New materials claim eco-friendly tag

and a solution to problems such as global warming, waste and housing for the masses. We may be on the verge of a technology and materials revolution that promises lower construction costs

By JOHN HARRISON

time of the Romans are all set to change CONSTRUCTION techniques and mate rials that have not changed much since the I was recently in California talking to a

even new cities from scratch is not the up the adoption of robotics for constructmuch of a building robotically. Holding California who has developed equipment form the substance of much of the built hurdle is the material that will in luture computer software nor the hardware. The ing entire subdivisions, skyscrapers and and software enabling him to construct professor at the University of Southern

finishing by robotic trowels. where and how they are placed for squeezed out of a nozzle and stay exactly paste; so that they can be pumped and rials used will have to behave like tooth single pass of a robotic device, the mate-To enable placement and finishing in a

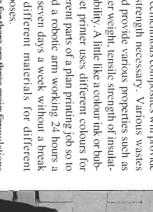
highly charged Mg ion in solution on water ly because of the unique affect of a small required for setting hydraulic cements. which is a highly polarised molecule TecEco binders have this property main-

The use of fibre reinforcing of these

use different materials for different day seven days a week without a break could a robotic arm working 24 hours a different parts of a plan printing job so to ble jet printer uses different colours for ing ability. A little like a colour ink or bublighter weight, tensile strength of insulatcould provide various properties such as the strength necessary. Various wastes new cementitous composites will provide

tive magnesia. Reactive magnesia hydrates to 15 percent MgO, 85 to 95 percent OPC that have been developed. Tec-cements (5 ubility, mobility and reactivity results in consumed Brucite controls the long term affective. After all the Portlandite has been sity and possibly raising the short term forming Brucite which uses up water reduccontain more Portland cement than reacpH. Reactions with pozzolans are more ing the voids:paste ratio, increasing denpH which is lower and due to its low solin the same rate order as Portland cement So far there are three main formulations

in porous materials carbonates forming 85 to 10 percent OPC) contain more reactive magnesia than in tec-cements. Brucite Eco-cements (15 to 90 percent MgO,



global warming and waste. John Harrison believes his products offer a solution to problems such as

stronger fibrous mineral carbonates and for waste utilisation and sequestration. therefore presenting huge opportunities

suited to toxic and hazardous waste immo-85 to 10 percent OPC) contain similar bilisation and when durability is required carbonate readily and develop less strength ratios of MgO and OPC to eco-cements but Higher proportions of magnesia are most in non porous concretes, brucite does not Enviro-cements (15 to 90 percent MgO,

> enabling technology for robotic construcability in the built environment. tion but will result in far greater sustain-These new materials are not only an

capacity to permanently immobilise wastes their extreme durability they have the than chemical composition. Because of ue to be recycled and uniquely utilise loose in the global commons. from our technical world harmful if let wastes for their physical property rather TecEco binders can themselves contin-

or cubic metre of concrete produced. 20 to 30 percent less is required per tonne wastes result in less net emissions as around concretes tec-cements that can assimilate Besides making much more durable

other binders in the system. In porous ing too much CO₂ in the atmosphere is to nature has shown us to any waste includrial in our built environment. The answer where it will do good as a building matetially sequester large amounts of CO₂ and gain strength and can therefore potenmaterials they absorb carbon dioxide to set Eco-cements are uniquely different to

development of eco-cements TecEco and works on the research and John Harrison is managing director of



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