

2020

PER SPEC TIVE

PREPARING YOUR PARACHUTE

REACHING NEW HEIGHTS IN
EDUCATION

ESPORTS

THE NEW ERA OF PROJECT
SCHEDULING

THE DIGITAL FUTURE

IT'S NOT ABOUT GROWTH, IT'S
ABOUT EFFICIENCY

A SURVIVAL GUIDE TO SELF-
PERFORMING WORK



CONTENTS

Preparing Your Parachute	4	The Past, Present, and Future	42
The Electoral, Economic, and Epidemic Implications for the AEC Industries		of Government Funded Projects' Cost Management in China	
Climate Change Emergency	8	It's Not About Growth,	46
		It's About Efficiency	
Project Governance	12	Early Contractor Involvement in a Busy	48
From Assurance to Project Delivery		Market	
Reaching New Heights In Education	16	Strategic Procurement	52
The Move to Vertical High Schools		How to Refine Your RFP Process to Position Your Team for Exceptional Outcomes	
In With The Old	20	The Value of 5D BIM	54
The Impact of Heritage Conservation on Building Development in Stellenbosch, South Africa		For Entire Supply Chain	
Accommodating Design	23	The Digital Future	58
Strategic Hotel Renovations		How Digital is Transforming the Construction Industry	
Adoption of the Swiss Challenge	26	A Survival Guide to Self-Performing Work	62
A Case Study from the QS Perspective			
To Collaborate or Cooperate?	30	Key Factors for Adopting Prefabrication in Hong Kong	64
But is That the Question?			
Esports	34	Convention Meets Invention	69
A Game Changer for Sporting and Entertainment Venues		Change, Technology, and the AEC Industries	
The New Era of Project Scheduling	38		
The Practice, the Possible, and the Pitfalls			



Project Governance
From Assurance to Project Delivery



The Past, Present, and Future
of Government Funded Projects' Cost Management in China



Key Factors for Adopting Prefabrication in Hong Kong

WELCOME

The year of 2020 represents the start of a new decade. Looking back at the past ten years, the building industry has gone through huge changes under the impact of new technology and market conditions. To make sound decisions in this fast-changing world, it's imperative for us to know what's happening, and make an educated guess of what will be next.

For this purpose, I'm delighted to introduce Rider Levett Bucknall's annual magazine, Perspective, a collection of our global experts' observation of the industry. In this issue, you will find many useful insights such as the impact of heritage conservation on building development, how to optimize property for consumer demands, lessons learned, etc. You can also find RLB experts' reflection on global trends based on their project experiences at the forefront, covering various sectors and new technology like prefabrication and BIM.

At RLB, the fact that everyone is keen to learn new knowledge and skills underpins our competitiveness. We believe in the power of communication and cooperation with different parties in the industry. The fresh perspective generated always serves as momentum that pushes the whole industry forward.

Changes will never stop, but RLB's commitment to quality and best service will remain constant. I hope you enjoy reading the 2020 Perspective Magazine, and can catch the wave of our time to make full use of the opportunities.



KENNETH KWAN
RLB GLOBAL CHAIRMAN



PER SPEC TIVE

Perspective

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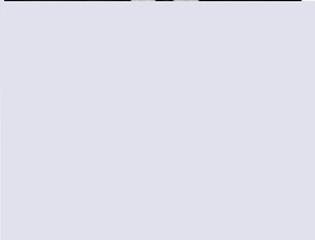
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With a network that covers the globe and a heritage spanning over two centuries, Rider Levett Bucknall is a leading independent organization in cost management and quantity surveying, project management and advisory services. Our innovative thinking, global reach, and flawless execution push the boundaries, taking ambitious projects from an idea to reality.



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PREPARING YOUR PARACHUTE

The Electoral, Economic, and Epidemic Implications for the AEC Industries

Julian Anderson

President, North America
Global Board Director

With the presidential race heading (at last!) into the final stretch, the conversation about how the outcome of the election will affect the construction industry was cut short by the COVID-19 virus hitting the United States. The arrival of the pandemic eclipsed the platforms that the candidates had carefully crafted. While the parties and pols differ on policies and primacies, a common denominator does exist: economic uncertainty.

Because of COVID-19, the recession that we had been expecting is here now. Its length and depth is, frankly, unknowable. The advent of coronavirus erased years of robust performance in the stock markets, triggered the largest wave of unemployment claims in history, and, as mentioned, unleashed a recession. While economic warning signs were already evident—the 2019 federal budget deficit totaled \$984 billion, and (pre-COVID) the Treasury Department estimated it will hit \$1.1 trillion in 2020—the pandemic is creating a crisis of unprecedented scale and complexity.

Without question, there will be a massive increase in the national debt. While interest rates are now at historically low levels, making it a good time to borrow, we must be aware that when those loans come due, the repaid expansion of debt may lead to inflation problems in the medium term. And despite enormous federal stimulus/relief programs, there will be significant and ongoing impacts to the economy for the near term. As a result, it's reasonable to expect some construction jobs will be postponed and others cancelled; claims for delays will increase accordingly.

Compounded by the coronavirus, the election is assuming an even heightened importance. Rather

than rely on the pundits or a crystal ball, let's turn to some historical data to provide some perspective on the construction industry. Compiled by the American Institute of Architects, the Architecture Billings Index (ABI) is an economic indicator for nonresidential construction activity, with a lead time of approximately nine to 12 months. Tracked from Q1 2015 through Q4 2019, the average ABI is 51.7; ratings of 50 or more indicates an increase in billings, and is considered positive. But a more granular look reveals some contrary undercurrents.

During the last election year, 2016, the ABI dropped to its lowest value for this five-year period; in the third quarter—just as the presidential contest was coming to a head—it posted a rather dismal 48.4. In 2019, with the current campaign beginning to take shape, the first three quarters reflect a negative trend, with scores of 47.8, 49.1, and 49.7. Even taking into account a fourth quarter rebound, when the ABI reached 52.5, the yearly average, at 49.7, was the first since 2015 not to top 50.

Another canary in the coal mine is the biannual RLB Crane Index. By measuring construction activity in metropolitan markets by counting the number of tower cranes, we take a snapshot of the local construction economy. In 2015 (the first year of the Crane Index) the national total was 439 cranes; in 2019, 423 cranes appeared on the skylines.

As with the ABI, this consistency has an important subtext. The cities surveyed are at different points in the construction cycle: some are ascendant, some peaking, and others are on the downslope. Currently, the majority of locations included in the Crane Index



are clustered near or at the top of the curve, meaning they will begin to enter a phase of decline in the coming years.

Taken together, these benchmark statistics give a fact-based context to a comparative summary of where moderates, progressives, and protectionists stand—even without the virus—on issues of importance to the construction industry:

THE INCUMBENT PLATFORM:

- **Trade.** Characterized by some as pugilistic, the administration's in your face approach to trade has exasperated producers and fabricators of construction materials—not to mention project managers and cost consultants.
- **Infrastructure.** States and municipalities have largely been left to their own devices for planning and funding of the much-needed improvements to roads, bridges, and transit systems, with mixed results.
- **Environment.** Under the mantle of being “business-friendly”, the administration has rolled back emissions standards for air and water, opened formerly protected land to industrial use, and attempted to cast doubt on the reality of climate change.
- **Labor.** The Department of Labor has proposed high-quality apprenticeship programs—but in its current state, this plan excludes the construction industry.
- **Housing.** A proposal from the Department of Housing and Urban Development redefines the way local jurisdictions would be required to promote fair housing in order to receive federal funding.
- **Healthcare.** Repealing Obamacare is the goal, but there's no plan being developed to replace it.

THE PROGRESSIVE PLATFORM:

- **Trade.** “People before profits” is the clarion call of the progressive candidates, who seek to replace what they see as corporate sweetheart deals with a trade policy that benefits American workers (and trade unions) and creates living-wage jobs.
- **Infrastructure.** Escalating the usual infrastructure agenda beyond roads and bridges, a number of candidates proposed a nation-wide expansion of the fiber-optic network that enables internet access.
- **Environment.** Progressive candidates are often vocal proponents of the Green New Deal. Goals include achieving net zero greenhouse gas emissions by 2030, transforming the domestic energy system away from fossil fuel and into efficient, sustainable sources and, in the process, create jobs.

- **Housing.** While most candidates focus on subsidy programs for housing, some target the construction of affordable housing stock. If enacted, the 2018 proposed American Housing and Economic Mobility Act would set aside \$500 billion over the next decade to build, preserve, and rehab units that will be affordable to lower-income families.
- **Healthcare.** Medicare for all is the progressive mantra.

THE MODERATE PLATFORM:

- **Trade.** Candidates are looking to temper the rhetoric of recent times and return to pre-2016 “normalcy” by restoring America's relationship with the international community through diplomacy and mutually beneficial multi-country trade agreements.
- **Infrastructure.** Through a mix of rolling back tax cuts, closing loopholes, and raising corporate taxes, candidates seek to rebuild federal funding for the repair of essential transportation arteries.
- **Environment.** Recommitting the country to the Paris Accord is seen as a safe first step to reestablishing the climate conversation; some candidates have indicated legislation of green buildings is a priority.
- **Housing.** Candidates espouse a holistic, social solution to affordable housing. The grassroots government program starts with helping people achieve economic parity and gradually transforms them from renters to homeowners.
- **Healthcare.** Preserving—with modifications—the Obamacare program is the moderates' path forward.

A passage from our January 2016 Quarterly Cost Report seems as relevant now—if not more so—as it did four years ago. “On the horizon is the shadow of the presidential election cycle which typically induces nervousness in investors and negatively impacts construction activity as November draws closer. Rider Levett Bucknall expects this cycle to generate somewhat more nervousness as the candidates seem to have focused more on addressing the electorate's frustration than on producing economic policy.”

While construction may be a lagging economic indicator, the time to size up the potential consequences of the election and the pandemic—to pack your parachute, if you will—to the industry is now. Preparing for a variety of outcomes in advance will help your business land securely and be positioned for the future, regardless of the political scenario. **P**

Julian Anderson
President, North America
Global Board Director



Creating a vibrant intersection of global and local knowledge

A super modern, innovative building in Sandton, Johannesburg, stands proud as the new global headquarters of Sasol, an international integrated chemical and energy company. The commercial building comprises 67,000m² of rentable area and is home to 2,500 of the company's employees. The building is 47 metres tall, with 7 parking floors, a ground floor and 10 office floors. Environmentally sustainable practices such as water recycling and LED lighting gave rise to the 5-Star Green Star rating by the Green Building Council of South Africa.

RLB's involvement on this project included full scope quantity surveying services, from inception to project close-out.

CLIMATE CHANGE





CLIMATE EMERGENCY



Ann Bentley
Global Board Member,
United Kingdom



Over the course of my career, fatalities on construction sites in the UK have fallen by over 70%, from a staggering 520 per year, to a still unacceptable 147, and in the same period we have gone from an environment where smoking was common place in the office, to it now being banned in all public places.

As I look around the RLB Global Practice, with forest fires in Australia, heat related deaths in the USA, flooding in the UK and air quality issues in China, it feels to me that we are now at the same pivotal point with climate change as we reached with Health and Safety in the 1970s and smoking in the 2000s. The evidence of climate change is there for everyone to see; governments are beginning to react and there is widespread demand for action from ordinary people. But just like Health & Safety and smoking, the speed of acceptance or change is not fast enough for many and is certainly not consistent around the world.

At RLB UK we have recognised the Environmental and Climate Change Emergency and we have publicly pledged our support to do everything we can to stop and reverse this trend. To make this tangible within our business, at the beginning of this year

we set ourselves the target to reach a net zero carbon position by 2025. Our commitment to sustainability is nothing new – we have had a carbon management plan in place since 2009 that is integral to our business – but this takes it to another level.

Individual actions are great, but collective actions are better and so we are extending this commitment to become a core component of our service delivery for clients. We are providing the tools and the support for our surveyors and project managers to challenge the environmental impact of every project we are involved in, from the outset, creating a ‘natural value’ model which sits alongside the ‘financial value’ model. We are training every person in our UK business to be carbon aware and for our practitioners to become as familiar with carbon and sustainability modelling tools as they currently are with Excel spreadsheets. Sustainability will be an unbroken thread throughout the business.

We know we are not the only ones making significant changes. Major contractors are also publicly setting targets to be waste free and carbon free by 2025 and sub-contractors at all tiers in the supply chain are

implementing measures to reduce their carbon footprint, including trialling electric fleets, paper only packaging and biomass boilers for waste. What is heartening is that many of these initiatives are not being driven by the need to adhere to government mandates but by organisations striving for efficiencies, by individuals personally feeling they want to make a change and by understanding that their part in the process can have an impact.

We are seeing changes in behaviours in even the most financially driven in our industry, as investors and lenders are including sustainability as a key element in their valuation of global real estate assets.

That said, there is no doubt that Governments are best placed to take a lead on this – and a catalyst for action in the UK was the Government’s decision to become the first major economy in the world to pass laws to end its contribution to global warming, requiring the UK to bring all greenhouse gas emissions to net zero by 2050, compared with the previous target of at least 80% reduction from 1990 levels. As part of this commitment, the Clean Growth Grand Challenge was brought forward by 20 years – with now only 10 years remaining to meet the 2030 target “to at least halve the energy usage of new buildings”.

With infrastructure and the built environment accounting for 40% of the UK’s total carbon footprint, this sense of responsibility is something that has brought me, both personally and professionally, some feelings of optimism.

We also know that at least 80% of our infrastructure – be that within housing, healthcare, education, transport, power or commercial – which will exist in 2050, has already been built and so the even bigger challenge will be the decarbonisation of existing buildings.

Of course, this drive to make a difference creates environmental value in the longer term but it has a short-term financial cost. Until very recently sustainable development was seen by most clients as a ‘nice to have’, however, over the last 12 months we have seen sustainability and environmental impact becoming in-built parts of the design, procurement and construction processes – just as happened with Health & Safety 40 years ago.

As procurement advisors, we have a critical part to play in this – by ensuring that holistic value, not simple price – is the basis for procurement decisions. We are doing this by developing and implementing value assessment tools and models and working with clients to understand the nuances of the value drivers on their specific projects and programmes.

As we look to this new decade, we need to continue to face up to this challenge ahead. Although we are taking steps in the right direction, we need to make these steps into leaps and gain momentum and pace to ensure that we have a future at all. **P**

Ann Bentley

Global Board Director, United Kingdom

Building for the future



Raffles City Chongqing is situated at the confluence of the Yangtze and Jialing rivers, Chongqing's historically significant gateway. Designed by Moshe Safdie, the most striking feature of this development is 'The Crystal', a 300m-long horizontal skyscraper linking six of Raffles City Chongqing's eight skyscrapers. From a distance, the project's curved facades call to mind a fleet of ancient Chinese ships. The vibrant complex accommodates luxury residence, shopping mall, office towers, serviced residence and hotel. It also serves as a new transportation hub for the city, linking directly to metro, bus and ferry terminals.

RLB provided cost management and quantity surveying services to this stunning skyscraper development.

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PROJECT GOVERNANCE:

From assurance to project delivery

Christopher Leong

Partner, Singapore



All projects are embedded within an organisational context. The fundamental view of governance resides in organisations, setting the boundaries for management action to achieve organisational goals. This immediately offers an opportunity to address and examine the coexistence of projects and project management within the corporate governance framework, which is best seen through the lens of what has come to be termed – “project governance”. Simply put, corporate governance sets the boundaries for project governance, and the governance of projects and project management are best appreciated as subsets of this. Implementation of governance in projects, whether defined in terms of value systems, policies, processes, roles and/or responsibilities, sets the tone for project performance by providing a framework for ethical decision-making and managerial action. These in turn, should be based on transparency, accountability and clearly defined roles for all project participants, regardless of their respective representations. Taken together, a congruence between project governance and project management emerges, beyond what may first appear as just some similarity in terms of their separate objectives.

Much of what project governance attempts to provide or demand permeates the project

scenario through an application of its principles to projects and project management. In addition, it enables and assists in ensuring consistency and predictability for the delivery of projects. Arguably, these same tenets of achievement resonate closely with what project management aims for in all projects.

The process of continuous review and realignment through the periodic measurement of achievements against targets is a feature that is at the heart of project management methodology. The measure we pursue in project delivery can only be supported if a structured responsibility and authority framework exists. This ensures the requisite accountability for any given aspect of a project, and fundamentally is the project governance agenda.

From a project governance standpoint, the central feature of project management as single-point responsibility must move towards single-point accountability. The relationship between responsibility and accountability is one of the key principles of governance. In one sense, the notion of project governance presents the necessary framework to successfully manage projects as well as to measure that degree of success and/or achievement.



In a broader sense, project governance and project management share objectives that are somewhat aligned. This convergence of objectives is inevitable. The foundation of all project decision-making is predicated on project systems and project controls that are clear and structured, and more importantly, realistically achievable.

Project management thrives on processes and methodologies that provide basis, clarity and means of tracking progress and achievement of set goals and targets. The ability to adjust to changing project conditions and to re-establish adherence to timelines and objectives is a constant in the dynamic project environment.

The close alignment that exists does, however, present some tension when project delivery is pursued from a practice standpoint. What supports effective and efficient project management can in turn pose as obstruction and an obstacle to the smooth delivery of projects in practice. Project performance is invariably about project delivery, undertaken to meet time, cost, quality, and scope deliverables. The demand for documented decision-making, which is the essence of providing and establishing assurance in governance, is further stretched when it deals with project reviews and audits. This immediately poses an underlying threat of overly extending deliberations and stifling the ability to make conscious and timely decisions that are central to proactive project management. Major projects, due to their heavy capital outlay and complexity, will constantly attract stringent demands for governance. These projects will need to rise to the challenge of internal and/or external audits, irrespective of whether they do, in fact, arise. This is even more critical if they are public development schemes funded through taxpayers' contributions. There may be a tendency and desire to support and justify every project deliberation in great detail. The procurement and financial aspects of the project often pose a process and protocols-led enquiry that could lead to the perception of managing a project on paper as opposed to managing the physical project delivery. An inherent hesitancy and reluctance to act can very quickly lead to an inability to act, whether structurally or behaviourally, and this can only be detrimental to a project.

Project audits also enjoy the benefit of hindsight. The benefit of hindsight in challenging decisions draws an added bias that oversimplifies project situations under investigation. The extent of sufficient information available at the time of a project decision can hardly be revisited simply in its incident and real-time framework. Many audit

investigations suffer due to inability to replicate the actual context in which decisions were made. This occurs in urgent scenarios due to the very dynamic nature of projects and the rigorous and fast-paced timelines they operate under.

This inherent inability of hindsight to closely recreate decision-making scenarios challenges the documentation detail and demands that are often the elements best able to assist and withstand scrutiny at the highest level. Proper systems, processes and protocols are crucial in such instances of challenge and justification. A solid project management framework, both structurally and procedurally, is unmistakably the logical response. From this perspective, project management safeguards the project governance structure, which in turn dictates the level and standard that project delivery should operate at.

In conclusion, project governance is a necessity for successful project delivery. It poses an unavoidable demand where the logical response must be one of embracing and rising to the challenge. The broader view ought to prevail - that of finding a balance between what project governance demands and what project management entails. The convergence in focus needs to be embraced. An ability to stand up to scrutiny lends legitimacy and validity to project deliverables. It also affords a level of confirmation and confidence that project management is as effective as it can be on any project. **P**

Christopher Leong
Partner, Singapore



Supporting the needs of a growing community

Providence Park is home to the Portland Timbers soccer team and lives right in the heart of downtown Portland. With the recent expansion, more fans will be able to fit in the stadium for each game. This expansion will have a significant effect on the Portland sports community, as the Timbers have sold out every game in their MLS history.

RLB provided cost estimating services for the famous Providence Park Stadium, home to the Portland Timbers; helping to begin a new era for Portland Timbers fans and for the entire neighborhood near the stadium.



REACHING NEW HEIGHTS IN EDUCATION

THE MOVE TO VERTICAL HIGH SCHOOLS

A lot more than 'Chalk & Talk'

Andrew Suttie

Managing Director, Australia

At RLB in Adelaide we have just completed full cost advisory services on a new 'world-class' CBD vertical secondary school with an educational focus on wellness and STEM (Sciences, Technology, Engineering and Mathematics). The school is designed to accommodate 1,250 students offering contemporary interdisciplinary teaching and learning in interactive settings.

This state-of-the-art designed school will promote individualised learning, creating settings for innovative teaching, incorporating new technology, environmental sustainability, collaboration and exploration of the surrounding environment.

Designed by Cox Architecture in partnership with Design Inc, the Adelaide Botanic High School delivers an innovative and flexible space to encapsulate the best in contemporary learning pedagogy. The ageing University of South Australia Reid Building was repurposed, providing six learning levels plus a basement hosting music, drama practice spaces and secure parking for 170 bicycles. The refurbished building is linked by a glass atrium to a brand new seven-storey building, also with a basement and rooftop terrace. Five rooms cantilever from the two buildings into the atrium overlooking the stunning surrounds of the Adelaide Botanic Gardens, Adelaide Zoo, parklands and the vibrant university precinct. The city itself will also be an immersive learning environment for this school.

The purpose-built learning environment enables the building architecture to enhance the student learning experience. Once hidden systems and electrical engineering mechanisms within the Reid Building have been exposed, and the new building design has mirrored the existing, it is difficult to determine old from new. Students are exposed to the application of engineering principles and technology to building design, construction and operation. Learning from the built form will deliver intuitive, investigative, environmentally aware students who will shape our future communities.

BEST IN CLASS

We were asked to provide full cost management services. We began working closely with the Department for Education and the Department of Planning, Transport and Infrastructure in early 2015 preparing early cost models for building options based on space planning schemes.

With the Adelaide Botanic High School being the first true vertical school in South Australia, we were able to benchmark similar projects from our Global Cost Database, enabling our Cost Planners to provide relevant cost data from precedent projects.

As the Department for Education determined projected student needs, we were asked to prepare cost options for 1,000, 1,250, 1,500 and 2,000 student capacities to determine the relative cost benefit and value proposition to increase capacity.

We were also involved in developing cost-efficient, high-performance design elements such as: energy efficient wall façade systems, modular atrium glazing systems, efficient structural solutions (particularly the sports gym which supports an outdoor learning terrace), and external 'pop-out' learning pods.

All internal design elements were designed with flexibility and robustness to minimise ongoing maintenance and achieve outcome alignment with our fully integrated team.

This project success could not have been achieved without our high performance, collaborative project team across all disciplines.

TOP MARKS

Our key project challenges included:

- Understanding the existing building conditions and the adaptive reuse implications. These included hazardous material removal, earthquake and seismic upgrades, building code compliance upgrades, façade removal and reinstatement, external link bridge connections and full building engineering services upgrades
- With the step change in educational pedagogy, challenges occurred when benchmarking the investigation of the functional fit-out requirements, such as open plan teaching environments which also have the ability to contain teaching spaces when required with operable walls, and the inclusion of the latest ICT/AV teaching requirements
- Procurement by Early Contractor Involvement (ECI) comprising of two Tier 1 Contractors in competition during the Design Phase, with both providing simultaneous program, cost and constructability advice (a relatively untested innovative procurement strategy)
- Providing a robust and independent cost plan throughout the project planning, design and documentation phases, often involved conflicting advice from the ECI Contractors
- Undertaking multiple value engineering sessions to align to the Value Management Roadmap to ensure not only budget compliance, but to achieve maximum value for money, whilst considering the longevity of building materials and engineering solutions
- Detailed tender assessments to ensure appropriate conversion into a Total Fixed Price (TFP) Design and Construct (D&C) Contract and successful novation of the design team

- Undertaking cost analysis studies with varying construction methodologies to safely construct a new building adjacent to an existing occupied University Building (including an operating animal house at basement level). This involved analysing several construction staging methods, external acoustic treatment options, and flexible structural building connections

TECHNOLOGY DRIVEN

Our in-house technology, ROSS 5D enabled our Cost Planners to prepare accurate estimates, cost plans and models from diverse information sources including BIM Models, 2D and 3D CAD drawings, hand drawn illustrations, schedules and other project documentation. Our software enabled flexibility in presentation and analysis of cost models allowing for a range of different estimate breakdowns, by utilising either: elements, trades, floor by floor or building components, separate buildings and the project phases.

Site infrastructure is often an area that is not dealt with adequately by cost consultants, with general allowances being allocated in early cost plans. Infrastructure is a specialist division within RLB that is staffed with Engineers and specialist Civil Estimators who complement our Quantity Surveying personnel. We were able to utilise their expertise for the infrastructure component.

We also drew from the expertise of our in-house Engineering Services Cost Managers to provide an independent assessment, and benchmark the engineering services estimates. We provided a full review of the site infrastructure costs, including stormwater, gas, sewer, electrical, etc.

Several façade scope verification and value management sessions were undertaken with proactive industry feedback to ensure budget compliance, whilst maintaining the architectural vision for the school.

Our team at RLB in Adelaide were key members in assisting the Department for Education in realising the construction of two additional levels to accommodate the increased anticipated student population of 1,250.

IN IT TO WIN IT

The project commenced with an Early Contractor Involvement (ECI) phase, with the intent to convert into a Total Fixed Price (TFP) Design and Construct method of procurement.

We reviewed and benchmarked functional areas to ensure the proposed scheme was efficient,



in addition to reviewing project risks and incorporating appropriate contingencies. Following a robust Project Risk Review, establishing the appropriate project contingencies was critical. Due consideration was required for all the project's varying risk factors including; working adjacent to an occupied building, potential for in-ground indigenous archaeological artefacts, hazardous material removal, challenging structural building link connections etc. Applying the appropriate contingency levels was a key challenge to ensure the building fabric and functionality was ultimately not compromised.

We facilitated multiple value management sessions, including the ECI partners, to ensure best value was achieved for the Department of Planning, Transport and Infrastructure and the Department for Education.

For an ECI/TFP Procurement Model the dynamics are different and reporting protocols need to be understood and observed by the Cost Planning Team.

In a pure Managing Contractor Model, the cost plan or model would be shared with the entire project team including the Contractor as a procurement tool for budgeting the trade scope. In effect, the Managing Contractor is an integral member of the consultant team and major cost risks remain with the client.

However, under an ECI/TFP Procurement Model, the Contractor will assume the major cost risks, and care needs to be given in relation to the extent of the cost planning and cost modelling information shared. Otherwise there remains the risk that the TFP commercial negotiations process could be potentially compromised.

TEACHER'S PET

We took a proactive, solutions-based approach to the management of scope and costs. When the budget was threatened, it was important to 'get on the front foot' to tackle the issues.

We provided early warning budget advice and facilitated strategic Value Management Sessions to understand the issues and opportunities that were available. We also monitored the developing design documents to ensure that the aligned value management initiatives were implemented. I believe the process worked particularly well and set the Adelaide Botanic High School project up for successful commercial negotiation and commercial close.

A PASS WITH DISTINCTION

The Adelaide Botanic High School was delivered by Early Contractor Involvement (ECI), then converted to a Total Fixed Price Contract (TFP), which does rely heavily on: a comprehensive Principal's Project Requirements (PPR), precise client vision, robust cost planning, proactive value management and budget forecasting.

We delivered the project on time and within budget, and it is regarded as a benchmark contemporary secondary education facility. **P**

Andrew Suttie

Managing Director, Australia

IN WITH THE OLD

THE IMPACT OF HERITAGE CONSERVATION ON BUILDING DEVELOPMENT IN STELLENBOSCH, SOUTH AFRICA

Lichelle Neethling
Director, South Africa

There is a rich complexity of heritage in the second oldest town in South Africa, Stellenbosch. Situated only 50 kilometres east of Cape Town, the town is a notable winegrowing region and home to one of the country's leading universities. Cape Dutch architecture and oak-lined avenues are only a few of the characteristics that make Stellenbosch resonate as one of the most prominent tourist towns in South Africa.

Heritage conservation is a phenomenon certainly not unique to Stellenbosch and the global prevalence of this tradition is surely an indication of its importance. The first legislation in South Africa, focusing on the conservation of objects, buildings and monuments, dates back to 1911. The methods of conserving heritage resources, however, are widely debated about amongst professionals in the industry and is, more often than not, a big thorn in a property developer's side.

For many, striking the balance between the protection of heritage resources in Stellenbosch and promoting urban development is fundamental. The question is: what is the true impact of heritage conservation on building development?

NATIONAL HERITAGE RESOURCES MANAGEMENT

In 1999, a heritage resources act was developed by the South

African government with the aim to introduce an integrated system whereby national heritage resources can be adequately managed and controlled, ensuring the protection and preservation thereof. Purposefully, a preamble to the act further elaborates on the cultural significance that heritage buildings bestow, allowing us to comprehend the impact that national heritage resources have on the education, traditions and the spiritual wellbeing of our country.

The National Heritage Resources Act 25 of 1999 (NHRA), as it is known, also brought about the establishment of an administrative body, the South African Heritage Resources Agency (SAHRA), to coordinate and promote the management of heritage resources at national level. The agency replaced the National Monuments Council (NMC) many years ago and is responsible for the protection of South Africa's cultural heritage.

THE SIGNIFICANCE OF STELLENBOSCH'S HERITAGE

It is no secret that Stellenbosch has some of the oldest buildings in the country and with a history dating back more than 300 years, the cultural traditions and architecture are, naturally, major contributing factors to the uniqueness of the town. It is recorded that the first building in Stellenbosch was constructed around 1685 – the magistrate's court building with

Cape Dutch architecture (rebuilt in later years), still forming an integral part of the historic core of the town today. This was followed by the construction of the first Dutch Reformed church in Stellenbosch, a mere two years later.

Lime-washed walls, thatched roofs and gabled façades are synonymous to the heritage buildings that line the streets of Stellenbosch and the reminiscent effects of these old buildings are truly invaluable. In Stellenbosch alone, there are close to 200 heritage sites – a natural reason for the impressive growth in the tourism sector over the past few years.

BUILDING DEVELOPMENT IN STELLENBOSCH

Population growth at around two to three percent, annually, and even more so the influx of students as Stellenbosch University puts into effect its own diversification, have unequivocally contributed to the increased demand for housing in the town over the past decade.

In addition, small businesses have followed suit with Stellenbosch becoming a favoured location for co-working and shared office spaces. It has been earmarked by investors for further development in both the commercial and residential sectors and is reported to be one of South Africa's next big economic hubs, with an annual Gross Domestic Product (GDP) growth rate of 2.9%.



WHAT IS THE IMPACT?

The implementation of heritage conservation of buildings, specifically the compliance with regulations, is often perceived to be a hindrance to sustainable development.

Restoration or refurbishment of old buildings is seemingly an interminable process and is known to be time-consuming, often requiring a contractor with a specific set of skills and knowledge. It is inevitable, yet an exasperating process.

An application requiring the go-ahead not only from the local municipality, but also from Heritage Western Cape (HWC) – a provincial heritage resource authority coordinating the approval process of restoration and refurbishment to any buildings classified as provincial heritage sites – can easily delay commencement of construction by a few months. A permit needs to be issued by the HWC before any building may be altered or demolished, and they are known to apply strict principles to enforce the law upon disobedience by any individual.

Furthermore, the result of construction work in a building

potentially completed in the 1600s, can be costly. The walls are typically quite brittle and you will most likely find old timber floors with a compromised structural integrity due to the void underneath. It is a fact, restoring old materials is expensive.

The direct impact on developments? More time and increased expenses.

A FAVOURABLE OUTCOME

However tedious this process may seem, the property developers who have courageously faced this challenge have undoubtedly reaped the fruit of their investments. The value of these buildings are immense and for a developer, being associated with the restoration or refurbishment of a building with such historic and cultural importance gives them surprisingly great stature in the town.

Contrary to popular belief, it is really not (only) about the money and more about adding value.

IN CONCLUSION

Dr William J. Murtagh, the first keeper of the National Register of Historic Places in the United

States of America and a heroic preservationist of historic value, so accurately encapsulated the essence of heritage conservation when he once said that preservation engages the past, in conversation with the present, over a mutual concern for the future.

Taking a holistic approach, the cultural, architectural and historical value of buildings in Stellenbosch are undoubtedly worth the fuss and the impact on building development is trivial, given the desired outcome. The restoration or refurbishment of a heritage building is, albeit seemingly illogical at times, a fascinating process to be part of with an end product which often leaves the community lost for words.

The secret to minimal impact on building development lies with a knowledgeable professional team, a streamlined process, preparing for the unexpected delays and perhaps, most importantly, focusing on the value of the positive impact on a community. **P**

Lichelle Neethling

Director, South Africa

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ACCOMMODATING DESIGN

Strategic Hotel Renovations

Paul Brussow

Executive Vice President, North America

Not so long ago, hotels had good reasons to embrace standardization. Basic guest quarters with a predictable sameness were the rule for the business road warrior who wanted a no-frills setting for work, as well as for vacationing families whose kids would demolish any décor elements. The cost of maintaining those cookie-cutter properties was minimal. Now, however, the scenario is more complicated.

Today, in an effort to control costs, hotel owners are challenged to make property improvements last longer than the typical 7- to 10-year cycle of renovations, while still remaining competitive and keeping up with consumers' changing tastes and demands. The solution is to get creative.

The recent editions of two leading industry trade shows—Sleep + Eat in London and BDNY in New York—provided an inside look at how the hospitality field is evolving and identified popular and emerging design trends that can be used in both “soft” and more extensive property makeovers.

WELLNESS AND HEALTH

Wellness tourism is forecast to grow into a \$1 trillion market by 2022. Hotels that capitalize on this trend can reap benefits beyond providing a memorable guest experience. Promoting new health and wellness features can raise the property's occupancy, boost the bottom line by increasing average guest spending, and, with sophisticated design enhancements, allows hoteliers to create an additional tier of guestroom suites at an increased average daily rate (ADR).

Design elements that are commonly upgraded or replaced in the course of a renovation can have an uncommon impact on a guest's health and wellbeing. Lighting and finish materials can be economically, yet imaginatively, deployed to enhance the guest experience. At Sleep & Eat, prototype guest rooms featured lighting schemes that were attuned to the body's circadian rhythms. Whether controlled by an app or hard-wired into

the hotel's infrastructure, these can help offset jet lag or set a serene mood for in-room meditation sessions. Pairing the fixtures with occupancy or motion sensors that automatically turn off the lights can reduce energy costs.

Used as upholstery, window treatments, or wall coverings, sound-absorbing textiles like felt and velvet add to the acoustic insulation of a room, increasing quiet and helping ensure a good night's rest.

TECHNOLOGY: SOPHISTICATED SERVICES, YET SIMPLE TO USE

When considering upgrades to technology services and systems, bear in mind that they should empower staff to better serve their guests, rather than being a futuristic replacement for high-touch service. One possible exception to this rule: Robotic luggage handlers, such as the one already in use at the Yotel in New York. “Yobot” (a machine adapted from its original use in factory assembly lines) can lift up to 500 pounds of baggage and place it into secure, individual storage lockers. Guests reclaim their luggage by using a touchpad and PIN number. Installed behind a glass wall where visitors can observe its operation, the feature has become a focal point of the lobby.

At the guest room, phone-based keyless entry systems are rapidly gaining traction. Voice- or app-operated controls for lighting, window treatments, and thermostats—by now, all familiar features transplanted from the home environment—are now found in guest rooms, and are also tied into the building's mechanical systems, facilitating energy efficiency.

Digital technology has an important role on the internal side of hotel operations, as well. When strategically used, it contributes to hoteliers' understanding of and indeed anticipating the needs of their customers. Automated functions such as mobile check-in/out, cloud-based interfaces,

centralized communications, push notifications, and online loyalty programs yield a constant stream of data that allows operators to create actionable guest and property improvements. Relatedly, social media platforms such as Instagram, TripAdvisor, and Yelp are valuable sources for both promotion and customer insight.

AUTHENTIC EXPERIENCES

The influence of Airbnb, with its emphasis on unique environments, has pushed hotels to be more creative and develop a genuine sense of place. Overall, guests' desire for distinctive designs coupled with personalized experiences has supplanted the once-valued model of homogeneity and also eclipsed extravagant, over-the-top interiors. Today's travelers want to feel a genuine connection to real people and places, not to amorphous branding concepts. Authenticity—as conveyed by finishes, furnishings, and programming—is the aesthetic expression that travelers are craving.

For example, incorporating recycled, locally sourced materials in the hotel conveys the essence of the place. At the Post Ranch Inn in Big Sur, nature and sustainability are forefronted in guest rooms that are paneled in redwood reclaimed from wine barrels. Visitors to the inn's native plant garden sit on benches fabricated from fallen trees. The authentic experience extends to the dining room, where tableware is made of plant fibers.

In the ultimate economic efficiency, some of these experiential innovations don't require an investment in the physical hotel—they can be realized through marketing channels. The New York Hilton Midtown offers a "City that Never Sleeps" package that immerses guests into the round-the-clock culture of the Big Apple. Featuring a night owl-friendly midnight check-in and 3PM check-out, the package includes a 24-hour destination guide, curated by the hotel team, highlighting quintessential NYC activities that run all night, including 24-hour pizza joints, the Staten Island Ferry, and the dazzling lights of Times Square.

SOCIAL SPACES

For better or worse, technology and social media have irrevocably changed the way we live. Hoteliers and their designers can be in the vanguard of promoting the human interaction that has been lost by providing guests with the chance to connect with others in person, or even reconnect with themselves. The challenge is to provide flexible spaces where users can activate the social experience of their choice.

Hotel lobbies are no longer simple transitional spaces, conduits for travelers moving from reception desk to elevator. They aren't merely waiting places, either. The dynamic design of lobbies and public spaces (such as rooftop lounges) is a concession to younger guests, who simply don't want to stay isolated in their rooms. Lobbies have been transformed into vibrant centers of diverse activities. For business travelers, a more functional lobby—with reliable WiFi, power outlets everywhere, and large shared worktables—becomes an extension of the office and evokes a cool, co-working ambiance.

At Sleep & Eat, design firm SpacelInvader created what senior interior designer Izzy Eling calls "a bar without a bar." She points out that "The biggest barrier between service and the customer within a bar is the bar itself." Guests use wall-mounted phones to place their food and drink orders while relaxing in a space populated with movable, freestanding furnishings rather than built-in, fixed seating and tables. Patrons are encouraged to customize the space to facilitate interaction.

According to the Preston Robert Tisch Center for Hospitality, Tourism and Sports Management at New York University, 15% of existing hotels undergo renovation every year. The challenge for operators is to balance economy and efficiency with style. While some of the design visions presented at the trade shows were highly conceptual, they do provide an exciting investigation into what travelers want in their choice of lodgings. From 5-star luxury establishments to roadside stalwarts, keen hoteliers in all categories will take a creative cue from these studies, and let them inform their next renovation. **P**

Paul Brussow

Executive Vice President, North America



Taking ambitious projects from an idea to reality



ASPEN | CONSORT PLACE, a development by Far East Consortium

This 900,000 ft² multi tower development includes two residential towers of 65 and 35 storeys, together with a 4-star 21 storey hotel, all linked by a central public square at ground floor.

At 713ft high, Aspen at Consort Place will be one of Canary Wharf's tallest residential towers. The 65 storey Aspen tower includes approximately 500 apartments, a spa and a spectacular sky bar on the 63rd floor.

RLB UK is providing cost management, project management and employer's agent services for the client, Far East Consortium.



PPP AND THE SWISS CHALLENGE

There are many types of Public-Private Partnerships (PPP) arrangements with varying degrees of private sector participation, all of which are driven by limitations in public funds to cover investments needs and efforts to increase the quality and efficiency of public services. In all arrangements, there are four broad principal roles for the private sector – to provide additional capital, alternative management and implementation skills, value added for the consumer and public at large and to better identify needs and optimise the use of resources.

As of 2016, more than 5,000 infrastructure projects (translating to \$1.5 trillion of investment commitments) in 121 low- and middle-income economies were delivered through PPPs in a span of 25 years. While competition is crucial in obtaining good value for money from the PPP arrangement, unsolicited proposals (USPs) are an alternative to the traditional competitive bidding framework.

In a USP, an individual private sector player identifies an infrastructure project that has not been earmarked by the public sector for development and approaches the government after establishing the project feasibility and specifications for their approval. In this instance, the

project is not won through a competitive bidding which runs the risk of not achieving the best value for money.

The Swiss Challenge method is one method of procurement that appears to address concerns and limitations of USPs. Upon receipt of the USP and evaluation, the government could choose to either (1) buy the intellectual property rights from the proponent and proceed to issue a request for proposal (RFP) and awarding the project to the most competitive bidder, or (2) allow other players of similar calibre to submit counter-offers which the original proponent is challenged to match or risk having his USP offered to the best bidder.

ADOPTING THE SWISS CHALLENGE FOR INFRASTRUCTURE WORKS

Generally, developing countries looking to catch up in terms of economic development would need to invest in soft and hard infrastructure and in three possible ways – privatisation, increasing public spending or engaging in PPP. The PPP arrangement for infrastructure projects is generally seen as a balanced approach which harnesses the cost efficiency of the private sector while allowing the public sector to retain ownership of public assets in the long run.

ADOPTION OF THE SWISS CHALLENGE: A CASE STUDY FROM THE QS PERSPECTIVE

Silas Loh

Joint Managing Partner, Singapore

Tay Wan Ding

Research Manager, Singapore

In recent years, our regional office has had the opportunity to provide quantity surveying (QS) services to one of the up and coming PPPs utilising the Swiss Challenge procurement method. Unlike the conventional reason for utilising the Swiss Challenge, this PPP was a solicited proposal by the regional government to develop a new city. The government formed a Special Purpose Vehicle (SPV) to spearhead the project as an entity “to assist in the realisation of the project”.

The first phase of the mega-project was to develop the infrastructure works over 8,000 hectares of land currently used for agricultural purposes. Works for the first phase include the construction of bridges, roads, power stations, water and wastewater treatment plants and infrastructure for the planned industrial areas and resettled communities.

The proponent submitted a set of pre-project documents (PPD) which included the land use plan for the project and its associated design, technical specifications and high-level cost breakdown of the infrastructure works based on input from their team of designers and surveyors. The cost component was then evaluated and negotiated and the PPD repackaged into an adapted Swiss Challenge tender document for public tender. The open tender was

an invitation to submit counter price proposals based on the PPD design.

In the event that a company successfully challenges the proponent with a lower bid, the proponent can choose to match the price offer or bow out but be reimbursed for the costs incurred in preparing the PPD.

CHALLENGES FACED AND LESSONS LEARNED

During the pre-contract stage, the following aspects of the Swiss Challenge contractual arrangement were of critical importance in ensuring transparency while also ensuring value for money:

Procurement method

To achieve the most cost efficiency for any project, a free and open competition should be ensured. This is also the underlying principle of the Swiss Challenge. A fair competition can be assured through transparency and accountability of the tendering process.

We sought to ensure that any challenger would be able to price for the tender by ensuring all standard and relevant documents were issued – from project specific front-end documents to detailed tender drawings where applicable, technical specifications

and site survey reports. As with most established and mature economies, a comprehensive quality criteria framework was clearly set out to adhere to good governance principles.

One clear disadvantage stands in the way of a truly fair competition – there are no symmetry in bidding time given to challengers to prepare their counter proposals. By provision of a comprehensive tender document as if it were a traditional tendering process, it could justify the shorter time frame given to the challenger to submit their counter price proposals.

Contractual framework

A single, comprehensive PPP law spelling out all parties' contractual obligations in a clear and concise manner can make a difference between a successful and unsuccessful public-private collaboration. As an emerging economy, we did not have a single source of contract legal framework for PPPs to work with and instead relied on a number of existing relevant laws and contract forms (e.g. arbitration laws, common law, local standard forms, etc.).

The front-end documents, in particular the Conditions of Contract and Particular Conditions, were drafted by our in-house legal team for the Client's legal counsel to review. Several discussions were held to understand the intent and effect of the bespoke clauses. These include potential "deal breaker" issues such as payment and dispute resolution mechanisms as differences will inexorably arise between parties during the span of the long-term contract.

By endeavouring to include issues specific to PPPs and USPs, we decreased the ambiguities between contracting parties and thus instil in potential challengers the confidence in the challenge.

Pricing transparency

In the evaluation of the proponent's cost breakdown, we discovered that in using differing standards of measurement, there was a gap between the quantities and rates. Given that the proponent was a foreign entity and had utilised their own standard of measurement, our initial checking quantities based on the local standard method of measurement (SMM) were not within the acceptable deviation.

This led to prolonged evaluation and numerous working meetings to ensure the proponent's quantities complied with the local SMM. Concurrently, the trade preambles documents were reviewed in conjunction with the Schedule of Works and Daywork Rates to ensure all the principles of measurement were in line.

In doing so, challengers would be submitting their counter-proposals on the same basis as the proponent, ensuring a fair comparison of prices. In the long term, it was essential for all pricing documents to be aligned to decrease any disputes that could arise during the post-contract stage on the grounds of conflicting methods of measurement.

CONCLUSION

The spirit of a PPP and the Swiss Challenge is manifested in the principles of transparency, accountability and cost efficiency. As an independently appointed consultant, we endeavour to meet the objectives of each unique project through systematic assessment while remaining a neutral party. In this case study, the objectives can be accomplished with the establishment of a comprehensive law, framework and contract documentation. **P**

Silas Loh

Joint Managing Partner, Singapore

Tay Wan Ding

Research Manager, Singapore

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Shaping the future of the built environment

The Raffles Hotel is one of the few remaining great 19th century hotels in the world and was declared a Singapore National Monument in 1987. After undergoing 2 years of complete refurbishment, “The Grand Old Dame” was reopened on 1 August 2019.

RLB was involved from inception to completion, in restoration and refurbishment of this 132 year old building, which has been carefully re-designed to preserve it’s unique historic charm. We are proud to be able to deliver this iconic project successfully while meeting the client needs.

TO COLLABORATE OR COOPERATE?

BUT IS THAT THE QUESTION?

The successful delivery of strategic programmes is more challenging today than ever. While project management is focused typically on delivery as it relates to quality, cost and time, programme management operates more on a strategic level. It can deliver a package of benefits and value that single projects would not generate on their own. As a result, programme management requires a different approach to project management as the relationship between connected projects drives a different set of behaviours. These behaviours often require the programme manager to make best use of the skills and experience across all the programme and project teams. We usually call this collaboration.

Just as DNA contains the genetic instructions used in the development and functioning of cells, understanding the DNA of a programme - and the organisation within which the programme is being managed - provides the programme manager with essential information to ensure the right behaviours are embedded at the outset and encouraged and nurtured throughout the programme duration. At the heart of these behaviours is usually the desire to collaborate, but do we really collaborate on programmes or do we, at best, cooperate?

Cooperation is really a simple approach to collaboration. The relationship is often informal and requires minimal planning with little investment in time and energy.

Collaboration is much more complicated. It requires two or more parties, organisations or teams to join forces to deliver a programme with shared goals to gain shared benefits from the programme while remaining true to their own organisations.

Collaboration enables a programme team to:

- share resources, skills, capabilities or capacity
- share learnings, best practice and training
- deliver programme benefits greater than what could be achieved individually
- allocate risk to those best equipped to manage it, and
- derive additional benefits drawn from the strengths of the group.

We often see this style of approach with a joint venture where organisations believe that no one team has all the answers. However, real collaboration requires a higher degree of unification and accountability. Each organisation must be as committed to the process as it is to the programme itself. Cooperation between organisations or teams can be achieved relatively easily as the risk to the individual parties is significantly less.

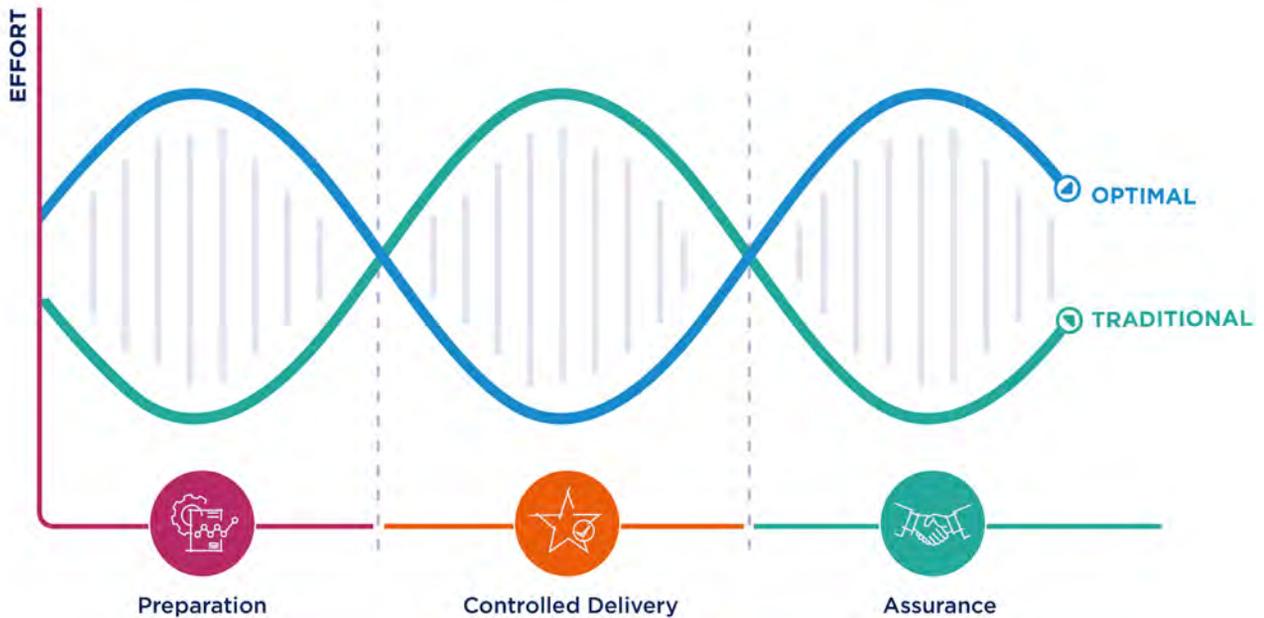
As programme strategies are developed, the question asked is, "How are we going to deliver this programme?" This inevitably leads to a discussion about whether we need to collaborate. But is that the right question to ask?

If we are truly focused on determining the best way to deliver a programme, we need to create an environment that supports, sustains, innovates, manages risk, and simplifies complexity. In order to do this, the parties need to become compatible. This can be achieved by unlocking the organisational and programme DNA from the beginning and ensuring that all parties are involved including, and without exception, the client team.

Traditionally in programme management, much of the focus and effort has been on controlling the programme once it is underway, with little regard for preparation. The end of the programme, when you evaluate the benefits delivered, skills transferred, and lessons learned, is often neglected.

By challenging the traditional approaches to delivering complex programmes, we can focus energies on the preparation stage and build the right programme strategy from the outset. That way we can be assured that we have the right skills, partners and operating culture to ensure a smoother programme delivery through an optimised control framework.

DELIVERING PROGRAMMES DIFFERENTLY (DOUBLE HELIX)



This approach creates manageable, transparent and controlled programmes that reduce risk, deliver effective procurement, safeguard results and provide added value.

The preparation stage is critical. Understanding how the programme should interact with its environment is an important decision to make. So, are we isolationist, cooperative or collaborative? Today most people would say collaborative, but is that the right solution for the programme? We can explore further at the outset by asking five questions.

DO WE NEED TO WORK WITH ANOTHER PARTY?

Does one individual or firm have all the skills and experience necessary to deliver a programme without any interaction with others? Unlikely, but can we simply interact with stakeholders through an engagement plan, or will we get more impactful results by solving problems and working as a team?

SHOULD WE HAVE A COMMUNICATIONS STRUCTURE IN PLACE?

Without communication, teams cannot survive or thrive. For collaboration to be truly effective, the use of collaborative workspaces will help keep everyone connected with increased productivity. However, all parties must be willing to share and be transparent otherwise this is simply cooperation.

HOW ADAPTABLE DO WE NEED TO BE?

Successful programme delivery depends on the team's ability and willingness to adapt together. The desire to 'keep things how we've always done them' can negatively impact on the team relationships, expectations and shared visions. We need to be able to listen to our partners and clients openly.

DO WE NEED LEADERSHIP?

Team collaboration relies on a strong leader who needs to trust that team members will complete their tasks regardless of the organisation or team they come from. Leaders must set expectations early as part of the

preparation stage and create a supportive, performing culture. Leaders must also seek opposing views as these are valuable and encourage innovation.

DO WE NEED TO SEEK AND LEVERAGE EXPERTISE?

It is extremely difficult for most programmes to be delivered in isolation. We rely on the expertise of others, be that inside or outside our organisation, just as our partners will rely on our expertise. This mutuality must be framed in a programme environment that is supportive and rewards good behaviours.

Ultimately, we all strive for mutual trust and respect in an environment and culture that will capitalise on our strengths - a place where we can all work together in the spirit of collaboration to achieve better outcomes. But does that prohibit the delivery of successful programmes? Not necessarily, however:

Do we work alone? Rarely.

Do we cooperate with other people or organisations? More often than not.

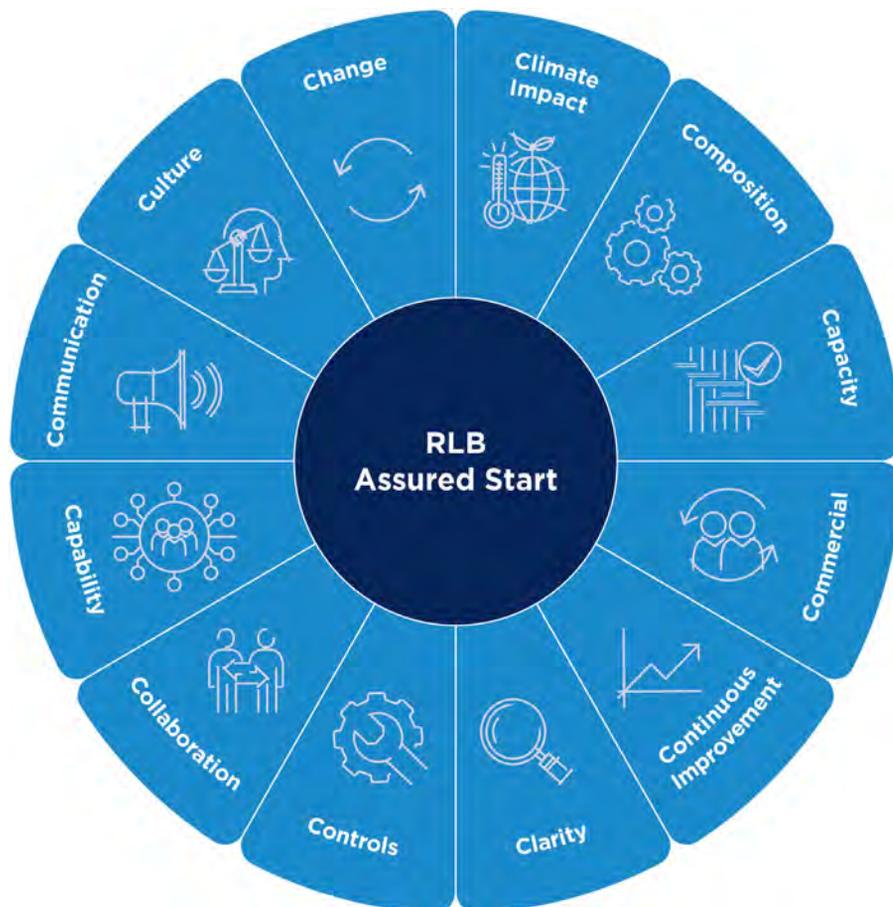
Do we establish the right environment and culture to truly collaborate? Sometimes, but that is not always a problem.

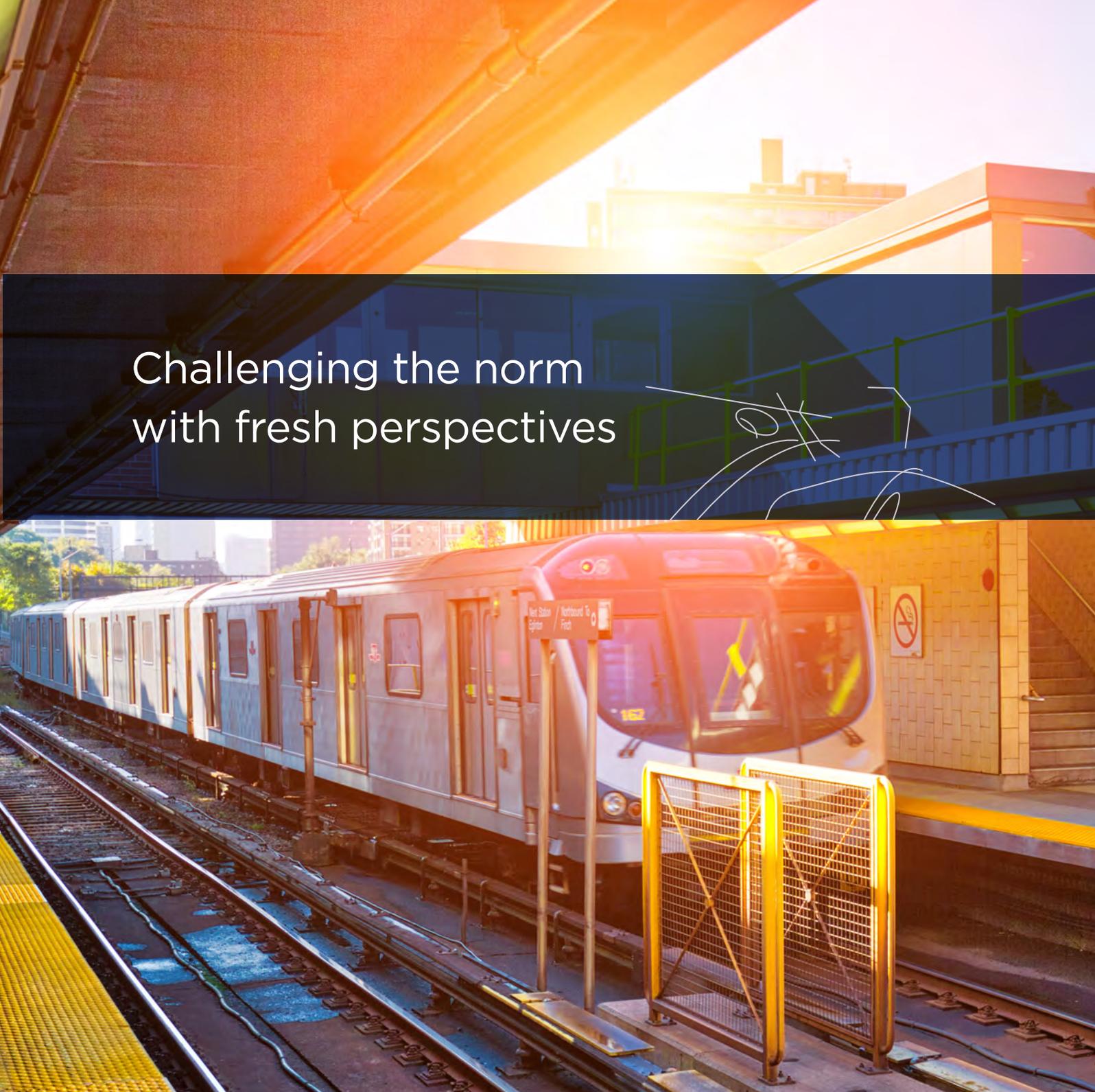
Cooperation can deliver very successful programmes. What prevents the delivery of successful programmes is when each team member or organisation has a different understanding of the programme, accountabilities and responsibilities. Success stops when individuals, teams and organisations seek to protect or ringfence information. Success stops when communication fails. Success stops when we do not set the programme up properly. Success stops when we do not understand the DNA of the programme.

RLB's Assured Start programme analyses the current or envisaged programme environment to decode that DNA. From a targeted initial assessment, the team builds a series of recommendations which will set up the right environment to build a successful programme ecosystem, one that builds resilience, reduces risk and increases the probability of success. This approach ensures that regardless of whether the best delivery approach is collaborative, cooperative or standalone - the right strategies have been designed and implemented from the outset giving the best chance of success. **P**

Mark Weaver

Commercial & Technical Director, United Kingdom





Challenging the norm with fresh perspectives

The Toronto Transit Commission (TTC) Spadina Subway Extension is a major, multi-faceted transportation project that provides a Rapid Transit Link (subway) across the municipal boundary between the City of Toronto and the Regional Municipality of York. The project expands the Line 1 subway line by 8.6 km and adds six new TTC stations. The project also includes the redevelopment of infrastructure displaced by the subway line extension including City of Toronto Fire Station 141.

RLB was retained to participate with the project controls team, Stantec, to provide full pre-construction cost estimates for the project to validate the business plan, including risk assessments.





ESPORTS

A GAME CHANGER FOR SPORTING AND ENTERTAINMENT VENUES

Oliver Nichols
Director, Australia

Competitive computer gaming, known as esports, is predicted to become the biggest spectator sport, surpassing American Football, by 2025. The esports phenomenon is challenging our venues and driving us to create flexible spaces to accommodate esports events and its growing community.

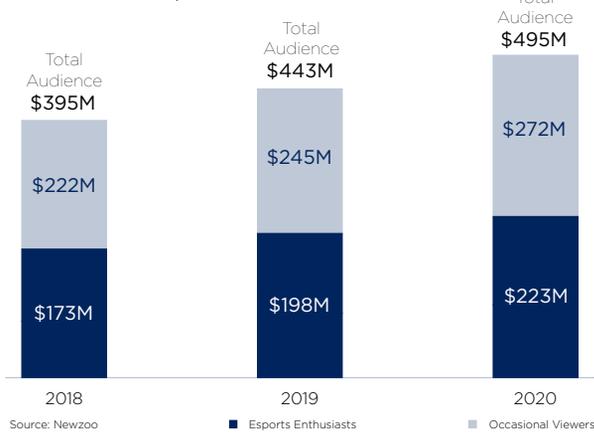
RISE OF ESPORTS

The earliest known computer game competition dates back to 1972 at Stanford University, and as computer games evolved, competitive gaming became more popular. Whilst video games continued to develop and become more complex, it was the development and accessibility of faster broadband internet speed, along with better connectivity, that led to global competitive tournament play and live video streaming.

Fast forward to today and the popularity of esports has grown exponentially year on year along with sponsorship and prize money. Professional players compete in esports leagues and esports teams are increasingly becoming a part of pro sport leagues and franchises.

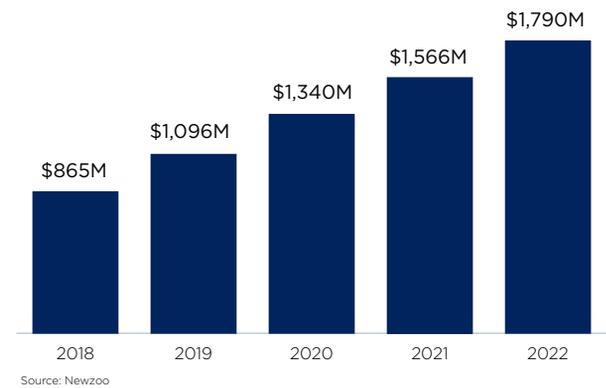
With the largest growing fanbase of any sports, there are estimated to be over 495 million esports viewers worldwide, with 223 million of these being devout esports enthusiasts.¹ In 2019 we saw teenage gaming sensations pocket millions of dollars watched by millions of fans across the world.

2018-2020 Global Esports Audience



2018-2022 Global Esports Market

Forecast toward 2022



CONNECTIVITY

For a sport that happens largely in the virtual world, the opportunity to connect in the real world is critical to building a community. In esports terms, connectivity is both physical and psychological and whilst esports generates a mass of online spectator's, events are becoming increasingly popular as players and fans get the chance to engage with each other.

When stability and connectivity is key for an esports tournament, finding a suitable venue to host esports events can be a challenge. There are varying types of game platforms and competitions, meaning that no one layout suits all, and there can be a need to dramatically transform venues to accommodate gamer and fan engagement.

SPACE INVADERS

Currently esports are being played in a variety of sport and entertainment spaces such as cinemas, convention centres, arenas and stadia, and all have pros and cons.

The large open space of a Convention Centre enables the venue to be adapted to suit the specific competition requirements and have been utilised for tournaments with multiple matches taking place at any one time. However, overlay costs can be higher due to the need to temporarily install hi-tech infrastructure equipment, stages for competitors and seating for spectators.

Stadia and Arenas have the advantage of existing infrastructure and can easily be adapted with a variety of stage styles. Many esports tournaments use an end-stage setup where a ringed spectator seating is required, Arenas can be configured with a centre staging and centrally hung jumbotrons. Stadia and Arenas can accommodate large crowds, however upper seating bowls are generally empty due to poor spectator viewing of players, commentators and most importantly screens. In addition, there is often a requirement for additional temporary mechanical and electrical services due to the IT load and cooling requirements.

THE CALL OF DUTY

Venues are starting to explore what their purpose-built facilities will look like in the future and how they can attract this next generation of fans while satisfying the diverse needs of competitors. This leads to the challenge for the built environment to design adaptive entertainment venues where traditional bowl designs can compromise the experience of the esports players, fans or both.

Lead designers have commenced the journey working with stakeholders to create appropriate venues and solutions to these issues.

Detroit based architects Rossetti, consider that an inverted bowl arena has several benefits for esports. The inverted bowl concept brings spectators closer to the action by eliminating the upper bowl and projecting tiered balconies forward. With large ceiling hung videoboard, this arrangement provides fans with optimal views of screens and players on-stage. In addition, compared to a traditional bowl, an inverted bowl generates a smaller footprint which can provide a more scalable solution for dedicated esports venues.²

HOK have also been exploring the scalability and adaptiveness of venues to meet specific gaming needs with player infrastructure being easily transferrable around an arena to create different atmospheres and experiences. HOK has designed a circular system consisting of large, movable, petal-shaped screens with the ability to display content and/or be used for lighting and effects. These huge surfaces hang above the seating bowl and double as team screens for a player's hub located centrally in the arena.³

Similarly, Populous has been using new technology to design a ceiling transformation system that shape-shifts into a variety of configurations and sizes dependent on an events scale. The ceiling acts as an immersive projection canvas and can be adapted from full arena mode into a half-house or quarter house mode to create a more intimate and atmospheric venue.⁴

PLAYER ONE READY

Whilst many larger esports events will continue to be held in existing large-scale stadia and arenas, there is an increasing demand from organisations and companies to create dedicated esports arenas.

Late 2018 saw the transformation of part of the Arlington Convention Centre Center into the largest dedicated gaming and esports facility in North America with a capacity of 2,500. The arena is open to the public seven days a week and features over 50 gaming stations. In addition, the arena houses broadcast studios, team training facilities and social and retail spaces for spectators and fans. It has become the source of valuable data and insight into the expectations of fans and engagement from a social and cultural perspective.

In 2021 we should see the completion of Fusion Arena, the first ground-up purpose-built esports arena in the western hemisphere. The 3,500-capacity venue located in Philadelphia will accommodate team offices and training facility along with a broadcast studio. Spectators will be treated to a variety of viewing experiences including two balcony bars, seats with USB ports, boxes and suites.

On a smaller scale, this year will see the Fortress Melbourne Esports Arena become the largest esports arena in the southern hemisphere. Located within the Emporium Melbourne shopping complex the venue will include a 200-seat purpose-built esports arena, gaming suites, restaurant, two bars and a professional esports boot camp room and training facilities.

At the other end of the spectrum, Hangzhou, is home to the first esports town. Opened in late 2018 and operated by the Hangzhou government, the esports town covers an area of 17,000 square metres. There are plans to build 14 esports facilities before 2022 including a theme park, esports academy, esports themed hotel and even a hospital specialising in treating players.

Hangzhou's esports town is the first of its kind in China, however it is unlikely to be the last, due to the huge popularity of esports and previous announcements of plans for similar esports towns in the East China cities of Wuhu and Taicang.

THE FUTURE'S BRIGHT

As global brands increase sponsorship and marketing, the esports community will continue to grow. Based on the revenue and fanbase growth in esports over recent years, the forecast future for the esports industry is bright. This will inevitably lead to advancements in technology and changing requirements of the industry. The built environment will therefore need to ensure venue renovations and purpose-built facilities keep pace with these progressions. With the emergence of purpose-built venues across the world there will be a need for existing stadia and arena venues to experiment and innovate if they wish to compete for esports events and a piece of the market.

The esports phenomenon is showing no signs of slowing down and is undeniably a game changer in the design of our sporting and entertainment venues. **P**

Oliver Nichols
Director, Australia

¹ Global Esports Market Report, Newzoo, 2019

² The Evolution of Esports Venues, Rossetti, September 2018

³ Developing the Esports Arenas of the Future, HOK, 2019

⁴ The Future of Esports Arenas, Populous, 2017



THE NEW ERA OF PROJECT SCHEDULING:

The Practical, the Possible, and the Pitfalls

John Armstrong

Associate, North America

Today, one of the most challenging tasks facing the construction is the ability to complete projects on time. Construction firms and owners are seeking creative solutions to manage schedule risk and perfect their ability to deliver certainty. Liquidated damages, spoiled reputations, and lost profits are just a few motivators for any player the industry to improve its performance on projects.

Improved schedule management practices can take multiple forms. The most basic is planning and scheduling resources in the most efficient manner. The industry is experiencing workforce shortages across nearly all trades and lack of qualified labor is a regular cause for delays on construction projects. This can be partially mitigated by ensuring subcontractors and crews are working without interruptions caused by congested areas, multiple mobilizations, sporadic work flow, and/or partially available work fronts. Giving crews continuous, logical, and uninterrupted work flows helps improve productivity and efficiency as well as improves subcontractors' confidence in the schedule and aides in their planning efforts.

Another method to improve schedule certainty is to improve the accuracy and frequency in which schedules are updated. The schedule is at the very least a contemporaneous representation of the parties' understanding of that overall plan, what has been completed and what will happen in the future. The schedule is then intended to be used to make informed business decisions and without accurate and timely information, contractors and owners cannot make smart decisions on how best to proceed. Having accurate, contemporaneous records increases the likelihood of resolving time-extension requests at the project level and identify

practical methods for accelerating the schedule when faced with delays. Accurate schedules also minimize costly disputes that cause distractions on the project and rarely results in a winner when it turns into litigation or arbitration. Contractors, owners, and other construction firms can improve update accuracy by closely adhering to AACE International's published recommended practices for planning and scheduling.

Based upon my experience and anecdotal evidence, the call for aggressive schedules is recently more likely to come from owners than contractors. However, most owners fail to realize that accelerated schedules come with higher price tags. Contractors aren't typically willing to forecast optimistic completion dates because they are feeling the real impacts of labor and material shortages that often prevent aggressive schedules. The most common times I see aggressive schedules being implemented is when the owner demands it or a contractor is relying on an early completion date as a bidding strategy. As a whole, I believe that the overall industry focus is more on driving scheduling certainty than aggressive schedules, which can be pricy, risky, and often unachievable.

PROJECT SCHEDULING AND THE PROMISE OF TECHNOLOGY

Scheduling-related software has been increasingly improving for the last decade, making it easier to create schedules, perform risk analysis, and produce reports.

Some of the most exciting programs contractors have embraced create schedules and assist planning through all stages of a project. SYNCHRO and other programs tie BIM to the schedule, are

becoming more widely accepted in planning and scheduling efforts. Some scheduling software platforms, such as Asta Powerproject, have made a concerted effort to make it easier to create 4D schedules.

Software can also prepare near-real-time reports on schedule performance, often through add-ons to existing construction management systems, such as those offered by Prolog, Aconex, and Ineight. Detailed comparison reporting is also feasible through standalone packages such as Acumen Fuse or Ron Winter's Schedule Analyzer. These platforms allow schedulers to share with stakeholders a more in-depth view of the project schedule—one that goes beyond PDF printouts and doesn't require expensive software licenses. In other words, superintendents and managers now have unfettered access to the inner workings of complex schedules that had previously been a black box.

Dashboarding—the digital display of multiple key performance indicators on a shared web page that is constantly updated—is becoming more and more popular, with some contractors and owners designing their own in-house systems that connect scheduling databases with Business Intelligence (BI) platforms, such as Tableau and Power BI. Dashboarding is a great way to communicate complex scheduling information to non-schedulers or even non-construction professionals, and can be used to capitalize on opportunities as well as mitigate project risks that might have been missed through traditional-style monthly reporting.

Looking ahead, I see augmented reality (AR) being used to identify conflicts or problems in the field before they become a delay. In the construction industry, AR is still in its infancy and has a high cost of entry, but I believe it will become much more prevalent as that financial barrier lowers, given the value it provides. TILOS, Asta Power Project, and Phoenix Project Manager are competitive, viable alternatives to Primavera P6 and Microsoft Project. And it seems like there are new suites coming out all the time that assist in conducting pull planning sessions.

PROJECT SCHEDULING AND THE PERILS OF TECHNOLOGY

While technology is unquestionably a driving force in scheduling, it's not without its caveats. In fact, technology—in and of itself—may not necessarily improve efficiency and productivity. I have growing concerns that many schedulers function more like software developers than they do actual planners.



They are not able to determine the accuracy of the information produced from these new software packages. Accordingly, we have to make sure that advances in technology aren't just a 'cool new toy' and are a tool that leads to smart decision making and identifying pragmatic solutions to common problems.

Also, arbitrarily or capriciously removing "fluff" or float time to produce more aggressive schedules is not necessarily the goal or even desirable. Float is often overlooked as a tool to build the most realistic, feasible schedule possible. One of the benefits of technology is to eliminate mundane scheduling work, such as repetitious tasks and identifying how complex sequences of work relate to each other. This helps save time and affords construction professionals more opportunities to find a better way to build the project or avert risk. And this can be achieved by the smart utilization of float—not its elimination.

This situation reminds me of something my mother used to say to me: "Don't be in a hurry to screw up." There are actually many instances where it does not make sense to aggressively complete select scopes of work within the schedule; the benefit it brings is not worth the costs and risks associated with the acceleration. Here's an example: building or renting additional concrete formwork may result in completing some tasks earlier, but it incurs additional costs and the time saved may not result in other scopes wrapping up any sooner or shortening the critical path. Given the ongoing labor shortage, I think a better application of new scheduling technologies is to minimize idle or standby time for resources as well as generating uninterrupted work flows for crew.

STAYING ON THE RIGHT TRACK

Continual growth and improvement should always be the primary goal for the construction industry, regardless if we are talking about safety, quality, time, and/or money. There are three actions that I believe will improve the industry's scheduling and planning performance:

- Promote advancing technologies. Technological innovation can help address the shortages in competent schedulers by minimizing redundancies and sharpening data analytics. Specialized technology, such as artificial intelligence, can also help with running scenarios and quantifying risks that previously have been difficult and time-consuming. Developments in 4D scheduling also help eliminate conflicts prior to work starting in the field and aid in planning efforts. Finally, new scheduling software is creating much-needed competition that the industry has not seen in a while. This is dropping the costs of software while simultaneously improving performance and usability.
- Democratize project planning and scheduling. Succinctly put, this means getting all project stakeholders (including the people who are actually building the work) involved with the upfront planning. While there has been some industry-wide progress on this front in the last few years, there's still plenty of room for improvement. There are many exciting practices being generated by groups like the Lean Construction Institute, and I am optimistic that this trend of collaborative scheduling will continue.
- Emphasize field experience as well as software proficiency. I have a growing concern that many of today's schedulers lack relevant field experience. They are unable to critically evaluate the accuracy or validity of outputs that come from scheduling software. There is no simple answer to this problem; however, I know some contractors train foremen and superintendents to become full-time, long-term schedulers. I have seen this successfully done on several occasions and I hope to see this practice become more prevalent. I have a tremendous amount of respect for the folks out in the field and some of the best schedules I have seen have been generated by former craft persons. In fact, my first scheduling mentor was someone who started in the construction industry as a mason.

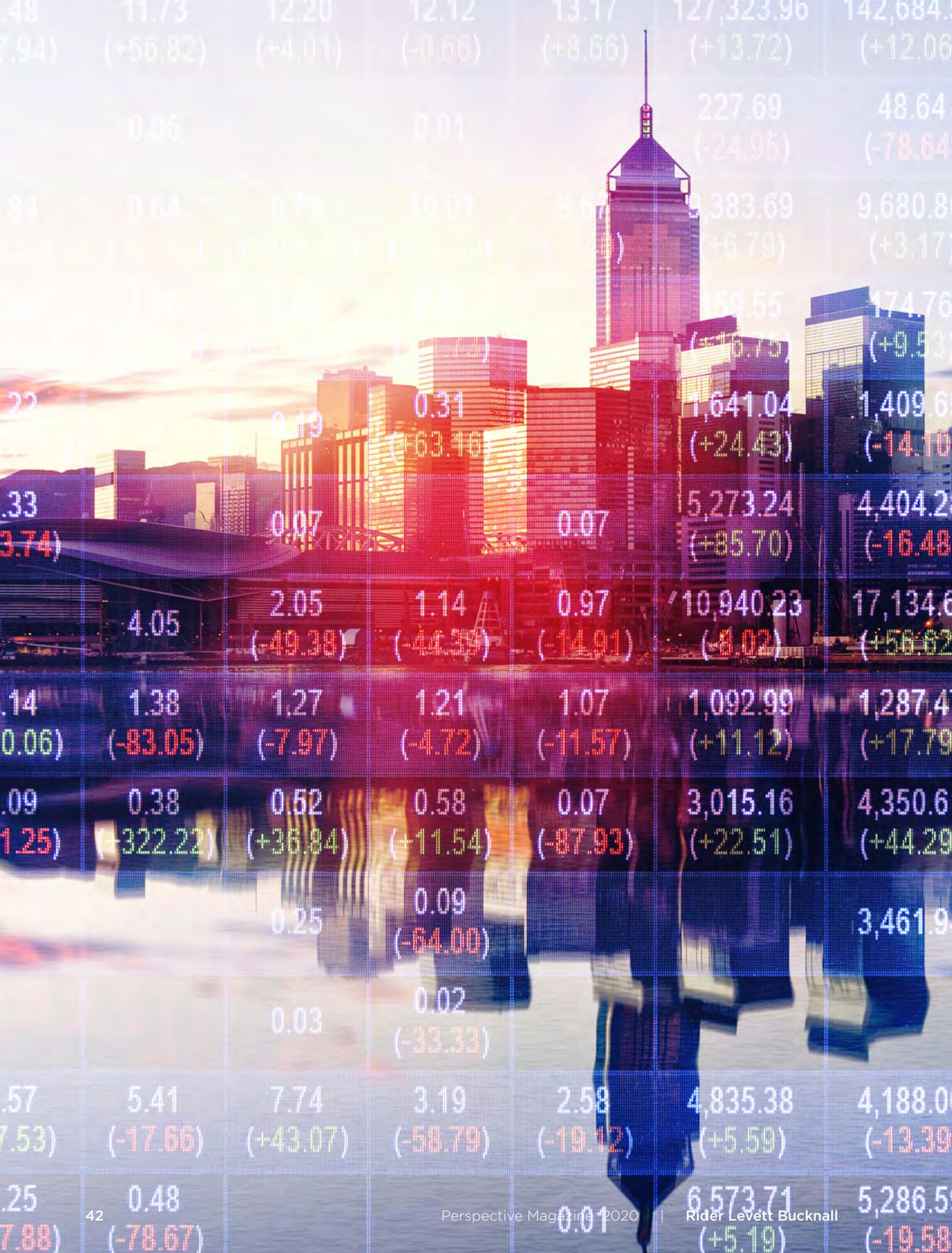
Implementing these three strategies will simultaneously help us reclaim the basics of sound planning and scheduling and ensure a vibrant, relevant future for the practice. I am constantly advocating that construction professionals understand and follow closely the recommended practices published by AACE International to avoid the late projects, blown budgets, claims, and confusion that are the inevitable result of slipped standards. If we collectively address issues that range from shaping the best software to educating and training new practitioners, the benefits will extend to the entire industry. **P**

John Armstrong

Associate, North America

As seen in:

Construction Executive, December 2019, "The New Era of Project Scheduling: The Practical, the Possible and the Pitfalls"



THE PAST, PRESENT, AND FUTURE

of Government Funded Projects' Cost Management in China

Wang Weiqing
Director, North Asia

THE HISTORICAL BACKGROUND

Since 1949, China has adopted a planned economy system. In construction industry, the pricing system used in cost management was based on standard schedule of rates, which was a set of combined standard items of quantity and price. At that time, projects were allocated to construction companies according to government plans, construction costs were priced according to standard rates, and final accounts were prepared based on actual work done. In the absence of cost consulting company, all the cost estimation works were done by design institutes.

In 1984, China had turned to a system of planned commodity economy which acknowledged buildings as tradable products. Tendering system was introduced in that period, yet, there was no change to the use of standard schedule of rates. In 1992, China began to move towards a market economic system in which the market was expected to play a fundamental role in resource allocation. In 2014, China's leaders pledged to let the market play a decisive role in the economy, and the planned economy system was repudiated from that time onwards.

During the above period, the government promulgated the Preambles for Bills of Quantities for use in Construction Works (GB50500-2013) in 2003 for the construction sector. However, the mechanism where prices were determined by the market was not popular in government funded construction projects, because the government had not established a cost management system which was compatible with the market economy.

THE CURRENT SITUATION

At present, the government funded construction projects, which still dominate the construction market in China, are facing some challenges in terms of project cost management:

- **Current policies and regulations are incompatible with market economy**

The existing laws and regulations of project cost management are formulated in the planned economy period. Many laws and regulations were issued before the implementation of the decisive market economic system, and for this reason, they cannot meet the requirements of the market economy. These include laws and regulations imposed on the Cost Estimate System, the Bidding System, the Final Account Settlement System, etc.

- **Current government regulatory system does not adapt to marketization**

The government funded projects are supervised by different segments of the government body. There is no single department to undertake the responsibility of investment, and the developer is not assigned as the legal entity. Administrative management still plays a leading role in cost management.

- **Standard schedule of rates remains dominant**

Although China has implemented the Bills of Quantities system, the cost management department still relies on the Standard Schedule of Rates to handle tender evaluation, final accounts, cost audit, etc. Furthermore, the developer, consultants and regulatory departments have expanded the use of Standard Schedule of Rates for the sake of convenience and exempting themselves from liability.

- **Segmented cost management**

The project cost management in China is segmented into stages, which deprives cost practitioners of participating in full quantity surveying and building up relevant experience. In the segmented process, different parties have different responsibilities: design institute is responsible for the cost estimates of schematic

design and preliminary design, tender agent preparing the tender documents and bills of quantities, cost consultant preparing the control tender price, then selected experts are engaged to evaluate the tender. At the construction stage, the cost consultant or the supervision company is in charge of the cost control. The project audit is undertaken by the auditing company.

- **Design documents lack specific details**

As the design documents are developed according to the Standard Schedule of Rates system in China, most of them lack specific details and cannot fulfil the requirements of fair market competition as well as full quantity surveying.

THE WAY FORWARD

In coping with the increasing demands of a market-oriented cost management for government funded projects, a number of reforms should be carried out from the perspectives of a market economy.

- **Implement a project legal person's responsibility system**

A project legal person's responsibility system should be implemented. Moreover, the developers of government funded projects should be allowed to carry out full quantity surveying services in accordance with international standards.

- **Cancel the bidding ceiling**

There should be no maximum limit to the quotes in order to reflect a real market mechanism. More stringent penalties on illegal activities should be imposed to maintain a sound market environment.

- **Eliminate the use of Standard Schedule of Rates**

In order to fully support the market mechanism, it is recommended to eliminate the use of Standard Schedule of Rates for evaluating contract prices, reviewing change orders and settling final accounts.

- **Establish a market-oriented database of project costs**

A market-orientated database of project costs should be set up. The database and other cost information including market price and index should be released to public on a regular basis.

- **Implement a complete cost management throughout the process**

An integrated cost management system with liability should be put in place to replace the current segmented cost management. This integrated system should cover the full spectrum of quantity surveying including the preparation of estimate, tender agent, contract management, project final account settlement, etc.

- **Formulate a well-established standard contract**

By integrating the international experience and the characteristics of construction industry in China, a well-established standard contract for building and civil engineering projects should be formulated to meet the demands of different entities, outsourcing models and pricing models.

- **Reform the design deliverables documents**

The existing design deliverables documents should be reformed and provide more detailed information with reference to international standards. For example, the documents on tender drawing stage as well as technical specification should be added.

Currently, the Chinese government has run a pilot program which carries out the full quantity surveying services on some selected government funded projects. Although overseas cost consulting companies are mainly involved in foreign and private investment projects, it is necessary to further explore the integration of the international cost management model into the existing cost management practice of government funded projects so as to develop a suitable cost control system. **P**

Wang Weiqing

Director, North Asia

IT'S NOT ABOUT GROWTH, IT'S ABOUT EFFICIENCY

Andy Stamps

National Head of Infrastructure, United Kingdom

As an organisation we work across many geographies – each with their own challenges and their own opportunities. One area that unites us is the need to operate our infrastructure efficiently and smartly, with the least intrusion, while adding the maximum value to our end customers.



IT'S NOT ABOUT GROWTH, IT'S ABOUT EFFICIENCY

One thing that is apparent - whatever the area of infrastructure we are working on, and unlike in other areas of the built environment - is that the drivers for investment are not about growing or expanding a portfolio or increasing revenue through more shops, office space or apartment blocks. It is about constructing something to help an organisation operate more effectively and efficiently, for the benefit of their customers - all of us.

By 2030 it is estimated that around 60% of the population will live in urban areas, with one in every three people living in megacities. Urbanisation splits opinion on whether it is a positive change, however, it is certainly continuing for the foreseeable future.

One viewpoint is that urbanisation is undeniably a good thing. There is robust evidence that cities outperform rural areas and even government thinking in terms of their efficiency in all aspects, such as their consumption of resources, their services and their connectivity. Many commentators quote cities such as New York, London and Tokyo as leading the way in terms of their infrastructures' performances. The draw of young people to cities is a sign of this progress with places like Birmingham in the UK now boasting the largest population of under 25 years old anywhere in Europe.

WORKING, PLAYING AND LIVING MORE EFFECTIVELY AND EFFICIENTLY

However, the real agenda in infrastructure is how we work, play and live in these spaces in a more effective and efficient manner. This is further enhanced by examining where we can add value to our clients, and to the communities which our clients serve. We all know we only have a finite level of resources - be that water, fossil-energy, food or land. How we consume and how that consumption is invested is the key to our future. It is cities and their infrastructure coupled with strategised consumption which is integral to the solution.

Of course, "more effectively and efficiently" itself has different meanings dependent on infrastructure sector, geographical region and country. For example, a recent and innovative project being delivered in the UK is the Very Light Railway (VLR). The VLR is a joint initiative led by WMG, Dudley Metropolitan Borough Council and Coventry City Council which will result in a lighter, and less impactful tram that can run across existing land with less intrusion and street furniture. The VLR signals an evolution for the UK transportation system. In less developed countries where economic barriers might be a restriction, the creation of the VLR with its lower energy and capital costs, could mean the introduction of a public transport system that connects people and their cities in a way that previously was unaffordable and unsustainable.

The innovation of such projects as the VLR - and the Sydney, Newcastle Canberra and Gold Coast Light Railway that RLB has been involved with in Australia - also reflects the increased demand to consider the commercial and socio-economic value of our projects from investors, owners, operators and the communities we serve. With less impact on the environment during construction and operation and allowing many communities improved connectivity, the value of such projects speak for themselves. At RLB we are helping clients assess all aspects of the value they are adding to the communities they design, build and maintain.

PROCURING FOR VALUE, NOT COST

Enhancing the outcomes for clients and improving the perception of our industry is key. Our industry, especially in the UK, has been driven overwhelmingly by cost and initial capital expenditure, in particular, for too long and our supply chain has been hampered as a consequence meaning that research and development is nominal and very slow to deliver advances. We still procure and construct with methods that are archaic. The pace and extent of development in other industries in the same timescale shows us how we should be capable of transforming what we do, how we do it and the outcomes we deliver.

In the UK the government is challenging industry to reform itself. In the Construction Leadership Council's 'Procuring for Value' report, authored by Ann Bentley, RLB's Global Board Director, we are encouraged to procure on the basis of the value of the outcomes delivered, rather than the capital cost of the inputs. This promotes a much longer-term view, that rewards innovative solutions such as VLR and recognises the sustainability of supply chains as a key component for project success. RLB's depth of knowledge of both cost and value makes us well-placed to help move our clients to take this longer-term value-based approach.

CHANGING THE SHAPE OF THE COMMUNITIES WE SERVE GLOBALLY

Infrastructure, probably more so than any other area of the built environment, reflects the changing shape of the communities we serve globally. Innovation - whether it is connecting people through rail and roads or virtually - or by lessening the environmental impact of smart delivery - can positively change the economy, the opportunity and the landscape of the community it serves.

We need to create a legacy of raising aspirations, enhancing skills and capabilities as well as securing jobs for the future. What a privilege it is to be part of that endeavour. **P**

Andy Stamps

National Head of Infrastructure, United Kingdom



Procurement is a widely debated topic, both in the New Zealand construction industry and worldwide. A buoyant construction market for the last seven years has seen heightened scrutiny locally in Auckland, with problems encountered by New Zealand heavyweight Fletcher Construction, and the liquidation of Ebert Construction, Arrow International and Stanley Construction.

As a result, the New Zealand Institute of Quantity Surveyors (NZIQS) has called for the government to address the issue of risk transfer in the construction industry. The current government has pushed forward with the Construction Accord, which looks at making some key recommendations around procurement models, risk transfer and ensuring the long-term financial viability of contractors.

However, this forms part of a wider issue and shouldn't be limited to government and their sectors.

Over the last few years, we have seen many clients (public and private) favour a two-stage procurement route with Early Contractor Involvement (ECI), especially on significant projects (+\$100M). This has typically been a direct consequence of the heated market and the need to secure the right contractor early from a limited

pool of experienced resources. These projects have largely still been under a traditional contract form with design risk remaining with the client, although some key projects of late have been under a two-stage design and construct contract. The New Zealand Design and Construct (D&C) market though is immature, so the single stage early D&C tender is typically not an option, as it so often is in the UK or in Australia.

These experiences are a reflection of a busy construction market, but consideration is needed to understand how the benefits and risks of ECI, and the two-stage tender approach, translate in all markets and within the economic cycle.

Clients, project managers and colleagues have probably encountered vastly different experiences of ECI. Some will be very positive, others not, with different project outcomes, different criteria for success, and having experienced varying impacts on their role in the project. The approach to the ECI process is not textbook, and the process can evolve through lessons learnt and by understanding what the critical success factors are.

This article looks at the key drivers for the ECI route and the main deliverables expected, while also summarising the critical success factors and reasons why this style of procurement may



EARLY CONTRACTOR INVOLVEMENT IN A BUSY MARKET

Josh Tattley
Associate Director, New Zealand

sometimes fail to live up to expectations. But before it's crunch time, some crucial questions need to be asked. What are they key client and contractor benefits? Can ECI be the long-term preferred procurement approach through the full economic cycle?

SO WHY ECI?

Traditionally, projects with the following characteristics have lent themselves to being procured via an ECI route and typically have the most to gain:

- Program driven projects where a traditional full design and tender route will fail on the required completion date. Requirements for fast tracking, with critical lead times or where enabling works, structure or envelope can progress while the remaining design is being finalised and able to be tendered later, off more complete documentation
- Complex projects with staging requirements, site restraints, ground conditions and/or requiring significant temporary works
- Complex design solutions requiring main contractor and sometimes, more importantly, sub-contractor design and co-ordination
- Significant projects \$100M+ requiring the client to secure a large financially sound builder, experienced team and appoint key sub-contractors early during the design phase

KEY DELIVERABLES

When engaging main contractors in the Stage 1 ECI process, it is crucial for all parties to be aligned on expected outcomes:

- Detailed construction program and identifying key milestones and early critical path lead times
- Design review and buildability analysis including:
 - Craneage options
 - Traffic management plans
 - Site setup and efficiencies
 - Temporary works options
 - Alternative methodology and staging options
- Key sub-contractor input including budget information, design input and value management input
- Potential overall budget review by the main contractor
- Ensuring the ECI contractor's project director or key site manager is involved throughout the ECI process.

WHAT DRIVES SUCCESS

Common factors driving a successful ECI process can include:

- A genuine collaboration and partnering approach from all parties - the client, consultants and the contractor. Trust and openness are crucial with everyone working for the good of the project and its long-term value rather than individual goals
- An agreed framework and deliverables including a program of what is expected
- Clients should pay key senior people's time and knowledge
- Inclusion of key sub-contractors in the ECI process for design opportunities, improved co-ordination and budget input. Sub-contractors should provide a schedule of rates or budget/estimate at key design phases. Sub-contractor ECI can also be tendered on a schedule of rates or budget price to pick a preferred party, such as tendering a Stage 1 Preliminary & General (P&G) and Margin with a main contractor before engaging them in ECI. Typical sub-contractors may include piling, structural steel, façade, lifts and mechanical
- Skin in the game at commencement of the ECI phase. This may be a Stage 1 tender with fixed P&G, a fixed margin and a program for the main contractor, or a budget pricing from key sub-contractors. It draws a line in the sand while providing increased time and cost certainty to the client
- Clear conditions of Stage 2 contract are agreed at commencement of the ECI phase
- Long-term relationships though multiple projects over time, with high levels of trust and continuous improvement through lessons learnt

WHEN IT DOESN'T QUITE WORK

Just as there are many factors for success, the pitfalls that can offset the benefits of ECI can include:

- Lack of ECI maturity and lack of trust from both clients and contractors in terms of experience and approach
- The ECI objective being predominantly about 'securing a builder' and security of program rather than leveraging all the ECI benefits and de-risking the project for the good of all parties
- Contractors with the wrong approach, looking to 'get their foot in the door' and simply wanting to secure a negotiated project for both cost and program

- The nominated ECI team not being provided or available, with less experienced resources and subsequently not being able to provide the right information
- Contract conditions significantly negotiated at the end of the ECI phase rather than upfront in the initial Stage 1 ECI appointment

Approach by the contractor's commercial team and management to the Stage 2 pricing and the ECI hard work, benefits and gains can be quickly undone by an inexperienced or immature approach to pricing. 'Open book' sub-trade tendering does nothing to solve the contractor's approach to pricing of the gaps, excluded tags and the perceived risks.

CLIENT BENEFITS

What are the benefits a client could receive from the ECI process (over a competitive full tender process) in a busy market, and will these benefits sway clients to continue to pursue the ECI in a less heated market?

- Long-term collaborative relationship with the contractor with continuous improvement
- A more attractive project and procurement route for the better contractors to participate in
- Ability to secure the right team and expertise early without price being the key factor
- Fewer surprises. ECI should identify, mitigate and appropriately allocate risks in a timely fashion before they occur onsite, with time and cost penalties avoided
- Higher cost certainty, with more closely aligned entry vs exit cost. This is heavily dependent on the procurement approach and when the main contractor is signed up. The ECI route can provide the client with a higher level of cost certainty when the contract is executed. Alternatively, if a contract is executed and commitment made based on P&G and margin only, then low-cost certainty is ascertained by the client

CONTRACTOR BENEFITS

Contractors also get the benefit of forging a long-term collaborative relationship with the client, leading to a more trusted position for future projects. This also allows contractors to have reasonably standardised agreed contract terms with the client which have a fair risk allocation for both parties.

Other benefits at a project level include:

- Design input, and knowledge ahead of pricing, with the ability to secure key sub-contractors on both price and non-price attributes early
- Full access to the consultant team for tag clearance and sub-contractor procurement. This allows sub-contractor packages to be more resolved with tags or issues agreed upfront rather than down track via the typical variation process
- Collaborative risk management, willingness to share risk and risk allocation to the party best positioned to manage the risk
- Reduced overruns in time and cost
- Reduced risk of conflict
- Greater security of both program and profit margin, with the real risks understood and controlled

ECI THROUGH THE ECONOMIC CYCLE

Long-term relationships built on trust and openness, that produce genuine collaborative environments will always be beneficial for projects. Clients and contractors who forge these relationships are more likely to value them, regardless of the economic cycle. Clients should understand that the entry price doesn't reflect exit price, and that the product received on completion can be superior when there is influence over the sub-contractors selected.

There will always be an argument for a competitive tender situation and rightly so. Some projects are more suited to a competitive tender, provided a good relationship and fair contractual terms are in place, should remain attractive to the main contractor market.

A little onus must sit with main contractors and sub-contractors to retain their policies on risk allocation through all economic cycles, and to avoid relaxing these in order to win work in a less heated market.

In closing, there is no reason ECI shouldn't be successful, if not more successful, in a less heated market. However, time will tell if we, as an industry, have learnt from history or not. **P**

Josh Tattley

Associate Director, New Zealand

STRATEGIC PROCUREMENT

How to refine your RFP process to position your team for exceptional outcomes

Faced with constant pressure to reduce costs and increase efficiency, organizations are continually seeking ways to deliver their products or services in ways that are quicker, cheaper, and better. To support these goals, procurement teams find themselves hyper-focused on crafting processes that offer value, enhance competition, and maximize the chances for success.

The advent of e-procurement programs (many with attractive track records) has allowed companies of all sizes to adopt standardized procurement methods and tools. While this approach is well suited to some applications—such as purchasing office supplies or equipment where numerous suppliers compete—its usefulness is limited when it comes to more complex and specialized procurements, such as those for professional services.

A strategically planned procurement process can maximize results for all parties. The elements of a successful campaign are summarized below.

ENSURE INTERNAL COORDINATION

- Map out objectives. Lay out the organization's goals in the RFP: discuss the aims of the procurement with the team in advance, outline in simple terms how the procurement relates to the organization's goals, and explain what role the selected contractor / consultant will play in advancing these objectives.
- Involve stakeholders. Ask key individuals who will play a significant role in the implementation phase—especially those who are not part of your organization—to participate on the interview panel. Engaging them early in the process will pay off down the road; establishing a relationship with people gives them an investment in the outcome.
- Know the rules. Make sure someone on your team has a strong understanding of the

legal statutes, codes, and other policies and procedures that will govern your process. Federal, state, and local guidelines apply here, as well as your organization's internal policies.

FACILITATE COMMUNICATIONS WITH PROPOSERS

Clear, timely, and complete communication with all stakeholders—before, during, and even after the process—sends a strong signal to all about your professionalism and engagement in the project, and ultimately attracts high quality submittals. Here are some tips on being a proactive communicator:

- Outreach in advance. Before issuing the RFP, get the word out that it's coming. More interest = more competition = better chance of success. Local industry event organizers are always looking for speakers with relevant, time-sensitive content, and yours may be exactly what they are seeking. Done right, these presentations provide an opportunity to convey what you're looking for in an informal setting that's much more engaging and compelling than the paper (or digital) RFP document.
- Accurately describe the project. Sure, it would be great to find a team that has done exactly what you are looking for, earlier this year, in your market...but if your requirements for "similar" experience are too restrictive, you will only limit competition. Structure your RFP in a way that defines your needs in general terms, and avoid being overly specific.
- Allow adequate turnaround time. Proposers need time to develop quality proposals. Depending on the nature of the RFP, this can range from a few weeks to several months.
- Encourage dialogue. Provide an opportunity to ask questions about the RFP and invite all parties to submit their questions. When you respond, provide your answers in writing to everyone; a website that's updated on a regular

basis is an excellent forum for this kind of communication.

- Be transparent. Lay out your process clearly in the RFP, include a schedule (and stick to it!), and don't be afraid to over-communicate.

ASSEMBLE AN EXCEPTIONAL TEAM

Executives and managers can provide great added value to their organizations by taking a hands-on role: collaborating with their procurement teams, working together to produce a thoughtful, strategic approach that clearly communicates desired outcomes, and aligning the RFP process with the organization's goals. Two positions are key to ensuring a project's success:

- Project champion. A robust senior leadership presence can be transformative. An effective project champion oversees the process, collaborates with the internal team, and is visible throughout the process. Proposers will see and appreciate this involvement, recognize the work is important to your organization, and be motivated to invest more time and effort into crafting a proposal that hits the mark.
- Procurement manager. RFP teams are usually led by a Procurement Manager, whose judgment and business savvy will be central to finding the best and brightest talent. Invest in hiring capable, qualified individuals who are positive team players with experience running successful procurements.

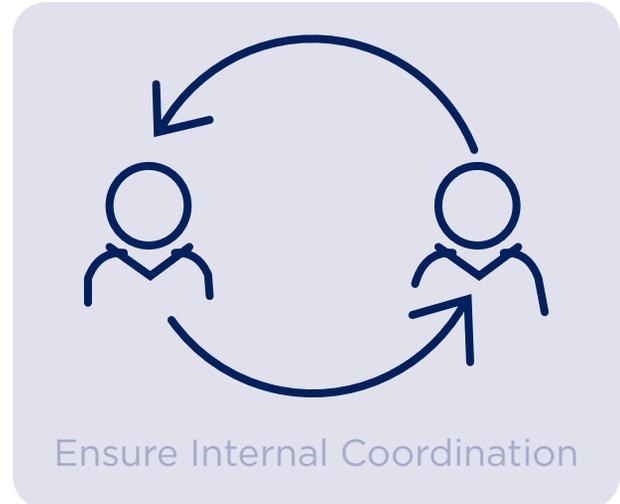
Successful procurement management isn't only about efficiency; it has a significant personal component that no automated process can replicate. Handling your project with intelligence, perspective, and empathy will yield optimal outcomes for all. **P**

Scott Summers

Senior Vice President, North America

As seen in:

American City & County, May 2019, "Strategic procurement for local governments"





THE VALUE OF 5D BIM

for Entire Supply Chain

Silas Loh

Joint Managing Partner, Singapore



BACKGROUND

Globally, approximately \$10 trillion (or 12% of the world's gross domestic products) is spent on construction-related goods and services annually. Yet, the industry has only seen a global labour-productivity growth of an average 1% per annum over the past two decades. This lags glaringly behind other sectors such as manufacturing which registered an average growth of 3.6% per annum. Evidently, there is room for improvement and to catch up with the progress made by other sectors in the past twenty years which McKinsey Global Institute estimates could translate to a value add of \$1.6 trillion a year for the industry.

Now, let us consider another statistic: we have the worst track record in making timely progress payments. In Singapore, data published by Singapore Commercial Credit Bureau in 2019 showed that the construction sector recorded the highest percentage of delayed bill payments for the twelfth consecutive quarter. In comparison, the second highest sector is approximately 9 percentage points lower.

In an environment where long term funding, usually amounting to hundreds of millions if not billions, is required for inherently risky projects, opaque and un-digitised processes mean that data (i.e. credit ratings, transaction histories and track records) remain underdeveloped. Trust and confidence, both badly needed, are not backed by a transparent and verifiable process.

CAPABILITIES AND LIMITATIONS OF THE CURRENT 5D BIM PRACTICE

5D BIM for the most part is highly utilised at pre-contract stage for cost planning, quantity take-off and bills and reports generation. At RLB Singapore, our quantity surveyors (QS) have been utilising the information in the 3D models to enhance our core competencies, allowing us to move away from being traditional bill producers towards value-add cost advisors.

Post-contract stage, there are many attempts to introduce 5D BIM data into project scheduling (4D BIM) in order to visualise the project cost estimate against the construction progress. However, this cash flow forecast is not usually updated when actual costs are incurred simply because there is no simplified way to do so other than to manually update the cost elements. As a result, progress claims are handled separate from the 5D BIM flow, creating a BIM-to-field gap.

On a smaller and more experimental scale, 5D BIM are being utilised during post-contract stage for progress payments and valuations. As QS, our main concern lies in the security of payments once work is completed. In a typical construction project, numerous contractors enter into contracts with either the upstream contractor or project owner for their services. Generally, these contracts set out the processes and criteria required before a contractor can seek to claim for payment. Despite the ostensibly clear terms, payment disputes often arise during the life of the contract.

The failure to provide timely payments have a detrimental impact on the overall project costs and timelines; business insolvencies have been on the rise in recent years, especially so for small-to-medium enterprises (SME) as they continue to suffer from tight cash flow and deteriorating margins. When disruptions in project financing occur, it can result in a domino effect throughout the entire contracting chain – from lenders, to developers, contractors, suppliers and even design consultants.

Two key pain points that have dogged the industry are identified as follows:

1. Lack of verifiable and accountable cost and time data for quantification, valuation, planning and progress claims throughout the value chain of the building. The key reason why construction project disputes can become intractable is an absence of adequate documentation and audit trails to allow for the quantification of indisputable payment claims. This happens because of the existence of many stakeholders providing different services over a prolonged period. To exacerbate matters, the different stakeholders are working and collecting data in different formats, which leads to an acute lack of accurate and verifiable data source to help with reliable payments. While there has been significant development in adopting BIM technologies for project time and cost management, most of these design models do not contain the relevant information needed by QS and contractors since there is no specific common data repository and standard for this. This leads to a fragmented approach for downstream cost planning, control, work validation and progress claims.
2. Security of Payments. The consequences of payment disputes are significant given the value of construction projects. The lack of data also has a cascading impact on payment issues in the contracting chain which led some jurisdictions to introduce security of payment legislation to ensure contracting parties can maintain the cash flow between them. However, this is not a statutory standard that is held around the world. For example, in countries such as the United Kingdom, it is very much down to the terms of the construction contract which normally favours the developer. In developing countries, contractors must rely on their relationship with and their trust of the developer to determine if payments will be honoured.

Moreover, while the enactment of such legislation has attenuated the problem, its

operationalisation is not without problems. The accretive nature of some disputes, which may require a final arbitration or court litigation to resolve continue to negatively impact project delivery and outcomes. Up against intransigent parties, meritorious parties may still need to expend unnecessary time and cost to enforce an adjudication determination, arbitral award or judgment for payments in their favour.

ADDRESSING COST MANAGEMENT PAIN POINTS THROUGH THE USE OF 5D BIM

Lack of verifiable and accountable cost and time data for quantification, valuation, planning and progress claims throughout the value chain of the building

To date, cost and schedule related software for QS and contractors are proficient in so far as they perform one to two specialised functions well but are typically not integrated with upstream nor downstream activities e.g. cost planning, work validation and progress claims. In this, the data generated at each phase is segmented from the rest and exists in a silo.

The advantages of incorporating cost management of a built asset to the model while well documented, has not successfully translated into practice due to the lack of technological breakthroughs and barriers to adoption. With an end-to-end solution that integrates 5D BIM with downstream cost processes, the envisioned outcome for the entire supply chain are:

1. Improved accuracy of quantification and valuation. With the development of a standardised set of cost data and through the use of a designated 3D model as the primary source of truth, data can be shared across the entire cost management workflow in an integrated manner.
2. Better planning and cost control. A cost calculation model will be integrated within a common 5D BIM environment with the QS's cost plans and/or Bills of Quantities. Cost model mapping will allow for a dynamic cost data linkage between the model and cost plan whereby the latter will reflect the actual changes in the former.
3. Linkage of work validation to progress claims. Progress claims process, which is highly fragmented currently, will be incorporated into the 5D model such that the QS can locate the specific elements within the model, edit its properties for site progress update purposes and generate progress claims reports from a single source.

Security of Payments

Along with the development of a standardised set of cost data and other frameworks, BIM technology applied together with blockchain technology can circumvent payment disputes and potential risks of formal dispute resolution such as adjudication under Singapore's Security of Payment (SOP) Act through the integration of fragmented information.

With the linkage of work validation to progress claims, all relevant project parties (i.e. architects, engineers, resident site staff, QS and contractors) can submit, verify, endorse and certify the work done on site for timely payment. This monthly progress claim and certification is encrypted, and every occurrence recorded as a block in a chain of blocks. This means that the information cannot be altered by any parties once the event is past yet can be shared across multiple parties without the risk of a data breach.

This system inspires trust and confidence between the developers and contractors as the BIM model serves as the source of truth for the overall project and payment statuses are locked from manipulation.

A WIN-WIN SOLUTION FOR ALL

The QS will be the first and foremost beneficiary of this technology, from cost plans to valuation of progress claims and variations tracking based on a singular 3D model as the primary source of truth. A seamless integration of 5D BIM through the whole life of construction would translate to reduced fragmentation and manual or double, even triple, work when all the processes were not integrated. We can now move forward to also provide a combination or variation of expanded roles and services (e.g. development or investment appraisal, whole life cycle costing, dispute resolution/arbitration services, etc.).

What about the rest of the supply chain then? We suggest that the progress claims functionality will be a game changer in the construction industry. For the first time, the BIM-to-field gap will be bridged – in a 3D model that can be visually understood by professionals and layman alike and in a manner that is transparent, digitalised and accessible by all

parties while being tamper-proof.

Lending entities such as banks, as laypersons, can understand on a visual level the percentage of physical work done and by way of cost attributes tagged to each element, find the corresponding value of work done. This allows the lenders an option to counter check the value of work done in relation to the QS's payment certification. Developers themselves have an inherent interest in the progress of the project – whether it is on time and within budget. With 5D BIM, they can keep real-time updates of the value of works done, in comparison to their cash flow projections. Furthermore, any changes to the model (i.e. variation works) will result in a corresponding update in costs, leading to informed and faster decision making on the developer's part.

When design consultants, be it architects or engineers, are appointed as contract administrators, 5D BIM with progress claims functionality can make their payment certification process more efficient as work done is clearly reflected on the 3D model. In the event that disputes arose from variation works, design consultants can simply refer to the 3D model as the primary source of truth for a swift and low-cost resolution. Differences between work done and payment certification would narrow between all contracting parties, leading to a decrease in late payments and thus lower percentages of defaults and/or insolvencies, especially for the SME contractors and suppliers.

CONCLUSION

In today's construction environment where opportunities for collaboration are potentially ample, uneasy working relationships often turn sour or even adversarial. Win-win situations are unexplored and lose-lose outcomes often prevail when trust is lacking. Productivity as an industry is not improving as it should and 5D BIM is a very large and unaddressed market without established, integrated technology solutions. Through the use of technology, we can make a direct impact on productivity through the integration of entire cost management process and 5D BIM. **P**

Silas Loh

Joint Managing Partner, Singapore

McKinsey Global Institute. (2017). Reinventing Construction: A Route to Higher Productivity. McKinsey & Company. Retrieved October 2, 2019, from <https://www.mckinsey.com/-/media/McKinsey/Industries/Capital%20Projects%20and%20Infrastructure/Our%20Insights/Reinventing%20construction%20through%20a%20productivity%20revolution/MGI-Reinventing-Construction-Executive-summary.ashx>

THE DIGITAL FUTURE RIGHT HERE, RIGHT NOW

How digital is transforming the construction industry

Matt Sharp

Chief Digital Officer, United Kingdom

Even as far back as 2014, the construction industry was proposing a technology-enabled future with the UK's Construction Industry Council issuing a seminal report, 'Built Environment 2050: A Report on Our Digital Future'. It stated, "the industry is undergoing one of the largest change programmes in its history, as it evolves from its traditional analogue-based tools and processes to a new and more connected digital state."¹

Six years on, we cannot undervalue how far construction has progressed, with industry-wide recognition of the need to modernise, to employ digital experts, to adopt new technologies and to collaborate through data sharing.

As much as the prospect of a digital future can daunt many, at RLB we have found that having a digital strategy isn't a radical departure from the way we have always worked. Our ethos, strengths and values remain the same, but our methodology employs more digitally efficient processes to provide our clients with the best solutions to deliver the best outcomes.

As our service offering has evolved digitally, both globally and within the UK, so has our digital culture progressed with our own in-house development teams; data and analytics capability; our own digital suite of solutions such as Ross5D, RLB Field, Focus and Pulse; and most recently our achievement of the much sought-after British Standards Institution (BSI) Building Information Modelling (BIM) certification.

DIGITALLY EXPECTANT CLIENTS

With on-going improvements in the use of technology and services outside of work, our clients are increasingly tech savvy, tech comfortable and expectant. Many of our clients have common requirements for the new services they procure but fundamentally these requirements remain to be what differentiates RLB in our market.

While clients have always expected an ease in doing business, an efficiency in completion of engagements and a trust in the quality and accuracy of our deliverables, the goalposts of their expectations are being shifted by digital technologies.

Digitally enabled business today needs to be easier, faster and more accurate – beyond transactional, digitally-performed calculation and process – and our experts need to offer additional value by tailoring the experience, the service and the outcomes for every client's unique situation.

¹ Construction Industry Council, 2014

What RLB clients expect of our services:

Easy to Consume	Efficient	Accurate
On-the-move, anywhere	Instantaneous and real-time	Correct (all the time)
Any device	Minimal effort and manual intervention	Trustworthy
Any time, all the time	Guided (when required)	Proven
Simple operation, click of a button	Interfaced via standard interfaces	Factual
Self-service	Interoperability	Based on extensive data
Transparent costs	Iterative	Agreed by and aligned to all other parts of the project
Graphical interfaces	High Volume	
Secure	Common Data Structures	

DIGITAL, DATA & TECHNOLOGY

'Digital' is a catch-all buzzword and we often hear talk of the 'digital transformation' we experience, research and strive to drive. RLB recognises three key areas that we need to understand, influence and exploit: digital, data and technology.

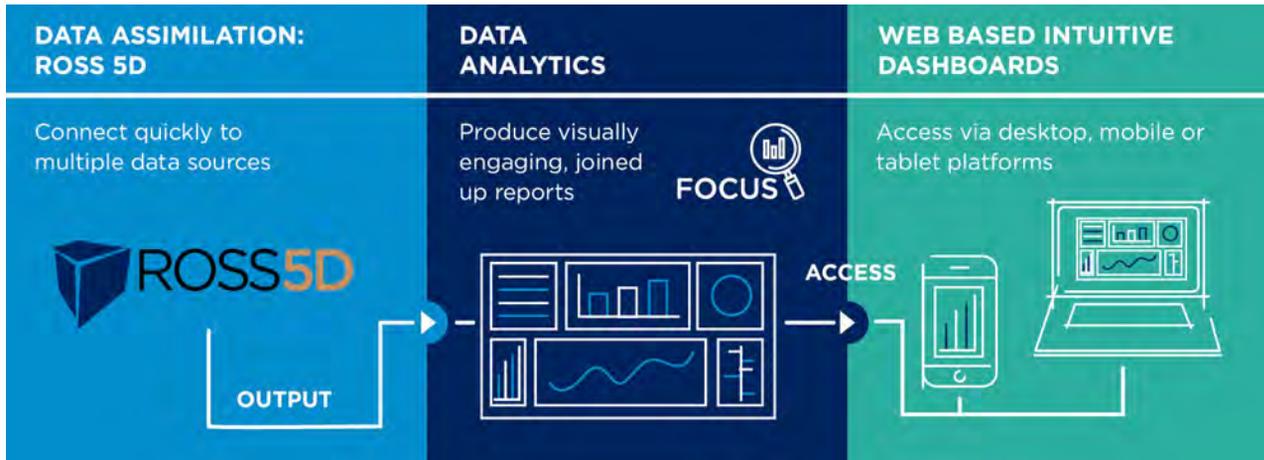
DIGITAL

Across our business we are leveraging advancing digital capabilities to improve or reinvent our processes and ways of working, allowing us to automate tasks through employing technologies such as Artificial Intelligence, Machine Learning, Automation and Orchestration. Our expert knowledge in the form of our industry-leading logic, formulae and calculations honed from the experience of decades of building projects in multiple industries across the globe, allows us to develop the best solutions for our services.

One example of how we have seen this digital transformation within the services we offer is through our RLB Field application. Field enables our teams and clients to use mobile devices to capture data – whether this be answers to questions, empirical measurements or photos – that is then securely stored in the Cloud, analysed and presented back to the client in bespoke, easy-to-understand digital dashboards and reports. McDonald's is currently using RLB Field for data capture on their Restaurant Refurbishment Programme. RLB is producing the robust quantitative results and qualitative insights that we always have for our clients, just in a digitally enabled and far more efficient way.

DATA

Every built environment project generates huge quantities of data. From initial concept through build to handover, every stage of the construction lifecycle is a flow of critical information.



RLB has an extensive, rich data set from our years of delivering construction projects across the globe. Our ability to federate all RLB data to a single place and to analyse and interrogate this data is tremendously powerful. We can offer market-leading, accurate insight by being able to compare projects against our data and we are able to find patterns and trends.

Our RLB Pulse benchmarking solution now gives RLB colleagues and our clients the ability to globally benchmark project costs and has the International Construction Measurement Standards (ICMS) and its associated International Property Measurement Standards (IPMS) embedded in its framework.

RLB Focus gives us the capability to present easily consumable, graphical dashboards to our colleagues and our clients, like Tesco, who use RLB Focus for estate condition survey reporting, so that they can dynamically visualise and interrogate their data from any device, anywhere.

TECHNOLOGY

Beyond digital and data there are many technology advances influencing our industry, the built environment, and the way in which our traditional disciplines are performed. Many of the projects we collaborate on with our clients are at the forefront of employing new technologies including drones, laser point scanning and augmented reality.

OUR DIGITAL CULTURE

Successfully evolving digitally is not about a radical changing of the guard, it is about augmenting our existing expertise by drawing in individuals with fresh perspectives that understand and can facilitate technological progress.

We must attract talent with digital qualifications, skills and knowledge that can complement our traditional

core disciplines of quantity surveying, cost management, project management and programme management, building surveying and specialist consultancy services. We must encourage collaboration between digital innovators and technical experts across disciplines to bring inventive ideas and to reverse mentor our colleagues - ensuring we are continuously aware of the 'art of the possible' and delivering the best possible service.

Of course, the competition for digital talent is high with many sectors including entertainment, retail and finance presenting attractive career propositions and the potential for significant reward for technology-qualified individuals. To advance digitally as we must, our industry must compete and ensure it is digitally attractive by demonstrating our:

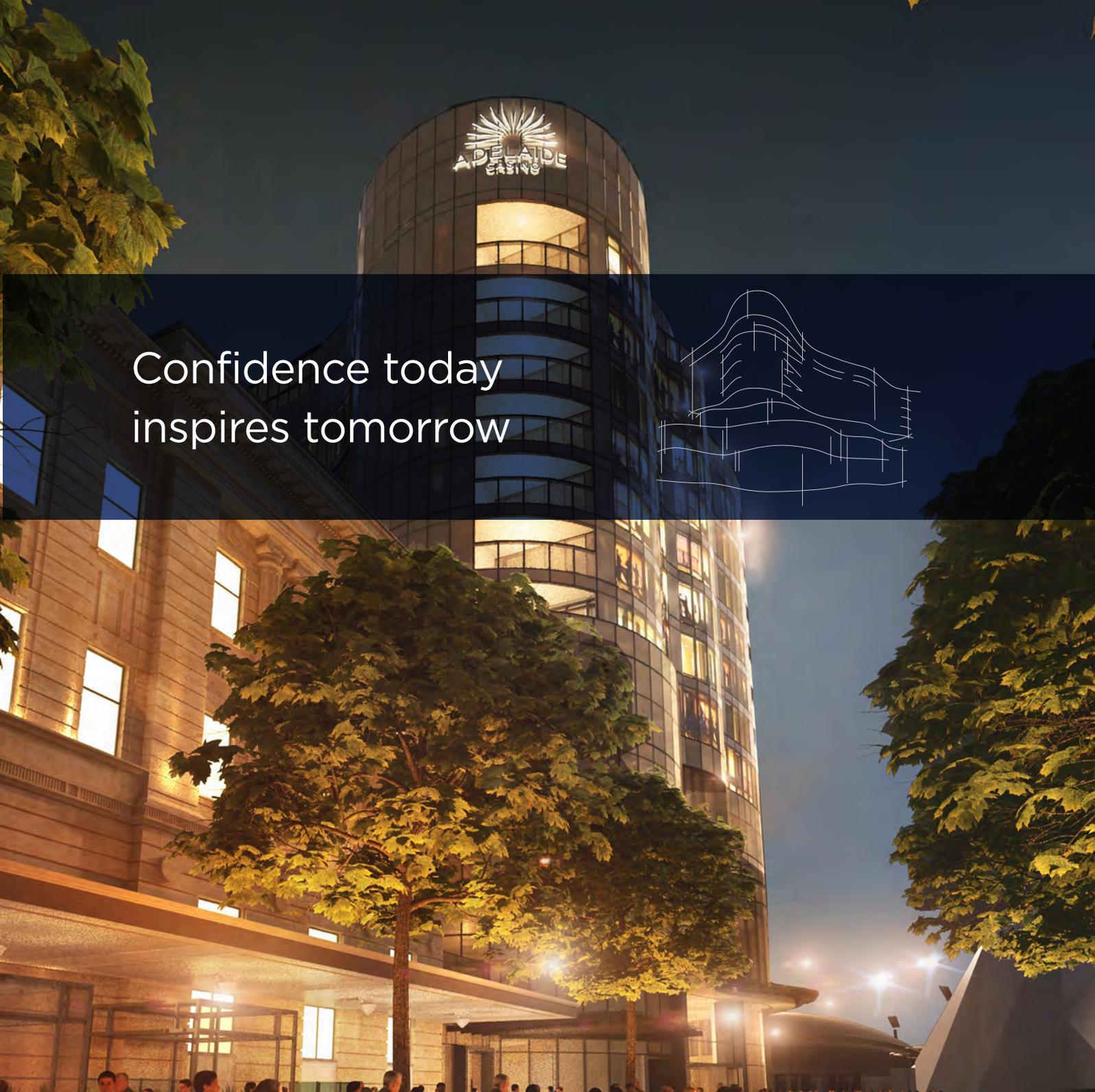
- digital ambition
- willingness to evolve working practices and adopt new technologies
- nurturing environment for technologists
- desire to invest, and
- digital successes.

RLB's digital culture needs to be one of inquisitiveness and exploration in which our existing colleagues eagerly learn about, adopt and optimally exploit new digital capabilities, and work collaboratively with those digital natives recruited into businesses across the built environment.

It is our collaborative approach - across our industry and our organisation - that will allow RLB to leverage our discipline expertise and harness emerging technologies to add value and deliver outcomes that provide the greatest benefit to our clients and their projects. **P**

Matt Sharp

Chief Digital Officer, United Kingdom



Confidence today
inspires tomorrow

The Adelaide Casino expansion delivers a luxury hotel and world-class entertainment precinct expanding the existing casino with high end retail outlets, new general gaming, VIP gaming and VIP gaming salons, conference facilities, signature bars, restaurants, and a wellness retreat. A three storey glass atrium connects Adelaide's historic Neo-Classical Railway Station to the new, opulent glazed golden façade tower overlooking the riverfront and Festival Theatre.

RLB's extensive involvement on this project includes full scope quantity surveying services, from inception to project close-out. The completion of this complex multi-staged project is on budget and on time and due to be opened in August 2020.

RLB.com

RLB Rider
Levett
Bucknall



A SURVIVAL GUIDE TO SELF-PERFORMING WORK

JOSH MARKS
Resident Manager, North America

Contractors that “self-perform” have the ability to do specific trade work without contracting with other companies (subcontractors). Their direct employees complete a portion of the construction, such as concrete work, steel framing, carpentry, or another specialty.

Many variables must be considered by general contractors when deciding whether to self-perform (SP) or subcontract work packages, among them risk, fees, supervision, schedule, and availability of labor. The reasons for self-performing vary, with some focusing on scopes of work requiring higher quality, greater complexity, or more aggressive schedules, and others on work that subcontractors are not interested

in undertaking—for whatever reason.

In the current economic climate, with its attendant construction labor shortage, many trade subcontractors, unsure of their ability to properly staff a project, are averse to providing cost estimates and bids. Additionally, estimators and other management staff at trade contractors are also busy, which forces them to be more selective in deciding where they spend time providing cost estimates to general contractors (especially at earlier design stages where the subcontractor may not yet be confident that the project is “real”) and in managing the actual construction work. Owners facing the pressure of schedule constraints on projects sometimes

accept this lack of input on the part of subcontractors with little question, moving on with the bidding process. This provides general contractors with an opportunity to slide into the driver’s seat when it comes to pricing, with the goal of garnering a contract for SP work.

Any lack of input from qualified subcontractors creates a critical void in the process. It puts added emphasis on the general contractor and throws into relief which of them can, or can not, supply SP services. Those that aren’t SP-qualified are frequently weeded out of the candidate pool, while those contractors who remain in contention are often asked to provide detailed pricing to the owner. It’s worth noting

that owners working without cost consultants are often at a disadvantage when it comes to understanding these detailed estimates for such specialized work.

When the feasibility of SP work is real, and since enacting it can yield benefits, a project team should plan for it very early on. For this to be effective, both the general contractor and the owner must be transparent in their communication. It is often observed that general contractors bring up the idea of SP work too close to the time of establishing the Guaranteed Maximum Price (GMP) with the owner. A collaborative approach between a general contractor with market knowledge and an educated owner will likely reveal an optimal solution well before any binding decisions need to be made.

WORKING TOGETHER

For complex projects, input from trade experts is valuable in early stages of design. While there is value to the project in selecting a trade contractor for this preconstruction input, it might also introduce an element of convenience to the general contractor. The significance of that convenience—selecting a subcontractor in the early design stages that will also likely perform the construction—becomes clear when it is their own internal SP department that provides the input. While this may streamline the flow of information, it also stifles pricing competition. Even if the opportunity is eventually opened up to other bidders within that trade to establish the GMP, those bidders, thinking that the scope of work has already been won by the “incumbent”, might not provide competitive numbers, or they might not have a complete knowledge of the intricacies of the scope which have been developed during the preconstruction phase.

Regardless of which entity provides the preconstruction input for a given trade, if a bidding situation for a trade exists that involves both subcontractors and SP, the fairest way to administer that situation is to have both parties submit their bids directly to the owner for review. Prior to soliciting the bids, there should be a detailed, descriptive scope of work for each trade. This will minimize the need for clarifications and assumptions in the pricing, and will ensure that comparing quotes between the subcontractors and the SP provider is as “apples to apples” as possible.

COMMUNICATION, COSTS, AND COMPETITION

The success of a SP project relies to a great extent on an established relationship between people who have a proven track record of collaboration and who operate in an environment that fosters efficient communication. However, these qualities aren't always present in the marketplace. Sometimes, and more often in today's busy environment, SP forces are willing to travel longer distances, from locations where resources may be more available, to fulfill manpower requirements. Not only is the synergy of familiarity lacking in these situations, but costs to the owner are more likely to be higher due to additional management staffing costs. Quite often, the SP divisions of general contractors act like actual subcontractors to the general contractor, with a completely separate management staff. Sometimes subcontracts are written within the company that contain a second layer of overhead and profit. Taking a more integrated approach to SP may lead to both lower costs to the owner, as well as better production by the SP contractor.

In this labor-strapped environment, some general contractors have recently proposed composite crews, where a “prime” subcontractor's workforce is supplemented by that of the SP general contractor, or vice versa. The sooner the owner and general contractor exchange expectations on staffing strategies, schedules, and budgets, the sooner a process for buying out the project can be formulated.

Choosing between SP and subcontracted work becomes even more difficult when the SP contractor's price comes in slightly higher than the subcontractor's price. This isn't an abnormal situation, since many SP firms have more experienced labor as part of their staff and may have better access to training programs. Especially in a setting where public monies are used to fund projects, it is very difficult to justify this additional cost to an owner. The SP firms may be able to demonstrate a superior record of quality and safety, or commit to a more aggressive schedule, but because of the focus on cost by many owners, a metric may need to be developed to justify the increased costs.

Hindsight, as we all know, is 20/20. Only once the project gets underway will it be possible to truly determine whether the right decision was made; if the SP contractor comes through on schedule maintenance, construction quality, and change order experience, it just might outweigh the difficulty of justifying the discrepancy between the initial price and the extra cost to the owner. **P**

Josh Marks
Resident Manager, North America



KEY FACTORS FOR ADOPTING PREFABRICATION IN HONG KONG

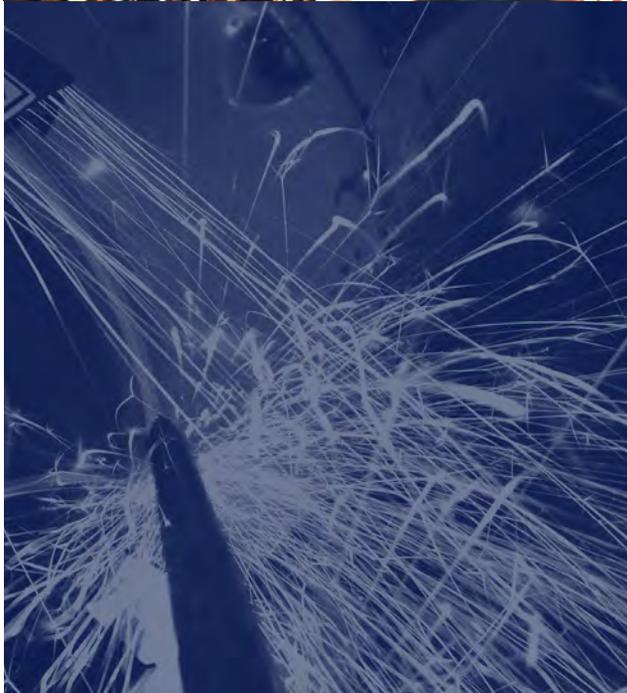


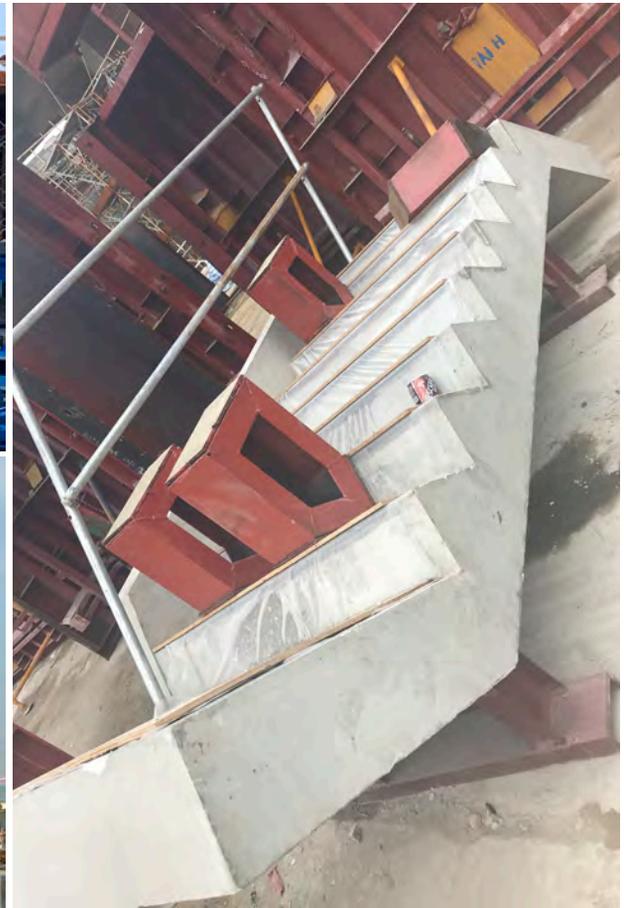
Tiffany Chan
Director, North Asia

Hong Kong is a small but densely populated city which is famous for its dynamic property development. Housing shortage has been the biggest challenge confronting the Government for decades, which has led to the continual need for the construction industry to increase its housing stock through higher efficiency as well as a better built environment.

PUBLIC SECTOR

Being the major housing developer in Hong Kong, the Hong Kong Housing Authority (HKHA) has been a pioneer to apply prefabrication in providing economical and fast track public housing. The precise definition of the term “prefabrication”, though commonly used worldwide in construction, may vary from country to country depending on user’s experience. In this article, the term “prefabrication” is referred to building components that are made off-site in manufactured yards or factories. Since 1990s, the HKHA has widely adopted standardized prefabricated elements, including external façades with window frames, staircases, watertanks, wall panels, semi-precast concrete floor slabs and volumetric precast bathrooms, to achieve as short as 6-day structural typical floor construction cycle.





PRIVATE SECTOR AND GOVERNMENT'S INITIATIVES

While prefabrication has been widely adopted in public housing, the private sector has taken a more conservative approach. When compared with the traditional in-situ construction, prefabrication construction has been considered as less cost-effective by the private sector at large. The lack of private sector experience has not demonstrated effectively the advantages of prefabrication. To encourage a wider adoption of prefabrication, the Government has played an important role. Since 2011, the area of non-structural prefabricated external wall has been exempted from calculation of Gross Floor Area (GFA), since then increasing popularity in adoption of prefabrication, one form or the other, is seen in private residential projects.

NATURE AND REPETITIVENESS OF PROJECTS

Owing to the comparatively high initial and transportation cost of prefabrication, cost effectiveness can only be achieved in prefabrication of components of large quantities and repetitive in nature. Hence, it is widely adopted in residential, hostels, hotels or similar projects. The HKHA

has developed a full set of standard design and specification for the prefabricated elements in public housing construction. The standardized design of prefabricated elements applied to public housing projects can secure competitive pricing and ensure a constant supply.

WEATHER FACTOR

Site construction progress is vulnerable to adverse weather conditions, especially during typhoons and wet season in May to October. The risks of adverse weather are either borne by the contractors who often have to squeeze the construction programme or by the employers who are obliged to grant extension of time for completion of the works. Neither case could effectively reduce the effect of adverse weather condition to construction activities on site. By transferring part of the construction activities, for example, in-situ concrete works, which are vulnerable to weather condition from the site to indoor manufactured yards, the time for on-site activities can be shortened and any adverse effects on progress of work due to adverse weather can be reduced.

LABOUR FACTOR

Aging problem of the construction labour force in Hong Kong is another factor that encourages off-site construction wherever possible. The median age of skilled labour rose from 48 years to 51 years from 2010 to 2017. About 23% of the total skilled labour in construction industry are over the age of 60. The shortage of skilled labour is becoming increasingly more alarming as the construction industry is facing a significant amount of construction works in the coming years, including the next 10-Year Hospital Development Plan amounting HK\$270 billion, Railway Development Strategy 2014 amounting HK\$110 billion, 5-year public housing target production of 100,700 units from 2019 to 2024 and HK\$ 620 billion Lantau Tomorrow Vision in creating new metropolis, etc. In order to ensure delivery of all these mega size projects on time, the Government and the private sector are eager to explore alternative construction solutions including prefabrication with application of innovative technologies to improve construction efficiencies.

QUALITY FACTOR

Compared with in-situ construction on site, building components manufactured under controlled condition off-site can better secure compliance with the required standard. The whole manufacturing process can be controlled, while testing and checking of prefabricated components in compliance with quality surveillance system can be performed at factories before delivery to sites. However, assembling and jointing of different prefabricated components on site would require close dimensional co-ordination of components and does not relieve the necessary testing and quality checking process on site. Also, regular visits by architects or engineers to off-site factories for better co-ordination and quality assurance are required.

FROM PRE-FABRICATION TO MODULAR INTEGRATED CONSTRUCTION (MiC)

While prefabrication of components has gained popularity in Hong Kong in recent years, the application of Modular Integrated Construction ("MiC") is still at infancy phase, with some pilot projects under planning or construction stage. MiC refers to the complete off-site factory pre-construction of volumetric modules of buildings with all finishes, building services and even furniture.¹ It can be illustrated as the maximum

application of pre-fabrication off-site and minimum construction work on site.

In order to achieve cost effectiveness, MiC is limited by far to transitional housing, residential, quarters, etc., which are generally repetitive in nature. However, repetitiveness and standardization also means lack of uniqueness and design characteristics. It remains as a challenge and an opportunity for designers to strike a balance between cost effectiveness and uniqueness and design characteristics to building design, with a wider application of advanced technologies and Building Information Modelling ("BIM").

Adoption of MiC or prefabrication can improve time certainty and reduce construction time on site. However, it requires detailed design to be available and frozen at the early stage with complete co-ordination of built-in building services. Close integration and linkage of design information to the manufacturers off-site are required. Since the financial and time impact on projects due to late changes in MiC or prefabrication elements could be much worse than that of in-situ construction, wider application of BIM technologies to streamline design and work flow would be expected.

For successful application of MiC, early involvement of contractors by contributing knowledge and expertise regarding methodology of jointing and assembling MiC modules on site, transportation and delivery may be required.

Transportation of prefabricated MiC modules from remote off-site factories to sites is a challenge to contractors. The location of Hong Kong lying at the gateway of Guangdong allows comparatively cheap water transportation of prefabricated MiC modules from factories located in mainland China. However, limitation in land traffic network within Hong Kong and the risk of damage to pre-installed fittings within the modules during transportation will drive the industry to look for the best balance of the type and extent of elements to be prefabricated in MiC modules and those being finished and fitted after delivery on-site.

In conclusion, while prefabrication and MiC in Hong Kong construction industry is expected to gain increasing popularity, the optimal degree and extent of application will vary for different nature and size of projects. Advanced technologies and BIM will also play more important role for the successful application of prefabrication and MiC. **P**

Tiffany Chan
Director, North Asia

¹ Construction 2.0, by the Government of Hong Kong SAR, 2018



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Te Oro is a music and arts facility in Auckland. The name 'Te Oro' taken from is the traditional Māori name for the sound created by wind blowing across the open crater of nearby volcano Maungarei. The project emerged from a prolonged period of open and collective engagement, with the community involved to embed local identities throughout. The 1485m² project has a strong environmental focus, with the upper roof surface covered in 250 PV panels, which reduce electrical consumption by 50%, rain water harvesting, above-code insulation, double glazing, reverse cycle heat pumps, and LED lighting.

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CONVENTION MEETS INVENTION: CHANGE, TECHNOLOGY, AND THE AEC INDUSTRIES

Julian Anderson
President, North America
Global Board Director

Change does not come easy to the AEC industries, but that doesn't mean we shouldn't challenge our thinking about the best ways to do business. The needs of the present (and the future) are unlike any we have previously faced.

But it's not so much that we should be doing different things when designing and building buildings, but that we should be doing the important things better. Innovation without insight is wasted effort. The popular term "disruption" is a dramatic misnomer that I suspect serves more as marketing bait for venture capitalists; what's actually happening is the antithesis of disruption. In the AEC world, technology is not interrupting the workflow, it is making it seamless.

Underlying all the technological advances we're seeing in software, hardware, and equipment, these changes boil down to making connections: between the designers and the engineers and the jobsite supervisors and labor and the owners. It's enhanced communication that can make project planning, project management, and project execution less susceptible to interruption.

GOD IS (IN) THE DATA

To be clear, that communication is not verbal in nature; it is digital. And the main participants in the conversation are the tech titans. Information collected from our homes, workplaces, and public spaces via a host of devices is converted into algorithms focused on efficiencies, a driving concern of the AEC world.

In the residential sector, Amazon has a deal with Lenar, one of the country's largest homebuilders, to equip its new housing stock with an array of Alexa-controlled products, including built-in WiFi, smart locks and doorbells, thermostats, and lights. To analyze uses and patterns in the office, WeWork has instituted extensive monitoring programs. An example of the granularity of its studies: To ascertain the occupancy rate of meeting rooms, battery-powered thermal sensors were placed under conference room tables to measure how many pairs of legs were present and for how long. Crunching the resultant numbers, the company concluded that conference rooms should be smaller in size since they're rarely full.

Going outside, we're about to get a ground-up look at how this kind of approach plays out at scale. Sidewalk Labs, owned by the parent company of Google, Alphabet, is a consortium of urban designers and technologists who are dedicated to exploring how new technologies can solve big urban challenges and improve the quality of life in cities. In 2017, it became a partner in a major development in

Toronto, called Quayside, which seeks to revitalize 800 acres of underutilized waterfront land with a slew of fresh thinking about affordable housing, resiliency and flood protection, retail, and transportation systems.

In Toronto, Sidewalk Labs is planning to contribute innovations that are overtly oriented to the built environment, such as canopies that automatically retract in advance of severe weather. But as the architect of the data infrastructure, the applications—and the implications—of Quayside’s digital domain will be significant beyond the immediate community. As with all R & D, it will take time to evaluate its success.

SPREADING THE DIGITAL WORD

A fundamental factor in transmitting this information is the telecommunications system. The advent of the 5G wireless network (rolling out in 30 US cities by the end of 2019) will open up new bandwidth spectrum for IoT use and small-cell deployment in urban areas, both which are central to construction applications. The faster rate of data transfer—upon its release, 5G downloads are initially estimated to be about 20 times as fast as the current 4G capability, and will accelerate to more than 100 times as fast—will support the reception and streaming of videos captured by drones, as well as enhance virtual-, augmented-, or mixed-reality tools.

BASED IN REALITIES

Those reality visualization programs are significantly growing in usage. World-wide spending on augmented reality and virtual reality is expected to reach nearly \$20.4 billion this year, according to market intelligence firm International Data Corp. That’s up from an estimated \$12.1 billion in 2018.

On the construction site, the rise of reality capture technology has opened the door to true, real-time analysis of projects. Drones, rovers, laser scanners,

and 360-degree cameras can more effectively track progress and productivity, as well as identify risks for potential delays. Drone-based visual inspections not only provide up-close, accurate images, but can easily produce pictures from vantage points that were previously inaccessible to human photographers, such as inside wall cavities or over bridges. All this can help streamline the design process (and timeline) by eliminating unnecessary design iterations.

Trimble recently introduced a viewing device that clips to standard hardhats and enables workers to access holographic information directly from the jobsite. Featuring a wider field-of-view than earlier generations of the hardware and a flip-up viewscreen, the XR10 with Microsoft HoloLens 2 combines state-of-the-art mixed reality and safe operation in restricted access work areas. Unlike immersive headsets, whose opaque displays conceal the physical environment and replace it with a fully digital experience, this transparent display allows users to see the physical world while digital content is superimposed into the view in real-time.

FROM THE GROUND UP

There’s been lots of discussion about the viability of 3D printing as a construction method. Historically, the construction industry is slow to change and risk-averse, for obvious reasons. Until a process is tried and true, developers will not embrace it. The large printers that are required for additive manufacturing—for onsite concrete pours, for example—rely significantly on the reliability of the print head. If a problem develops there, the entire process can grind to a halt. The enormous size of these printers makes them expensive and difficult to transport, as well.

The future of modular construction, where building components are manufactured in a factory-controlled environment instead of on a construction site, looks more promising. Big Data is ever deeper involved in this facet of the industry. Through its Alexa Fund,

Amazon has invested millions in Plant Prefab, a Rialto, California-based company that builds prefabricated, custom single-family and multifamily residences using sustainable materials and processes. For its modular homes, Plant Prefab has developed a proprietary technology which the company claims can reduce time by 50 percent, while also achieving a savings in overall costs of between 10 and 25 percent, depending on the geographic market.

FUTURE PERFECT?

Disruption has its place; without it, there could be no progress, and we'd be stuck in an endless status quo. By the same token, continuity is critical; we can't go back to square one every time an innovative step is taken. It's worth bearing in mind that the AEC fields are composed of both creative forces and conservative thinkers, and their needs are sometimes divergent. By applying these new technologies to the design and construction process, we are reducing risk, cost and time and enhancing the process which then empowers the parties to it and adds value across the board. **P**

Julian Anderson

President, North America
Global Board Director

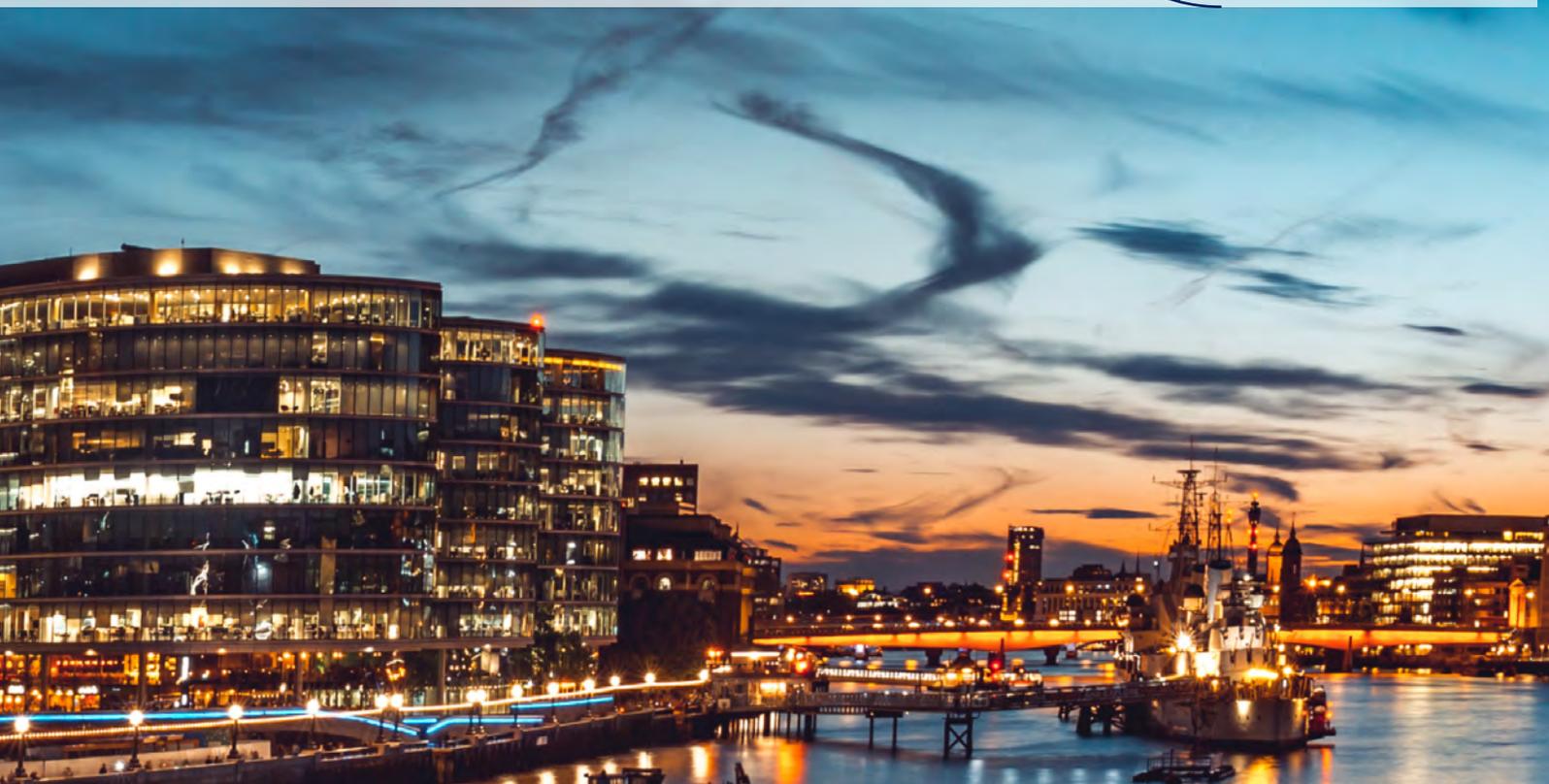
As seen in:

Design Intelligence, Q2 2019, "Convention Meets Invention: Change, Technology, and the AEC Industries"





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