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Engineering Materials & Processes

Tough nylon cuts manufacturing costs by 40%; low cost concrete fibres; improved EMI shielding

Rapid Product Development Report

Rapid tooling; rapid prototyping; FEA improves pinball machine; lean product development

Linear Motion Report: Part 2

Eureka's second report based on a round table debate with four UK-based linear motion suppliers

Concrete fibres are low cost

Tom Shelley takes a look at an alternative source of polymer fibres that dramatically improve the mechanical engineering properties of concrete

Following the publication of an article in the January 2006 issue of *Eureka*, 'Polymer fibres make flexible concrete to withstand earthquakes', it has been brought to our attention that a company in Pakistan has, for some time, been producing a similar fibre product which it sells for the princely sum of £1.80/kg.

Syntech Fibres produces a fibre called 'Duracrete', which consists of 13mm long polypropylene fibres, which were initially developed to prevent shrinkage cracks leading to reinforcing bar corrosion, a particular problem in marine environments, including parts of the City of Karachi where the fibres are manufactured.

MD Hamid Omar told *Eureka* that the exact formulations used, including the crucial coatings, are the results of "lots of experiments". Different grades are supplied for different purposes, with 'hard' grades for engineering



concrete and 'soft' grades for reinforcing plaster. As in the US-Japanese studies, the fibres have a dramatic effect on mechanical properties. Impact strength of concrete is 14 times greater with fibres than without, flexural fatigue strength is 30% greater, and load carrying deflection prior to failure about 70 times greater, giving a vastly increased flexural toughness. Test results cited were produced by the South Dakota

School of Mines and Transportation in the US.

Recommended dosage is about 0.6 to 1.8kg of fibres per cubic metre of concrete, depending on the nature of the work. The fibres are supplied in bulk or in small 100g or 150g bags to be added as one bag per bag of cement. □

Enter 509 for Syntech Fibres at www.eurekamagazine.co.uk/enquiry

Conductive Plastic Shielding

Polymers offer improved EMI shielding and design freedom

Two new thermoplastic shielding materials have been launched that achieve new levels of EMI shielding and electrical conductivity. The ability to include design features on a part made from the materials, such as internal compartments, also means customers can accommodate multiple logic and RF components in a single shield.

Chomerics' 'Premier' range of conductive plastic shielding materials now includes two compounds: 'A230-HTHF' and 'A240-HTHF', with properties that, the firm said "enhance design freedom" and make them suitable for use in the most demanding applications. The materials conform to RoHS, WEEE and EPA standards.

The compounds achieve impressive shielding performance of around 85dB.

They use high aspect ratio, nickel-plated carbon fibres, which are treated with a proprietary sizing agent to give superior processing and dispersion.

The fibres are then augmented with nickel-based fillers with a lower aspect ratio. The careful control of this process results in a high melt flow. This, in turn, allows the manufacture of parts with walls down to 0.8mm, with localised areas between 0.5mm and 0.8mm thick, without loss of shielding effectiveness or electrical conductivity.

The reduction of long fibres also produces a smoother, more even surface on finished parts. Chomerics said this was particularly useful "where aesthetics are important". A good example of this, the company said, is where parts, once assembled into a



finished product, are visible to the equipment user.

Premier shields offer space, cost and weight savings (they are up to 75% lighter), plus greater design freedom compared to most other shielding approaches. □

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