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ISSUE THREE 2017

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## An introduction to the Australian Institute of Building

The Australian Institute of Building (AIB) is incorporated by Royal Charter and is the preeminent professional body for building professionals in Australia and the Asia-Pacific region. The AIB has a long and proud history of supporting and serving the building profession. For more than sixty years the Institute has worked with the building and construction industry, government, universities and allied stakeholders to promote the building profession, support the development of university courses in building whilst promoting the use of innovative building techniques and a best-practice regulatory environment.

The AIB is proudly supported by:





# CEO's Column

Nothing gives me more pleasure than seeing 'results' for the AIB.

As you may recall, at the face to face meeting of National Council back in September last year four (4) major priorities were identified that we must focus on:

1. Develop a strong national Corporate Partners program
2. Develop a strong overseas membership engagement strategy
3. Ramp up our commitment to Continuing Professional Development (CPD)
4. Develop strong joint ventures with a view of increasing the AIB membership Value Proposition

In the first instance, I am happy to announce and welcome both CSR and Exactal to the stable of Corporate Partners to the AIB. I am committed to offering benefits that have not been delivered before in previously recognised 'sponsorship' opportunities. The stable will ultimately grow bigger but not at the risk of losing impact of our current and new Partners.

I have been working hard with our new Chapter President Overseas, Norman Faifer in identifying new opportunities for membership in various parts of the globe. You will be aware that we have more than 500 members in SE Asia, however we have already started meaningful conversations in places such as Dubai and other areas.

We have been working closely with the team from Pointsbuild and hopefully by the time you read this, you will be able to or very soon see the fruits of our labour – that being a refreshed suite of material and more/newly commissioned work (specific to the AIB) to come.

And finally, we have been working behind the scenes with a trusted brand/organisation to deliver a combined and exciting new training program. More to come.

Regards

**Greg Hughes AIB CEO**



## A message from the president

BY PAUL HEATHER, AM, JP, FAIB  
National President Australian Institute of Building



Welcome to the third edition of Construct for 2017 and what is continuing to shape up as exciting times ahead.

As for membership matters, through the continuing leadership of our CEO, Greg Hughes, the Institute is being further strengthened by; the development of additional streams of revenue to support the Institute's long term strategies; the ongoing development and roll-out of a Corporate Partner program; providing advocacy to Federal and State Governments; the delivery of a regular E-News to our SE Asian membership and the re-launch of Continuing Professional Development (CPD) online courses in Australia. As a natural extension to our CPD Program, we are looking at how to develop and deliver CPD online courses in other languages; investigating and developing options to deliver an annual awards program in SE Asia; the renewal of long standing relationships with kindred Associations; hosting the 2019 Constructing Our World conference in Sydney and the forging of new relationships looking at other countries such as the United Arab Emirates, South Africa and Indonesia where we hope to deliver the many benefits that comes with our membership.

There is always much to do and as we progressively deliver on these and many more initiatives in the years to come, the AIB will continue to evolve and grow, remembering that your Institute is underpinned only by the strength of the membership and the important role that every member has to play.

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*Ancon has offices in Sydney, Brisbane,  
Melbourne and Perth*

# Sydney gives nod to whirling timber tower

By JOE QUIRKE

Planning permission has been granted to the extraordinary wooden whirlwind known as the Darling Exchange, to be located in the Darling Square district of central Sydney.

The civic centre, which will have 20km of wood in its spiraling façade, was designed by Tokyo-based architect Kengo Kuma Associates.

Kuma said: "Our aim is to achieve architecture that is as open and tangible as possible to the community, and this is reflected in the circular geometry that creates a building that is accessible and recognisable from multiple directions."

The exchange will include a library featuring an "innovation exchange" with a programme to support creative and technology start-ups, a permanent ground-floor open market hall, a childcare centre and a rooftop bar and restaurant with views over Tumbalong Park, the Chinese Gardens and Cockle Bay.

The 2,700 sq m project is part of the square that Australian developer Lendlease is making available as public space.

Darling Square is designed by Australian architect Aspect Studios and is part of a larger Darling Harbour project, a \$3.4bn development by the New South Wales Government.

According to Lendlease: "Darling Square will be a vibrant village with around 4,200 residents and 2,500 workers as well as all the Sydneysiders and tourists expected to visit the area." It is already home to 500 students living in a recently completed student accommodation building.

Construction work on the Darling Exchange will begin shortly and is due to be completed in 2018.

# Builders be Aware – Don't Simply Follow the Product Installation Guidelines

Non-conforming building products and the issues they raise for both builders and consumers have been at the forefront of media articles at various times over the years with serious claims and safety concerns arising over 'dodgy' building materials.

This article poses the question and raises concerns for builders that even 'conforming' building products, if not installed correctly, may be in breach of the National Construction Code (NCC), Australian Standards or Building Code of Australia (BCA).

With every product comes instructions on how to use it. The same goes for building products and with technology and advancements in manufacturing new building products are coming on to the market regularly.

Manufacturers may be capable of producing 'conforming' building products, but are they capable of providing 'compliant' installation guidelines? Is the same level of care being applied to these guidelines and specifications?

The manufacturer is a long way down the chain in a claim brought by a residential dwelling owner under the Home Building Act 1989 for a breach of statutory warranties. What is the downfall for a manufacturer in providing instructions on installing a product that may work in isolation for that product but lead to serious defect issues

arising for the consumer?

At the end of the day, it is the builder who is going to be primarily liable for damages arising from a breach of statutory warranties if defects arise from the non-compliant installation of building materials.

Can a builder simply take it for granted that specifications provided for installation are compliant with the BCA? The short answer is 'No'.

Looking at waterproofing detail for example, with water ingress problems forming the majority of issues in building defect claims, complex detail of window flashings or transition flashings exist under the building codes. If a builder simply follows the installation guidelines for the product and takes it for granted that they are compliant they may find themselves in breach and up for considerable remedial works or the payment of damages.

A timely reminder for builder's not to simply rely on product installation guidelines as they may find themselves in breach.

\*\*\*The information contained in this article is general information only and not legal advice. The currency, accuracy and completeness of this article (and its contents) should be checked by obtaining independent legal advice before you take any action or otherwise rely upon its contents in any way.

# South Korea to build world's largest rotating floating solar plant

South Korean solar firm Solkiss has announced plans to build the world's largest floating, rotating solar park.

The plant would have an output of 2.7MW. This is not large as far as floating solar goes – China have already launched a 40MW facility with 160,000 panels – however its ability to manoeuvre means it is highly efficient.

Solkiss saying that the farm's engines and its rotating technology deliver 22% more energy than traditional land-based solar farms and 16% more than floating facilities

that do not move.

Construction has started on the project, which will be based on the Deoku Reservoir.

Solkiss is planning two other moving and floating plants for Myeoku Reservoir which are capable of making 3MW.

All three solar plants are due to be completed in November this year.

The firm plans to build farms on other Korean reservoirs to support the country's recent move away from nuclear energy.





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# CSR Gyprock marks 70 years of innovation

Australia's plasterboard pioneer, CSR Gyprock, celebrates 70 years of innovation and performance as the country's leading plasterboard manufacturer – cementing its place at the forefront of the Australian building market.

From the introduction of the first paper-faced plasterboard to market in 1947 to its commitment to new technology development, CSR Gyprock has continued its strong tradition of evolving its product range to meet the needs of the ever-changing construction and building industry.

"2017 is a very special year for CSR Gyprock and marks a time of reflection as we look back on many years of achievements in the Australian building industry," says Najwa Khoury, General Manager - Marketing, Gyprock. "We have continued to invest in new technology to meet the needs of the building trade, which is reflected in the widespread use of Gyprock plasterboard across a number of large-scale projects – such as the restoration of the Sydney Opera House, the Melbourne Recital Hall and more recently, new Royal Adelaide Hospital and Perth Stadium."

It's this established history and leading industry reputation that showcase the importance of CSR Gyprock in many iconic Australian buildings. "Our longstanding history in the industry shows the importance placed on the relationships we have cultivated with our customers and the professionalism, performance and reliability they have come to associate with the Gyprock brand," explains Khoury.



1950s Plaster Truck



Cowra Plaster Works employees in 1955 and 2017

Long-standing Gyprock customer, Cowra Plaster Works in regional NSW, has enjoyed a 50+ year association with the manufacturer. Established in 1947, after a brief respite during the war years, Ray Jones & Sons (later Cowra Plaster Works) commenced making plaster sheets and cornices before moving to factory-produced plaster products from Gyprock

in the early 1960s, to better service the growing demand for quality plasterboard in the area.

Paul Jones, the grandson of Ray Jones, joined the family business in 1996 after working in the banking sector for 17 years, and took over from his father and uncles to run the business with his wife Kim.



"My dad Bernie and his brothers got involved in the business after the war and established Cowra Plaster Works in 1947, around the time Gyprock was starting out," says Paul. "I was in banking when my dad said to me, 'There's no better job than being a Gyprocker,' and so I joined the business in the late 1990s and started out on the tools. I was the oldest apprentice in Cowra!"

The historic partnership between Gyprock and Cowra Plaster Works is testament to the mutual respect and trust the three successive generations of the Jones' family have had for the manufacturer, who remain faithful Gyprockers to this day.

"For the last 20 years my wife Kim and I have built a solid business with a great team focused on quality professional service and high performance products, and, as a result, we were named winners of the 2015 CSR ILS (Internal Lining Specialist) of the Year award," Paul says. "We have had a great partnership with Gyprock and look forward to continuing it for many more years to come."

Known as a plasterboard pioneer, CSR Gyprock led the industry in 1968 with the launch of a revolutionary base coat product GB175, known today as Base Coat 45. In the late 1990s, Gyprock launched its Perforated and Flexible plasterboards and



*1960s Yarraville VIC, Factory 2012 Yarraville Official Re-opening*

Wet Area Base Coat. Gyprock has long been committed to managing its impact on the environment and has continually been at the forefront of sustainable building practices, helping to drive standards higher. In 2008, Gyprock launched the first Australian-made plasterboard to be certified by Good Environmental Choice Australia (GECA), the original EC08 with ReCore technology.

In 2011, Gyprock's premium 10mm

plasterboard product Superchek joined EC08 with a GECA certification, raising the bar for residential plasterboard through an environmental solution with a unique point of difference.

In 2014, Gyprock EC08 Complete and Gyprock Sensitive plasterboard products were approved by the National Asthma Council's Sensitive Choice program, and Optimised Core technology was introduced into its leading Supaceil plasterboard.

As building and construction trends in Australia move towards greater efficiency across installation, delivery and energy usage, Gyprock continues to provide advanced solutions to the industry. In 2017, the manufacturer released its all-new, expanded edition of its design guide, the Red Book. The latest edition showcases Gyprock's latest products and solutions, supported by other CSR brands, including Cemintel, Ceilector, Bradford, Hebel and AFS, as stalwarts of the Australian building industry.

"CSR Gyprock is proud of its 70 year history in the Australian building industry, documented by the consistent innovation among our product range and by our longstanding relationships with plasterers, builders, architects and designers," says Khoury. "As the past 70 years has shown, we are well positioned to meet the challenges and needs of the Australian building and construction industry and look forward to supporting the building trade for the next 70 years and beyond."

## Key CSR Gyprock innovation timeline:

- 1947 – CSR Gyprock paper-faced plasterboard
- 1964 – CSR Gyprock GB100 plasterboard cement
- 1968 – CSR Gyprock Base Coat 45 – revolutionary base coat
- 1969 – CSR Gyprock stud adhesive system
- 1971 – CSR Gyprock low-sag plasterboard
- 1974 – CSR Gyprock Cornice Cement
- 1982 – CSR Gyprock Super Fyrcek with clay
- 1990 – CSR Gyprock Jointmaster all-purpose compound
- 1991 – CSR Gyprock Red Book - an industry design guide featuring selection of fire, acoustic and thermal wall, ceiling, column and beam systems released.
- 1992 – CSR Gyprock patented Control Density Technology
- 1998 – CSR Gyprock Wet Area Base Coat
- 2000 – CSR Gyprock Impactchek
- 2001 – CSR Gyprock Security Wall and Freshtone ceiling panels
- 2008 – CSR Gyprock EC08 with ReCore technology environmental plasterboard, certified by Good Environmental Choice Australia (GECA)
- 2009 – CSR Gyprock Superchek plasterboard
- 2011 – CSR Gyprock's premium Superchek 10mm plasterboard product joined EC08 with GECA certification
- 2014 – CSR Gyprock EC08 Complete and Gyprock Sensitive plasterboards approved by the National Asthma Council's Sensitive Choice program, and Optimised Core technology was introduced to Supaceil plasterboard
- 2017 – New design guide staple - CSR Gyprock Red Book released

**For more information on CSR Gyprock, please visit [www.gyprock.com.au](http://www.gyprock.com.au)**

# An imaginative design for a high-rise urban tower in outer Brisbane called for a creative solution from OneSteel Reinforcing



Urban renewal in Newstead on Brisbane's fringe is in full swing with the incredible Gasworks precinct development, a vibrant hub of mixed use facilities including restaurants, cafes, shops and apartments.

At the heart of the precinct is the 15-storey Lucent Tower – currently boasting Australia's longest rooftop pool at 55 metres. However, the impressive building presented an unusual construction dilemma.

## The challenge

'The design called for the concrete awnings on level one to be hung from the level two slab,' explains Michael Cavallucci, director of Torre Developments, the firm tasked with the build on behalf of Cavcorp. 'This meant that the level two slab had to be constructed prior to the awnings on level one.'

Torre Developments decided to call in PFX in the planning phases of construction to find a workable solution.

'Of course, you would usually complete each level from the ground up, so the problem we presented to PFX was unusual to say the least,' Michael says. '[And] due to the stringent steel reinforcing design requirements, other standard construction techniques were out of the question.'

## The solution

PFX manager Grant Casemore said that while Torre's design called for something special, the solution was available from the PFX prefab product range. PFX, backed by OneSteel Reinforcing's more than 80 years of experience and reputation for innovative reinforcing solutions, is rapidly becoming known for being the experts in prefab.



'The beams and columns certainly presented a unique challenge for the PFX team at OneSteel, but we could solve it with our CUSTOMCAGE product,' Grant says.

CUSTOMCAGE is a highly customised prefab solution for specialised applications, including footings, walls, beams, and columns – exactly what was needed. OneSteel Reinforcing's PFX team worked in close collaboration with Torre, producing a series of shop drawings which demonstrated what could be achieved and how their concept would come together.

'With OneSteel's wealth of experience to draw on, the PFX team was able to identify various complications during the process that, once identified and overcome, allowed the CUSTOMCAGE solution to proceed to installation seamlessly,' Michael says.

## The result

'From our point of view, our involvement has been extremely successful,' Grant says. 'In recommending CUSTOMCAGE, we solved a challenging brief for a valuable and loyal customer. For us to provide a solution to a difficult problem is very satisfying.'

'It allowed the original design intent to be achieved while allowing program, safety and construction techniques to be satisfied,' Michael adds. 'As you'd expect with a prefab solution, there were savings in time and money too. With prefab, you're less subject to weather interruptions, so downtime and labour costs onsite are minimised.'





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# Training the Construction Managers of the Future

The University of Newcastle (UON) is a national leader in training construction management professionals. UON's Bachelor of Construction Management (Building) (Honours) is rated No.1 in NSW for overall satisfaction, good teaching, skills scale and median salary.\* It is also recognized globally, ranked in the world's top 45 for education in the architecture and built environment fields in the Global QS Subject Rankings.

From a one-of-a-kind partnership with the United Nations to a genuine flexible learning approach, the UON Construction Management degree is designed to set students up on a global stage. They learn from leading industry partners and have amazing employment prospects when they graduate.



## INDUSTRY LINKED

UON students benefit from regular job opportunities through leading industry contacts. The university has

partnerships with the world's best construction management firms to be able to offer students the very best learning experience.

The degree is the most industry-lead in the country and allows teaching to be practical and guided by current trends and best practice. It also allows for students to form important links with professionals from day one. This is why graduates have an outstanding reputation and have the highest graduate starting salaries in NSW, with 92% employed within four months of graduating.

UON have negotiated an exclusive \$2.6 million agreement with world-leading construction industry software providers, Buildsoft. This partnership provides leading-edge learning opportunities for students including the use of Buildsoft software; support and training; as well as research opportunities and cash prizes. Not only do UON Construction Management students have a key role to play in the continued development of the





software system, they are matched with a senior Buildsoft team member to mentor them in their final year dissertation. This partnership pitches the UON Construction Management degree as one of the best in not only Australia, but the world.

### **PRACTICAL AND FLEXIBLE LEARNING**

UON's online platform offers flexible study options. Students currently working in the industry can choose to complete their study 100% online or a combination of both online and face-to-face. This enables them to earn and learn and apply their studies on a daily basis.

There are also no exams in the program. UON believes in practical teaching and giving students hands-on experience such as a 16-week work placement is much more valuable than a test. The flexible approach to learning also allows students to be mobile – they can pursue the most exciting job opportunities around Australia and the globe knowing that they can switch to online learning and easily continue their studies.

### **GLOBAL FOCUS**

Graduates of this degree are recognised globally. This degree the most professionally recognised in Australia, with accreditation from AIB, AIBS and AIQS, it is endorsed by two leading professional bodies in the United Kingdom; CIOB and RICS. Additionally, the new disaster management course within the Construction Management degree is partnered with the United Nations. Students will learn best practice in sustainable development and be taught by world leaders in this field. This is the only course of its kind and provides certification from the UN Institute for Training and Research.



### **Graduate profile: Chris Stone Making important connections**

Throughout his degree Chris Stone was able to build not only strong technical skills, but also important links across the construction industry. This saw him go on to secure a place on the graduate program at international engineering firm - Laing O'Rourke. Chris works in project delivery as a site engineer, which involves planning and resourcing projects, materials procurement, cost management and cost forecasting. He enjoys solving the variety of challenges his job brings, and is striving to deliver the best possible outcome for his clients. This role has opened Chris' eyes to the multidisciplinary nature of the construction industry, including the interface between construction managers, civil engineers and the other engineering disciplines.



### **Graduate profile: Paige Armstrong Finding her calling**

The desire to develop practical skills, alongside a curiosity to understand how things work, led Paige Armstrong to Construction Management at UON. Paige was accepted into the degree through the Subject Selection Scheme, a program that selects students for their strength in certain high school subjects rather than their ATAR. Paige's great results in engineering and business studies made her the perfect candidate for Construction Management. In second year of her degree Paige successfully gained a full-time position with a company that develops property. She is loving this opportunity to put her learning into practice. Paige is really excited to see where this degree will take her in the future



Learn more about studying Construction Management at UON:

**[www.newcastle.edu.au](http://www.newcastle.edu.au)**

**\* [qilt.edu.au](http://qilt.edu.au)**



# Advanced analytics and the digital transformation of the construction and infrastructure industry

By KENNY INGRAM, Director of Engineering, Construction and Infrastructure, IFS

The move to a data-driven digital asset lifecycle is causing a huge disruption in the industry across all stages of an asset's life. Different digital technologies are starting to impact how construction projects are delivered and how assets are subsequently operated and maintained. These include BIM (Building Information Modelling), 4D and intelligent scheduling, 3D printing, drones, mobility, laser scanning, robotics and automation, virtual reality, the Internet of Things (IoT), cloud computing, big data and analytics.

These digital technologies will collect a vast amount of data, so the need to manage this data and drive intelligent actions and decisions is going to require smart solutions. Today, most companies involved in the asset lifecycle are struggling to manage the information they have now. Their business and IT solutions are usually not integrated and it is very common for users to manage these large projects on Microsoft Excel spreadsheets. This traditional approach will simply not work in the future, so change will be essential for most organisations if they are to survive in this new digital world.

Organisations that embrace these new technologies are likely to be winners in the future. It is likely that the shape of the industry will change dramatically over the next 10 years with many traditional players going out of business and new entrants taking the initiative.

"Digital transformation is not just a technology trend; it is at the centre of business strategies across all markets and segments," says Jason Anderson in a recent IDC report. Enabled by the four technological pillars of social, mobile, cloud and big data/analytics, digital transformation represents an opportunity for companies to redefine their customers' experience and achieve new levels of enterprise productivity.

Executives are being driven to implement

big data/analytics strategies through pressure from clients, competitors and employees (i.e., internal stakeholders) that collectively drive greater demand for data capture, management and analytical software. Clients expect companies to have detailed granular information at their fingertips; the competitive landscape is driving innovation through new competition and faster time-to-innovation enabled through data-driven insight; we need to have the ability to collaborate with subcontractors and co-workers – and to leverage that collaboration for business decision-making.

Those solutions having the greatest impact in meeting these demands will be the ones providing real-time, accurate, actionable intelligence.

## **How big data and analytics are transforming asset lifecycle industries**

For organisations involved in building, operating and maintaining assets, the benefits of big data have the potential to be profound. Digital technologies are not only transforming the industry, they're also benefitting the companies which embrace change.

Some digital transformation technologies have a greater focus depending on whether you are involved in constructing the asset or maintaining and operating it. For example, BIM has had a greater impact on the construction phase and big data, IoT and analytics have been more focused on the maintenance and operation phase. This is not surprising when you consider that an asset like a pump will be installed once during the construction phase. However, when it goes into operation, sensors could pick up operational measurements by the second and many maintenance tasks are likely to be carried out over its life. The largest amount of big data is going to be collected during its operational life.

We should not be too focused on the term big data. It is more about having

all of the relevant data that you need to design, procure, subcontract, construct, install, commission, operate, maintain and dispose of the asset with the objective of maximising the benefit from the asset at the optimal cost. The focus now is about the total asset lifecycle, hence, TOTEX (CAPEX + OPEX) cost is now the key financial measure. For construction companies, their primary goals are still to deliver projects faster, at lower cost, safely and at a high-quality standard. Many will also be involved in or own the maintenance or facilities management contract, so they have to consider how to optimise the whole asset lifecycle. There are an increasing number of uses for digital technology to meet these very challenging objectives.

Most construction companies have poor analytical data on how a project is performing, so there is significant room for improvement. The first step is to have a solid project lifecycle business software solution in place. Then, you need to embrace all digital technologies to achieve the very tough goals demanded by asset owners and governments. Having access to real-time data can help organisations to build and maintain their assets in a smarter way through the ability to access detailed asset information; knowing exactly what the condition of an asset is, how it's performing, its location, etc.

To survive in this digitally transforming industry, asset lifecycle organisations must first develop a digital strategy so that they can use big data and analytics to their advantage. If they can, they'll be able to drive down costs, reduce time-intensive tasks and increase the quality, reliability and performance of an asset through its life – ultimately securing and maintaining a competitive advantage. However, if they do not develop a strategy that includes big data and analytics, and if they continue to rely on the traditional, document-driven business processes, they will lose their ability to be agile and ultimately put their



# Are your showers ticking time bombs?

Despite builders best efforts, leaking showers are consistently listed in the BSA's top ten defects.

Sadly, sometimes this is due to sub-standard workmanship, but most of the time it is the design of the shower itself which is creating the potential for disaster.

Most contractors are at a complete loss as to why, but detailed testing has shown how, by the action of expansion and contraction, water is "pumped" along glue cavities to escape the shower enclosure, no matter how well it is water-proofed.

The best way to prevent the problem is to seal the screen directly to the membrane, and NOT to the tiles.

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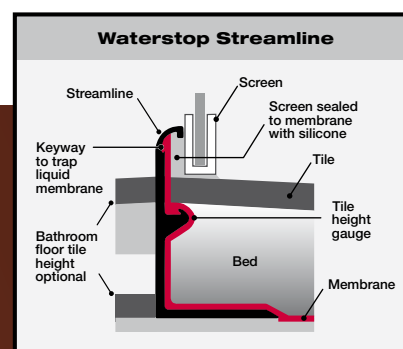
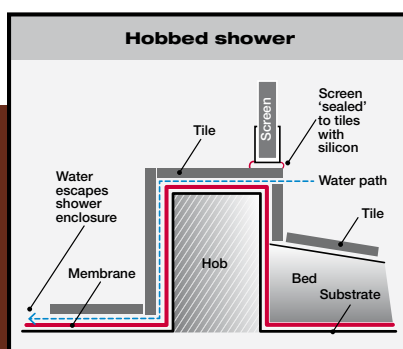
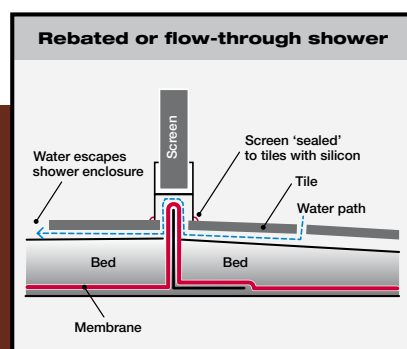
*My business has expanded rapidly since we started using the Waterstop Streamline hob and I now have tilers recommending the Waterstop Streamline system - and me - to other builders. Everyone that uses it loves it.*

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competitive advantage at risk.

### **Taking steps towards advanced analytics**

Companies successfully embarking on initiatives like digital transformation and the application of analytics typically take three essential steps:

1. Envisioning what the organisation's digital future will look like:

This means seeing new ways that technology like analytics improve things like performance and customer satisfaction – not just trying to find an application for the technology. Problems may come through an excessive focus on the technology rather than the different ways of operating that technology enables. The vision should be transformative, not incremental, to keep it from being limited. The vision should be “the what, not the how.”

2. Investing in digital initiatives and skillsets:

Getting to where you want to be will require investment. In many cases, a small initiative may lead to a substantially larger strategic investment – a step that only top executives can authorise. Understanding the need for investment, managing risk and making the necessary changes to capitalise on the investment are critical to successfully moving forward. It's important to find the right skills to facilitate and successfully implement new tools like data analytics. Those skills may not be resident in the company. Don't be afraid to hire new talent or turn to proven vendors to drive or manage initiatives moving the company down a data-driven path.

3. Ensuring top-down support to lead the transformation:

Unless transformation initiatives have C-level endorsement – and top-down communication and corporate governance – the likelihood of success is greatly diminished. As with any change, there will be resistance to it and the application of analytics. Some ways to combat this: communicate on an enterprise-wide scale as opposed to traditional hierarchical passages, and collaborate across the organisation (think social media: forums, blogs, etc.) to encourage an ongoing conversation and get valuable insight about how employees feel and are responding.

Enterprise software applications bring a number of tools to the table to help turn change into a business advantage without complexity. For leveraging data analytics to drive operations, Enterprise Operational Intelligence software brings together solutions that visualise information to support decision-making at both strategic and tactical levels, providing insight in context when and where it is needed.

By combining enterprise architecture, business activity monitoring, intelligent business process management, business intelligence and reporting capabilities, a platform is created that allows for an end-to-end picture that is in line with the organisation's business objectives.

Imagine what this could do for a business involved in building, operating and maintaining an asset. By actively monitoring the performance of your projects, assets and business, you could make faster, better decisions, which would ultimately lead to productivity improvements and cost savings. In demonstration of this, take a look at Serco, Inc., a North American service provider, which adopted IFS Enterprise Operational Intelligence as its global standard. As a result, they are able to provide their customers with much higher levels of service, meeting KPIs and SLAs more effectively.

- What's more, using Enterprise Operational Intelligence has also enabled Serco to:
- Improve customer service levels
- Win new customers
- Help customers reduce service costs
- Achieve real-time access to critical business data
- Focus investments more accurately on areas that need improvement
- Easily configure software for a wide range of roles
- Increase their decision-making processes

### **What's next?**

According to IDC, “Tools to present the output of modelling are arguably one the most important elements of incorporating big data/analytics as this is where the output becomes actionable. Modelling output data, if too complex and not presented in an easy-to-understand manner, can be overwhelming and can lead to inaction, thereby defeating the underlying goal. Interactive tools that enable visual representation of modelling output data are likely to have higher success.”

These tools will lead to the rise of operational intelligence, which focuses on real-time dynamics and business analytics to providing visibility and insight into data, streaming events and business operations. Operational intelligence delivers real-time analytics for actionable decision making, through manual or automated actions.

The benefits are coming, but for early adopters, they're here now as well. Big data/analytics solutions are working where service is the core business. These tools

are being adopted because of the value they deliver, and the results customers appreciate, including:

- Up to 90 percent fewer resources are required for reporting: less administration for business and IT.
- Up to 90 percent increased agility: keeping pace with business needs as they change.
- Twenty percent greater management efficiency: better decisions made based on visible facts.
- Twenty percent increased productivity: process improvement is aligned with strategy.
- Performance, compliance and risk are balanced: integrated management delivered.

For some organisations, facing these challenges may be threatening or intimidating, but for others, like Serco, it's allowed them to provide higher levels of service. In cases like theirs, they have reached out for what's next – actively seeking it and looking to shape it. They didn't just seize the opportunities available to them – they made them by actively participating in the transformation process, and that is why they believe their best days are ahead of them and that what's next is what really matters.

### **About the Author**

Kenny Ingram is the Global Industry Director for Construction, Contracting, Engineering, Infrastructure and Shipbuilding at enterprise applications company IFS and a key member of its Product Direction Board. Kenny has been with IFS for 16 years and is now regarded as one of the top specialists in Project Based Business systems. See: [www.ifsworld.com/au](http://www.ifsworld.com/au)

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# IFS research reveals major differences in digital maturity across industries: aviation most progressive while oil and gas lags behind

Big Data, ERP and IoT noted as top investment areas for digital transformation, but more than one in three companies are unprepared due to talent deficiency.

IFS, the global enterprise applications company, reveals the findings of its Digital Change Survey that polled 750 decision makers in 16 countries, with 52 respondents in Australia, to assess maturity of digital transformation in sectors such as manufacturing, oil and gas, aviation, construction and contracting, and service.

## Strong willingness to invest

Nearly 90 percent of firms surveyed (96% in Australia) have 'adequate' or 'advantageous' funding for digital transformation, indicating a strong willingness to invest and an appetite to evolve their business in order to stay competitive and grow. When asked about prioritised investment areas, the top three choices globally were big data & analytics, ERP and internet of things (IoT). In Australia the top three were big data & analytics, ERP and software as a service.

"It is apparent that companies today understand the urgency of focusing on digital transformation," IFS VP of global industry solutions Antony Bourne said. "Technologies such as big data & analytics, enterprise resource planning and internet of things are paramount to transforming a business. Companies need to apply innovative technologies hand in hand with their relevant industry expertise to succeed and gain a competitive edge. It is this combination that makes digital transformation both meaningful and powerful."

"Australian organisations are more likely to take a conservative approach to digital transformation than their international peers," said Rob Stummer,

managing director for IFS in Australia and New Zealand. "Australian funding levels for digital transformation are more likely to be adequate, but less likely to be advantageous. The driver for investment is more likely to be increased competitive pressure than accelerating innovation. And while Australian firms rated their digital transformation maturity more highly, a lack of talent is a bigger issue in Australia, particularly in key technical areas such as AI & robotics and internet of things."

## Lack of talented employees

Alarming, more than a third of companies (34% globally – 40% in Australia) feel either slightly or totally unprepared to deal with digital transformation due to talent deficiency. When asked to name the areas that will experience the greatest deficit in talented staff, 39 percent (38% in Australia) cited "cyber security" and 40 percent (29% in Australia) "business intelligence". Other areas of concern are "AI & robotics" (30% globally, 33% in Australia), "big data/analytics" (24% globally, 25% in Australia), "cloud" (21% globally, 21% in Australia) and "IoT" (20% globally, 31% in Australia).

Antony Bourne added, "Although new technology is key to digital transformation, it is clear that change communications and access to the right talent are principal catalysts to succeed. It is alarming that more than one in three companies are not staffed to manage digital transformation. These organisations need to focus on concrete talent investment plans to make sure that they establish what roles are critical to success in their industries. After that the key is both to find and attract new talent as well as training and re-skilling existing staff."

## Major differences across industries

When asked about the digital

transformation maturity level of their organisations, meaning actual progress, 31 percent of the respondents (38% in Australia) consider their business to be in the two highest levels of maturity on a five-graded scale. The aviation industry is the most progressive with 44 percent of global respondents considering themselves advanced in their ability to leverage digital transformation. Runner up is the construction and contracting industry, 39 percent of whom identified themselves as mature. At the other end of the spectrum is the oil and gas sector, where only 19 percent of the respondents consider themselves able to benefit from digital transformation.

"The differences in digital maturity levels across industries are notable. The highly competitive nature of the aviation industry, together with its rapid adoption rate of new technologies such as predictive maintenance and 3D printing for spare part manufacturing, are key drivers of its successful digitalisation," Antony Bourne said.

## Drivers and investment focus

43 percent of respondents (40% in Australia) identified "internal process efficiency" as the number one driving force behind digital transformation. "Accelerating innovation" (29%) and "growth opportunity in new markets" (28%) were recognised as the second and third most significant drivers globally. In Australia, "increased competitive pressure" (40%) tied with "internal process efficiency" for first place, and "productivity gains" (35%) was the third most significant driver.

## Obstacles to digital transformation

Despite the practical and technical complexities of digital transformation, the number one barrier to change globally is on the human side: "aversion to change" (42%). The second and third



largest barriers are the more concrete “security threats/concerns” (39%) and “absence of the right organisational and governance model” (38%). In Australia, the “absence of the right organisational and governance model” (36%) and “lack of standard processes and training for implementing new technology” (36%) are the biggest barriers, with “aversion to change” (35%) a close third.

#### Which will be the most disruptive technologies?

When asked what technologies will be the most disruptive, Big Data tops the list with a score of 7.2 out of 10 (7.4 in Australia). Second is Automation (7.0 globally, 7.2 in Australia) and third is IoT (6.6 globally, 6.1 in Australia). Although Big Data is ranked the highest overall, there is a significant minority globally who feel that automation will have the most dramatic impact. Over

40 percent (42% in Australia) rated the level of disruption by Automation as 8 or more out of 10, while 32 percent gave such high ratings to Big Data (44% in Australia). In the construction, aviation and manufacturing industries globally, 48 percent, 48 percent and 50 percent respectively consider the automation disruption score >8/10, which makes it the highest rated technology for those industries.

#### About the survey

This survey was commissioned by IFS to assess maturity of digital transformation across industries on a global scale. It was conducted as in-depth interviews by the research and content agency Raconteur Custom Publishing, who took in the views of 750 decision makers in 16 countries in the oil and gas, aviation, construction and contracting, manufacturing, and service industries.

Countries surveyed were USA, Canada, the UK, Sweden, Germany, France, China, Japan, Australia, Norway, Denmark, the Netherlands, Spain, Poland, the Middle East, and India.

#### About IFS

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# Interview with Kerry Barwise from the Construction Forecasting Council

The Australian Institute of Building is a member of the Australian Construction Industry Forum (ACIF) and recently caught up with Kerry Barwise from the Construction Forecasting Council who presented his 'industry insight' at an ACIF Industry breakfast in early May.

**Kerry, even though we are now across the Federal Budget for the 17/18 year ahead, with your global binoculars how does the picture look for the construction industry over the next couple of years?**

The Global economic outlook is broadly benign at the moment, although there are areas of growing risk and uncertainties.

The United States, Europe and Significant parts of Asia are projected to see continued output growth. Growth in China is slowing, but it is easing rather than plummeting. Yes, despite all the headlines and concerning commentary these key economies are expected to see continued growth. The negative headlines are not completely spurious. There remain significant risks around political events, including management of the ongoing Brexit process, disputes about territory and trade deals etc.

**Can we talk about the effects of long term interest rates and inflation – this would presumably play a role in the construction tempo across the board?**

The recent uptick in Long term interest rates and the increase in the CPI are already playing a role in shaping other

economic fundamentals and, inevitably, the cycles of activity in the Construction Market. Higher longer term interest rates lifted the Australian dollar and raised the cost of capital for investment in Australia which has slowed non-mining business investment growth. The Reserve Bank has been watching these developments very closely and has kept short term interest rates at a record low point to offer support to the much anticipated economic transition away from mining investment. While there is much going on in housing supply and demand, it is likely that record low interest rates have played a role in the ongoing boom in housing markets (and possibly contributed to increased demand and prices). Non-Residential building work is struggling along with non-mining business investment with significant differences by subsector depending on weather activity is oriented to meeting subdued domestic demand or increased external demand in areas such as Accommodation. The tempo of work and cycles in engineering construction is less dependent on domestic interest rates and inflation.

**At the recent Industry Breakfast, you mentioned the 'Trump Bump' – what did you mean by that?**

I think that the "Trump Bump" relates to the upturn in long term interest rates, stock market values and the exchange rate in the United States. This lift worked its way through to many other major economies including Australia. I think it's called the Trump Bump mainly because the changes were difficult to align with changes in actual economic performance in the US and elsewhere, but did follow the election of President Donald Trump. Capital markets had read President Trump's pro-growth stance, including cuts and investment in infrastructure, favourably. While it is not clear that the Trump policy agenda is actually progressing (and more than a few signs indicated that it has stalled), it is notable that many governments and opposition parties around the world, including in Australia, are talking up plans in infrastructure investment as well as reducing reliance on foreign labour and foreign investment in housing.

**You also talked about the fact that there is 'still capacity in the labour**

**market' – are you referring to the available labour market vs the amount of work that is currently and forecast to be available?**

We see a lot of evidence about spare capacity in the whole labour market at the moment. Unemployment is hovering at around or just under 6% of the workforce at present and many analysts are worried that the gradual trend decline may have faltered in recent months. Much of the job growth that we have had has been in part time employment, pointing to substantial under-employment. Spare capacity seems to be associated with low growth in wages. The rate of growth is at historical lows right now. Low wages growth is capping cost pressures and inflation, which enables the Reserve Bank to keep short term interest rates at their lowest on record.

Employment in building and construction activities has marched to a different drum than the economy at large. Reasonable or even strong employment growth in construction industries has been maintained despite the massive drop in the value of work done over recent years. It seems that employment growth has been maintained despite the drop in the value of work done due to the end of the construction phase of the mining boom because of the smaller boom in residential building. There are more jobs in building houses than in Engineering Construction projects -- even when considering very large Engineering Construction projects.

We foreshadow that employment in construction will shrink in the medium term, as the construction sector absorbs the double dip decline in both Engineering work and Residential Building work. This may add to problems in the economy at large, raising unemployment and probably reducing income growth and growth in domestic demand. That is one of the reasons why we see the Reserve Bank holding interest rates "Lower for Longer".

**According to your data, Residential Building is set for a downturn in 2018/2019 – is this part of the 'boom/bust' cycle that we often hear about?**

Yes, very much so. The ACIF CFC views that the extraordinary boom in apartment building has outpaced the economic







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fundamentals. We are already seeing signs that growth has peaked. Recent measures to cap lending growth and other measures impacting on investors and foreign buyers will entrench the market "correction" which, in more excitable terms, will look like a "bust".

**Will this bust give relief do you think to first home buyers?**

The bust that is coming will give first home buyers relief from competition from investors and foreigners.

But the outlook for costs and prices will be complicated by the fact that the market dynamics also shrink the number of new buildings that home buyers can choose from, especially in apartments. So, owner/occupiers are likely to increase their share of ownership of the stock of new buildings, while the share of new buildings that are more expensive stand - alone houses will also increase. It is not clear that first home buyers will obtain much relief in terms of lower housing costs. They may end up facing roughly the same cost on average, or possibly face an increase in average costs because of the reduction in supply of the lower cost apartments.

**You mentioned that a lot of slated large scale construction/engineering projects that have delivered us somewhat buoyant times have now but all been completed. What is your sense from a timing perspective when we might look toward these busy periods again?**

It's hard to get our minds around just how truly momentous the last mining and resource development boom was. While there are ups and downs in various commodity markets today, and in the outlook, there is no sign that global imbalances in supply or demand will be sufficiently large or sustained for long enough to bring about a repeat of the last mining development boom at any time in the next decade or even further out.

We view that the key questions for Engineering Construction activity over the next decade revolve around how much further the mining bust will push activity down and how much public infrastructure spending will arrive and when it will arrive. The May 2017 ACIF forecasts view that mining and mining related infrastructure work will continue to fall for the next 2 years. Meanwhile, Telecommunications and Road construction activity is already growing. We view that Rail and Ports activity and additional road building projects are in the pipeline (with funding for many major projects confirmed in the most recent Federal and State Government budgets).

Because mining related activity is such as large part of the total and because

of the ongoing bust in this activity, total Engineering Construction work will contract for the next 2 years. Work will settle to a floor of around \$75 billion to \$77 billion into the medium term.

**In your presentation, you talked about good debt and bad debt – I am keen to understand your thinking on this?**

The expert panel received a question about the implications of the Federal Government's proposal to change the way it accounts for and allocates debt according to poorly defined ideas of "good" and "bad" debt. My contribution was to say that the difference between good and bad debt is very simply this: good debt is debt that is used to acquire infrastructure or other assets that provide a return that is higher than the cost of the debt while bad debt doesn't. Further investment in infrastructure construction and necessary debt to fund it should be welcome only if it were "good" debt. We really don't want to be involved in building very expensive white elephants just to get the short term gains but end up paying more than they are worth in the long term. This is especially so when there is a pool of good projects that have been evaluated and assessed to draw from. It is possible that many of the most worthwhile projects are in less politically attractive categories of investment or regions. It really is a case of making sure that we actually get the most bang for the construction buck.

**Given your presentation was in May, and we have now been exposed to the Federal Budget, has this changed any of your thinking or forecasts?**

The recent Federal Budget was announced in the period between when we finalised our forecasts and published the results in the Australian Construction Market Report for May 2017.

The budget provided much support for housing. Measures included establishment of a \$1 billion National Housing Infrastructure Facility, setting up the National Housing Finance and Investment Corporation, allowing Managed Investment Trusts to be used to develop and own affordable housing, providing investors in affordable housing with greater income certainty by enabling direct deduction of welfare payments from tenants, and increasing the capital gains tax discount to 60 per cent for investments in affordable housing, as well as measures such as providing a tax cut on first home deposit savings. All of these measures will take some time to implement and begin to impact on actual building and buying of dwellings. They will probably start to have a material impact in 2-3 years, which is just about the time when we see the expected downturn arriving in earnest. ACIF is still

obtaining more information about how the measures translate into actual supply and demand pressures and when, but our preliminary view is that they will not alter the broad direction of the correction that is on its way in the Residential Building market.

To support growth the government announced that it would "invest in building Australia, rail by rail, runway by runway and road by road". The budget announced a variety of projects and funding arrangements that would deliver \$75 billion in infrastructure over the next ten years. Many of the projects mentioned in the Budget were already included in ACIF's Major Projects database. The budget serves to confirm funding and raise certainty that these projects will proceed. We are still seeking information about specific projects and timeframes. We view that there is no need to change our projections at present because they have factored in most, if not all, of the budget's infrastructure funding commitment. Just to put some figures around that, we had forecast that Engineering Construction activity over the next 10 years would amount to \$749 billion and the Federal Government is saying that it expects to fund or finance \$75 billion of that over the next 10 years.

The budget announcements have not materially altered the key cycles that we see occurring. So, we still view that the ongoing decline in Heavy Industry Including mining and the completion of export infrastructure projects in rail facilities and ports will dominate the outlook for Engineering Construction for the next 2-3 years. We see that public and private infrastructure spending is arriving and that this will be sufficient to put a floor in Engineering Construction activity at around \$75 billion to \$77 billion a year into the medium to longer term.

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# Subcontractor Comparison Tools- Why They're Necessary

Subcontractor Comparison tools can vastly aid contractors in their business. In the case of highly specialised or trade specific work, it is often necessary to request bids from multiple subcontractors for packages of work that would be required on a construction project. When receiving multiple bids for each work package, a method of scheduling, organising and analysing comparable quotations on a like-for-like basis is paramount.

Subcontractor comparison systems provide a means of listing each quote received against its respective work package to help rank the bids and make a decision on which subcontractor will be appointed for the relevant scope of works. Examples are found in simple Excel® workbooks, through to those with inbuilt complex logical formulae, through to bespoke modules within dedicated estimating software applications.

An effective subcontractor comparison system will need the ability to:

- Incorporate a database of Subcontractors allocated to specific trades
- Keep a database of Subcontractors together with their associated contact details
- Sort/break up the base estimate information into user-defined (trade-based) packages of work that reflect how the job is to be let/procured
- Export packages out for Subcontractors to price their respective scope of works
- Enter multiple quotes received from prospective Subcontractors
- Readily identify flagged items not yet priced or 'excluded' from a subcontractor's quote
- Accommodate varying levels of detail i.e. lump-sum or priced schedule
- Allow for choice in filling gaps in quotes from competitor's pricing, from estimate pricing, etc.
- Split items into separate work packages
- Provide analytical reporting capability

- Allow lump-sum or percentage based adjustments across wholesale or selected items for final settlement of a quote
- Further manipulate the Main Contractors final tender submission price by adding on Margins, Contingencies or any further allowances
- Re-sort the work package based comparison back into the original/source format required for transmission to a client

While there are various solutions out there, CostX estimating software offers all of the above, with the added benefit of the subcontractor comparison being totally integrated within the main software package, creating an all-in-one solution that will suit all your requirements.

Overall, an effective subcontractor comparison system is integral to your business and offers the following benefits:

- Time saving
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- Mitigates the possibility of incorrect data entry
- All the data can be entered into one single system
- Efficient analysis process
- Assists in making more informed decisions

For more information on how CostX's subcontractor comparison system could help your business, please contact our team at [sales.au@exactal.com](mailto:sales.au@exactal.com) or 1300 006 222.







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## University of South Australia School of Natural and Built Environments Scholarships, Prizes and Awards Ceremony 2017



*Recipients at the School of Natural and Built Environments, Scholarships and Awards Ceremony. University of South Australia, May 2017.*

The University of South Australia's Scholarships, Prizes and Awards Ceremony is celebration of the winners of the various scholarships and prizes offered by the School of Natural and Built Environments. The school has three disciplines consisting of Environmental and Geospatial Sciences, Civil

Engineering, and Construction and Project Management; recipients from each discipline are presented with their awards during the ceremony. The event also consists of end-of-ceremony celebration which allows students to meet and network with the advisory committee members and industry partners.

## Caterpillar buys into Australian bricklaying robot

Caterpillar Inc, the world's largest maker of construction machinery, has announced that it will invest in Hadrian, a brick-laying robot developed back in 2015 by an Australian aeronautic engineer.

The deal sees Caterpillar lend its weight to developing the technology, which can now lay 1,000 bricks an hour.

The US company will buy \$2m of Fastbrick Robotics shares over the next year with the option to make a further \$8m investment later, subject to the approval of Fastbrick's shareholders. This money will be spent on further research into the technology, the development of a commercial product, together with sales and servicing.

The two companies will also form a "strategic alliance board" to oversee the development of the system.

Hadrian was invented by Mike Pivac, who developed the idea in 2005 during a shortage of bricklayers in Perth, Western Australia. He

then spent 10 years developing a 28ft-long prototype.

Commenting on Caterpillar's investment, Pivac said, "Fastbrick Robotics is delighted to sign a memorandum of understanding with Caterpillar and welcomes the company as a new shareholder.

"Caterpillar is a globally recognised industry leader, and we look forward to collaborating with the company and uniting our teams to share ideas, pursue innovation and explore opportunities to commercialise our unique technology."

The latest iteration of the technology is Hadrian X. This can lay 1,000 bricks an hour. The 98ft arm, which is controlled by a CAD program, is able to cut and lay bricks in a precise pattern, and to inject mortar to cement them in place using inbuilt nozzle. The boom auto-corrects 1,000 times a second to ensure that it is putting the bricks where they are meant to go.

## Seattle to build world's first floating rail bridge

Seattle starts work next month on a \$3.7bn project to build a light-rail link on a floating bridge over Lake Washington, to the east of the city.

Project leaders claim it is a world first.

A big challenge was working out how to keep the tracks stable while the I-90 floating bridge bobs in waves or moves in wind.

The project is part of the East Link rail service that will lay 23km of track to connect the Eastside rail system with downtown Seattle.

"There is no light rail that's on a floating bridge anywhere in the world. It's been a very exciting thing to be working on," John Sleavin, of Sound Transit, told local broadcaster Q13 Fox.

Sleavin described the bridge as a 3,500ft-long boat secured by anchor cables.

Engineers with Kiewit-Hoffman, the main contractor, had to design a system that accommodates six degrees of motion as the bridge moves up and down and north and south in response to wind, waves and traffic loading.

The focus was on the transition point between the fixed and floating structure of the bridge.

"Very similar if you're walking from a fixed dock to a floating dock and you have that ramp that connects the two and it goes up and down with the tide," said Sleavin.

At this transition, the rails will rest on bearings and plates allowing movement with the changing lake and bridge conditions.

It passed tests, but Sound Transit said that if wind speeds reached 40mp/h it may reduce train services.

"About once a year we may only allow one train per direction," Sleavin said, "and about once a decade we may have to cease operations on the bridge until the wind dies down."

Four car trains are projected to start running in 2023.

The project is intended to reduce the congestion plaguing Seattle. The metro area was recently ranked 10th worst in the US, and 20th worst in the world for traffic delays.





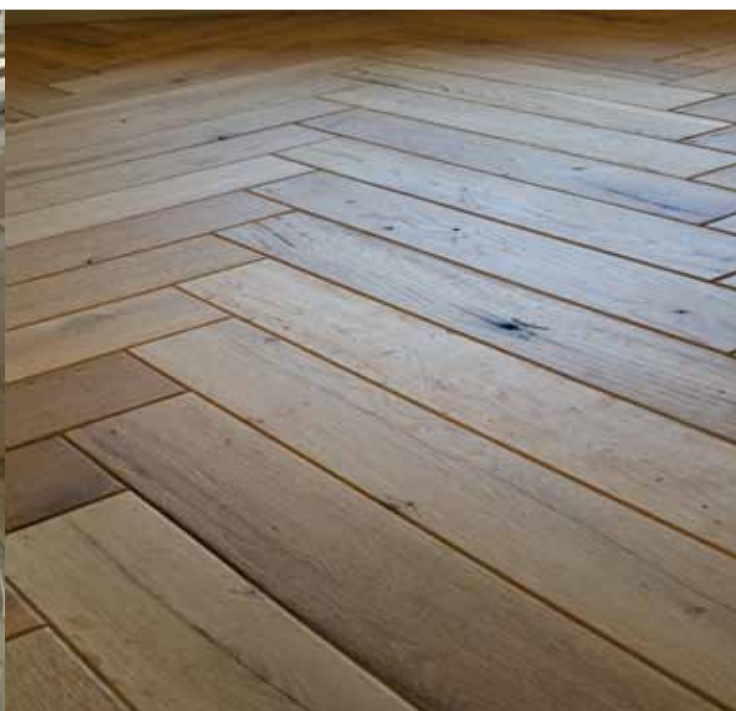
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# China's \$37bn railway to Tibet is "world's riskiest"

China has begun work on a 1,700km railway line between Sichuan and Tibet, a project that one Chinese engineer described as "the riskiest in the world".

The line, costed at just under \$37bn, will connect the city of Chengdu in south central China with Lhasa, the capital of the Tibet Autonomous Region.

It will be the second link to China's far west, following on from the 2,000km Qinghai project that was completed in 2006. This line, which reached 5km above sea level, connected Tibet to northern China.

When the line is finished, it will have a maximum speed of between 160 and 200km/h, and will cut the travel time between Chengdu and Lhasa from 48 hours to about 13.

You Yong, the chief engineer at the Institute of Mountain Hazards, told the Xinhua news

agency: "The construction and operation of the Sichuan-Tibet railway must overcome the biggest risks in the world."

The project, which was approved in October 2014, is being built by China Railway Eryuan Engineering Group, a subsidiary of China Railways.

It has already begun work at either end of the line, however the longest and most difficult stretch, is still under design. This is the phase between Kangding in western Sichuan and Nyingchi in Tibet, which covers the southeast Tibetan plateau.

Engineer You said the dangers of this section include relatively frequent earthquakes, particularly in the Longmen Mountains and Yarlung Zangbo River seismic belts. Among the difficulties, too, are sudden changes in elevation, frequent landslips and avalanches, and a fragile ecology.

He told China Daily: "The regions along the railway have the most developed, most active, most diverse and most serious mountain hazards in China. Constructing a railway in such a complicated geological environment will face a lot of scientific and technological difficulties. And the prevention and control of mountain hazards will be key to its success."

Construction of that phase is not expected to begin until 2019, and could take about seven years to complete.

You's Mountain Institute has been analysing the route of the railway for the past three years. It has set up a database to list the risks, and has carried out experiments on mitigating them.

# Revolutionary Maglev elevator makes debut in Germany

German manufacturer Thyssenkrupp has announced the launch of Multi, a radically new elevator that promises shorter waiting times, greater capacity and lower space and energy requirements.

The system replaces the traditional rope and counterweight design with a linear motor that can move carriages vertically and horizontally. This motor was originally developed for maglev trains, but has been adapted for use in elevators.

The horizontal movement is possible because the Multi uses two shafts rather than the one-shaft-per-cabin layout of a traditional elevator.

The company says: "With one cabin per shaft, traditional elevators take up more and more space as buildings increase in height. Multi consolidates multiple

carriages into fewer shafts, which reduces the elevators' footprint by up to 50% and increased passenger throughput by at least as much."

The cabins are controlled by a wireless data system and an algorithm that can direct cars to callers in a more efficient way.

The Multi system was unveiled on Thursday, 22 June, at a 246m test tower in Rottweil in southwestern Germany. A one-third scale model had previously been shown to the press in November 2015.

Antony Wood, the director of the Council on Tall Buildings, who attended the event, said: "This is perhaps the biggest development in the elevator industry since the invention of the safety elevator some 165 years ago.

"The 'holy grail' for elevators has been to move beyond being pulled vertically by a rope under tension towards a system that allows movement in inclined or horizontal directions.

"Multi has the capacity to transform the industry at large, changing the way tall buildings are designed, and allowing for much more efficient core designs, as well as better connectivity in buildings."

Andreas Schierenbeck, the chief executive of Thyssenkrupp's elevator division, said: "We believe Multi is a genuine game-changer that will truly transform the way people move, work, and live in our built environment."

The first building to be fitted with the Multi will be OVG Real Estate's East Side Tower building in Berlin.



# India finally gives green light to New Delhi's second international airport

A \$3.1bn public-private partnership project to build an international airport to serve New Delhi has been approved by India's ministry of Civil Aviation. When complete the Noida International Airport is expected to have an annual passenger capacity of between 30 and 50 million.

The announcement was made Ashok Gajapathi Raju, the minister for civil aviation, at a press briefing in New Delhi. Raju added that the government expected 109 million passengers to pass through New Delhi by 2009.

The project was proposed in 2001, but has been delayed by disagreements between the national and state governments over its location. One problem was that a site near the town of Jewar was within 150km of the Indira Gandhi International Airport, and would contravene an agreement the government had reached with the GMR Group, the Bengaluru company that runs that facility.

Agreement was subsequently made easier because both the state and federal governments were in the hands of the Prime Minister Modi's BJP party.

The project will be complemented by the Yamuna Expressway Industrial Development Authority (YEIDA), an agency of the state government of Uttar Pradesh (UP), that was formed to promote growth in a 2,700 sq km economic corridor that stretches south from New Delhi to Agra.

YEIDA has earmarked 3,000ha for the Jewar site, which is about 60km south of New Delhi.

Noida is scheduled to be operational within six years.

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# Australia's largest commercial timber building rises in Sydney

Timber constructions are rapidly carving a place in urban environments all over the world. Now, Sydney is home to the Australia's largest commercial all-timber building.

The International House by Tzannes Architects is a seven-story building constructed entirely with engineered or cross laminated timber, reports Inhabitat.

Between the Barangaroo South area and the historic heart of the city, the International House is an all-wood design. With the exception of the single ground retail level, which is made out of conventional concrete, the striking building was constructed with engineered or cross laminated timber, including the floors, columns, walls, roof and elevator shafts. The building is the first timber commercial building of its size in Australia.

The architects chose to go with timber for its many sustainable features, but were also determined to create a design whose all-wood aesthetic would serve as an iconic landmark for the city.

According to the architects, "We have turned the structural limitations imposed by the use of timber to advantage and celebrated them, forming a unique colonnade form evocative of a forest of trees which gives the building its distinctive character."

The project used 3,500 cubic meters of sustainably grown and recycled timber. Using timber instead of concrete resulted in saving thousands of tons of greenhouse gases from being emitted into the environment.

# India launches world's first solar train

Indian Railways has launched a solar-powered train service from Safdarjung station in Delhi. The train will be used on the 20km route between there and Farukh Nagar to the southwest.

Six coaches on the diesel-electric hybrid train are fitted with 16 Indian-made solar panels connected to a battery that can power the train for 72 hours.

About 50 such coaches are to be brought into service in the next few days. Initially they will be used on commuter routes but later they will be used for long-distance services as well.

Indian Railways plans to install 1GW of solar and 130MW of wind generating capacity over the next five years, half of which will be used to power train stations and half to power trains.

The state-owned rail operator first began fitting panels to its coaches in 2015 but they were used to power lights and air-conditioning. Trials of solar-driven trains began last year.

So far the company has signed power purchase agreements for about 250MW of solar for electrified rails, mainly from utility-scale farms such as the 50MW Rewa Ultra Mega Solar in Madhya Pradesh.

A further 16MW has been installed on administrative buildings, according to the company's 2016/17 environmental report.

Ravinder Gupta, the chief executive of Indian Railways Organisation for Alternative Fuel, commented that the plans would save Indian Railways about \$110m a year when they were fully implemented.

Other measures to make Indian Railways' vast property estate more sustainable include a switch to LED lighting, rainwater harvesting and the planting of 50 million trees.

## New research from University College London (UCL) has found that buildings use more energy per square metre the taller they are.

Electricity use per square metre of floor area is nearly two and a half times greater in high-rise office buildings of 20 or more storeys than in low-rise buildings of six storeys or less, researchers at UCL's Energy Institute found.

Gas use also increases with height by around 40%. As a result, total carbon emissions from gas and electricity from high-rise buildings are twice as high as in low-rise.

Their hypothesis is that taller buildings are more exposed to cold and heat, requiring more heating or cooling.

Researchers analysed data from 610 office buildings in the UK, looking at energy consumption in operation.

Professor Philip Steadman said: "The use of air conditioning plays a part in but does not provide a complete explanation of these results. On average, carbon emissions from air-conditioned offices are found to be 60% higher than those from offices with natural or mechanical ventilation.

"It is not the case, however, that the high-rise buildings in the sample are air-conditioned and the low-rise are not. The sample includes buildings of both types, of all heights. The increase in emissions with height is seen in buildings with and without air conditioning."

The research team also looked at all residential buildings in 12 London boroughs and found that gas use increased substantially with height, while electricity use also increased but less sharply

The analysis was made by taking census districts in the capital and comparing total gas and electricity use in each district with the total heights of all houses and flats added together, along with their volumes, footprint areas, and other building and population aspects.

Professor Steadman added: "We suspect that the reasons for our findings are connected with the physical and meteorological consequences of building higher. Air temperature decreases with height, and

average wind speed increases.

"Taller buildings that stand up above their neighbours are more exposed to these strong winds, as well as to more hours of direct sun. Thus energy use for heating and cooling would both be increased. But these hypotheses have yet to be tested."

A third part of the study looked at the relationship of different forms of building to their densities, where density is measured by taking the total floor area and dividing by the site area.

The work has shown that, in many circumstances, the densities achieved by tall towers can be achieved with lower-rise slab or courtyard buildings.

It is not always necessary to build tall to achieve high densities and energy use could, in many cases, be greatly reduced by building in different forms on fewer storeys.





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# How Blockchain Technology could reinvent construction

By BAS DE VOS, Director of IFS Labs at IFS

Blockchain technology was created to provide legitimacy to pioneering crypto-currency Bitcoin after the financial cataclysm of 2008. At its heart is a disdain for central authoritative control, offering instead a decentralised network of self-compliance and regulation. But the servant has become the master, offering business benefits not envisaged during its conception.

In fact, it's nothing short of a game changer for those who can master it. While originally created as a system for running crypto-currencies, Blockchain's uses extend much further today with applications being developed in secure asset tracking and smart contracts.

For example, valuing an asset under construction is a long and complex negotiation involving multiple parties. Blockchain can simplify and expedite the process leading to quicker payments, more accurate valuations and improved stakeholder relations. Before drilling down into how that would work, let's understand a bit more about the technology.

Blockchain is a secure distributed electronic ledger, connecting multiple parties in a network of trust and integrity, facilitating the transfer of assets and the information pertaining to those assets.

It does this by securely recording digital transactions in a sequential chain using cryptographic digital keys, which are verified by the network as authentic. Duplication, editing or removal of transactions is prevented by the chain, which is held on everyone's devices on the network and open to anyone within the Blockchain.

## Business benefits of Blockchain

Utilising this new platform can bring many business benefits, but most are centred on delivering one or more of six competencies:

1. **Efficiency** – As transactions are completed directly between the relevant parties with no intermediary and with digitised information, settling the transaction can be quick. Added to this is the ability to operate smart contracts which automatically trigger commercial actions based on satisfying specified criteria. This can dramatically streamline processes and remove time and cost from transacting.
2. **Auditability** – As each transaction is recorded sequentially and indefinitely, it provides an indelible audit trail for the life of an asset as it passes between different parties. This is especially important if

source data is essential in verifying an asset's authenticity.

3. **Traceability** – Tracking goods in a supply chain can be advantageous when seeking to trace where components are currently residing. Information relating to the component can then be relayed to or from the new owner for possible action.
4. **Transparency** – Lack of commercial transparency can sometimes lead to delays and a breakdown in relations. By providing details of transactions against the commercial construct, further trust can be enlisted within the process and so provide a more stable relationship based on transparency rather than negotiation.
5. **Security** – As each transaction is verified within the network using independently verified cryptography, the authenticity of the information can be assured. Assured information is one of the fundamental keys to unlocking the benefits of the Internet of Things, which is a closed loop cyber autonomous process linking assets to actions.
6. **Feedback** – With full traceability throughout the lifecycle of an asset, the asset designers and manufacturers can accommodate through-life asset management into their products to make them more effective. This can allow for information returning from shipping, installation, maintenance and decommissioning.

So far, most use cases for Blockchain technology have been focused on the financial sector, including transaction management. Be it reducing costs by keeping property ownership and records on Blockchain or using it to track high-value goods such as diamonds, all these cases are about creating secure, verifiable and traceable storage of information.

Looking beyond the more obvious financial applications, however, IFS Labs is researching the benefits and impacts it might have on other business applications. In particular, there is a huge, untapped market in the area of asset management. But what challenges do we need to solve in the implementation of Blockchain technology before these benefits can be achieved?

## Blockchain in the construction industry

Let's highlight the application of Blockchain with an example from the construction industry.

Think about the current situation where a

major asset is being constructed on site for a customer. There are many subcontractors performing many activities towards a long term plan to complete this complex asset.

Each month, the customer meets with the contractors to agree the work completed, the quality of that work in accordance with the contract, and estimates for the work still to be completed. From these meetings the customer can ascertain each contractor's performance and the value of their work, and in conjunction with the contractual terms, pay the contractor accordingly and value the asset in accordance with accounting procedures.

Now imagine if, by connecting the parties through a Blockchain, the completion of activities and associated quality inspections of these activities were recorded as blocks on the chain. This could be extended to a smart contract where the valuation of the activities was pre-determined and the payment automated using algorithms set against the contractual terms. This could either trigger an external event (such as an invoice) via an Internet connection, or a crypto-currency like Bitcoin could be used to complete the payment inside the Blockchain.

How would this change things in construction? Activities completed against issued work orders would be verified on the chain as they are completed, with valuations calculated immediately according to the algorithm set up against the contract. This would negate the 'negotiation' and interpretation of information recorded by contractors which would speed up agreement and payment and improve working relations. Accuracy of value would also be enhanced as it would be based on completed work as it is completed, with estimates forming part of the calculation within the chain.

## Integration of information is key

So how can we achieve these benefits in reality? There are several players that need to work together to make this happen: the technology providers like Microsoft (with Azure Blockchain as a Service) must work together with construction companies and quality inspectors, as well as with application software vendors. We all need to work together and be willing to share information to integrate with the Blockchain.

We're not there yet, as there are still several challenges to overcome. Things like technical performance need to be thought about as transaction delays and the availability of computing power could stand in the way for achieving consensus within a chain. Data ownership, privacy and security must also be addressed.

There are certainly a few things to consider in order to succeed with Blockchain for construction, but there is huge potential and a competitive edge to be gained for those who are willing to get in on the ground floor.

## About the Author

As Director of global enterprise applications company IFS's in-house technology think tank, IFS Labs, Bas de Vos is responsible for innovation projects that illustrate the future of enterprise software. Bas and his team research and develop ideas that derive from concepts and technologies beyond the usual context of traditional enterprise IT.





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On behalf of the existing membership, the Chapter Committees and the National Council we extend a very warm welcome to all these new additions to the AIB family.

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