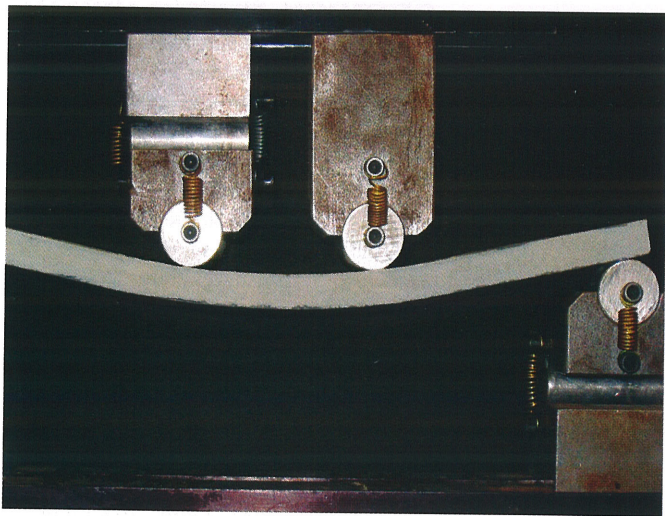


Bendable concrete gains ground



Researchers from the University of Michigan, USA, are hoping that the latest project incorporating their fibre-reinforced concrete will stimulate American interest in their new material.

The Engineered cement composites (ECC) developed at Michigan have been used in projects in Japan, Korea, Switzerland and Australia, but the adoption of the material in the USA has been slow.

Professor Victor Li from the University of Michigan, says that other countries have been quicker to adopt ECC technology because of the orientation of their construction industry towards performance. 'In Japan, for example, the reminder of the Kobe earthquake and the anticipation of the next large one hitting forms a major driving force. Their government infrastructure contract bidding approach also favours innovative technology adoptions,' says Li, who holds appointments in the both the Engineering and Materials Science departments at the university.

ECC looks like regular concrete but, according to the researchers, is 500 times more resistant to cracking and 40% lighter. The performance of the concrete is attributed in part to the tiny fibres that comprise about 2% of the mixture's volume. The materials in the concrete itself are also designed for maximum flexibility.

The Michigan Department of Transportation is scheduled to use ECC to retrofit a section of a bridge in Ypsilanti, Michigan, in the coming months. 'The ECC link-slab installation this summer on the Grove Street Bridge will provide structural design guidelines and large-scale material mixing and placing experience for sharing with the construction community,' says Li. The slab is 23cm thick, 5.5m long and four lanes (roughly 20m) wide.

'ECC was chosen for this project for its high stretchability, thus serving the function of a conventional expansion joint, but without the typical problems of expansion joints (such as jamming and deterioration of surrounding concrete due to wheel impact loads and expansive maintenance),' continues Li. Once installed, the ECC link slab will make the bridge deck a continuous one. The ECC material does not depend on steel reinforcement for tight crack width control, which gives the link slab the flexibility of a hinge while maintaining durability over time. 'While highly deformable without fracturing, the ECC materials have compressive strength ranging from normal to high strength concrete,' adds Li.

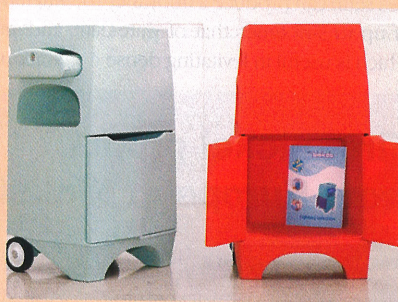
The ECC link slab is expected to significantly lower the maintenance costs of the bridge deck in future.

News in brief

■ New computing techniques based on genetics and evolutionary theory could transform the manufacture of iron and steel, according to research published in the current issue of *Materials and Manufacturing Processes* (Vol 20, No 3). The issue is dedicated to evolutionary computation, and covers 'virtually every facet of iron and steel production', says the editor, N Chakraborti, a professor of metallurgical and materials engineering at the Indian Institute of Technology in Kharagpur, India. Genetic algorithms are computer techniques based on the principles of evolutionary biology. In steelmaking they can be used to optimise the operation of furnaces, minimise forging defects, or control the cooling and solidification process. To view the journal online, visit www.tandf.co.uk/journals/titles/10426914.asp.

■ Organisers of the Queen's Awards for Enterprise are inviting applications from the plastics and packaging sector. The Awards are open to any UK-based organisation that has excelled in the following categories – International Trade, Innovation, and Sustainable Development. The deadline for applications is 31 October 2005. Winners are entitled to use the Queen's Award emblem for a period of five years in their marketing and operations. Website: www.queensawards.org.uk.

■ A bedside cabinet made from an anti-MRSA plastic has been launched by the University of Manchester, UK, and Brimaid, the healthcare product manufacturer. It is hoped that BioKab, which is made from a polyethylene plastic impregnated with an antibacterial agent proven to kill the MRSA bug, will help prevent the spread of the harmful bacteria in hospital wards. The lightweight cabinet has been designed with round corners to make it easier to clean. The Biokab material is doped with Irgaguard – an organic antimicrobial – during the manufacturing process. The antimicrobial does not degrade with time, is non toxic, and has a heat resistance of up to 800°C. Website: www.biokab.co.uk.



Finding a cure

Inditherm plc, based in Rotherham, UK, and the Centre for Infrastructure Management at Sheffield Hallam University, UK, have won a major grant for a concrete curing project. The award, which came from the European Union's Sixth Framework Programme (FP6), will fund a two-year project entitled 'Low voltage accelerated curing systems for concrete (LOVACS)'. The systems will be developed within a trans-European consortium, including academics, precast concrete mould manufacturers and end-users. The heat source for the project will be based on Inditherm's conductive polymer, which can run on voltages as low as 6V, and at 48V can produce temperatures of up to 120°C. The polymer is sandwiched into an insulated heating blanket that can be only 6mm thick. The leading partner in the LOVACS project is Sheffield Hallam University. Professor PS Mangat said the university recognised the potential for Inditherm's heating system over three years ago. Inditherm expects the LOVACS project to produce intellectual property rights and establish a market lead for Inditherm and its partners in the production of *in situ* and precast concrete.