

#04

APRIL 2021

iNFORMER

YOUR QUARTERLY FRC NEWS &
TECHNICAL UPDATE FROM iNFORCE

THIS ISSUE

- Project Focus: Over A Decade In Service
- Reinforcing Steel Within Concrete
- Disrupted Face Technology in Armored Joints
- Supporting Grass Roots Rugby



PROJECT FOCUS: OVER A DECADE IN SERVICE

At the end of last year, one of our Directors, Finn McGaveston visited one of our oldest fibre only jointless industrial floor slabs. Coming up 15 years in service, this warehouse floor slab located in Ashburton, was designed with Naylor Love, to provide the client with maximum load bearing capacity while offering a reduction in long term maintenance with the removal of sawn joints right through the complex.



He was pleasantly surprised by the quality of the floor after 15 years. 'While there was the expected surface wear and tear of a busy storage warehouse, the slab in general was in remarkable condition with no sawn joints to be damaged by the hard tyre forklifts. Not a single crack was visible though out the store. One learning we took from this was with the advancement of steel armored joints, it is critical to ensure a covered plate joint is utilised so the void created by the shrinkage in the slab is covered.'

It was particularly interesting to note the steel fibre floor finish after 15 years of service; there were still very few fibres on the surface which would be missed by the casual observer. This has a good deal to do with using the right fibre type in conjunction with the concrete contractor adopting Inforce's steel fibre placing techniques for industrial floors.



PERMABAN WAVE JOINT

DISRUPTED FACE TECHNOLOGY: ARMoured JOINTS

Armoured Joints are an important consideration when designing and constructing industrial floor slabs. Not using a steel armoured edge to protect the aris of the joints edge will result in failure and deterioration of both the joint, and the Material Handling Equipment (MHE) operating on the slab, resulting in costly implications.

Armoured Joints is a broad term and many products fit within the category. The industry globally is fast trending towards the use of the disrupted face joint systems allowing un-hindered flow over the joints. A disrupted joint system sports a 'wave' type pattern with no straight edges, allowing the MHE to run over the joint unhindered.

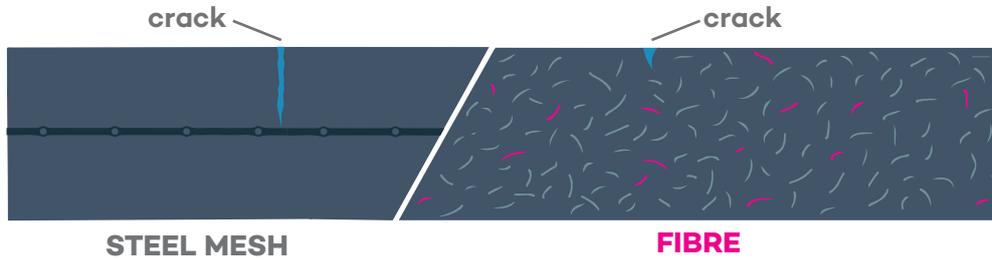
An axle hitting a straight joint directly at 90 degrees causes potential risk of impact damage due to the wheel momentarily dropping between the joints causing a 'noisy' jolting type movement.

Through the use of a Disrupted Face joint, the load will be transferred between the slabs smoothly and quietly as the joint has no straight lines for a perfect 90-degree approach.

CORROSION: REINFORCING STEEL WITHIN CONCRETE

Fibre Concrete Reinforcing:

Creating faster yet **so much stronger** concrete slabs.

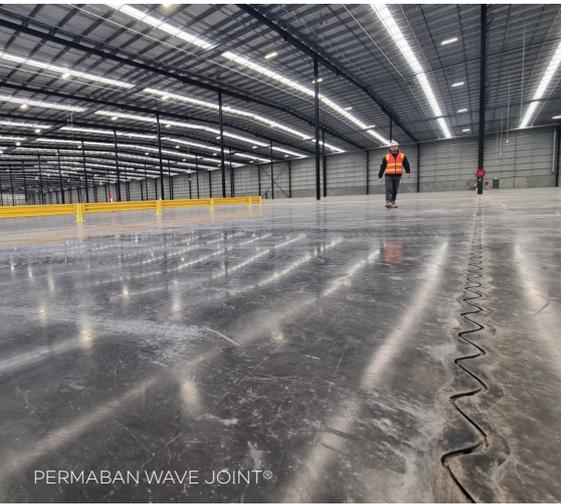


Reinforced concrete's durability depends on concrete cover isolating/protecting steel from corrosion. One of the main challenges in using steel reinforcement is the corrosion potential due to environmental factors the concrete is exposed to.

Testing on NZ wharf structures indicated that for uncracked concrete elements, chloride attack occurs at roughly 0.5 – 1mm per annum (non-linear) - depending on concrete mix and maintenance. This implies that under regular maintenance conditions, 100mm cover may effectively be reduced to 50mm in 50 years and zero in 100 years. Cracking and corrosion will start as soon as chloride and oxygen encounter the steel. Even though corrosion happens slowly, failure often happens unexpectedly and unpredictably.

Consideration needs to be given to different ways of improving the corrosion resistance of concrete to protect the reinforcement. New reinforcing products like Basalt fibre, GFRP or structural fibers used to reinforce concrete can mitigate corrosion of reinforcing steel.





CONTINUED: DISRUPTED FACE TECHNOLOGY ARMOURED JOINTS

This system removes any jolting or impact from the MHE's providing an optimum joint system that will not cause deterioration to the equipment or the slab.

If you have a project you would like to discuss joint options for, reach out to one of the Inforce team for guidance and assistance in selecting the right type of jointing system.



AUCKLAND SUP

Inforce worked with CBP, WSP, NZTA and AT to provide a design for the Shared User Paths along side the Southern Motorway in Auckland using our Radforce structural synthetic fibre to replace all steel mesh reinforcement. This not only sped up construction of these slabs but also provided a more durable slab and a corrosion free design relevant to marine areas.

CONTINUED: CORROSION REINFORCING STEEL WITHIN CONCRETE

While the steel reinforcing is properly encased in the concrete, it is likely to stay largely corrosion-free. The alkaline concrete environment helps to protect reinforcing steel in the absence of cracks - particularly cracks $> 1\text{mm}$. Any cracking forms pathways for corrosive elements to enter the structure.

Fibre reinforcing ensures the surface of the concrete is markedly less prone to cracking, therefore ensuring the surface stays crack-free for longer. When cracks do occur, they tend to be much smaller and more controlled in fibre concrete than with steel mesh or rebar alone. In many cases, structural fibre can eliminate steel mesh or rebar to achieve the same performance. If the fibre chosen for design is structural synthetic, the corrosion potential is entirely mitigated. Where steel fibre is chosen, the discrete nature of the fibre throughout the concrete matrix, means that if any individual fibres are subject to corrosion it will not transfer to the rest of the fibres. The surface area of a fibre is too small to cause any oxide jacking, meaning that steel fibre reinforced concrete will not experience enhanced corrosion as is the case for exposed steel/rebar reinforcement.



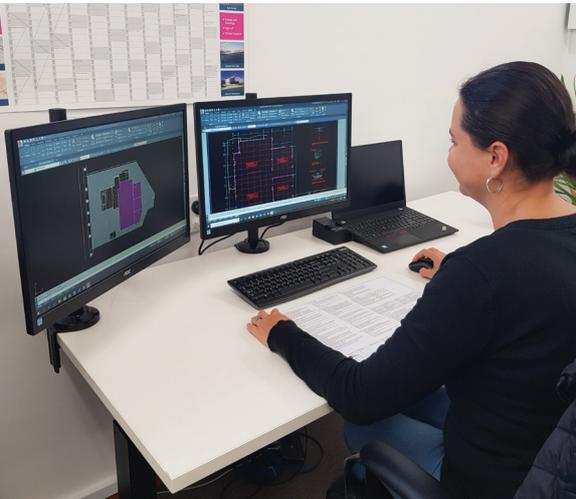
RESOURCE RECOVERY CENTRE

Work has been progressing at the Fielding Resource Recovery Center where Inforce worked with GHD to provide the client with an optimised jointless slab in areas of the complex where corrosion was such that any joints or cuts in the slab would have a detrimental effect on the long-term durability and structural integrity of the slab. Inforce used a Jointless Hybrid slab design utilizing Steel Fibre Reinforcing with a single layer of mesh at the top of the slab for crack control.



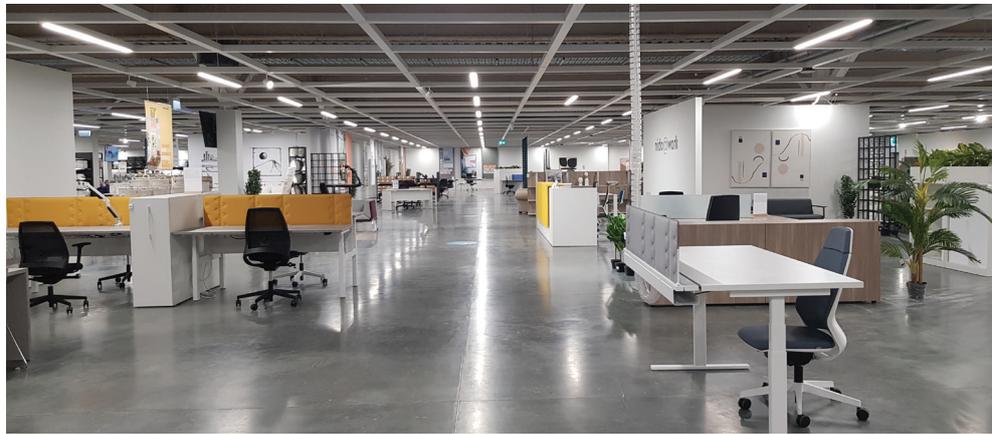
CARGO PLUS FREIGHT DEPOT

Freight depots like this one need high quality concrete slabs to accommodate the repetitive axle loads and heavy shipping container weights. Inforce work with the D&B contractors right across the country to provide a durable and cost-effective slab design to meet their client's needs.



- DESIGN
- SPECIFICATION
- CONSTRUCTION SUPPORT

Talk with the INFORCE design team to discuss how we can best optimise your slab design providing you with full design service, specification including construction drawings and onsite support for construction teams as required.



RETAIL CENTER

Over 15,000m2 of retail floor in Auckland utilizing Permaforce steel fibre reinforcing in the floor slab. Inforce worked closely with Russell Gordon Contracting to achieve a highly finished slab, using a variety of different placing and finishing techniques.



SUPPORTING: GRASS ROOTS RUGBY

The team at Inforce were pleased to be supporting the Buller Rugby Union, the smallest representative club in New Zealand. Due to challenges with Covid19, the 2020 Heartland Rugby Competition was cancelled however the BRU arranged fixtures with other affected Heartland sides and a series of games were held with South and Mid Canterbury. We value what these small clubs do for the community, helping young people be exposed to leadership and personal development opportunities.

inFORCE

SIMPLIFY WITH CONFIDENCE.