straight up

THE MAGAZINE OF THE BUILDING OFFICIALS INSTITUTE OF NEW ZEALAND

APRIL 2019

In this month's issue:

Pool Fencing

Fire Testing and Exterior Wall Cladding Performance

Materials Compliance

Building Officials Institute of NZ

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straight up

IN THIS ISSUE

Cover Image: Flames and smoke after a fire broke out at the The Address Hotel in Dubai.

Photographer: STRINGER **Credit:** EPA

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Building Officials Institute of New Zealand
P O Box 11-424,
Manners Street, Wellington
Level 12, Grand Annexe,
84 Boulcott St, Wellington
Phone (04) 473 6002,
Fax (04) 473 6004
E-mail: office@boinz.org.nz

Building Officials Institute of NZ

Message from the President

This time last year my comments in Straight Up article "Opportunity Knocks or Does It?" reflected on the dichotomy of those in the industry who had pride in their building outcomes and those who sought to circumvent best practice and compliance. I alluded to the dramatic changes to our industry that have occurred in recent times, including globalisation, the increase in non-skilled labour, rapidly changing technology, product assurance issues and leadership, concluding there is an opportunity to move away from the past and seek better quality for the structures we build.

As you can imagine, the built environment problems currently experienced here exist in other countries to a greater or lesser extent. Our Institute and its members are uniquely positioned to see and experience what works and what doesn't. Ideally, we would like to be the barrier at the top of the cliff rather that the ambulance at the bottom, but our environment (read culture) and regulations often don't allow for this.

As an organisation, the Institute through its members, can influence positive change, and we have done this successfully over many years, both internally and externally. At our recent Board Strategy Workshop this is exactly what we sought to do. We looked at the roadmap ahead and landed on 3 new strategic platforms; Membership, Education and Training, and Advocacy. Each in their own way will deliver better outcomes for our members and the wider built community. Work on these platforms is currently underway and we envisage this will be available for Branch meetings April onwards.

Similarly, the regulator is about to deliver on "the biggest changes to the Building Regulations since 2004". While I have no doubt all involved will have taken the role of ensuring that buildings the community live and work in are safe and healthy, there is an equally vital component that needs addressing; the system needs effective tools and processes to bring to account the roles and responsibilities of all in the building chain. While is it a bit rich to say "we have total failure across the board" the reality is the public don't have much faith in the wider industry. The "that's someone else's responsibility – not my fault" comment is all too common and when coupled with the perception the building surveyor should ultimately sign off a build, it's not hard to see why we have a problem.

Legislative reform is about delivering on the basics and getting these right. For the last decade we have had issues around roles, responsibility and accountability. MBIE have signalled they are about to release discussion papers on Building Products, Occupational Regulation and Risk and Liability. We obviously don't want more red-tape and it is my expectation that the proposed change recommendations deliver clarity and purpose, improved definitions, better information requirements and efficient tools to deliver on accountability expectations. A strong acceptance by all sectors of the built environment, that they contribute to a better culture, and endorse a regime where failures have consequences should be a natural outcome of a well-designed legislative change.

The key areas of concern promoted by the Institute in respect of the legislative reforms have been;

- Occupational Regulation: Appropriate levels of site supervisory span of control and individual LBP supervision competence
- Products: The importance and value to the built environment of Independent 3rd Party Certification for critical product in the important building product areas of structure, cladding, fire and health.
- Risk and Liability: The impact of "phoenixing" building companies on homeowners and BCA's is disproportional to the risk responsibilities of these two parties when something goes wrong.

If the proposed reforms deliver on sector expectations, they will "Build Confidence in Building". For our part the Institute will engage ensuring the experiences and foresight of its members contribute to best performance and future proofing outcomes. We look forward to the consultation.

Kerry Walsh - President

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The Institute would like to acknowledge and thank our 2019 Premier Partners for their support.

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BOINZ TRAINING ACADEMY

Our suite of 20+ courses not only provide relevant technical knowledge delivered by industry expoerts, but also underpin four of NZ's Building Surveying qualifications. BOINZ also has new courses currently under development, always striving to help advance member capabilities.

Upcoming Courses:

April

01 - 03 April	TA002	Building Controls	Auckland
08 - 09 April	TA020	Fire Docs	Wellington
08 - 09 April	TA022	BWoF & SS	Dunedin
12 April	ADV005	Difficult to Consent	Hastings
18 April	SSFH	NZZHA Solid Fuel Heating	Hamilton
29 - 30 April	TA013	E2 Weathertightness	Timaru

May

03 May	ADV025	Earthquake Engineering	Timaru
06 May	LDR-E	Leadership Workshop 1 & 2 (Emerging Leader)	Wellington
07 May	LDR-A	Leadership Workshop 1 & 2 (Advanced Leader)	Wellington
10 May	SSFH	NZZHA Solid Fuel Heating	Dunedin
13 - 14 May	TA017	Services and Facilities	Wellington
24 May	ADV020	Advanced Fire	Dunedin
27 May	SSFH	NZZHA Solid Fuel Heating	Whangarei
31 May	ADV027	ANARP	Christchurch

June

05 - 07 June	TA024	Investigative Training	Christchurch
07 June	TA001/3	Comms & Ethics	Wellington
10 June	LDR-E	Leadership Workshop 1 & 2 (Emerging Leader)	Dunedin
11 June	LDR-A	Leadership Workshop 1 & 2 (Advanced Leader)	Dunedin
12 - 14 June	TA002	Building Controls	Timaru
13 - 14 June	TA014	B2 Durability	Palmerston North
17 June	ADV026	Asbestos	Wellington
21 June	ADV027	ANARP	Auckland

July

01 July	ADV025	Earthquake Engineering	Hamilton
04 - 05 July	TA012	H1 Energy Efficiency	Queenstown
08 July	ADV026	Asbestos	Dunedin
12 July	TA004	Accreditation	Christchurch
18 - 19 July	TA014	B2 Durability	Auckland
22 July		Barrier Free Seminar	TBC

ADV = Advanced Course

Please be aware that for a variety of reasons, course dates and locations are not final and are subject to change. To view the most current information, please visit our website.

For more information or to express your interest, contact us or visit us online

training@boinz.org.nz | 04 473 6003 | www.trainingacademy.org.nz

Exemptions, exceptions and alphabet soup

By Sarah Macky, Partner, Heaney & Partners

The decision of Plastertech Systems Limited & Simple Construction Limited v Auckland Council [2018] NZHC 3400 is a helpful reminder about how Schedule 1 of the Building Act 2004 operates when it comes to what building work is exempt from requiring a building consent and what is not.

The case was an appeal from a District Court judgment where the defendants Plastertech and Simple Construction were successfully prosecuted. The High Court found that the Council was right to have prosecuted the defendants for replacing a large window (which had been leaking) without obtaining a building consent.

Pursuant to section 1 of the Building Act 2004, building work does not require a building consent if it is "repair and maintenance using comparable materials in the same position". However, if the repair and maintenance is of an item that has failed to satisfy the durability provisions of the building code, then a building consent is required.

Plastertech and Simple Construction maintained the replacement of the window was "repair and maintenance" and was accordingly an exemption to the requirement to obtain a building consent. The critical issue in the case was whether replacement of the window involved any structural elements. As you will be aware, structural elements in a residential building must have a durability requirement of 50 years pursuant to the building code. The Council submitted the window assembly included double studs which were a component of the wall that provided structural stability for the window, the external cladding and the internal wall lining.

Plastertech and Simple Construction argued the studs were not walls and did not provide structural stability to the building.

The Court made this wonderful comment with reference to the relevant legislation:

"Understanding building consent requirements involves navigating a legal thicket of provisions, exemptions and exceptions to exemptions, all strewn with alphabet soup".

The Court found that the double studs were an integral part of the structural stability of the building and therefore were required to fulfil the 50 year durability requirement. Accordingly, a building consent was required and the appeal was dismissed.

Often the focus is on the fact that the building work is repair and maintenance using comparable products when considering whether an exemption under Schedule 1 of the Building Act 2004 applies. This case is a useful reminder not to forget about the durability requirements exception to building work which one might think is exempt under Schedule 1.

Also of significance is the extent to which Plastertech and Simple Construction were convicted and fined. Plastertech was fined $25,000 and Simple Construction, $10,000 with 90% of the fines ordered to be paid to the Council.

Addressing the complexities of confirming compliant supply

By Philip Sanders, Chief Executive, ACRS

There have been a number of recent widely-reported high profile failures in buildings and other structures in Australia. While most of these failures are still being investigated, they have all served to highlight the importance of strict quality control through all phases of construction and/or fabrication - from design and engineering, through to fabrication and construction and, importantly, the selection of materials. Ensuring that all materials and products used throughout all stages of construction or fabrication conform with Australian and New Zealand Standards is of critical importance. After all, these Standards have been considered and developed to ensure that buildings and other structures are not only 'fit for purpose', but are also capable of meeting their design life requirements.

Historically, builders have sourced materials from local manufacturers, operating to long-established standards. The quality of materials was well known and consistent, and so they, and their customers, knew what they were getting.

Then, around 20-years ago, imported materials began arriving in large quantities from an ever-increasing number of sources, offering new and often financially attractive alternatives - a larger world of choice, with (often) imperfectly understood risks.
After some recent well-publicised cases, materials compliance has, quite rightly, become a major issue in Australia and New Zealand (e.g. steel mesh, structural hollow sections, building cladding, windows, timber, to name but a few). As a result, various tools for materials selection have been created to attempt to ensure products and materials being used are 'fit for purpose' and that built structures 'meet the Code', including third-party certification systems, product selection flowcharts, etc.
Some of these are effective, providing clarity and confidence. Some are not, or not so much. So, how do you choose which to pick to manage your risk from non-conforming materials arriving on your project?

The bottom line for building professionals using any selection tool - including certification - is that you need to know what materials you are getting, and whether they remain conforming and suitably identifiable at each point in the supply chain. An unclear choice, especially coupled with low-rigour certification, can easily fool the builder or building surveyor into thinking the materials are adequately verified to a standard when in fact they are not. Or that they were at manufacture, but are not by the time they reach you.

NOT ALL CERTIFICATION SYSTEMS ARE THE SAME

Firstly, there are several different types of certification; quality, testing, inspection, or product. All do a different job, **so they may be complementary, but they are not interchangeable.**

Secondly, not all certification schemes of a given certification type are equivalent, as not all schemes do the same things, in the same ways, on the same schedule, or with the same expertise and rigour – even if all are JAS-ANZ accredited. JAS-ANZ simply looks at whether a scheme meets

the basic ISO framework and whether the scheme operator applies the schemes rules effectively. This can leave the gate open for…

Test certificates supplied with the materials claiming to show compliance of all supply: Global experience shows test certificates may not be compliant, may not be accurate, or may be fraudulent. Other test certificates attempt to set limits on their use as a valid tool, such as stating validity only in country of manufacture, not in Australia or New Zealand, or the end-use of the materials. Also, how easily can you match the test certificate to each piece of materials? Which comes from…

Poor traceability: Materials' traceability is essential if you are to avoid substitution of the specified materials in whole or part with materials of unknown conformity (even if you can identify the manufacturer).
Unfortunately, most available guides and tools, whilst calling up product certification as one option, do not provide for a critical component of product compliance - traceability. Traceability is especially important to avoid mixed supply of compliant and non-compliant materials. Which stems from…

Unverified Factory Production Control:

Factory Production Control ("FPC") is what processes and controls are in place, including testing of the materials to validate conformity, at the point of manufacture or subsequently, by any downstream processor. But what controls? By whom? (independent of the supplier, or by the supplier itself? If independently, by a materials expert scheme or a process generalist?). To what level? (all levels can be accredited (quite appropriately) by JAS-ANZ, as appropriate - it's left to the user to choose what certifier scheme they accept). And lastly, how often? (If too infrequent, experience suggests that production usually reverts to the local "norm", and that may not be AS/NZS Standards). Which leads to...

Product Certification:

So, you quite rightly demand "3rd-party certification", independent of the supplier. But not all independent, third-party certification is product certification. It could be FPC certification, or test certification. That's good, but it's just not enough.

SO, WHAT DOES A PRODUCT CERTIFICATION BODY DO?

Broadly speaking, there are 4 basic variables to be considered when certifying construction materials:

1. Samples selection from manufacture; or
2. Samples selection from market; and then
3. Periodic assessment of the production process; or
4. Audit of the management system.

The extent to which any of these four variables is undertaken, when, and with what expertise, is up to each individual scheme accredited by JAS-ANZ (or similar international body). For instance, some product certifiers may only do two of the four variables, such as one for testing and one for quality. (For the record, ACRS covers all four variables, at least once-per-year, for every production site, and uses only ACRS own qualified and experienced metallurgists and engineers).This is why different product certification schemes should never automatically be assumed to be equivalent, even if both are JAS-ANZ accredited. This is especially true in the supply of high-risk materials, like steel, or electrical goods where less rigorous product certification may leave you open to…

Materials supplied "to an equivalent standard" when it is not:
I have seen many examples of appropriately certified materials being ordered, only to find that the materials actually delivered being presented as only "equivalent" to the specified product. Such materials are sometimes supplied by a stockist from available stock made to an overseas standard that does not meet AS/NZS requirements. And this is not the manufacturer's fault: They didn't sell the materials as "equivalent". The materials supplier did.
So, how do you know what material you are getting?
Specifying either a 2-stage certification scheme (certifying both the materials manufacturer and the materials processor/fabricator) and in addition, a suitable materials traceability certification that tracks the material from source to delivery to site is the best way to be sure.

THE BOTTOM LINE

You need to know what type of certification you need and what the lowest level of certification is that you are prepared to accept. Then, and only then, should you choose your certification scheme, and what certificates you will accept – or reject.

For more information please email ACRS at: info@steelcertification.com or visit the website: www.steelcertification.com

Philip Sanders is Chief Executive of ACRS. Philip is a Chartered Fellow of the Institution of Engineers Australia, Civils College, with thirty years' experience in design, construction, specification, and product conformity.

Building Officials Institute of NZ

UPCOMING BRANCH MEETINGS

Branch	Date
Wellington	Thursday, 11 April
Auckland	Wednesday, 17 April
East Coast	Tuesday, 28 May
Waikato/ Bay of Plenty	Friday, 31 May
Northland	Wednesday, 5 June
Nelson/ Marlborough	Tuesday, 11 June
Canterbury/ Westland	Tuesday, 11 June
Auckland	Wednesday, 19 June
Wellington	Wednesday, 19 June

***Subject to change; Branch meeting notices will be sent out closer to the time of the event with further details.*

Farewell to a Prominent Member

A prominent past member of the Institute passed away in December 2018 aged 88. Archibald Henry (Archie) McDonald, held an important link with the Institute, going back to its inception as the NZ Institute of Building Inspectors in 1967. Archie's first official recognition (from records available) was as an apology in the minutes of the First General Meeting held on 31 May 1967. The chair recorded the evening as "such a poor night" so one could assume the weather may have affected the attendance of Archie and his colleague D. Petrie from Invercargill City Council at the venue Paparua County Council in greater Christchurch. While Archie couldn't join the Institute for it's 50th Celebrations he did send in a letter with a few reminiscences advising of his 10-11 hour Invercargill to Christchurch round trips for Institute meetings.

ARCHIBALD HENRY McDONALD – always known as 'Archie', passed away December 2018

Archie started with the Invercargill City Council in April 1961 as an Assistant Building Inspector on a starting salary of 880 pounds. A house was reserved for Archie and his family at a rental of 3 pounds 10 shillings per week.

The next record from Council files was the appointment of Archie to the Senior Building Inspector role, in June 1969. The comments on the letter were that "this appointment is in recognition of the efficient and satisfactory manner in which you have carried out your duties over the past 8 years".

Archie was one of the founder members of BOINZ as he recognised from an early stage that the industry needed consistency in approach to all manner of building work, and inspectors required specific training in their tasks.

Archie was well thought of within not only Invercargill but also the rest of New Zealand regarding making the job of Building Inspectors better for everyone in the industry.

Prior to starting his long career with the ICC, Archie started work in 1946 as a carpentry apprentice in Mosgiel working on housing and shopping projects. He then moved to Dunedin undertaking building work on hospital sites, then to Omarua to work on a freezing work project which involved reinforced concrete construction. He then moved with his young family to Lincoln to work as a maintenance carpenter, and then a foreman. Following this he left this position to take up the role as Assistant Building Inspector with ICC.

The letter of reference from Lincoln College is still on Council's file and is a testament to the high regard Archie was held in. In part, it read "Archie looked after 190 buildings on the Lincoln site where he managed to not only work well but also to manage appropriately the staff under his control. At all times he was co-operative and put his abilities to good use. We lose his services with regret but understand that in his new position he would add to his talents and make greater contribution by his activities".

I only knew Archie briefly as I took over his role as Chief Building Inspector in 1995 when Archie retired. He did stay on for a number of months undertaking warrant of fitness audits. He was an invaluable source of knowledge and as like most Senior Building Inspectors, he knew his town, the people in it, what was going on, who to watch and who to trust.

After his retirement Archie still managed to keep active and would often phone up for a chat about a particular building and would always end the conversation the same way – "I will leave it with you".
I can recall a newspaper article a few years ago featuring Archie making play houses out of recycled milk containers – it just goes to show once you have a talent for building, it never goes away.

Archie was a true gentleman and the industry is a lesser place without him, he is survived by his ex-wife and 3 daughters.

Simon Tonkin

DEVELOPMENT LIAISON MANAGER
INVERCARGILL CITY COUNCIL

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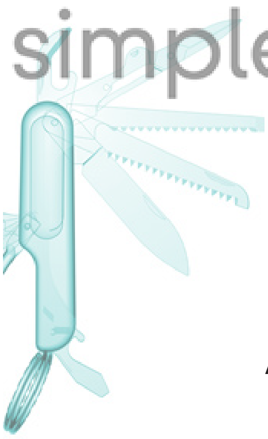



Helen Rice, Managing Partner

Have a legal question that needs answering?
Rice Speir is here to help. For 25 years we have worked with councils to make the complex simple. We answer queries from our local authority clients from the far north to the deep south. Chances are we've dealt with your issue before.

Q: What should a council do if it identifies non-compliant pool fences that have previously been passed as compliant?
From Paul Cook, Building Control Manager, Whangarei District Council

A: Safety of children around pools is paramount. That means that the answer is clear – councils must notify the owner of any non-compliance and ensure the fence is upgraded as required to prevent children under 5 accessing the pool unsupervised. This can be done informally through correspondence with the owner following a failed inspection, or formally through a notice to fix.

Section 164C of the Building Act 2004 requires swimming pools to have fences that prevent children under 5 from accessing the pool unsupervised. The council has a duty under s 162D of the Building Act 2004 to ensure swimming pool fences are inspected for compliance at least every 3 years. This ongoing duty reflects the reality that even existing pool fences (which are deemed compliant under s 450B of the Building Act 2004 so long as they were compliant when constructed) can become non-compliant over time. The simplest example is climbable trees or shrubs growing near a fence, meaning a previously compliant fence no longer complies with s 162C of the Building Act 2004.

A trickier situation is where a council's understanding of compliance changes, for example becoming aware of MBIE determinations finding a particular fence feature that had been passed previously is and was in fact not compliant. Owners will not want to hear that their swimming pool fence requires work to be compliant, especially when it has passed previous inspections with flying colours. Regardless of the reason for non-compliance, the owner must be notified and compliance required, whether that is informally with a co-operative owner, or formally through a notice to fix. The council's duty is clear – the safety of children near pools is paramount.

Please send your questions to helen@ricespeir.co.nz.

Time to "tidy up" your dangerous, insanitary and affected building policy?

By Nathan Speir, Partner, Rice Speir

At the start of a new year I - like many people - have become hooked on Netflix's cult new show about the art of decluttering.

If you haven't seen "Tidying Up with Marie Kondo" yet, be prepared to fold tea towels like you never knew you could.

These tidy up principles don't just apply at home. Council officers around the country are right now considering their dangerous, insanitary and affected building policies and asking: "Is ours up to date?"

With the window for adopting an "affected buildings" policy having now closed, we have received a number of calls in recent months from councils about what this all means and how to achieve compliance.
Now is a perfect time to make sure your policies are valid and, most importantly, user friendly. A policy that is out of date, unwieldy and scary to look at is as bad as having no policy at all.
Maybe it's time for a bit of a tidy up?

Councils' obligations in a nutshell

Councils must adopt a policy on dangerous and insanitary buildings within their district. That policy may be amended or replaced only in accordance with the special consultative procedure in section 83 of the Local Government Act 2002 (LGA).

In 2013, the Building Amendment Act 2013 added a requirement to include affected buildings within a reasonable period following the next review. As this involves amending or replacing the existing policy, the special consultative procedure is required.

Three years later, a 2016 amendment to the Building Act made councils again look at their policies to remove any reference to earthquake-prone buildings. The law said that if the amendments did not materially affect an existing policy, then the special consultative procedure in section 83 of the LGA didn't need to be followed.
Removing any reference to earthquake prone buildings from a policy can be done without materially affecting it. Highlight, delete and you're done. But, adding affected buildings is a different kettle of fish. It requires some thought and a more robust process.

What it all means for you

Five years on, some councils have found themselves without a valid policy and uncertain about whether or not a special consultative procedure is needed. The procedure isn't as scary as it sounds - unlike that wardrobe of yours housing 20 years of regrettable purchases.

All that a council needs to do is:

- Draft a statement of proposal that outlines the background to the proposal, purposes of the amended policy and a copy of the draft new policy.
- Draft a brief public notice inviting public (written) submissions on the amended policy (we expect you would be unlikely to receive any). Councils generally leave a period of one month open for submissions to be made.
- Hold a strategic planning and policy committee meeting where oral submissions can be made by those who have submitted written submissions if they wish.
- Adopt the policy.

Having been through this exercise with a few councils now, we are well placed to ensure that policies remain up-to-date, user friendly and fit for purpose.

If it's time for a tidy up of your policies, give them the KonMari treatment (Google it).

The Value of Expertise - An Opinion Piece

Who hasn't experienced the pain of taking on a new role, replacing someone whose expertise has been honed over decades? The reality is this experience will be exasperated over the coming years as our rapidly aging population seeks retirement.

In the fast-paced world of building and construction, new design methodologies, new materials and new ways of calculating best practice outcomes; the value of a sound technical background is more important that ever. The recent and ongoing culture of failing to educate and to recruit appropriate expertise to meet an increasing design-build demand could, if not changed, deliver a country which has no control of its building and infrastructure destiny or wealth. The world is littered with examples of failing countries whose practices of declaring war on or neglecting to encourage the development of expertise have led to their demise. One could argue recent examples are Venezuela and Zimbabwe.

New Zealand's wider building sector currently finds itself with significant skill shortages because of years of apprentice employment and training neglect.
In the current high demand building atmosphere, a lack of appropriate technical capacity obviously heightens operational and business risks, the outcomes of which often affect innocent parties. Interestingly this has happened over a period of increasing regulatory accountability in respect of roles and responsibilities. Our regulator, the wider building sector and their supporting service providers, such as tertiary organisations, trade associations and institutions, have collectively dropped the ball in respect of collaborating and resourcing for the future.

That said, it is now very pleasing to note an increasing number of initiatives to improve the construction industry's ability to entertain and encourage uptake and delivery of skilled jobs and careers.

The Construction Skills Action Plan announced by the Minister of Building and Construction, Hon. Jenny Salesa, sets the scene for the seriousness and pathway out of our current plight in respect of the trades sector, via its six initial priority areas which will hopefully deliver on the construction sectors much needed skills. These six initiatives are:

- Leveraging Government Procurement
- Establishing additional jobs and skills hubs
- Growing construction careers and credentials
- Expanding skills for Industry
- Mana in Mahi – Strength in Work (employment/qualification subsidy)
- Further changes to Immigration settings

https://www.mbie.govt.nz/building-and-energy/building/supporting-a-skilled-and-productive-workforce/construction-skills-action-plan/

Thinking differently is essential if we are to modify long outmoded beliefs and actions. Some organisations are successfully doing this. The most high-profile being BCITO's promotion of *micro-credential qualifications* and their highly visable construction trades promotional *media campaign*. The TV presence is well and truly in your face. This *Big Picture* story, which expounds opportunity, needs to be part of our every day dialogue if we are to avoid a continuation of the traditional compartmentalised, non-productive and short-term consequences that have frustrated a future ability to scale up to meet an increasing and necessary build demand.

Scale is part of our future, and a consequent pathway to small business success may well lie in partnership, amalgamations and collaborations. All to often small businesses have specific but limited expertise. How often do we hear of the technical business owner with no business acumen, or the business owner with no supporting technical expertise? Both are important, and we need to change to long term strategic planning for sustainable building businesses.

The National Construction Pipeline Report 2018 predicts our sector has a sustained growth curve through to 2023, indicating the built business community should be in a strong position to plan for their future with confidence. Between now and then, annual residential dwelling consents are expected to increase some 13,000 to 43,000, KiwiBuild will add another growth dimension, as will the significant leaky building remediation requirements and the expanding commercial sector, particularly in the Auckland, Waikato and Canterbury regions. The rise of multi-unit dwellings which will require differing skill sets and construction methodology, should also be factored into business training and expertise agendas.

With this environment in mind what is the value of experience? Arguably it is significant, and not to be taken lightly. Good operators will plan to educate, train, retain and reward appropriately. This investment philosophy which is not new, should if well executed produce bottom-line returns in respect of efficiency and effectiveness. Additional outcomes will be new business opportunities and succession planning.

How can we achieve a cultural change that values trade and technical ability as an integral part of business sustainability? It starts from the top. We need to accept the engine room of the building environment is its technical capability. If we don't feed it, we will continue to create an ongoing capability void that will be filled by an ignorance, potentially propagating systemic issues. Every organisation from the regulator through to professional institutes, trade organisations and the myriad of design and construction sector business have a collaborative role to play.

The starting point for change is a very necessary awareness and acceptance that the value technical expertise brings to business and business opportunity. This will happen when the construction sector tells its big picture story and motivates awareness in respect of opportunity. Opportunity is there for the taking, if one plans and invests in expertise.

Nick Hill
Chief Executive
BOINZ

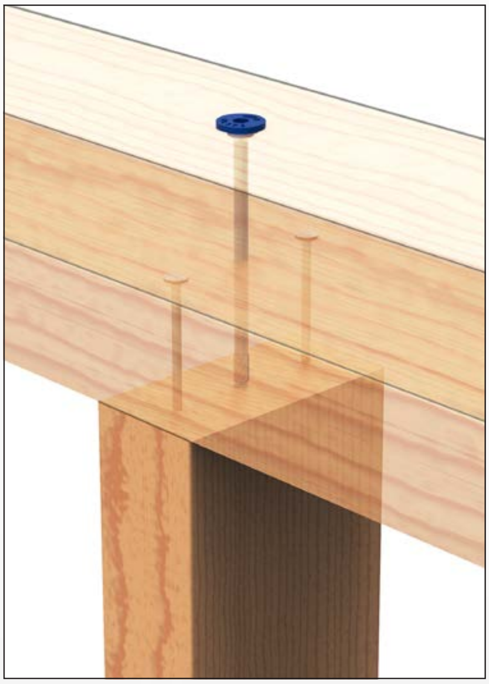
MiTek®

Leading building connections

Stud to top plate fixing made easy

Ask for STUD-LOK™ SL170

STUD-LOK™ SL170 has been specifically developed to provide an easy option, applied through the very top plate or capping plate, when fixing top plate to studs as per the requirements in Section 8 NZS 3604:2011 and forms an integral part of the MiTek® Truss and Frame design layout.



www.miteknz.co.nz

StudLok SL170 by Mitek NZ

MiTek's new STUD-LOKTM SL170 screw is designed to suit double wall plates, that are installed by builders on site and is an alternative fixing connection to the LUMBERLOK STUD-STRAP. When installed the STUD-LOKTM SL170 provides a completely internal connection avoiding any clashes with wall linings.

The STUD-LOKTM screw complies with fixing requirements in Section 8 NZS 3604:2011 and forms an integral part of the MiTek Truss & Frame design and layout, and are suitable for walls supporting roof members at 600,900 or 1200mm centres.

2N = 2/90mm x 3.15dia nails
SL = single STUD-LOK screw plus 2/90mm x 3.15 dia. nails

STUD-LOK SL170 ADVANTAGES

- Hexagonal socket head that suits standard 5mm drive bit.
- Screw length and product identification stamped onto coloured head for easy inspection.
- Ultra smooth driving ability.
- Flat head sits flush with wall plate surface.
- Does not interfere with truss tie down fixing on side of wall frames.
- Zinc plated for corrosion resistance.
- Fully engineered and tested to New Zealand Standards.

Fixing Selection Chart as per wind zones in NZS 3604:2011

Load Dimension (mm)			Light Roof					Heavy roof				
Stud Centres			Wind Zone					Wind Zone				
300mm	400mm	600mm	L	M	H	VH	EH	L	M	H	VH	EH
3.0	2.3	1.5	2N	2N	SL	SL	SL	2N	2N	SL	SL	SL
4.0	3.0	2.0	2N	2N	SL	SL	SL	2N	2N	SL	SL	SL
5.0	3.8	2.5	2N	SL	SL	SL	SL	2N	2N	SL	SL	SL
6.0	4.5	3.0	2N	SL	SL	SL	SL	2N	2N	SL	SL	SL
7.0	5.3	3.5	2N	SL	SL	SL	SL	2N	2N	SL	SL	SL
8.0	6.0	4.0	2N	SL	SL	SL	SL	2N	2N	SL	SL	SL
9.0	6.8	4.5	SL	SL	SL	SL	SL	2N	2N	SL	SL	SL
10.0	7.5	5.0	SL	SL	SL	SL	SL	2N	2N	SL	SL	SL
11.0	8.3	5.5	SL	SL	SL	SL	SL	2N	2N	SL	SL	SL
12.0	9.0	6.0	SL	SL	SL	SL	SL	2N	2N	SL	SL	SL

Isn't it all just the same anyway… residential, mid-rise, and medium density housing

By D. Scheibmair - Specification Engineer, Simpson Strong-Tie New Zealand Limited

Construction in NZ is often grouped into three broad segments; Residential, Commercial, or Industrial buildings. Our design standards acknowledge these building typologies and their differing intended uses. Loads taken from AS/NZS1170 for example applied in design calculations reflect a building's use; residential (domestic) dwellings have an allowance of 150kg/m2 to replicate people moving around on the floor, whereas this increases to 300kg/m2 or more for commercially occupied (eg office) buildings. A further safety factor is added by way of Building importance levels in AS/NZS1170, adjusting the design based on the impact of failure on human life and economic or environmental consequences.

CONSEQUENCES OF FAILURE FOR IMPORTANCE LEVELS

Consequences of failure	Description	Importance level	Comment
Low	**Low** consequence for loss of human life, *or* **small or moderate** economic, social or environmental consequences	1	Minor structures (failure not likely to endanger human life)
Ordinary	**Medium** consequence for loss of human life, *or* **considerable** economic, social or environmental consequences	2	Normal structures and structures not falling into other levels
High	**High** consequence for loss of human life, *or* **very great** economic, social or environmental consequences	3	Major structures (affecting crowds)
		4	Post-disaster structures (post disaster functions or dangerous activities)
Exceptional	Circumstances where reliability must be set on a case by case basis	5	Exceptional structures

Industrial type buildings can have very different structural forms to residential and commercial structures and have added complexities; think portal frame type construction compared to framed residential and commercial buildings(columns/studs and beams). So not only must design parameters and importance levels be appropriate, but an industrial building's acceptable movement (deflection) limit for example might be much greater than what's acceptable in a residential or commercial building. This can have implications on doors, windows and weathertightness detailing that all have relatively strict movement limitations.
In general there's ready awareness and acceptance of these aspects across the design, compliance, and build professions.
More recent developments in urban planning and land use have seen additional terminology introduced to better define buildings within the broad context of residential construction. This is as a result of traditional stand-alone dwellings typical many years ago having evolved into multi-residential buildings like townhouses or duplexes. This 'new' form of residential construction still largely followed the principles of the traditional stand-alone dwellings; 2 to 3 storey in height with horizontal but rarely vertical intertenancies. Our design standards mostly catered for this type of construction. As urban densification has continued over the past years there has been an emergence of new building typologies beyond traditional stand-along or semi-detached dwellings:
Stand-alone housing

- Smaller lot sizes
- Not attached to other dwellings
- Two to three storeys in height
- Can be part of a larger development
- Semi-detached or duplex dwellings
- Two side-by-side dwellings within one building usually with one joint/ common wall between tencacies
- Often one dwelling is a mirror image of its partner
- Two to three storeys in height
- Townhouses, terraced, or row housing
- Row of identical or very similar attached dwellings joined on one or both sides of other houses
- Usually accessed alongside one side with outdoor living spaces on the opposite side of the joined houses
- Two to three storeys in height
- Apartments
- Often single storey self-contained units within a larger building
- Share a common access/stairwells and have shared or centrally located facilities such as courtyards (outdoor living spaces), rubbish, post boxes.
- Height can vary from a couple of storeys to high rise buildings
- Mid-rise
- Buildings that are in the vicinity of 3 to 6-8 storeys in height
- Share common access/stairwells and

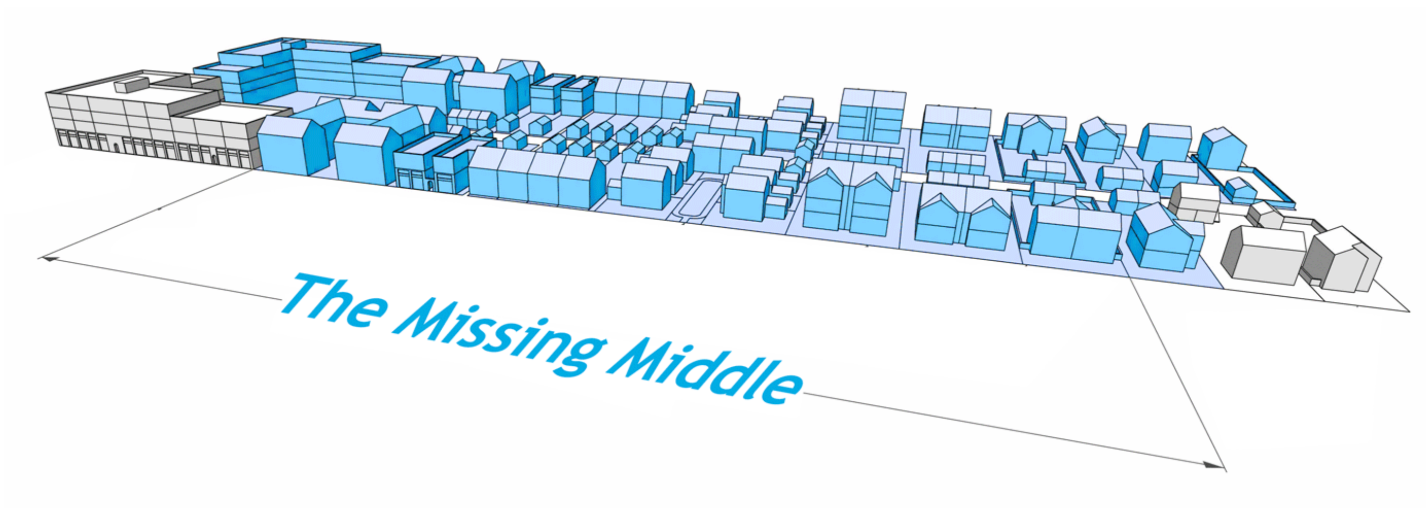
have shared or centrally located facilities

- Medium Density Housing
- The term Medium Density Housing (MDH) has also gained a following in New Zealand. While there is a lack of agreed definition, it's generally accepted that it defines comprehensive developments of multi-unit dwellings up to ~6 storeys in height. This could therefore include housing developments with a large number of low-rise (up to ~3 storeys) units with shared access and/or facilities, just as it would capture a mid-rise apartment building.

Apartment, mid-rise, and MDH typologies often no longer follow the traditionally accepted residential construction principles;

- They may have both horizontal and vertical intertenancy,
- Different fire, and acoustic considerations might be required,
- Mixed occupancy groups might be present in the same building,
- and hybrid structures combining multiple building materials are becoming more prevalent.

The 'new' typologies of mid-rise and MDH do already exist in NZ, but just as there was a move from stand-alone dwellings to townhouses in past years, we're likely to start seeing far more mid-rise and MDH in the coming years to fill the gap of might be referred to as 'The missing middle'.
All this is of importance particularly in design and building compliance as different building typologies require unique considerations – in effect the well accepted splitting of construction into residential, commercial, or industrial buildings now needs to be replicated at a macro-level to take into account differing design, construction, and compliance requirements for the different typologies under the broad residential category. Keep an eye out for future Straight Up articles in which these differences will be explored further.



PrefabNZ Top Five

1. NZ'S BID TO BOOST MID-RISE TIMBER

In the current issue of Built Offsite magazine, read PrefabNZ CEO Pamela Bell's contributing article on New Zealand's central government Ministry of Primary Industries (MPI) approval of the 'Mid-rise Wood Construction Primary Growth Partnership' (PGP) with PrefabNZ Member Red Stag Investments. The four-year $5M NZD program aims to boost mid-rise timber building construction, by using local engineered and panelised framing timber to deliver a range of regional, social, environmental and other benefits. It also aims to boost collaboration across New Zealand's engineered timber construction industry, by sharing the insights, lessons and information it develops in an industry-first open-source manner. Go to prefabnz.com/Projects/Detail/built-offsite-magazine to read further.

2. CLUSTER MANUFACTURED BATHROOM POD'S

Wellington received the first Cluster event for the year. Cluster events are a PrefabNZ hub for collaboration in the built environment. Wellington attendees got the rare opportunity to visit 1 Dixon Street apartment building which is currently under construction and get up close to the prefabricated elements that were incorporated into the building - including an offshore manufactured bathroom pod. All enjoyed fun thought-provoking quick-fire presentations and caught up with others that shared an interest in innovative construction. Join the next Cluster in Hamilton on 10 April, go to prefabnz.com/events.

3. PREFABNZ'S SUMMER SCHOLAR JIHWAN'S SNUG MODELS

The SNUG is a complementary dwelling for your garden that is smaller than 65m2. The need for a range of SNUG solutions is backed up by a report which identifies the potential for 180,000 additional dwellings through partitioning existing homes and other Accessory Dwellings.

Following the release of the SNUG catalogue featuring 12 SNUG designs, copies have been flying out the door. Since then, PrefabNZ's Summer Scholar Jihwan Jeon, a post-graduate student at Victoria University of Wellington, has been diligently fabricating flat-packable SNUG models. Following Jihwan's Bachelor's degree he's worked at B+G Atelier workshop as an architectural graduate. He has recently completed an exchange programme in Mexico. His summer research with PrefabNZ has been making physical models of SNUG homes using laser-cutting and machinery-cutting MDF. Laser-cutting was used to precisely cut structural elements and to etch texture on surfaces. Some pieces were finished with machinery-cutting to create angled edges for corner joints. All pieces were then slotted, assembled and glued to form the model doll-house sized SNUG homes

4. COLAB LAUNCHES FROM THE STARTING GATES IN STYLE

Colab 2019 (held at Ellerslie,13-15 March), was a massive success and accessed top industry minds with the latest knowledge to support businesses and help ensure they are a race favourite to deliver innovation, affordability and quality. With a field of session leaders including international experts, government ministers and the top innovators in New Zealand, CoLab provided valuable information for those who attended. And for PrefabNZ it was launch galore, announcing exciting times ahead for the prefab industry surrounding prefab financing. PrefabNZ CEO Pamela Bell also proudly shared PrefabNZ's Summer Scholars fine work; Eleni Timotea collated a broad-scope of prefabrication projects across New Zealand to produce an impactful information-dense case study called "HOW to prefab", and Jihwans 12 stunning doll-sized flat-packable SNUG models, which will be touring New Zealand soon.

5. PREFABNZ INNOVATION BITES WEBINAR SERIES – STARTS 2019 WITH A BANG

Inspiration through conversation is the driving force behind PrefabNZ's Innovation Bites. These informal yet informative snappy 45-minute lunchtime webinars are held every two weeks on Tuesdays - with a new expert introduced every session.
"I enjoy the audience interaction and conversational style" said one of our regular webinar registrants.
So far 2019 has been packed with expert topic leaders; David Chandler on precompetitive innovations, Jeff Vickers on Environmental Product Declarations, and Andrew Confait on health and safety in prefabrication and Toni Kennerley on Planning barriers for prefabricated housing. Replays of all the Innovation Bites series can be viewed on PrefabNZ's YouTube channel - search for PrefabNZ on YouTube! Register here for upcoming bite-sized webinars: http://www.prefabnz.com/Events. CPD points available.

Spotlight on a Member

Name:
Richard Lorgelly
Official job title:
Quality Assurance Training Assessor
Region:
Christchurch City Council

Richard Lorgelly is the Institute's Chairperson for Canterbury/Westland Branch. Outside of his role as Quality Assurance Training Assessor for Christchurch City Council, Richard loves spending time with his wife of twenty years and his four sons Noah, Ethan, Julian and Alex-miles. Richard is also a kinetic timber artist, combining his love for wood and things that move. The easiest way to explain is to check out his work on YouTube: https://www.youtube.com/results?search_query=richard+lorgelly. Richard spends a lot of time outdoors as a way to unwind and slow down for a while. He enjoys having "father and son" times with his boys tramping/camping and showing them simple bush skills, as he feels it's good to have a balance in life not just video games and TV. He also likes long walks in the hills with his rifle.

What was your first full-time job?

After leaving high school in 1991 I got a job as a brush hand for a decorating company, 6 months later I got offered a job as a hammer hand for a small construction company and that's where I started my road to become a qualified Carpenter.

How did you get into the industry?

After 18 years on the tools I didn't want to become a broken tradesperson so I decided to re-train and become an Architect (that was the plan), after finishing my Bachelor of Architecture in 2012 I worked in an Architecture firm and soon after that I found myself working as a BCO at Christchurch City Council – and now as a Training Assessor for the Quality Assurance team.

What do you think has changed about the industry since you first started working in it?

Lots of changes have happened in 28 years some good some bad, the 2004 building Act would be a big one, the use of cavity battens, there are more products on the market now and the combination of compatibly might be an issue in the future.

What does the future of building control look like to you?

I would love to see more consistency across the country. I think we have come a long way in a short time and it's awesome to see that change, but I know we can do better.

What is the most interesting part of your job?

The people. Not one day is the same, I love trying to help people understand something, and when you see they have had that lightbulb moment it's fantastic.

What do you consider to be the biggest challenge in your role?

When we get a training need and trying to ascertain what is it that they actually want and how to deliver a group of people of all different learning types and needs.

What do you think is different about the Christchurch region versus other regions?

The earthquake is the obvious one, but I think that's getting old now. I don't think we are that different from other regions, we have the same issues every BCA is having. I do think having one national building framework is awesome, it just means everybody should be on the same page. I feel lucky to be working in a dedicated training team who are working hard to meet the requirements of our staff.

Spotlight on a Member

Could you be next?

If you're interested in talking to us for future issues or you know of someone who is doing great work within the industry and deserves to have the spotlight on them, please email

marketing@boinz.org.nz

Behind The Scenes Of Fire Tests

By Hans Gerlich - Senior Engineer, Winstone Wallboards

Fire testing is a fickle and expensive business, and once a positive result has been achieved there is little incentive to test again. This in turn means that fire test data can sometimes be rather dated.

But one of life's certainties is change; things never stay quite the same. For example, gypsum is a natural resource and although supplied from the same mine, extraction location and depth inevitably change. Similarly, and despite careful control of incoming goods, additives may subtly change with time.

On the other side of the equation fire test standards, furnaces, and data acquisition methods evolve. For instance, the main fire test facility in New Zealand recently converted furnaces from diesel to run on gas. We must accept that 'creep' occurs and that subtle changes can combine to cause larger effects over time. With this in mind we have, over the last 2 to 3 years, invested heavily in a 'refresh' fire testing and development programme of work, which has culminated in the release of our new Specification and Installation Manual 'GIB® Fire Rated Systems, 2018'.

Here at Winstone Wallboards we do not miss an opportunity to get down and dirty as we involve ourselves with construction and instrumentation of specimens, observation of tests, and subsequent data gathering and analysis.

We do not simply adhere to minimum test standard requirements and include additional temperature measurements (thermocouples) to find out what is going on in the framing cavity and between layers. This allows us to determine the effect of variables such as framing type, cavity insulation, type and thickness of linings, and any composite actions. The in-depth knowledge gleaned by our team of engineers from extensive data analysis allows us to respond quickly to customer enquiries and, where appropriate, assist with finding project specific solutions. The new 'GIB® Fire Rated Systems, 2018' Manual contains, in printed and easily digested form, our most common fire rated construction elements and gives details that aim to ensure construction of reliable passive fire protection in New Zealand buildings. In an ever-evolving world, printed literature is out of date the moment it hits the market, but our commitment to ongoing development continues.

Acknowledging this, we intend to use our website gib.co.nz for future 'live' updates and to post regular outputs as common threads emerge from market enquiries. For further information and advice go to gib.co.nz or call the GIB® Helpline on 0800 100 442.

LEFT: Steel studs glow red-hot immediately following a pilot-scale furnace test. **MIDDLE:** A timber framed specimen at the end of a full-scale furnace test. **RIGHT:** Thermocouples collect important temperature data.

Fire Performance of Cladding Systems: Guidance

Ministry of Business, Innovation & Employment

The Ministry of Business, Innovation & Employment recently published a new guidance around Fire Performance External Wall Cladding Systems. This document was created in collaboration with industry experts with the goal of helping the industry to achieve the compliance requirements of the building code, including the overall risks.

FIRE TESTING PROTOCOLS: INDIVIDUAL COMPONENTS VERSUS CLADDING SYSTEMS

Since 2001 fire testing protocols used for Building Code compliance in New Zealand have been based on either bench scale testing of individual materials or components using AS/NZS 3837 (or more recently ISO 5660) or the larger scale NFPA 285 facade test.

Bench scale fire tests have typically been used in New Zealand for cladding in a way that treats fire spread over the external wall as a surface flame spread phenomena (similar to interior linings). However, it is apparent that in many cases it is the entire system performance that must be considered and not only that of the outermost cladding material.

Large scale fire tests are a way of assessing how an external wall cladding system performs when exposed to flames projecting from an opening in the external wall. Fire performance in these tests can be sensitive to a small change in the system details. External wall cladding systems are complex and can include a multitude of combustible components. It is difficult to determine how each of those individual components contributes to the overall system performance to limit fire spread.

It may therefore not always be possible to confidently evaluate the overall system performance for facades containing combustible components solely based on small scale fire testing of only the individual components.

This guidance has been prepared to help address the questions from industry such as:

1. Are there any acceptable fire testing protocols other than those currently cited in an Acceptable Solution or Verification Method?
2. How should the fire test criteria be applied to external wall cladding systems?

This guidance is intended to:

- make it clear what constitutes an external wall cladding system for testing external vertical fire spread and assessing performance against the New Zealand Building Code requirements
- describe the suite of fire testing protocols that could be applied to demonstrate compliance with the Building Code
- scope the parameters that need to be considered when addressing external vertical fire spread.

The guidance does not intend to provide a fire-engineered design solution for individual construction details but covers broad principles requiring consideration in their development. Some of the principles are based on a simplistic risk assessment approach.

NEW ZEALAND BUILDING CODE COMPLIANCE PATHWAYS

The Building Code is performance based. Clause C of the Building Code describes

the performance criteria for Protection from Fire. Clause C3 describes Functional and Performance Requirements for fire affecting areas beyond the fire source.

Functional Requirements – Building Code Clause C3

- C3.1 Buildings must be designed and constructed so that there is a low probability of injury or illness to persons not in close proximity to a fire source.
- C3.2 Buildings with a building height greater than 10 m where upper floors contain sleeping uses or other property must be designed and constructed so that there is a low probability of external vertical fire spread to upper floors in the building.
- C3.3 Buildings must be designed and constructed so that there is a low probability of fire spread to other property vertically or horizontally across a relevant boundary.

There are two Performance Clauses that describe the constraints for control of

external vertical fire spread:

- Clause C3.5 – limiting the vertical spread of fire
- Clause C3.7 – covering the ignitability of external wall cladding materials.

Three pathways are available to demonstrate compliance with the Building Code Performance Requirements: Acceptable Solutions, Verification Methods and alternative solutions. The following table outlines the Performance Requirements of the New Zealand Building Code and summarises the associated compliance pathways:

COMPLIANCE PATHWAYS FOR NEW ZEALAND BUILDING CODE CLAUSE C3 - EXTERNAL SPREAD OF FIRE.

<table>
<tr><th>C3.5</th><th>C3.7</th></tr>
<tr><td colspan="2">Building Code Performance Requirements</td></tr>
<tr><td>Buildings must be designed and constructed so that fire does not spread more than 3.5 m vertically from the fire source over the external cladding of multi-level buildings.</td><td>External walls of buildings that are located closer than 1 m to the relevant boundary of the property on which the building stands must either:
•be constructed from materials which are not combustible building material, or
•for buildings in importance levels 3 and 4, be constructed from materials that, when subjected to a radiant flux of 30 kW/ m2, do not ignite for 30 minutes, or
•for buildings in importance levels 1 and 2, be constructed from materials that, when subjected to a radiant flux of 30 kW/ m2, do not ignite for 15 minutes.</td></tr>
<tr><td colspan="2">Compliance Pathway – Acceptable Solutions C/AS2 to C/AS7</td></tr>
<tr><td colspan="2">The Acceptable Solutions (C/AS2 to C/AS7) contain three means of demonstrating compliance:
• Fire properties of external wall cladding systems must be in accordance with ISO 5660 Reaction-to-fire tests – Heat release, smoke production and mass loss rate – Part 1: Heat release rate (cone calorimeter method), or
• External wall cladding systems must comprise only materials that individually are classified as non-combustible (exempting a 1 mm combustible finish), or
The entire wall assembly must be tested at full scale in accordance with NFPA 285 and must pass the test criteria.</td></tr>
<tr><td colspan="2">Compliance Pathway – Verification Method C/VM2</td></tr>
<tr><td colspan="2">The Verification Method (C/VM2) contains four means of demonstrating compliance:
• Fire properties of external wall cladding systems must be in accordance with ISO 5660.1 or AS/NZS 3837, as per the tables in C/VM2, or
• The external wall cladding system must use non-combustible materials, or
• The external wall cladding system must comply with the Acceptable Solutions (for buildings with an importance level not higher than 3).
• Large or medium scale facade type tests must be used to determine the extent of vertical fire spread is not more than 3.5 m above the fire source (C3.5)</td></tr>
<tr><td colspan="2">Compliance Pathway – Alternative Solution</td></tr>
<tr><td>An alternative solution proposal must be provided that justifies how the design of the building will not result in fire spread of more than 3.5 m vertically from the fire source over the external cladding of multi-level buildings.</td><td>1. The external wall cladding system must use non-combustible materials (combustible building materials is a defined term in the Building Regulations, and “means" building materials that are deemed combustible according to AS 1530.1), or
An alternative solution proposal must be provided that justifies how either:
2. for buildings in importance levels 3 and 4, the external wall cladding system is constructed from materials that, when subjected to a radiant flux of 30 kW/ m^2, do not ignite for 30 minutes, or
3. for buildings in importance levels 1 and 2, the external wall cladding system is constructed from materials that, when subjected to a radiant flux of 30 kW/ m^2, do not ignite for 15 minutes.
The above criteria for b and c can be achieved by the use of bench scale fire tests (e.g. ISO 5660-1) to confirm that materials when exposed to 30 kW/ m^2 do not ignite within the specified time period.</td></tr>
</table>

FIRE TEST METHODS FOR EXTERNAL WALL CLADDING SYSTEMS

Clarifies what test methods can/may be used to determine fire performance of external cladding systems to demonstrate compliance with Building Code.

Fire testing requirements for an external wall cladding system

To demonstrate compliance with the Building Code for Protection from Fire Performance Clauses C3.5 and C3.7 for external vertical fire spread, the external wall cladding system includes all substantive components within the complete wall assembly. This includes sheet cladding materials, framing, rigid air barrier, any insulation, sheet materials or blanket and the internal lining. Where relevant, the direction of fire exposure to be considered is from the exterior side of the wall.
Recommendations on the different fire testing options to evaluate the fire properties of an external wall cladding system are given in the risk matrix in “External wall cladding system vertical fire spread – risk assessment approach”.

Alternative test methods to those currently cited

The New Zealand Building Code Protection from Fire Acceptable Solutions and Verification Method currently cite two fire tests for assessing the fire performance of cladding systems. These are a bench scale independent component test (ISO 5660), and the intermediate scale system test NFPA 285. This guidance broadens the suite of test protocols to include the British Standard BS 8414 with the acceptance criteria provided by BR 135.

- BS 8414-1:2015 Fire performance of external cladding systems. Test method for non-loadbearing external cladding systems applied to the masonry face of a building. Amended by BS 8414-1:2015+A1:2017 (June 2017).
- BS 8414-2:2015 Fire performance of external cladding systems. Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame. Amended by BS 8414-2:2015+A1:2017 (June 2017).

- BR 135 Fire performance of external thermal insulation for walls of multi-storey buildings: (BR 135) Third edition, BRE (15 March 2013).
- It is also acceptable to test cladding systems using the methods outlined in the Australian Standard AS 5113 to meet the 'EW' (external wall) classification. This classification standard in turn references BS 8414 as a test method.

Test components within cladding systems can also be tested using the methods outlined in EN 13501: 2007+A1:2009 to meet a Euroclass A1 or A2 classification.
For guidance on where the different test methods may be used, refer to the risk matrix in the "External wall cladding system vertical fire spread – risk assessment approach".

BR 135 FIRE PERFORMANCE OF EXTERNAL THERMAL INSULATION FOR WALLS OF MULTI-STOREY BUILDINGS – 3RD EDITION 2013

BR 135: 2013 addresses the principles and design methodologies related to the fire spread performance characteristics of non-loadbearing external wall cladding systems. Although various potential design solutions have been identified and discussed in BR 135, robust design details are not presented. In this rapidly changing market generic solutions are not available where new products and novel design solutions are frequently presented. The illustrations and scenarios presented in BR 135 are based on typical examples of current practice in the UK. To help designers and end users better understand the parameters impacting on the fire-safe design and construction of external wall cladding systems, BR 135 focuses on the issues surrounding the topic of external vertical fire spread.

BR 135 Annex A provides a classification system for the test methodology outlined in BS 8414-1 Fire performance of external cladding systems – Part 1: Test method for non-loadbearing external cladding systems applied to the face of the building.

BR 135 Annex B provides a classification system for the test methodology outlined in BS 8414-2 Fire performance of external cladding systems – Part 2: Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame.
Other construction systems such as concrete-framed or timber-framed construction are not considered in BR 135. However, the general principles in the BR 135 guide may still apply, although suitable additional risk assessments and detail design reviews would be required. The risk matrix approach provides an option for considering alternative forms of supporting wall frames.

What is specifically excluded from external wall cladding systems for compliance with C3.5 and C3.7?

For the purposes of an external wall cladding system as defined in Section 4.1 of this guidance and for demonstrating compliance with the Building Code for Protection from Fire, substantive components may exclude:

- signage and billboards – aggregated area up to 25 m2
- video screens up to 6 m2
- greenwalls – the acceptance of green and living walls will be dependent on the type of system proposed, its support structure and the associated management and maintenance/irrigation procedures. Generally, plants growing on metallic support systems (such as stainless steel wires) will not present an increased fire hazard provided they are adequately maintained. Other systems that include combustible support systems should be proven via fire test evidence to support compliance. For more information on greenwalls refer to:

ANS Living Walls receive a Fire Safety Standard on the ANS global website

Fire Performance of Green Roofs and Walls on the GOV.UK website

- sunscreens/sunshades/louvres up to 6 m2 or any area if non-combustible
- any materials used as part of the external wall cladding system for the topmost floor provided the roof does not require a fire resistance rating. (Other requirements to prevent horizontal fire spread to other property may still apply e.g. limits on unprotected area and/or the ignitability of the wall cladding when located within 1 m of the relevant boundary .)
- doorsets and window frames (these are not included with the cladding requirements)
- sealants and tapes comprising < 5% of the wall area
- a canopy or balcony at ground floor level of buildings that exceed 10 m in height where it can be shown or is agreed that a fire is unlikely to spread from the area to the main external wall cladding
- minor trim and gutters, downpipes and fascias – limited amounts of materials are excluded from the requirements where it can be shown or is agreed that a fire involving the materials is unlikely to spread fire to the remaining parts of the external wall cladding or where they are remote from the main building cladding.
- individual components on or within the wall assembly that are non-combustible but include a surface coating not more than 1 mm thick.

Note: the above exclusions are only relevant to each component when taken in isolation. Consideration needs to be given when the above items are combined as part of a whole system to determine the contribution of each component to the overall performance of the cladding system. For example, a video screen meeting the size limitations attached to a noncombustible cladding would require further consideration and might not be appropriate if attached to a combustible sunscreen or rainscreen system.

In-wall cavities

Continuous vertical channels and cavities within external wall cladding systems are known to promote upward vertical fire spread. Fire researchers have noted that when flames are confined within a vertical cavity or channel they elongate, leading to flame extension of up to five to ten times the expected unconfined flame lengths. This is true even in cavities without additional combustible materials present, but is made worse by the presence of combustible materials. This flame extension effect can support rapid, potentially unseen, fire spread

within an external wall cladding system and must be limited.
The provision of cavity barriers within external wall cladding systems is important, particularly when combustible cladding, rigid air barriers (RAB) and insulation products are used.
Cavity barriers based on fire-resisting construction tested to AS 1530.4 or similar and satisfying integrity and insulation ratings for at least 30 minutes are likely to provide an acceptable means of controlling flame spread within cavities. However, additional consideration is needed to ensure that cavity barriers within a facade system located at the junction of fire separations and the external wall assembly have adequate support, can remain in place for the period required, and provide the required level of fire resistance rating.

Examples of other potentially acceptable test standards that may be used for curtain wall systems include:

- ANSI/ASTM E2307 Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus, or
- BS EN 1364-4:2014 Fire resistance tests for non-loadbearing elements.

EXTERNAL WALL CLADDING SYSTEM VERTICAL FIRE SPREAD - RISK ASSESSMENT APPROACH

Provides a risk assessment approach to determine fire testing options for external wall cladding systems for vertical fire spread based on building height and risk group.

A simplified risk assessment approach has been developed to classify a building's level of complexity and fire risk to help identify suitable fire test protocols to assess the cladding system for external vertical spread of fire. The parameters considered are:
- building height
- vulnerability of risk group
- provision of an automatic fire sprinkler system to the requirements of NZS 4541 (as modified by the NZBC).

How to use this table – find the risk level Low, Medium or High applying to the building based on the building height and risk group. Refer to the table key to determine the fire testing options considered acceptable for the applicable risk level.

Table 1: External wall cladding system - risk matrix for fire testing protocols

Building height	Sleeping use* Risk groups SM, SI		Non-sleeping use* Risk groups CA, WB, WS, VP	
	Sprinkler protected	Non-sprinkler protected	Sprinkler protected	Non-sprinkler protected
Single level	Low	Low	Low	Low
≤ 10 m and up to 2 levels	Low	Low	Low	Low
> 10 m and ≤ 25 m	Medium †	High	Medium	Medium
> 25 m and ≤ 60 m	High	n/a	Medium	n/a
> 60 m	High	n/a	High	n/a

** For building height ≤ 10m, cladding systems used for important level four buildings or multi-floor buildings incorporating staged evacuation, phased evacuation or evacuation to a place of relative safety within the building should meet the requirements for risk levels Medium or High given below*

† Where a NZ 4515 residential sprinkler system is installed then the non-sprinkler risk level in column 3 should be used instead (i.e. risk level High given below)

WHERE RISK LEVELS LOW, MEDIUM AND HIGH ARE MATCHED TO FIRE TESTING PROTOCOLS P1 TO P5 AS FOLLOWS:

Low No requirement for building height ≤ 10 m (NZ Building Code Performance Clause C3.5).

Medium P1. All cladding and rigid air barriers used in the external wall construction may be individually tested using ISO 5660-1 to meet requirements in C/AS2 to C/AS7 Paragraph 5.8. Insulation products, and filler materials (not including gaskets, sealants etc) to be limited combustibility*. Timber framing and combustible battens may be permitted in buildings with a building height of up to 25m, and must be properly encapsulated and/or protected (see P5) in buildings with a building height over 25m. All external wall cavities need to be fire stopped using cavity barriers at each floor level and at the junctions to other vertical fire separations. ACP materials must be tested without Aluminium (metal) facing as per C/AS2 to C/AS7 Appendix C7.1.5.
Any of options P2-P5 below are also acceptable.

High

- P2. External wall cladding system may meet the performance criteria given in BR 135 for cladding systems using full scale test data from BS 8414-1:2002 or BS 8414-2: 2005; or
- P3. External wall cladding system may pass the NPFA 285 full scale test; or
- P4. External wall cladding system may meet 'EW' classification in AS 5113; or
- P5. All cladding, framing**, battens, insulation products**, Rigid Air Barriers and filler materials (not including gaskets, sealants etc) used in the external wall construction may be of limited combustibility*. If vapour barriers, drainage mats, building wraps or similar are not of limited combustibility* then all external wall cavities need to be fire stopped using cavity fire barriers at each floor level.

*** Limited combustibility means the roduct/material meets one or more of the following criteria:**

1. A1 or A2 classification in accordance with EN 13501-1:2007+A1:2009.
2. Non-combustible or not combustible when tested to AS 1530.1 or ISO 1182.
3. Concrete, brick/block masonry, stone, glass, ceramic tiles, aluminium and steel with or without paint or similar thin surface coatings not exceeding 1 mm thickness.

** Timber framing (or combustible insulation products within a framed wall assembly) may be used if a robust protective lining material (being of limited combustibility) is fixed to the exterior side of the framing and can be demonstrated to remain in place and protect the framing during the period of external fire exposure. 'Protect framing' can be assumed to be achieved if the protective lining material as part of a light timber frame wall exposed to the test conditions of AS 1530.4 can be shown to prevent charring of the timber frame for a period of 30 minutes. One way to determine this is to limit the temperature on the cavity side of the fire-exposed protective lining material during the test period to be no greater than 300 degrees Celsius.

Use of combustible Rigid Air Barrier

A combustible rigid air barrier, for example plywood, may be used for any building if it has been included as part of a representative external wall subjected to a full scale fire test and meeting the criteria in P2-P4 in the risk matrix.

External walls of any height located within 1 m of a relevant boundary

To limit potential horizontal fire spread to and from a neighbouring property, the exterior cladding material shall either be of limited combustibility or be tested using ISO 5660-1 to meet the requirements in C/AS2 to C/AS7 Paragraph 5.8. The test specimen shall comprise the cladding material mounted over a representative substrate if the cladding material is less than 50 mm thick.

NOTE: This is not a vertical fire spread provision and needs to be considered in addition to the requirements of Table 1. It is also acceptable for the exterior cladding material to be tested using ISO 5660-1 using an external irradiance of 30 kW/m2 and not ignite within the period of time given in NZBC C3.7.

Technical assessment in place of test

Cladding products and systems range in nature and complexity. There are also a range of base wall assemblies that may impact upon how the outer weather-facing part of a cladding system product will perform. Examples include:

- Exterior Insulation Finish Systems (EIFS)
- High Pressure Laminates (HPL)
- External thermal insulation composite systems (ETICS)
- Rain screen cladding
- Structural insulation panel systems (SIPS)
- Expanded Polystyrene Systems (EPS)
- Timber cladding.

Key system performance considerations that must be considered in a technical assessment are:

- Combustibility of insulation
- Combustibility of framing (e.g. timber frame)
- Composition of Rigid Air Barrier
- Building underlay
- Uninterrupted vertical cavity
- Continuity of products.

In order for an external wall cladding system to be certified for fire safety performance, it needs to be constructed to replicate the details of the test. This includes, for example, framings, substrate, flashing details, gaskets, sealants and fixing mechanisms.

A technical assessment may be presented as part of the plans and specifications to demonstrate compliance with the performance requirements of the Building Code. Situations may arise where the proposed cladding system installation differs slightly from the absolute details of that described in a fire test report. A technical assessment must be provided by accredited testing laboratory or from a subject matter expert with knowledge and experience in fire science and fire testing.

Documentation and evidence for building consent

Information for BCAs to consider when assessing external wall cladding systems for compliance with Building Code Clause C3 External spread of fire.

When considering an application for a building consent the building consent authority (BCA) needs to be satisfied on reasonable grounds that the provisions of the Building Code would be met if the building work were properly completed in accordance with the plans and specifications that accompanied the application.

The BCA needs evidence of which compliance pathway you are using to show how the building's cladding system meets the performance requirements of the Building Code and evidence to show how it can be constructed to comply. BCAs may wish to consider the following when assessing external wall cladding systems case-by-case:

- The extent of combustible products used on the building (i.e. is it a feature or the entire cladding?)
- The building use (occupancy type)
- The active (e.g. alarms and sprinklers) and passive (e.g. firewalls and smoke compartments) fire protection systems throughout the building
- The system tested by the manufacturer or supplier and whether its use is consistent with this (and if not, are the changes likely to negatively affect the building's fire performance?)
- The quality and accuracy of the building consent documentation and detailing in relation to external wall assemblies (i.e. can the cladding system be constructed from the information that has been provided?)
- The height and proximity of the building to other buildings
- The use of plastics (e.g. polyethylene core aluminium composite panel), including the content of the specific product and its use
- Whether the design has been reviewed/peer reviewed by a suitably qualified and experienced person.

For more information, visit **www.mbie.govt.nz**

Hope for the best but prepare for the worst – learning the lessons for natural disasters

By Darryl O'Brien

For this edition of Straight Up I thought that I would share the lesson of some recent natural disasters that have occurred in Queensland. Although I don't wish to speculate on whether or not the frequency and intensity of storm events may increase in the future, it is an observed fact that New Zealand has been subject to similar storm events in the recent past. One such recent example affecting the North Island being ex-Tropical Cyclone Debbie.

The first place to start in this discussion is an examination of how building codes seek to manage and mitigate risks associated with natural hazards. In seeking to improve safety, risk must be reduced, often before the likelihood, magnitude or consequence of the hazard is fully understood. Methods to mitigate risk include hazard avoidance (not building in flood prone areas), loss mitigation (building to minimum structural standards) and reducing the magnitude of the loss (providing sprinkler systems to extinguish fires). In response to this risk reduction triangulation, building codes are primarily responding to hazards that have proven to be a risk in the past. This focus on code content addressing significant environmental hazards is not surprising. Historically, the management of risk has largely followed a triage hierarchy whereby known hazards involving immediate death and serious injury are prioritised over other less obvious or emerging hazards.

The risk level is judged to be acceptably managed if these mitigation strategies are successful. Hazards are identified in terms of severity and likelihood with the risk management system reflecting an analysis of predicted hazards. The resultant risk management strategies are then expressed in either qualitative (statements of quality) or quantitative (numerical benchmarking) terms.

Generally a building code approach to risk management adopts a linear three stage process where risks are identified, potential design responses evaluated and the optimal solution implemented. In the first stage of this process the statistical likelihood of a recognised hazard occurring during a pre-determined period is considered. An example of this process is the 1 in 100 year Average Recurrence Incidence (ARI) process which assigns the probability of an event occurring in a given period. This risk management framework attempts to quantify uncertainties where the data base is incomplete, but there is some historic precedent to support the assumptions made (such as the relative occurrence of floods or storms). Following the risk identification and evaluation phase a range of possible designs are evaluated, with the most capable of withstanding the identified hazards being selected. Finally, the optimum design response is implemented as part of the construction process. However, it must be recognised that building codes represent minimum standards where a calculated trade-off is made between the cost of construction and the statistical likelihood of a hazard occurring. Generally this methodology is effective, but occasionally there are failures. It is from these failures that we learn where we need to improve the code response.

In this article I want to briefly describe some of the failures observed from the 2013 Bundaberg (Qld) floods and the factors that led to the failures.

The 2013 Bundaberg floods were a result of ex-Tropical Cyclone Oswald, with the Burnett River reaching its highest recorded flood level of 9.53m AHD, with peak river flows estimated at 70 km/h. Most of the significant damage was recorded at North Bundaberg. This was an older suburb where the predominant dwelling type were traditional 'Queenslander' type houses. It was in this suburb that a number of houses suffered catastrophic structural damage as the result of the flood. **Figure 1** shows typical house type and resultant damage.

Subsequent investigations demonstrated that a number of interrelated factors contributed to the structural failure of these buildings.

Firstly, the geotechnical substrate of the area was one of non-cohesive sandy or silty loam. Many millennia ago this area was the delta mouth of the river, with the loamy soil being deposited of historic time frames. Generally, such soil is considered a sound substrate for footing and slab designs as lacking significant clay content it tends to remain stable regardless of the moisture content. However, as will be seen in this event these non-cohesive soils were a significant factor in the building failures. Whilst the flood depths recorded at North Bundaberg were not a critical factor in theses failures, the calculated flood water velocity of approximately 11 km/h was. It appeared that a combination of high peak flow rates and non-cohesive soil substrate reacted with dwelling type (i.e. lower section of house acted as a barrier) and created vortices that led to scour and

FIGURE 1

FIGURE 2

eventually catastrophic failure. Indeed, sandy/silty soils can have a shear strength as low as 2Pa compared with high plasticity clay that can have a shear strength of 60Pa, with scour occurring in the former at velocities as low as 1 km/h. The bottom right hand view of **Figure 2** illustrates both the extent of building damage and the deposits of sandy loam substrate removed as a result of the flood.

This damage would suggest that both soil type and potential flood water velocity are factors that should be considered when designing in potential flood prone areas. In a number of cases scour depths of approximately 2m meters were observed, with the erosion being halted only when encountering the high plasticity clay substrate (as shown in **Figure 3**).

The importance of a stable substrate can be further demonstrated with reference to **Figure 4**. This garage was situated directly adjacent to the Burnett River and would have been subject to much higher peak flows than the dwellings that failed in North Bundaberg. However, as can be seen the garage was constructed on a compacted fill base. Whilst suffering some scour and erosion, the damage was not catastrophic. Other building types that only suffered minor damage in this event were those that were open below (not creating a dam wall to initiate the vortices effect) and ones that had hard stand apron around the base to resist flood scow.

FIGURE 3

FIGURE 3

The 2013 Bundaberg flood significantly exceeded the existing 1:100 year design standards (it was estimated to be closer to a 1:200 year event). Further, the dwellings that suffered catastrophic damage were of an age that pre-dated modern design standards and construction methods. However, we can still learn valuable lessons with respect to the potential impacts of similar events and implement these lessons into future best-practice designs. It is to the Councils credit that they examined the impacts of the 2013 flood and used this research to create a new guideline document for building in flood prone areas. Details of this document are contained in the reference list.

One final observation - Bundaberg had only recently suffered a 1:100 year flood in 2011 and it was said some residents did not take the 2013 evacuation warnings seriously and stayed in place until it was almost too late. The reason for this was they thought they had their flood for the century in 2011, and in any case the 2011 event was not as bad as predicted. Thankfully in the 2013 flood, complacency was not fatal, but this response points to the need for people to understand the limitations of the ARI approach and to listen to expert advice.

References

Australian Building Codes Board (2012) *Construction of Buildings in Flood Hazard Areas,* Australian Building Codes Board, GPO Box 9839 CANBERRA ACT 2601

Bundaberg Regional Council (2013) *Improving Dwelling Resilience to Flood Induced Scour Guidelines for Dwellings Constructed within a Flood Hazard Area*, available online at http://bundaberg.qld.gov.au/development/regulatory-building-planning-flood-response

Dr. Darryl O'Brien is a lecturer in Building Surveying and the Built Environment at Central Queensland University

Bricking It Right The First Time.

The Brick and Blocklayers Federation (BBFNZ) have, via their veneer assessor network, identified several common code non-compliance issues with masonry veneers appear to be "sneaking" through inspection processes countrywide. In an environment of inter-association collaboration, the BBFNZ and BOINZ are keen to ensure Building Consent Authorities (BCA's) and their building inspectors nationwide are aware of these issues ensuring they are picked up earlier in the build process.

The most common defects being sighted regularly are:

1. **Undersized brick cuts**. The Building Code E2/AS1 specifies that masonry units are required to be laid to stretcher/running bond. This is defined in NZS4210:2001 Section 1.3 as overlapping the previous course by between 25% -75%. The BBFNZ would like to highlight that any brick that is cut to less than 25% of the previous course is unable to meet the stretcher bond requirement. These cuts are being regularly missed next to window openings and within internal corners.
2. **Undersized mortar joints.** NZS4210:2001 Section 2.7.1.3 specifies that mortar joints should be 10mm +/-3mm (with an allowance of up to 20mm on the bottom course). From an aesthetic requirement these joints should have a consistent appearance when viewed from 6.1m. BBFNZ are noticing several reports coming through where joints are varying anywhere between 3mm and 18mm.
3. **Insufficiently sloped brick sills.** E2/AS1 Figure 73c specifies a masonry or tile sill cantilever or flush, with a minimum 15 degree slope. BBFNZ are happy to share with any BOINZ member the reporting templates they have developed for their assessors – email request to: info@bbfnz.co.nz BBFNZ work very closely with their trade association - The New Zealand Masonry Trades Association (NZMTA) to ensure that their members are aware of these reoccurring items. The value Trade Associations and Institutes bring to professionalism and quality is a well-known precedent. BBFNZ and BOINZ will continue to work together to lift compliance and work quality awareness. Collectively we can achieve better build outcomes and if you as a Building Control Officer (BCO) chance upon bricklayer practitioners not meeting minimum industry standards, a reference to the merits of belonging to a supporting organisation (in our case the NZMTA) so they can receive appropriate information, education and support would be gratefully appreciated by the wider build sector and public.

Article supplied by BBFNZ CEO Melanie McIver

PREFABNZ FOUNDER AND CEO PAMELA BELL CALLS IT A DAY, AFTER ALMOST A DECADE AT THE HELM

In February this year, the PrefabNZ board announced Pamela Bell, the not-for profit's founder and CEO, "has made the exciting decision to hand over the baton of PrefabNZ's leadership", this is to "enable the organisation to continue to thrive whilst allowing Pamela to both pursue alternate challenges and extend her influence within the offsite space".

Pamela started the organisation in 2010 after completing her Master of Architecture thesis entitled Kiwi Prefab and holding a Kiwi Prefab Workshop at Victoria University's School of Architecture and Design with over 140 attendees. She has since helped the organisation grow to be the pre-eminent body for prefabrication in New Zealand.

PrefabNZ Board chair Leah Singer notes, "in less than a decade Pamela Bell in her role as Chief Executive Officer has transformed PrefabNZ from a small group of enthusiasts into a dynamic social enterprise of 370 Member organisations and 4500 following construction professionals. With Pamela at the helm, the industry has enjoyed countless networking events, interactive conferences, site visits, informative reports, and useful infographics – all dedicated to offsite construction and the resultant benefits associated."

The end result being, that New Zealand is recognising the potential prefab can play in the future of our housing requirements.

BOINZ would like to acknowledge the collaborative approach taken by Pamela in sharing her knowledge and industry case studies with our membership. Our Straight Up magazine has had a regular Top 5 article from PrefabNZ enabling members access to valuable case studies and prefab trends. We wish Pamela all the best in her future challenges and thank her for being a part of the Institute's journey.

2019 Excellence Awards

TE PUIA ~ 21 MAY ~ ROTORUA

Nominations now open - visit www.boinz.org.nz

Contribution to Technical and Legislative Improvements Award
This award is given to the individual who has excelled in contributing to advancing the technical and/or legislative understanding of members.

Emerging Leader Award
Each Branch is to nominate an individual who has shown exceptional leadership skills at a local and/or national level, whose actions have grown the value of BOINZ among members.

Contribution to BOINZ Award
The individual or organisation who have made a significant impact to the advancement of BOINZ in the market place.

Outstanding Commitment to Information, Skills Development and Education of Building Officials Award
The individual or organisation who demonstrated outstanding commitment to providing information, developing skills and advancing the education of Building Officials within the Industry.

The Young* Building Control Professional of the Year Award
Young* defined as under the age of 35 as at 31st December 2018. This Award goes to an individual that reflects strong professional growth and has dedicated their time to enhancing the Building Control profession.

Training Commitment Award
The Individual or Organisation that has committed to significantly improving the position of training in their field.

Branch of the Year Award
The Branch award is considered by the BOINZ Board each year based on participation, innovation and member value at a local level.

Innovator of the Year
This award recognises a building control professional or team engaged in building control activities, who has demonstrated commitment to innovation.

Organisational Commitment to Customer Service & Excellence
Awarded to an organisation who demonstrates dedication to exceptional customer service and excellence.

Unsung Hero Award
One particular unsung hero - a volunteer who has dedicated significant time to the Institute.

GETTING IT RIGHT
LEAD THE WAY

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