New Zealand Institute of BUILDING SURVEYORS

NZ INSTITUTE OF BUILDING SURVEYORS JOURNAL

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The Journal

Knowing the basics about insurance

Construction insurance is complex subject and why early advice on this matter from a genuine specialist is critical to your construction project should anything go wrong

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FRONT COVER: Like all religious buildings erected before 1905, the state of France owns the Notre Dame Cathedral and as such, acts as its own insurer. In effect, it was not insured when – on 15 April 2019 – it went up in flames. *Photo 144937646 / Church © Matthew Lockhart | Dreamstime.com*

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FROM THE PRESIDENT

NZIBS PRESIDENT
Heather Crilly

Fostering a future work stream

It seems hard to believe that we are already nearly halfway through the year, and it has been over a year since the whole country came out of lockdown.

For those of you who were able to join us, the hot topic at March Training Day this year was *Building Better in a Climate Emergency* following the Government's declaration of a Climate Emergency on 2 December 2020.

New Zealand has now joined 32 other nations that have recognised the effects of global warming and chosen to act. However, there is no doubt New Zealand still has a long way to go in achieving the goal of net zero emissions by 2050, being one of only 12 (out of 43) industrialised countries to have seen net emissions rise between 1990 and 2018, with a 60 per cent increase in net emissions in the past two decades.

BRANZ has completed some interesting studies comparing New Zealand with the UK, Australia, and most recently, Ireland to find – for example – that New Zealand allows two and a half times more heat loss through windows than the UK when comparing New Zealand and UK locations with similar average temperatures.

Minimum standards for thermal performance in Ireland are two to three times higher than those in New Zealand despite comparable climates in Dunedin and Dublin. The reasons for this become clearer when looking at the steps the various countries have taken over the last 20 years to improve thermal performance; for example, the minimum R-value for walls in Ireland has increased by 200 per cent since 1991, while here, there has been an increase of only 27 per cent in over 40 years.

I think the presentations gave all of us some more insight into the current concerns, considerations, and challenges faced by our country – and the rest of the world – in lowering our carbon emissions and making sure buildings are better able to cope with the future effects of climate change.

As building surveyors, our members have long been working to improve standards in the built environment. Historically, this has been from

EDITOR
Robin Miller

An opportunity to disseminate new information

Welcome to the winter 2021 edition of the NZIBS Journal! My first thoughts for the content for this edition go back to last spring when a seismic-strengthening project I've been involved in for the last four years or so started to near construction.

As we began procurement and the preparation of a building contract, my client took advice from their insurer about how to cover work on their existing building.

One thing off the list – or so I thought – as when I checked, the advice received was simply to let the contractor's all risks insurance cover it. A bit further down the line (and many phone calls later), this advice was reversed by the insurer and principals insurance was put in place. This got me thinking how often insurance is left to the last moment in a construction contract and wondering how often the wrong cover is accepted, unknowingly, and what the consequences could be.

As building surveyors, we should know the basics and know enough to know when to ask. I'm very grateful to Donald Gardner of Marsh for agreeing to provide an article to assist with this. When you read it, you will realise what a complex subject construction insurance is and why early advice on this matter from a genuine specialist is critical to your construction project should anything ever go wrong.

Following on from March Training Day, Joe Lyth and Amy Tankard have written articles on Passive House and Linda Lodetti has introduced the NZ Wood Design Guides. There is so much good information here and advice on how the construction industry can do so much better in a carbon-conscious future. ▶

a weathertight perspective. However, better quality control and careful attention to detailing and construction (that results in a more weathertight building) can also be employed to achieve better thermal performance and airtightness, thus ensuring more healthy and comfortable internal environments and lower net emissions.

Also of note is the recent consultation for proposed changes to the Unit Titles Act 2010 as set out in the Unit Titles (Strengthening Body Corporate Governance and Other Matters) Amendment Bill, for which the Executive has made a submission. This is mainly in support of the proposal to introduce new Section 157D, requiring that at each review of the long-term maintenance plan for large residential developments (i.e. those that include no fewer than 30 principal units that are primarily used as places of residence), the long-term maintenance plan of the body corporate must be peer-reviewed by a member of either the New Zealand Institute of Building Surveyors, the Royal Institution of Chartered Surveyors, the Institute of Professional Engineers New Zealand or any other body prescribed in the regulations. It is good to see that the industry values the skills that our members have to offer and, hopefully, it will create a good work stream for us in the future.

The date for our annual conference has been set for 23-25 September 2021 – the topic being *Keeping Connected*. Conference early bird registrations will soon be open. I hope to see many of you there to enjoy all that sunny Nelson has to offer, and perhaps even to learn something new!

Following on from the last edition, which focussed on who building surveyors are, Ian Fong, a NZIBS Transitional Member, has written about his change of career in to building surveying and his recent experience of the Institute's training modules.

I'll leave you to read on, but as a final note, there are a huge number of changing and developing aspects of our profession currently.

For many, work is so busy that there's little time to promote them. Instead, the pressure of work means that we just get on with what we have to do and, often, forget how we can help others to understand and grow professionally.

The Journal is an opportunity for all construction professionals to explain their particular type of work and to help our building surveyors (and our associated architectural, engineering, property, construction and quantity surveying colleagues) learn and disseminate new information to our clients and peers.

I'm really encouraged how our profession has weathered the global problems of the last 18 months or so and, as we face the future and the growing scope and value of the professional work we offer, I'm minded that (to coin an old phrase) we are again at the end of the beginning – with a strong, positive future ahead, I'm sure. Please do get in touch if you would like to submit an article on any subject within the construction industry that you have expertise in.

DONALD GARDNER

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FIBANZ – Head of Construction Specialty NZ

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Donald has 28 years broking experience working in both New Zealand and the United Kingdom with a specialist focus in construction, servicing major New Zealand and global contracting clients including The Fletcher Construction Company, Fulton Hogan, Mainzeal, Leighs Construction, Southbase, Downer Edi Works, and Broadspectrum, as well as placing Principal arranged insurance programs for major projects.

Insuring building renovation projects

Building alteration projects, especially seismic upgrades or structural work projects, require careful planning, preparation, and ongoing monitoring to ensure that the project is successfully completed.

Insurance is an area that may not receive the care and attention needed during the project planning stage. Depending on the project scope, building owners and project managers may need to consider a range of insurance policies to ensure that the project is adequately insured.

What is Insurance?

Insurance is a contract between Insurer and Insured that sets out an agreement to pay specified amounts if defined events occur during the policy period, providing a financing mechanism to meet the direct costs of an insured event.

Insurance cannot meet all the costs of a loss, but will provide a financial response such as damages, or the cost of repairing or replacing an item; it cannot respond to non-monetary remedies such as equitable relief, specific performance, injunctions, or estoppel.

Construction cover under Material Damage (MD) Insurance

Although MD policies exclude property under construction, there is normally an extension that covers minor alterations or additions; however, this cover has limitations:

- An MD policy will normally contain more exclusions than a contract works (CW) policy (breakdown being the most important);
- the MD policy deductible may be higher than contractors are comfortable with;

- The extension is normally achieved by way of a write-back of the property under construction exclusion, but only where the value of the works is less than a specified amount. Importantly, if the value of the works increases above this specified amount, then there is no cover for the works or for the existing structures affected by the works.

This means that any project value over the specified amount needs to be declared to the MD insurer to be certain that cover for the building continues whether or not separate contract works insurance is arranged for the project – for the same reason it would also be prudent to advise the insurer of any tenant instructed works even when they are being insured by the tenant. Insurers may want to charge an additional premium under the MD policy for projects that are too big for the automatic cover under the MD policy, due to the increase in risk represented by the project.

For some projects a more cost-effective option may be to extend the CW policy to cover the building for damage arising out of the performance of the works ("performance damage" cover). This would be either for the total value of the building, or more commonly on a "first loss" basis (for $500,000 to $2.5m per event) with the MD policy covering the balance of the building value. Using this approach, the performance damage cover acts as an increased deductible for the MD policy where the damage to the building arises from the project.

CW Insurance

While minor alterations and additions can be covered by an extension to an MD policy, larger projects will require a CW policy. It is important to align the CW insurance with the MD policy to avoid gaps in coverage or delays in repairs caused by the CW and MD insurers disputing which policy should cover the damage – this is especially critical for seismic upgrade projects where the reinstatement of the works and the building damage would be completely integrated.

Business Interruption (BI)

While the use of the CW extension under an MD policy has the advantage of automatically providing BI cover for loss arising from damage to the works, under the BI cover the indemnity period commences at the date of the damage rather than at the expected date of the resumption of normal operations. This may not be an issue for smaller works, however if damage to the works could significantly delay the resumption of normal operations, then the indemnity period under the BI cover may not be adequate. Where this is the case, the building owner should consider the need for Delay in Start Up (DSU) / Advance Loss of Profits (ALOP) Insurance.

DSU / ALOP Insurance

This insurance provides cover for a loss of revenue or increased costs of working caused by damage to the works that would be covered by the CW policy. The contractor usually has no insurable interest in this policy, so construction contracts don't generally address this cover. However, because the DSU / ALOP insurance must be placed with the CW insurer, the building owner should consider the need for this policy before deciding who will be responsible for arranging the CW insurance. While it can be possible for the contractor to arrange DSU / ALOP insurance for the building owner, where DSU insurance is required, it is generally best for the building owner to supply the CW insurance.

Public Liability (PL)

The common approach to arranging PL insurance for construction projects is for the contractor to arrange PL insurance; however, the contractor's policy will only cover building owners for their vicarious liability arising from the contractor's performance of the works, so building owners still need to ensure that their own PL insurance will respond to claims arising from the building owner's acts.

Additionally, construction contracts will usually stipulate that the contractor is not liable to the building owner for losses arising from:

- The permanent use of or occupation of land by the works and the right of the principal to carry out the works on the site;
- Injuries to persons or damage to property or interference with the rights of others which is the unavoidable result of carrying out the works in accordance with the contract; or
- Any act or omission of the principal or other parties engaged by building owner that the building owner is responsible to the contractor for (such a building owner's designer).

Contractor losses arising from these items are usually indemnified by the building owner. In particular, the third point above includes liability arising from defective design – where a building owner has provided a design and an error in the design causes damage or injury to a third party (i.e., someone that is not the building owner or the contractor), then this exposure is a building owner's risk.

Unless construction activities are part of the building owner's normal ongoing activities, their PL policy will not necessarily automatically cover this exposure. However, it should be possible to extend a PL policy to cover the building owner for liability arising from a construction project, although depending on the project there may be some cost involved to do so. Where this cost is significant or allocation of liability between the parties could be difficult, a project policy covering all parties may be the best insurance solution for the project. ▶

Marine Cargo

This insurance should usually be the responsibility of the party ordering the materials from overseas suppliers, which is usually the contractor (although where DSU / ALOP insurance is appropriate the building owner is usually better served to arrange the marine cargo insurance for the project).

Depending on the terms of purchase and transfer of the risk of damage, supplier's marine insurance can be used instead of the contractor arranging this insurance. Care should be taken when relying on supplier's insurance as:

- Incoterms[1] specify who is to arrange the insurance, but do not specify anything further such as the level of cover, the basis of settlement, or the policy deductible;
- Overseas suppliers will generally have arranged insurance with insurers in their home territory, which can lead to issues when dealing with the insurer in the event of a claim such as language barriers, access to insurance representatives, and a lack of commercial relationship to leverage in the claim negotiations.

Use of Aircraft / Drones

While the use of small drones can be accommodated under standard general liability policies, where large drones or manned aircraft will be used (such as using a helicopter to lift materials into position), it is appropriate to add some specifications for aviation insurance – usually in the form of requiring that the aircraft operator have adequate liability insurance and that the building owner and contractor are covered for their vicarious exposures arising from the use of the aircraft.

Watercraft

General liability policies will usually include cover for liability arising from the use of small watercraft (typically up to 8m in length, although some insurers will agree to increase the maximum length), however where larger vessels (including barges or pontoons) are required for a project, specific marine liability insurance should be addressed by the contract in the same manner as discussed above for aviation liability.

Pollution

Most insurance policies will contain exclusions relating to pollution damage or liability. Generally, policies exclude pollution unless it can be traced to a specific event lasting no more than 24-72 hours (depending on the policy), although over the last five to 10 years insurers have become willing to provide pollution cover with specialist policies becoming readily available on commercial terms:

- Contractors Pollution Liability – covers the exacerbation of an existing pollution condition or the development of a new pollution condition as a result of construction works;
- Premises Pollution Liability – covers new pollution conditions that occur as a result of operational activities.

In addition to covering liabilities to third parties, these policies can also cover actions by regulators (such as requiring that a spill into a stream be remediated), damage to first party property, and interruption to business.

Pollution liability cover should be considered for projects involving removal of asbestos, remediation of contaminated land, or work in or adjacent to environmentally or culturally sensitive land.

Statutory Liability

This policy insures defence costs, reparation costs, and fines arising from accidental and non-reckless breach of statute; breach of specific acts are not covered, typically those where criminal intent is required, and fines and penalties under WorkSafe legislation cannot be insured.

A building owner has separate duties to the contractor under WorkSafe legislation; when a building owner is prosecuted, it is for their own breaches rather than the contractor's, so vicarious liability does not respond. Consequently, building owners need to ensure that they have their own insurance in place unless they are comfortable self-insuring this exposure.

Uninsurable Risk

While each type of insurance has its own specific exclusions, some exclusions are common to most insurance policies; these are added to policies for various reasons, including:

- Business risks (e.g., failure to meet a specified standard, or poor workmanship);
- Inevitable damage (e.g., wear & tear and other slow and gradual processes such as long-term pollution), although consequences of such are usually covered;
- Moral hazard / public policy issues (e.g., the insured's deliberate acts, failure to comply with law, fraudulent or dishonest acts);
- The accumulation across multiple policies arising from one event would be too large for the insurance industry (e.g., war[2] and nuclear[3] risks, terrorism), or historic losses have been too large for insurers to underwrite profitably (e.g., asbestos, "Wet buildings" or building defects);

[1] Incoterms rules or International Commercial Terms (published by the International Chamber of Commerce) are a series of pre-defined commercial terms identified by a series of three letter codes that are intended primarily to clearly communicate the tasks, costs, and risks associated with the transportation and delivery of goods.

[2] includes invasion, act of foreign enemy, hostilities, civil war, rebellion, revolution, insurrection or military or usurped power.

[3] includes ionising radiations, contamination by radioactivity from any nuclear fuel or nuclear waste from the combustion of nuclear fuel or any self-sustaining process of nuclear fusion, or arising from nuclear weapons.

- Liability assumed by agreement beyond what would exist at common or statute law (commercial decisions to accept a higher standard of responsibility than would otherwise apply);
- The exposure is more specifically insured under another policy (e.g., excluding motor vehicle operations under a public liability policy).

Some of these exclusions are limited to the direct cause only with the consequent damage being covered (e.g., defects exclusions will typically exclude the defect itself but provide cover for damage or loss caused by the defect), while other exclusions operate to totally exclude all cover for loss arising from the excluded peril (e.g., war and terrorism).

It is possible in some circumstances to buy cover for war or terrorism; however, given New Zealand's perceived low exposure to terrorism, this is not common.

Historically, getting meaningful cover for pollution / asbestos has been difficult and expensive, however specialist pollution cover is becoming more common.

- In addition to policy exclusions, some risks are not covered by insurance due to their failure to trigger the insuring clause of a policy. Examples include:

The existence of a defect in the absence of physical damage is not covered by property insurance as there is no external event to trigger the policy, however a contractor's liability to a building owner for the defect may be covered by their liability insurance, depending on the scope of cover that they have purchased;

- Loss as a result of delay due to unforeseen events where there is no damage or negligence such as late delivery of cargo due to inclement weather resulting in a slower voyage;
- Failure to perform agreed services without an intervening cause;
- Costs that would have been incurred regardless of the event occurring.

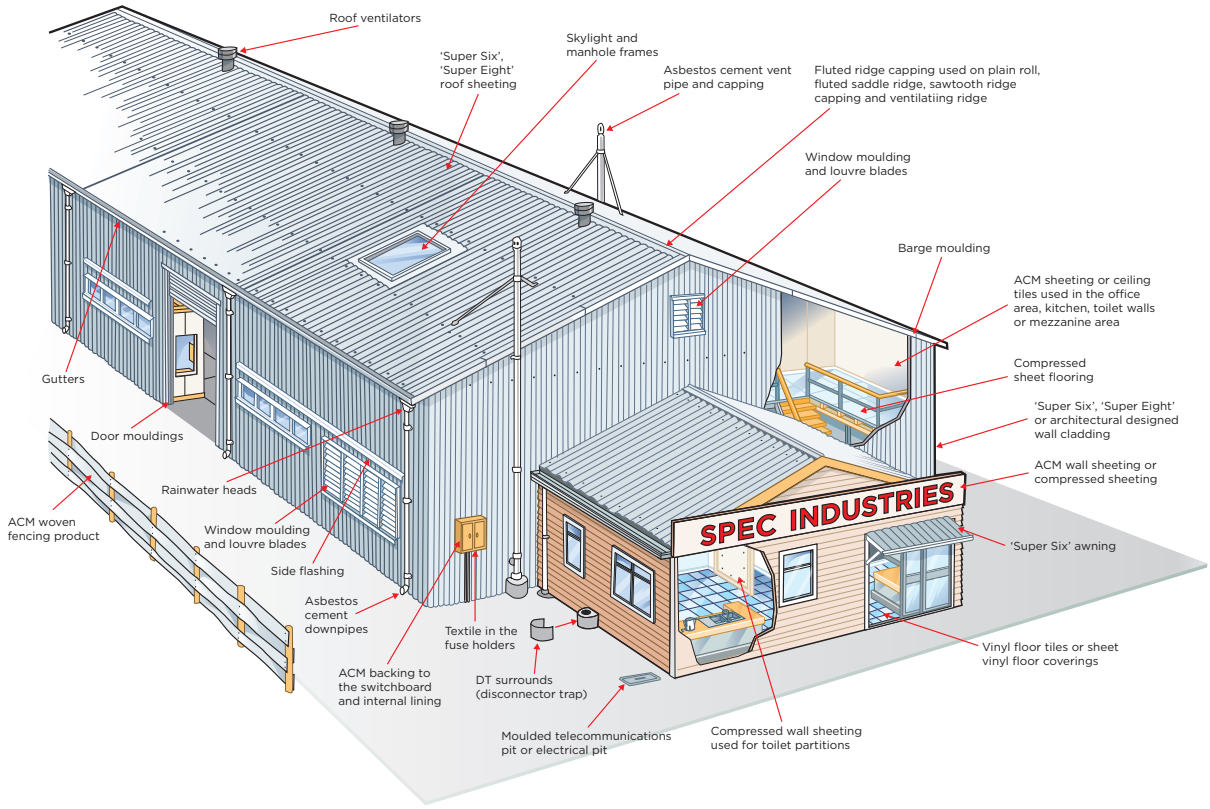
Insureds have a common law duty to disclose all material facts before entering into, renewing or altering a contract of insurance, and policies can also contain specific provisions on disclosure. Failure to disclose, or misrepresenting, material facts (one that would influence a prudent insurer in accepting or rating a risk) can void insurance cover.

The duty of disclosure does not include facts which are common knowledge or facts already known to the insurer, or which ought to have been known to the insurer in the ordinary course of business.

Conclusion

Standard forms of contract don't address all of the insurance policies that may be appropriate to a project, and additional insurance may be required for some projects – projects need to be reviewed from a risk perspective at the outset, taking into account construction methods and unique exposures.

Insurance can be a valuable tool to mitigate counter-party credit risk and finance contingent liabilities, and the best results are obtained by involving your insurance advisors from the beginning of the project.



Building better with Passive House

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I was lucky enough to attend the March Training Day – *Building Better in a Climate Emergency*. It was inspiring to see such a key part of the industry so engaged with this, and so much interest in Passive House specifically.

Passive House is a rigorous, proven and effective method of designing and building, resulting in highly energy-efficient and healthy buildings. The design of a Passive House building is modelled to predict building performance using Passive House Planning Package software. A Passive House building will have suitable insulation and windows for the climate, an airtight building envelope, avoidance of thermal bridges, a ventilation system with heat recovery, and will aim to optimise the orientation of the building to the sun. This leads to excellent air quality, minimal use of energy required for heating and cooling, and a comfortable temperature maintained year-round.

Passive House can also be applied to refurbishment of existing buildings, although naturally this would normally be more difficult than planning to build to the Passive House standard from the beginning. The EnerPHit standard recognises this and is used for existing buildings, and can be achieved either through compliance with required component

(windows, walls etc) performance levels, or compliance with energy demand criteria. Applying EnerPHit makes a vast improvement to the performance of a building including energy efficiency, structural integrity and thermal comfort.

I believe most building surveyors will have a holistic view about buildings, often see the best and worst, and have an excellent understanding of what makes a building perform badly and conversely, what makes it perform well. You will understand that attending to basic principles early on in the planning stages, and following through with these in the build make a huge difference to the performance of the building. So, I think surveyors more than most will appreciate the art and science of Passive House.

My own interest in Passive House started only about 3 years ago, when we were looking for a family home to buy. We even had a survey done on one but were put off by the discovery of a previous house fire. But even amateurs, such as ourselves, didn't need a survey to spot the prevalent mould, condensation, cold floors and oddly structured extensions that featured and were seen as perfectly acceptable in so many of the homes for sale.

We started to look into Building Better, and this led us to Passive House. For us it was a no brainer – we could guarantee a warm, dry, comfortable home for our family and save on heating and cooling bills too. Having gone through a thorough planning and design process, our Passive House build is underway. And last year, I joined the Passive House Institute New Zealand as its first CEO.

Passive House Institute New Zealand, Te Tōpūtanga o te Whare Korou ki Aotearoa (PHINZ) is a charitable trust working hard to bring the Passive House standard into the mainstream in Aotearoa New Zealand. PHINZ aims to increase awareness of the benefits and opportunities

of high-performance buildings based on the Passive House standard through research, education and building sector engagement. One of our key drivers is the community benefits that living, working and playing in nurturing healthy spaces brings to people. Low energy demand can help alleviate fuel poverty, good indoor air quality brings health benefits, a comfortable temperature year-round is great for our health and wellbeing.

More than ever, people are aware of climate change and the role they can play as consumers in mitigating for this, they have a rising awareness of how they can live more sustainably and are questioning what changes they can make in their lives to use our collective resources more efficiently. Housing and other buildings is a significant part of this. And, building to Passive House standard in Aotearoa is a possible solution to meeting MBIE's Building for Climate Change goals.

Celebrating its 30th birthday internationally, Passive House is a relatively new concept in New Zealand with the first Passive House being certified in 2012, and the market up until now has been small. However, PHINZ membership has doubled in the past year, demand for training through the Passive House Academy (a project of PHINZ) is at an all-time high, and enquiries from component suppliers about how to engage with Passive House have increased significantly.

And whilst Passive House in New Zealand has traditionally been single family dwellings, this is also starting to evolve. The High Street Cohousing project in Dunedin is ready for people to move in and is finalising its Passive House certification. Bushland Park near Christchurch offers house and land packages with the house already designed to meet Passive House certification. Bellbird Developments are providing incentives for owners to build energy efficient homes at Greenwood Lane in Wanaka -owners must model their house with an approved Passive House designer, and will be given help towards the cost of this and towards the cost of Passive House certification.

If you're interested in finding out more about Passive House, you can find certified professionals on the PHINZ website **www.passivehouse.nz**. Find out more about Passive House by contacting PHINZ on **enquiries@passivehouse.nz**, and see upcoming training information at Passive House Academy New Zealand at **phanz.ac.nz**.

A pathway and precedent for achieving healthy, high performing buildings at standard budgets

It's common knowledge that building in New Zealand is extremely expensive.

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With over 10 years' experience in residential planning and design, Joseph has shown his passion for the industry with a portfolio of interesting work.

The issue is attributed to a number of factors: increasing land prices throughout the country; onerous testing and compliance costs; escalating material costs in a small; uncompetitive market which have only been exacerbated by supply issues; and the ongoing pandemic.

The list goes on. Yet despite the high construction costs, we also have some of the unhealthiest and lowest performing buildings in the developed world.

Levels of respiratory diseases are extremely high, affecting one in six New Zealanders. And living and working with condensation, drafts & mould, despite high energy bills is business as usual at home, office and school.

The primary function of any building is to keep its inhabitants safe, protected and healthy.

It's widely acknowledged that the way we currently build doesn't actually achieve these crucial aims, and significant change is needed to improve the performance, health, and durability of our buildings.

But even when standard construction is so costly, how can we hope to 'build better' while keeping construction affordable?

After listening to my young children's worsening coughs night after night, and with health statistics ringing in my ears, I believe that the question is more how can we **not** afford to improve our built environment?

Whatever the program or use, achieving a healthy building goes hand in hand with increasing energy performance.

The less energy required to heat, cool and ventilate a building the lower the bills will be, and the more likely it is that the building will be properly ventilated and kept at an adequate temperature to prevent condensation, mould, and damage – good for the building, and great for the inhabitants.

The principles behind achieving a high performing building are the same whatever the program – airtightness, minimal thermal bridging, site specific insulation, well-performing windows and doors, and adequate ventilation.

Airtightness – This doesn't mean a hermetically sealed box; it just means minimising heat loss through unintended air leaks and preventing moist interior air getting into the envelope.

In the same way that you want to control water coming into the building using taps and prevent it leaking through the roof, you need to control the air coming in and out through the opening windows and ventilation system, rather than leaking through your walls and roof!

Airtightness is assessed through a blower door test, when the building is pressurised to a set pressure of

n50, and the air changes per hour are measured as air leaves the building.

Minimal thermal bridging – A thermal bridge is a point in the envelope where the heat flow through is higher than the area around it. This usually refers to materials which transfer heat easier (i.e., a steel beam bridging interior and exterior, an aluminium window frame, or even a timber stud in an insulated wall).

It also refers to geometric thermal bridges such as external corners, where the exterior heat loss area is greater than the interior area.

All of them result in points where higher levels of energy are lost, and lead to cold spots where the risks of condensation and mould are increased.

Site specific insulation – A building in Auckland will have a totally different requirement for insulation to one in Wellington, but a house on an elevated, exposed, south facing site in Auckland will also have different requirements to a protected, north facing one.

It's important to provide adequate insulation based on the site – too much can result in overheating, but too little will result in more heating required.

Well-performing windows & doors – These are the weakest part of the envelope, but they also have the most jobs to do! They need to let natural light in, while preventing too much solar gain in summer.

They need to allow enough solar gain in winter while still preventing too much heat energy loss. They also need to be openable and yet airtight when closed!

The glass, glass edge spacer, and window frame all need to provide adequate thermal protection, and they need to be installed in line with the thermal envelope – double glazing in a non-thermally broken aluminium frame, installed in line with the cladding, just doesn't cut it.

Adequate ventilation – Ventilation is essential to achieve healthy interior environments, to provide fresh air which has the particulate matter (pollen, pollution, etc) filtered out, while also removing moisture, volatile organic compounds and carbon dioxide from the interior.

It's also important that the correct amount of ventilation is provided continuously, while also preventing too much heat loss – not too little, not too much.

Natural ventilation relies on too many uncontrollable factors to provide adequate ventilation all the time.

Positive pressure systems push moist air into the building fabric, negative pressure systems pull whatever is outside into the building through whatever opening can be found.

And all three lose large amounts of energy – a balanced ducted system, with heat recovery to minimise energy loss, is the way to go.

While steps are being taken to improve the performance of our buildings, if you just apply one of the principles (e.g., higher levels of airtightness), you must also apply the others.

More controlled ventilation will be required to ensure air quality and moisture control, good windows to control solar gain and prevent overheating.

Often by just applying one, you can actually make issues worse, so a holistic approach needs to be taken to ensure the building meets all of the requirements.

While there are several schools of thought on the best way to achieve healthy, high performance buildings, Passive House Certification is the only international certification that has consistently been proven to achieve the as-designed performance, and has all of the preceding principles at its core.

This achievement is due to the way the certification process is undertaken, through modelling and scientific assessment.

From the start of the design process (ideally!), the design is 'modelled' in the Passive House Planning Package (PHPP) – a spreadsheet where all the data that affects the thermal performance of the building is entered.

There are a set of metrics for airtightness and energy use that must be met to achieve certification, but if these are achieved it doesn't matter what type of constructions are used, or what typology the building is. ▶

While commonly known for its use in new houses, there are certified schools, medical centres, and even swimming pools around the world!

The certification can also be applied to existing buildings through the Enerphit pathway.

Once the proposal has been modelled, all the documents are assessed by an independent certifier to confirm whether, if it is built as per the documentation, it will achieve certification.

A good level of construction monitoring and photographic evidence is required throughout the build to ensure it's built as per the drawings.

Airtightness is assessed through a blower door test, then finally the ventilation system is commissioned to ensure it is correctly balanced and provides the correct level of ventilation; and if all the requirements are met, you'll have a Passive House Certified building!

The certification has been used internationally since 1991, and while the first one was built in New Zealand in 2012, it is increasingly gaining traction.

I first heard about it while working in London in 2007, so when the opportunity arose to learn more about Passive House Certification in 2019, I jumped at the chance.

I took a course on it, then a second one, and when we began to consider building our first home, we decided Passive House Certification was the way to go.

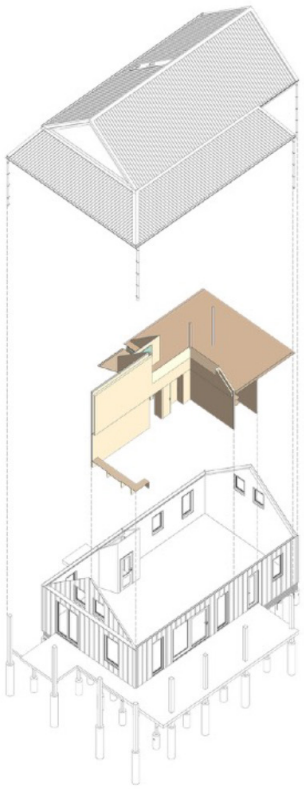
The initial stages of the project came with warnings about increased costs related to higher performance buildings, and indeed the first build price came in at over double our budget.

However, after years in cold, damp homes, I refused to believe that healthy buildings were just 'unaffordable' to build.

Over the past 12 months, I've been using our project to explore whether building healthier, higher performing buildings is achievable at close to, or around standard construction budgets, in the hope that my learnings will help others do the same.

After months of design, the project evolved into a Lower Saddle Passive House, a one-off residential building for my own family, which we are moving into in early May 2021.

To keep the build costs down, the project had an overarching philosophy of building what we could afford now but build it well.



The budget went into a high-performance envelope – Formance Structural Insulated Panels (SIPs), sheep's wool insulation in a suspended timber floor, triple glazed timber joinery sourced from Europe, and a fully ducted heat recovery ventilation system which all worked together to produce a high performance, airtight envelope, and a healthy interior environment.

Further cost savings were made through designing compact, hard-working spaces. After Australia and the USA, we build some of the largest homes in the world, but reducing the plan by 10% can suddenly make a project achievable within your budget, and very often you wouldn't even notice the difference.

At 169 square metres for four bedrooms, two bathrooms, an open plan living, kitchen and dining space, an overlooking mezzanine, a 59m2 covered deck, a good-sized laundry, and a surprising amount of storage; Lower Saddle fits a lot into a compact footprint.

This came through careful design, assessing what we actually 'needed' for each space, and making the most of every nook and cranny!

When it comes to performance, compact designs work together with simple forms.

Fewer corners and angles make achieving a high performing building easier, while also lowering the construction cost.

This doesn't need to mean boring buildings though as cladding choices, and elements such as frames around openings and shading devices can add form, interest and beauty to the exterior.

This also applies internally, where simplicity and beauty can go hand in hand.

Lower Saddle utilises prefinished linings that have colour and texture, rather than standard painted and stopped GIB.

The roof void is open to create a double height living space and allow

accommodation in the roof, and views through, across, and out of the various spaces add intrigue and a sense of size.

While a lot of the 'value' of a property is often placed on the fittings and finishes, we elected to keep these simple and robust.

I built the kitchen myself; we lined all the interior walls with plywood and

finished them ourselves. We left the SIPs exposed and painted internally to take out the cost of lining them.

All of this made the project achievable within our budget, but it meant that when we could afford to, we could still gradually upgrade the finishes and fittings – it's a lot easier to upgrade your kitchen or bathroom, than your windows or walls.

Whatever the project, ensuring the envelope is as high performing as you can afford should always be the principal aim.

A high-performance envelope will result in lower bills, little to no moisture and mould issues, and a far more durable, healthier and robust building.

If the structure and interior spaces are also designed to be more flexible, they can then be turned to a variety of programs with less intervention, resulting in a building that will meet many uses over a far longer period of time than most.

All of this mitigates the up-front investment of building to a higher standard, and after sourcing evidence from New Zealand and abroad, our own project was valued with a 12% premium due to its level of performance.

Lower Saddle has definitely been a roller coaster of a journey, and the amount of grey hair and the size of my eye bags have both increased substantially in the last six months.

Nevertheless, the outcome of a warm, dry, robust and healthy home for my family will be worth every second.

The project is extremely close to coming in on budget, a budget which would be low for any new home build in the Auckland market, let alone a Passive House Certified building.

It's only a start, but it's evidence that with prioritisation, passion and careful design; healthy, high performing buildings can be achieved at standard budgets.

Why change your career to building surveying?

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NZIBS Transitional Member:

- Project Management
- Contract Administration
- Certificate of Acceptance reports

According to **careers.govt.nz**, a career change could improve your life in many ways:

1. Mental health;
2. Grow your skill set;
3. Earn more money; and
4. Why not find out more?

To paraphrase renowned sage, American singer and actor Michael Lee Aday, or better known as Meat Loaf: "three out of four ain't bad". As for which three, read on.

My new life here in New Zealand meant I had to adapt to a new marital status, a way cooler climate and a new career. As for which career was best, I had to consider why I had first chosen to study mining engineering – which was a willingness to be challenged. That also explains exactly why I chose to start a married life in a place where I would struggle for warmth (Netflix mini-series on this coming out soon!).

Former workplace - underground mine in 36 degrees Celsius heat

In my early days here in New Zealand, I was first introduced to facilities management and quickly appreciated the importance of this role in ensuring an asset was managed for the benefit of all users rather than just the investor or owner.

One of the early challenges in this role was trying to explain to loud irrational upset owners why remedial works did not remediate defects. And having seen first-hand, multiple unsuccessful attempts to solve the same problem, I was keen to learn why the root causes of defects were not being identified. And why sealants did not seal (incompatibility! Who knew!).

As the facilities management role allowed sufficient flexibility, I noted I could put aside time to go through structured learning again. With the support of family, I decided that building surveying would be worthwhile as this was a profession that could add value to, not just me, but others around me, as we all live in or use buildings daily.

With the decision made, I made a firm commitment to put every effort into the Core Modules offered by the NZIBS to complete all the modules in as short a time as possible.

There were four things (or four C's) I looked at when I considered whether this was suitable:

1. Course Presenters credibility;
2. Cost;
3. Current Pass Mark; and
4. Completion Time.

Having attended structured learning before, number three on my above list was an eye-opener – 70 per cent pass mark! Can I get through this?

As with my opening paragraph – three out of fourain't bad. And it was number four that ultimately tipped my decision to go through with this. An opportunity to gain a national academic qualification within months! Time was important as it meant I could get back to my family

and my facilities management role without missing too many beats.

However, well before the courses started, I also 'surveyed' (pun intended) the built environment I was in and saw multiple construction projects literally a minute walk or less apart. During my off-site hours, I would turn up with a hard hat, vest and the relevant PPE for site entry and pester the many site managers of the new builds to allow me in to observe what was going on. From a school to single and double level residential builds, I observed the stages of construction from foundation through to final inspections (Yes – I could see all these as each house was at a different stage although side by side).

Together with the pre-course reading material, I built up a substantial understanding of building, construction and building surveying. However, even during the modules, there was jargon that would still be alien to me - which I made a note of for after-hours research. Clearly these modules are not for entry level students but even with a limited background, you can still achieve a pass mark with sheer dedication and effort!

Effort here was with a capital 'E' including from course presenters. During class, the course presenters did not hold back. Question time! Quizzes! Assignments! One of the first questions before the class started – did you read it? Doesn't matter! I don't need your answer. You will answer it for me by answering this short quiz! Bam! Away we go. The approach by the course presenters is worthy of highlighting as it established the standard and quality of the course.

A moment of appreciation here for the course presenters is warranted because the bold but fair approach to hold each of us to the same standard regardless of our background, current occupations or employers established for me that the NZIBS mean business when they refer to professional integrity, competence and credibility.

The modules were my first-hand view of how this institute operates and served as a stark but welcome reminder that professional membership was not meant to be easy and had to be well-earned.

Therefore, with the same approach I took to each course – that the classroom is only a part of it as the real learning is before or after class – I was able to pass all my courses within the space of 5 months. Intense but well worth it.

After the modules, I approached the NZIBS administration team to discuss membership and their incredibly welcoming and immense support has led me to a full time role now as a building surveyor at August Millard Ltd. I distinctly remember one of the prime reasons for getting on board here was that I would get to work directly with those who had practical hands-on experience in building and construction – after all, I am still keen to know the root cause of building defects.

My journey to Registration is in progress and so far it has been hugely challenging but rewarding. Whether I am interpreting details of a junction on a multi-million-dollar reclad project or crawling through the sub-floor taking timber samples, each task has a purpose and fits into the wider scope of building surveying work.

As with life, the best lessons are learnt from mistakes, and I appreciate being under the direction and guidance of colleagues who allow me the latitude to take a wrong step but quickly correct it when necessary. One of the best learning opportunities is through peer review of reports which I have written based on field work I have gathered information for. From what appears to be minor or insignificant edits, for example, with photos through to timber sample results – every correction explains why and how it matters in the bigger picture – and for example, that it could become evidence for expert witness work.

These peer reviews are kept on file and are a reminder to me that mistakes will be made, and we can learn from the mistakes of others as well. As such, I will now declare a mistake has been deliberately made. Plot twist! Careers.govt.nz was right and Meat Loaf was not – four out of four is pretty darn good now that I have changed career to building surveying.

Current workplace – consultancy office in 18 degrees Celsius

Reducing our carbon footprint to achieve desired outcomes

I am the author of the first "Costing Timber Guide" in New Zealand sponsored by Wood Processing Manufacturing Association. The guide is one of many technical guides published by NZ Wood Design.

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Linda is a Registered and Chartered Quantity Surveyor specialising in cost consulting and professional quantity surveying services in the Bay of Plenty.

As a registered Building Surveyor and Chartered Quantity Surveyor, I have spent most my life providing construction cost advice within the construction industry in three countries: South Africa, the United Kingdom, and New Zealand.

So why would New Zealand need such a guide? Surely New Zealand has been building in timber framing for many decades now?

The reality is that innovation around the world has resulted in new manufacturing and processing techniques providing a range of engineered timber products, such as Laminated Veneer Lumber (LVL), glulam, Cross Laminated Timber (CLT) and cassette flooring systems, to name but a few.

Strength and performance of products depends on tree species, thickness, manufacturing process and application.

With any relatively new products, construction costs may not be certain and cautious budgets provided by Quantity Surveyors for new mass timber solutions have been criticised.

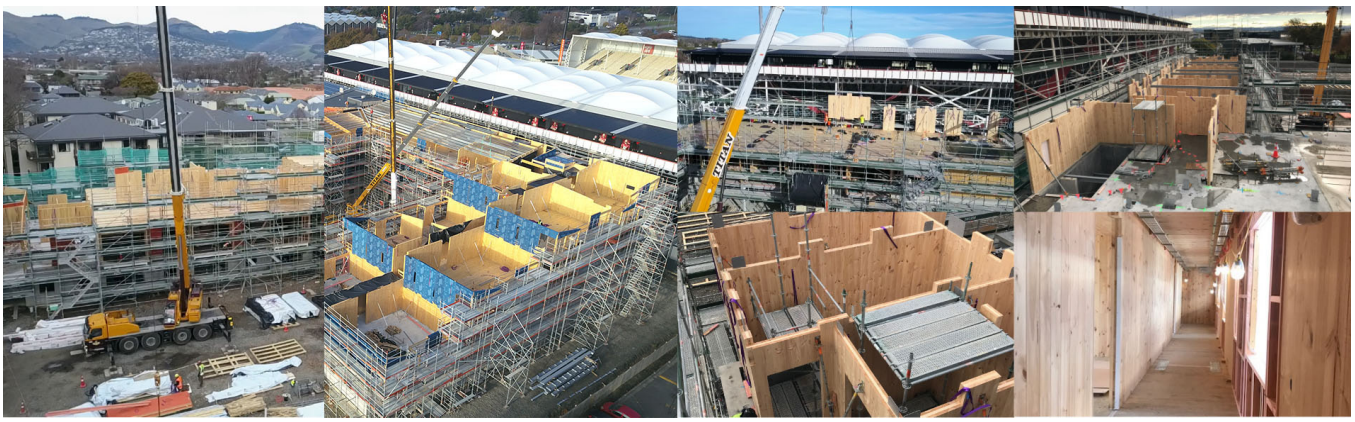
So why do quantity surveyors do that?

Assessing project risks in the absence of historical cost data or benchmark projects tends to lead to contingency factors being included in the budget for a project.

And what now...?

The guide looks to readers to take on board the factors that do impact on costs and to understand what to assess. It aims to avoid unnecessary allowances being made that have potential to kill the viability of a project.

During the preparation of the guide, it became evident that timber manufacturers also need to understand Quantity Surveyors' estimating and pricing processes. The guide developed a two-fold agenda to explain how Quantity Surveyors approach costs per m2



of GFA (requiring historical data) to elemental analysis of the proposed construction project and, eventually, trade costs based on developed detailed drawings (see **page 14** of the Wood Design Guide).

The guide explores key aspects

"When is mass timber appropriate to use" and "The value propositions of timber solutions".

My favorite examples are where the "soil conditions are poor" – mass timber presents a solution due to the properties of timber being 1/5 the weight of concrete and also less dense than steel. For example:

1. Bealy Ave Backpackers, Christchurch was a project that was not financially feasible in traditional piling and steel structure, but using timber piling and CLT panel structure presented a viable outcome. **See Bealy Ave Backpackers**

2. Arvida Retirement living village, Christchurch, where preloaded gravel and concrete floor slabs with CLT panel structures avoided the expense and risk of traditional piling foundations. **See Arvida Apartments**

The case study in the guide does showcase where a structural timber frame is cost neutral by using LVL joists and beams with a strongrod tie system.

As more project types and cost information become available, the more historical data will be available to form budgets (see page 27 of the Wood Design Guide). ▶

Collaboration is key

In collaboration with Martin Bisset of QV cost builder, we were able to include extracts from QV Cost Builder, which is a paid for on-line service that provides analysis and cost data (the old 'Rawlinsons', which was the trusted QS cost bible) - **see page 16** of the Wood Design Guide.

We were also able to show how from Concept design what the cost plans are based on, then as the measure moves to Elemental analysis, what cost data looks like. It is ultimately this "collaboration" with all those involved in the process that leads to successful outcomes.

Why support mass timber solutions?

We are not saying that steel and concrete do not have a place in design solutions, but we want to know when mass timber is appropriate to bring to the design table (**see page 21** of the Wood Design Guide). The value-added proposition of timber goes beyond the bottom line costs.

Experienced QS's will know that you need to look at the big picture and the only way is collaboration with all involved from the design engineers and suppliers to the proposed (ECI) contractors on buildability issues.

At the moment, direct comparisons of traditional steel frames with structural timber shows mass timber as a more expensive option. To unravel that we need to look at the full picture:

- Can timber result in reduced foundation loads and costs?
- Can Preliminaries be reduced due to shorter programme durations?
- Can scaffolding costs be reduced due to site methodologies?
- Can waste removal be reduced on site?

- How much is early occupation worth to the client in potential earlier income?

So, quantity surveyors need to be challenged when considering mass timber solutions to assess what does this innovative product bring to the table? What are the cost drivers? **See page 27** of the Wood Design Guide.

What about our carbon footprint?

Timber is the only truly renewable construction product, and by using timber from sustainably managed certified forests represents a real solution.

Timber's stored and sequestrated CO2 properties are far greater than that of steel, which is destroying our air quality, and it is not as demanding on our water resources as concrete production. All of this adds to the merits and value proposition of mass timber.

Having the difficult conversation about how the construction industry can contribute to the future of our planet means that mass timber becomes a preferred building product.

In July 2020, the Ministry of Business, Innovation and Employment (MBIE) launched a programme entitled "Building for Climate Change: Transforming the Building and Construction Sector to reduce emissions and improve climate resilience". The Government Act to achieve Carbon Zero by 2050 will require changes to our Building Code and consent requirements, which are targeted for implementation in October 2021.

Reducing our carbon footprint by consideration of construction products and methodologies will form part of the actions needed to achieve these desired outcomes.

View the NZ Wood Design Guides online for a range of technical guides, such as the guide on "Carbon and the Environment" and on the MBIE webpage.