirements to help develop Performance (Alternative) Solutions. The International Code Council takes the effort needed to understand the unique needs of each partner, user or client and offers the following resources:

- *The International Codes (I-Codes) and Standards* – The International Code Council is the developer and publisher of the most recognised and adopted codes and standards for buildings globally. While not for direct application in Australia and New Zealand, the I-Codes and ICC Standards may contain evidence that in Australia and New Zealand can be used for the purpose of a Performance (Alternative) Solution through an expert opinion provided by one of ICC's services assessing equivalence to local requirements.
- *Product Certification* – ICC Evaluation Service (ICC-ES) maintains accreditation for product evaluation to Australian and New Zealand building codes in our scope of services. Evaluation Service Reports produced by ICC-ES can be used as evidence of compliance to the Building Code of Australia as well as the New Zealand Building Code.
- *WaterMark Certification* - The ICC-ES Plumbing, Mechanical and Fuel Gas (PMG) program is accredited by JAS-ANZ to provide plumbing product certification for WaterMark under the Plumbing Code of Australia.
- *Testing and Evaluation* – In conjunction with NTA, ICC-ES provides product testing, inspection, design review and evaluation for plumbing and building products, including off-site/modular construction.
- *Accreditation* – The International Code Council offers International Accreditation Service to verify the technical competence and processes of bodies such as building departments, professional membership-based organisations and quality assurance processes to ISO standards.
- *Technology/Digitization* – The International Code Council offers building code solutions that make it possible to digitally link planning ordinances, land-use zoning, building codes, planning and building approval documentation and other essential content for local government and building officials procedures and service platforms.

## A MARK OF CONFIDENCE

ICC ES

## CONTACT US

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*Front Cover Image - Paris's Musée du Quai Branly*



# CONTENTS

# Moving with Change

*How we contribute to the future of building, essentially is about our people, and their contributions.*

**As we head out from the shorter days of winter and into the longer days of spring, I am pleased to say the Institute is in good heart, having a growing membership and just undertaken yet another successful annual event.**

In bringing this article together, the significance of two recent but totally different events, have played on my mind.

Firstly, the sad passing of Her Majesty Queen Elizabeth II, following 70 years on the throne. World leaders and dignitaries have been paying tribute to her as an individual and in respect of her achievements throughout her lengthy reign. As an individual, few have had such impact on moderating global issues.

A second event of significance was the announcement by the Prime Minister, that the COVID protection framework (traffic lights) would end, bringing effective closure to two and a half years of COVID management and restrictions.

While many of us will reflect with a heavy sadness at the passing of Her Majesty, and relative joy at the removal of the COVID restrictions, it occurred to me that both these events will bring change to our lives, and a departure from what was once *'familiar and normal'*. How we handle change, whether it is through replacement or doing something different, defines us.

During our August Conference, our President, indicated we had advanced work on our Constitution project. This is a significant body of work to deliver a *fit-for-purpose* governance document and one that reflects changes required by the Incorporated Societies Act 2022. For the most part, I am sure you will see the changes as pragmatic, and sensible delivering to the Institute a governing document that will ensure the Institute can move with the times and fully deliver on future member benefits. We will shortly arrive at the part in the process where a legal review will take place prior to a roadshow and information for members.

The Institute has also been actively engaged in writing submissions over the last months to MBIE and other organisation consultations. Our goal in responding to consultations is to contribute to better outcomes and deliver on pragmatic and sensible solutions. As likely the only organisation that has the ability to provide an independent perspective on New Zealand's built environment, we believe we deliver value as opposed to agenda driven considerations. Our vision is a prime motivation for our content "to improve the quality and performance of the built environment".

A significant body of work that will likely drive future change was consulted on by MBIE as the Building System Reforms, of which there are three legs.

- Review of the Building Consent System
- Occupational Regulation
- Consumer Protection

## OUR BOARD

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**Peter Sparrow**

**Nick Hill**
Chief Executive

As an Institute, we have actively campaigned for improved accountability and behaviour across the system, with goals to lift performance, improve inputs (right first time) and fair outcomes if things go wrong. We were pleased to see these deliverables articulated in the recent Building Consent System Review consultation. We are also mindful that each of these reforms may have links to other legislative initiatives, including Climate Change, Local Government Review, and the Resource Management Act Review. In short, like the recent events mentioned at the beginning of this piece, we should be prepared for change, and change that is measured, consumer centric and delivers pragmatism and quality building outcomes. The next few years will see the Institute heavily engaged in providing quality input, particularly in managing potential change while maintaining levels of stability. In doing so, we will be fostering and encouraging MBIE to continue their collaborative interaction with the Institute and its members.

How we contribute to the future of building, essentially is about our people, and their contributions. We have a fantastic membership base, and it was wonderful to see our leaders and innovators win their awards at our recent Gala Dinner and Awards ceremony in August. My hearty congratulations to each of the Awards winners, all very well deserved.

In closing, I would like to acknowledge two members, both past presidents. Firstly, the recent sad passing of Nick McKinstry, President (90-92), Life Member and Auckland Branch stalwart. For those who knew Nick, and I had that privilege, he was a rock for the association over his lifetime and a person of uncanny wit. Secondly, Kerry Walsh, who was awarded Life Membership this year for his outstanding devotion and commitment to helping and bettering support for members and the Institute. Both have reflected with me on the value and changes the Institute has made; however, I would humbly suggest they both were significant contributors.

**Nick Hill** - Chief Executive

Looking to the future with fewer COVID restrictions, I look forward to more in person engagement with you all via branch visits.

*Nick Hill*
*Chief Executive*

## OUR PREMIERE PARTNERS

We would like to thank our Premier Partners for their support and commitment to the Institute.

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STANDARDS NZ

# Update on Standards for the Building and Construction Sector

**There are several key standards in development for the building and construction sector – here is an update on what's on the horizon from Standards New Zealand.**

## NZS 3604:2011 Timber-framed buildings – drafting stage

New Zealand's most sought-after standard used by builders, architects, engineers, designers and students is undergoing a revision to incorporate a decades' worth of sector learnings and policy changes. NZS 3604 provides methods and details that are used to design many NZ timber-framed houses, small buildings, and residential decks. NZS 3604 can be used for timber-framed buildings with one, two or certain configurations of three storeys. It provides a way of complying with the New Zealand Building Code requirements for the structure of those buildings, including their foundations, framing layout, member sizes, bracing systems, fixings and connectors when read along with the Acceptable Solution

B1/AS1. This standard is in drafting stage with public consultation planned for the end of 2022

NZS 3604 is sponsored for free download by the building regulator BSP (Building System Performance), a branch within MBIE.

## NZS 3404 – Steel structures standard – drafting stage

Undergoing its first full revision in 25 years, NZS 3404 Parts 1 and 2:1997 Steel Structures Standard has far-reaching applications for buildings, cranes, and road, rail and pedestrian bridges constructed of steel, composite steel and concrete. It supports compliance with the New Zealand Building Code and sets out the minimum requirements for the design, fabrication, erection, and modification of steelwork in structures in accordance with the limit state design method. As such, it is a core resource for engineers, builders, designers and building consent authorities.

The revision includes removing material that is duplicated in other standards and technical specifications and simplifying and clarifying the standard to make it easier for more people to use. Considerations will include durability, retrofitting, repairability and inspection, as well as reviewing sections on fire and seismic requirements, and potentially adding content regarding sustainability and safety in design.

Public consultation is expected to go live in October 2023 with subsequent publication planned for April 2024. NZS 3404 is sponsored for free download by BSP.

## NZS AS 1720.1 Timber Structures - Part 1: Design Methods – publishing soon

Structural engineers will be awaiting the upcoming publication of newly revised NZS AS 1720.1. This sets out general requirements for the verification of timber structures and a wide range of engineered wood products including laminated veneer lumber (LVL). The revision allows designers and engineers ways of designing timber structures that are outside of the scope of NZS 3604:2011 Timber-framed buildings.

Utilising AS 1720.1-2010 as it's basis, the revision, incorporating a decade's worth of technology and material innovations, has specific portions for New Zealand users.

NZS AS 1720.1 is due for publishing in October and will be available from Standards New Zealand's webshop.

## NZS 4211:2008 Specification for performance of windows – publishing soon

NZS 4211 specifies requirements for the performance of windows to be installed in exterior walls within the wind pressure limitations of the wind zones defined in table 5 and table 6. The properties covered are strength, stiffness, operating facility, air infiltration, and water penetration. Addressing 15 year's-worth of industry advancements, the revision will bring the standard up to date for an era where windows will play a crucial role in energy efficiency, climate change resilience and healthy homes and workplaces.

NZS 4211 is undergoing final stages of its revision and is due for publication mid-September, with access sponsored by BSP.

## NZS 3910:2013 Conditions of contract for building and civil engineering construction – drafting stage

NZS 3910:2013 is used as the foundation for the majority of New Zealand contracts in the building, engineering, construction and infrastructure industry sectors (the construction sector).

It is a standard form that contains general conditions of contract for incorporation into building and civil engineering construction contract documents, suited to New Zealand's industry and legislative environment. It enables principals, consultants, and contractors to quickly establish well understood contractual arrangements to support the delivery of a variety of building and civil engineering projects.

You can find the latest chair's report and further information on this standard revision project on its own dedicated page:

https://www.standards.govt.nz/develop-standards/standards-nz-work-programme/revision-of-nzs-3910-project/

## Joint Australian and New Zealand standards

We support representation on joint standards used across Australia and New Zealand. The following are current sector-relevant standards undergoing revision.

- AS/NZS 2327 - Composite structures - Composite steel-concrete construction in buildings – this is at project approval phase with drafting to commence shortly.
- AS/NZS 4063.2 - Characterisation of structural timber, Part 2: Determination of characteristic values – this project is being set up and is in its early phase.
- AS/NZS 1328.1 - Glued laminated structural timber, Part 1: Performance requirements and minimum production requirements – this standard is underway at drafting phase. Keep an eye out for upcoming public consultation.

## Keep up to date with Standards New Zealand

You can keep updated on all building and construction standards, including a range of further joint Australian and New Zealand standards in development, through our monthly work programme available here:

https://www.standards.govt.nz/develop-standards/standards-nz-work-programme/

To stay up to date on sector related standards and specific standards subscribe to Standards New Zealand's Touchstone and Building and Construction newsletter. The 'Keep Me Up To Date' subscription service means you can keep across changes on specific standards too.

https://www.standards.govt.nz/

# Putting Building Compliance and Construction Experts at the Heart of Standards

*We can all help make sure New Zealand homes, workplaces and public buildings are built and designed to be safe, durable, efficient, adaptable and stand strong for generations to come.*

**Presenting at and attending the BOINZ Conference in Rotorua gave me a much-valued opportunity to meet with many of you, members of BOINZ and experts in your fields of building compliance and construction.**

Yours is a sector we at Standards New Zealand maintain a special relationship with. For me personally too, having previously worked as a building inspector, building surveyor and architectural designer, and in more recent times worked with many of you in a regulator role capacity with MBIE and the former Department of Building and Housing and Building Industry Authority before that.

It was great to reconnect with many old faces and share in the heart-warming and well-deserved awards evening. An opportunity to recognise and reward the extraordinary and sometimes unsung heroes that help ensure our buildings are built to protect New Zealanders and endure the rigours of our environment.

Standards have been at the heart of your sector; from our beginnings in 1932 in response to the Napier earthquake, to today with standards forming invaluable tools for Acceptable Solutions under the Building Code and 131 standards for compliance generously sponsored for free download by the building regulator MBIE's Building System Performance branch. While standards play a crucial role in today's design and construction practices, only a few who use them give thought to where standards come from. They are good practice, developed by subject matter experts

who have come together to agree consensus on the best way forward. Quality construction is built on good standards. Durability is built on good standards. Safety is built on good standards.

## Is it your time to represent, participate, contribute, and connect on a standards development committee?

Behind the scenes at any given time, hundreds of experts are meeting with industry partners, or even competitors, or international peers to share their distinct and specialist skills, expertise and needs, listen to others and find a common ground that satisfies all. When a standard is developed through the consensus and representative approach it helps prevent monopolies or any individual vested interest from unduly influencing the outcome. It also enables and supports technical expertise and wisdom, and consumer, industry and regulator perspectives to be heard

and captured appropriately. Result, a standard everyone around the committee table believes and buys into, agrees is fit for purpose and feels proud of through the hard work by all.

## Standards are nothing without people. And that's where you come in.

Standards New Zealand is New Zealand's national standards body under the international ISO (International Organization for Standardization), IEC (International Electrotechnical Commission) and joint Australian/New Zealand standards system. Are you interested in representing your organisation, industry or area of specialism on a standards development committee? Can you share your years of applied skills, expertise and wisdom, and make a valuable contribution now and for the future? If yes, then we invite you to complete an expression of interest to become a standards development committee member.

There are several benefits that come from being active as a committee member; direct access to shaping standards you might use; a good professional network of industry experts relevant to your work; an opportunity to learn from others and build your knowledge and real experience for your professional development; and you can leave a valuable contribution and legacy for your sector. You can make a huge difference with national or international impact.

But don't take our word for it. Learn more from some of the hundreds of diverse committee members already contributing to standards in development:

> *'You need the courage and inquisitive mind to ask questions that are rarely voiced, which keeps all committee members learning. New Zealand is good at finding innovative and elegant solutions that enable us to punch above our weight!'*
>
> Brian Fitzgerald, energy sector committee member

> *'When you have a distinct specialism it's important to leave your mark for others to benefit from. That's how we grow as industries, societies and individuals. Putting that knowledge into standards, means you've given something back that will shape your area of work for years to come.'*
>
> Dr Sara Broglio, Seismic engineer and committee member

> *'I believe committees need a good balance of younger and older, more experienced people and not just those involved in policy writing, but creatives, innovators, pragmatists.'*
>
> Alison Holt, IT specialist and committee chair

> *'It's quite a feeling to have an impact on a standard that you use in your daily work. The standardisation process helps to resolve differences. Through the consensus approach, it's important to listen to everyone. It allows for robust discussions considering multiple viewpoints and helps prevent biases so you can create one source of truth. With limited viewpoints and opinions, decision makers may ignore agreed good practice and this could influence decision making. Without a standard, an authority could set its own criteria around what's appropriate, without the agreement of the industry or sector.'*
>
> Sally Hargraves, Engineering geologist and P4431 committee member

## Your next steps

Tell us about yourself – complete an expression of interest via our online form at https://www.standards.govt.nz/develop-standards/standards-development-committees/become-involved-in-standards-development/

Where there is not a committee currently active we will maintain your details on our database for future reference. From here the Standards Approval Board assesses nominations for diversity of skills, knowledge and experience, and looks for balance and wide representation.

BOINZ members use standards and BOINZ members help develop standards, often because they have been nominated by BOINZ. Together, with Standards New Zealand, we can all help make sure New Zealand homes, workplaces and public buildings are built and designed to be safe, durable, efficient, adaptable and stand strong for generations to come.

A huge thankyou to those BOINZ members who have already contributed to and supported standards development committee work to date.

*By Malcolm MacMillan*

*National Manager, Standards New Zealand*

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CONCRETE NZ

# Decarbonising Concrete

**The concrete industry is evolving, with recent achievements in emissions reduction set to continue via manufacturing and delivery initiatives that will enable net zero carbon concrete by 2050.**

You will have heard it before, but it is worth repeating - after water, concrete is the most widely used substance on Earth.

Concrete has shaped civilizations for centuries, and today it is indispensable in residential, commercial and infrastructure development.

As a metaphor for strength, concrete offers whole-of-life benefits such as durability, thermal mass, recyclability, CO2 uptake, resilience to extreme weather, as well as being local.

Such is our reliance on concrete that its decarbonising journey is one industry is excited to share, and which building officials will undoubtedly be interested in.

## New Zealand Concrete

New Zealand is virtually self-sufficient in concrete. Ready mixed concrete is produced close to where it is cast, meaning it meets the sustainability principle of products being consumed near their place of origin.

The concrete industry plays a key part in the country's economy, employing over 7,000 people across 190 concrete plants and 22 cement facilities throughout the country.

Record levels of quality assured concrete (some 4.5 million cubic metres annually) is currently being produced using locally sourced aggregates, recycled water and either locally manufactured or imported cement.

## Emissions Reduction

Committed to helping New Zealand achieve its *Climate Change Response (Zero Carbon) Amendment Act 2019* objectives, the concrete industry is halfway towards its target of at least a 30 percent reduction in CO2 emissions by 2030.

Sustainability consultants - *thinkstep* - confirm that emissions from cement have been reduced by 15 percent between 2005 and 2018.

This reduction was achieved in part through increased use of low carbon Supplementary Cementitious Materials (SCMs).

Industry has also enhanced its environmental practices by adopting synthetic vehicle fuels, as well as diverting/recycling waste streams away from landfill and into usable products.

## Supplementary Cementitious Materials (SCMs)

The increasing global use of low carbon SCMs to partially replace Portland cement and therefore directly reduce embodied CO2 makes ecological sense.

SCMs are derived from lower embodied energy and recycled materials, and can result in environmental benefits, improved concrete performance, and long-term cost advantages.

These are ground granulated blast furnace slag (from steel manufacture), fly ash (from coal combustion) or microsilica. Volcanic ash (a natural pozzolan) from New Zealand's Volcanic Plateau is another type of SCM.

To allow increased uptake of SCMs,

Concrete NZ has completed a Building Research Levy funded project to assess classification techniques, along with the fresh and hardened performance of SCM concrete. Outputs will inform a review of the cement Standard.

## Gearing-Up Supply

Industry commitment to low carbon concrete via SCMs is clear, with Holcim New Zealand constructing a new facility at the Ports of Auckland to accommodate what will be a significant increase in its use of cement replacements.

Mount Maunganui based cement supplier HR Cement, has commissioned a new grinding mill for the processing of either slag or natural pozzolans to meet inevitable demand.

New Zealand's end-to-end cement manufacturer, Golden Bay Cement, will also be utlilising SCMS as part of its low carbon offerings.

In short, the low carbon concretes enabled through cement replacements will be a real 'game changer' in the materials space, and in turn hugely significant for the future built environment.

## Alternative Fuels

Considerable reductions in energy use (and therefore CO2 emissions) have been realised in New Zealand over the past decade by improving the efficiency of the cement kiln operation.

Golden Bay Cement uses alternative waste fuels and is examining the practicalities of increased supplementation.

A significant proportion of fossil fuel used at its Northland facility has been substituted with wood waste (biofuel), while the use of up to 3 million waste tyres each year will reduce coal consumption by 15 percent, and in turn CO2 emissions by around 13,000 tonnes.

## Future Goals

Under the Concrete NZ banner, the concrete industry has developed a medium-term vision which states that by 2030 it will be recognised as a sustainable, socially responsible and profitable participant in the construction sector, and have reduced its global warming potential by at least 30 percent of 2005 levels, by:

- Supplementary cementitious materials (SCMs)
- Efficient energy sources for manufacturing and delivery processes
- Driving waste minimisation in manufacturing, delivery and construction
- Using recycling processes to minimise the use of virgin materials
- Adopting new technologies where appropriate
- Being engaged with local communities

Beyond 2030, the New Zealand concrete industry is targeting net zero carbon by 2050.

To enable these goals, Concrete NZ has adopted an Environmental, Social and Corporate Governance (ESG) approach, which concerns the impacts of a business or sector on people and the environment, and how the external world impacts on the business or sector.

Part of a global strategy, the New Zealand concrete industry's *Net Carbon Zero Roadmap* will set out how, in collaboration with stakeholders and policymakers, it will fully decarbonise.

To be launched in New Zealand during early 2023, the international *Roadmap* approach has been applauded by Greenpeace as a "defining moment" that illustrates the "willingness of industry to be part of the solution in global climate protection."

Also worth highlighting, is that the United Nations' Inter-Governmental Panel on Climate Change (IPCC) has recognised concrete's ability to permanently absorb atmospheric CO2, referred to a "carbon uptake", which means the net embodied carbon of concrete buildings and infrastructure is much less than had previously been calculated.

A pan-industry *Sustainability Report* is also being developed by Concrete NZ. This will involve conducting an assessment on the industry's impacts on people and the environment.

The topics that will be reported on, and compared to United Nations' Sustainability Development Goals (SDGs), will be energy and emissions, freshwater, built environment, health & safety, socio-economic benefits and waste & the circular economy.

## Final Word

At the forefront of Concrete NZ's work are good information (including more Environmental Product Declarations EPDs) and constructive engagement with government and stakeholders, as we pursue increasing recognition of the concrete industry's work to enhance its environmental and social impact.

Improved policy settings and better knowledge of concrete among specifiers, designers, contractors and building officials, will be measures of success.

---

*By Rob Gaimster, Chief Executive - Concrete NZ*

*For any questions or for more information email admin@concretenz.org.nz or call 04 499 8820.*

*Images. Westlock Concrete Solutions Ltd (WCS).*

# MBIE is Releasing Online Learning Modules for Insulation Requirements in Buildings

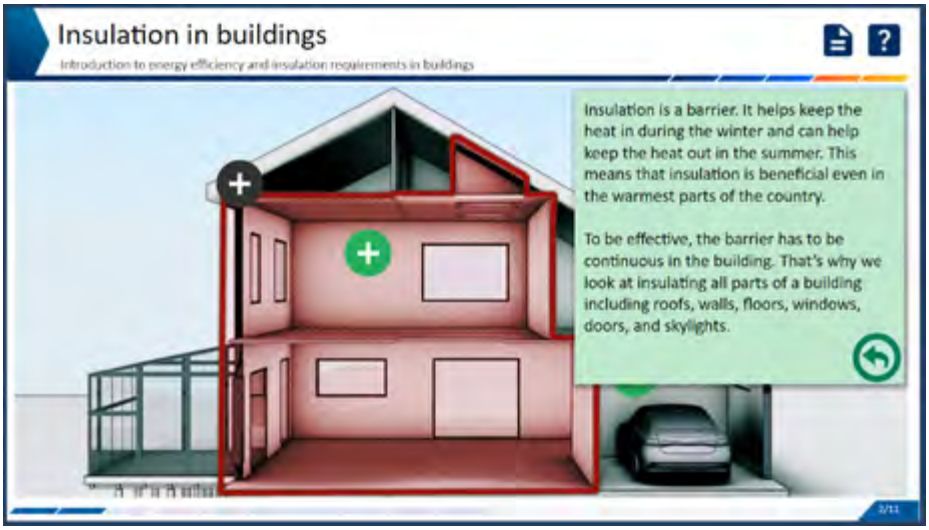
**MBIE is producing a range of resources to help those impacted by the changes, understand the energy efficiency requirements.**

One of the resources MBIE has been creating are online interactive learning modules.

These learning modules explain the compliance pathways to meet minimum insulation requirements set out in clause H1 Energy Efficiency of the New Zealand Building Code.

They are hosted on learning.building.govt.nz and will continue to be developed over time.

For more information on the H1 changes see: H1 Energy efficiency | Building Performance




A screenshot of module 1 providing an introduction to insulation in buildings

## The purpose of the learning modules

The material is delivered in four learning modules which have separate content for different audiences and buildings. They include information for people who are learning about insulation requirements for the first time as well as examples for design professionals and building officials who have some prior knowledge and understanding of the Building Code documents. These may be useful for those who want to improve their general understanding of insulation requirements and the compliance pathways of the Building Code.

The four learning modules are:

### Learning module 1 - live now

Introduction to energy efficiency and insulation requirements in buildings

**What is it about?**

- This module gives a general overview of why insulation in buildings is important, and the energy efficiency benefits of increasing insulation.

**Who is it for?**

- This module will be useful for anyone looking for an overview of the general requirements of H1 Energy Efficiency.

### Learning module 2 – work in progress!

Compliance pathways for H1 Energy Efficiency

**What is it about?**

- This module provides a general overview of what is in-scope and what is out-of-scope of the acceptable solutions and verification methods for H1 Energy Efficiency.

**Who is it for?**

- This module will be useful for designers, builders and building consent officers.

### Learning module 3 – work in progress!

Determining the minimum R-values for housing and small buildings

**What is it about?**

- This module will take you through different examples of housing and some of the sticking points that may be encountered when trying to determine the minimum R-values for compliance.
- It covers more common situations like skillion roofs, attached garages, and increasing or decreasing the area of glazing.
- It is focused on compliance using the schedule and calculation methods.

**Who is it for?**

- This module will be useful for designers and building consent officers.

### Learning module 4 – work in progress!

Determining the minimum R-values for large buildings

**What is it about?**

- This module will take you through different examples of determining minimum R-values for larger buildings.

**Who is it for?**

- This module will be useful for designers.

*Modules 3 and 4 provide a high-level overview of the modelling methods that would be expected for building consent applications. However, they do not include the details of computer modelling specifically. This is best left for design professionals with experience in that area.*

MBIE

# New Digital Licence for Building Practitioners

**The Ministry of Business, Innovation and Employment (MBIE) will release a new Licensed Building Practitioners (LBP) portal in October 2022. This new LBP portal will replace the current online system for building practitioners.**

One key change in the new portal, relevant to building officials, is that MBIE will no longer issue physical ID cards. Instead, building practitioners will be able to download digital licences at any time directly from the new LBP portal.

The new digital licence will display:

- the building practitioner's name;
- their photo;
- their licence class/es and area/s of practice;
- their licence expiry date; and
- a QR code which will link to their record on the LBP Public Register.

Building officials can verify a building practitioner's identity by scanning the QR code on their digital licence, or looking up their details on the LBP public register at https://lbp.ewr.govt.nz/publicregister/search.aspx.

Building practitioners may print their digital licence or save a copy on their mobile device. Any current physical ID cards can continue to be used as long as these remain valid.

Any questions about the new digital licence or the LBP portal update can be sent to engage@lbp.govt.nz.

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Construction stages of the new GIB® plasterboard manufacturing and distribution facility in Tauranga.

# Updated Online Tools Help Designers Meet and Exceed H1 Compliance

Photo Credit: Rob Suisted

**BRANZ has updated tools and resources to help building designers meet and exceed the recently updated acceptable solutions and verification methods for energy efficiency in the Building Code.**

"Changes to the requirements under Building Code Clause H1 Energy Efficiency are an important step in this country's journey to net-zero carbon emissions by 2050," says BRANZ General Manager – Research, Dr Chris Litten.

He says BRANZ is aware that many construction industry professionals want to play their part in designing and building high performing, low carbon buildings. "We are committed to supporting the building and construction industry on this journey. Our updated tools and resources will enable designers to meet, and exceed, the new requirements for energy efficiency."

For building occupants, the changes mean homes that are warmer, drier, and healthier. It is expected that home heating costs will reduce by up to 40 per cent in some parts of Aotearoa New Zealand. And this means a reduction in the carbon footprint of residential housing in this country.

The new requirements, which were published by MBIE in 2021, will come into force between late 2022 and late 2023.

Dr Litten says regulation need not be the only driver for better performing buildings in this country. "Better performing buildings are in the interests of everyone who calls Aotearoa New Zealand home, both today and in the future. The sooner we can act, the better the future will look," says Dr Litten.

He says designers and builders who implement these changes early will be well positioned for future changes to build requirements. "Getting on board early will make the journey ahead much easier."

BRANZ's updated suite of online tools includes an updated H1 Calculation Method Tool, a revised House Insulation Guide, and an updated H1 Schedule Method Tool. It also features H1 guidance and links to relevant BUILD magazine articles on H1.

In many cases BRANZ's H1 tools and resources have been enhanced and improved. For example, the updated H1 Calculation Method Tool that aligns with H1/AS1 5th edition, amendment 1, now enables users to generate a results page that can then be used to show H1 compliance.

BRANZ is developing the H1 Hub, which is an online portal connected to H1 information on various partner organisation websites. It will use machine learning to tailor search results to the specific needs of each user. It will also help to inform BRANZ and partner organisations where knowledge gaps exist and guide the development of new resources to meet current and future industry needs.

BRANZ will be making an announcement about the H1 Hub go-live date in the coming weeks.

"BRANZ is also keen to hear from industry and BCAs about areas where more guidance or advice is needed. We want to do all we can to help ensure a smooth transition for all," says Dr Litten.

*Find out more*

# Diversity in the Workplace

## Fire and Emergency New Zealand

**We asked Kaye AhSam from Fire and Emergency New Zealand to tell us about diversity in the workplace and what solutions have been initiated and implemented within FENZ.**

> *Tēnā koutou*
> *Ko Te Whau te maunga*
> *Ko Manawai te roto*
> *Nō Kerikeri ahau*
> *Ko Kaye AhSam tōku ingoa*

Currently my role in Fire and Emergency New Zealand (FENZ) is the National Advisor for Women's Development which is a secondment from my permanent role as a Volunteer Support Officer (VSO).

My journey began 15 years ago when I became a volunteer with the, then Fire Service. It took some time, but I became the first female Station Officer (SO) of the Kaitaia Volunteer Fire Brigade. The most exciting thing about that achievement is, I believe Kaitaia will soon have their second female SO in a much shorter time frame!

In 2017 I started my role at FENZ as a Volunteer Support Officer (VSO), and it was then that it became apparent that there were very few women in certain roles. The number of wāhine in FENZ has increased over the years to nearly 6% operational career firefighters, 20% volunteer firefighters and 23% in the non-operational space. We have very few in leadership roles and one of the hurdles to increasing that number is that women only stay in the organisation half as long as their male counterparts.

Some of the challenges females face in FENZ are not exclusive to females, other minority groups are disproportionately affected as well. One challenge that affects many personnel is ill-fitting PPE and uniform.

From a Health and Safety perspective ill-fitting PPE can cause injuries which can be serious in nature, from trips and falls and degenerative injuries like knee, hip, and back pain. This can also restrict a person's ability to do their job to a high standard and can have a knock-on effect to a person's confidence. They can start to feel that they are not good enough to do the job. This leads to decreased job satisfaction. We have a working group that looks at 'fit for purpose' design but there are a lot of standards that firefighting PPE needs to adhere to, so it's a work in progress.

Infrastructure such as our older stations present challenges and there are a lot of factors to consider. They were originally directed towards one main group, and it is not a simple or cheap job to modify or change them. I think it's very important considering this topic to be forward thinking in our design of new builds and upgrades, as it is an asset that is expensive and lasts for a long time.

If we want to attract diversity in the workplace then we need to create and provide spaces for people to coexist, feel safe, included, and valued. I think it goes beyond just considering unisex toilets, it's more like what does a "gender neutral pod" look like, and when we consider carcinogen management that includes showers and sleeping arrangements for shift work, how does that fit a broad range of requirements.

The configuration of stations and how that looks for the demographic of the community and what that may look like in 10-20 years is also a consideration, as one size will not fit all. I think we are heading in the right direction but it's a case of constantly asking the questions and not just settling for meeting the minimum standards requirement.

One of the hardest initiatives to get over the line was having sanitary bins installed in all stations. Some stations already had them, some stations couldn't wait to get them, and some stations had to be forced by a directive from the highest level of the organisation. It took two and a half years to complete but because of this, we are now about to roll out personal hygiene packs on all front-line appliances and there has been no push back.

FENZ is a unique organisation considering a large majority of the

operational workforce is comprised of volunteers therefore some situations are complex, but we are heading in the right direction. My advice to employers regarding creating a more inclusive culture would be to do a bit of reading on the research out there showing the benefits of having a diverse and inclusive culture. Be aware of unconscious bias (we all have them!) so you can challenge the bias and get comfortable with being uncomfortable. By that I mean if you see something that is a barrier to creating a better culture then call it out, don't leave it to the minority group to try and change a culture. A lot of the times the conversation you don't want to have, are most important.

For wāhine trying to have difficult conversations I would recommend being prepared. Do your homework, come with facts, data and research that supports the kōrero along with possible solutions or desired outcomes. Find a colleague or someone you trust to bounce ideas off and sense check with. This can also help group your momentum.

Lastly, remember when you want to start a conversation whether you are an employee or employer, do so in a calm manner. Don't try to start something while emotions are high (I still struggle with this sometimes!). Take note of what you want to say and put it aside until the situation has subsided. We all want more diversity and inclusivity in the workplace but it is choice and one we must work on constantly so it can nurture and grow.

> *Ma te Huruhuru, Ka Rere te Manu, Adorn the bird with feathers so it may fly.*

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# Using P21 Tested Bracing Units Outside the Scope of NZS 3604

## Introduction

**Bracing Units (BU) were introduced in 1978 for builders and architects to easily calculate wind and seismic demand and resistance of light timber-framed structures such as residential dwellings used within the design scope of NZS 3604. In 1978, New Zealand houses were usually smaller than today, with more regular plan shapes and, consequently, high redundancies.**

More recently, and in response to designer-lead aesthetic demands, engineers have begun to use BU-rated systems outside of their intended use for specific engineering designs, potentially without understanding the associated implications and risks.

This article discusses the background to bracing systems that have undergone P21 testing and the limitations when engineers use BU-rated systems to design structures outside the scope of the New Zealand Building Code (NZBC) Acceptable Solution B1/AS1, which references NZS 3604.

The article provides examples of structures that comply with the intent of NZS 3604 and those that do not. Some examples are the same as provided by Wouter van Beerschoten and the Timber Design Society in their 2021 webinar. The author is grateful for the input provided by various engineers and organisations.

## What is a P21 Test

The BRANZ P21 wall bracing test and evaluation procedure (2010) evaluates the performance of wall bracing elements and their fixings when subjected to an in-plane racking load applied along the wall length (Figure 1). The test captures information about bracing systems for lightweight timber-framed structures designed within the intent of NZS 3604. Therefore the test is designed to rate bracing elements that will only be used in a building that is reasonably symmetrical, has well-distributed bracing in plan, is a maximum of two stories high, and has sufficient redundancy.

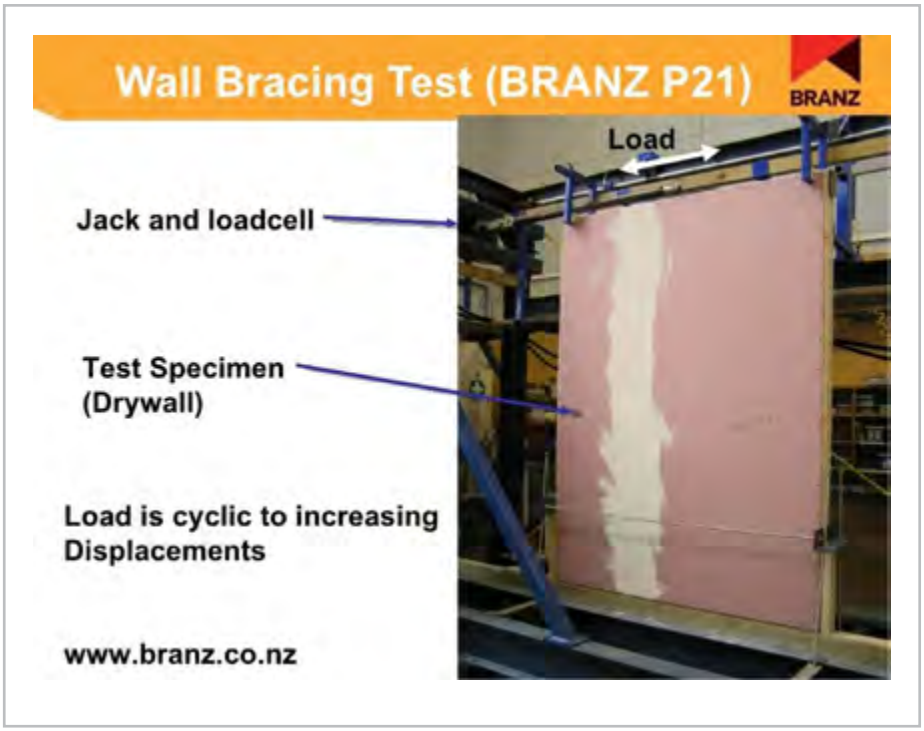


Figure 1: P21 test[1]

The results are only valid for the systems when constructed following the materials and construction details as tested. Derivation of the BU ratings (wind and earthquake) includes consideration of:

- adequate strength to withstand the maximum likely wind and earthquake loads
- adequate stiffness to avoid excessive deflections
- adequate elastic recovery after loading to prevent unacceptable permanent deflection
- resistance to repeated loading and demonstration of ductility and reserve of strength so that earthquake energy can be adequately dissipated.

1 https://www.slideshare.net/cjvial/timber-houses-and-buildings-in-new-zealand

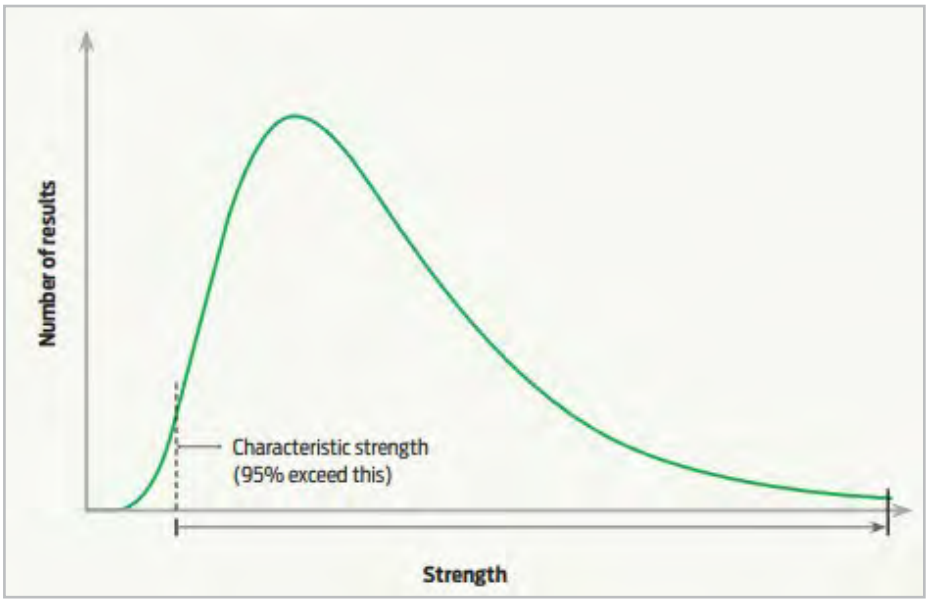


Figure 2: Characteristic strength graph[2]

## Understanding Characteristic Strength and Demand

Structural engineers typically design with timber, steel and concrete using their characteristic strengths. This means that extensive testing has determined the range within which a material will fail. Characteristic strength is defined as that level of strength below which a specified proportion of a population of the material or assembly is expected to fail. Unless otherwise stated, this proportion is taken to be 5% based on a statistical probability methodology (Figure 2).

Using this approach provides reliable factors of safety by using materials that have been extensively tested.

## The Difference Between Characteristic Strength and P21 Testing

### Why is there a Difference?

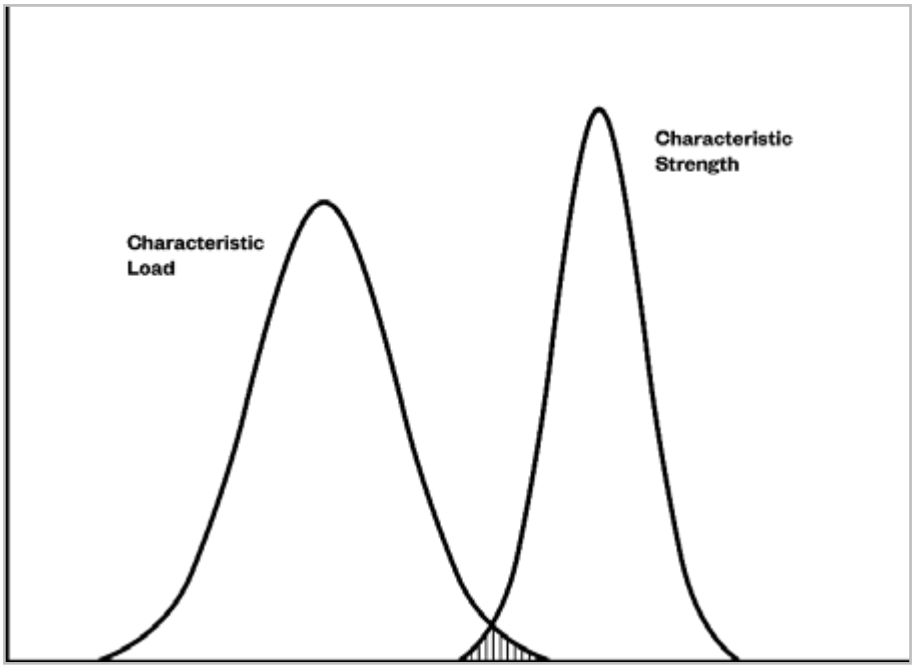


Figure 3: Characteristic load vs characteristic strength

### Verification Methods vs Acceptable Solutions

Engineers use NZBC Verification Methods to design outside the scope of Acceptable Solutions using calculation and analytical methods such as mathematical modelling. When engineers design using Verification Methods, they factor in the demand and the characteristic strength of materials to increase safety margins.

Using Verification Methods requires the engineer to fully understand the loads and expected behaviour of the structure they are designing.

Acceptable Solutions, and associated Standards such as NZS 3604, are written for a general audience without the knowledge of a professional engineer. Therefore, they are kept simple and only apply to a limited range of buildings with high levels of redundancy when designed and built in accordance with the Acceptable Solution.

Unfortunately, with the drive to achieve the more complex and ambitious plans increasingly being proposed, some engineers apply NZS 3604 principles to buildings that do not fit the intent of that Standard. BU ratings derived from the BRANZ P21 test method are not characteristic values but represent the average of peak loads recorded for three nominally identical specimens.

Although the effect of variability between specimens is minimised by capping high results to a maximum of 20% above the lowest, one or two out of three specimens may still perform below the average values used to derive BU ratings. While this may seem odd from a pure engineering viewpoint, it is deemed acceptable for buildings designed and constructed within the scope of NZS 3604, given accepted redundancies and load sharing within such a structure.

### Performance of NZS 3604 structures

Traditional NZS 3604 type structures have performed very well in past earthquakes. We saw the results following the Canterbury earthquake sequence, where the primary damage was from ground liquefaction or settlement and other

2 https://www.buildmagazine.org.nz/assets/PDF/Build-144-35-Design-Right-Understanding-Loads.pdf

impacts such as falling chimneys. Those houses affected by shaking only in the Canterbury earthquake sequence, while sustaining damage, did not collapse.

Testing of NZS 3604 type structures and experiences following recent earthquakes teaches us that assumptions relating to redundancies are valid as they relate to relatively simple timber-framed buildings. These redundancies are due to factors like:

- the relatively high number of walls,
- partial height windows,
- lintels over doors providing some portal frame action,
- secondary effects from skirting boards and scotias and occasionally from secondary walls not identified as 'bracing' walls,
- load-sharing which takes place through non-structural connections such as plasterboard stopping.

### Risk of using P21 systems outside of the intent of the Acceptable Solutions

When engineers work outside the scope of the Acceptable Solutions, the 'benchmark' for compliance is

B1/VM1, which doesn't have a cited design standard for materials such as plasterboard or fibre cement.

When using P21 test-derived BU ratings outside Acceptable Solutions, the engineer relies on tests that do not provide the same level of surety as those for concrete, steel, and timber. This means that the overlap between characteristic load and the system's strength is unknown, as shown by the shaded area in Figure 4.

## DESIGNING BUILDINGS WITH P21 TESTED SYSTEMS

NZS 3604 and the National Association of Steel-Framed Housing (NASH) Non-Specific Design Standard are the only documents that reference the P21 test method. Engineers should not use BU-rated systems outside these Standards in Specific Engineering Design (SED) unless they fully understand what BU values represent, and that similar redundancies exist.

### What is the intent of NZS 3604

Engineers designing residential structures should read and understand the BRANZ Study Report SR 168, which covers the Engineering Basis for NZS 3604 (Shelton, 2007),[3] which shows that NZS 3604 is intended for lightweight timber-framed buildings that

- are reasonably symmetrical,
- have regular bracing lines with similar amounts of bracing on each line, are one or two storeys high,
- have a floor area (footprint) that falls within the scope of NZS 3604,
- have multiple redundancies and alternative load paths (as mentioned previously). This is also the intent of the P21 test, as outlined above.

### What if the Structure Does Not Meet the Intent of NZS 3604

Structures outside of the intent of NZS 3604 frequently do not have the characteristics shown above.

Because the structures lack those characteristics, the engineer must consider the impacts of using P21 bracing systems in conjunction with SED.

### Additional damage

Lightweight timber-framed structures (often architecturally designed homes), designed using a mix of NZS 3604 bracing and SED, suffered much greater damage than structures without SED during the Canterbury earthquake sequence. The damage was primarily due to stiffness incompatibilities, which meant that the buildings twisted and suffered consequential damage. BRANZ Study Report SR337

### Design

Guidance on Specifically Designed Bracing Systems in Light Timber-Framed Residential Buildings (Liu, 2015)[4] provides guidance on how to design structures, including a mix of SED and NZS 3604 design.

### Additional risk

The risk to life involved in designing/building a lightweight timber-framed two-storey dwelling with few inhabitants is relatively low. Conversely, a multi-storey building may have many units and many

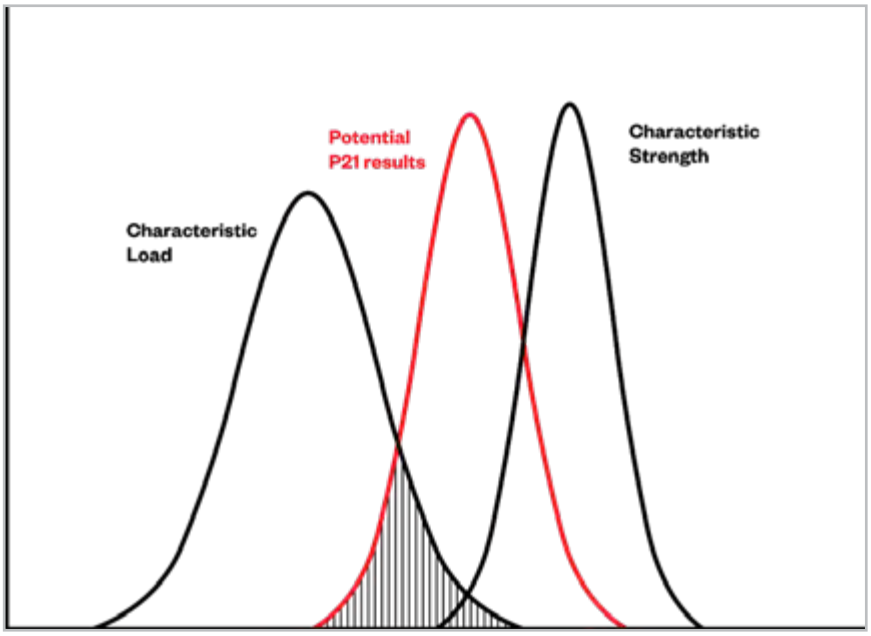


Figure 4: Potential for decreased safety margins when using P21 systems outside of Acceptable Solutions

3 https://d39d3mj7qio96p.cloudfront.net/media/documents/SR168_Engineering_basis_of_NZS3604.pdf
4 https://www.branz.co.nz/documents/203/SR337_Design_guidance_bracing.pdf

potential inhabitants/tenants.

### Ductility disparity

The authors of NZS 3604 considered a ductility of μ = 3.5 appropriate for a well-designed light timber- framed building. The (yet to be published) timber design standard only allows for a ductility of μ = 3.0.

### Using appropriate Standards

When engineers design structures, they should use the appropriate material Standards (for example, the timber, steel and concrete standards) to ensure that the design strengths are equal to or greater than the demand. Because of these different design philosophies, engineers should only rely on P21-tested BU ratings with a complete understanding of what they represent.

### Compatibility with the rest of the construction

Irrespective of the BU ratings derived by the P21 test, NZS 3604 imposes a limit on the bracing capacities of tested elements by limiting ratings, commensurate with the strength of the surrounding structure (e.g. floors and foundations). Designers need to be aware of this. For example, the strength of the hold-down system for a bracing element must not be less than that resulting from the strength of the bracing element – a capacity design principle.

### BRANZ multi-story light timber-framed design guide

The BRANZ multi-storey light timber-framed buildings in New Zealand engineering design guideline[5] (BRANZ design guideline) demonstrates the SED of light timber-framed walls, connections, and buildings up to six storeys.

Timber design Standard NZS 3603 (1997) provides strength values for lining materials, such as plywood, and calculations for the design of connections. Some manufacturers can provide strength and stiffness values for proprietary products in line with capacity design principles. The Standard is soon to be replaced by NZS/AS 1720.1.

Figure 5: Three storey town house

## Examples

### Example Four (Figure 5)

Does this meet the intent of NZS 3604?

- It is three storeys high
- A low ratio of walls to windows in the across direction
- Irregular bracing lines
- There are unlikely to be expected redundancies in the system

✕ No – it is a series of three-storey townhouses and outside the scope of NZS 3604.

Appropriate design methodology

1. Design the bottom storey applying SED, relevant material standards, and characteristic values. μ = 1.25 is considered an appropriate ductility for the ground floor.
2. Stiffness of the bottom storey is a major influence on the behaviour of the upper two storeys.
3. The lateral demand on the entire structure must be calculated from AS/NZS1170.
4. The top two storeys may use P21 tested BU-rated bracing systems provided NZS 3604 assumed redundancies exist.

### Example Seven (Figure 6)

The top floor of this six-storey structure was designed using P21 tested BU-rated bracing systems. The demand was derived using the method described on the next page and the structure was designed with these limitations in mind.

With respect to the top storey, does this meet the intent of NZS 3604?

- High ratio of walls to windows
- Multiple internal walls with redundancies comparable with NZS 3604 construction
- Regular bracing lines with well-distributed bracing – unlikely to be torsionally sensitive
- Upper level only

✕ No – Sited on concrete lower levels, the methodology to provide bracing resistance on the top floor only is described below

Design methodology adopted by engineer

1. Calculate demand on upper floor walls using NZS 1170 “Parts and Components” with χ = the bottom of the timber level, and μ = 3.0 (or 3.5)

5 https://www.branz.co.nz/shop/catalogue/multi-storey-light-timber-framed-buildings-in-nz-engineering-design_748/


Figure 6: Six-storey structure and representative bracing plan

2. Distribute bracing on each bracing line based on a tributary width approach (not as per NZS 3604)
3. Check walls are generally laid out reasonably symmetrically and have good redundancy, as mentioned earlier in this document
4. A few other requirements:

   a. Check the ceiling system used is in line with NZS 3604 (not a suspended ceiling or adjustable clips without blocking)

   b. Only use with truss or timber-framed roofs

## Conclusion

NZS 3604 type structures have proven capabilities in earthquakes and various wind zones. As shown in the Canterbury earthquake sequence, compliant NZS 3604 structures performed well. However, many architecturally designed houses with less redundancy and a mix of BU-rated and SED bracing elements suffered higher levels of damage.

P21 tested bracing systems are designed for use within the bounds of an NZS 3604 structural system, with multiple load paths and redundancies which we cannot accurately model. Because of these acknowledged redundancies, BU ratings do not represent a characteristic strength similar to systems designed in accordance with the various material Standards referenced by B1/VM1 (e.g., timber, steel, concrete).

Because of this characteristic strength disparity, engineers should not use BU-rated systems in SED structures unless they give due consideration to the limitations and assumptions of these systems.

Such an approach would need to be considered an Alternative Solution to the NZBC, as no Verification Method allows for the use of the P21 tested system and average strength values.

Therefore, professional engineers who carry out the design should show that they:

- have sufficient understanding of the tested system,
- are aware of the system limitations, and
- clearly demonstrate how they are compensating for those limitations.

***A full copy of the article, including all illustrative examples, is available on our website.***

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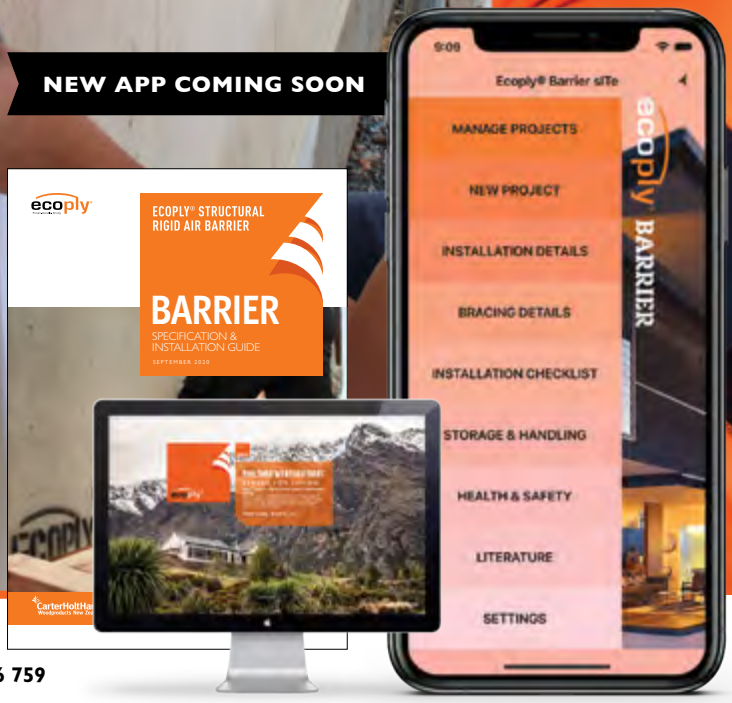


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# Case Goes to Court to Force Construction Parties to Pay

**A decision delivered by the High Court in March of this year is a helpful reminder of the challenges that can be experienced for councils in defending building defects claims against them.**

The case of *Johns v Hamilton City Council & Ors* (CIV-2019-419-222) proceeded to trial primarily because it was not able to be resolved satisfactorily beforehand by way of settlement. This was due to the variety and number of construction parties involved in the claim and in a sister proceeding *Hamilton City Council v Parrot & Ors* (CIV-2020-419-153).

The plaintiff, Mr Johns in the first proceeding, sued the Council and the developer/builder, Mr Davey. In turn, the Council and Mr Davey joined various construction parties as third parties.

In addition, the Council issued a separate proceeding claiming against some of those same third parties and additional construction parties. In 2008, Mr Davey built two houses. One for Mr Davey to live in and the other to be sold, which was purchased by Mr Johns in 2009.

In 2014, Mr Johns became aware that the deck was leaking and engaged a builder to repair it. In 2016, Mr Johns applied to the Weathertight Homes Resolution Service for an assessor's report. After receiving the assessor's report Mr Johns conducted a full reclad of the property. He then sold the property in May 2019 and issued the high court proceeding seeking the cost of the actual repairs in damages.

In terms of timing, which is not unusual with building defect claims against councils, preparation of the evidence for the trial and the trial itself took place some 13 years after the construction of the property.

This inevitably meant that the Council officers involved would not have had any tangible recollection of their involvement in inspecting during construction given the amount of time that had passed.

> *The Council's inspection processes are often looked at under a microscope, sometimes with the benefit of hindsight*

Here, the Council inspectors involved during construction did not give evidence at the trial. As a result, the documentary record on the Council's file became the most reliable record of the Council's inspection process. The case is a good reminder that it is always important that council inspectors actually give evidence in court even if their recollection is sketchy. Otherwise, the court is able to take the inference from their absence at trial that the evidence they would have given would not assist the council's defence to the claim. This was noted by the trial judge in this decision.

A further aspect of the decision highlights that the Council's inspection processes are often looked at under a microscope, sometimes with the benefit of hindsight which can result in heavy criticism by the court. In this decision, aspects of the construction which would be the type of issues that would ordinarily be detected by a site supervisor or project manager were found to have been missed by the Council inspectors. The Council subsequently was found to have a liability for these less obvious defects. An example is there having been no provision to seal or flash rivet penetrations through the roof metal parapet flashing.

In respect of some of the defects, the Court formed the view that the Council inspectors could not be satisfied that they had reasonable grounds to conclude the building work had been constructed correctly. Absent evidence of enquiry of the construction parties involved, the Court concluded the Council inspectors ought to have required that the areas of construction work be deconstructed in order to satisfy themselves that the building work was code compliant.

While this claim is a good reminder of the high threshold that the courts sometimes place upon the quality of councils' inspection processes there was no alternative other than to proceed to trial in this case. This was required to establish the liability of the construction parties who would not meaningfully participate in attempts to resolve the claim prior to trial.

The apportionment of liability to the Council was set at 25% which was a little higher than the usual 20% because the Council had settled prior to trial with one construction party.

Despite the liability findings, the Council was successful as it achieved an award of 75% of the claim against Mr Davey and the other construction parties.

*By Sarah Macky, Partner, Heaney & Partners*

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CONFERENCE 2022

# SBCO/Conference & Expo 2022 Wrap Up

**The 2022 SBCO/Conference and Expo (held in Rotorua, 7-10 August) was our first full conference in three years and it was great to be back. It included talks on numerous topics and several side talks in a smaller room. Most of these were technical with a nod to our theme of 'Let's talk about the Future' and how we could survey and build that path and what it would look like.**

It was great to be able to interact with everyone during the three days and many great conversations were had as we had over 300 in attendance. Thank you again to all who attended, delegates, stakeholders, exhibitors, and speakers, without you and your support this would not have been possible.

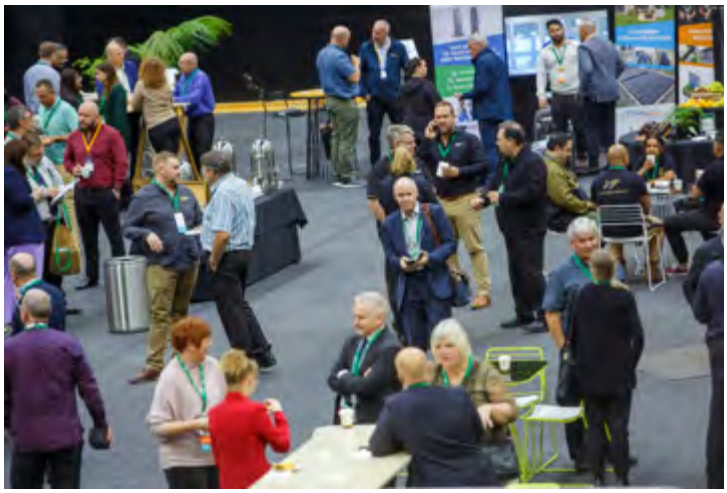
We have received a lot of positive feedback about the conference, which was nice to hear as well as ideas to apply for next year. We put a lot of effort into creating a great conference and experience, and it seems to have worked well.

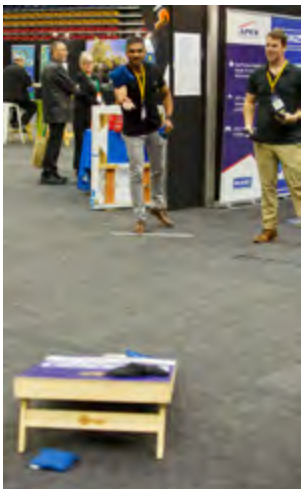
As we are not able to show you everything from the Conference and Gala Dinner, we still wanted to share with you a few highlights.


**AWARDS -** Congratulations again to all our award winners, to see the full list head to our website.

**SPEAKERS -** A range of speakers gave their time and expertise which was greatly appreciated with many delegates gaining valuable information.

**GALA DINNER -** The scene was set to be a James Bond affair at Skyline Rotorua. With a gondola ride to the top and a martini in hand, the night started off with a bang.  Hosted by Te Radar and sponsored by ICC Evaluation Service, the festivities continued throughout the night.





**EXHIBITION AREA -** The Expo area was a great place to hang out, get one-on- one time with exhibitors and delegates alike and enjoy the catering, especially the coffee cart.

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# BOINZ - Life Membership Award

**We recently held our annual Conference in Rotorua and at our Gala Dinner and Awards night, Kerry Walsh was awarded the Life Membership Award. This award reflects a member who has continually given to the Institute for the betterment of his peers.**

Kerry was schooled in Rangiora, before attending Christchurch Polytechnic, he started work at the Waimakariri District Council as a Plumbing and Draining Inspectors assistant, before taking on a Building Technician's Cadetship and being appointed a Building Control Officer.

His career then followed several appointments in other councils including Queenstown as a Building Consents Officer, before moving north again to Christchurch City Council. He then spent some time in private building inspection with Prime Building Compliance, and then back to Waimakariri District Council. He is now the Property and Building Manager for Hurunui District Council.

Kerry is a passionate Building Officer with his main focus is around the customer experience. This was and is a personal hallmark. "I am forever pushing toward a more positive customer experience in relation to building in the Hurunui District and NZ wide". This push is focused on each and every interaction with our customers from applying for consents, booking inspections, carrying out an inspection, issuing a CCC to the long-term customer experience with durability and satisfaction of building owners and their houses.

Kerry joined the Institute in 1993 and remembers going to BOINZ meetings back then. In 2007 he took the reins of the Canterbury-Westland Branch as chair before another big leap onto the Institute's Board in 2009.

As a Board Member, he was extremely active across several areas including:

- the Board's Complaint Committee,
- numerous training advisory roles,
- the Accredited Building Surveyors Technical panel,
- the Audit Committee and
- Constitution Review Committee

In 2016, Kerry was elected by his Board peers as President of the Institute and held that role for two terms until he chose to stand down in 2020.

Regarding the Institute Kerry says "They are my second family and are my people. They are not for profit - everything they make comes back to us and the industry. The training BOINZ provides is of the highest quality which greatly benefit my team members. The networking between members is also very important to me and for me to carry out my role".

Kerry believes if you are a Building Officer you should be a BOINZ member. How would you operate if you weren't, he questions. You would not have all the information, tools, contacts, training, representation, and the support.

When Kerry is not at work, he enjoys spending time at home on the land doing jobs as well as spending time with my wife and boys. I love to have a project on the go.

Kerry is also passionate about Rowing and is the chairman of the St Bedes Rowing Club. He is really looking forward to the rowing regatta season including Maadi Cup in 2023. "I love being part of a team that all get along, does well and get good results".

With Kerry's awards, he has now joined a special group of 15. The last time this award was given out was four years ago in 2018. The institute is honoured to have the support of Kerry Walsh and welcomes him into the Life Membership Club.

ALLCO

# Leaks: Five Reasons Why they Occur and How to Prevent Them

**As a supplier of materials used for waterproofing and preventing leaks, Allco is also typically involved in the investigation and remediation of leak problems. This experience has provided us with an understanding of the most common causes of leaks and how leakage problems can be minimised or avoided altogether.**

Below are the top five issues that are most often the causes of leaks:

## 1. Joint sealant absence or inadequate installation

The product is either not installed at all or is installed without adhesive, without proper joint preparation, with inadequate concrete coverage, or is physically damaged prior to covering. It is a common misconception that joint sealant is superfluous because the waterproofing membrane is already protecting the structure anyway. However, this reasoning fails to recognise that the joint sealant is located precisely in those locations where the membrane is most likely to become damaged like the wall/slab joint, which is a common area for leaks to occur. This area is known to be the sloppiest, most debris-laden area within any waterproofing project. The same issues exist on an under slab or wall application where a "tail" of the membrane may be exposed between concrete pours. The membrane can be damaged during this exposure period, necessitating the proper function of a joint sealant.

Solution: Ensuring proper installation of joint sealants such as CETCO Waterstop RX combined with the correct adhesive, and making sure the membrane is not damaged prior to pouring concrete.

## 2. Poor backfilling of soil against membranes

Although the membrane itself may be installed well on a freestanding wall application, the placement of backfill remains critical to the success of the system. This task is often left to earthworks contractors with little knowledge of or concern for the waterproofing membrane. Consequently, they may use improper materials (large rocks or construction debris) which can damage the membrane. They may not compact the backfill in lifts, allowing voids to occur which can threaten seam integrity as well as not covering the membrane all the way to the termination, allowing deterioration of exposed areas.

Solution: Proper backfilling (as described in the Allco Technical Backfill Document) is extremely important and make sure earthworks contractors knows their responsibilities. Use project inspectors to monitor the backfilling process and make sure to specify the materials to be used for backfill in the project.

### 3. Improper terminations of the waterproofing membrane

The membrane is often not terminated with a secure mechanical and hydraulic seal. Dirt and debris can fall behind the membrane during and after backfilling, allowing water from above to flow into these openings causing apparent leaks inside the structure.

Solution: Construct terminations with termination bars and accessories like sealing mastic. Monitor the backfilling process to prevent damage to terminations and ensure backfill extends above termination and that tie-ins to the building envelope are completed according to plan.

### 4. Poor detailing and lack of sealant products

This category covers a wide range of installation defects but can be summarised with the broad statement that wherever the membrane is penetrated is a common source of leakage. These areas include wall/floor joints, column transitions, tiebacks and pipe penetrations. Leaks often occur in these areas when the membrane system is penetrated after it has been installed.

Solution: Ensure proper details are executed according to project-specific plans. Ensure all details have adequate accessories and joint sealants such as CETCO Bentoseal and CETCO Waterstop RX are used, paying extra attention to areas that are susceptible to leakage.

### 5. Lack of communication

Communication among key parties involved in the application of the waterproofing system is key. Often there is a failure to hold pre-construction meetings and ongoing status meetings to address specific issues and identify areas of responsibility for different aspects of the project that affect the waterproofing system. This lack of communication results in a wide variety of problems that can ultimately cause leaks. Inadequate site conditions provided by general contractors can be also an accruing problem.

Solution: Project specifications must include waterproofing pre-construction meetings, to be attended by the general contractor, earthworks contractor, waterproofing applicator, inspector, and architect/engineer at a minimum. These individuals should review project details and coordinate the waterproofing work with other site work.

### Repairing leaks

Addressing these known trouble areas at the outset of a project will dramatically reduce the potential for problems. Leaks are avoidable if proper preventative measures are taken early on the process.

PLUMBERS, GASFITTERS & DRAINLAYERS

# Updates from Plumbers, Gasfitters and Drainlayers Board

## Building Consent Authorities

The Board wants to work better with Building Consent Authorities (BCAs) throughout the country. As part of this we will look at how we share information and where we can work together to deliver better outcomes for practitioners, councils and the Board.

Each quarter we pull together key themes that we have identified through our complaints process and share them with BCAs. For the first quarter of our licensing year our, Complaints team has seen inquiries relating to billing and contractual issues have begun to increase. They represent an average of 19% of the inquiries for this quarter, compared to an average of 10% in the same quarter last year. This is not surprising given the current consumer sensitivity to costs and the realities of a business environment where product and labour shortages need to be accounted for.

Our data also shows a correlation between notifications around billing and contractual issues and with consumers struggling to get council documentation from plumbers and drainlayers, such as producer statements and as-laid plans. As finances begin to get more stretched, more consumers will dispute their bills. This can have a knock-on effect for BCAs getting these documents used to sign off for code of compliance. We are seeing that licensing issues remain the majority of those noted in this quarter. Unauthorised work notifications were particularly high with 46% of the notifications relating to unauthorised work.

Plumbers, Gasfitters and Drainlayers Board

A high number of unlicenced work notifications is normal for the first quarter of the licensing year. This percentage is slightly higher than 2020 (40%) and 2021 (43%). This increase is not surprising given in 2020 New Zealand was in a lockdown during the main relicensing period. Also, in 2020 the CPD was waived due to the uncertainty around meeting in person for the CPD roadshow, this meant that there was a lower barrier in 2021 for tradespeople to relicense.

We do have concerns that as financial pressures increase more tradespeople

will delay getting their licence each year.

If this information is helpful and you work at a BCA and want to keep up to date with what we are doing email us on enquiries@pgdb.co.nz. The Board has a number of plans in place to work better with BCAs.

## Problem spots in drains

When practitioners install our drainage system, they construct it to avoid the likelihood of blockages.

Some of the likely places a blockage occurs is where we have a change in direction or the intersection of two parts of the system. This can be because the change in direction may allow waterflow to continue and the solids to become stranded, or sometimes even pushed back up into a branch.

With the increasing number of water saving devices for reducing the volume of the toilet flush, sometimes there simply isn't enough water carrying the solids to get them past these tricky corners, often leaves things sitting high and dry waiting for the next flush.

As its always been, connecting of drains or branches needs to be made with junctions with an upstream angle of no greater than 45°. For a drain to join another at right angles (or 90°), practitioners use the 45° junction, and then a 45° bend.

Recent modifications to AS/NZS 3500 Part 2 have resulted in changes to how practitioners set-up the junctions and branches in our foul water drainage systems to try and alleviate blockages at these problem spots.

AS/NZS 3500.2:2021 clause 4.9.1.2 (proposed to be cited in G13/AS3) now requires that for new Installations;

"Where a junction is used to make the connection of a DN 100 branch drain to another 100 DN Drain, the entry level of the branch shall be elevated at an incline of not less than 15° above the horizontal."

What does that mean? And what needs to be done?

Practitioners now need to set up their junction by tipping it on an angle a bit. If a junction is on a slight angle it makes it more conducive for what's flowing from a branch to continue flowing without getting left stranded without any water. It also stops anything else backwashing up it.

It all means that for junctions where the drain and branch are the same size and are;

- joining at a right angle, needs to have the junction at sitting at 15°(pointing slightly up), and then a 45°bend,
- coming from a 45° angle, the junction sits at 15°(sitting up) needs a 15° bend to bring it back onto the correct gradient.

Where it's an unequal sized branch coming in, the rules have stayed the same - that's having it so that the invert (inside bottom) of the branch is at least 10mm higher than the soffit (inside top) of the drain to which its joining.

So hopefully by setting up our branches like this, everything will keep on its journey.

## Electricity and Gas, high risk databases

All gasfitting work falls into one of three classes of risk. Each class has different requirements when it comes to their completion certificates.

Practitioners must issue the Gas Safety Certificate within 20 working days and must also enter any details of High-risk gasfitting on the WorkSafe Electricity and Gas High-risk Database as well.

The Gas (Safety and Measurement) Regulations 2010 specify what information practitioners are required to retain about the work that they have done. This information is captured on the gasfitting certificates. The certificates aren't just a record of the work done and who it was done for, but they're a statement from the practitioner saying that the work is compliant, safe, and is connected to a gas supply.

These are legal documents that provide assurance to gasfitters, consumers, regulators, insurance companies, local authorities and energy suppliers of the safety and compliance of the work.

It is important that the information on the Certificates is complete and the details are as thorough as possible.

WorkSafe provides gasfitting certification templates that capture all of the information required. They are available both as PDF and Microsoft Word on the WorkSafe site below:

Gasfitting certification templates | WorkSafe

The High-risk database holds the records of the work classed as being of the highest risk. It provides public access to key mandatory information about where this work was carried out and who certified it. It also provides WorkSafe and regulators information to assess and improve competency and safety of installations.

Please note, entering a High-Risk job onto the WorkSafe database does not replace Gasfitting Certificates.

***For more information or to keep up to date with what we are doing, email us on enquiries@pgdb.co.nz.***

# Metal Roofing Code of Practice Drainage Calculators

**The New Zealand Metal Roofing and Wall Cladding Code of Practice (COP) has several calculators that augment the water run-off information given in E2/AS1.**

These include:

- Maximum length of run
- Valley capacity
- Area above penetrations
- Area above spreaders

These were developed by WSP engineering in accordance with AS/NZS 3500.3 and give custom solutions for a wider number of situations than the set limits offered by E2/AS1.

But are they unconservative compared to the Acceptable Solution?

A set solution must cater for all variables, so a good acid test is to compare the solutions in COP with E2/AS1, under a worse-case scenario. Rainfall can reach 175mm/hr in NZ, but in residential locations that is unlikely to exceed 150 mm/hr (50 year ARI), so that is the rainfall intensity used below.

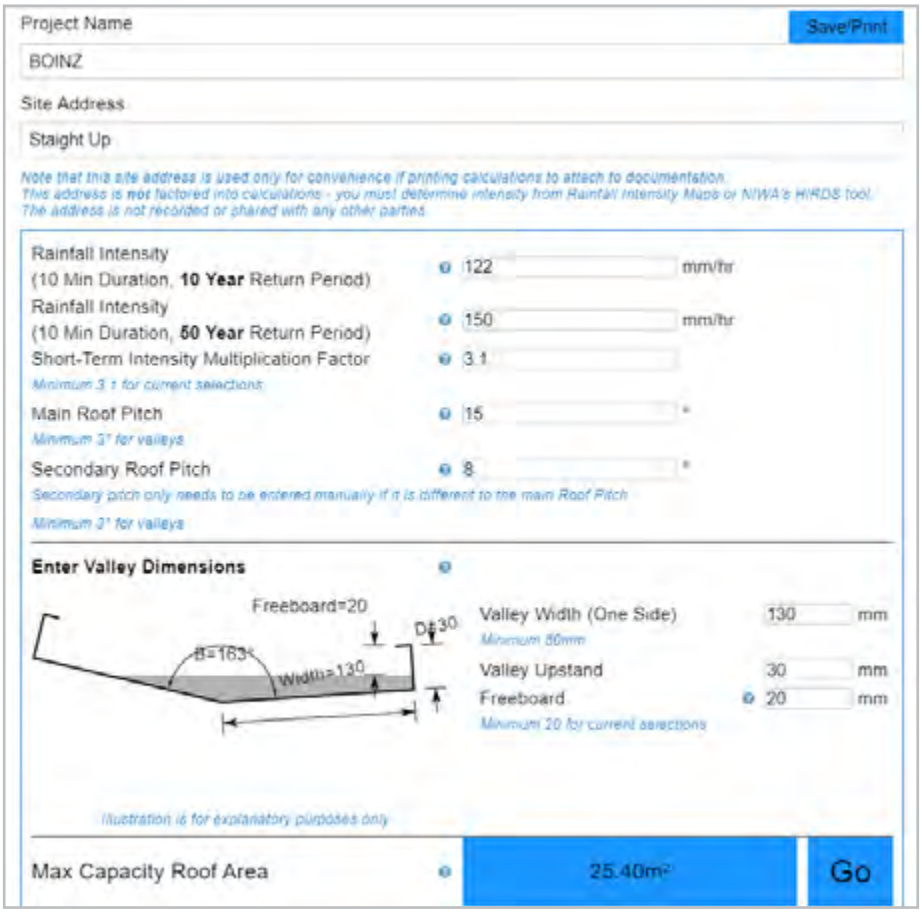
As you can see the COP is more conservative than E2/AS1 in those scenarios, in many cases markedly so. Admittedly that is using a very high rainfall and the lowest trapezoidal covered by E2/AS1 but set solutions for such important design factors should cater for all circumstances within their scope.

As lower rainfall levels, steeper pitches and higher rib heights are entered, the COP will offer catchments well in excess of E2/AS1 set limits. However, as simple test above attests, the drainage calculations in the COP are inherently more conservative than E2/AS1 and can be used with confidence.

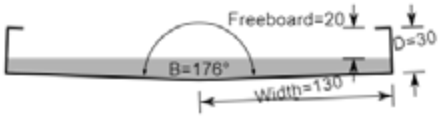
**COMPARISON OF E2/AS1 AND COP IN A 150 MM/HR RAIN INTENSITY**

| Function | Corrugate 17 mm 8° Minimum Pitch | | Trapezoidal 20 mm 4° Minimum Pitch | |
|---|---|---|---|---|
| | E2 | COP | E2 | COP |
| **Maximum Run** | No Limit | 22m | No Limit | 31m |
| **Standard Valley Capacity** 250mm wide, 20mm deep | 25m² | 10m² | N/A | 2m² |
| **Area above penetration** 750mm wide discharging one side | 6m² | 0.9m² | 12m² | 3m² |
| **Area above spreader** 6m run to lower roof | 25m² | 19m² | 25m² | 16² |

Green figures indicate COP is more conservative




Example of an asymmetrical valley calculation showing two pitches and factor for short term rain intensity variation.

| ALLOWABLE CATCHMENT OF 3° STANDARD VALLEY AT 150MM/HR RAIN INTENSITY | | |
|---|---|---|
| Valley Depth | 20mm | 30mm |
| Allowable Catchment | 1.2m$^2$ | 17.4m$^2$ |
| Illustration |   |   |

One of the key areas that makes our solutions more conservative is that our calculators multiply the 10-minute intensity by a factor to equate it to a 1-minute event. That is because within that 10-minute period, rain intensity will fluctuate by a median of 3.1 X the average, and it only takes a minute for a valley to flood. It also calculates capacities for valleys between roof of different pitches, an increasingly popular design detail.

The COP also offers solutions for valleys at less than the 80 limit imposed by E2/AS1. Because much of a standard valley cross section would be taken up by freeboard, the secret to getting these to work is to the decrease the thickness of the valley boards to achieve more depth in the valley. Deeper valleys may also affect the capacity of the spouting that they discharge into, this should also be considered, and rain heads or extra downpipes installed where necessary.

The MRM welcomes feedback and queries regarding the COP and can give training on the use of the COP calculators as required.

*Article written by Rod Newbold*

*NZ Metal Roofing Code of Practice*

*Ph: 021 541 986*

*Email: roofmattersnz@gmail.com*

TRACKLOCK

# Rise of the Calculator

**Those involved in the design, construction or fit-out of interior commercial spaces, are familiar with and have been required to provide a PS1 or estimate the cost of materials for a seismically compliant design.**

Even if they've been in the industry for years and it's never been a "problem", they have noticed it's a question that's being asked of them.

## Supply Chain Pressure

As we know there are several reasons behind this change. The need is driven by an increasing council requirement for consent at an early stage, and also by the challenges of supply chains, and a need to order materials early. Designs need to be signed off and materials need to be ordered earlier than ever. Pressure on the supply chain means a Just-In-Time strategy is now too risky so designs need to be locked in early. No one wants a last minute design change because the seismic engineering requires it.

## Tender Requirement

Equally, leaving the cost of interior seismic engineering as an unspecified amount on tenders is becoming less acceptable. Those tendering for work need to be able to show their planned design and cost will stand once the project is underway. However, as a contractor, it's a significant cost to include a PS1 for a tender you may not win.

The range of construction professionals needing to secure a PS1 or provide an accurate estimate of costs is increasing by the day. Asset owners, head contractors, designers, architects, project managers, quantity surveyors, fit out suppliers and fit out contractors are all needing to dive into the world of seismic calculations. It is important therefore for Building Authorities to be aware of what is out in the marketplace – what's good and what may have bias.

## Seismic Calculators and Wizards

The use of seismic calculators have been increasing in response to these changes. The ability to input the variables of the build into a wizard, and check that the outcome will be seismically compliant, gives confidence and accuracy to a quote or tender application. It also allows the correct information to be supplied with consent applications.

The costs around seismic design have often been referred to as a dark art, with non-engineers left uncertain of their design prior to a PS1 completed by a seismic expert. However, the

seismic calculators are able to provide a pathway to achieving compliance, and provide more certainty for users.

It sounds like a fairy tale ending to a tricky story – as technology saves the day. Unfortunately there are some limitations which make the solution less than perfect.

- The majority of seismic calculators apply only to designs for buildings of Importance Level 1-3. This excludes buildings that need to continue functioning after an earthquake, such as a hospital or some police stations.
- Many calculators limit their use to buildings under a certain size, or ceilings under a certain weight
- Most calculators are specific to the company that creates them, limiting the choice of product to their range. This is not always ideal when contracts haven't yet been given, or when more flexibility is needed given supply chain challenges.
- Calculators can quickly become out-of-date. The building code is updated every six months. This means that the calculators must also be continually updated to stay in line with the latest code.

Calculators are a great guide, but do not give you 100% certainty. That only comes with a signed-off PS1 reviewed by an engineer with interior seismic expertise.

However, in many cases, an engineer sign off may not be needed just yet. This is when something more than a calculator is required; a wizard with more flexibility than a simple step by step approach.

## More than a Wizard

Choosing a web app such as TRACKLOK® Calculator powered by Prenguin, provides the functionality of a wizard but with greater depth of engineering capability to help get around the issues discussed.

Built as intelligent software, the TRACKLOK® Calculator is constantly updated to reflect the latest changes in the building code, and the resulting designs have 100% certainty of being seismically compliant. This is because the software is designed by seismic engineers specialising in the field of interior engineering. The complexity that sits behind the calculations ensures the app can be used for buildings at an IL4 level, and can handle calculations for ceiling weights and heights.

The TRACKLOK® Calculator designs for standard ceiling and partitions are detailed and accurate enough to submit to an engineer for a PS1. With the confidence that comes with a TRACKLOK® calculation, a PS1 can be signed off within hours by a registered engineer.

We encourage all compliance practitioners to become familiar with this software as it will revolutionise the ability for designers, building professionals and others to design like an engineer – we hope the outcome will be tighter compliance and less RFI's.

FUTURE SKILLS

# Site Inspections, Build Connections

**My first face-to-face teaching inspection opportunity for 2022 was in Hamilton. Our cohort comprised of 25 students from different Councils across New Zealand and lasted for three days. Future Skills Academy teaches a mix of face-to-face block courses and online courses that make up the NZ Diploma in Building Surveying.**

There are six courses in year one (Level 5) which are all about residential buildings:

1. Regulatory Environment.
2. BCA Environment (BCA Regulations etc.).
3. Building Construction materials and Systems.
4. Building Code and Acceptable solutions Residential.
5. Plan Processing Residential.
6. Site Inspections Residential.

We teach five courses in year two Level 6 which are all about commercial buildings:

1. Building Code and Acceptable solutions Commercial.
2. Plan Processing Commercial.
3. Judicial Proceedings.
4. Statutory Environment.
5. Site inspections Commercial.

The way we deliver courses has changed a lot. This is mainly because of Covid-19 and what the council requires, due to the large workloads that most councils have faced for the past three years. In 2019/2020, for example, most of the diploma courses were delivered in face-to-face block courses. When Covid-19 hit in 2020, we went completely online for a while. We then surveyed all council Building Consent Authorities and came up with a happy balance between face-to-face and online course delivery. Because of the ongoing effects of Covid-19 and the respiratory flu, we have had to adapt courses and delivery many times. Despite the changes, we have delivered the course with increased student numbers.

Plan Processing and Regulatory Environment courses have been consistently delivered face-to-face although my last face-to-face inspection session was in August 2021. It was covering the same subject, Inspections.

Due to a Covid-19 outbreak in Auckland, I had to rush home quickly on the first day and finish our sessions online. This was incredibly sad for me. I must acknowledge the resilience of our students to deal with the changing landscape caused by the pandemic.

While I live in Auckland, we have Lecturers teaching the Diploma in several other parts of the Country, the Far North, Tauranga, Kapiti and Christchurch. We just need someone now in Dunedin or Invercargill and we will have the entire country covered.

Over the past three years, we have taught the diploma in student cohort groups in Auckland, Hamilton, Hastings, Kapiti, Wellington, Nelson/ Tasman, Christchurch, Dunedin and Queenstown. Our Head of Department, Patrick Schofield, and our Senior Lecturer, Peter Sparrow, have been the Lecturers, especially in year two with Patrick delivering most of the face-to-face block courses and Peter concentrating on the specialist areas of Judicial Proceedings and Statutory Environment as well as the Building Code.

Future Skills Academy has introduced specialist lecturers to teach Plumbing and Drainage and NZS3500 as well as Fire Safety and Weathertightness. This results in balance and expertise in all the subject areas BCA staff need to know. The diploma course was made for the BCA industry and designed by the leadership of BOINZ and the BCA industry to launch the initial diploma.

As an organisation, we had planned for the Covid-19/Flu scenario of moving to an online model as quickly as we could. In some instances, it was fine, especially in the certification of documentation, Building Code, and several other courses. But the practical role of an inspection does require a hands-on approach to deliver the subject in a manner that is memorable.

Our students do not get the chance to connect much and due to the pandemic, we had to restrict again this emotional connection opportunity.

Our students who are trained in the diploma have already and will by its very nature eventually take leadership roles across the width and breadth of New Zealand.

The opportunity to connect helps cement relationships that could last for years in advance. I along with our other lecturers try to encourage this as we support the Building Consent Authorities to create a healthier built environment.

I would like to acknowledge Hamilton City Council and specifically the senior building inspector, William Moffett who created a real-world opportunity for our students to experience site inspections. This could not have happened without the support of the Team Leader for Inspections, Brendon Friend, and Tessa Sayliss, the Learning and Development manager for all the Hamilton City Council students.

For the 2022 year and the first-year students, I have elected to continue the mixture of classroom teaching with some practical site visits.

We were fortunate to have the Hamilton City Council inspectors allow us to visit a multi-build subdivision in Hamilton.

The building style of this subdivision was two-storey duplex dwellings. These homes had firewalls and used engineered mid-floors. This is typical of what is currently being constructed nationwide as the district plans, the unitary plans, and special housing areas all adapt to allow more homes in a smaller area. The students were able to see the building code related to inspection requirements in action in a real-world environment.

For the 2022 year and the first-year students, I have elected also to expose students to any new possible styles or techniques of builds that do not necessarily fit within the acceptable solution framework.

I would like to acknowledge Wafaey Swelim for very kindly allowing 26 students into his extremely busy factory. Wafaey is pioneering the first ever New Zealand robot-printed concrete structures.

Check out their website here: https://qorox.co.nz/

It just so happened that on the day we visited, his organisation had just received third-party independent evidence from BRANZ! Check out the BRANZ Appraisal Number: 1218 QOROX 3 D Printed Concrete Wall System Appraisal

The introduction of the proposed modular component manufacturer rules is going to have an effect on Building Consent Authority functions. My hope of exposing students to different ways that we might build is in a way preparing these students with resilience for the future.

In summary, I am immensely proud of the conduct and the learning pathways of all the students I am exposed to in my role as a lecturer. I do know that Future Skills Academy will prepare our students to be forward-thinking, articulate, and compassionate leaders in the built and Regulatory environment BCA community across New Zealand and beyond.

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*Author: Carl Graham joined Future Skills Academy as a lecturer in April 2020. He has spent his whole working life- 41 years- working in various aspects of the building industry. He teaches the year one site inspections course for the Future Skills Academy NZ Diploma in Building Surveying Level 6.*

*Want to find out more? Get in touch with us today by emailing info@futureskills.co.nz, visiting our website www.futureskills.co.nz, or phoning 0800 888 001.*

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# CALL FOR PAPERS NOW OPEN!

The Institute invites all those who are interested in submitting an abstract to be part of Conference 2023, to head to the BOINZ website for more details.
www.BOINZ.org.nz

We are looking to build a technical programme across the building surveying spectrum. It would encompass a range of relevant industry issues, experiences, solutions and innovations. Which will offer delegates, including our stakeholders, an opportunity to gain further insight, knowledge and expertise to develop their skills as professionals in their fields.

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