

By **Dan Heyworth**, Director – New Projects, Box

Hologram homes and more

Look around the world (and closer to home) and you'll discover that there are both exciting and downright dull revolutions that promise to change how we build and provide many benefits.

THE HYPE of prefabrication has made it synonymous with innovation, but are we forgetting about the other innovations happening in the construction industry?

Just-in-time delivery

There is still a place for off-site manufacturing, but it very much depends on the type of building produced. The trend is towards mass-componentised solutions where panels and bathroom and kitchen pods are made off site and delivered just in time to the building site.

The buzz is around bringing the factory process to site. This means a close integration of factory and site in terms of production, scheduling and installation. Apart from the sight of a supervisor holding an iPad, there is no fancy tech here – just good process and project management to make sure things run as efficiently as possible.

Tech companies driving optimisation

A company on this path is Silicon Valley darling Katerra, billed as a modular home-maker with a mission to optimise every aspect of building design, materials supply and construction.

Katerra has raised almost US\$1 billion as a design-construction operation cleverly dressed up as a technology company. It produces subassemblies (large building components) in factories that are installed on site guided by an enterprise resource planning system integrating all its business processes. It's a case of back to the future as it's not too dissimilar to the marine and aircraft manufacture industries, which have done this for years.



Augmented reality is bringing the next big step-change.

Investment in R&D and software

As the directors of Katerra point out, construction companies are not big on R&D, traditionally investing less than 1% of revenue in new technologies. Even in Aotearoa, that seems to be changing.

One of our largest volume house builders has just spent millions of dollars not on factory machinery but on software that helps control the process from land evaluation through to handing keys to the client.

It estimates that this will speed up build, reduce risk and increase quality. Does this sound familiar? Technology now has the potential to connect the site, suppliers and trades to e-produce the kind of benefits

that off-site production is selling - reduced lead times, improved quality and lower construction risk.

Small widgets also having big impact

At the other end of the scale to these comprehensive software solutions are tiny innovations that simply do the job. Builders have started to use little widgets such as bottom plate packers that prevent the bottom plate of frames from sitting in water during construction. I've been laughed at for touting this as a major innovation, but this slither of plastic costing a few cents has probably had more of an impact on bottom lines over the last year than anything else.

If you can reduce delays on site and the cost of call-backs simply because your bottom plates are not soaked in water, this small innovation deserves more respect!

Visualisation the next big thing?

But back to the big guns. Forget BIM (building information modelling) or virtual reality, it's augmented reality that is now ground-breaking. Imagine interacting with a hologram model of aspects of a home. It's now possible mainly thanks to Microsoft HoloLens.

Word has it that Apple is close to launching something similar. Assisting a builder or tradesperson to visualise how something should be built or assembled is a great way to improve productivity, reduce wasted time and materials and simplify a complex activity.

3D printing evolving

3D printing technology remains a hot topic. Although it was first developed in the 1980s, it's reached a stage of development that represents a seismic shift in construction methodology - a real game-changer.

Out with stick building, in with squirting a house from an industry-size nozzle to create a complex building of different materials with very little labour input. This has the potential to upset the economics of construction.

It's not something we will perfect overnight, but we can see the green shoots in Holland, where the construction company Van Wijnen intends to build the world's first habitable 3D-printed houses.

Here come the robots

While we wait for this technology to mature, European machinery goliaths Weinmann and Randek are taking prefab to the future with demonstrations of robotic production lines. It's still construction the old way using time-honoured materials and processes, except it's slowly replacing workers with robots.

Automatons are unlikely to turn up bearing the keys and a celebratory bottle on completion of the job, but if we don't find a way to lure the 50,000 plus extra construction workers needed, they may be our only option! ◀