

REMEDIAL CONNECTIONS

The Australasian Concrete Repair & Remedial Building Association (ACRA)

Inside this issue:

- * Welcome the new ACRA President 2019-2021
- * Meet your new ACRA Board
- * Setting the standards in the Remedial Industry
- * 'It's a game changer': How we can save Australia's oldest apartment buildings from ruin
- * Grouted HDPE Corrosion Protection Linings - the Silver Bullet
- * Magnesite floors may be a bigger problem than cladding
- * Risky business: how our 'macho' construction culture is killing tradies
- * Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes
- * Industry news
- * Australian tradies are taking up yoga for mental health
- * New ACRA Members.

Cover: Bondi project by Max Build



Setting the standards in the remedial industry since 1991

President's message

In my inaugural message as the new President for ACRA, I am humbled and honoured. I give my thanks to Hamid for setting a high standard – I hope I can continue to meet and greet to promote ACRA half as well as he has and continues to do. Some of you may wonder what I bring to the table? I fell into remedial work when I joined Costin Structural (now Costin Roe and Strata Engineering Solutions) sometime in the last century to get exposure to bigger engineering projects than I could on the Coast. At the time, Wayne had a little team of remedial engineers doing all range of diagnostic and remedial work, in insurance, technical due diligence, defect and expert witness work. I was strangely attracted, and perhaps being a closet wordsmith in an engineering career, I found the wonder and joy in finding out what was wrong with a structure, how to fix it, and how to explain it to non-engineers. I have continued that over the last (oh dear) 17 years since I joined the business that I currently own.



I come into the President's seat with a dynamic Board keen to continue the growth developing over the last few years, and welcome a few new faces to the team as well, increasing our diversity a little more. This year we had competition for Board seats, and in order to maintain the required balance, a vote was held to fill the allowable quota for Contractor members. Unfortunately, the result meant that we could not fit in the good people we had available, and lost some previously active members, BUT these people have now volunteered to establish the new NSW Sub Branch Committee which now consists of Dominic Lambert from Buildcorp and Peter Dukino from Dukes. Anyone wishing to join this group and would like a bit more information on the sub branch committees in any state, please contact the ACRA office 02 9645 3692.

I take this opportunity to specifically thank past Board members: Mr Jason Dagg of Duratech WA, who was unsuccessful in re-election through the voting round, and Mr Daniel Rowley at CECS Group, who stepped down to maintain focus on his business activities in the ACT. Be aware gentlemen, I may well call upon you as ACRA members to continue to participate in subcommittee capacity.

We have a few things happening in the near future:

- ⇒ The updated website is near completion which we aim to make it easier to search for contractors, consultants and suppliers for specific jobs for both the ACRA Membership and the general public.
- ⇒ New Corporate membership categories have been released, contact the ACRA office for more details.

The 2020 awards will take place in Oct 2020 in Sydney and – with our expansion into broader construction repairs -- will be open to new categories of remedial building and remedial waterproofing and of course concrete repair. The Awards committee has already met and is working on defining the new categories, the judging criteria and appointing judges, so now is the time to start thinking about what projects you wish to enter, including if you might submit a joint entry with another ACRA member.

Members, thank you for your continued support of ACRA. We represent the remedial industry's interests: Suppliers, Contractors, Asset Owners and Consultants. Should you wish to contribute or suggest content please contact the Secretariat info@acrassoc.com.au

Sponsors, thank you manifold also – as a non-profit association your support helps us maintain value and get more things done. Should you wish to discuss ways of improving value for your sponsorship, please also make contact 02 9645 3692.

For those of you who have read this far, thank you for your indulgence. I do hope to fulfil the role and continue the momentum in growing ACRA further, and also to return to the industry even a fraction of what it has given me.

-Grahame Vile - ACRA President 2019-2021

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Meet your ACRA Board for 2019-2020

<i>Grahame Vile (ACRA President)</i>	BAAM Consulting
<i>Greg Zambesi</i>	GHD
<i>Peter Johnsson</i>	ACOR Consultants
<i>Una McKenna</i>	Triaxial Consulting
<i>Mike Rutherford</i>	Conspectus
<i>Henk van den Heuvel (ACRA Treasurer)</i>	Andersal
<i>Caroline McConnachie</i>	Max Build
<i>Kieran Smith</i>	Freyssinet Australia
<i>Ramiro Garcez</i>	Preservation Technologies
<i>Hamid Khan (ACRA Immediate Past President)</i>	Fosroc
<i>Harvey Wellman</i>	Ardex Australia
<i>Grant Dowling</i>	SIKA Australia

Grahame Vile (ACRA President) - BAAM Consulting (Consultant)



Since 1996 Grahame has been predominantly in building asset management, specialising in condition assessment of concrete structures in the built environment. He completed a Master of Engineering Studies at Sydney University in 2001 focused on concrete deterioration causes assessment and remediation. He is the Managing Director of BAAM Consulting, a remedial consultancy serving clients nationally.

He maintains an active involvement in industry associations including service on ACA (since 2006-2019) and CIRCEA committees, has been one of ACRA's presenters since 2012, and served on the Concrete Institute of Australia Durability Task Group 1 in 2013-14, and was a speaker for CIA's Forensic and Durability national roadshow in 2013.

Key areas of advice:

- * Condition assessment and remedial specifications for structures including water/sewer, grandstands, car parks, pavements, and strata/commercial buildings.
- * Develop of risk-managed solutions to remedial works.

Hamid Khan (ACRA Immediate Past President) – Fosroc (Supplier)



Hamid Khan working presently as Product Segment Manager – Repairs and Grouts at Fosroc/ Parchem Construction Supplies, Australasia, holds a bachelor degree in Civil Engineering discipline. He also holds a double Master in Business and Strategy from the University of Wollongong. Hamid is certified in Concrete Technology and Construction, by City & Guilds of London Institute (UK) and is a qualified expert in concrete repair & refurbishment with 19 years of experience in the industry.

He was associated with Fosroc International in Dubai for 14 years taking up various roles in technical and management. Hamid's experience comes from the Gulf, Middle East, Europe, East Asia and Central Asia.

Henk van den Heuvel (ACRA Treasurer)– Andersal (Contractor)



Henk is a Fellow of the division of Chartered Professional Engineers who manages Andersal, a contracting business that specialises in remedial and facade repairs to buildings and structures, which is based in the Sydney area. Henk has completed a second Bachelor degree in Economics with a major in Business Law along with a Post Graduate certificate in Applied Finance. Henk has been a board member of ACRA since 2001 and has been active in many areas of their activities including President, Treasurer and currently Past President. Henk is also on the MBA, NSW Waterproofing Technical Committee which has recently published Books 2 and 3 on the Waterproofing of Balconies and Planter boxes respectively.

Caroline McConnachie– MAX Build (Contractor)



As MAX Build's General Manager, Caroline's accountabilities include designing the overall business strategy, setting goals for growth, and managing finance. She is a key link between the senior corporate team and the projects, and has a proven track record building strong relationships with external stakeholders including clients, suppliers, consultants and service providers. She drives the people and culture agenda through overseeing the day-to-day operations. Under her stewardship the organisation has sustained an annual average growth of 45%, since 2012. The company employs over 40 staff, is approved by iCare to carry out up to \$28m in residential works, runs 6-8 sites, is ISO 9001, ISO 14001 & ISO 4801 certified, and has a 95% employee retention rate. Caroline has initiated collaborations with the wider built environment sector. In 2019 MAX Build partnered with the University of Sydney in the ARC Linkage Project LP190100415 'Transforming Housing: Co-design Guidelines for Existing Apartment Buildings'. This major research project is due to commence in 2020 and at its three-year completion, will produce an industry tool for managing the adaptation of multi-dwellings. She was recently a keynote speaker at the Griffith University 2019 Strata Title Conference *Rise Transforming Aging Buildings: a Game Changer in Strata*, which addressed a key trend in the management and maintenance of strata schemes built prior to 1980.

Kieran Smith – Freyssinet (Contractor)



Kieran Smith is the Buildings Remediation Manager of Freyssinet Australia Pty Ltd, a leading provider of specialist property and infrastructure post-tensioning, civil engineering, remedial engineering and repairs. Kieran has over 20 years' experience in the remediation industry and has previously worked across the country as both a Project Supervisor and Project Manager. Kieran's experience in the industry has been solely focussed on remediation works and has both hands-on and design experience in providing concrete repair solutions such as conventional hand applied repair, gunite and shotcrete, sacrificial anode and impressed current cathodic protection. Kieran has been involved with many significant projects during his time in the industry, such as Australia Square, The MLC Centre, The Four Seasons Hotel, Geraldton Silos and Caltex Wharf. Aside from concrete repair he is experienced in all sectors of structural and building remediation and now heads up the Buildings Remediation section for Freyssinet Australia in NSW.

Ramiro Garcez – Preservation Technologies (Contractor)



Ramiro is a qualified carpenter, a licensed builder and has also completed a Master's degree in Construction Project Management. With 15 years' experience in the remedial building industry and some exposure to client side project management, Ramiro is a Project Manager at Preservation Technologies.

Harvey Welman – Ardex Australia (Supplier)



Harvey Welman has over 28 years within the construction industry, including 13 years specifically within the Concrete Durability / Remedial and Waterproofing market segment. Harvey holds Contractor Licensing & Supervisor Certificates in Waterproofing, Plumbing and Bonded Asbestos Removal. Harvey currently works as the Waterproofing & General Construction Manager at Ardex Australia focussing on a 'holistic approach' to the refurbishment and rectification of structures within the New South Wales market: this includes crack injection, concrete repair, render systems, flooring reinstatement, waterproofing and façade coatings.

Grant Dowling – Sika Australia (Supplier)



Grant has been a board member of ACRA since 2012 and has approximately 20 years' experience in sales and marketing to the remedial and new construction industry. Grant is employed by Sika Australia as the National Target Market Manager – Refurbishment & Strengthening. Grant also has experience in the Remedial Building Consultancy area as a Technical Remedial Consultant conducting diagnostic inspections and analysis of concrete structures, Defect liability inspections and reports, Remedial project management and Remedial Specifications.

Greg Zambesi – GHD (Consultant)



Greg is a Snr Materials Scientist with extensive experience in infrastructure inspection and assessment, material selection, diagnostic investigation and asset management of concrete, steel and timber. He has over 20 years' experience with Civil, Road, Maritime, Port and Rail infrastructure projects throughout Australia and New Zealand

Peter Johnsson – ACOR (Consultant)



Peter is an Associate in ACOR's Remedial Engineering, Building Diagnostics & Facades team. He has 20 years' experience in the concrete repair and remedial engineering industry. He has been a board member of ACRA since 2004 and President of ACRA on two

occasions. He is currently head of ACRA's Technical & Training Committee and has been responsible for the update of HB84 along with presenting ACRA's One-day course.

Una McKenna – Triaxial Consulting– (Consultant)



Una the Remedial / Legal / Insurance Team Leader at Triaxial Consulting. Una has over 3 years' experience working on civil and roads infrastructure projects in the Ireland and over 8 years' experience in remedial engineering, forensic investigations, building

diagnostics and project management throughout Australia. Una is passionate about the remedial Industry.

Mike Rutherford – Conspectus (Consultant)



Mike is the Principal of Conspectus (QLD) Pty Ltd, an independent consulting company providing specialised asset maintenance engineering and asset management support services.

Mike has in excess of 35 years' experience in concrete remediation and protection gained through

product development and marketing, contracting and consultancy positions and currently holds positions with ACRA Queensland Sub-branch Committee and the ACA Applicator Technical Group. Industry Corporate and Individual Memberships are held with ACRA, ACA, CIA, NACE, SSPC.



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ACOR—Setting the standards in the Remedial Industry

2019 may be remembered as a turning point for the NSW Construction industry with the advent of long-anticipated building reforms, released in October, creating a new registration system from which developers will be forced to comply with "declared" building designs.

However, the reforms apply only to buildings yet to be constructed whilst the scale of issues affecting existing building stock remains to be seen.

NSW Building Commissioner David Chandler went as far as suggesting that owners could "spend more time" seeking out issues before they purchase a home but there remain numerous aggrieved situations where property owners, occupiers and investors have been left out of pocket.

Rife with claims of building misconduct Strata corporations across Sydney are having to come to terms with a plethora of issues to remediate apartment stock. Below we discuss some of the most common 'defects' facing bodies corporate and what to look out for.

Magnesite floors

As governments and the building industry focus on managing combustible cladding issues, another crisis is looming over the use of a flooring material known as magnesite. Peter Johnsson, Associate Principal at ACOR Consultants was interviewed by the AFR for an article published on 23 October 2019 stating, "The cost to fix this issue can range from \$30,000 for an apartment on the low side to over \$100,000 to-day... You could argue that magnesite is similar to faulty materials like flammable cladding, but because it's not a new building there's no current pressure for the government"

Magnesite, which was commonly used as a floor topping or levelling product in the past, contains a binder. When magnesite absorbs water, the glue can leach into concrete floors and corrode steel reinforcement bars.

The City Futures Research Centre at University of NSW said that in NSW alone there were more than 14,000 strata schemes containing more than 186,000 lots or units registered between 1961 and 1979.



Magnesite floor that has not been properly remediated



Magnesite floor remediation in action

ACOR has assisted hundreds of apartment owners over its 21-year history, including properties across Sydney. Typical costs to fix a complete block containing say 20 units could quickly escalate to over \$1m in repairs.¹ Magnesite induced corrosion can be tricky to diagnose because it does not necessarily induce immediate spalling, whilst it is often hidden by floor covering. However, the repair work cannot be ignored as the corrosive effects may cause structural collapse. Unfortunately, it is often the case that even when identified as a problem the repair is handled incorrectly, with ill-qualified builders incorrectly 'repairing', resulting in early failure and usually needing repair of the failed repair within 3-5 years.

¹ SOURCE: BCRC, CITY FUTURES RESEARCH CENTRE UNSW

ACOR—Setting the standards in the Remedial Industry

Façade repairs – exposure and degradation

Sydney's coastal building façades are particularly sensitive to the effects of environmental agents such as sea salts and high moisture. Signs of cracking, or spalling concrete, paint degradation and rust staining are all signs that the building has been exposed for some period and may be the first indicators of a larger problem. Apart from the aesthetic decline, the outcome of ongoing deterioration is that sections of the façade may detach and fall to the ground, potentially endangering life and property.

The cost to remediate a façade can range from a few hundred thousand dollars to multi-million dollar repairs. Apartments that have been around for 20 + years should consider devising preventative maintenance strategies to extend the service life of the building fabric.



Defective repair and ongoing spalling



Slab degradation

For example, concrete spalling (sometimes referred to as concrete cancer) is caused when the steel reinforcing within a concrete slab begins to corrode. As the steel rusts it expands, displacing the concrete around it, which in turn accelerates the corrosion process. Correct diagnosis by an experienced remedial engineer is key to providing the correct advice to building owners. At times the news is not what they want to hear, but that doesn't change the problem.

If the issue is not fixed properly the first time, then defective repairs will need to be demolished and re-fixed, doubling up on repair costs. The process requires the concrete to be fully broken back to expose the steel bars that reinforce the concrete. The steel is then treated before the concrete is reinstated with a specialist repairs mortar to prolong the service life.

Combustible Cladding

Shortcomings in the National Construction Code (NCC) along with poor building industry practices have resulted in cladding systems being installed on buildings that may pose significant risks to persons and/or property in the event of a fire. Insurance Underwriters have been refusing to continue insurance coverage, or at the very least started increasing premiums. Owners and tenants are also seeking to remove the risk of combustible cladding on their buildings.

Combustible Cladding is yet to fully impact the market, in particular residential apartments, with many holding out for government assistance or seeking legal recourse. ACOR has tested hundreds of buildings, both residential, commercial and industrial. While some may avoid the need to remove their cladding many are in line to require re-cladding due to banned materials contain a polyethylene core material above 30%.



Test sampling to check ACP composition



Recladding of buildings is a growth industry

ACOR—Setting the standards in the Remedial Industry

ACOR has assisted clients in the commercial, industrial and residential markets to test and determine if their cladding is compliant and specifying the required remedial scope for rectification of any combustible cladding issues. The first step is to determine the construction of the façade, test the cladding for its chemical composition before proceeding with the design and specification of the cladding replacement works. Careful consideration is given to the interface with internal / external cladding to ensure building weather tightness, structural adequacy, durability of proposed material changes and a fire compliant non-combustible material. Replacement cladding selection is determined by the original design intent, including the overall look and feel -of the facade.

Waterproofing

Waterproofing is a widespread issue that can have drastic consequences for apartment stock because it undermines the structural integrity of a building. ACOR has been providing leading waterproofing design advice for major projects including at Barangaroo and Quarter Quay whilst also diagnosing and specifying remedial works for hundreds of waterproofing issues on roofs, planter boxes and basements. Most building waterproofing defects result from poor material selection, poor application, age-related deterioration and subsequent loss of integrity. As a general rule of thumb, the cost of waterproofing usually accounts for less than 2% of the construction cost of a project, yet staggeringly nearly 80% of all defect issues or complaints emanate from water ingress. Water ingress can cause soil movement and put pressure on load bearing beams and foundations.



Failing waterproofing membranes require correct diagnosis



Remedial waterproofing is never as simple as a new-build

Certified waterproofing design is critical to the integrity of internal wet areas (such as bathrooms, laundries, etc), external above ground areas (such as roofs, balconies, etc) and below ground areas (such as deep basements).

Web: www.acor.com.au



‘It’s a game-changer’: How we can save Australia’s oldest apartment buildings from ruin—Sue Williams, Domain



A before shot of the Bondi apartment building that will be brought into the 21st century with balconies and beautiful new common spaces. Photo: Maxbuild

A dilapidated 1930s three-storey apartment building in Sydney where unused space is being converted into extra units, and balconies are being added, is forging the future for more than 100,000 crumbling old blocks throughout Australia.

In what’s being hailed as a game-changer for strata nationally, the redesign and renewal of the Bondi Beach property will transform the decrepit property into a smart, up-to-date, much more valuable set of units – and act as a prototype for much of the ageing apartment stock.

“This is the forerunner, really, for strata renewal in Australia,” said Caroline McConnachie, general manager of Maxbuild, a building company specialising in strata. “It’s about adaptation and remediation and bringing the whole building up to scratch, and then turning it into a role model of what you can achieve with ageing buildings. “It will inspire confidence, bravery and perseverance among owners to get something similar done. Being able

to see a finished building, and knowing that the process will become quicker as more buildings come online, will make all the difference. This is the game-changer for strata.”



The Bondi project, being financed by selling off the new lots, the sale of air space and a strata loan, has also kicked off plans for a major new three-year research project into renewing ageing apartment buildings.

The basement in the Bondi building. Photo: Maxbuild

‘It’s a game-changer’: How we can save Australia’s oldest apartment buildings from ruin—Sue Williams, Domain

With more than 100,000 strata schemes in Australia built before 1990, and 11,794 of three or more lots registered before 1980 in Greater Sydney alone, its progress is being keenly watched. It has the potential to unleash a whole new wave of adaptive redesign in the strata world, rather than the current fondness for knocking down old blocks and building new ones.



The loft balcony that has been constructed and now has views over Bondi Beach. Photo: Maxbuild

Associate professor Hazel Easthope of City Futures at the University of NSW, together with associate professor Sandra Löschke at the University of Sydney’s School of Architecture, are applying for federal research funding for the study, along with a group of industry partners.

“It’s more sustainable environmentally, as well as economically and socially, to do these kinds of projects rather than knocking down buildings and rebuilding them,” Ms Easthope said. “People don’t all have to move out, and you don’t have all the issues of embedded carbon and the financial and environmental costs of demolition.”

The building in Bondi at the heart of the movement, at 101 Ramsgate Avenue, is an 18-lot building of one-bedroom units that needed significant remediation works to get it up to standard, due to minimal maintenance since its construction in 1938. Typical of its era, the building had small windows and no outdoor spaces.



A render of the loft in the Bondi apartment. Photo: Maxbuild

'It's a game-changer': How we can save Australia's oldest apartment buildings from ruin—Sue Williams, Domain

But owners agreed to add two balconies onto each apartment and to divide the common property basement area – a wasteland of abandoned surfboards and IKEA furniture – and develop it into two new lots, with a sunken courtyard to bring light in, which would be sold to fund the main works. At the same time, the building received a complete remediation and upgrade, including compliance works.

One owner also merged two top-floor apartments, with a loft addition into the roof space, to create a spacious two-level, three-bedroom, two-bathroom unit with panoramic views of Bondi Beach from the balconies.

The work is being partially funded with a strata loan through Lannock Strata Finance, which is also loaning money to owners at the 1960s eyesore Glenview Court in Tamarama for a \$20 million facelift, which includes creating two ocean-view penthouses on top that will be sold for around \$10 million each.



After – the final vision render of the Bondi project where unused space will be converted into extra common areas, and balconies will be added.



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“With these kinds of projects, it makes sense to finance them with a combination of money in the sinking fund, owners contributing via a special levy and a strata loan,” said Lannock CEO Paul Morton.

“If they include features that they’ll be able to sell, like extra apartments, it’s the obvious thing to borrow against them because you’re going to be creating income. In essence, it’s like bridging finance. And you know there’s going to be a good return on your investment.”

One of the Bondi owners also has a garage and turned the disused storage area above it into a new lot for short-term letting, which another owner duplicated for his similar lot.

Building work on the block started in early 2018, and the main works are expected to be completed around Christmas this year, with Maxbuild doing a full fit-out and refurbishment of 10 of the apartments.

Render of the penthouse at the Bondi apartment building that will get redesigned. Photo: Maxbuild



The block had every problem imaginable in an old building, including asbestos in the roof, worn wiring and non-compliance with modern fire safety requirements. “There was no fire rating between here and next door, not much water pressure and we had to install tanks underground to hold 30,000 litres of water,” said Maxbuild site manager Brad Gallivan.

“We also had people still wanting to live on-site while the building work was going on. At one point, it was fully occupied but had no extremal walls, and 70 per cent of the building was on props.”

Such multi-owner projects take a long time to come to fruition and require owners to work closely with builders, architects, the strata manager, surveyor, the council and lawyers. As a result of the work already done on this building, three neighbouring buildings are now considering something similar.

“It’s difficult to see just how big a movement it is, but it’s a massive, but silent, trend,” said McConnachie.

“There are 100,000 strata schemes across Australia built before 1990, which means they require maintenance or need to be upgraded and future-proofed with facilities like lifts for mobility.

“This adaptive design space is a great solution to future-proofing buildings and upgrading for how we live today; and has a far more positive impact than just remediating.”

Web: www.maxbuild.com.au



Grouted HDPE Corrosion Protection Linings—The Silver Bullet - Bluey Technologies

Water authorities have been specifying spray on membranes to remediate corroded underground concrete structures in their sewerage networks for many years. Epoxy and PUR membranes display excellent chemical resistance and structural stability tested in controlled application conditions. However, the membrane's integrity and bond to the substrate is often compromised in the field due to their incompatibility with moist environments and other difficult mixing and application conditions. This can result in premature failure.

Alternatively, HDPE corrosion protection linings have the same excellent chemical resistance as epoxies and can be safely secured into a concrete structure using an engineered grouting system. This process includes proof testing grout bond in the cleaned structure walls prior to installation, compression testing of the mixed grout and sounding of the finished surface and pull testing of the cast-in HDPE anchors. The high flow, high strength, grouts have zero bleed and are compatible with damp surfaces.

An example of a HDPE corrosion protection lining is BluSeal AKS - Anchor Knob Sheet which has been used to remediate concrete sewerage structures for more than a decade. The polyethylene sheet only requires installation and extrusion welding to form a durable, chemically resistant concrete protection membrane that provides a 100 year extended service life solution.

Over the past ten years Bluey has partnered with approved applicators across Australia to develop the post-grouted process using BluSeal AKS, including comprehensive sealing methods around pipe penetrations, ladders, platforms and more.

Dormway Contractors are an approved applicator at the forefront of this development work, especially with regard to smart, strong formwork systems, utilising ISO9001 construction processes.

Authorities are now recognising BluSeal AKS as a cost-effective remediation solution when considering whole of life cost.

The images to the right depict the completed works in South East Queensland work by one of Bluey's approved applicators.

before



after



Bluey Technologies Pty Ltd

Web: www.bluey.com.au

Phone: 1300 0 BLUEY



Magnesite floors may be a bigger problem than cladding

ACRA recently received a call from the Australian Financial Review about problems with Magnesite floors and Peter Johnsson, ACRA Past President and Associate Principal at ACOR Consulting, took the call and was interviewed by the Australian Financial Review reporter Nila Sweeney, about the issues with Magnesite floors and it may be a bigger problem than cladding.

As governments and the building industry focus on managing [combustible cladding issues](#), another crisis is looming over the use of a flooring material known as magnesite, experts warn.

Potentially affecting tens of thousands of apartments built from 1960 through to the 1980s, the little-known magnesite-related defects are also more expensive and invasive to fix.

Up to 90 per cent of apartments built between 1960 and 1980 have magnesite-related defects, according to experts. Louie Douvis



Magnesite, which was commonly used as a floor topping or levelling product, contains glue.

When magnesite absorbs water, the glue can leach into concrete floors and corrode steel reinforcement bars, causing the concrete to expand.

The City Futures Research Centre at University of NSW said that in NSW alone there were more than 14,000 strata schemes containing more than 186,000 lots or units registered between 1961 and 1979.

Peter Johnsson, associate principal with engineering consultancy firm ACOR, said up to 90 per cent of apartments built during that period had magnesite in their flooring, particularly those in Sydney's eastern suburbs, northern beaches and western suburbs.

"The cost to fix this issue can range from \$30,000 for an apartment on the low side to over \$100,000 today," Mr Johnsson said.

Marton Marosszeky, director at BCRC, a group of specialist consultants in materials for construction, said owners of older apartments needed to be aware of the problem.

Affected buildings	Apartments built between 1960-1980
Registered strata buildings in NSW (1961-1979)	14,000 (186,000 units)
Cost to remediate	Up to \$100,000 per unit

Magnesite defects

SOURCE: BCRC, CITY FUTURES RESEARCH CENTRE UNSW

Magnesite floors may be a bigger problem than cladding

"It's a looming problem that's coming towards us at a fast rate the moment," he said.

"There are thousands of buildings built in that era with magnesite floor topping. This could potentially eclipse the cladding issue. But because it's hidden and slow to manifest, it's not getting a lot of attention."

Mr Marosszeky said one of the magnesite-related jobs BCRC was working on in Sydney involved a 64-apartment building where all units were affected.



Signs of magnesite damage include cracked tiles and floors that bulge over rusting steel bars.

"The owners will have to spend up to \$2 million to fix this problem," he said.

"They're spending millions of dollars rectifying a problem caused by a defective building material that is no longer in the market for the last 30-odd years."

Unlike the cladding issue, which prompted government and insurance industry intervention because it involves newer buildings, owners of older apartments with legacy problems will have to shoulder the cost.

"You could argue that magnesite is similar to the faulty materials like flammable cladding, but because it's not a new building, it's been built at a lower standard in the old days, there's no current pressure for the government," Mr Johnsson said.

A costly legacy issue

"In those days, apartments were built quickly and builders didn't take time to make the floors perfectly flat with the concrete.

"The magnesite used to make the floors nice and flat was filled with sawdust and cork held together by a glue. Now the glue was the problem because it was made of magnesium oxychloride."

Magnesite absorbs water and dissolves the chloride in the topping. When the chloride leeches to the steel bars reinforcing the floor, it corrodes them. Mr Marosszeky said the corrosion causes the concrete to expand by as much as eight times the volume of the original steel.

"These expansive forces rupture the concrete, lifting the concrete just as a tree root lifts a footpath as the roots expand," he said.

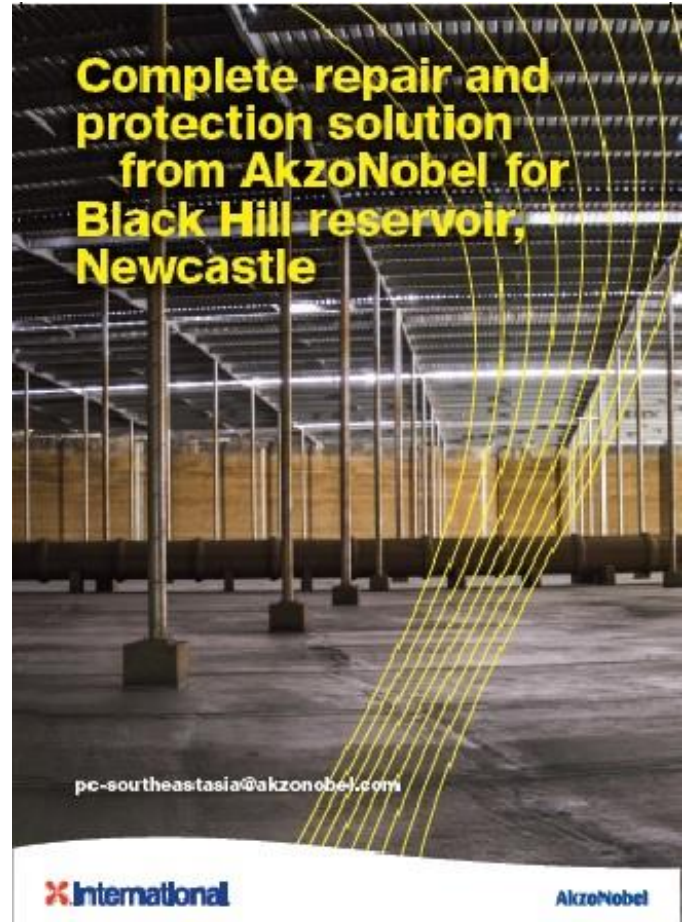
Magnesite floors may be a bigger problem than cladding

Magnesite damage could show up as hollow sound on tiles, [cracking of tiles](#) and bulging of the carpet over the rusting steel bars.

Because of the slow corrosion, the symptoms aren't visible until the damage is already widespread.

"Usually, when it's discovered, the affected area that you can see is nowhere near the extent, because it's a massive hidden problem in the concrete," Mr Johnsson said. "So you'll be looking at least two to three times the amount that is visible on the surface that will require repair. So when you see lumps on the floor, or corrosion rust stains on the concrete, the problem is already there." Because it is a structural issue, ignoring it is not an option.

"If you leave it for too long the bars simply get eaten away and then structural strengthening has to be undertaken, adding very significantly to the remedial cost," Mr Marosszeky said. "If you let it go, it can cost more than \$1000 per square metre to remediate the problem, so stay alert and get help as soon as you detect any issues. "In the worst cases, the building will collapse. You have to fix it because it's a structural problem."



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Risky business: how our 'macho' construction culture is killing tradies -by www.theconversation.com/au

The construction and building industries can be dangerous places to work. These jobs not only pose risks to a person's physical health, but can threaten their mental health, too.

In Australia, "tradies" make up less than one-third of all people in employment, but represent [58% of serious claims for workers' compensation](#). Construction ranks in the top three for industries with the [highest work-related injury or illness](#) and [deaths related to traumatic injury](#).

While accidents and disease can be put down to the occupational risk of working on construction sites, the disproportionate [rates of mental illness seen in this industry](#) cannot. Construction workers are [overrepresented](#) in suicide rates in Australia, and this urgently needs to be addressed.

The physically demanding work tradespeople do has long been associated with male toughness and "macho" workplace cultures. But it's this toxic mentality that's largely responsible for tradies' poor mental health.

The stats on tradies' mental health and suicide

Research shows workers in construction are at [a higher risk of experiencing mental health problems](#) than workers in other professions.

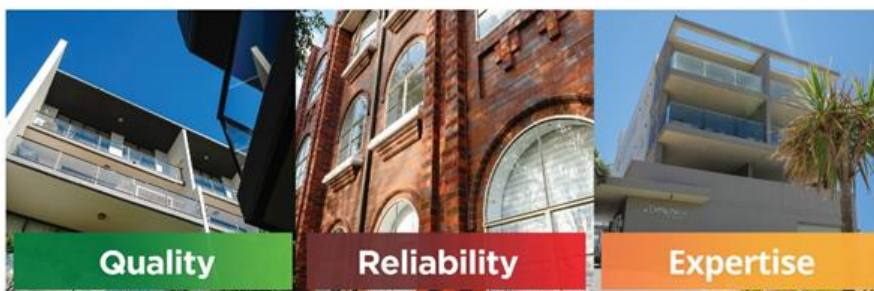
In 2012 in Australia, [a total of 169 men](#) working in the construction industry committed suicide.

A [2017 report](#) indicated the suicide rate is 24.2 per 100,000 male construction workers compared to 13.9 per 100,000 males in all other occupations – almost double.



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Risky business: how our 'macho' construction culture is killing tradies -by www.theconversation.com/au

Why do we have this problem?

Research into [Australia's construction industry](#) indicates workers can be on site for up to double their contracted work time. So long hours, resulting in fatigue and poor work-life balance, are likely affecting tradies' mental well-being.

Importantly, this research points to [strong links](#) between masculine workplace norms and the increased likelihood of mental health issues.

A "macho" work culture emphasises self-reliance; there's an expectation tradespeople can withstand [insecure and transient](#) work arrangements.

There's also stigma associated with men [talking to others about psychological distress](#). For this reason, many ignore stress-related mental health problems like panic attacks, anxiety, insomnia and depression, risking the worsening of symptoms. Competition at work may also lead to a breakdown of trust, a lack of collegiality, and conflict.

"Macho" workplaces [decrease the likelihood men will look after themselves](#) by consulting health-care professionals, talking to a supervisor about reducing hours or asking for time off.

Further, a culture where workers are expected to be tough and self-reliant is exacerbated by [the problem of bullying and hazing](#) on work sites. Victims can be left feeling isolated, increasing their risk of burnout, depression and suicidal thoughts.

High profile cases such as the [suicide of apprentice Alec Meikle in Bathurst](#) after he was relentlessly bullied have brought this problem to public attention.

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The diagram illustrates the range of Fosroc products and their applications in construction. It features eight icons with corresponding labels: Concrete Repair, Grouts & Anchors, Waterproofing, Joint Fillers & Sealants, Industrial Flooring, Protective Coatings, Surface Treatments, and Concrete Admixtures & Grinding Aids. Below the icons is the Fosroc logo, which consists of the word 'FOSROC' in a bold, sans-serif font above a stylized red graphic of a person running or jumping. To the right of the logo is the tagline 'constructive solutions'.

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Waterproofing

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Surface Treatments

Concrete Admixtures & Grinding Aids

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constructive solutions

Risky business: how our 'macho' construction culture is killing tradies

-by www.theconversation.com/au

What about women?

The construction industry is highly segregated in terms of gender, with women making up only [1-3% of tradies in Australia](#) and other Western countries.

[Our research](#) and [other work in the field](#) has looked at the barriers women face to equity and inclusion in the construction and building industries. We've identified the "macho" culture as being harmful to women as well as men.

Based on our interviews with tradeswomen and industry stakeholders in New South Wales, it's clear bullying and harassment are very real issues for both genders.

Some women have been subject to dangerous pranks and left alone on heavy lifting and other jobs that require more than one person. These sorts of risky practices are linked to injury and psychological distress for women as well as men.

What's being done?

The tightening of regulations, and particularly [Safe Work Australia's](#) continued focus on high risk industries, has meant tradies are physically safer on work sites today than they were a decade ago. On site fatalities in Australia declined by [48% between 2007 and 2017](#).

But much less is known about the extent of deaths from diseases contracted at work. Estimates suggest as many as [2,000 Australians are dying per year](#) as a result of chemicals they were exposed to during their working lives. So this must be an area of focus moving forward.

On the mental health front, alongside [awareness campaigns](#), several groups now exist to provide counselling and facilitate peer support networks within the industry.

[Mates in Construction](#) conduct various programs to tackle psychological distress on work sites, and are actively involved in [suicide prevention measures](#).

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Risky business: how our 'macho' construction culture is killing tradies

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A program called “[Bluehats](#)” in Victoria aims to challenge the stereotype tough men don’t have emotional or mental health problems. It offers tradies the option to undertake training to become a “bluehat volunteer”, which enables them to provide support to workmates on site. The trained volunteers can be identified by their blue hats.

Entrenched cultures can be hard to shift. There may be resistance to changes, be it procedures to ensure safer work practices, or new coworkers (women or men) who don’t conform to the “macho” stereotype. But this change is imperative. Maintaining physically and psychologically dangerous behaviours is killing tradespeople at work. As we continue to enact regulations to protect tradies’ physical health, cultural change is essential for the improvement of their mental health, too.

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Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes—John McCrone

It is the issue that will have to surface eventually. Why are people saying both slab and ring foundations were systematically under-scoped following the earthquakes?

JOHN MCCRONE investigates.

You want his guesstimate? Auckland concrete expert Bevan Craig reckons there could be still tens of thousands of houses in Greater Christchurch at risk of having unacknowledged earthquake damage to their foundations.

He says even now, nine years on from the Canterbury earthquakes, new cases like one he is inspecting today keep emerging.

Craig, of Underfoot Services, has flown down with his "divining rod" for another week of structural checks for home-owners like Tracey Glass.

Glass bought her West Melton bungalow in 2014. On the stony ground of the rural outskirts of Christchurch, with a clean property report and no visible cracks in its Gib, exterior walls or marble kitchen floor, it seemed a safe bet, she says.

But in July, she was getting the en suite bathroom freshened up. "I was thinking we might stick the house on the market in spring and move back into town again.

"The carpet fitter discovered a lacework of cracks in the concrete slab floor. Now Craig is here to check over the whole house properly.

With a metal sounding pole, he taps his way across the carpet in the living room methodically. It rings solid near the walls then gives a tell-tale thud towards the middle. Glass says even her lay ears could pick that up.



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Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes—John McCrone

A small square of carpet is removed, revealing a ragged fracture wide enough for Craig to wiggle a finger in. As he half-expected, the foundations were built without wire mesh reinforcement – a shockingly penny-pinching practice Christchurch building codes allowed right up until the earthquakes. So no surprise the concrete slab shattered, even if the broken pieces have stayed pretty much in place. To find out how bad it is, Craig drills a hole alongside the crack. The long snake of an inspection camera is poked down into the sand and stone sub-base. He invites Glass to take a look. Craig has warned the worst damage is often buried out of sight beneath the concrete itself. Quakes can churn up the sub-base, leaving the slab floating above a void.



Next steps: West Melton's Tracey Glass expects her broken slab will have to be dug up.



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Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes—John McCrone

Again, cheapskate building practices didn't help Christchurch, he says. Where Auckland uses crushed quarry rock that is strong and triangular – more likely to stay locked in place – the South Island fills its foundations with local greywacke river stone, cheap and abundant, but also soft and round. A material that shatters and slides.

"You can imagine in an earthquake, all these smooth river stones get shaken up. The fines, the sand, also wash away. The slab on top can't follow and so voids are created," Craig explains.

In Glass's case the slab did crack. But Craig is finding houses where the deeper problems remain completely hidden. Especially where the land is soft and damp.

"The sub-base can carry on repositioning itself. So the void will be growing bigger and bigger until finally the slab can't take it anymore. You get a bang, a dishing of the floor, because the walls were the only thing keeping the slab in place."

Through the scope, Glass can see the cavities Craig refers to.

And there it is. One minute, the proud owner of a smart home with a ratings valuation of \$1.27 million.

The next, not knowing quite where you are.

Glass says it is not as if the Earthquake Commission (EQC) never assessed the property. Records show a claim was settled after the quakes – for a buckled garage door.

Now her house could be a tear-down. Or at the very least, Craig is warning the broken floors will need to be excavated right down to the sub-base and rebuilt.

THROWING ANOTHER \$1B AT THE CITY

It is worth repeating. Greater Christchurch is nine years on from the Canterbury earthquake sequence. Yet so many homes may still rest on unacknowledged foundation damage.

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Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes

By John McCrone

Paul Finch, a Rangiora engineer and project manager, and David Townshend, a Christchurch property investor and member of the EQC Claimant Reference Group, say Craig is right. The problems are way bigger than anyone wants to admit.

Townshend says look at the latest payments the Crown is having to dish out – about \$1 billion to cover "re-repairs" and "on-solds". "Those are mostly about foundation issues coming to light." Re-repairs is Christchurch jargon for all the houses EQC supposedly fixed under its Fletcher Construction-run building programme. Townshend says EQC thought it could patch properties – keeping them under its \$100,000 insurance cap – by "jacking and packing" foundation piles or levering up the corners of a slab.

However, a broken foundation will keep moving. So EQC had to set up its re-repair programme.

In 2016, that was supposed to cost around \$60m. Now the official projection has reached \$640m, with much work still to be done. Then in August, there was the surprise news of a \$300m fund to sort out the on-solds issue – houses with unaddressed damage that have now changed hands. "The new owners were finding their homes were never repaired properly – either never actually touched, or the repairs have failed and are still moving," Townshend says. It has become clear the houses are over-cap. They need to be lifted and the foundations replaced, or else demolished and rebuilt entirely. But because of the failure to diagnose this before the six-year statute of limitations on insurer liability passed, the full cost has fallen back on EQC.

EQC was on the eve of a High Court test case it was expected to lose, says Townshend.

The Government wound up with little choice but to spend another \$300m of taxpayer funds to settle things before EQC's methods came under harsh legal scrutiny.

However Townshend points out that the on-solds deal is only a narrow settlement covering 1000 or so faulty properties handed on to unwitting buyers through recent house sales.

The ex gratia payments are also strictly time-limited. Homes bought since August will no longer be covered. And existing owners only have a year to discover they have damage and stick in a claim.



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Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes—John McCrone

So Townshend says another way of looking at this \$1b of extra spending is the Government is doing what it takes to finally shut the door on a couple of outstanding liabilities – two scenarios where EQC has been found out and was legally exposed.

But what of all the other houses in the city, Townshend asks? What of Craig's claim the recovery failed to identify foundation damage in thousands of homes?

Finch says this is where Christchurch needs to wake up. After nine years, you would think people would understand that with the way it shook, and the weakness of many of its building standards, its foundation problems simply have to be widespread.

Yet every week there are still home-owners waking up to the fact that while it may take time, eventually – and expensively – buried trouble will find its way to the surface.

THE GAME OF CLAIMS

Finch and Townshend are speaking out because this year there is a public inquiry into the actions of the EQC conducted by Dame Silvia Cartwright. A possible chance of justice.

Like others – such as Underfoot's Craig and members of the claimants group, EQC Fix – they believe Greater Christchurch was put through a cut-price recovery.



Underfoot Services' Bevan Craig speaking out on hidden damage to a rubble ring foundation back in 2014

Home-owners have been left with many hidden problems because an insurance process was created that did its best not to look too deeply for foundation damage.

It was a systematic oversight, they say. And through an exhaustive campaign of Official Information Act (OIA) requests leading to a submission to be put to Dame Silvia's inquiry, the pair have been tracking how the game has continued right up until the present day.

The basic story is well enough rehearsed, says Townshend. *The Press* covered it extensively.

Right from the first September 2010 earthquake, the insurance industry was worrying it might be bankrupted by having to meet its standard "repair to as new" home policies.

It stood to reason that pretty much every house in Greater Christchurch would have cracked or settled a bit.

An "as new" policy was like standing there with an open cheque-book.

So there was a motivation to draw a line as to what amount of foundation damage actually counted – what affected the performance of a home structurally?

Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes—John McCrone

EQC was then in its own position of wanting to defend an interpretation of the EQC Act where it only in fact needed to get houses back to "as was" – their effective condition on the eve of the quakes.

Thus even before assessments, there was a two-step game where, if EQC felt it could handle foundation damage under-cap – under the first \$100,000 that was its responsibility – its lesser standard would apply and insurers would be saved from their own more gold-plated commitments.

Townshend says to get ahead of the coming claims battle, EQC formed an Engineering Advisory Group (EAG) headed by Wellington consultant Dave Brunsdon, of the Kestrel Group.

The EAG was given the job of drawing up a manual of guidelines for the rapid scoping of building damage and also advising on the cheapest methods of repair that could satisfy the Building Code.

But control of the EAG was then quickly handed over to a separate government agency, the Ministry of Business, Innovation and Employment (MBIE), responsible for housing standards and the Building Code.

"EQC obviously realised that as itself an insurer, it couldn't put out such a document under its own name." So MBIE was there to offer the assurance of independence when it came to defining the minimum level of earthquake repair insurers would have to achieve, Townshend says.



Home-owner's nightmare: Redoing the bathroom exposed the problems at Tracey Glass's property.

Yet a paper trail of internal emails now shows how cynically the exercise unfolded, he believes.

Townshend says logically, the proper way to assess earthquake damage is ground up. If the land has moved, drains and foundations ought to be checked first.

They are the expensive problem. There is not much point worrying about the house above if the damage below is not addressed.

However putting its name to the EAG-drafted advice, MBIE produced a guidance document, "Repairing and rebuilding houses affected by the Canterbury earthquakes", which approached the scoping from the top down.

The focus was on cracked walls, split Gib, tilted floors and other above-ground evidence a house was quake-affected.

As reported widely at the time, says Townshend, EQC's assessors did not make a habit of lifting carpets or crawling about under houses. Foundations were presumed sound unless the damage was too obvious to ignore.

Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes—John McCrone

The get-out clause was always that MBIE's guidance was just that. It provided rules of thumb to tell if building damage was structurally serious enough to leave a home in breach of the code. And then, what kind of basic repair could bring it back in line with code.

As MBIE's fine print stressed, the guidance did not replace any larger insurance policy promise about a house having to be returned to "as good as new".

However – as EQC Claimant Reference Group members can attest, says Townshend – back in the real world, the guidance was often employed as an argument that this was what the "experts" considered a serviceable earthquake fix.

So it was as much as a home-owner should expect – especially given providing an entire city with "as new" foundations would soon bankrupt the recovery effort for everyone.

COUNTING CRACKS

It might have worked. The belief was that above-ground damage should give a reasonable picture of a property's below-ground structural integrity.

Operating under MBIE's guidelines, EQC's assessments would weed out the more minor foundation problems – like a sunken foundation pile or crack in a slab – which could be patch-repaired for under \$100,000.

Insurers would be saved the full cost of an over-cap claim being triggered.

But Townshend says the MBIE approach did not allow for Christchurch's history of poor building practices. And as well as such things as slabs without reinforcing mesh, there emerged a general issue with "rubble" ring foundations.

Craig was the first to ring an alarm bell about these. Arriving to inspect houses after the quakes, Craig soon found most pre-1970s Christchurch homes were built on piles with a ring foundation.

However these concrete perimeter walls were often constructed using any old material as aggregate, the local soft river stone, but also lumps of broken concrete or bits of brick. Craig says they frequently lacked steel rod reinforcement.

The older they were, the poorer the construction tended to be. "Any kind of building rubbish [was] tipped into the foundation trench," he says.

Before the earthquakes, even a rubble foundation could hold a home up. But after the tremendous violence of the February 2011 earthquake especially, Craig was finding many had been left shattered and spalled inside. Chip off the mortar veneer and the concrete behind was often "just exploded".

But in January 2013, MBIE had come out with its guidance for dealing with "Type B" perimeter and pile foundations.

The recommendation was that localised cracks of less than 5mm could be pretty much ignored – just filled cosmetically and given a dab of paint.

Larger cracks could be repaired by injecting epoxy resin – a newly available solution which EAG structural engineers said would be strong enough to restore full functional strength to a perimeter wall.

When it sets, epoxy is in fact tougher than concrete. And being liquid, it could be pumped into a gap in minutes.

So it promised to be an extremely cost-effective way of gluing a cracked ring back together. And a cheap fix for cracked concrete slabs too.



EQC failure: Attempts to "jack and pack" a ring foundation.

Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes—John McCrone

With the blessing of MBIE's guidelines – Townshend says internal emails describe them as a "circuit-breaker" EQC set to work epoxying foundations and saving insurers from sticky conversations about what "as new" might mean.

But Townshend – dealing with repairs to his own seven rental properties – says with a rubble foundation, cracks can run everywhere out of sight. As Craig says, the concrete is shattered.

And yet the top-down assessment approach meant EQC staff were simply making counts of particularly visible cracks rather than considering foundations as a whole.

Even having a size threshold – where a 5mm crack qualified for epoxy, yet a 4mm one didn't – made no structural sense, Townshend says. "There's still an air gap. It doesn't join."

One of his properties had 29 cracks in its ring. But as all were under the 5mm threshold, it was dismissed as having no real concerns.

However even more insidious was how the wording of the guidelines let EQC limit its scopes to just isolated sections of a ring foundation.

Townshend says a ring foundation is meant to function as a single continuous concrete beam, spreading its load across the whole footprint of a house. But EQC was dealing with unreinforced rubble perimeters likely to be broken by hairline fractures all along their length.

Under the guidance, it was permitted to glue a visible crack and ignore the rest. Or if epoxy couldn't bind a cracked area, perhaps cut out a section of the bad concrete and replace it.

So because the process didn't start with a full engineering assessment of the ring, Townshend says you would wind up with a property sitting where it was on loose footings – a few patches rebuilt to Building Code standards, but most of it still a code failure.

Hardly what the MBIE guidance was meant for. Give it a few years, and the fact nothing was actually fixed is going to show, Townshend says.

THE EMAIL TRAIL

What happened with Townshend's rental properties happened with many earthquake claims.

Townshend and Finch say a failure by the EAG to understand the realities of Christchurch construction standards, coupled to EQC's desire to keep claims under cap, led to a systematic under-assessment of damage to building foundations.

The guidance is the critical link in the story. And so the pair have been pursuing the internal tale of how it was formulated, as told in a dossier of emails and letters flying between the EAG, MBIE and EQC.

Finch says there are two important questions. Why didn't the EAG seem to know about the rubble issue? And what did it do after it found out?

The three key EAG members working on the foundation guidance were Kestrel's Brunsdon, Graeme Beattie, then principal structural engineer of BRANZ, and Mike Stannard, then chief engineer at MBIE.

Craig was talking widely about the difficulties of repairing rubble rings by 2014. Yet even in mid-2015, Beattie was writing, "We are trying to get to the bottom of what 'rubble' concrete is". Stannard echoes, "I still don't understand what rubble foundations are."

The EQC repair programme was, of course, several years under way. Finch says to get a grip on matters, MBIE's William Whewell was sent to Christchurch to investigate why so many EQC repairs were failing.

This Canterbury Earthquake Damage and Repair (CEDR) study demonstrated that guidance-endorsed techniques like jacking and packing – inserting spacers to level the floors of ring foundation properties – couldn't last because the rubble concrete was too fragile.

Whewell reported back to Beattie and Stannard of builders struggling to find sound bits of perimeter to attach fixings to.

"The walls are incapable of taking a percussion drill, let alone drill a dowel hole. On one property, the wall had been chased for double the original length without achieving a dowel hole."

STUNNING ADMISSION

Finch says this shows that by late 2015, MBIE knew why rubble was a problem. Yet nothing further was done in terms of the guidance and the issue left to lie for the next couple of years.

Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes—John McCrone

Then, in 2017, a Christchurch law firm was readying a High Court case against insurer Southern Response and its engineer decided to ask MBIE directly how the guidance could even be applicable to rubble-type foundations.

Dennis Monastra, an MBIE compliance spokesperson, consulted with Whewell as the in-house expert and replied the 2013 advice "does not apply to weak or oversize aggregate concrete".

It could only apply to foundations with concrete conforming to a modern Building Code standard like NZS 3604.

Finch says this was a stunning admission that rapidly circulated among engineers in Christchurch in late 2017. It appeared to mean that when it came to rubble, insurers couldn't even start to use the MBIE approach to scoping and repair. A full structural investigation would be required from the outset, likely triggering an over-cap insurance claim in many cases.

The email trail then shows Southern Response's own engineers soon double-checking whether Monastra's answer was officially sanctioned. And shortly after that, EAG's Brunsdon writing to MBIE bosses, saying there needed to be a public clarification.

EQC's research chief, Dr Hugh Cowan, was also emailing, urging a better answer on rubble. Eyebrows were raised at that. "Do you think this has been sent unprompted?" remarked one MBIE staffer.

The correspondence shows that pressure for some kind of retraction was building through April and May 2018.



Doing it properly: How many houses should have been lifted and had their foundations rebuilt?

Dave Robson, MBIE's building performance manager, writes: "I thought we had closed the lid on this can of worms? ... I'm happy if you think we need to do something for EQC. Let me know."

Eventually Brunsdon, with the EAG's Beattie and Stannard, did draft a correction, issued in June 2018 as Update 10 to the guidance.

This said while the guidance didn't offer a specific repair solution for rubble foundations, it did contain information – like the uses of epoxy – which might be helpful.

The update added that while the original guidance was aimed at NZS 3604-qualifying construction, that did not mean it was narrowly tied to a foundation type or concrete specification, just generally to "one- and two-storey timber-framed dwellings".

Thus in retrospect, rubble could be deemed as having always been covered by the intent of the advice the EAG produced.

Finch and Townshend's expressions tell what they think of this. Clearly, they say, an unwitting Monastra gave an honest answer. Since then, MBIE has been indulging in verbal gymnastics to avoid its foundation guidance unravelling.

MBIE, for its part, would not comment directly on the email evidence gathered by the pair, nor on the incongruity of advice being found to apply to a type of foundation damage it had been unaware of.

Cracks hidden in the concrete foundations of 'thousands' of Christchurch, NZ homes—John McCrone

It would only restate that the guidance was always intended to apply across a "continuum" of foundation types, and repeat that its sole purpose was to "develop repair solutions" that would be acceptable under the building code.

The usual question of whether a proposed fix then achieves the promises of a home-owner's insurance contract had to remain a matter of separate professional advice.

But for Townshend and Finch, the episode just illustrates the pressure to hold the line when it comes to assessing Greater Christchurch's earthquake damage.

ALARMIST TALK?

As it happens, Townshend and Finch are not the only ones collecting the evidence of internal emails and pushing for a full investigation of the foundation assessment question.

Claimants' group EQC Fix – represented by Mel Bourke, Cam Preston and Jake Preston, who works with Craig's Underfoot Services – is making a series of similar submissions to Dame Silvia's inquiry.

Bourke says talking about unaddressed foundation damage is an uncomfortable subject. Many Christchurch home-owners are still in denial, not wanting to risk their property values by making waves about the systematic under-scoping of the city's housing stock.

And that attitude continues to play into the hands of EQC and the insurers.

"People say, oh, my house wasn't that flash to start with. There's a few cracks, but I had some cracks before."

However Bourke says owners are also realising Townshend and others must be right when they say buried trouble will eventually surface. Unfixed houses will keep moving.

And seeing the scale of the settlements for re-repairs and on-solds will be spooking people now, she says. It shows just how much money is involved once any part of the foundation question is honestly faced.

So what about Craig's guesstimate there may be tens of thousands of homes at risk of unacknowledged earthquake damage?

Is this simply alarmist talk from someone making a profit from acting for claimants, as detractors might suggest?

Craig – who in fact worked with EQC after quakes in Palmerston North in 2003 and Te Anau in 2004, and helped research foundation performance – says his figures just follow from the severity of the event.

By his reckoning, Christchurch has some 56,000 pre-1970s homes highly likely to be sat on rubble perimeter rings. We know all about the under-scoping there, Craig says.

Now, in addition, there is the widespread problem he has identified with slabs and their sub-bases. And here the issues have remained even more concealed than they were with rubble.

Craig says the MBIE guidance made assessors focus on surface cracks. However, if it is the underlying river tailings that have been shifted about and left voids, the damage beneath could be considerable.

"You can imagine what happens in an earthquake if all your sub-base suddenly disappears and your slab is going up and down like a diaphragm on a drum."

Even wire in the concrete wouldn't save the floor, he says. "The cracks you can see on the top might be hair-line and cosmetic. But if you could go under the slab and look, the cracks could be 10 times bigger."

Craig says Christchurch would have about 40,000 properties with slab foundations that went through the earthquakes. So if you add on all the serious damage that could have been missed there, it is no surprise you might start to get some very big numbers.



Years of protest: Home-owners confronting former Regeneration Minister Megan Woods in 2018.

Industry News

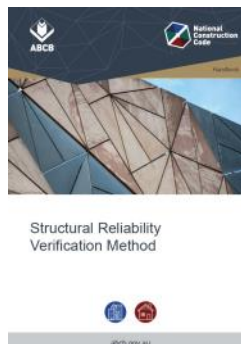
At the completion of a wonderful evening, at the Concrete Institute of Australia awards for excellence gala dinner, at Sydneys Doltone House, [EYWAD Pty Ltd](#) walked away with the National medallion for “Excellence in Concrete”, in the Repair and Rehabilitation Category, for the Brooklyn Trunk Sewer BTS001 Rehabilitation, in Victoria for Melbourne Water. The National Medallion award, along with the CIA Victorian State Award and the [ACRA](#) Award for Excellence, reinforces the outstanding achievement in the successful delivery of an extremely high risk and complex project. Once again, thank you and congratulations to [Triaxial Consulting](#) and to all involved in the project. Hearty congratulations to all category nominees and award winners!!

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Structural Reliability Verification Method Handbook

ABCB (Australian Building Codes Board) has released its guide that provides details of the structural reliability verification methods for buildings in NCC Volumes One and Two. It guides practitioners through the methodologies to assess structural reliability with practical examples. It also offers theoretical knowledge about structural reliability and the policy objectives of the NCC Performance Requirements. Click the link below for your pdf copy of the [National Construction Code Handbook](#).



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Australian tradies are taking up yoga for mental health

-By Reid Butler—ACA Reporter

A growing number of Australian tradies are dropping the tools and taking time-out to focus on their "inner-selves", practising yoga, meditation and pilates to improve their mental health.

"I think one of the biggest barriers to entry to meditation for tradies is this idea that we need to 'harden up'," Daniel Tucker told A Current Affair.

The Byron Bay tradie has worked for almost two decades in the construction industry. Fatigue and stress on the job would often lead to anxiety, and Daniel would struggle. Then he found meditation. "You can do it anywhere you can find a space to sit. It could be in a smoko shed, in the car...wherever you are," he said. "The major benefits was I realised that I didn't need to be so tired and heavy."

He says he's never been happier and now hosts his own podcast: The Spiritual Tradie.

"Meditation doesn't require any physical activity. I first found out about it through an app called 'One Giant Mind'." Rather than be embarrassed about focusing on his mind, he's encouraging his mates to do the same.

"I actually taught a bunch of tradies, six tradies, to meditate last week and it was a great experience to take blokes through from having no experience in meditation to then being able to be self-sufficient. There is a bit of resistance around things like yoga and meditation because of the stigma that comes with spiritual practice," he said.



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Australian tradies are taking up yoga for mental health -By Reid Butler—ACA Reporter

Daniel's not the only tradie occasionally swapping jackhammers for mindfulness. Construction operations manager Pip Seldon says the industry needs to focus on "health and wellbeing" to help the many workers who deal with anxiety and depression. That's why she created "The Healthy Tradie Project", an organisation which goes to work-sites and teaches tradies yoga moves to help with injury prevention and career longevity.

"I've seen and felt first-hand the pressure of our industry but the catalyst for me to create 'The Healthy Tradie Project' was the loss of my eldest brother to suicide. He also worked in the industry as a carpenter."

Physiotherapist David Hall agrees that the day-to-day life of tradesmen and women can be tough on physical and mental health.

"Safework Australia statistics have shown us that while tradies make up about 30 percent of the workforce they make up about 60 percent of serious workplace injuries."

Teaching flexibility through yoga is a massive plus for tradies.

"You don't get flexibility through being on the tools, so it's important to be flexible to be able to do the work without getting injured."

As for "Spiritual Tradie" Daniel, he tells ACA he'll keep sharing the "zen" way of life. It's actually very detrimental to our mental health and wellbeing to bottle up our feelings. The actual practice enables us to make a connection with the deeper sense of self."



Tradies are putting down the tools



And swapping over to yoga mats.



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Industry News



Congratulations to Ollie McKeon who was recently promoted to Executive Director at Duratec Australia.

Ollie started with Duratec Australia in 2010 as a Project Manager and over the years has steadily been promoted which is a directly reflection of the great work he has been doing at Duratec Australia. **Duratec Web:** www.duratecaustralia.com.au **Phone:** 1300 402 401

Congratulations James Meagher from MAX Build has been selected as this years Sydney young entrepreneur of the year for property & construction hosted by Business News Australia. Great nod to the MAX Build team. James is looking forward to building on this strong year in 2020.

MAX Build Web: <https://maxbuild.com.au> **Phone:** 02 8033 4725



Kennards Hire WA network just got a little larger this week. Its been a few weeks of hard yakka, but Hugh and Steven have opened the gates to Kalgoorlie, their 22nd branch in the state. With solutions for any project, they'll service trade, construction, infrastructure and mining sectors in and around Kalgoorlie.

See more: <https://bit.ly/2WVcgVN>



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Industry News

Recently **Raw Worx - Structural | Civil | Marine | Rail** celebrated our 10 Year anniversary! What a journey it has been from Water-proofing and Crack Injection at their inception on to Bridge Repairs and Remediation. Their Director Ryan Young would like to thank all those who put their trust in Raw Worx to deliver their projects and gave the underdog a chance. They look forward to providing solutions for another decade! www.rawworx.com.au



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Corrosion is a degradation process which limits the service life of reinforced concrete buildings and infrastructure and poses a threat to an asset's integrity and durability.

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Since its inception in 2013, Remedial Technology Pty Ltd has been involved in research projects related to aspects of the design and delivery of corrosion control measures for concrete structures.

Some of our ongoing research activities include:

- **Development of solutions to stop grout acidification of ICCP systems installed in tidal areas.**



Pictured: acidification of the grout material which encapsulates the ribbon anode strips in tidal areas, and a completed repair area.

- **The use of renewable energy for the corrosion protection of concrete structures.**



Pictured: development of MicroNex solar power supply unit with remote monitoring capability.

Remedial Technology operates a Quality Management System that has been certified to AS/NZS ISO 9001.



VALE DAVID SHORT

It's with a heavy heart that we said goodbye to one of our ACRA Members, David Short from Metrocorp Technologies. We received news that David passed away on Thursday 12 September 2019.

David established Metrocorp Technologies in 1989 and became a member of ACRA soon after the Association was established, and has been an active member ever since which also saw him win ACRA Awards for various projects he worked on over the years. David will be a big loss to the industry and the Association.

Our condolences to David's family, staff and friends. When a person becomes a memory, the memory becomes a treasure.
RIP David Short.



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President's Christmas Message



This year can be summarised in a few words: In the face of significant challenges, we made significant progress. I thank you all for your continued commitment and all that you do to deliver on the purpose of the Association.

With the new name of the Association, **Australasian Concrete Repair & Remedial Building Association (ACRA)**, we are starting to get many interested in the new categories of Waterproofing and Remedial Building. Corporate members who successfully taken advantage of applying for these added categories will also be open to register in these categories in our 2020 ACRA Remedial Industry Awards.

Contact the ACRA office for more details and note, you must already be a corporate member of ACRA to apply info@acrassoc.com.au

Our direction or the New Year is clear, and we know what we must do. Our job is to continue to focus intently on raising the industry standards and providing our members and participants with the best events and industry information in Australia and New Zealand.

In closing, I ask you all to take a moment to reflect on the year that has been, and be grateful for what we have all achieved.

I wish you all a Merry Christmas and a safe and prosperous New Year.

-Grahame Vile, ACRA President

P.S. I also hope you take spare time out to have a little fun, and play safely over the break.



5 December 2019 ACRA Christmas drinks



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