STRAIGHT UP

THE MAGAZINE OF THE BUILDING OFFICIALS INSTITUTE OF NEW ZEALAND

Summer 2021

THE SUMMER ISSUE

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STRAIGHT UP

THE MAGAZINE OF THE
BUILDING OFFICIALS INSTITUTE
OF NEW ZEALAND

IN THIS ISSUE

ISSN 1175-9739 (print)
ISSN 2230-2654 (online)

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MESSAGE FROM OUR PRESIDENT

The Future of Learning

Well, as the 2021 year draws to a close, it is time to again reflect on what has been a very challenging and changeable year for all. I have always known to expect and embrace change throughout my professional career – but really this Covid period has to take the cake. I guess business challenges and technology enhancements we come to expect, but with the challenges we have seen recently they have been tough because of their impact on our physical interaction with each other.

I am thrilled to be part of BOINZ at times like this - one of the hardest things in the year was cancelling our gala awards night at Te Papa, but to see the resilience of the team putting those sessions together online afterwards really made me smile and to be proud of all the achievements of our members out there.

As we have a chance to reflect on what we want to achieve in the coming year, I do hope you will think about what you need to make yourself better and more resilient. You need to do that first and foremost, and then follow that up with good things for your family, followed by your professional family of BOINZ colleagues. Please continue to value the role you do and the important part you perform in our industry, and I invite you to think even more about learning opportunities, either for you personally, or what you may be able to help your colleagues achieve.

Depending on how you look at it, fortunately or unfortunately, learning has changed much in the last 50 years. Many would argue it has been dumbed down in the area of trades (vocational) learning. Equally, there are many employers saying similar things about tertiary qualifications.

The pandemic, though, has altered our learning pathways considerably and we need to evolve rapidly to the big changes that are coming.

COVID-19 has disrupted traditional classroom learning experiences creating a percentage shift to remote learning. This disruption has worked for some and disadvantaged others. Skill gaps are likely to be the casualty as sector after sector report the need for more trained workers to fill both existing and predicted job demand.

Add to this complexity, today's rapidly moving tech-heavy landscape, and ask yourself, do your educational qualifications 'cut the mustard' in respect of what you need and do within your current working life? Annually the ground shifts as industry and education try to align to meet education and training expectations.

In the school environment, COVID-19's impact has disrupted education to the extent that despite remote learning, students were on average 5 months behind in mathematics and 4 months behind in reading (US McKinsey & Co. report). I would expect a similar result here in New Zealand, and these failings can be added to if one takes into account the now much talked about high school dropout rate.

In industry, and particularly the construction sector, of which we are very much a part, the current boom is creating havoc, as sectors neglect much needed training investment. Of all the industry sectors, construction allows the highest entry volume of unskilled workers into its ranks, causing untold financial harm to owners and occupiers. As a consequence, we now have daily reports of faulty construction dominate our headlines.

There was a saying about smallpox which went something like "a rosy glow at dawn, and death at dusk". How often do builders fail because they don't manage the technical and knowledge needs of a building's complexity. The remediation costs of mistakes hurt not only building companies and subcontractors, but more importantly the honest investor who mistakenly believes that builders and their staff are qualified, and regularly update their skills.

While true that much of our education still focuses on set discipline and skills, we need to realise and accept this is only part of the journey. Construction (and by that, I mean every discipline – from developer through to designer, builders, plumbers, building surveyor and so forth) needs to change and change quickly. It now has the unfavourable reputation across any industry sector in respect of delivering a quality product. Construction needs to invest, and the best investment it can make is in lifelong learning and reskilling.
Politicians, government regulators, and business leaders need to accept a high level of accountability and drive a shift in construction educational and training practices to align with public expectations around quality and compliance. The importance of aligning construction outcomes with expectations is acutely related to qualifications and ongoing learning.

Similarly, one of the simplest and most effective avenues for businesses to lift productivity and the quality of their outputs is to collaborate with their professional bodies and trade associations. These organisations have the growth and development of individuals and companies they support at the heart of all they do. Unfortunately for construction, the growth of many 'patchwork educators' is undermining quality education and training in New Zealand. So-called 'training experts' pop up to deliver tick-box educations on a regular basis, only to disappear a year or two down the track. While all is fair in business, "fly-by-night" trainers' impact on quality delivery needs. Any decision to save a quick buck with a 'fly-by-nighter' impacts quality providers such as institutes and associations who, rather than take money out of industry, reinvest for the good of their members. Is cheap, low-quality training really the sensible approach participants in a faltering industry should take?

Remember BOINZ is an institute with charitable status with a fundamental approach to providing education for its members and the built community which we serve.
Ongoing learning should be fundamental for everyone. In construction, training needs to be factored into the business model and seen as an off-set to inefficiency and poor workmanship.

The uptake of technologies such as remote learning and even virtual reality have helped to develop student and teacher skills, and we can truly thank COVID for accelerating this. This type of technology can quickly develop specific skill sets to support and add to qualifications, transitioning learners into new skills and technologies, creating a stackable skills model. Virtual reality (VR) and augmented reality (AR) will push personalised learning over the next 5 years. Technology such as this requires levels of collaboration between institutes and associations with industry, and in the case of Building Surveying with BCAs. Identifying and crating cost effective stackable learning is a team effort that delivers to the needs of industry, organisations, staff, and the public alike.

This type of model will catapult skills learning and make it affordable. Learning for the future is about strong collaborations delivering on collective efficiencies. This is the pathway to affordable delivery and sustainable, efficient work practices.
If you are interested in working with the Institute in this regard, please get in touch as the future of learning is changing quickly and the demands on your business models are altering daily.
Wishing you all a very Merry Christmas and Happy New Year
Pete.
Peter Laurenson

WHAT'S ON @ BOINZ

Training Academy Calendar

**course dates and locations subject to change*

February		
16 Feb	NZHHA Solid Fuel Heating	New Plymouth - Inhouse
22-23 Feb	TAO12 H1 High Energy Efficiency - including MBIE updates	Hamilton
25 Feb	TA015 F1 Safety of Users & TA016 D1 Access Routes	Nelson - Inhouse
TBC	South Island - Fire Show	South Island - Inhouse

March		
TBC	South Island - Fire show	South Island - Inhouse
7-9 March	TA002 Building Controls	Hamilton
11 March	TA015 F1 Safety of Users & TA016 D1 Access Routes	Dunedin
14-18 March	TA019 Plumbing and Drainage	Hamilton
28-29 March	TA013 E2 Weathertightness	Hamilton

April		
4-5 April	TA017 Services and Facilities - Including MbIE updates	Wellington
TBC	Intermediate Fire	Hamilton/Tauranga
6 April	TA015 & TA016 D1 Access Routes & F1 Safety of Users	Wellington

May		
3 May	Interactive Webinar - Accreditation	Nationwide
6-13 May	TA019 Plumbing and Drainage	Timaru
10 May	ADV027 As near as resonably practical	Hamilton
10 May	TA014 B2 Durability	Hamilton
17 May	TA008 NZS 3604 Timber Framed Buildings	Wellington

Annual Accredited Building Surveyors Training and Networking Event

29th May 2022
Rotorua

Building Officials Institute of NZ

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2022 Course Dates:

18 - 20 March
26 - 28 May
29 - 31 July
23 - 25 September
18 - 20 November

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Winner to be announced in the Autumn Edition of StraightUp

2022 Board Elections Notice

The Constitution of the Institute requires the Institute's Board elections to occur every two years. The next Board election will be held in 2022. Please visit the BOINZ website, where you will find the 'Criteria for Nominations to the Board,' as well as the timelines for the elections.

The official 'Nomination Form' for Board Members for the 2022/2024 yearly terms will be made available once the Call for Board Nominations goes out on 21 March 2022.

This is an important process and is your opportunity to advance candidates you believe will add value and direction to the Institute. Please keep this in mind over the Christmas break for next year.

2022 Annual General Meeting Notice

The Institute's 2022 Annual General Meeting will be held at the Millennium Hotel Rotorua, 1270 Hinemaru Street, Ohinemutu, Rotorua, on Monday 30 May 2022 commencing at 3:45pm.

Access to the 2022 AGM will be undertaken by the presentation of your current 2022 Membership Card, proving your current membership status, and by the presentation of your My Vaccine Pass.

AGM Timelines
Notices of Motion to the Chief Executive to be received by 12 April 2022(at least 48 days prior to the AGM).

Notices of Meeting, agenda and any notices of motion to members by 2 May 2022 (At least 28 days prior to AGM).

DECISION MAKING FRAMEWORKS

MANAGING EARTHQUAKE-PRONE COUNCIL BUILDINGS

A recommended new decision-making framework for councils. *Article courtesy of BRANZ*

Recent research shows that there may be inconsistency in how territorial authorities approach difficult decisions about whether to close, or keep open, their earthquake-prone buildings. The legal obligations governing these decisions are contained in more than one piece of legislation and closing a building can have broader impacts on the community and local businesses. A BRANZ-led collaboration has developed a decision-making framework (see page 10) to help territorial authorities assess the different types of risk and to navigate their obligations consistently.

A common misconception is that if a building is rated as less than 34% NBS and/or declared earthquake-prone, then the building is dangerous and should be closed immediately. The decision to close buildings is further reinforced by a perceived legal exposure for councils under the Health and Safety at Work Act (HSWA) 2015.

However, closing council buildings can also have social and economic impacts on local communities. Facilities and services previously housed in closed buildings may not be available for long periods. Businesses operating there may be interrupted and/or forced to relocate.

To support a more consistent approach for making decisions about council-owned earthquake-prone buildings, BRANZ (in collaboration with Resilient Organisations, Kestrel Group, the University of Canterbury Institute of Law, Emergencies and Disasters, and Massey University Joint Centre for Disaster Research) researched and developed a framework to assist this type of decision making. This framework is designed to help territorial authorities navigate their obligations around seismic safety and community wellbeing in a way that is consistent with the legislative timeframes for remediation. This would also ensure that the legal classification of *'earthquake-prone buildings'* is not causing immediate and unnecessary building closures.

Legislative obligations

The Health and Safety at Work Act 2015 does not have specific provisions that relate to seismically vulnerable buildings but does establish that building owners and employers are considered a person conducting a business or undertaking (PCBU). PCBUs must protect the health and safety of workers (and others) while providing a safe working environment as far as is reasonably practicable.

Section 14 of the Local Government Act 2002 requires councils to take the interests of current and future communities into account when making decisions. This means decisions to close council buildings should also account for the economic, social and cultural impacts on the local community. Under this Act, councils must also consider the views and perspectives of people likely to be affected by the decision.

The Building Act 2004 was amended under the Building (Earthquake-prone Buildings) Amendment Act 2016 and contains the requirement for territorial authorities to identify buildings or parts of buildings that are potentially earthquake-prone and to request engineering assessments for them from the owners. The Act includes statutory timelines for remediating earthquake-prone buildings and does not preclude continuing to use and occupy them. The Building Act defines dangerous buildings as those that pose an immediate threat to people in and around the building. The definition of a dangerous building and process for managing them is set out in section 121. Earthquake-prone buildings are not considered dangerous buildings unless they cause immediate danger to the

people in or around them in the ordinary course of events.

The decision-making framework

Information and feedback were gathered during interviews and workshops with several councils to understand how decisions were made and develop a five-step decision-making framework. The interviews revealed that there appeared to be little internal discussion around risk tolerance. Of the councils involved, few had developed or adopted formal policies for decisions about earthquake-prone buildings. This lack of transparency and consistency leaves decisions open to challenge.

Of the people interviewed, much of the decision making appeared to rest on the potential consequence of an earthquake event rather than its likelihood. None of the people interviewed explicitly considered and assessed the immediate socio-economic impacts of closing a building on the community within the decision.

The recommended framework helps decision-makers explore the actual exposure to risk in detail. Factors such as the numbers of people occupying the building and the average time they spend in the building are evaluated, along with the likely period of time before the building is strengthened. This approach is taken because risk is a function of time: the longer we are exposed to a risk, the more chance we have of the event occurring. The framework also prompts users to consider the consequences of immediate building closure, such as the ability to deliver services by other means, impact on vulnerable communities, impact on neighbouring buildings, and impact on staff.

Step five in the process combines both the exposure of people to the safety risk of being in an earthquake-prone building with the social and economic consequences of the building closure. This step is critical to ensure that territorial authorities are balancing both their responsibility under the HSWA 2015 and their duties in promoting community wellbeing under the Local Government Act.

The steps in the framework, shown opposite, largely align with the ISO 31000 risk management process, stepping users through the risk identification, assessment, and treatment phases of risk management. Decisions in the flowchart (refer to page 10) are supported by five tables (not shown) that can be tailored to match a council's current tolerance for risk.

The tables help users evaluate:

- how the building is used (the number of people generally present, for how long and how often),
- the likely time before the building is strengthened and the local seismic risk
- the direct consequences of closure on the community, local businesses and staff.

Decision-makers using the flowchart should do a 'sense check' before making a final decision, and consider any other hazards like hazardous substances or asbestos in the building or geological hazards adjacent to the building (e.g. unstable ground) that might create an additional health and safety risk during an earthquake. The demographics of the people using the building should also be considered – are they elderly, physically impaired, or vulnerable in any way? Does this change the risk to their safety?

Note that the framework is intended specifically for the management of council-owned buildings. It is not intended for use in post-earthquake building occupancy decision-making.

More information

To download this free decision-making framework, including detailed user guidance, visit the BRANZ online shop at www.branz.co.nz/shop/catalogue/earthquake-prone-buildings_994.
To see the decisionmaking framework got to page 10.

If you have any questions or would like to register interest in participating in a training workshop for your council, please email *michael.nuth@branz.co.nz.*

Further reading:

- BRANZ Research Now: Seismic resilience #2. Managing earthquake-prone council buildings. Available at www.branz.co.nz/pubs/research-now/seismic-resilience. Available at www.branz.co.nz.
- BRANZ Study Report 463: Managing earthquake-prone council buildings: Balancing life safety risks and community costs. Available at www.branz.co.nz.

Decision-making framework for earthquake-prone council-owned buildings

STEP 1 :

Building assessment

Start with a detailed seismic assessment of the building that clearly identifies any structural vulnerability, mode of failure, and the area of the building that is affected

Is the building, or any part of it, identified as dangerous?

YES → **Manage as a dangerous building** (see s121-124 of the Building Act 2004).

NO

Is the building less than 34%NBS?

NO → **Use normal asset management process.** Include in the long-term seismic upgrade programme.

YES

GO TO STEP 2

STEP 2 :

Building user exposure to risk

Evaluate the number of people using the building and the length of time they spend there (use Tables 1, 2, and 3)

What is the level of life safety exposure?

LEVEL I → **Building remains open.** Communicate any risk to building owners and visitors. Include building in seismic upgrade programme (Building Act 2004 requirements as minimum). See also notes 1 and 2.

LEVEL II

LEVEL III

GO TO STEP 3

STEP 3 :

Risk mitigation measures

Identify any temporary measures that can be put in place to reduce safety risk to building users (e.g. fence off the dangerous part of the building, close adjacent footpaths, remove parapets)

Can risk be mitigated temporarily?

YES → **Building remains open.** Communicate any risk to building owners and visitors. Include building in seismic upgrade programme (Building Act 2004 requirements as minimum). See also notes 1 and 2.

NO

GO TO STEP 4

STEP 4 :

Consequences of building closure

Determine likely immediate consequences of closing the building. This includes impacts of staff, building users and neighbouring business and community (see Table 4)

GO TO STEP 5

STEP 5 :

Overall assessment of building risk

Evaluate the overall risk (safety and consequences of closure) (see Table 3, 4 and 5)

What is the overall risk?

Category A → **Building remains open.** Communicate any risk to building owners and visitors. Include building in seismic upgrade programme (Building Act 2004 requirements as minimum). See also notes 1 and 2.

Category B → **Building remains open.** Communicate any risk to building owners and visitors. Include building in seismic upgrade programme (Building Act 2004 requirements as minimum). See also notes 1 and 2.

Category C → **Close building within reasonable period** (see note 1)

Note 1: Before making a final decision, do a sense check: is this a reasonable and justifiable decision?

Note 2: Consider the demographics of the people using the building – are they elderly, physically impaired, or vulnerable in any way? Does this change the risk? Consider other hazards that might create additional risk, like the presence of hazardous substances or asbestos in the building, or natural and geological hazards nearby, such as unstable ground.

BRANZ · UC University of Canterbury · kestrel group · Massey University – University of New Zealand · Resilient Organisations

NEW GUIDANCE

TINY HOUSE GUIDANCE RELEASED

In November this year, MBIE released Tiny House guidance to help with navigating the building regulatory process for tiny houses. This guidance is available on building.govt.nz

Why has MBIE published this guidance?
The Tiny House guidance has been developed to help clarify how tiny houses on wheels should be classified and when and how tiny houses interact with the Building Act and Building Code. It aims to ensure a consistent approach to issuing building consents for tiny houses across each region of New Zealand.

While no legislative or regulatory changes have been made regarding tiny houses, this guidance has been created to help people understand the current requirements, and outlines things to consider before buying a tiny house. This guidance will help the user to determine if a tiny house is a building or a vehicle, or both a building and a vehicle, and which relevant laws they will need to comply with.

People look at tiny houses as a housing option for a number of reasons, such as the affordability of standard homes in the housing market. However, there are many factors to think about when considering building, buying or living in a tiny house.

Tiny houses need to be safe, healthy and durable for their intended use. Tiny houses that are immoveable in terms of the Building Act and intended to be occupied on a permanent or long term basis will have additional requirements in order to ensure that they can be used safely for these purposes without endangering people's health. The guidance outlines considerations to be taken into account when determining if a tiny house meets the Building Act definition of *'immoveable'* and *'occupied on a permanent or long term basis'*.

How does MBIE define a tiny house?
There is no definition for a Tiny House in the Building Act, but for purpose of this guidance MBIE has defined a tiny house as small, compact dwellings. A tiny house can be a building or a vehicle, or both a building and a vehicle.

How the guidance was developed?
MBIE has developed this guidance alongside a Tiny House stakeholder group, which was made up of diverse representatives across the sector and consisted of Councils, Manufacturers, Tiny House associations, and MBIE/Waka Kotahi representatives. The purpose of the group was to enable MBIE to test its thinking and understand the issues faced by these groups. Recent determinations have also helped to clarify MBIE's position on the classification of Tiny Houses.

What else is MBIE doing to encourage the use of innovative and efficient building technologies?
As part of wider building system reforms, MBIE is developing a new modular component manufacturing certification scheme which will enable a streamlined consenting pathway for certified manufacturers of modular, offsite, or prefabricated buildings.

Tiny Homes (houses) was also listed as a trend in this year's Sector Trends Annual Report. This report shows, amongst other things, how the building landscape is changing with the introduction of innovative building designs, technologies and materials such as smart buildings, 3D printing and engineered living materials.

Tiny House Guidance can be found on the *building.govt.nz* webpages.

SPOTLIGHT ON A MEMBER

Naki Tupou

Naki is a BOINZ Licensed member based in Upper Hutt. We have put the spotlight on Naki's career highlights, and get some insight in to his experience as a Building Surveyor.

How long have you been working in Building Control?

Coming up nine years now - Five years with Wellington City Council, three with Hutt City Council and I'm currently at Upper Hutt City Council

Tell us about your pathway into the industry, where did you start your career, and what got you into this role?

I went into building straight out of high school and spent 10 years as a builder. I always had an interest in the building control side of things but initially felt like building inspection wasn't for people like me. I was lucky enough to land a role with Wellington City Council where I was trained and mentored by some really great, encouraging senior inspectors and I've never looked back.

What has been the highlight of your career so far?

As well as spending time with working for three Wellington based Councils, I have also had secondments to three other councils around New Zealand. I have really enjoyed getting to know different part of the country and learning how different councils operate.

What do you think are the biggest challenges the industry faces at the moment?

With the huge focus on new development and building new houses so quickly, there is a risk that quality and compliance will be sacrificed along the way. I think one of the biggest challenges for the building control industry is striking the right balance between efficiency and quality. Another major challenge that many councils are facing is a shortage of trained building control staff. As an industry, we need to be looking at ways to attract and retain staff.

What challenges do you feel the industry would benefit from?

It would be great to see something set up to make it easier for councils to collaborate and share resources. This might help address some of the staffing issues that the industry is currently facing.

What advice would you give to someone just starting their career in Building Control?

Go for it! It really is a great industry to be a part of. Everyday is different and you're constantly learning and being challenged. When I first started out, my most valuable learning came from listening to inspectors who had been doing the jobs for years. So take the time to listen and learn from people who have been in the job a while - they have wisdom and experience that won't find written in any books.

Thank you to Naki for standing in our spotlight!

KNOW SOMEONE WHO DESERVES THE SPOTLIGHT?

Our members are centre stage in our industry. If you are 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

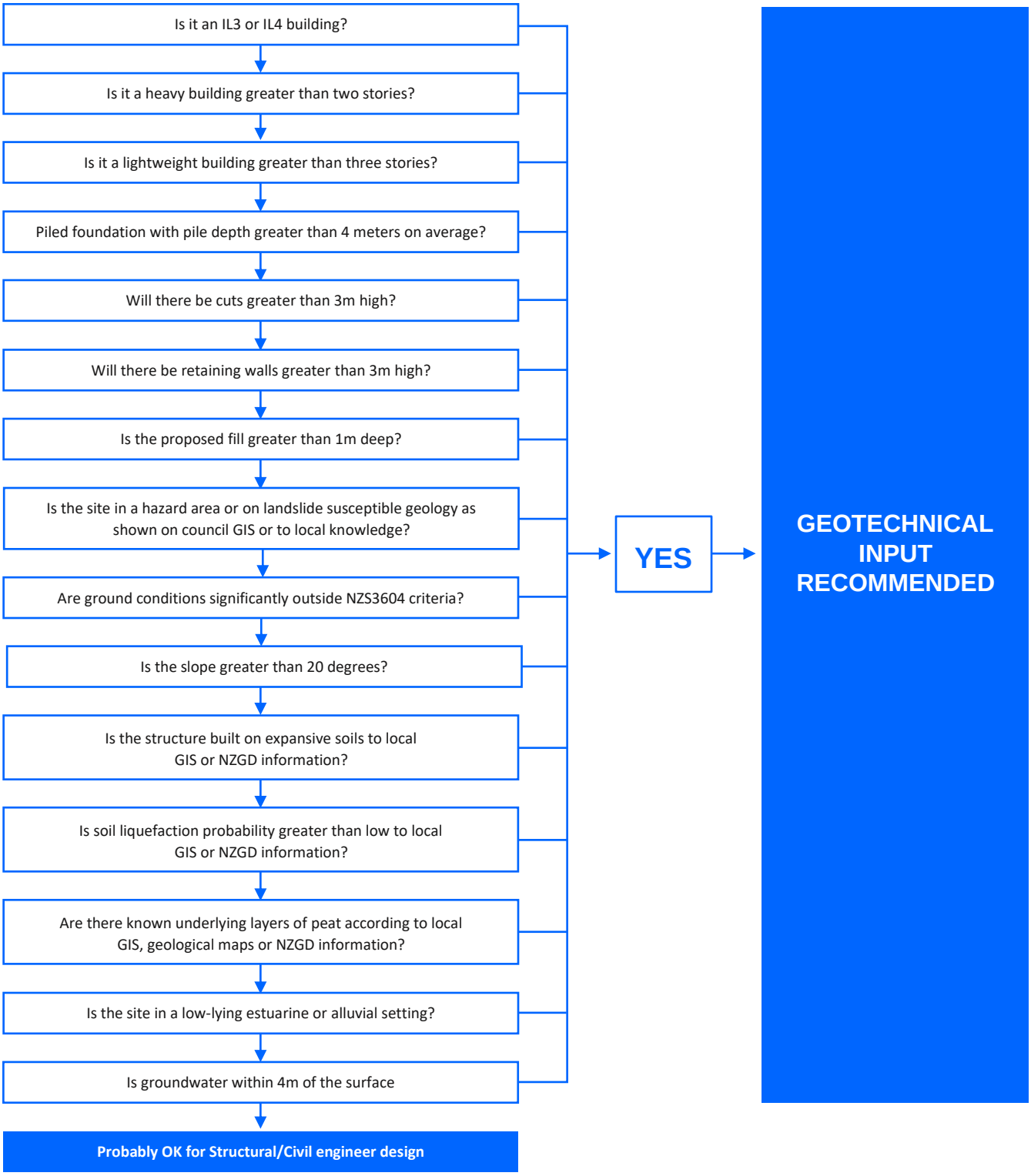
engineering new zealand
te ao rangahau

GEOTECHNICAL INPUT DECISION CHART FOR STRUCTURAL ENGINEERS

Structural engineers are sometimes criticised for acting outside the bounds of their competence when undertaking geotechnical work. The flowchart below is designed to help engineers, building consent authorities (BCAs) and others understand when input from a specialised geotechnical engineer is likely to be required. The tool should provide a good indicator and contribute to clearer communication and expectations between engineers, clients and BCAS.

This document is only an indication of when additional information or expertise may be required. There will always be exceptions to general guidance, and you should use your professional judgement in every case to determine the appropriate skills and expertise required for the job.

The chart will vary slightly from region to region due to the different topographies and soil conditions throughout New Zealand. To use the chart, if the answer to the question is no, continue to the next question. If the answer is yes, geotechnical input is recommended.



NEWS FROM MBIE

EARTHQUAKE GEOTECHNICAL ENGINEERING PRACTISE SERIES

The Minstry of Business, Innovation and Employment (MBIE) has recently published a revision to the Earthquake Geotechnical Engineering Practise Series. The practise series comprises of a suite of guidance documents covering earthquake geotechnical eningeering overview, investigations, foundation design, assessment, mitigation of liquefaction hazards, ground improvement and retaining wall design.

The Practise Series is issued as section 175 guidance unedr the Building Act summarises current best practise in earthquake geotechnical engineering with a focus on New Zealand conditions, regulatory framework, and practise.

The Practise Series was first released in 2016 alongside a request for feedback from the geotechnical community , add new information, and to reflect updated scientific knowledge, working in collaboration with Engineering New Zealand and the New Zealand Geotechnical Society.

By following the updated guidelines whic hwere published on the 29th November 2021, geotechnical engineers have the most up-to-date science available which will improve the quality and consistency of design and practise.

Key changes in the revision

The changes to modules include content changes, clarifications and updates, including consideration and incorporation pf relevant existing feedback.

In the revised version of the practise series, Module 1: *'Overview of Guidelines'*, which relates specifically to earthquake hazards, contains interim updates to the seismic design hazard values for geotechnical design. These hazard values are based on a limited hazard study and represent the latest scientific knowledge in the interim period while the National Seismic Hazard Model (NSHM) is under review. It is important to note that this is relevant to the design of new buildings only; there is no change to hazard assessments for existing buildings.

A full-scale revision to the NSHM is currently underway and is expected to be completed in August 2022. Following the revision, MBIE will be undertaking a programme of work to translate the outputs of NSHM in Building Code regulatory settings. Until then, designers are encouraged to make use of the interim guidance for geotechnical design of buildings.

The updated practise series have no impact on existing buildings under Earthquake Prone Buildings (EPB) legislation. This means the revised hazard estimates should not be used for:

- Structural design
- Assessment of existing buildings (including assessment of existing buildings made for purposes other than EPB decisions i.e for market related activity)
- Design of building strengthening
- Hazard mapping

The practise series is guidance only and is not a prescriptive Acceptable Solution or Verification Method under the Construction under the Building Code. Following these guidelines does not automatically mean that Building Consent Authorities (BCAs) must accept the consent application, however BCAs can rely on the guidance when making *'reasonable grounds'* decisions on code compliance but are not bound to accept it as mandatory means of compliance.

For further information on the Earthquake Geotechnical Engineering Practice Series and the changes made to the revised Series, visit *https://www.building.govt.nz/building-code-compliance/b-stability/b1-structure/geotechnical-guidance/*

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A NEW ZEALAND SOLUTION

DESIGNING HEALTHY HOMES

"I want my research to be at the forefront of delivering healthy homes in New Zealand," says Te Herenga Waka—Victoria University of Wellington PhD student Griffin Cherrill.

Griffin is aiming to support the creation of healthy homes by simulating the risk of mould growth and condensation during the design of timber-framed houses.

"I am attempting to identify a reliable tool that assesses the risk to healthy homes from thermal bridges and aligns with the New Zealand government's Health Homes Standards that commit to building warmer, dryer, and better-ventilated homes."

In construction, a thermal bridge is a material with a higher thermal conductivity that passes through an insulation layer, such as a timber stud in an external wall. Griffin has discovered that 1-dimensional models used to calculate energy demand assume that surface temperatures are constant across an internal surface, but this is an oversimplification. Instead, increases in thermal conductivity due to thermal bridges in the building fabric lead to colder local surface temperatures and an increased risk of internal moisture.

"Using a 1-dimensional tool can produce results that are warmer than in reality, which could lead to the risk of internal moisture being overlooked," Griffin says. "Therefore, the industry must identify tools to reliably assess the local risk of internal moisture if homes are to improve in these respects."

Griffin hopes that the Ministry of Business, Innovation and Employment and building practitioners can use the tool he is working on to update the New Zealand Building Code and inform their home designs to serve New Zealanders better.

Griffin has also identified some issues with current standards used to reduce moisture in homes. "The Clause E3/AS1 method used in the Building Code assumes that an overall R-value of at least R-1.5 will stop condensation and mould growth, but there is no evidence-based research of why this value has been chosen," Griffin says.

Researchers have not been able to confirm whether these standards are actually enough to stop internal moisture in homes, he says. Also, previous research highlights that most timber-framed homes in New Zealand have a percentage of timber in the external walls that make it impossible to meet the minimum energy efficiency and internal moisture standards laid out in the NZ Building Code.

Griffin's research uses the BRANZ Test House, located in Porirua, as a case study to identify critical thermal bridges where internal moisture is likely to occur. The single storey timber-framed house, with an attic and subfloor zone, has been the subject of building research for two years. He is using several tools, including heat and moisture modelling tool WUFI Plus, to document the risk of internal moisture depending on local climate, insulation levels, and percentage of timber used in construction.

To advance his research, Griffin is working closely with the Building Research Association of New Zealand (BRANZ), an independent organisation that researches, certifies, and tests building designs and materials in New Zealand in partnership with the industry and the central government, with BRANZ providing funding for his research. He hopes to discuss

his ongoing work and building solutions to deliver warm and dry timber-framed homes in New Zealand with ministries and building practitioners and see his research in action in the New Zealand building sector.

Griffin Cherrill is a candidate in the Wellington Faculty of Architecture and Design Innovation under the supervision of Associate Professor Michael Donn, Dr Nigel Isaacs, and Stephen McNeil.

Contact Griffin to hear more about this research on *griffin.cherrill@vuw.ac.nz.*

Victoria University of Wellington, Wellington Faculty of Architecture and Design Innovation

CAREERS

PERSEVERANCE NETS NEW CAREER

Olivia's journey to becoming a Building Control Officer has been bumpy , but she has remained optimistic throughout all stages in her journey. Olivia offers great encouragement to all who want to enter the Building Surveying industry. Read her story below, and how Future Skills assisted her on her road to success.

Persistence has paid off for Building Surveying student Olivia McGregor. The mother of two has endured a taxing year juggling the demands of raising a family, maintaining a job and studying. "To say this year has been extremely taxing would be an understatement" she says. But Olivia is reaping the rewards after landing a dream role as a Building Control Officer at the Timaru District Council.

The 34 year old says the skills she gleaned through the NZ Diploma in Building Surveying (Blended Online) have been valuable at the new job. "The content that Future Skills Academy provided throughout this year's papers, that I spent many tiresome hours studying, is already helping me carry out the processing role."

After completing her last assignment, she will change her study from in-class to while working with the NZ Diploma in Building Surveying (In-Employment). This will involve taking block courses next year to finish the Diploma. "I am really looking forward to next year where I will be able to practise what I am studying on the job whilst having the support of co-workers."

The Timaru resident says she harbours a real passion for the construction industry, a long-standing part of her history. " There is so much going on in the industry and it is quite fluid."

A love for construction runs in the family - Husband Shannon is a Builder. Olivia's previous role in an Architechtural firm saw her pre-vetting and submitting building consents. "That spurred my interest in learning about building compliance as well as being eager to secure a qualification and a sound, long term career. After a quick google search, Future Skills Academy came up with the qualification I was after to comply with the Regulation 18 requirement to be able to work in a Building Consent Authority."

Olivia savoured learning about New Zealand's construction and legislative relationship, and how buildings were created. She also relished the work experience component which she initiated by contacting two acquaintances at the Timaru District Council. Kerry McDonald took her out to site inspections and Paul Hansen let her observe plan processing in the office. "These two gave me so much of their time and guidance" she says. "Without them, I would never have got through this year, so I am extremely grateful to both."

Olivia urges anyone undertaking stud, especially long distance, to keep at it. "Yes it is hard work, but find a supportive mentor or two and just keep ticking off the assignments off one by one, especially given our COVID-19 living conditions! In the word of the late Kobe Bryant, "Great things come from hard work and perseverance. No excuses"

She is looking forward to spending quality time during the summer break with her husband, daughter Isobel, 7 and Son Henry, 2. "I am a Christmas fanatic" she says, "I can't wait to put up the tree and decorate it twice, as I will have to rearrange the kids decorations".

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CONCRETE NZ

A CERTIFICATION SCHEME FOR PRECAST CONCRETE

Although the construction sector is busy managing the continued uncertainty created by COVID-19, building quality must never be compromised.

Concrete NZ's Precast Plant Certification Scheme provides purchasers and specifiers with peace-of-mind that their precast concrete products meet quality requirements. Within a construction environment dominated by concerns around operating during the pandemic there have been recent reports of building material supply issues, and in turn, potential quality concerns.

The media picked-up on a recent industry survey which reported a number of concerns, including increased costs, customer complaints, and product substitutions due to a lack of building materials.

While the concrete industry is not immune to operating challenges such as a shortage of truck drivers, and is monitoring aggregate supply, there are no capacity issues that should force building contractors to replace the quality concrete products supplied by members of the Concrete NZ Precast Certification Scheme with inferior alternatives.

The Precast Plant Certification Scheme is gaining traction amongst Concrete NZ Precast members and their clients. The manufacture of precast concrete products requires considerable experience and skill, as they often form a building's primary structural system. Poor precast manufacturing practices have the potential to compromise a structures durability and the life safety of its occupants.

In addition, safety considerations are paramount during the manufacturing, handling and installation of precast products, with any short cuts potentially resulting in unsafe outcomes with significant consequences.

The Precast Plant Certification Scheme provides specifiers, contractors and their clients with confidence that products purchased from a Precast Certified Plant are backed by an established operator with appropriate facilities, experienced staff and quality assurance programs.

Regardless of the application of the precast product - architectural, structural, cladding, civil or other - purchasing from a Concrete NZ Precast Certified Plant ensures that the product has been manufactured at a facility with systems audited by an independent, third-party body.

Certified Plants invest heavily in modern equipment, oversight procedures and staff training with the intention of delivering "quality". While cheaper alternatives may be available, cost must never be the only consideration.

Procurement decisions should always factor in quality as a prerequisite, and in terms of precast, the mark to look for is the Concrete NZ Precast Certified Plant logo.

concretenz
PRECAST
CERTIFIED PLANT

For more details on the Precast Certification Scheme and a link to the precast plants currently registered, visit the

Concrete NZ website:
www.concretenz.org.nz

NZCIC

NEW ZEALAND'S PEAK BODY FOR CONSTRUCTION ANNOUNCES LEADERSHIP APPOINTMENTS

New Zealand Construction Industry Council (NZCIC) has appointed Andrew Eagles as Chair, while previous Chair, Graham Burke becomes the organisation's first Executive Director.

Incoming Chair, Andrew Eagles brings a passion for sustainable and resilient building to the role. He has served as New Zealand Green Building Council's CEO since 2016. Andrew is a qualified economist with more than fourteen years' experience in the built environment. Working for consultancies, associations, government and built environment charities, he has a wealth of knowledge in housing, market mechanism, advocacy, and the construction supply chain.

Andrew believes that "the construction industry has a huge impact on Aotearoa New Zealand. It delivers the places we live, work, and play in; employs hundreds of thousands of people and has a significant and long-running impact on our wellbeing.

The Construction Industry Council is working hard to ensure New Zealand has a world leading construction sector. I am delighted to take on the role of Chair of the Construction Industry Council and to be working with such a professional and focused executive committee, Deputy Chair and Executive Director."

Outgoing Chair, Graham Burke moves into a new NZCIC Executive Director role. "I am excited to have the opportunity to work beside Andrew Eagles over the next two years" he said, "Andrew has an amazing range of qualification and experience across government, NGO and private enterprise, and his knowledge of green building principles and economics will be invaluable as we navigate towards a carbon neutral industry. I am also very pleased to have Malcolm Fleming continue as Deputy Chair, as he has been an amazing asset to NZCIC over the last two years and has had a major role in our success, which is set to continue."

The NZCIC is the peak industry body representing 35 member associations, covering all aspects of the New Zealand Construction Industry. NZCIC is the cohesive voice driving industry wellbeing and performance for a better built environment for New Zealand. The term of the appointments is two years.

NZCIC Executive Team
Andrew Eagles (Chair) **NZGBC**
Malcolm Fleming (Deputy Chair) **NZIOB**
Troy Coyle **HERA**
Rob Gaimster **ConcreteNZ**
Nick Hill **BOINZ**
Donna Howell **PMINZ**
Peter Silcock **Civil Contractors**
Tania Williams **ENZ**
Gillian Wess **FMANZ**

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NZCIC Chair, Andrew Eagles
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THE FUTURE OF CONSTRUCTION

NEW RESEARCH SUGGESTS ADOPTION OF CONSTRUCTION 4.0 TECHNOLOGY IS KEY TO PRODUCTIVITY GAINS

HERA comissioned BERL to prepare a report on the potential economic impacts of Construction 4.0 on the New Zealand economy. The results are striking with modelling suggesting a total GDP gain of as much as $8 billion in the next few years.

What is Construction 4.0?

Construction 4.0 is the name applied to the technologies that are driving the next great industrial revolution, as applied to the construction sector.

The first industrial revolution was powered by steam and helped to mechanise the manufacturing process. The second used electricity to drive mass production and the third employed electronics to automate the process. The fourth revolution builds on advances over the last fifty years to fuse physical production with smart digital technology. It is the age of cyber-physical systems.

This is not sci-fi. It is not the realm of filmmakers and futurists.

This change is happening now and promises to transform our industry as much as, if not more than, the introduction of water, steam, and electricity did in the past. A quick internet search will offer a lot of buzz words and jargon on the theme – IoT, IIoT, CPS, AI, Big Data, and Cloud Computing. The new revolution is comprised of over 30 different digital technologies that, together, are reshaping our world.

In essence, Construction 4.0 simply enables companies to have better control and understanding of their business. Interconnectivity, data, and cyber-physical systems connect and enable collaboration between departments and across the supply chain. They are more responsive to fast-changing environments and consumer demands.

The Report

The report showed a clear link between the adoption of new technology and improvements in productivity, efficiency and profitability. It applied sophisticated economic modelling to test assumptions and demonstrate the uptake of new technology on factors such as GDP, wages, employment and productivity.

Mark Cox, Principal Consultant at BERL, asked a simple question: What would happen if we applied Construction 4.0 technology more widely in construction and increased productivity? What would the effects in productivity be?

"The headline effect is that depending in which scenario used to increase productivity, over the next 5-years GDP would increase by 0.5 to 1%. This sounds like small numbers until you factor in that GDP is $260 billion, you are talking an increase in GDP of $1.25-$2.5 billion," he said.

The findings suggested:

1. GDP will be boosted. Total GDP gained over the five year period could be as much as $8 billion and, even our most pessimistic forecasting revealed a $4 billion increase, compared to the base scenario. By comparison, this is roughly equivalent to the value of a bipartite trade agreement, such as one with the UK.

2. Wages are likely to increase. An increase of almost $3.5 billion over the five year period.

3. The benefits will be felt most by those in the middle-income bracket and is marked by higher incomes and consumption. This reflects the particular mix of people employed in the construction sector.

4. Government spending can evolve. With more money, the government can invest in large-scale infrastructure and well-being projects.

5. The construction industry would benefit. So too would other industries along the supply chain from logging to the users of commercial buildings.

The full report can be viewed here and HERA's *'Stiring the Pot'* podcast *'The economic case to adopt Construction 4.0'*, with Mark Cox can be listened to here. The podcast further details the research and the methodology used.

Pictured above: Dr Troy Coyle, Hera CEO

What are the Barriers?

It is easy to advocate for change and it is clear that those companies that take up the adoption of new technology are more likely to be insulated from a rapidly changing global economy.

As Klaus Schwab, Founder and Executive Chair of the World Economic Forum states, "We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before."

Like the Luddites of old, railing against the invention of the Spinning Jenny, business stands at a crossroad where they can accept new technology or watch their business slowly stagnate.

There are barriers.

These can be broken down into three. Firstly, technical – the new technology is difficult to understand, expensive and will take training to implement. Secondly, structural – the construction industry in New Zealand is composed of many small companies and there is a lack of standardisation. And lastly, human – people not wanting to change as it is daunting to think of new ways of doing business.

If these barriers can be overcome, however, the rewards are great. Fortunately as Mark Cox states there is help available from institutions like the Callaghan Innovation.

The Benefit

Greater productivity, increased scalability and efficiency and a faster adaptability to change are the hallmarks of Construction 4.0. The new technology enables change to take place rapidly without disruption of the value chain and production grinding to a halt.

The flow on effects are enormous.

If design is maximised for multiple outcomes not only will the construction industry benefit but so will society. Better performing buildings capitalising on better design and building efficiencies will create a better and more sustainable future.

By Dr Toy Coyle, Hera CEO

EARTH BUILDING

ADOBE & TIMBER HOUSES IN NEW ZEALAND

A comparative study of their thermal performance and energy efficiency.

How do adobe buildings differ from conventional residential timber houses in their thermal comfort and energy efficiency? This question was the starting point for the research paper *'Adobe (mud brick) and Timber Houses in New Zealand: A comparative study of thermal performance and energy efficiency'*, produced last year for Massey University to discover which material shows better performance in each aspect. This research used as case studies six adobe and three timber houses from different parts of the country. The study enabled a better understanding of adobe construction from North to South, assessing their strengths and weaknesses, considering principles for passive design, energy sources, humidity and temperature balance capacity, and thermal comfort, among others. The results may encourage the choice for a more affordable, sustainable and energy efficient material as a way of reducing numerous environmental damages caused by the construction industry.

Sources and Samples

A number of adobe houses were identified and catalogued predominantly from research carried out by architect Min Hall (2012). In total, eight house owners volunteered to be part of this research, one adobe and one lockwood (solid timber) house from the North Island, five adobe and two timber framed houses located in Nelson, Motueka and Takaka. Among them John and Collen's iconic adobe house designed by Graeme North in Helensville, and Peter Olorenshaw's home built in a semi-rural Nelson. All timber framed houses were chosen based on their proximity to the adobe ones to compare data obtained in similar weather conditions.

The houses were monitored during spring and summer, from 30th September to 22nd December 2019. Their internal temperature and relative humidity were recorded by an electronic thermometer (iButton®) positioned in the living room (or north facing room), and in a south facing bedroom. The thermometers were programmed to record temperature and relative humidity every thirty minutes and the data was then assessed for thermal performance. Data related to external temperatures and relative humidity was also gathered using the NIWA (National Institute of Water and Atmospheric Research) database, using the closest station to the houses. These data enabled a comparison of the capacity of thermal regulation for each type of construction.

A visual assessment was also made considering passive design concepts, sun and wind directions, wall thickness, use of insulation, and type of joinery. We undertook personal interviews with the occupants in which themes related to thermal performance perception, indoor thermal sensations through the seasons, and occupant's behaviour, such as frequency of use of appliances or other strategies related to thermal comfort and energy efficiency were analysed. The participants were required to provide energy bills (when on grid), in order to compare which type of construction requires more energy to run, relating this back to the information given in the questionnaires regarding participants energy use behaviour.

Results and Discussion

The results suggested that adobe houses tend to have less fluctuations in temperature and relative humidity, maintaining comfortable

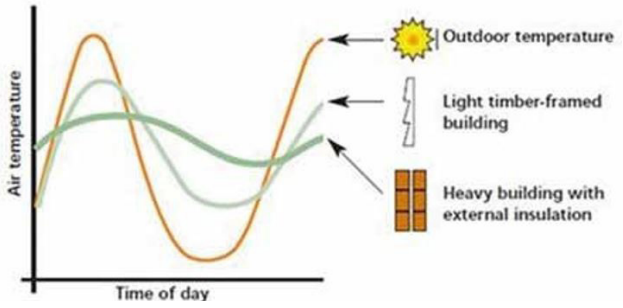

Figure 01:
Thermal mass effect on temperature fluctuations (Australian Greenhouse Office 2010).

Source: https://www.researchgate.net/figure/Thermal-mass-effect-on- temperature-fluctuations-Australian-Greenhouse-Office-2010_fig8_281279058

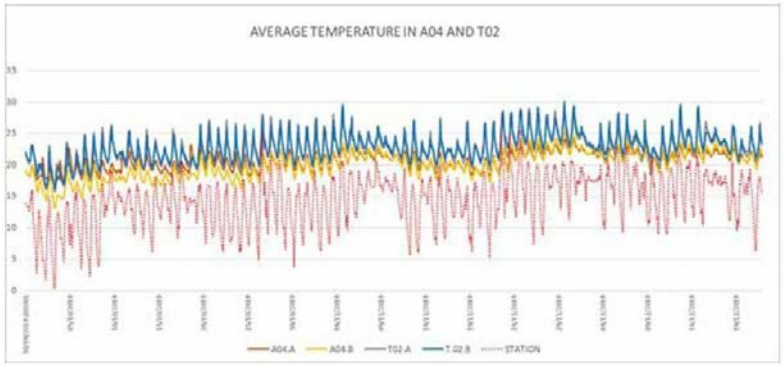

FIGURE 02:
Internal and external temperatures registered from 30th September to 30th December in an adobe house (A) and a timber framed house (T)

levels for long periods, with slight variations, unlike timber houses, which undergo great fluctuations following the external temperature changes, as expected (Baggs, 2013). The highest and lowest internal temperatures were recorded in the timber houses being 33°C and 13° respectively, which means they tended to be more influenced by external variations, presenting overheated spaces or temperatures below the standards for thermal comfort as recommended by Ministry of Business, Innovation and Employment (MBIE). MBIE consider temperatures comfortable when ranging from 19-24° (sedentary work) or 16-21° (physical work) during summer. The most significant differences were observed between an adobe house (identified as "A04" North and South, respectively) based in Nelson, and a recently built timber framed house (T02) just fifty metres from each other, thus sharing the same weather conditions, as can be seen in Fig.02.

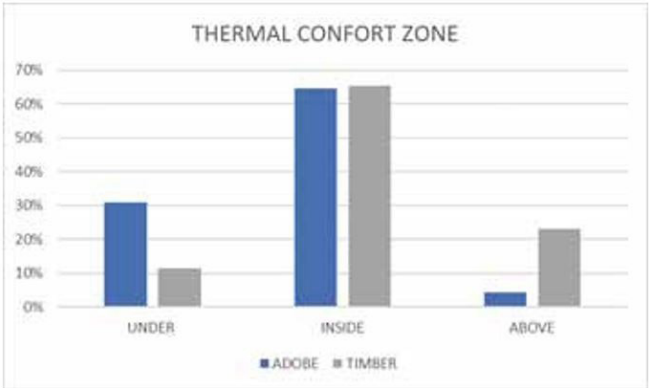

FIGURE 03:
Graph shows the percentage of hours during which internal temperatures of timber and adobe houses were inside, under or above the thermal comfort zone.

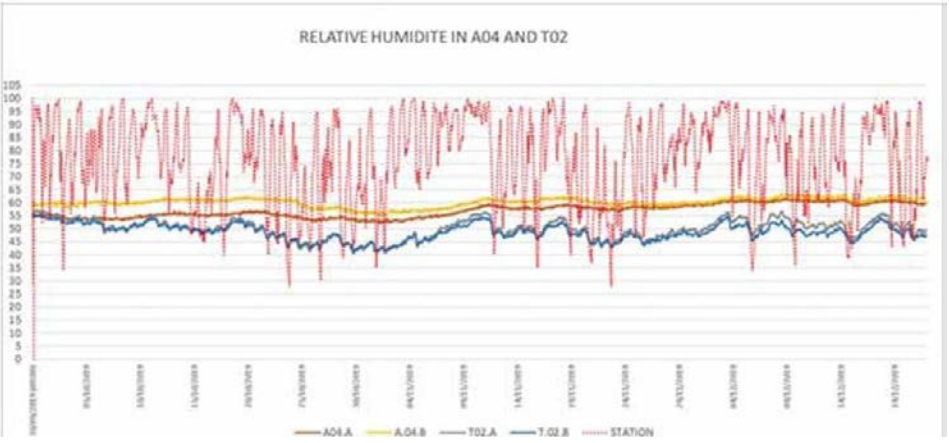

FIGURE 04:
Internal and external relative humidity (represented by the red dots) registered in an adobe (A) and timber framed (T), in Nelson.

Note in blue and grey the temperatures registered in the timber framed house oscillating widely and registering long periods above 25 ° in both rooms monitored. In the adobe house, however, mild temperatures were maintained fluctuating from 15 to 24°C mostly, even when external temperatures (represented by the red dotted lines) were close to 28°. When comparing data regarding the time both types of houses were considered to be "out" of thermal comfort levels, as shown in Fig.03, it is noticeable that adobe and timber houses maintained comfortable temperatures for a similar period of time, around 65%, however, adobe houses registered temperatures below 19° for 30% against 12% of the time monitored in timber framed houses. On the other hand, timber framed homes registered temperatures above 24° 23% of the time, while adobe registered only 3% of all time recorded. This means that adobe performs well in hot temperatures but demonstrates a poorer thermal performance when temperatures drop below 19°C.

Energy Efficiency

An energy efficient building can be defined as one that uses less energy to run and costs less to maintain, involving not only cost-savings for occupants but also a more sustainable way of life. Although the interpretations of the results can be considered limited by the number of participants who made the power

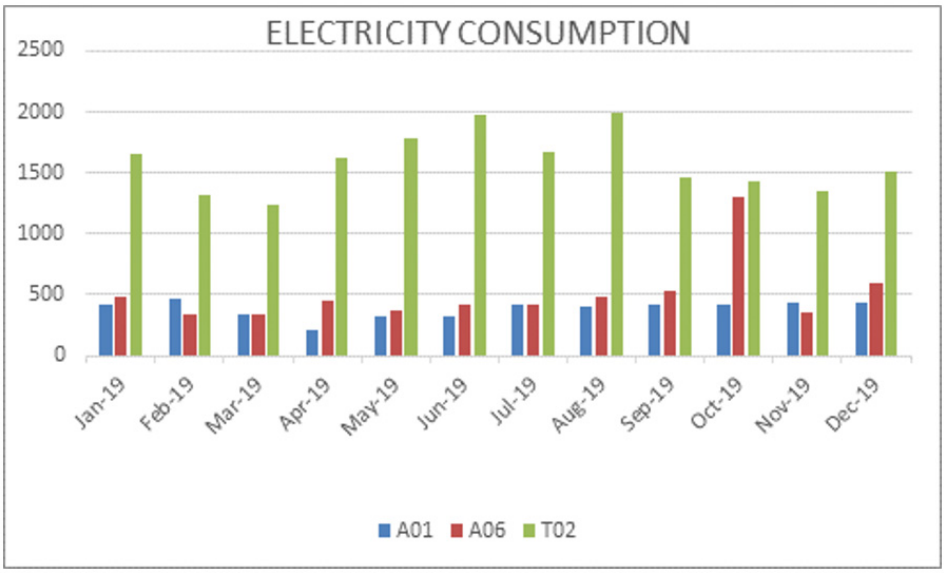

FIGURE 05:
Electricity consumption over the year of 2019, measured in two adobe (red and blue) and one timber framed house (green).

bills available for assessment, being two adobe and one timber framed house, it is notable that timber houses required a higher energy consumption compared to adobe houses, reaching almost five times the energy use in the coldest months, note all of the houses are of similar sizes.

According to Elias-Ozkan et al. (2006), "due to their thermal insulation and/or thermal mass properties, straw bale and mud brick structures require comparatively less energy to sustain thermal comfort conditions." It is not possible to analyse whether an adobe construction is more energy efficient than timber construction since factors such as the use of passive design, alternative energy sources, type of joinery and insulation could significantly influence the energy savings results of the surveyed homes.

It is remarkable that all adobe house owners adopted alternative sources of energy, such as solar panels, including one of them totally off grid, however, none of the timber houses had done so.

Conclusions

Assessment on data available demonstrates that adobe houses can be considered better not only for their thermal comfort levels, but also for their thermal regulation capacity. Further investigation looking at internal temperatures during winter is recommended, as earth houses tend to be colder during this season and presented lower temperatures than the timber framed ones during cold weather, though it appears adobe house owners are less inclined to use heating appliances.

Adobe houses can also be more energy efficient due to a combination of factors; the correct use of passive design tools, alternative sources of energy, type of materials used for joinery, use of insulation, and an environmentally friendly behaviour, not only due to the properties of adobe as a thermal mass itself.

FIGURE 06 & 07:
Correct use of passive design influences the thermal performance of an adobe house. *Source: personal archive.*

Author Bio

Sara Azevedo is a Brazilian architect who specialised in conserving and restoring historic buildings and monuments. She worked for six years as a consultant for UNESCO and Brazilian regulatory agencies before starting her own construction company with her husband and was involved in designing and managing the construction of approximately a hundred homes. After moving to New Zealand in 2019, she decided to return to her passion for Vernacular Architecture when writing this Master's research paper. She assisted the restoration of St. Paul's Church in Auckland for a year. She lives with her family in Nelson.

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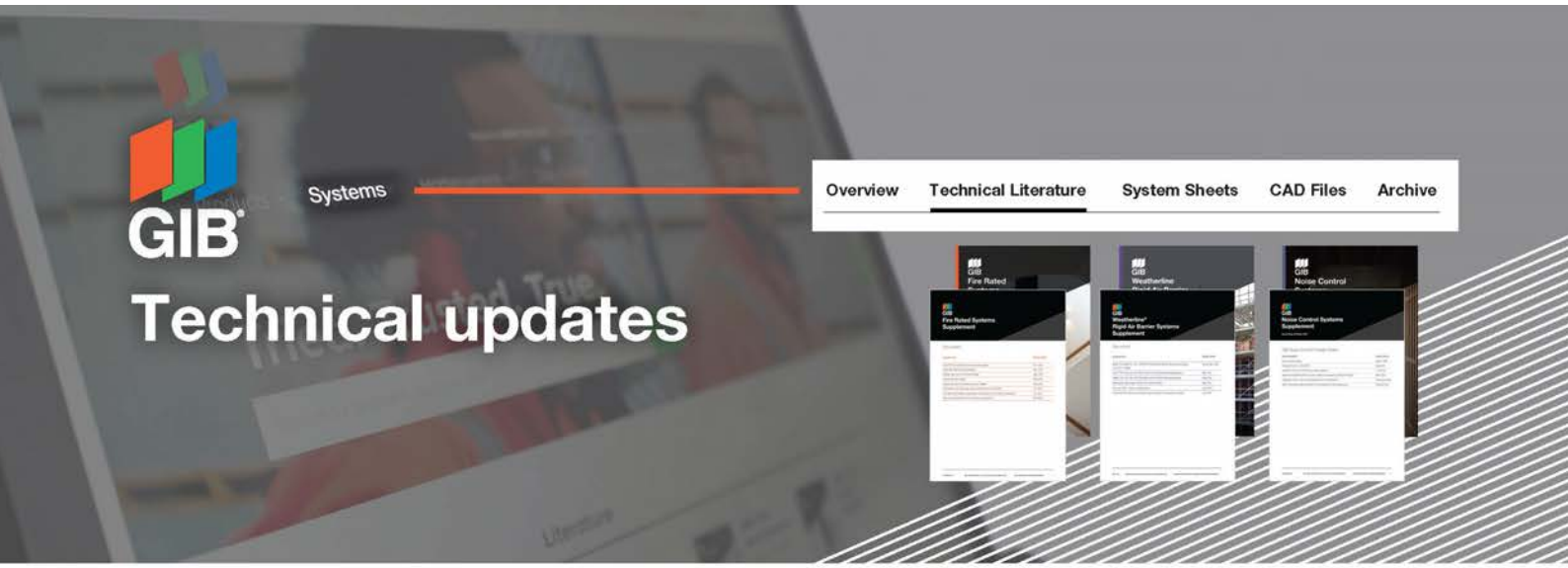


Technical updates

What a wild ride 2021 has been! Just in case you might have missed it, here's some updates of what's happened and what we have planned for the year ahead.

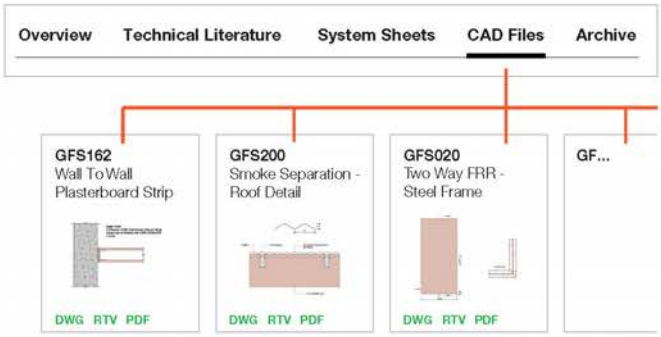
In February we released the revised GIB® Wet Area Systems literature. Due to improvements of our GIB Aqualine® boards, and the inclusion of our new GIB Weatherline® boards, the literature now includes allowances for tiling on GIB Toughline® Aqua and GIB Weatherline®. Key changes are new tile weights (10mm now up to 26kg/m^2 and 13mm now up to 40kg/m^2) and screw centres increased to 150mm centres. We've also added and updated the CAD details. Literature can be downloaded from gib.co.nz

Since their release in 2016, our GIB Barrierline® systems have taken the market by storm. But, as with any new release, we've continued to test and develop products and systems, all the while updating and adding to the details and information we provide. This also means we're at the stage where we are preparing to release the 'GIB Barrierline® 2.0' literature very soon. This will include a 30 min system and 13mm GIB Weatherline® option in place of 16mm GIB Fyreline® where this is laminated to the 25mm GIB Barrierline® in the roof space. Watch this space in February/March 2022!

As our literature is widely referenced, we endeavour to keep the key publications up to date. Currently we are working on updates for the GIB® Site Guide (last version 2018). The changes to AS/NZS2785:2020 'Suspended Ceilings – Design and Installation' (released in 2020) has had an impact on the industry, from the way ceilings are designed and tested, through to how they are installed and lastly, how they should be maintained. We recognised it was time for us to also update and review our GIB® Rondo® Metal Batten Systems manual. Both books are currently being worked on with the expected release date of early 2022.

As an industry, we're working online more than ever before, which means the most up-to-date and current information has never been more accessible. However, we're finding that although we are continually updating and adding to our online Supplements portfolio, not everyone is aware of the additions - or even where to find them! For easy access, please select your desired system under the 'Systems' tab, then click on the 'Technical Literature' tab. You will find the Supplements page in PDF format.

We are also continually adding to our library of CAD details, these are being updated (sometimes on a daily basis!) on our website.



With 2021 suffering even more disruption than 2020, many of our scheduled regional training sessions were either postponed or cancelled. In light of this, we are still planning training sessions for 2022. But as we book them, we'll include an 'Option B' for virtual sessions, just in case things 'go south'. I am looking forward to seeing you in 2022!

Graeme Robertson
Technical Advisor

CODE INTERPRETATIONS

CONSISTENT BUILDING CODE INTERPRETATIONS

"I have been doing this for the last 10 years in another area of the country and that BCA has never asked for this before" is a common response from a building consent applicant when asked by a BCA for evidence for compliance with a specific Building Code performance.

Background
One of the drivers of the building reforms of the 1990s was to have one national system to replace the bylaw systems that were written and enforced by each local council. The national system was introduced, based on the Building Act 1991, and contained the Building Code as the First Schedule to the Building Regulations 1992. The performance-based Building Code specifies the outcomes buildings and building work must achieve, facilitates innovation, and enables more than one way of complying with the Building Code, while continuing certainty for established, mainstream construction, such as NZS 3604 for timber framed buildings.

When a designer is not using a compliance pathway that BCAs must accept, such as Acceptable Solutions, Verification Methods, MultiProof certificates, CodeMark certificates, a site-specific Determination, energy work certificates, or NZS 4121, the building work proposed in the building consent application is evaluated by the BCA to see if it complies with the Building Code. Effectively this means most building consent applications have some building work that will need evidence and be checked against the Building Code's performance criteria, either directly or by comparison to a known compliance pathway.

It is not surprising therefore, that designers and builders find variation in interpretation when designing and constructing buildings in different parts of the country when they require approvals from different BCAs.

Examples
Investigating this topic further will use the following examples:

- Roof-collected water
- Pool barriers
- Air filtration

Roof-collected water
Building Code clause G12.3.1 requires potable water to be provided for uses of human consumption, food preparation, utensil washing and oral hygiene. Acceptable Solution G12/AS1 is based on connecting the building's water supply to a network utility operators potable water system and does not include a solution for connection to other water sources. Some BCAs request evidence that the water supplied for the uses listed in G12.3.1, is potable. This can be achieved by a series of water quality tests showing the water is potable if the water is from a bore. For roof-collected water; leaf guards, first flush diverters, floating intakes in the tank and ultraviolet (UV) sterilisation may be the solution for demonstrating the water is potable.

The requirement forpotable water for human consumption, food preparation, utensil washing and oral hygiene has been in force since 1992 and should by now be readily understood by designers, plumbers and BCAs.

Pool barriers
The Building Code was amended in on 1 January 2017 by inserting a new clause, F9 Means of Restricting Access to Residential Pools, the Fencing of Swimming Pools Act was revoked, and the provisions were

incorporated in the Building Act 2004 by the Building (Pools) Amendment Act 2016. The Building Code clause F9 is supported by two Acceptable Solutions F9/AS1 Residential pool barriers and F9/AS2 Covers for small-heated pools.

F9/AS1 contains solutions for pool barriers and a solution when the boundary fence is used as the pool barrier. Pool barriers are designed to keep children under 5 years out of the immediate pool area. The design for the boundary fence as the pool barrier is different because the pool owner does not have any control over the use and behaviour of the neighbour on their property. Hence, the safety of the barrier is changed from keeping children out, to stopping them climbing down into the immediate pool area. This is done by installing a 900mm zone on the pool side of the fence that is design to stop children under 5 climbing down.

However, F9/AS1 does not include details of the junction where the 1200mm (min) high pool barrier meets the boundary fence barrier 1800mm (min) high. Without this junction being specified in an acceptable solution BCAs have to interpret the Building Code clause F9 and the existing F9/AS1 Acceptable Solution when designs are proposed in a building consent application.

With different design approaches for pool barriers and boundary fence pool barriers it is easy to understand why different BCAs could easily approve different details in different parts of the country for this detail on building consent applications.

Air filtration

As a result of the Covid-19 outbreak, how will BCAs approach evaluating compliance with Building Code clause G4 Ventilation, particularly for virus spread?

Maintaining a healthy indoor environment using ventilation, is an existing Building Code requirement in Building Code clauses G4.3.1, G4.3.2 and G4.3.3(h). Paraphrasing these clauses; ventilation is required with outdoor air to maintain air purity; prevent harmful bacteria, pathogens and allergens from multiplying in air handling plant; and collect or remove from the space which they are generated bacteria, viruses or other pathogens.

It is likely that BCAs will take a fresh look at this depending on the building's use, location in a city, small town or in a rural setting and number of occupants. It is anticipated there will be a greater use of HEPA filters (high efficiency particulate arrestors) in future mechanical ventilation systems.

Increasing national consistency

If increasing nationally consistent solutions for Building Code compliance it still a government priority it would be helpful to the industry and BCAs if MBIE issued guidance to sits alongside the Acceptable Solutions (AS) and Verification Methods (VM), which can be used to assist designers and BCAs to design and evaluate Building Code complying solutions that are outside ASs and VMs and other deemed-to-comply pathways.

Article by Bruce Klein

PROJECT MANAGEMENT

THE IDEAL PROJECT MANAGER IN THE CONSTRUCTION INDUSTRY

This article covers an ideal project management situation in an organisation with mature project management practice. It has been written to give readers context on proper project management practice. In reality, the project manager in the construction industry can be classified into three categories. The first category is the client project manager, the next category is the professional project manager and the third category, is the contractor project manager who can also be a site manager in large projects.

How a project is created

All established organisations have strategic business goals which are long term and aspirational. From these goals, measurable outcomes, called objectives are created. The objectives are then broken down into actionable outcomes, which in turn are initiated by a business case. The business case outlines the need for the activity or project, the indicative budget, the timeline for delivery, risks and benefits derived if the business case is actioned within the specified framework. Once the business case is approved, a project charter, which defines the project within the business case parameters, is created. Ideally, there are five phases in the construction project. Initiation, planning, execution, closing and monitoring/controlling. The ideal project management situation is when the project manager is involved from the start of the project to the end of the project. This means that they are appointed immediately after the business case is authorised and manage the project up to completion. It has to be noted that the project phases are not entirely sequential and some activities in the next phase begin before the previous phase is complete. Fig 1.5 on page 31 shows the relationship between the phases and the level of effort required.

Initiation

In this phase, the project manager is appointed and a project governance structure set up. The project governance structure depends on the size and complexity of the project and may comprise several steering committees. The elements of project governance will be covered in a subsequent article, suffice to say that key stakeholders for the project within the project governance structure is the project sponsor who is responsible for the project outcome and the project owner who is accountable for the project outcome. The project sponsor must be sufficiently senior enough to act as an enabler and escalation point for the project manager. The project manager, sponsor and owner, along with any other appointed members of the project governance team, work together to develop a project charter, which authorises the start of the project, officially appoints the project manager, outlines the overall budget, timeline and desired outcome at a high level.

The project manager is also made aware of how the project fits into the business strategy including its relationship and impact on other initiatives. For instance, the project to build a stadium on the outskirts of a city would need concurrent development of support infrastructure like; access (roads, rail etc), public utilities (3 waters, gas, electricity, telecommunications etc). The appointed project manager then identifies key stakeholders and creates a stakeholder management plan which will be constantly updated as the project progresses. Stakeholders in a project include all those taking part in the project and all those that are affected one way or the other by the project. One of the most important stakeholders is the project subject matter expert (who can be the lead engineer/architect),

who becomes the right-hand person for the project manager.

Planning

The project manager calls for a kick-off meeting, where representatives of all identified stakeholder groups are invited to be briefed on the nature of the project. The project manager then invites input from the stakeholders to ascertain the feasibility of delivering the project. The inputs include financial analysis, logistics challenges, legal aspects, engineering considerations, trades requirements, health and safety, resources management (human and material), risks and opportunities etc.

The project manager in consultation with key stakeholders, creates the project management plan (PMP), which includes verifying project risks, budget, initial scope, timeline to delivery and all project deliverables, based on the information gathered in this meeting and the business case. The project scope is the project guiding document which outlines in sufficient detail what needs to be done for the project to be successful. It is also important to note what is out of scope to ensure that there are no unnecessary additions – called scope creep – which can affect the project budget and time to deliver among other things. The PMP also includes the project schedule, cost baseline, quality assurance, resource management plan, communications management plan, risk register, procurement plan, legal requirements and stakeholder management plan.

Execution

The next phase is project execution which follows the PMP. This is where the planned work gets done. The project manager's role is to direct and manage project work and knowledge. In other words, they manage quality, acquire resources, manage communications, implement risk responses as appropriate, conduct procurements and manage stakeholder engagement.

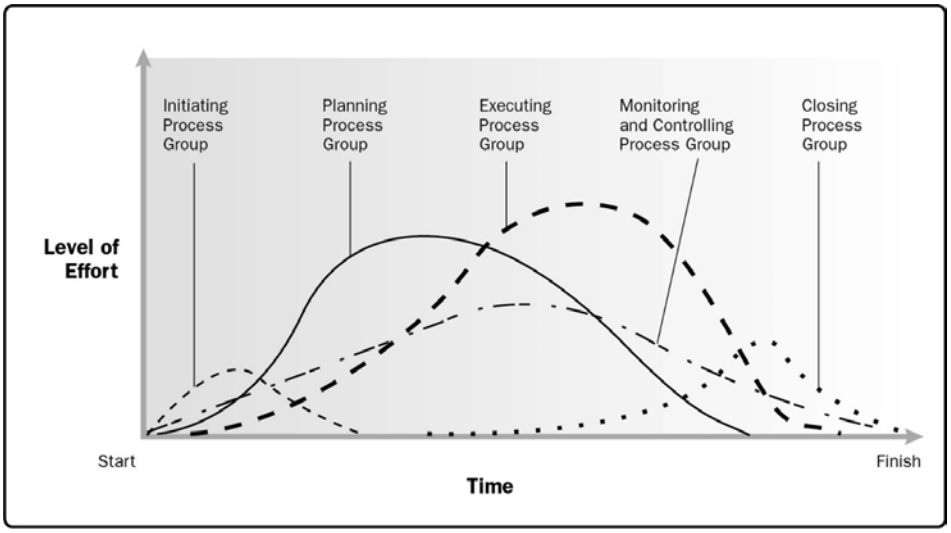


Figure 1-5 (Standard). Example of Process Group Interactions Within a Project or Phase

Monitoring and Controlling

The monitor and control phase sits across the other four phases. Any project exists in an ever-changing environment and needs to adapt to the changes in order to remain on track to deliver the desired outcomes. The monitoring and controlling phase has the following activities; validate and control scope, control schedule, costs and quality, control resources, monitor communications, monitor risks, control procurements, monitor stakeholder engagement and manage the change process.

Closing

Closing is the last phase, where the project activities are wound up and the project manager hands over the agreed project deliverables to the project owner who either accepts or rejects them in accordance with the set success criteria. The rejected deliverables are then corrected to conform to the required outcome. The activities in the closing phase include; project document updates, final product / service / result transition, final report, project cost, time and quality analysis and lessons learned. The lesson learned are gathered during a meeting with all stakeholder representatives and has open discussions on what went well, not so well, what could be done better and actions arising. The lessons leaned become part of organisational reference documents.

Conclusion

If the project management practice is applied professionally, the organisation would have up to date information on the project performance as it progresses and can make informed decisions on what changes to implement. In the next article, I will cover project management in the construction industry as it is currently practiced.

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NAME CHANGE

OFFSITE CONSTRUCTION IS FOR EVERYONE

PrefabNZ's recent name change to Offsite NZ is an important step forward for the construction sector. The name change reflects the industry's expanding depth and breadth in providing much-needed, high-value, sustainable solutions for the residential, commercial and infrastructure building sectors. In today's high-demand and increasingly expensive building climate, offsite manufacturing is growing in innovation and appeal, and is a far cry from the prefabricated buildings of the 1950's.

Various terminology is used to describe prefabrication, modern methods of construction and offsite building. When people hear the word '*prefab*' their first thoughts might be of cold, damp classrooms. Also, the term '*prefab*' often limits examples to temporary homes, tiny homes, flat pack and secondary dwellings and while these are an important and valid part of the construction sector, it does not cover all parts of it. That kind of association and limitations is a stumbling block to starting credible conversations about the need for the building and construction industry to embrace innovative technology, systems and processes.

Offsite construction in New Zealand needs to become mainstream, helping to deliver higher productivity and better value for clients and society. For the offsite sector to become mainstream we all need to start talking about the full potential of the offsite sector. Too often I hear construction businesses say that offsite is not for them, it is too complicated, it is too expensive or they don't see the benefits. As an industry all stakeholders need to be more open minded and receptive to changing the way they build. The construction sector is renowned for being expensive and wasteful (no surprise as waste contributes to the cost) and unproductive. Everyone should be asking how we can approach construction differently. When a residential builder says to me that offsite is not for them, I ask them if they use frame and truss. When the answer is yes, then they already use an offsite solution. However, the frame is basic (low value), better than delivering sticks to a building site but still basic. The opportunity is to move the frame up the value chain to a panelised system. Imagine if every new-build in New Zealand used a standardised panelised system delivering a weather tight house in a couple of weeks. Impossible? The sector needs to aim high and have a vision for where we want the construction industry to be in 10 years. If 90% new builds use frame and truss now then is it so difficult to move to a panelised system? Leadership and a desire to change is needed to unlock the potential of offsite construction.

How do we get there? In the first place all stakeholder leaders need to have a vision for the construction sector in 2030. The industry needs to learn from other industries. How did the automotive sector more along the value chain? That sector is always innovating and adapting, stripping out waste, being efficient, embracing technology and innovation. The automotive sector is adapting yet again to embrace the electric revolution. The construction sector is still installing insulation, lining and cladding on a building site in all weather. Why is that acceptable to everyone?

Offsite NZ will continue to help lead a better discussion about innovation in the construction sector and I encourage others to do the same.

Scott Fisher, CEO, Offsite NZ

Below is a colouring in project for the summer holidays. Send a picture of your masterpieces to marketing@boinz.org.nz

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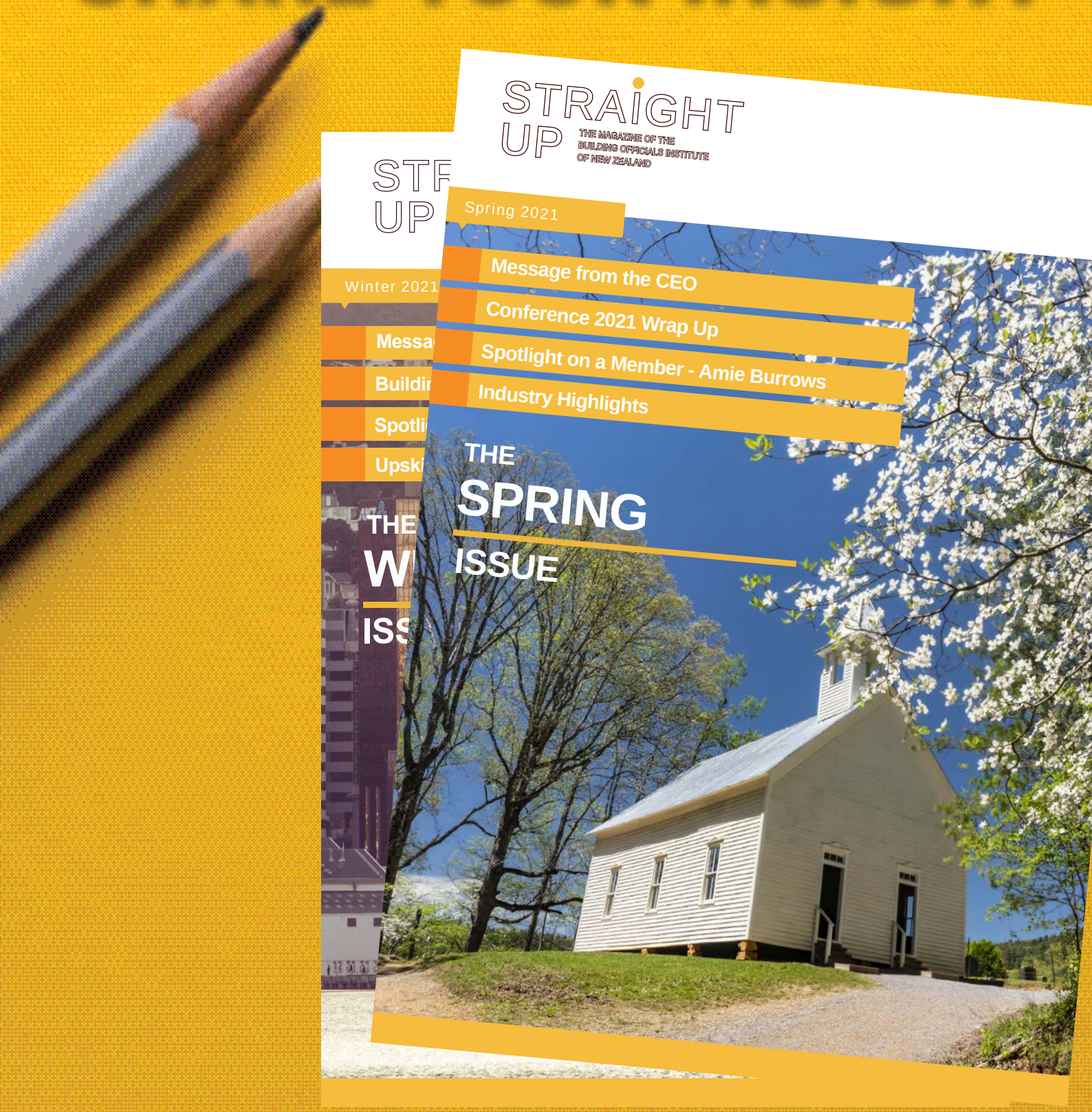

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