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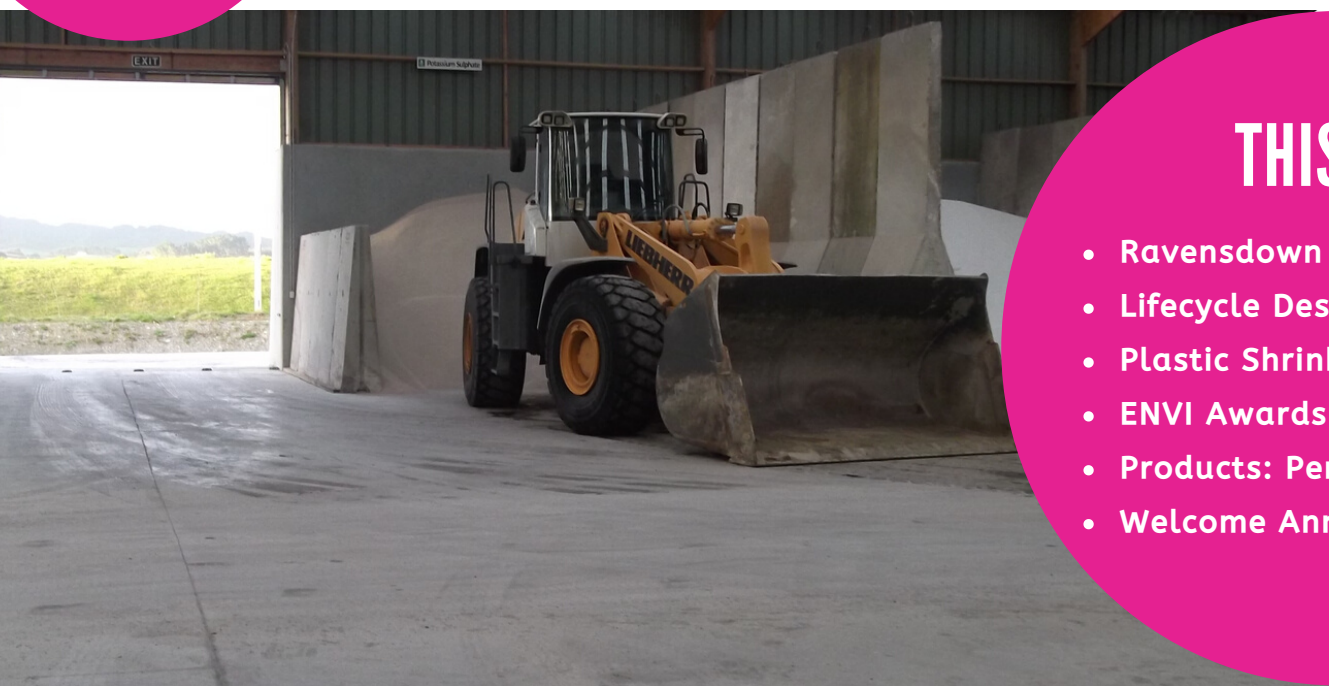
FEBRUARY 2020

iNFORMER

YOUR BI-MONTHLY FRC NEWS & TECHNICAL UPDATE FROM iNFORCE



THIS ISSUE

NEW STAFF

iNFORCE is proud to welcome Anneke Visagie to the Westport team, all the way from Rustenburg, South Africa.
Anneke joins us as a Civil Engineering technician with many years experience in the consulting industry. As our Projects and Design Lead, Anneke will be assisting you with project specifications, drafting and education around fibre reinforced concrete.
Welcome!

AND WHO KNEW..

Thomas Edison (inventor of the lightbulb) was an early expert in precast concrete patents and designs

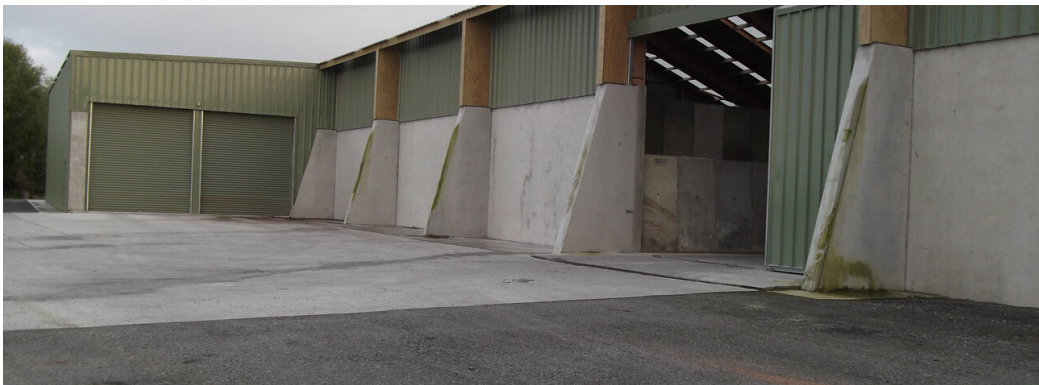
Chinas Three-Gorges Dam is the worlds largest concrete structure

Concrete is the most widely used man-made material in the world by volume, about 5 billion tonnes per annum

RAVENSDOWN WHANGAREI:

A FRC slab designed for hard wear and heavy loads, still perfect after 9 years of hard use.

Towards the end of last year, members of the Inforce team visited the 3200m2 Ravensdown Fertilizer building in Whangarei, where back in 2012 we had worked with Naylor Love to design and deliver a fibre reinforced slab.
The team were very impressed with the condition of the slab; despite nearly 9 years of service, the slab was in 'good shape' and described as 'perfect' with very minimal surface cracking or joint deterioration.
Back in 2011, Inforce were approached to provide a fibre design alternative for the building, with the prior slab design already specified with 2 layers of steel mesh reinforcing. The team were faced with designing a slab that was subject to high wear, movement of bulk transport and the constant activity of a loader with sharp cutting edges on the bucket 'scraping' over the slab.



The design team solution was to utilise our Permaforce 38mm steel fibre in a high-fibre mix (more on Permaforce later in this issue), to create large unrestrained joint-less panels interconnected with dowelled steel joints, to mitigate saw-cuts.

Ravensdown Issues:

High wear slab, loader bucket scraping repeatedly on slab surface, high impact areas, heavy traffic, saw cut deterioration over time.

iNFORCE Solution:

Remove the 2 layers of steel mesh and replace with a FRC mix only.
A high fibre concrete mix, creating large joint-less panels to eliminate the saw cuts and mitigate the risk of long term joint deterioration and slab wear.
Inclusion of fibres in the slab contribute to a stronger and more durable concrete matrix.

PLASTIC SHRINKAGE CRACKING

Plastic shrinkage cracking is an unsightly and undesirable result of concrete finishes drying out too fast with surface water evaporating, or subsurface moisture not bleeding through fast enough.
The drying concrete surface shrinks & cracks occur as tensile stresses develop in the curing surface layer. Hence why placers love to do their thing early in mornings or late at night to help mitigate this phenomenon.

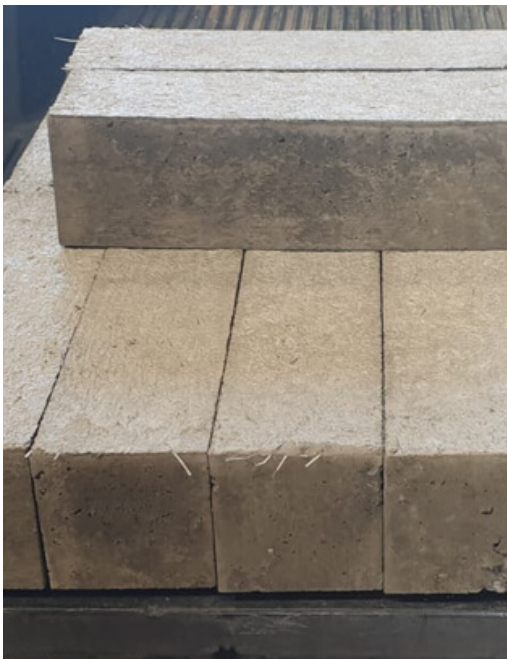
Engineers can help arrest the likelihood of plastic shrinkage by opting to add a fibre like Microforce®(our micro synthetic polymer fibre) which can aid in arresting plastic shrinkage by providing secondary reinforcement in the surface of the slab.

If your project is likely to be in a dry environment, completed at a hot time of year or has a greater potential for plastic shrinkage - talk to us about specifying Microforce® and the advantages it can provide for challenging projects.

Get your BEAM on

In the coming months, Willem de Bod our Engineering Manager, will be beginning a fibre beam testing programme to help us better understand how our fibres perform.

After casting a series of concrete beams with different fibre mixes, dosing rates and concrete strengths - Willem will observe and gather data as his creations are taken to failure point by 3 point hydraulic press at WSP Opus in Wellington.
Using an accredited independent laboratory here in New Zealand, with local materials, will give us highly accurate design data going forward. This will be valuable for helping our customers to create highly accurate & economical reinforcing solutions.



PRODUCT FOCUS: PERMAFORCE

PERMAFORCE® is a 38mm steel fibre for concrete, recommended for industrial applications as superior to mesh. Wire crimped steel fibre is made of low-carbon cold drawn steel and has a minimum tensile strength of over 700Mpa. The fibre contains deformations that run the full length of the fibre and give an incredible mechanical bond to the concrete matrix.

PERMAFORCE® fibre provides a uniform distribution of reinforcement throughout the concrete that increases the tensile strength, impact resistance, shear strength, and ductility of the concrete. No sophisticated or expensive equipment is required to achieve uniform, ball free distribution of PERMAFORCE® fibre in the concrete matrix.

Contact iNFORCE for a free sample of PERMAFORCE® fibre sent to your door.

LIFECYCLE DESIGN: THINKING MORE SUSTAINABILITY WITH CONCRETE

Comparing concrete with other materials - may pose more questions than answers

Life cycle design and the topic of sustainability is having a marked impact on the building and construction industry the world over.

More and more, consumers attention is being drawn to the impacts of their demands, and consequently, design and engineering has to consider and adapt to the levers of consumer opinion in order to stay relevant, offer desirable solutions and to get projects across the line.

But what does the concept of lifecycle design actually mean? Our assessment is that this concept seeks to consider the entire impact of materials or designs, from their inception to their demolition.
When we plan a project, in order to consider lifecycle design, we might be asking questions such as; What materials? How are they sourced? How will they contribute to energy consumption over time? How will they be disposed of post demolition? Are they of a high carbon footprint?

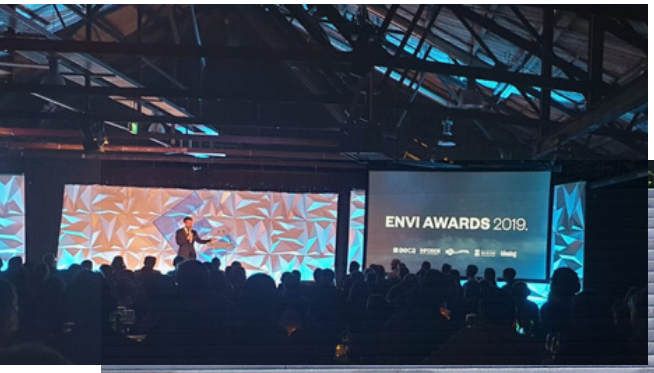
When thinking about materials - itself but a niche element of the entire lifecycle design thoughtspace - and concrete in particular, there is more than one way to look at its lifecycle. Undeniable permanence around concrete structures usually means a vastly extended life that requires less maintenance and material inputs to ensure its performance.

ENVI AWARDS 2019

Late 2019 saw the inaugural ENVI Engineering Awards take place at Shed 10 on Auckland's waterfront.

As a corporate sponsor, iNFORCE was proud to watch a talented class of Engineers be recognised for work across categories such as Young Engineers, Innovations, Leadership, Creativity, Partnerships, Diversity and Impact.

Congratulations to all recipients and we look forward to the 2020 event.



LIFECYCLE DESIGN: SUSTAINABILITY IN CONCRETE CONTINUED

Energy use over the longer lifecycle, would usually be lower than for materials such as timber or steel, which require more lifecycle maintenance (painting, upkeep, replacement) and have a shorter lifespan.

This thinking is juxtaposed by the fact that timber starts life with a head start in terms of environmental friendliness - having been a net contributor to a cleaner world, as trees. Compared to concrete and steel, which take large energy inputs to develop and move about.
But what of steel, with its (assuming it isn't rusting away) near infinite recycling potential?

There is plenty to consider around lifecycle design and no clear cut answers or arguments, but whatever the thinking - we can put forward solid and sensible arguments for the inclusion of concrete in any designs that consider enhancing the lifecycle of a project.

A project in concrete will require far less inputs over its (longer) life than competing materials

NEXT ISSUE:

- Nido Retail, Henderson
- Impact Resistance and FRC
- Talking Seismic
- BECA Presentation
- Inforce Webinar Series
- Product Focus: Radforce

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SIMPLIFY WITH CONFIDENCE.