#07
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iNFORMER

YOUR QUARTERLY FRC NEWS & TECHNICAL UPDATE FROM iNFORCE

SWAP MESH FOR FIBRE AND HALVE YOUR CARBON FOOTPRINT!

OPTIMISED SLABS HELP TO MINIMISE CO^2 EMISSIONS

We're passionate about optimising concrete slab and pavement designs - not just because they can be made more durable and cost effective with fibre, but also because there are substantial environmental benefits to be had through optimised designs.

As an example, using fibre in slab on grade projects to replace steel mesh results in better quality designs that minimise waste and have a substantially reduced carbon footprint.

This is due to the reduction in manufacturing and transport emissions when compared to traditional mesh. Mesh is heavy to transport, difficult to handle and time consuming to set up.

In contrast, fibre reinforcement is only a fraction of the mass of conventional reinforcement, meaning significant reductions in imported shipping and domestic transport. Truckloads of steel mesh reinforcing can be replaced with a small number of pallets!

Contact us to see how we can optimise your slab and pavement designs for strength, cost efficiency and reduced environmental impact.

> *"Studies have shown that using fibre reinforcement in concrete as an alternative to conventional steel rebar can reduce the carbon footprint of an industrial floor by as much as 56%.**

*Source: https://atlantisfiber.com/environmental-impact/

INSIDE AND OUT: NZ VANLINES, PALMERSTON NORTH

THE PROJECT
iNFORCE was pleased to be involved this awesome NZ Vanlines facility in Palmerston North.

We designed over 2000m2 of both the internal and external slabs, using steel fibre reinforcement to help our client lower construction costs and speed up the project.

THE iNFORCE DIFFERENCE:
• DESIGN
• SPECIFICATION
• SUPPORT

A key part of our business is the ability to handle design & specification for our clients as well as offering on site support.

The iNFORCE team of engineers and fibre design specialists can provide you with expert advice in line with global best practices.

This gives our clients confidence in specifying and using fibre in future projects, as well as helping you to achieve high quality, long-lasting and cost effective fibre reinforced concrete slabs and pavements.

DONE-FOR-YOU SPECIFICATION SERVICES
We can provide written specifications alongside our working drawings, and detailing with our design services. This can either be included in the drawing package or used in conjunction with project drawings.

FIBRE IN FOCUS: ULTRAFIBER 500

ULTRAFIBER 500 Cellulose fibres provide excellent crack control due to their high fibre surface area, close fibre spacing, and excellent bonding within the hydrated cementitious matrix.

These lightweight fibres help to create a stronger matrix and help to reduce the risk of plastic shrinkage cracking.

Cellulose is porous, allowing wet concrete to fully penetrate the fibre and harden to create a strong, anchored substrate. It is also resistant to the alkaline environment of cement so it won't degrade over time.

ASK AN ENGINEER:
STEEL FIBRES & CONCRETE FLEXURAL STRENGTH

Written by David W. Harris, PhD, PE

Once cracks initiate they want to open and increase deflection, normal to the crack. This is a tension stress state.

We are familiar with reinforced steel design for beams which is designed to carry the tension stress in the bottom of the beam to resist cracking.

What are possible alternatives for carrying load perpendicular to a crack?

Imagine if we could design a mini-rebar across each crack. We can!

> *Hooked end fibres increase the shear carrying capacity by 50% or more when used in concrete beams and thereby increasing the flexural strength.*

Steel fibres and some structural synthetic fibres are available for concrete. Hooked or crimped steel fibres are mixed with the concrete anywhere from 10kg/m3 right up to 40kg/m3.

The fibres are mixed through the matrix of the concrete so are positioned in random directions, which allows tension loads to be carried by the fibres as they develop from various directions.

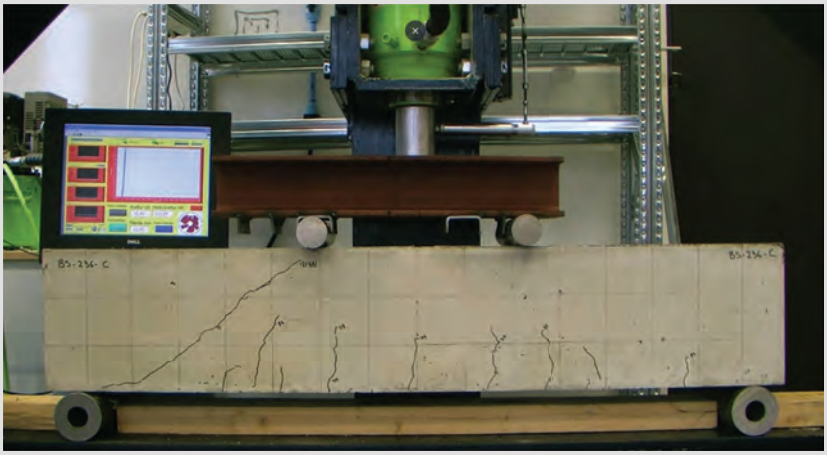
The American Concrete Institute specification gives the shear strength for normal weight concrete as:

$$V_c = 2.0\sqrt{f'c}\, bw\, d$$

Experimental research by Parra-Montesinos *(Concrete International, 2006, pp. 57–66)* showed that the factor of 2.0 could be increased by 3.0 or greater with hooked or crimped end fibres.

Hooked end fibres increase the shear carrying capacity by 50% or more when used in concrete beams, thereby increasing the flexural strength.

Contact our engineering team to see how you can use steel fibres to increase the strength and durability of your concrete slab or structure.



> *This concrete beam tested in a third-point flexural apparatus shows cracking and shear failure under load.*

CONCRETE WITH A VIEW: WINE TANK SLABS IN THE WAIRAU VALLEY

Designing slabs and pavements around New Zealand takes us across a diverse range of industries and to some unique places in our beautiful country.

We got involved in this project up the Wairau Valley in wine country, designing heavy duty tank slabs for wine storage in Marlborough.

Mixing wine and concrete... not a bad thing!

MEET THE TEAM: CRAWFORD FISHER, PROJECT MANAGER

Crawford brings a lot of enthusiasm and positivity to the team and to our clients.

With extensive experience in managing complex projects, he works with our clients to ensure we're helping them achieve the best results possible with their concrete works.

"I love really getting involved in our projects, being on site and actually seeing our designs come to life."

"It's fantastic to see customers who are new to FRC just blown away by how quick, easy and safe fibre reinforced concrete is to place compared to traditional steel mesh."

iNFORCE

SIMPLIFY WITH CONFIDENCE.