



Bringing a Digital Dimension to Construction

The digital age is in full swing, with every industry embracing new technologies. Here's how construction is innovating for the future.

– By Gammon Construction Limited

This year, Gammon Construction Limited celebrates its 60th anniversary. Establishing its presence with a runway extension contract at Hong Kong's Kai Tak airport, the company has since flourished to become a leading contractor of infrastructure, power stations, learning institutions, high end residential and commercial high rises plus complex data centres. With British heritage by means of equal ownership by Jardine Matheson and Balfour Beatty, Gammon's 7,000 employees operating in Hong Kong, Singapore, mainland China, Macau and Vietnam contribute to an annual turnover of US\$2.5 billion.

Innovating for the future

Gammon credits much of its success to pioneering use of new techniques and technologies. As the construction industry faces an aging workforce and strain on natural resources, Gammon is rising to the challenge with its very own digital construction toolkit. It is using this approach to drive change

within both its own business and the industry itself, rethinking how the construction sector approaches engineering and project delivery in order to offer improved efficiencies and value for clients whilst securing a sustainable future for the company.

Digital twin

Gammon is already well-advanced in the use of Building Information Modeling (BIM), which uses the latest 3D software packages to generate a 'virtual reconstruction' allowing design optimisation over the entire asset lifecycle. In collaborative virtual reality design walkthroughs with clients, all parties can enhance design and construction methods to avoid clashes and associated abortive works. The company's 10-dimensional BIM roadmap (10D) has been adapted to include time, cost, sustainability, facility management, open collaboration, robotics and artificial intelligence to ultimately improve safety and quality.

Digital construction

In 2018, Gammon launched a tech startup called 'Digital G' to supply innovative digital technologies to Asia's construction market. Digital G develops and distributes sensors, Internet of Things (IoT) devices and digitised workflow technologies via collaborations with international tech startups and academia. Andy Wong, General Manager, explains the aim of Digital G is to improve the construction process by making it safer, more efficient and less labour intensive. "Our digital technology stands to revolutionise the way the construction industry operates and how the built environment is managed, enabling better decision-making and increased profit margins."

25% increase in offsite construction

Possibly the most disruptive innovation currently in pursuit by Gammon is Modular Integrated Construction (or MiC), which has the potential to overcome inherent problems in the industry, whilst reducing risk for all concerned within the supply chain and delivering higher quality outputs for clients with fewer resources. MiC and other offsite techniques optimise manufacture and assembly principles by integrating construction methodology during design to allow prefabrication off-site. Gammon already provides a number of pre-cast concrete and prefabricated modular Electrical and Mechanical (E&M) solutions; by transferring site construction work into factory-controlled conditions this allows for greater quality control. Just-in-time delivery and pre-rehearsed site installation techniques by skilled trades are inherently safer.

This year, Gammon delivered Hong Kong's first MiC demonstration project at Construction Industry Council's Zero Carbon Building to showcase the productivity and environmental benefits of prefabricating modular units offsite (complete with high quality fixtures and fittings). An increasing use of MiC will be central to achieving the company's bold 'Responsible Growth – 25 by 25' sustainability strategy that mandates a 25% reduction in carbon intensity by 2025.

Headquartered in Hong Kong, Gammon Construction has a reputation for delivering high quality projects throughout China and Southeast Asia, as well as offering innovative solutions and services to our customers. At Gammon, we focus on our customers' needs and how we can best use our abilities and resources to add value for them through innovative and sustainable solutions

Robotics (physical and digital)

Gammon are pioneering welding robotics in the company's steel fabrication factory in mainland China to help address the industrywide shortage of quality welders, whilst other robots are currently under development.

The company has developed its own software 'bot' powered by Artificial Intelligence, known as Gambot, which processes large amounts of everyday site 'big data'. This has been particularly popular for automating weekly safety reports, intelligent dynamic risk assessments and safety observations by operatives in the field.

Not to be outdone, Gammons' head office functions have also deployed virtual software robots to carry out repetitive and rule-based tasks (known as Robotic Process Automation), used for comparing workers' professional accreditation records with the CIC website for example, to increase accuracy and streamline operations.

60 years and beyond

As Gammon celebrates its diamond anniversary, the construction industry stands on the cusp of enormous change. It is a change the company relishes and, in many ways, is instigating, as it becomes more innovative and embraces new and better ways of doing things. Gammon recognises the future is digital and invests in young people with diverse skillsets to complement its engineering excellence heritage, as Gammon seeks to flourish over the next 60 years in Hong Kong and Asia.

"Taking construction offsite and embracing digital transformation are integral parts of our 'Responsible Growth – 25 by 25' strategy and are essential for the sustainability of our business," says Emma Harvey, Group Sustainability Manager. 

