

I am writing to SESOC to express my concern as a contractor, specialising in the design and construction of slab on grade, over the information being supplied with steel fibre in the New Zealand market.

Steel fibres are routinely being used as reinforcement for concrete slab on grade however engineers, ready mix concrete suppliers and construction companies such as ours are being offered a wide range of steel fibres, typically with no sound data on their quality or performance in concrete. To compound the issue proprietary design programmes are being used with no proven relationship between the design values being used and the fibres being supplied. Further I would suggest that there are instances where the fibre being supplied has no relationship to the fibre brand being marketed.

The market seems prepared to accept product and designs without serious question.

There have been infrastructure projects in Australia where the ongoing QC performance testing of the steel fibre reinforced concrete has resulted in an increase to the dose rate suggested at tender stage, highlighting they have much the same issue there.

While failure of slabs on grade is not life threatening I do believe it is in SESOC's interest to educate engineers as to good practice in this area. I understand slab on grade failures makes up the majority of Consulting Engineers insurance cases! Steel fibre is an excellent and practical reinforcement but its use in New Zealand could be set back years by the practices currently being seen.

This situation has existed for quite some time but it seems help has arrived via a European manufacturing standard for steel fibres; EN 14889-1 and certification to this standard (CE labels). This provides a standard test of the performance of the fibre in concrete giving the design engineer or contractor a simple measure of comparative performance.

This European standard includes a beam test to determine the effect on concrete strength of the addition of fibre. Using a standard concrete the manufacturer must provide a minimum dosage of fibres to achieve certain stress values:

1.5MPa at a deflection of 0.47mm (CMOD=0.5mm) and  
1.0 MPa at a deflection of 3.02mm (CMOD=3.5mm)

EN 14889-1 states the manufacturer must record on the CE label the minimum dosage required to meet these stress levels, this label is attached to the product supplied to market. Thus for the first time we have a standard that can give a comparison between different fibres.

I would recommend to SESOC that they encourage all engineers to specify that steel fibres should comply with EN14889-1 and a copy of the CE label and Certificate of Conformity is supplied to the engineer, contractor and ready mixed concrete supplier and that it matches the CE label attached to the pallet of steel fibres supplied to the concrete plant. This should give all parties the confidence that what's been specified is what's being supplied on site.

Steel fibres can be sourced from all over the world and it's common for the fibres to be sold to agents or marketing companies who re brand them and promote them in their respective markets. Any of these manufacturers who wish to supply product into Europe will be using EN14889-1 and will have the CE information but to date we have seen a CE label from only two suppliers in the NZ market. Our belief is that this information will not be supplied as it will show their fibre performs poorly in concrete unless supplied at very high dose rates.

On the issue of design the protection for the NZ engineer or contractor will be through ensuring the supplier of the design has adequate PI cover for the NZ market. It is very difficult to know whether the information being used in the programme has any relevance to the fibre performance in concrete, whether the design method used in the programme is robust or what is the engineering knowledge of the person undertaking the design. They are the ultimate black box.

In summary it is my perception we have an excellent product being used without adequate control in an effort to provide the cheapest solution to the market. This is certain to lead to failures. I can only encourage engineers to take control of the situation by specifying CE labels as mandatory to provide comparative data on the performance of the product in concrete, to know the engineer undertaking the design and to be comfortable with the level of PI insurance provided.

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