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Concrete research news

from University College, London

Influence of fibre reinforcement upon the development of cracking in reinforced concrete

AIM OF THE INVESTIGATION

In designing reinforced concrete structures, the upper limit of steel strength used is usually governed by the maximum width of cracks which are expected to develop under the design load. This results in the use of steels which have relatively low strength compared with that obtainable commercially. This research programme is being carried out to assess the possibility of using steels of higher strength by incorporating fibres into the concrete.

EXPERIMENTAL TECHNIQUE

Tests are being made on specimens either in flexure or in direct tension. The tension specimens are 75 × 75 × 500 mm prisms, each reinforced with a single 12 mm bar placed centrally along its axis. The load is applied to the steel and measurements are made of steel strain and widths of surface cracks on the concrete.

The flexural tests are made on slabs loaded so that the central part of the span has a constant bending moment with the tensile surface uppermost. Measurements are made of the central deflections, the surface strains on both sides and crack widths at the tensile face over the constant moment zone. The slabs are 100 mm thick and 1·8 m long being supported at points 0·8 m apart. They are reinforced with various types and diameters of steel.

PROGRESS TO DATE

More than 150 tensile specimens have been tested containing either polypropylene or steel fibres. Thirty flexural specimens have been tested.

The range of fibres include:

(a) polypropylene: two thicknesses, 520 and 6000 denier, with lengths from 25 to 75 mm.
(b) steel: round and 'Duoform' fibres with aspect ratios ranging from 25 to 250 covering diameters from 0·15 to 0·5 mm.

The reinforcing bars have included both plain and deformed types with ultimate strengths up to about 1500 N/mm^2. The tests so far indicate that polypropylene gives only a modest improvement of crack control but that the steel fibres have a much more promising effect.

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Future *Concrete research news*

The Editor will welcome submissions for future editions of *Concrete research news*. Entries should relate to programmes of research which are just starting, or which are just entering a substantially new phase. Each item must be submitted, or at least authorized in its final form, by the head of department or director of research concerned.