

Jackson Formwork
Ellerslie noise walls



INNOVATIVE PROCESSES BOOST INFRASTRUCTURE

INNOVATIONS IN THE DELIVERY OF MAJOR INFRASTRUCTURE PROJECTS, SUCH AS THE USE OF 3D MODELLING, 3D SCANNING AND CNC MACHINING, ARE BEING USED ALL ACROSS NEW ZEALAND TO DELIVER SAVINGS, MAKE SET UP EASIER AND REDUCE THE NUMBER OF MISTAKES.

Kirk Ricketts, Department Manager, Architectural Concrete Formwork and Form-liners at engineering firm Jackson Industries, believes that technology has unlimited potential to aid in the supply of component formwork parts to make infrastructure projects more economically viable.

He says that technology can enable complex kitset manufacturing to reduce the number of mistakes and simplify any required set-up processes for workers on the ground.

‘When you have existing 3D models to work with, you not only have accurate data to manufacture component parts, but you also have a lasting record of the physical elements within that project for future reference, replacement or upgrade,’ he says.

Ricketts points to examples such as new and upgrade tunnel works, in situ bridge formwork, in situ shear wall castings and other large-scale complex operations. He has been involved in the supply of intricate mould and form-liner products to achieve a vast range of architectural finishes for such infrastructure projects as Ōtāhuhu Interchange; Northern Corridor Auckland mechanically stabilised earth (MSE) wall and TL5 bridge barriers; Southern Corridor Auckland; Ellerslie noise walls; overpass projects, including St Lukes, Rimu Road and Onewa Road; portal entry barriers at Waterview Tunnel; the Pokeno Rail overbridge retaining wall blocks; and the Transmission Gully MSE wall blocks.

‘In these situations, we have been able to combine our 3D modelling, scanning, machining and material combinations to achieve unique surface designs that are able to enhance the overall aesthetic of such large-scale projects. In such examples as the Pokeno Rail bridge, we

adapted scanned data to achieve a curved retaining block with realistic stone texture, alongside the corresponding flat stone blocks within the Stone Strong retaining system.

‘Using 3D technology, we have worked through a series of block layouts, including two sizes of curved blocks. As far as we know, these are possibly the only natural surface precast curved blocks available in the industry, possibly [in] the world.’

In contrast, says Ricketts, the Ellerslie noise walls project, which won a sustainability award in 2018, was an entirely iwi-inspired design of a tuatara and a tiki. Covering one kilometre of motorway, this concrete moulding rubber application is conducive to deep and intricate detail. ‘It was the perfect



Kirk Ricketts



solution for achieving the high volume of panels needed to complete the project.’

Ricketts also highlights the Ōtāhuhu Interchange building as another example in which the team used standard form ply for a low-frequency casting option. The building went on to win the New Zealand Institute of Landscape Architects Award of Excellence in 2017.

‘More recently, we supplied the complicated lintel beam moulds for the Auckland Downtown Ferry Terminal. These represented intricate detailed manaia along the front faces in a series of seven differing beam layouts running the length of the main pier. All the MSE wall and TL5 bridge barrier moulds for Auckland’s Northern Corridor Improvements incorporated 11 different moulds for the TL5 barriers, and nine different moulds for the MSE walls.’

Ricketts and his team have access to the in-house Caro C material, a grainless tooling board that can be cast in any sized blocks required.

‘This means we are not subject to the usual restriction of medium-density fibreboard or plywood board size when it comes to creating machinable stock. It also does not require any sealing, which from a mould-making perspective puts us light-years ahead of traditional mould suppliers. It not only negates the need for harsh chemical sealing sprays, but it also reduces our mould-making time significantly.’

Ricketts believes that this process provides a superior surface finish to other materials. ‘It is made on site in our specialist blending facility room, and allows us to control the entire mould-making process from start to finish, while achieving the best possible results.’

In the immediate future, Ricketts will be working on the Auckland City Rail Link and the Baypark to Bayfair Link Upgrade projects. He believes that it is imperative that innovation is a key focus for infrastructure projects within New Zealand.

‘We are currently seeing huge cost blowouts in projects all over the sector. We currently have technology and tools that, when combined, can make the supply of modular frameworks, formworks or even completed concrete parts that, in conjunction with a repeatability of design mindset, can have positive cost savings.’

Ricketts says that innovation is important in other areas, too, such as ‘the added design aesthetic for the overall visual palate of our large-scale road projects, and the addition of surface textures for maintaining the natural environment (such as with retaining walls in coastal environments to help accommodate marine life). The benefits are huge in comparison to the overall costs of these projects.’ //



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