Focus on Glassfibre Reinforced Concrete’s (GRC) Potential
HERITAGE MAYFAIR BUILDING IN CENTRAL CHRISTCHURCH REBUILT

Precast Concrete Key To Capital’s New Residential Housing Model
WELLINGTON’S TE ARO PA PAPAKAINGA APARTMENT COMPLEX SETS EXAMPLE

Concrete’s Role In NZ’s Uptake Of Passive House Standard
ENERGY EFFICIENT BUILDING REDUCES ECOLOGICAL FOOTPRINT
UPFRONT

SPOTLIGHT ON PRECAST CONCRETE FLOORS

The 7.8 Mw Kaikoura Earthquake of 14 November 2016 - a complex multi-fault rupture with prolonged ground shaking – was a wake-up call for Wellington.

As a result of 25-30 seconds of strong motion in the CBD, with localised amplification on deep deposits near the waterfront, structural damage tended to be concentrated on moment-resisting concrete frame buildings between six and 15 storeys.

The outcome has been a number of official recommendations intended to ensure more rigorous regulations and address public safety concerns. Issues with the performance of precast concrete floor systems are reflected in these recommendations.

PRECAST CONCRETE FLOORS

While the spotlight is warranted to a degree, it is important to consider some qualifying factors.

For instance, the codes in force at the time a number of these buildings were designed (e.g. NZS 3101:1995 Concrete Structures Standard) did not account for the unique nature of the earthquake. These codes have been, or are in the process of being, updated with total concrete industry support.

Moment-resisting, concrete frame, multi-storey buildings comprise a significant proportion of the Wellington CBD, and would therefore inevitably be amongst any damaged stock by sheer volume.

We must also not have our attention drawn away from the more pressing challenge posed by unstrengthened unreinforced masonry buildings.

Another outcome of the Kaikoura Earthquake from which valuable lessons can be learnt is the debate around safety vs. amenity. It seems that although, with the odd exception, our buildings perform as designed, public expectations are not being met.

The disruption caused by building repair or demolition has seen a growing call for damage resistant design, an approach which allows for ‘life safety’ as well as ‘building survivability’. Through PREcast Seismic Structural System (PRESSS) and base isolation concrete is ideally positioned to help meet this demand.

KAIKOURA EARTHQUAKE

Post-quake discussion has focussed on two areas. Firstly, an investigation into Statistics House - a six storey reinforced concrete office building built in the CentrePort Harbour Quays business park in 2005 - which suffered the partial collapse of two floors.

Secondly, Wellington City Council’s (WCC) Targeted Assessment Programme, which sought to address public safety issues by confirming the structural integrity of multi-storey buildings that had experienced significant shaking in the Kaikoura Earthquake.

STATISTICS HOUSE

The Ministry of Building, Innovation and Employment (MBIE) ordered an independent investigation into Statistics House to understand the implications for the building regulatory system.

The report concluded that a combination of four factors contributed to the partial failure of lower floor segments. Two of the factors – the flexible frames and style of floor construction – combined with significant shaking for up to 120 seconds, and localised amplification of the shaking, to compromise the support of the lower precast concrete floor units on their framing.

continued on page 3…
Many older brick and masonry buildings now must be structurally upgraded or face an early retirement at the hands of the demolition contractors. Other buildings, such as those damaged by earthquakes, need to be strengthened as part of their reinstatement to safe habitable buildings.

**SEISMOLOCK GRC Plaster**

The SEISMOLOCK GRC Plaster is formulated to provide a strong bond to the surface of a masonry wall while the embedded layers of fibreglass mesh provide the tensile strength to resist in-plane shear loads and face loads on brick and masonry walls.

**RECOMMENDATIONS**

The MBIE investigation made four key recommendations - investigate similar building to Statistics House in the Wellington region, notify industry about issues with existing buildings with precast floor systems and frames that may be affected by beam elongation, access expertise to consider the implications for this type of design for new buildings, and undertake research into Standards to ensure they reflect current best practice.

The MBIE report noted that the combination of the causal factors in the partial floor collapses of Statistics House was not foreseen by Standards when the building was designed. As such, NZS1170.5 – Earthquake Actions Standard and NZS3101 were identified as requiring review. In fact, Amendment 3 to NZS3101 will be published soon, addressing design issues in this area.

The WCC report offers nine recommendations in such areas as building owner responsibility, post-earthquake assessment 1 and instrumentation to gauge shaking impacts. A number of the recommendations also relate to precast floors, including the call for a testing regime, standardised details and guidance for practitioners.

However, the report mentions that while the focus of the assessment programme was on buildings most affected in this earthquake, it is important that structures vulnerable in earthquakes, such as unstrengthened unreinforced masonry buildings, remain on the radar.

**MOVING FORWARD**

These reports set a path forward for the wider Wellington region, one which will require collective buy-in from all stakeholders if the recommendations are to ensure a more robust building regulatory system and address public safety issues.

The concrete industry is fully committed to this process; participating in technical discussions, driving Standards revision and exploring new low damage approaches to seismic design.

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1 From 1 July 2017, there is a nationally consistent approach to the assessment and management of earthquake-prone buildings, along with a standardised notice and national public register of earthquake-prone buildings.

**References**


**HR CEMENT COME ON BOARD**

With the launch of Concrete NZ on the horizon HR Cement Limited has joined as Gold Members of the consolidated association.
ASSOCIATION CONSOLIDATION APPROACHES

THE CONCRETE NZ ‘STRATEGY WORKSHOP’, HELD RECENTLY IN WELLINGTON, WAS DEEMED A SUCCESS, PRODUCING AN ESTABLISHMENT FRAMEWORK AND STRATEGIC PRIORITIES FOR THE SOON-TO-BE LAUNCHED PEAK INDUSTRY BODY.

RECAP

After a period of consultation, beginning at the 2014 New Zealand Concrete Industry Conference, the Cement & Concrete Association of NZ, NZ Ready Mixed Concrete Association, NZ Concrete Masonry Association, Precast NZ, NZ Portland Cement Association and the NZ Concrete Society arrived at a consensus in late 2015 to explore options around consolidation.

There was a common understanding that with unprecedented construction activity and growth forecasts it was the ideal time to set the platform for future pan-industry representation.

Over an 18 month period the Consolidation Working Group, made-up of representatives from the participating associations, developed a value proposition, an organisational structure and constitution. All of these were ratified by the various memberships during the 2016 round of AGMs.

Since the beginning of 2017 a Project Manager has been working with stakeholders to bring the new association to life by late 2017.

UPDATE

In addition to registering Concrete NZ as an incorporated society, financial instruments have been set-up to receive funds for establishment costs.

A Concrete NZ brand has been developed to capture unity across the wider concrete industry, and also represent the Sector Groups and the NZ Concrete Society as the association’s founding members.
The CCANZ Board, which as outlined in the Concrete NZ constitution will act as the Concrete NZ Board for the first year of the association’s life, has now met twice.

Chief amongst the Board’s items of consideration has been the high-level outputs from the aforementioned Strategy Workshop.

With the objective to develop a proactive industry response to the demanding external environment the aforementioned Strategy Workshop was a key mechanism in establishing a foundation for Concrete NZ.

In summary, the Workshop drafted Concrete NZ’s establishment framework, comprised of vision and mission statements, scope of primary activities, key success indicators and organisational values.

In addition, Concrete NZ’s strategic priorities over the coming three years were recognised as building confidence in quality concrete, educating to increase the use of concrete, establishing Sustainability and Health & Safety positions, as well as driving a skills strategy.

Underpinning all activities will be a drive to further strengthen the sense of unity embodied by the creation of Concrete NZ. Mechanisms for accomplishing this will include aligning cultures, developing clear Strategic and Business Plans, communicating openly with all stakeholders and streamlining administrative functions.

NEXT STEPS

The Concrete NZ brand, including the CEMENT, MASONRY, PRECAST, READYMIX and LEARNED SOCIETY identities, will be further refined with the development of a Brand Identity Guide that will provide guidance and specifications on how to correctly and consistently apply the Concrete NZ brand to positively shape perceptions of the new association.

Throughout August and September work will continue on setting up the Concrete NZ Association Management System (AMS). This online platform will provide integrated services across membership management, website design and hosting, member communications and events management. The AMS has been adopted as a means to create administrative alignment between the participating organisations, elevate the member experience and offer additional value.

Arrangements for a launch event at Parliament in Wellington during late August are also underway.

1 An Aggregate of Associations - Or Six into One Does Go! (2014). Rob Gaimster (Cement & Concrete Association of NZ), Bob Officer (NZ Ready Mixed Concrete Association) and Carl Ashby (NZ Concrete Society). NZ Concrete Industry Conference. Rotorua, New Zealand.

2 The NZ Portland Cement Association (NZPCA) was dis-established in December 2015 and replaced with the CCANZ Cement Technical Committee.

CONCRETE MAGAZINE

In circulation since 1957, Concrete magazine has been the information source that provides solutions and inspiration for a wide cross section of building professionals.

Under Concrete NZ Concrete magazine will continue to be produced along with a range of communication devices that meet the needs of the Sector Groups and the NZ Concrete Society.

Consolidation into Concrete NZ does however offer an opportunity to review stakeholder communications to improve efficiencies and effectiveness. This will most likely include a greater use of digital / social media platforms.
FIVE OPPORTUNITIES TO WIN A 32GB IPAD

1. How to enter: Email concrete-prize@ccanz.org.nz a single pdf document containing:
   a. Your name, tertiary institute, department and certificate/diploma/degree, email and a contact phone number.
   b. A paragraph or two on why you should win a CCANZ prize this year.
   d. Screen shot proof of:
      i. The CCANZ homepage.
      ii. The CCANZ “Publications” webpage.
      iii. IB 86 Self-Compacting Concrete (SCC).
      iv. Answer the question: “Which photograph in IB 86 shows SCC being bottom pumped into the form?”
      v. Answer the question: “Where would you source The European Guidelines for Self-Compacting Concrete?”
      vi. Page 8.5 of the Guide to Concrete Construction [available for download from the CCANZ website].
      vii. Figure 9.2 Loss of Strength Through Incomplete Compaction found in the Guide to Concrete Construction [available for download from the CCANZ website].


3. The winner will be selected and contacted. Note: winner selected from the pool of correctly submitted entries and CCANZ decision is final.
2017 COATINGS & CORROSION CONFERENCE & EXHIBITION OFFERS ASSET MANAGERS THE OPPORTUNITY TO
DEVELOP THE SKILLS NEEDED TO PROTECT NEW ZEALAND’S INFRASTRUCTURE THROUGH PROACTIVE CARE.

Scheduled for 28-29 August in Auckland, this is the premier event for asset owners to meet with industry experts to mitigate and minimise the cost and effects of corrosion in the industry.

The event features international and domestic thought leaders delivering case studies, new developments and innovations in the field.

EXPERT INSIGHT FROM
- RB Corrosion Services
- Linetech Consulting
- Ballance Agri Nutrients
- The University of Auckland
- G Group Consulting
- Canada Street Overbridge
- SGS
- ICS - Inspection and Consultancy Services
- Callaghan Innovation

BOOKABLE WORKSHOPS
Two practical workshops give delegates the opportunity to deepen their understanding and gain valuable skills as the best in the industry offer practical insight on the corrosion protection process and explain how to manage specific needs.

This year’s event features TWO separately bookable workshops delivered by industry experts International Paint.
- Passive Fire Protection
- Understanding changes to standard AS/NZS 2312.1.

CCANZ Members are entitled to a 10% discount.
To qualify, enter the promotional code MOKOCG while booking online at www.conferenz.co.nz/corrosion

Mitigating corrosion in concrete covered steel
Visibility and assessment - on your structures
Conducting a coating failure investigation
Coatings experts panel & Asset owners panel

28-29 AUGUST 2017 | PULLMAN HOTEL, AUCKLAND

CONFERENZ.CO.NZ/CORROSION
BCITO CONCRETE QUALIFICATIONS

**DID YOU KNOW THAT BCITO OFFERS QUALIFICATIONS FOR DIFFERENT INDUSTRY ROLES?**

Here’s the full rundown of what’s on offer and what topics are covered in each apprenticeship. You should seriously consider the option that’s tailored just for you if you’d like to become a qualified professional or to upskill your team.

<table>
<thead>
<tr>
<th>COMPULSORY</th>
<th>ELECTIVES</th>
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<tbody>
<tr>
<td><strong>For those new to the concrete industry looking to gain solid all-round industry knowledge and skills</strong>&lt;br&gt;<strong>National Certificate in Concrete Core Skills (Level 2)</strong></td>
<td>Tool use&lt;br&gt;Concrete production&lt;br&gt;Concrete testing&lt;br&gt;Health and safety&lt;br&gt;Environmental practices&lt;br&gt;Problem solving</td>
</tr>
<tr>
<td><strong>For Concrete Construction workers</strong>&lt;br&gt;<strong>National Certificate in Concrete Construction (Level 4)</strong></td>
<td>Health and safety&lt;br&gt;Construction equipment&lt;br&gt;Construction processes&lt;br&gt;Installing precast components&lt;br&gt;Codes of practice and legislation&lt;br&gt;Placing and curing concrete&lt;br&gt;Repairing existing concrete structures&lt;br&gt;Measuring techniques</td>
</tr>
<tr>
<td><strong>For those who are involved in Concrete Production</strong>&lt;br&gt;<strong>National Certificate in Concrete Production (Level 3)</strong></td>
<td>Health and safety&lt;br&gt;Concrete industry practice&lt;br&gt;Concrete materials&lt;br&gt;Use and maintenance of equipment associated with concrete production&lt;br&gt;Handling orders and production and ready-mixed concrete&lt;br&gt;Testing concrete</td>
</tr>
<tr>
<td><strong>For Masonry Product Producers</strong>&lt;br&gt;<strong>National Certificate in Concrete Product Manufacture (Level 3)</strong></td>
<td>Knowledge of the masonry product manufacturing process&lt;br&gt;Safety&lt;br&gt;Plant and equipment&lt;br&gt;Make masonry products&lt;br&gt;Curing concrete</td>
</tr>
<tr>
<td><strong>For those working in Placing and Finishing Concrete</strong>&lt;br&gt;<strong>National Certificate in Concrete (Placing &amp; Finishing) Level 3</strong></td>
<td>Health and safety&lt;br&gt;Measurement&lt;br&gt;Placing and finishing specific types of decorative concrete&lt;br&gt;Concrete industry operations, plant and equipment&lt;br&gt;Site preparation&lt;br&gt;Curing</td>
</tr>
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</table>
For those involved in Sawing and Drilling Concrete
National Certificate in Concrete Construction (Sawing & Drilling) (Level 3)

- Health and safety
- Concrete industry operations, plant and equipment
- Knowledge of slurry control
- Performing sawing and drilling operations on site

First Aid
- Confined spaces
- Performing deep floor, wire or track mounted sawing operations
- Performing large core and deep drilling operations

For those who manufacture Concrete Pipes:
National Certificate in Concrete Product Manufacture (Pipe) (Level 3)

- Reinforcing and cast-ins
- Producing concrete
- Casting cylinders
- Curing concrete
- Checking and fixing
- Making pipes including: Jacking, Rubber ring jointed; Inspection chambers; Flush joint; Skid rings
- Machinery includes: Plant and equipment
- Operating overhead cranes
- Moving and storing includes: Storing and dispatching, Receiving, storing and maintaining material
- Confined space entry

For those working with Precast Concrete
National Certificate in Precast Concrete (Level 3) with strands in Structural, Prestressing, Precast & Traditional Tank

- Health and safety
- Specifications
- Moulds and de-moulding
- Environmental management
- Plant and equipment
- Fabrication and reinforcing
- Curing and remedial work
- Handling, lifting and transport
- Confined space entry
- Testing
- Orders for materials and products
- Manufacture and fabrication of moulds
- Cutting and drilling concrete
- Crane operation

- Structural precast - Manufacturing precast concrete panels, beams, columns and stairs
- Prestressing - Manufacturing prestressed beams, columns, flooring units and panels
- Precast tank - Manufacturing precast concrete tanks
- Traditional tank - Manufacturing traditional concrete tanks

With unprecedented levels of construction activity generating an abundance of new opportunities for concrete businesses around New Zealand, it's important to ensure you keep up with demand.

Getting enrolled or involved in training allows you to:

- Add value to your business and your people
- Give back to your industry
- Improve skills
- Build a positive workplace culture

EXPERIENCE RECOGNITION

As well as apprenticeships for those new to the concrete industry, BCITO can also deliver these qualifications in a way that suits those who already have skills in concrete. That's called Experience Recognition - where BCITO may be able to recognise existing experience. You or your staff may be able to get formally qualified through this delivery method in a much shorter timeframe if you've been working in the concrete industry for a while now.

If you're an employer interested in taking on a new apprentice, you'd like more detailed information about how apprenticeships work or want to know more about Experience Recognition, contact BCITO today on 0800 4BCITO (422 486) or visit www.bcito.org.nz/concrete

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GET STARTED TODAY

STEP UP
CEMENT YOUR FUTURE IN THE INDUSTRY WITH A FORMAL QUALIFICATION

BCITO building people
The Concrete in the Classroom programme has come a long way since its inception back in 2011, when it was known as Concrete Shoebox. Concrete Scotland, a trading name for Security Initiatives, has developed the scheme with support from CITB Scotland – and more recently CITB and Constructionarium Scotland – to develop the active learning resource and deliver it to almost 500 secondary school pupils during 2016–17.

When a school signs up, the lessons can be delivered in a way that is best suited to that particular school and the five-to-six-lesson programme is enhanced as it contextualises the students’ learning through a visit to a concrete factory, construction site or similar manufacturing facility.

Through the extended pilot that ran in 2016, supported by CITB Scotland, 16 schools were involved – with over 200 pupils participating in the experiential learning activities that cover material testing and sampling, health and safety in the workplace, and basic concrete technology.

The pilot was runner-up in the Scottish Training Federation’s annual awards for innovative training.

**POSITIVE EXAMPLE**

In its evaluation of the scheme, Integratis Consulting noted: “Concrete in the Classroom is a positive example of how education, industry and skills and training providers can collaborate and work together to help stem the skills shortages that have been identified within the construction sector and ensure the supply of training meets industry requirements.”

At the end of June 2016, Concrete Scotland hosted a Concrete in the Classroom – Teachers CPD at which the teachers were unanimous in their support of the programme, the development of a qualification and the addition of a further activity or project to be undertaken by the pupils.

The aim is to have Scottish Qualifications Authority (SQA) certification in place by the autumn term 2017, which will offer a single unit – ten hours – of learning that can be used as a credit against a wider achievement award or as a standalone National 4 or National 5 award.

This was always the aim of the programme, namely to get concrete – the world’s most used construction material – into the general curriculum.
LIVE PROJECT
Concrete Scotland collaborated with the Royal Botanic Garden Edinburgh (RBGE), the Edinburgh School of Architecture and Landscape Architecture (ESALA), part of The University of Edinburgh, and Network Rail to deliver a live project for Inverkeithing High School and Queensferry High School to work on after completing the Concrete in the Classroom scheme. The theme of the project for the pupils was ‘Connectivity and How the Built Environment Interfaces with the Natural Environment and Vice Versa’ – thinking about what their local area means to them.

Through Concrete in the Classroom, and again working with RBGE and ESALA, Concrete Scotland further connected with Glasgow University’s School of Geographical and Earth Sciences and the Scottish Wildlife Trust to offer an opportunity to Craigroyston High School to become involved in a Natural Environmental Research Council project – looking at ‘Greening the Grey’ and how we can develop seawall construction to support and enhance marine life.

This has also developed into a sixth lesson on ‘Coastal Concrete’ by Mairi MacArthur (a PhD student at Glasgow University), which can be offered as an addition to the schools programme.

BENEFITS
Apart from the clear educational and community engagement benefits that Concrete in the Classroom offers, it also delivers on a whole different level that hadn’t been appreciated at the outset. It is the effect it has on the company’s employees who host the school visits and the revitalised feeling of purpose and self-worth of all those involved. It is the feeling they are giving something back and that, in their own way, they are helping to develop the young workforce of the future.

Last month, the teachers’ CPD developed into a wider Concrete in the Classroom Teachers CPD and Construction Conference looking to promote the Go Construct careers website, future accredited CitC SQA Award and further developing the wider learning proposition to schools. We are already in discussions with groups looking to develop ‘Roofing in the Classroom’ and ‘Formwork in the Classroom’ programmes. Having completed the Octavian Concrete programme for West Lothian Council, we also have the ‘Working on the Railways’ and ‘Surveying’ modules that can be readily delivered.

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NEW ZEALAND PROJECT TAKES HOME INTERNATIONAL AWARD

THE AMERICAN BASED POST-TENSIONING INSTITUTE (PTI) RECENTLY ANNOUNCED ITS 2017 PROJECT AWARDS. THOSE RECOGNISED INCLUDED BBR VT INTERNATIONAL LTD FOR THE JAMES PASCOE GROUP DISTRIBUTION CENTRE PROJECT, WINNER OF THE SLAB-ON-GROUND CATEGORY.

PTI PROJECT AWARDS

The PTI Project Awards recognize excellence in post-tensioning applications. Any structure completed or rehabilitated in the past seven years that uses post-tensioning as a structural component is eligible.

Awardees were selected by a jury of industry professionals and were judged based on creativity, innovation, ingenuity, cost effectiveness, functionality, constructability, and aesthetics.

PROJECT SUMMARY

James Pascoe Group required a state-of-the-art national distribution centre to consolidate warehousing for all of the groups retail brands, which include Farmers, Whitcoulls, Stevens and Pascoes. They set out with a long-term goal to minimize costs and maximize value for customers.

This was supported by introducing the absolute latest warehousing systems and technology, including 16m high very narrow aisle (VNA) racking — the highest level installed to date in the southern hemisphere.

The cutting-edge VNA racking and material handling equipment (MHE) required a level of floor flatness that is considered the highest in the world, existing on the margins of what had been achieved globally.

The floor was constructed as a series of large bay post-tensioned floors, coupled together so that there were only two opening
joints located within the 25,000m² ground floor. Combined with the use of a new system for concrete floor jointing – the Rhino joint – this creates a surface that would require little to no maintenance during the life of the structure.

The use of post-tensioning allowed for an efficient and relatively thin 240mm thick floor to cater to the 120kN back-to-back rack loading, thereby reducing the volume of concrete compared to a traditional floor system. As the key working surface in the facility, the 25,000m² post-tensioned concrete high-performance ground floor played a pivotal role in the success of the project.

Traditionally, a VNA floor would be constructed in narrow strips one aisle at a time to ensure the exacting flatness standards were achieved. Traditional construction processes would slow down the program, thicken the floor, and make it weaker and more prone to maintenance.

A hybrid, large-bay post-tensioned solution was developed, which minimized joints, allowed fast construction, and provided a more sustainable solution by reducing concrete volumes. The combination of faster construction time and a more efficient use of materials resulted in an approximate 25% reduction in cost.

JURY COMMENTS:

• The use of post-tensioning significantly minimized the number of construction and expansion joints and allowed for precise control of floor flatness.

• A facility such as this one really benefits from the advantages of post-tensioning.

The Post-Tensioning Institute (PTI) is recognized as the worldwide authority on post-tensioning. PTI is dedicated to expanding post-tensioning applications through marketing, education, research, teamwork, and code development while advancing the quality, safety, efficiency, profitability, and use of post-tensioning systems. For additional information, visit www.post-tensioning.org.
A mixture of Portland cement, fine aggregate, water, chemical admixtures and alkali-resistant glass fibres, GRC was deemed most suitable to rebuild the 2011 earthquake-devastated building, says Naylor Love project manager Aidan Suckling.

“Achieving a weathertight façade wasn’t possible with some alternatives, nor was achieving Building Consent approval or sign off at the end of the project,” says Aidan.

“Working with Seddon’s allowed us to achieve the look we wanted whilst dealing with one supplier, rather than having to co-ordinate several separate suppliers.”

Drawing on a 30-year working relationship with Naylor Love and having recently produced heritage chimneys for Nelson’s Melrose House with designers Jerram Tocker Barron Architects (JTB), Seddon’s owner John Seddon describes a highly-collaborative project.

“I had numerous discussions with Chris Pyemont [JTB associate] and Opus Dunedin and together we worked out a system of casting the GRC panels and hoisting them up on site to clip and bolt onto fixing plates attached to the main structure,” he says.

“Seddon’s then worked from enlarged photographs of the original building and, together with heritage architect Michael Findlay of Dunedin, our highly skilled mould makers reproduced all the original features — for example, string course architraves, cornices, corbels, the scallop feature and all the other fine detail work.”

“Hundreds of man hours went into reproducing the original features by our fibrous plaster mould makers, from which moulds for the GRC were taken.”

“We were proud to be able to play our part in the reconstruction of such a finely detailed building for the Christchurch rebuild. From a technical point of view it was one of the most challenging projects I have been involved with in over 40 years in this business.”

Compared to potential alternatives, Chris says the GRC system implemented by Seddon’s has complemented the November 2016-completed project “in a number of areas”, particularly emphasising:

• it was economically more viable
• the system was structurally certifiable and could satisfy complex seismic requirements
• the lead time for documentation was shorter
• the GRC system was compatible with other materials – this was important when reviewing the best method of replicating the bricks in the façade
• the GRC system did not affect the critical path of the project and could be installed after or during the interior fit out

“We were initially engaged to peer review an existing, detailed design set of documentation for the rebuild of the Mayfair Hotel and investigate alternative methodologies for reinstating the original ornate façade,” says Chris.
“This evolved into a fully revised and co-ordinated set of documentation that encapsulated the many compliance requirements and complexities of the site.”

Chris also praises the high level of co-ordination between the parties, which ultimately saw the project’s challenges met to deliver a finished product “we are all really pleased with.”

“Site access was restricted due to the façade location, immediately on the street front. Naylor Love provided the scaffolding required to access the three-storey façade and they liaised with Seddon’s to adapt the scaffolding as required to allow all GRC panels to be installed correctly.”

“Base castings were installed on the main structure and intricate finishing work was undertaken on site, as planned, to provide the finish required. All joints between the larger panels were finished on site to provide an exceptional seamless finish.”

Looking at the project overall, which entailed reinstating an originally 1906 erected brick structure as a modern building, Aidan Suckling says there were a few notable challenges from his perspective. One of which was the installation of Kingspan material leading from the neighbouring Hotel 115 within a very confined space that required innovative construction methodology.

Another challenge was the precise bracketry with ability to install fixing required for the installation of the GRC.

“A temporary working structure that allowed for the GRC installation, with variation to deck width, was essential. Bracketry and fixing ability was achieved by close communications and working through methodology between Seddon’s and Naylor Love carpentry which achieved a great result.

“The temporary working structure was achieved by outlaying the GRC requirements, scaffold legal requirements and other works requirements for use of the same structure. It was then modelled on BIM before erecting on site.”

“[Furthermore], the top two floors of the Mayfair Hotel were only accessible through the existing Hotel 115 once encased by the Kingspan wall cladding. Through great team planning and working in with Hotel 115’s requirements, the construction team achieved the high level internal room structure and finishes.”

“Delighted” with the outcome, Aidan describes the façade as a “welcome readdition to the street scene that faithfully replicates the original building.”

As a parting thought, he sees a “significant opportunity” for the continued replication of historic façades as part of the overall reconstruction of Christchurch.

“There are a huge number of similar-sized sites around the CBD where there had been a unique façade that has unfortunately been lost. By researching what was there, and by using GRC technology, Naylor Love can provide a cost-efficient option to recreate a safe and harmonious replacement.”
IN SITU CONCRETE CORING AND STRENGTH TESTING

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SEDDON’S AND GRC

Founded in 1953 by Allan Seddon -- father of Seddon’s GRC Innovations’ current owner John Seddon -- the business has become well established in the fibrous plaster manufacturer and installation sector.

John Seddon says the evolution into Glassfibre Reinforced Concrete (GRC) was a “logical step”, given the capability of the mould makers in the firm's midst and that there are “many similarities” between the two trades.

He sees the advantages of the composite material as including the capability to impart “accurate and fine detail”, as well as adhering to current seismic standards and weather tightness requirements.

"[Another major benefit] of using GRC is that the finished product is light-weight compared to alternatives due to the fact it is cast in a section generally 20mm thick,” he says.

“This has advantages for the building engineering in terms of foundation and structural design. The weight factor is also a plus for freighting panels.

"Cost per square metre depends on the design and finish required, but as can be seen on the Mayfair job, GRC is very versatile in regards to colour, pattern shapes and the ability to be moulded to give the appearance of brickwork."

The composite material is noted for combining the high compressive strength properties of cement mortars with significantly increased impact, flexural and tensile strength.

The final properties of GRC depend on a wide range of variables such as mix materials and formulation, manufacture, fibre product type, length and orientation, and admixtures.

GRC does not contain asbestos, has good chemical resistance and will not rot or corrode. In addition, it will not burn, has negligible smoke emission and offers good fire resistance.

Having worked with Naylor Love on various contracts over the past three decades, Mr Seddon notes the first GRC project involving the two firms was the restoration of Eichardts Hotel in Queenstown in 2000.

Seddon’s has now completed major GRC projects in Invercargill, Queenstown, Dunedin, Oamaru, Christchurch, Nelson and Hamilton.
HOUSING CO-OPs COULD BE THE ANSWER

MORTEN GJERDE
CO-OPERATIVE HOUSING ASSOCIATIONS COULD GO A LONG WAY TOWARDS ALLEVIATING NEW ZEALAND’S HOUSING SHORTFALL, BUT THERE HAS TO BE A CHANGE IN THINKING - AWAY FROM PRIVATE DEVELOPERS.

WITH THE TREASURY ESTIMATING A CURRENT SHORTFALL OF 60,000 DWELLINGS IN NEW ZEALAND AND THIS SHORTFALL GROWING BY 40 HOUSES A DAY, IT IS LIKELY HOUSING ISSUES WILL BE A TOPIC OF DISCUSSION FOR YEARS TO COME. SHORT OF THE LABOUR PARTY’S PROMISE TO BUILD 100,000 HOMES IF IT WERE ELECTED, IT IS CLEAR CURRENT PROPERTY DEVELOPMENT MODELS ARE INSUFFICIENT.

No matter how much the conditions for property development are streamlined by central and local government, the reality is making anything happen on the ground is still largely reliant on private initiatives, motivated by profits.

Several years ago, the Productivity Commission was invited to examine the conditions that conspire to make New Zealand housing so unaffordable. Its report discussed the need for more effective management of greenfield land and for overly restrictive planning controls to be reconsidered, all of which we’ve heard before. In the end, 13 recommendations for change were put forward, but none discussed our extensive reliance on private developers.

When we consider that this part of the industry adds between 20 and 25 percent to the cost of each housing unit and that the decisions made about housing have more to do with financial risk than quality, it may be time to look for alternatives. One could be for people to work together to eliminate the middle person; cooperative housing associations have been doing just this for more than a century in many parts of the world, including Australia.

The idea of residents cooperating to build their housing emerged early last century in response to market conditions similar to those affecting us today. Swedish workers had flooded into cities around the time of the First World War and found that the housing being offered to them was short in supply, poor in condition and expensive. The first cooperative project was undertaken by a group of tradespeople who not only funded the project but also helped build it. From this grassroots beginning, cooperative associations have spread throughout Scandinavia to become a major player in the housing market today. As much as 40 percent of all housing in Norway’s capital, Oslo, a city of more than 600,000, is owned and managed through such associations.

Housing cooperatives can take several forms, perhaps the most well-known of these would be the one-off development undertaken by a small group of like-minded individuals in pursuit of a particular lifestyle. The Earthsong community in Auckland, built on ecological principles, is one such development. However, Scandinavian models are more enduring than these one-off projects, enabling the association to trade on its size and economic capacity to benefit its members. In Norway, where more than a million people currently belong to housing cooperatives, their size enables them to assemble large sites for redevelopment even if it takes years to achieve. Cooperative housing associations operate in competitive markets and are managed by members for the benefit of members.

Could cooperative housing associations become established and thrive in New Zealand?

In some social and economic contexts, cooperatives are already accepted. Take, for example, cooperative community-based playgroups, which many of us will have experienced as kids or as parents. In the business world, one of the country’s largest organisations, Fonterra, is cooperatively owned by its members. Then, if we look at the different home ownership models currently on offer, unit-titled developments can be seen as a limited form of cooperative ownership. While individuals own their units outright, they also have a share in the common areas and the responsibility of maintaining them. A difference is that owners come into a body corporate well after key decisions about the form of the development have been made. Cooperative associations put those key decisions back into the hands of members.

There was considerable interest in cooperative housing models back in the 1970s and 80s, at a time when New Zealand was also going through a crisis of housing affordability. Auckland City Council even saw sufficient merit in the cooperative tenure model to have commissioned a discussion paper, which it published in 1981. As today, the writers of that report saw a very useful precedent for cooperative ownership in the papakainga model.

In recent years, a number of iwi up and down the country have begun to pursue this form of collective ownership on behalf of their members. Recently, Wellington’s Te Aro Pa Trust built 14 papakainga housing units on a site in the city’s Evans Bay. However, developing such collective forms of housing is not without its challenges, even when the owners are well resourced. This is where the Productivity Commission’s recommendation discussing the need for financial and legal institutions to change in order to facilitate the papakainga housing model could also help other forms of cooperatives become established.

If potential benefits of collective housing are to be realised, the Government will also need to respond. In a recent paper comparing the effectiveness of cooperative housing in Sweden, India and the United States, the authors found success to be strongly affected by the political context and the relationships the cooperatives formed with their governments.

The most successful were found in Sweden, where the Government has worked closely with housing associations to ensure their viability. While cooperatives have remained autonomous, they have also enjoyed protective and enabling legislation. These relationships have never been one-way only and the Swedish Government has been found to have shed some of its responsibility for housing onto housing cooperatives in a truly effective partnership.

Cooperative housing associations may not solve all the problems we are facing with housing in New Zealand, but may be an option worth pursuing. What is clear is the current developer-led model is not meeting our needs. The constrained environment house-building-for-profit operates in, must shift.

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AFFORDABLE CITY LIVING FOR IWI BUILT IN CONCRETE

IAIN MACINTYRE

A SOCIAL-DRIVEN GOAL OF PROVIDING AFFORDABLE CITY HOUSING FOR LOW-INCOME IWI HAS BEEN REALISED WITH THE RECENT DEVELOPMENT OF THE TE ARO PA PAPAKAINGA APARTMENT COMPLEX ON EVANS BAY PARADE IN WELLINGTON.
Entailing ten three-bedroom and four one-bedroom precast concrete units, the $3.7 million project provides prioritised tenancy for those with lineage to Te Aro Pa iwi, who were forced from their land at the bottom of Wellington’s Taranaki Street about 140 years ago.

Te Tumu Paeroa business relationship consultant Richard Wickens, whose organisation managed the project on behalf of the Te Aro Pa Trust, says the development is fostering a community of “various age groups, income levels and family structures”.

“The market we have positioned ourselves in is not a high-end market and it involves building on Maori land,” says Richard.

“The fact that we did not have to obtain a return on grant funding from the Maori Housing Network (Te Puni Kokiri) – other than to provide accommodation to those in less-fortunate circumstances – meant that there were significant cost savings. If we did not have such funding, this project could not have proceeded.”

Elaborating on the point, Richard observes that without the Te Puni Kokiri grant, the Maori owners of the land would not have been able to secure a necessary bank loan and would therefore have been facing a significantly different outcome.

“Once all debt is repaid, the land owners will own both the improvements and the land. If they had entered into a joint venture with a developer, with nothing to contribute other than the land, they would have been only lessors and might never have owned the improvements or been able to accommodate their own people. This is a source of much pride for the approximately 1100 land owners.”

Richard says a financial imperative has been to ensure the development can meet current repayments on the loan, which was obtained at commercial interest rates, with a sensitivity analysis also completed to ensure future interest rate rises can be accommodated.

“Rentals are currently $310 and $580 for a single and three-bed unit respectively. Many tenants are in receipt of Income Rent Related Subsidies (IRRS) from the Ministry of Social Development (MSD) and maximum rentals are governed by the MSD’s limits for the area and quality of housing offered.

“We will adjust our rental rates at appropriate intervals to keep them aligned with market increases and MSD limits on rents based on location and rental offerings. At the end of the day, we also need to ensure that we are able to meet loan repayments, outgoings on the buildings, and provide scope for upgrading at some future date.”

Richard acknowledges that the financial model used to develop and manage the Te Aro Pa Papakainga apartment complex makes it relatively unique. However, to facilitate social-driven housing initiatives requires a different approach, one that sits outside of the commercial sector “norm” of profit maximisation.

The development was designed by Walker Architecture & Design, which Richard praises for “maximum use of the site” and delivering “two imposing and modern concrete structures, that are unique but not out of place in the neighbourhood.”

Two of the three-bedroom units have been positioned above the single-bedroom units in each block, so as to break up what would otherwise have been straight level rooflines, and the design also heavily features the use of precast concrete.

Homestead Construction general manager Daniel Lawry, whose firm manufactures that material, says this decision advanced the speed of construction over alternative methods -- particularly through “not being held up by weather as much as with wet timber drying out.”

“Fire rating, sound and strength are other main benefits,” he says.

“On top of this, long term there are savings on maintenance and upkeep.”

Daniel says all speed-of-construction and longevity advantages were further appreciated given the challenging site environment.

“The site wasn’t easy, as there was limited room, and being on a busy street required a lot of behind-the-scenes co-ordination. With the cliff behind, rockfall protection for the units needed to be considered and a 200mm thick precast wall was constructed.”

“Being in a marine environment, concrete is the answer because of its durability.”
Walker Architecture & Design head Roger Walker adds that precast concrete was selected due to the main factors of “robustness, durability, build time, projected appearance of solidity, sound attenuation between units and between floors, and cost effectiveness”. He adds that the rear retaining wall was completed with metal finishes of marine exposure compliance.

Furthermore, Richard notes the predominant use of precast concrete delivered a significant financial advantage. “The interval between the commencement of construction and tenancing was shortened and therefore the period when interest could not be offset against rental income was correspondingly shortened. This helped to hold down total construction costs.”

“In fact, the erection of the precast concrete slabs took around two weeks. During construction, the weather was kind to us -- high winds do present a problem when wrangling large, concrete slabs into position by crane.”

“However, only six days were lost through bad weather. Using a fixed-price, fixed-term construction contract also helped this project stay on track.”

The finished design also features triangular motifs, intended to represent Mount Taranaki and its ranges.

“It symbolises the connection of the land owners to their iwi back in Taranaki,” says Richard.

“The two pou in the central garden area symbolise the concept of whanaunga or community which is one of the objectives of this development.”

In regards to occupants’ feelings on the use of precast concrete in the build, Roger Walker says feedback has been “very good”, with Daniel Lawry noting the material has proved “very durable and gives the feeling of security and a sense of strength.”

Adds Richard Wickens: “The owners I have spoken to are appreciative of the opportunity to live in a brand new home unit. There have also been some who are openly delighted to be able to connect through the apartments to their iwi.”

Having commenced in October 2015, the development was officially opened on March 19, 2016.
AS INTEREST IN THE PASSIVE HOUSE STANDARD IS GROWING IN NEW ZEALAND, AND ACROSS THE WORLD, IT IS IMPORTANT TO CLEAR UP SOME OF THE MYTHS AND MISCONCEPTIONS.

One misconception is that Passive House requires a specific type of construction (e.g. timber frame or SIPS) and therefore precludes the use of reinforced concrete construction. This is incorrect. There are many exciting examples of Passive House buildings around the world that make creative and effective use of concrete in different ways.

WHAT IS PASSIVE HOUSE?
Passive House is a stringent yet voluntary international standard for high-performance architecture. The standard includes specific requirements for building energy efficiency, occupant comfort and quality assurance of the design and construction process.
The energy requirements are focussed most sharply on heating and cooling demand which must be below 15 kWh/(m².a) in both cases. Heating and cooling are the largest energy consumption in most buildings and so cutting these is a highly effective means to improve building energy efficiency.

Aside from the effectiveness of this approach, the other equally important aspect of dramatically cutting heating and cooling demand is that this shifts the focus to finding an architectural design solution. Incremental improvements in energy efficiency can be made by simply improving the specification of heating and cooling systems and components.

Passive House energy efficiency isn’t an incremental improvement though, it is a paradigm shift. And for this, improved systems and components aren’t sufficient. The building design must inherently perform at a very high level to reach the Passive House standard. This requires thorough consideration of the design from the building form and orientation right through to construction detailing and specification.

As well as presenting a creative design opportunity, this paradigm shift in energy efficiency leads to exceptionally comfortable and healthy buildings. In fact, comfort and health were as equally strong drivers as energy efficiency in developing the Passive House standard. After all, energy efficiency is pointless if it results in uncomfortable buildings.

A Passive House building has excellent indoor air temperatures, but not only this, it also has excellent surface temperatures, including window and door frames and glass, and plentiful fresh air all year round without any draughts or background noise. These are the result of the continuous high-performance thermal envelope inherent to Passive House buildings. As well as providing exceptional indoor comfort, the high-performance thermal envelope eliminates condensation and mould risks. This makes for both a healthy indoor environment and a robust durable building structure.

CONCRETE IN PASSIVE HOUSE
Concrete has been used for Passive House construction from the very beginning of the standard in Germany. There are many Passive House buildings that rely on reinforced concrete frames, load bearing walls and slabs, along with many variations of masonry and Insulated Concrete Form (ICF) construction. There are many Passive House buildings showcasing concrete cladding and concrete interiors. As with all construction materials there are challenges and benefits inherent in using concrete as part of a Passive House.

BENEFITS OF CONCRETE
Traditionally, in ‘Passive Solar’ design, exposed concrete has been incorporated so the thermal mass can act as a heatsink to
even out extreme fluctuations in temperature. Passive House design optimises solar heat gain, internal heat gains (from people, equipment, activities etc.) and a minimal heating system. This optimisation eliminates the extreme temperature fluctuations by design and, therefore, Passive House is not critically dependent on thermal mass. In this way, Passive House removes a constraint and provides greater design freedom to use concrete for aesthetic, structural, and functional purposes. However, the thermal mass of concrete is still a useful tool in the architect’s design toolbox. It can be used to balance the solar heat gain of large areas of glazing. Some caution must be exercised, though, as the heat stored in the thermal mass may need to be later discharged to prevent overheating.

Concrete is often admired for the homogeneity of the material. Concrete can be sculptural and massive in a way that framed construction cannot match. This aesthetic quality is also beneficial for Passive House as the homogeneity is essentially draught-free. There is very little air leakage (infiltration / exfiltration) through cast in-situ or precast reinforced concrete – it creates an inherently ‘airtight’ building envelope without the need to apply membranes or sheathing. However, junctions between different concrete elements, especially with precast concrete, and with other components such as windows, remain critical to maintain the continuity of the draught-free envelope.

Reinforced concrete framing is a robust and well-understood structural solution for building at a certain scale and height. This is also true of large scale Passive House buildings – the structural capabilities combined with the inherent airtight nature of reinforced concrete make it a good structural choice.

CHALLENGES FOR CONCRETE

The importance of the thermal envelope for Passive House means that materials with high thermal conductivity – including concrete – cannot pass through the insulation layer. This needs to be a key consideration throughout the design process. If concrete must pass through the thermal envelope, a thermal break detail will be required. If the concrete is performing a structural function, as it often is, then a structural thermal break component will be needed to reduce the thermal bridging effect to an acceptable level. What’s an acceptable level? Firstly, it needs to be an acceptable heat loss for the whole building performance. Secondly it needs to maintain an acceptable internal surface temperature so that it doesn’t introduce a localised condensation risk along with the associated mould and health risks. A whole range of specialist structural thermal break components have been developed over the years and are now mainstream in northern Europe. While less common in New Zealand, they are available.

Reinforced concrete is draught-free, however, typical medium dense concrete block is not. This presents a challenge for using masonry in Passive House design, but it is easy to overcome. The solution is simply to plaster the concrete block elements with a cement or gypsum based plaster depending on the location. Wet plaster provides a continuous draught-free layer to the concrete block construction. It also forms a surface for airtight tape to interface with other components such as windows.

Concrete masonry construction may require a cavity construction or a double skin of masonry with insulation in between. The two skins will need to be tied together which unfortunately creates a multitude of thermal bridge points through the insulation. There are, however, solutions for most, if not all, situations like this that might arise. Low thermal-conductivity ties formed from basalt are one solution and in some cases even stainless steel ties (which is less thermal conductive than galvanised steel) might reduce the thermal bridging sufficiently. The rigour of Passive House requires that the specific details of the project are checked and calculated. There is no rule of thumb or look-up table to find a quick generic solution.

The complexity of the building form and geometry may also require secondary steelwork to support concrete elements – again resulting in thermal bridges breaking the continuity of the thermal envelope. These elements, like structure passing through the insulation layer, will need structural thermal break components to maintain the continuity of the insulation layer.

THE FUTURE

Concrete provides undeniable benefits for Passive House, especially for buildings at a scale larger than a single-family house. However, like all materials and construction systems, concrete presents challenges as well as opportunities. Passive House is at the forefront of high-performance building technology developments worldwide, though, and there are abundant solutions to the challenges of using concrete.

Most importantly, Passive House is a voluntary standard with clear performance requirements, a design methodology and accessible design tools. It does not prescribe what materials and methods must be used to achieve the standard. It does not prescribe or limit architectural expression or aesthetics. It is about the inherent performance of the architecture.
RE-LEVELLING A DWELLING IN A NEW WAY
THE CANTERBURY EARTHQUAKES GAVE RISE TO ANY NUMBER OF INNOVATIVE SOLUTIONS TO THE PROBLEM OF BUILDING ON LIQUEFACTION-PRONE SOILS.

Experts in the construction sector were quick to adapt the concrete slab floor system, so long as it supported a relatively lightweight structure. One system became especially popular, consisting of a concrete foundation with embedded jacks that could be used post-quake.

Graeme Jacobs Architects Ltd, working with structural engineers Strucura Consultants, has now delivered an alternative. Their solution suspends a floor slab approximately 500mm above ground level on a concrete perimeter foundation - thus spreading loads as far as possible - and uses an external cantilever system that removes the need for internally-accessed re-levelling systems.

“This was a complete rebuild of an existing dwelling, and the insurers required us to build a ‘like-for-like’ home,” explains Graeme Jacobs. “Geotechnical engineers had determined the whole area would be prone to liquefaction in any future event, so we needed to design for that in the rebuild.”

The system requires a damp proof membrane to be installed at ground level to inhibit liquefied soil settling beneath the house, instead driving most of it to the surrounding areas.

A solid 400mm wide x 600mm deep concrete foundation forms the perimeter rectangle. 200mm thick x 1200mm wide hollow precast concrete panels are then laid across this alternately with 25mm thick x up to 700mm wide timber infills.

These base panels and a 75mm thick, reinforced concrete topping above them span the foundation, and extend 700mm beyond the edge of the south foundation, and the majority of the north edge. There is also a 400mm cantilever over the west foundation edge to maintain the floating effect.

The two overhanging edges of the slab act as external cantilevers. “This also removes the need for pre-installed jacks since in any event requiring re-levelling, external jacks can be employed at points along the dwelling’s length,” says Graeme. “It means workers don’t have to crawl into potentially dangerous, confined spaces to reach the pre-installed ones, and any repairs can be completed relatively quickly.”

The cantilevered sections are heavily reinforced to ensure they can sustain the loads required for re-levelling work to be performed effectively.

It’s now expected that repairs required as a result of a seismic event can be carried out easily, quickly and cost effectively, using fewer resources to do so and with minimal damage to internal fit-out.

By allowing the re-levelling design to be exposed as an architectural feature, Graeme believes it reassures the owners of their dwelling’s resilience in any future quakes. “The dwelling seemingly floats above a dry moat filled with round stone which surround the dwelling and disappears under the cantilever. This contributes to the feeling of security necessary for any home owner following such a significant natural disaster,” he says. “The solution offers a viable alternative to the range of re-level-able concrete slabs and foundations that have been created post-earthquakes.”

COMPANY
Graeme Jacobs Architect Ltd

PROJECT
Earthquake Re-Level-Able Dwelling

CONSULTANTS
Graeme Jacobs Architect Limited
Strucura Consultants
ALL-CONCRETE HOME SHOWS THE WAY FORWARD
Concrete houses are often promoted as low-maintenance and quiet. With Compass Homes’ fully cast-in-situ concrete dwelling thermal mass and energy efficiency are added to the list of benefits occupants can enjoy.

Compass Homes’ structure includes a specially designed raft floor to cope with the additional weight of not only a concrete exterior wall, but, in many cases, every interior wall as well. While Compass Homes build also in traditional wood, the company has imported and adapted overseas technology to offer a home almost entirely constructed of concrete.

Once the slab is in place, reinforcing steel is installed and services placed appropriately. Aluminium forms are then erected to surround the reinforcing, and specially formulated concrete is poured in a single pour. The forms can be removed and re-set to get ready for another pour in a relatively short period of time.

Interior walls are 100mm thick, and the exterior wall is 200mm. Within the exterior wall is set 50mm-thick continuous EPS insulation, which can increase the thermal performance of the exterior wall by nearly 40% over that of conventional construction.

Compass Homes Group’s Sales and Business Development Director Garry Shuttleworth is enthusiastic, “This home has very little in common with other New Zealand new homes, even though it looks exactly the same,” he explains. “The only similarity is that it has a traditional timber truss roof and plaster board ceilings.”

While this technology is fairly new to New Zealand, it’s been well proven in the Asia, United States and Europe for more than 50 years. “There has been substantial capital required in terms of formwork and the R&D needed to get the technology to a stage that meets New Zealand conditions and the Building Code,” he says.

“We can reuse the forms many times, so this building technology is very cost effective.” The walls are erected on site using a single concrete pour process so the home is also completely weathertight. “There are no breaks that need sealing or that can shrink away from jointing,” says Garry.

Scott Gordon and Kim Williamson, Directors/Owners of Compass Homes (Rodney) Ltd, have nothing but praise for their concrete show home. “The house is very quiet and has a very even temperature range inside even when it is extremely hot outside,” says Kim. “We really enjoy working here.”

Interior concrete walls are an innovative concept for New Zealand, but the company is excited about their use. Concrete’s inherent thermal benefits can be harnessed throughout the home, and once skinned and painted they look the same as any other interior wall.

The company believes the benefits of this technology will be huge for landlords too, with tenants unable to damage walls, and only a simple re-skimming required to remove any visual damage that cannot be washed off or painted over.

The home’s construction means the company believes it is already eligible for a 6-Homestar rating from the NZ Green Building Council. This means the home has no insulation gaps, is double glazed, has efficient damp proofing, water use and waste management, energy efficient lighting and heating, and good exterior space.

Compass Homes also has concrete show homes at other branches in Papakura, Western Bay of Plenty and Christchurch. “Our focus is on building better homes and maintaining the highest quality,” says Garry. “We are bringing this technology, built around the benefits afforded by concrete construction, directly into the new home market.”
The Concrete and Concrete Masonry Basement Design Guide informs the initial design process for underground structures; covering use considerations, site characteristics, design methods, and material selection. Download a copy from the CCANZ website www.ccanz.org.nz

HISTORY OF CONCRETE: A VERY OLD AND MODERN MATERIAL BY PER JAHREN
Post-war Europe and Asia have seen the development of German and Japan from a war torn countries into two of the most powerful nations in the world. As the two most populated countries, China and India, transform themselves into Asia powerhouses, cement and concrete will sustain their double digit economic growth. History of Concrete summarizes the history and development of cement and concrete, from prehistoric period to today, from ancient Egypt and Rome to modern China, over tens of thousands of years of human civilization.

SOCIAL HOUSING: DEFINITIONS AND DESIGN EXEMPLARS BY PAUL KARAKUSEVIC & ABIGAIL BACHELOR
Social Housing is a sector undergoing a huge period of change - with different organisations increasingly building their own housing for those in need. This book explores how social/affordable housing has been delivered and designed with success throughout the United Kingdom in the last 10 years. Weaving together exemplar case studies, essays and interviews with social housing pioneers and clients, it demonstrates real-life best practice responses to the challenges associated with housing provision, with a focus on design ideas.

LIBRARY QUIZ
To go in the draw to win a copy of Social Housing: Definition and Design Exemlars by Paul Karakusevic and Abigail Bachelor answer the following question:

For which project was BBR VT International Ltd recently honoured by the American Post-Tensioning Institute (PTI)?

Email your answer to library@ccanz.org.nz. Entries close Friday 18 August 2017.

Congratulations to Bryan S Romanes of Gypsy Design Group, who correctly answered the Vol 59 Iss 2 Library Quiz to receive a copy of The Fabric Formwork Book: Methods for Building New Architectural and Structural Forms in Concrete by Mark West.
NEWS FROM THE ASSOCIATIONS

NEW ZEALAND CONCRETE SOCIETY

CONFERENCE BRINGS DIVERSITY

The technical programme for this year’s Concrete Industry Conference (12 – 14 October at Wellington’s Te Papa) has been formalised, and even a brief examination of its content reveals a fascinating spread of presentations.

New Zealand’s temperamental seismic conditions are again a focus point at this year’s event. The keynote presentation on the opening day, for example, explores the Challenges and Progress toward the Assessment of Residual Capacity for Earthquake-Damaged Concrete. It is presented by Ken Elwood from the University of Auckland.

Later that same day, Ken is joined by the University of Auckland’s Richard Henry, Dave Brunsdon (Kestrel Group) and Peter Smith (Spencer Holmes), in an outline of the damage to buildings with precast concrete floors during last year’s Kaikoura earthquake. He covers the implications to design and seismic assessment.

Similarly, Adnan Rais, Royce Liu and Alessandro Palermo (all University of Canterbury) discuss the damage assessment of concrete road bridges during the Kaikoura earthquake, while Mark Browne and Gareth Morris (Holmes Consulting) present a paper on the post-earthquake repair and strengthening of the Christchurch Town Hall.

Heritage buildings too, come under the microscope in an examination of the seismic strengthening of Parnell's Textile Centre, which benefitted from an innovative combination of post-tensioning and FRP. The presenters are Niraj Ranjit and Rhys Rogers (BBR Contech), P Molloy (NZ Strong) and S Khatiwada (PRENDOS).

The theme switches briefly to ‘concrete as art’ on day two, when the keynote address from Victoria University’s Andrew Charleson explores the aesthetic evaluation of concrete structures on the Mackays to Peka Peka Expressway.

Research-based presentations are also well represented at the event. They include a paper on fibre optic relative humidity sensors for use in concrete structures, authored by Sebastiampillai Raymond, Yaodong Jia, A J Swanson, S Janssens and D Carder – all from Callaghan Innovation.

This is followed by the exotically-titled Towards an Electronic Ephemera: Exploring Atmosphere and Architectural Space in Virtual Engines – presented by Victoria University’s Eliot Blenkman. Delegates interested in the evolution of 3D printing applications should attend the presentation by Callaghan Innovation’s Yaodong Jia and Conrad Lendrum – 3D Concrete Printing: Potentials and Challenges.

A number of large-scale infrastructure projects in Auckland are discussed during the programme. They include Auckland’s Big Push – by Edward Ayre (McConnell Dowell Constructors Ltd) and Dene Cook (Firth Humes Group), and Watercare’s Mangere Wastewater Treatment Plant BNR Upgrade (Blair Davidson and Chris Lenssen – Holmes Consulting), with Colin Newbold (MCD-HEB Joint Venture) and Sven Harlos (Watercare).

Visit the Conference website for more details – www.theconcreteconference.co.nz
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