



'Off-site Construction Assurance – the looming industry Game Changer' Melbourne: 13th September 2017

Today I want to make the case that 'construction assurance' is now the single most influential force shaping the Modern Construction era. In this instance 'construction assurance' means providing the industry's customers with a 100-percent risk wrap.

This year's conference is about Growing, Innovating and Revolutionising. The themes have been consistent in predicting the disruption to construction that the Modern Construction era heralds. Mark Farmer poured accelerant onto this subject with his insights into the construction industry's burning platform for change. I have read his [Modernise or Die Report](#) into the UK construction industry, and for many here, we will have seen parallels with the UK situation in Australia. Perhaps the local challenge is magnified by our federated governance structures and the multitude of industry representations that hold back change across a fragmented country that only seems to act as one when we play for the Ashes.

In a global construction market, we play against fiercely driven [national agendas](#) that do not submit to protectionist or out of step local jurisdictions who have tried and failed to lift their industry's local capabilities and compliance standards. Everyone will be aware of the current [Senate Enquiry into Non-Conforming Building Materials](#). For those who may have made submissions or attended a hearing it seems to be more of the same, as one enquiry after another act to hose down a matter of public concern such as flammable cladding materials or asbestos by making go-nowhere recommendations that miss the reality of the changing nature of our industry. Today's construction industry is rapidly embracing the digital economy, is becoming industrialised and is part of a US\$15 trillion global market of which Australia's and New Zealand's combined presence measures less than 3-percent.

Today I want to make the case that construction assurance is the game-changing feature of the Modern Construction era. I bow to Mark Farmer's assertion that the '[big central theme](#)' of modern construction is off-site manufactures - Prefab. However, where I differ is that, the evolution of Prefab is only an instrument in bringing the matter of construction assurance to the surface. The result is a new urgency to resolve construction's vexed challenge of delivering in-full and assured construction to the industry's customers, and getting paid.

There is insufficient time to fully present all the why's and what for's of how the modern industry will, and is already responding to the profound changes to culture, contracts and risk that are now playing out. These responses have been driven by the inevitable transfer of wasteful on-site construction processes, to off-site. This was foreseeable as a momentous shift into the new millennium where systems, based on an old industrial model that had served us well for more than a century, are facing post-industrial stresses and '[they are becoming increasingly unworkable in our networked world](#)'.

To make the case for the impact of *construction assurance* on the industry's future, five themes are discussed here, but there are others. This presentation has been prepared

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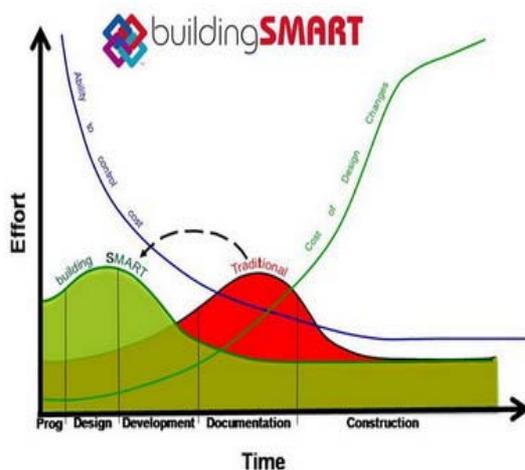
drawing on many references, as this important subject should not be left to opinion alone. A copy of this presentation and supporting links are provided. So, let's look at the themes:

- What's holding back the adoption of Modern Construction (including OSC/Prefab)
- What's propelling 'construction assurance' as the Game Changer
- Influencing earlier payment recognition for Off-Site Construction (OSC) inputs
- Technologies and processes in other industries that will migrate to OSC
- Trends in the context of a transforming construction industry
- What's in 'construction assurance' for clients and constructors?

What's holding back the adoption of Modern Construction (including OSC/Prefab)

We have just launched a Centre for Smart Modern Construction ([c4SMC](#)) as part of the Construction Management program at Western Sydney University. One of our main focus's is looking at how Modern Construction's pieces and parts may come together to deliver a measurably smarter built world. One where future buildings are more assured than their traditional counterparts. Our contentions, and these are supported by industry are;

- That modern construction enterprises are a driver for modern construction projects
- That smart construction is a pre-requisite for making smart buildings
- Smart buildings can only be created by early inclusion of their smartness
- Construction must become [customer facing](#), better, fit for purpose and assured
- Construction's customers will need credible evidence that the Modern Construction era justifies new procurement models and breaking with long-standing practices.



Modern construction proponents need to convince their customers that what the industry now promises, is real. Such a 'value proposition' is counter to the risk adversity of construction today. It is counter to the ring-fencing that all in the traditional construction supply chain (including its professionals) have enshrined for too long. It is counter to a denied single point of accountability that consumers and the public should expect from a modern industrialised, global industry. It is counter to the current applications of standard head contracts, and it is counter to the often-meaningless performance

warranties that are offered up during and at the end of projects. It is counter to the current supply chain engagement practices that we all know have run their race.

Unless these counterintuitive forces are dealt a fatal blow then what's possible will be still born. Everyone straddling this transition knows that these barriers are holding them back.

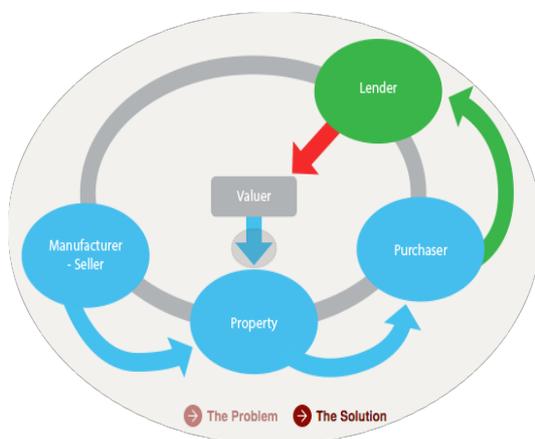
What's propelling construction assurance as the Game Changer?

The UK industry was amongst the first to encounter the breezes blowing back on OSC.

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At the heart of this were clients and financiers resisting pressure to pay for Off-Site Construction manufactures. On the other side of the equation was OSC suppliers being unable to bankroll the increasing value of work that is now being organised ahead of incorporation on-site. On this side of the fence are contractors who do not have the financial where-withal to provide the increased securities required under traditional forms of construction contracts, for more payments to be made in recognition of off-site inputs. We are rapidly approaching a point where more than 50-percent of construction value is created off-site. Increasingly, off-site will involve more off-shore sourced OSC.

With so many inputs into the UK construction market now coming from countries like Turkey, Spain, Lithuania and China there was angst amongst clients and financiers that payment for these inputs was relatively un-assured in terms of compliance and suitability. The UK's Build-Off-Site organisation is a powerful and forward looking representation of OSCs. The resolution, has been the development of a Build Off-Site Payments Assurance Scheme ([BOPAS](#)). The scheme has become much more than an off-site payment solution.



BOPAS has been developed to address the perceived risks associated with innovative construction and is recognised by the principal UK mortgage lenders as providing the necessary assurances underpinned by a warranty provision.

The assurance scheme comprises:

- A durability and maintenance assessment
- A process accreditation
- An online database comprising details of assessed building methodologies, registered sites and registered/warranted properties.

BOPAS is underwritten by the Lloyds Register, Lloyds Bank Group Santander Nationwide and Allianz Insurance. Cover can extend to 60-years. Serious assurance is now in play.

CertMark International (CMI) provides a voluntary building product certification scheme that supports the use of new or innovative products. CMI claims to provide confidence and certainty to regulatory authorities and the market through the issue of a Certificate of Conformity, which is one form of evidence that can be used to demonstrate that a building product complies with our National Construction Code. CertMark is the active Australian member of the World Federation of Technical Assessment Organizations ([WFATO](#)).

CMI is currently involved in CodeMark certification of several Pre-Fabricated housing systems from China. Recently, CMI signed a cooperative agreement with the China Building Materials Federation (CBMF). CBMF through its members, assert they supply 68% of the worlds building materials. CMI's job is to make sure that the materials that land in Australia and NZ from China are fit for purpose, and cooperating with CBMF is aimed at fostering the testing and accreditation of products in line with our strict NCC acceptance standards.

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Interest in the Buildoffsite Property Assurance scheme continues to grow. This has not been restricted to the UK – offsite manufacturers have been assessed in Spain, Germany, Austria, Sweden, Turkey, Lithuania and China. Non- traditional construction inputs can now be sourced with confidence and traceability, supported by insurances to assure certainty. Construction assurance is now the key to being part of global construction supply chains.

Influencing earlier payment recognition for OSC inputs

It is useful to review the existing construction payments regime and culture.

AS 4902 (2000) is a typical contract these days. The world has changed. This contract was conceived seventeen years ago. It's mostly obsolete for modern construction. It covers the following types of project procurement;

- Design and Construct Contracts
- Design Development and Construct Contracts
- Design, Novate and Construct Contracts

The risk allocation in AS4902 has a broad brush. It requires the Contractor to engage and retain the consultants identified (or novated) in the Contractor's tender. And, the Contractor shall not without the Superintendent's prior written approval, subcontract or allow a subcontractor to subcontract any work. And, with minor exceptions, approval to subcontract shall not relieve the Contractor from any liability or obligation under the Contract. This all seems pretty-clear in the accountability stakes.

The contractor is obliged to carry out and complete the work in accordance with the contract. The principal shall pay the Contractor. The Superintendent shall, after receiving a progress claim issue a progress certificate evidencing the Superintendent's opinion of the moneys due from the Principal to the Contractor. However, neither a progress certificate nor a payment of moneys shall be evidence that the Work Under the Contract has been carried out satisfactorily. Here, the soft edges of compliance start.

Practical Completion is another soggy edge. It is a stage in the execution of the work under the Contract when; the Works are complete except for minor omissions and minor defects, which do not prevent the Works from being reasonably capable of being used for their stated purpose, and which the Superintendent determines the Contractor has reasonable grounds for not promptly rectifying, and rectification of which will not prejudice the convenient use of the Works, and the tests which are required by the Contract to be carried and passed before the Works reach Practical Completion, have been carried and passed.

Again, there are no warranties implied or given by the certifying superintendent. The number of non-compliances and buried defects generally remain a mystery, for a while.

These observations touch on the uncertainties in AS 4902 (and other standard forms of contract) that leave the absolute presence of [defects](#) and other [impairments](#) unidentified or compromised. They become more tenuous as more on-site construction moves off-site and off-shore. This is why, new chains of traceability and compliance assurance are evolving.

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Systemic weaknesses in assuring construction hold back the momentum of OSC. These weaknesses are unsustainable. Products like CodeMark and BOPAS will help turn these weaknesses around. These assurances are only part of the picture. Other technologies are at play. But, enabling a point of value add certainty and recognition is fundamental to construction's future. Informed clients need to start demanding these assurances.

The technologies and processes in other industries that will migrate to OSC

Insurance companies price residual risk. They do not price unknown risk, they exclude it.

There are major changes going on in the global insurance markets as big data enables lines of sight to specific risks and how to better manage them. The motor vehicle industry is a good example where risk is now priced to offer policies based on individual customer profiles. For example, car insurer [Youi](#) offers tailor made premiums. The days of one size fits all policies are diminishing. The most significant change to auto-insurance risk however, will come from the growing ride-share market and autonomous vehicles. The convergence of consumer and automotive technologies will transform the way we drive and commute – sooner than most expect. Profound disruptions like these are on their way to construction.

KPMG's report on '[Automobile Insurance in the Era of autonomous Vehicles](#)' is instructive. They describe the core ingredients for massive change aligning within a decade. They predict a continuous decline in the frequency of accidents that will drive a drop-in industry loss costs and subsequently premiums. They forecast a scenario within 25-years where the personal automobile insurance sector could shrink by 40-percent. The elimination of excess underwriting could bring severe market disruption with changing business models and new competitors adding to the speed of change. Imagine the abatable risks in construction.

GS1 is a [Global Data Synchronisation Network](#) serving the retail, consumer packaged goods & fresh foods, apparel, fashion & footwear, healthcare, transport & logistics, foodservice and humanitarian initiatives sectors. GS1 provides standards for barcodes & [RFID](#) technologies. They create a common foundation for business by uniquely identifying, accurately capturing and automatically sharing vital information about products, locations and assets. GS1 enables visibility through the exchange of authentic data.

Smarter construction and the onset of the so-called fourth industrial revolution brings with it a huge opportunity for using sensor technology and digital information to better understand our assets at every stage of their life cycle. Jennifer Schooling, is the director of the Centre for Smart infrastructure and Construction at the University Cambridge. Schooling is the author of *The Role of Sensors and Data in the Built Environment* [White Paper](#).

[Strongbuild](#) is an early construction sector adopter of product chain of custody and traceability technology in its off-site to on-site business. Strongbuild uses RFIDs to track its CLT products from source, through fabrication and to assembly on-site. Adam Strong knows that it is inevitable that some cowboy looking for an opportunistic ride on the 'make it with wood' bandwagon will through incompetence or lack of ethical resolve cause the same brand damage that has led to the current Non-Conforming Building Materials and work

enquiry. Just imagine if the same level of product custodianship and traceability had been applied by those procuring and certifying external insulated panel cladding systems.

Adam Strong has a significant investment in his OSC business. He knows that the digitisation, industrialisation and globalisation of the construction industry will lead to buildings having their own smartness. These buildings will know where all their pieces and parts came from, that their designs were complete and fit for purpose, that the sourcing and compliance of these inputs will be traceable, that in the end every building will be able to demonstrate its own compliance and resilience DNA. He knows that it will soon be important to owners of buildings to know the embedded carbon accumulated in making them. He knows that smart buildings will engage with their users to monitor comfort levels and record consumption. And most importantly, Strong accepts that the technologies which will define modern construction and the big-data it feeds will enable individual buildings to be risk rated, just at the supply chain who made them will each carry the same records.

We are looking at the end of days for one size fits all construction and built property risk and pricing. Once the insurance industry can see directly into the relative risk for every constructor and building then residual risk assessment will be a simple process. Expect the UK's Council of Mortgage Lenders to push for products like BOPAS to become a condition of lending for all projects. Unless they do so, financiers will be failing in their duty of care to mitigate their own risk exposures. Expect products like Australia's last resort Home Owner Warranty Assurance schemes to be consigned to history, ending the nightmare that this lowest common denominator coverage has wreaked on construction's residential customers. Expect that owners of the most assured assets will enjoy significant whole of life insurance premium benefits and underlying value when their buildings affirm a low risk.

The modern construction industry will not thrive if it fails to break out of a culture that has often treated customers as *guinea-pigs*. Leaving customers to bear the risk of construction innovations that seemed like a good idea at the time, but subsequently were found to be wanting will not be the propellant a vibrant and profitable OSC sector will need in future.

Consider these trends in the context of a transforming construction industry

The time has come for the construction sector to reform by seizing the opportunities offered by the Digital Economy. A fully digitised construction industry will need to change the way it procures projects, not in terms of new paper collaborative contracts, but with smart contracts. [Construction contracts are already being re-imagined](#). The leaders in these developments are assessing what moving from digital to intelligent and smart will mean. *Intelligent contracts* ask better questions of the contract users and use logic to plan, create and negotiate bespoke contracts based on the users' answers.

The failure of the supply chain to read, understand or operate construction contracts as intended is a major cause of global construction disputes. Intelligent contract systems could replace an entire suite of standard forms with one single access questionnaire portal. Intelligent contract systems will use code to automate processes such as:

- Delivering the agreed contracts to specified parties for digital execution

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- *Paying the supply chain based on (automated) certification of monies due*
- Releasing copyright documents and incorporating licence agreements
- Submitting real time claims from companies based on weather data analysis, instructions issued by the contract administrator, or logged risk events.

Paying construction's supply chain at the time, and at the point of *assured value* having been added would reset one of traditional construction's greatest weaknesses. This eventuality will remove significant cost and uncertainty from construction's future dealings. The process will rely on their being dynamic lines of assurance, traceability and chains of custody. It will reward OSC investment off-site. It will sharpen the rigor needed to deliver in-full, on-time, compliant, fit for purpose and resilient smart buildings.

Smart construction contracts will be an essential element of the next transformation now making its way into the modern construction industry. [Blockchain](#). Many in the industry have limited knowledge of what trust based ledger to ledger technologies will mean and how this will affect their business models. This is not a fad, blockchain is coming fast. [Every industry will be disrupted by blockchain](#). Construction is not immune.

Intelligent and smart contracts will not only help achieve the goals of a smart digitally able industry, they will radically reduce the scope, type, size and cost of contract disputes. More importantly, smart contracts will underpin the use of construction assurance technologies.

What's in construction assurance for clients and constructors?

The transformations discussed in this paper point to a better deal for construction's clients. If these were to be initiated in a single jurisdiction, there would be fierce resistance from the defenders of the status quo. The reality is that these transformations are about adapting to a modern construction future. They are as much about scoping future projects, as they are about procuring and manufacturing them. They are about assembling, accepting and operating tomorrow's buildings. They are not about red tape and additional cost. They are not dependent on the whole of the industry agreeing to adopt these changes as a pre-condition to moving forward. They are available to the first movers and those who soon follow. For the rest, they may find their run too late. But there will be many new starters.

Across global markets investors in property assets will look forward to a new era where the risk and resilience attributes of their investments can be considered alongside the other economic judgements they make. Financiers and insurers of those assets will be able to become more competitive as unknown risk is compressed and priced accordingly. These are no longer single jurisdiction matters. Single jurisdictions trying to fix the same old problems, the same old way, expecting a better result, may soon be relegated to a lesser status.

Clients and constructors already started on this journey are reporting positive outcomes.

Bill Hughes, Head of Real Assets, Legal & General Investment Management recently said, "we consider the Offsite and Modern Methods of Construction (MMC) sector to be an important part of the future in terms of addressing the supply shortage issues currently

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facing the construction industry. Key benefits include being able to deliver consistency in terms of quality and reliability in timing, in a sustainable fashion – features that appeal to long term institutional property investors. The BOPAS scheme will be an integral part of any credible organisation's offer, when producing any Offsite/MMC products. It is key in providing the surety and insurance backed guarantee a long-term property investor requires, when investing in a property that utilises modern technologies and products."

UK, Stewart Milne Group has attested to, "BOPAS accreditation having been invaluable to our company. Not just in terms of giving comfort to the major mortgage lenders and insurers, but also in providing advice on our systems and processes, which has enabled us to fine tune how we operate making us more effective as a business and ensuring we stand out in the industry."

SIG Building Systems reported: "BOPAS took us on a journey that made us analyse the business in a way we had never done before. It presented many questions, some of which we would have not thought to ask, it created the fundamentals behind our business model, it's now an integral part of our culture and defines the way we operate day-to-day."

There are a growing number of testimonies like these, but Mark Farmer makes a very important point in his 'Modernise or Die Report';

"We are all in this together, it is important to clarify that I do not want to see a divisive binary future industry where innovators or early adopters at the vanguard of change leave the laggards in isolation. This is about creating a vibrant, re-skilled, fully integrated, more predictable and productive industry such that traditional working and new approaches can co-exist and complement each other, driving much wider longer-term benefit" he said.

This year's PrefabAUS conference is about Growing, Innovating and Revolutionising. The themes have been consistent in predicting the disruption to construction that the Modern Construction era heralds. For these reasons I conclude, that OSC, Prefab, BIM, DfMA and Lean are all important enablers of modern construction transformation. But, *construction assurance* is the Game Changer.

The burning question for OSC in Australia and New Zealand is not if to adapt, but when?

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Other Articles of relevance by the author include;

- <https://sourceable.net/trust-is-about-character-and-competency/>
- <http://www.thefifthestate.com.au/innovation/building-construction/serious-questions-at-the-senate-inquiry-into-building-materials-answers-still-pending/93831>

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- <https://sourceable.net/is-whats-wrong-with-construction-assurance-sorting-itself-out/>
- <https://sourceable.net/is-design-for-assembly-about-to-replace-cpm/>
- <http://www.buildmagazine.org.nz/articles/show/where-to-for-construction>