

Innovation & Research



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Industry bodies launch civil engineering sustainability action plan

Leading civil engineering and construction bodies have prepared a new Strategy and Action Plan to make their industries more sustainable. This was launched at a Seminar at the Institution of Civil Engineers in July at which, in addition, recent CEEQUAL progress was reported and five recent awards celebrated. CEEQUAL is the Civil Engineering Environmental Quality Assessment and Awards Scheme



The Sustainable Development Strategy and Action Plan for Civil Engineering is supported by:



From right to Left: Dr Jean Venables, Vice President ICE; Eric Hughes, Chairman of CEEQUAL Ltd and of the Seminar; Owen Jenkins, CIRIA; John Wilson, CECA; Rita Singh, Construction Products Association; Ashley Bateman, Association for Consultancy and Engineering

by the end of the year, detailing the priorities for climate change that the construction industry must face up to in order to become more sustainable, plus a 'top ten' list of actions that clients and designers must undertake to make their work more sustainable. Another key action is to promote the take-up of CEEQUAL Assessments across the industry.

Outside the construction industry, the group is aiming to liaise with academics to support the wider inclusion of sustainable development in relevant curricula in Further and Higher Education.

Quentin Leiper, Institution of Civil Engineers' President, commented: 'There is a real opportunity for the construction sector to help the Government deliver more sustainable communities. As civil engineers and construction professionals, we possess the knowledge to deliver sustainable solutions that represent real value for clients and for society.'

To view the Sustainable Development Strategy in full, go to www.ice.org.uk/knowledge/specialist_document_details.asp?Docu_id=1757&FacultyID=3

Further information on CEEQUAL can be found at www.ceequal.com.

For further information on this activity please contact Dr Chrissie Pepper, Senior Policy Executive, Institution of Civil Engineers, (020 7665 2221; Fax: 020 7222 0973; Email: chrissie.pepper@ice.org.uk).



Precast Concrete Design

dti

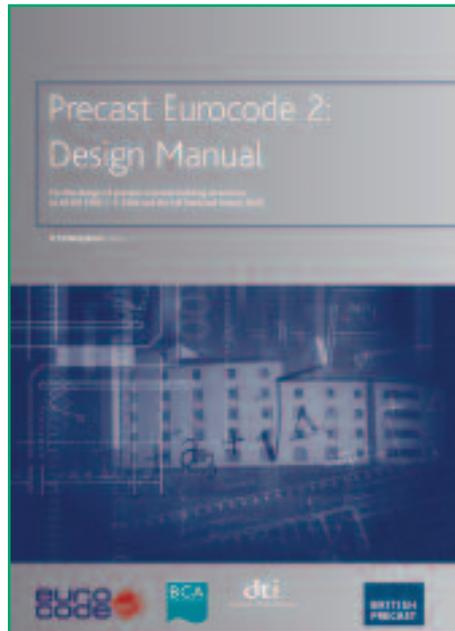
Now that the Eurocodes for construction are actively in the implementation stage, the publication of the *Precast Eurocode 2: Design Manual*, sponsored by the Department of Trade and Industry under its earlier Partners in Innovation scheme, is very timely. It is anticipated that it will be influential in helping consulting structural engineers and the UK precast concrete industry make the best use of the Structural Concrete Eurocode, EC2.

BRITISH
PRECAST

The move towards modern methods of construction, which includes a shift to offsite construction techniques with the construction site becoming more a place of component assembly, makes the Manual a tool of particular importance for design engineers.

The Manual has been prepared by a well-known expert on the Eurocode and a key member of the UK's Eurocode development team, Professor R S Narayanan, with the support and assistance of a Project Team, chaired by Dr Howard Taylor and drawn from consulting engineers, industry bodies, precast concrete producers and academia. It was also subject to review by another well-known member of the UK Eurocode team, Robin Whittle, formerly of Arup.

The Manual attempts to summarise the material that is likely to be used in the design of building structures using Eurocode 2, focusing on the consideration of precast components, and using extensive clause referencing to guide designers



through EC2, the UK National Annex and other relevant Eurocodes. It also has appendices containing design aids.

A further publication, *Precast Eurocode 2: Worked Examples*, complements the Design Manual and is currently in preparation. It is anticipated that the industry will make great use of these publications during both the transition to full implementation of the Eurocode and for some time beyond.

Based on the development of the publications, British Precast has arranged two courses for the industry. The first, an introduction to Eurocode 2 for precasters has already been attended by a number of precast industry personnel. The second, a more detailed look at the use of Eurocode 2 for precast design, was held in July 2007.

For further information please contact ec2manual@britishprecast.org, telephone 0116 253 6161 or visit <http://www.britishprecast.org>.

FLOODING & DESIGN

Resilience built in ...



New planning policy should direct future development away from areas of high flood risk, but it is inevitable that some development will be necessary in places that flood, albeit with a low or residual risk. As part of the hierarchy of flood mitigation measures, it is important to design and construct these new dwellings so they are more resistant or resilient to flood damage. This is particularly important since climate change is predicted to bring with it an increased flood risk.

HR Wallingford has taken a key role within a research consortium that has produced fresh guidance on improving the flood performance of new buildings. The report, which was published in May 2007, was jointly funded by the Department of Communities and Local Government, Defra, and the Environment Agency.

Although it follows on from other publications produced in response to the 1998 and 2000 floods, this new work is different – in that materials and construction assemblies were laboratory-tested at Wallingford under appropriate flood conditions, for several days. Results on water penetration and drying ability have provided new information to corroborate previous opinion – both 'anecdotal' and expert.

The guidance manual provides information on flood avoidance and resistance measures but it is mainly concerned with flood resilient design and construction.

Flood resilient construction has clear benefits. It can limit damage to the fabric of a building and minimise the time during which families are without their home. As a result it can help to reduce the stress and anxiety that flooding can cause. As an example, a resilient home in Lowestoft,

retrofitted as part of the European FLOWS project, can be reoccupied within one to two days following a flood. In contrast, families in Carlisle affected by the major flood in January 2005 were kept out of their homes for months, or even years.

Resilient construction provides one of the key adaptation strategies to climate change envisaged in the Stern Review. This new guidance, authored by experts from HR Wallingford, provides an indispensable reference document for all who are concerned with construction in the 21st century.

Copies of the Manual can be downloaded from http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf

For more information about HR Wallingford's role in this project contact, Andrew Tagg, Principal Engineer at HR Wallingford (01491 835381; E-mail a.tagg@hrwallingford.co.uk).



Laboratory testing cavity masonry walls.

Highways Agency research into tree-related accidents

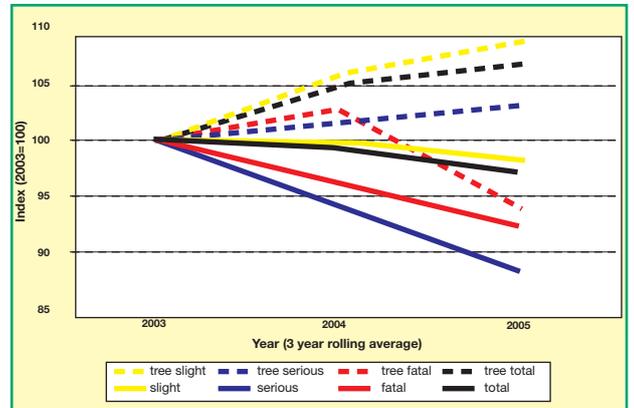
Although – overall – casualty numbers across the road network are falling, the percentage of tree-related casualties continues to rise. Despite the low numbers involved, this increase in people killed or seriously injured as a result of collisions with trees has given sufficient cause for concern to warrant further investigation.

In 2006, the Highways Agency commissioned the Highways Research Group to analyse personal injury accident data to provide a detailed understanding of the characteristics of tree-related injury accidents on the trunk road network in England.

The study showed that between 2001 and 2005 the number of tree-related personal injury accidents rose by around 6%, while the overall number of accidents declined by 3%. Tree-related injury accidents accounted for 6.3% of all killed or seriously injured casualties.

There were 11 other key findings from the research.

- The majority of tree-related accidents took place on dual carriageways (42%), with motorways seeing a further 37% of accidents.
- Single carriageways accounted for 16% of tree-related casualties and 24% of the fatalities.
- In tree-related accidents, 63% of accidents involved just one vehicle and the majority (88%) were cars.



Trends in tree-related and all accidents



Location of tree-related accidents on ha network 2001–2005

- Tree-related accidents were spread through the day.
- The average age of drivers involved in tree-related accidents was lower than for all accidents – male 37 and female 35.
- The 17–28 age group were most likely to be involved in a tree-related accident early in the morning and late at night.
- There was a concentration of tree-related accidents in the early hours of the morning involving drivers between 28 and 35 years old. These were possibly sleep-related.
- The incidence of positive breath tests among drivers was greater in tree-related accidents.
- Saturdays and Sundays accounted for a third of tree-related accidents, compared with less than a quarter of all accidents.
- Most tree-related accidents occurred in December.
- When vehicles left the carriageway the majority (85%) did so to the nearside in tree-related accidents.

These findings indicate that there is a significant driver behavioural background to tree-related accident causation: drivers were younger than the average for all accidents; more occurred at weekends and in December; and the incidences of excess alcohol were greater. However physical factors were also identified, though these varied between sites.

This implies that remedial works at some sites and programmes of driver education could be beneficial, but that there is no universal panacea for substantially reducing the extent of tree-related accidents.

The next stage in this research is to use these findings to determine the impact of different interventions aimed at reducing the severity and number of tree-related accidents.

For further information please contact Peter Whitfield, Highways Agency, Manchester (0161 9305687; E-mail: peter.whitfield@highways.gsi.gov.uk).

Steel Alliance: A new web advisory service

In recent years, it has become apparent that the most successful markets for steel are those supported by technical institutes dedicated to steel in construction. These institutes are characterised by: an in-depth understanding of the detailed technical requirements of specifiers and supply chains; substantial in-house technical expertise; and the provision of an advisory service. In order to make such expertise and impetus available in all European countries, the SCI has created the Steel Alliance, a joint venture with its French counterpart CTICM (Centre Technique Industriel de la Construction Métallique). This venture aims to promote the effective use of steel in construction through expert and innovative solutions.



As the demand grows throughout Europe for access to comprehensive technical information on steel in construction, the Steel Alliance is responding by launching a dedicated technical advisory web site: the Steel Alliance e-Advisory Service (www.steel-alliance.org).

The service operates in English and French and is open to subscribers on a 'pay as you go' basis. For €240, subscribers can ask up to 6 questions on any specific technical matter, including detailed design to the Eurocodes, initial design concepts, fire engineering and best practice for construction. This unique formula offers great flexibility to its users, who only pay for what they truly need. Engineers can directly – and in complete confidentiality – address their questions to SCI or CTICM experts, whose target response

time is within one working day.

For a limited period, the Anglo-French Alliance is offering subscribers the opportunity to get a feel for the quality and reliability

of the e-advisory service by providing a free introductory offer.

The service is directly linked to other web tools dedicated to the Eurocodes such as "Access Steel-Eurocodes Made Easy" (www.access-steel.com) and SEFIE (<http://sefie.steelbiz.org>) the electronic forum concerned with Eurocode implementation.

The Steel Alliance e-Advisory Service illustrates the positive impacts of industry sharing best practice and creating a common entity whereby two national institutes can operate effectively outside their own countries.



The Steel Alliance e-Advisory Service

For further information please contact Clare Convy, Steel Construction Institute (01344 636525; Fax: 01344 636570; Email: c.convy@steel-sci.com).

WATER RESOURCES

Water resources – a changing climate?



HR Wallingford has completed research that examined how climate change could affect river flows and groundwater recharge – and hence water resources – over the next 30 years. The work was carried out for the UK water industry and the Environment Agency and will be important to water companies in the production of long-term water resources plans, drafts of which are due to be produced by March 2008.

Climate change and water resources are intimately linked. Warmer conditions and drier summers are predicted, and would increase the frequency of short droughts in the UK. Pressure on land for housing is also likely to increase demands by the 2020s. It is therefore important to know how water resource systems might respond to global warming over the next 30 years. Will they adapt to meet the demand for water from agriculture and for public water supply? Or will increased water scarcity result in losses of aquatic habitats or limit housing growth?

Climate Change Scenarios published in 2002 used the Hadley Centre Regional Climate Model (RCM) – HadRM3 – and offered four descriptions of how climate and mean sea level could change under various emission scenarios. Different climate models can produce very different predicted

results in the mid-latitudes of Europe and, over the last five years, it was recognised that a wider range of models should be employed in water resources planning to improve our understanding of the possible effects of predicted climate change.

'We worked with Lancaster University, Entec UK and the Met Office, using output from various global climate models (GCMs) to devise a range of new techniques for assessing the impacts of climate change on river flows,' explains Steven Wade, project leader at HR Wallingford.

Researchers selected six GCMs and used them to develop the 'UKWIR06 scenarios', which include monthly rainfall and potential evapo-transpiration (PET) changes for the 2020s.

Next, they developed 70 catchment-scale hydrological models to estimate the impact of changing rainfall and PET on river flow

and groundwater recharge. Models were calibrated on historical catchment information. They were then run using 'future' rainfall and PET data (derived from the GCMs) to estimate upward or downward trends in monthly flow for the 2020s, compared against a 'baseline' period (1961–1990). From these results, staff computed mean monthly flow factors ('UKWIR06 flow factors'), which can be applied to UK catchments for a quick assessment of how climate change might affect flow.

Information is available in a set of spreadsheets, based on CAMS boundaries, and should prove a valuable tool for water resource planners.

For further information please contact Dr Steven Wade at HR Wallingford (01491 822214; Email: s.wade@hrwallingford.co.uk).

iCon: An innovation assessment tool



A new online assessment tool, iCon, has been developed to encourage innovation within the construction industry. It has been prepared at CICE, Loughborough University by Maxmood Gesey.

iCon provides a rapid online assessment of innovative practices and competencies in construction companies. By filling in a simple questionnaire, it allows managers to assess their innovation performance and highlight the areas where improvement is needed. It enables them to integrate innovation-related strategies and/or best practice guidelines into their business activities and to benchmark their performance with peers within the construction industry.

The iCon system is built around the assumption that, in order to be innovative, an organisation is required to excel in six categories:

- Leadership** to drive policies and strategies, and to ensure successful implementation;
- Management** that believes in innovation and takes strategic measures to drive its adoption, implementation and usage, thus delivering business benefits;
- People** who have adequate skills and under-

standing, and who believe that innovation is the successful exploitation of new ideas; **Process** that enables and supports the successful adoption of innovation; **IR Investment** which is one of the key determinants of innovation or technology in any industry; **Technology** tools and infrastructure necessary to support the business functions.

Individuals using iCon complete an online questionnaire. This comprises a series of statements to which respondents are required to indicate the degree they agree or disagree with each (see Figure 1) The system relies on the judgement of the respondent in the context of their organisation, department, business unit or group.

Once all the questions are completed, respondents are presented with their overall innovation performance in all six categories. This is in the form of a report, which includes colour indicators to visually depict the level

of innovation in an area (see Figure 2).

A Radar Diagram is also generated automatically (see Figure 3), enabling construction companies to undertake competitive benchmarking against their peers and the construction industry as a whole. These reports can then be used as the basis for innovation enhancements.

The iCon prototype was evaluated using methods such as self-evaluation and peer review during the development phase and then through both academic and construction industry practitioners such as innovation managers, business improvement and development managers, and innovation, technology and/or R&D managers. Evaluation was based on the functionality of the prototype application, its user-friendliness, errors, and its relevance to construction industry.

For further information please contact Maxmood Gesey at Loughborough University (01509 222884; E-mail m.gesey@lboro.ac.uk) or Dr J Glass (01509 228738; E-mail j.glass@lboro.ac.uk).

Figure 1 (below) A typical iCon questionnaire page

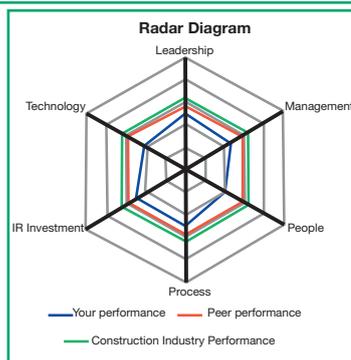
Figure 2 (bottom left) Benchmarking of Performance with Peers and Construction industry

Figure 3 (bottom right) Overall Innovation Performance Benchmark

Please tick the appropriate box to indicate your response						
Leadership		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Senior management is fully supportive of the development of our innovations	<input type="radio"/>				
2	Our leaders are aware of the potential rewards and risks of our innovations	<input type="radio"/>				
3	We recognise the benefits of being an innovative organisation	<input type="radio"/>				
4	Our organisation has a director/manager at board level with overall responsibility for innovation and research (IR) issues	<input type="radio"/>				
5	Teams here have a lot of discretionary power	<input type="radio"/>				
6	Senior managers are "hands ready" knowing exactly when and when not to get involved	<input type="radio"/>				
7	When problems occur, our leaders immediately act to provide appropriate support and guidance	<input type="radio"/>				
8	Our organisation has an agreed set of operating principles/codes of conduct to support and facilitate the achievement of its long term vision of innovation	<input type="radio"/>				
9	Our company has a vision and/or mission statement, which sets the organisation's direction in relation to innovation	<input type="radio"/>				
10	Our company has a definition of innovation in construction for internal and external use	<input type="radio"/>				

Category Name	Mean Score		
	Your Company	Peers	Construction Industry
Leadership	2.5	2.8	3.2
Management	2.3	2.9	3.2
People	2.0	2.9	3.2
Process	2.5	2.9	3.2
IR Investment	2.5	2.9	3.3
Technology	2.1	2.9	3.2

Your performance matrix score



ENVIRONMENT

CEEQUAL progress

CEEQUAL, the ICE-led scheme that assesses the environmental quality of civil engineering projects, has now made Awards to more than 20 Projects. The construction value of projects that have been or are being assessed passed £2.5bn at the end of June.



Clark's Bridge Refurbishment by British Waterways and Galliford Try is one of the most recent CEEQUAL Awards

For further information please visit www.ceequal.com or contact CEEQUAL Technical Support at Crane Environmental (020 8399 4389; Email ceequal@crane-environmental.co.uk).

ERA-NET ROAD



In 2000, European Heads of State met in Lisbon and decided that Europe should be a knowledge-based economy, spending 3% of GDP on research. This commitment was called the Lisbon agenda. In 2002, to accelerate the transformation, they created European Research Area Networks (ERA-NETs). These are intended to stimulate collaborative research across Europe, with the European Commission funding the setting up of collaboration mechanisms. This mechanism is being applied to a range of technical areas and the €2.5M ERA-NET ROAD project is an example in the highways sector. It is funded by the European Commission, started in 2005 and will be completed in 2008.

What is the ERA-NET ROAD project aimed at achieving?

National road administrations spend 150 million Euros annually on roads research. Many of these organisations face similar challenges, including safety, environmental impacts, congestion, degrading assets, costs, and rising customer expectations. Developing the new knowledge needed to address these challenges, if done collaboratively with other like-minded roads administrations, would improve the quality of results whilst reducing costs. So ERA-NET ROAD seeks to create mechanisms to collaborate across member states and to understand which research areas are appropriate for a collaborative approach, both strategically and in the near-term. The approaches are being tested with two pilot projects.

- placing people safety at the heart of road design;
- adoption of a holistic approach towards sustainable roads;
- road owners 'getting to grips' with climate change;
- effective asset management meeting future challenges;
- financing and procurement concepts that promote innovation;
- road pricing and charging to meet societal needs;
- emerging technologies underpinning the service provider role.

- completing the pilots and capturing lessons;
- facilitating collaboration on near-term research;
- developing the strategic research opportunities into programmes and projects;
- launching at least one trans-national call for projects;
- refining the toolkit in the light of experience; and
- proposing a follow-up project in the 7th Framework Programme, starting in 2009, to involve more partners and to embed a culture of collaborative research in and between roads administrations in Europe.

Next steps

Next steps for the ERA-NET ROAD project include:

For further information please visit: www.era-road.net

Who participates?

The following countries are project members:

- Austria
- Denmark
- Finland
- Germany
- Netherlands
- Norway
- Poland
- Slovenia
- Sweden
- Switzerland, and
- United Kingdom (project coordinator).

What are the benefits from collaboration?

Benefits are seen to include:

- better value for money – more for less;
- reduced duplication of research;
- better quality;
- exposure to international best practice and other cultures;
- the opportunity to undertake larger projects;
- the opportunity to form consortia;
- a longer term view for suppliers;
- a wider choice of suppliers;
- lower project management overheads for clients.

Progress to date

The current and planned research programmes of the partner countries have been analysed, and clusters of common areas of interest have been identified through workshops. Tools to facilitate collaborative research have been developed, addressing:

- strategic coordination of research;
- the management and monitoring of collaborative projects;
- procurement practice; and
- intellectual property rights.

Strategic opportunities

Seven strategic research opportunities have been identified:

RESEARCH & INNOVATION

New Research Professorship in Low Carbon Energy Technology: an example of RAEng research support



The Royal Academy of Engineering runs several schemes to support engineering research. These vary from the prestigious Research Chairs scheme, five-year professorial appointments at UK universities, to the highly-prized international secondments scheme, the Global Research Awards.

One of the key objectives of the Academy's research support programme is to gear academic research with funds from UK industry. Over the past few years this has been a most successful ambition, with over £8 of industry funding for every £1 of Academy funds invested in our schemes. These funds, from our industrial co-sponsors, often serve to establish or enhance research centres in UK universities, led by a Research Chair, a full-time professorial appointment.

One recent appointment is the establishment of The Royal Academy of Engineering Research Chair in Low Carbon Energy Technology at Loughborough University in conjunction with the energy company, E.ON. The incumbent, Professor Dennis Loveday, aims to develop the optimum mix of energy sources and to identify the paths and measures required to ensure a smooth transition from today's high carbon energy system to a low carbon future, which is both

sustainable and secure. His work will focus on the built environment as the major consumer of fossil fuels.

Another successful Academy scheme is our international secondments programme, the Global Research Awards (GRA). The GRA scheme is open to UK-based applicants – from either academia or industry – and provides funding for research engineers to conduct projects at centres of excellence overseas. In the past year, 15 UK engineers have been sponsored to work around the world, in China, Australia, the USA and across Europe.

For more information on the research schemes offered by The Royal Academy of Engineering please go to: www.raeng.org.uk/research or contact Robert Barrett at the Royal Academy of Engineering (rob.barrett@raeng.org.uk) about Research Chairs, or Chris Coulter (chris.coulter@raeng.org.uk) about the Global Research Awards. Both are on 020 7227 0500.

Confidential Reporting on Structural Safety – Newsletter No 7



The 7th Newsletter of the Confidential Reporting on Structural Safety system (CROSS) has been published on the theme of Local Authorities and Building Regulations submissions.

There are reports on Building Regulations checking; Building Regulations submissions; Local Authorities and Approved Inspectors; Effective lengths of load-bearing walls; and Loading on balconies. The Newsletter can be downloaded in Word from http://www.scoss.org.uk/cross/pdf/Newsletter_No_7.doc or for pdf versions from http://www.scoss.org.uk/cross/pdf/Newsletter_No_7.pdf.

This Newsletter is available to those

who have registered their interest through the Institution of Structural Engineers web site. Anyone else wishing to receive these emailed links in future will have to register, whether or not they are members of the Institution, using the procedure given on the CROSS website (<http://www.scoss.org.uk/cross/index.asp>) and also in the Newsletter.

CROSS is an initiative of the Standing Committee on Structural Safety, which is

an independent body established by the Institution of Structural Engineers and the Institution of Civil Engineers and others to maintain a continuing review of building and civil engineering matters affecting the safety of structures.

For further information please visit the SCOSS website or contact the secretariat at the Institution of Structural Engineers (020 7235 4535; Email scoss@istructe.org.uk).

MATERIALS AND ENVIRONMENT

CO₂ uptake from the re-carbonation of concrete

Preliminary calculations by the British Cement Association (BCA) examining the key UK cement markets and applications show that around 20% of the direct CO₂ emissions from the manufacture of cement is reabsorbed by concrete over its lifecycle.



An important issue often overlooked in the environmental debate is the re-absorption of CO₂ from the atmosphere by concrete and other cementitious materials during their service life and their secondary life following recycling. This process is called re-carbonation.

In 2006, BCA reported that the manufacture of one tonne of UK cement generates approximately 0.8 tonnes of direct CO₂ emissions. Around 40% of this is from the fuel used, and around 60% is from the thermal decomposition of calcium carbonate (CaCO₃), otherwise known as calcination. Emissions of CO₂ associated with calcium carbonate decomposition are not only distinct in terms of the process that generates them; they are also partly reversible through the process of re-carbonation.

The mix design of structural concrete limits any re-carbonation to the surface, helping to prevent corrosion of embedded steel reinforcement. However, there is a greater uptake at the end of its structural life when it is typically crushed for reuse as an aggregate. This uptake results from the significant increase in surface area, allowing CO₂ to be more readily absorbed, even when used in ground works.

In low-strength un-reinforced concrete such as blocks, and cementitious materials such as mortar, re-carbonation is much more rapid during the service life, as CO₂ can permeate the material more easily. This is of no significance with respect to durability since there is no steel reinforcement.

Whilst the re-carbonation process cannot be said to diminish the CO₂ emission to air resulting from the manufacture of cement (the main contributor to the

embodied CO₂ of concrete), when viewed in terms of whole-life performance it will however ultimately reduce its environmental impact.

A study undertaken by the BCA shows that over the life cycle of cement and concrete there is around a 20% take-back of the CO₂. In whole-life terms it can be argued that this reduces the impact of one tonne of cement from an initial 0.8 tonnes of CO₂ to

approximately 0.6 to 0.65 tonnes. This reduction is an average based on the various applications and markets for cement and concrete in the UK, and is an important factor when considering the environmental impact of cementitious materials.

For further information please contact Tom De Saulles at the BCA (01276 608714; E-mail: tdesaulles@bca.org.uk).



The crushing of concrete demolition waste greatly increases its surface area and the subsequent uptake of CO₂

(photo courtesy of the Portland Cement Association).

RiPPLE update



RiPPLE is a five-year research programme consortium funded by the UK's Department for International Development (DFID). It aims to advance evidence-based learning on water supply and sanitation (WSS) focusing on the cycle of money into water (how can better WSS services be planned, financed and delivered) and water into money (how can improved WSS services contribute to poverty reduction and pro-poor growth). Lead partners are the Overseas Development Institute in London, the International Water and Sanitation Centre in Delft, the Institute of Development Research at Addis Ababa University, and WaterAid-Ethiopia in Addis Ababa.

Research is under way in three regions of Ethiopia: Oromia, Benishangul-Gumuz and Southern Nations, Nationalities and Peoples Region (SNNPR), covering three broad themes (Governance and Planning, Financing, and Growth), in parallel with cross-cutting capacity building, communications and mapping activities. Case studies are developing around the implications of Ethiopia's Universal WSS Access Plan, linkages between WSS and food security, and the costs & benefits of multiple use water systems. Analysing the causes and implications of low budget utilisation by regional bureaux is another critical area.

In addition to its core research activities, RiPPLE has strong communications and capacity-building components and has produced a film *Money Into Water, Water Into Money*, which was shown at Ministry of Water Resource celebrations on World Water Day. A quarterly newsletter is released in English and Amharic. The program also sponsors MSc Development Studies students at Addis Ababa University, who will



Water for livestock is a vital use of water in pastoral areas of Ethiopia



A water source used for washing clothes

collaborate with RiPPLE in their second (thesis) year.

RiPPLE's action research is closely linked to implementation, and will increasingly be driven by stakeholder platforms called Learning and Practice Alliances (LPAs) at regional and woreda (district) levels. In due course RiPPLE will establish a national-level Alliance. The LPAs guide research according to local priorities, test new approaches to improving services, and serve to share experiences between levels, themes and regions. In parallel, RiPPLE is building linkages across the Nile region.

RiPPLE has offices in Addis Ababa, Harar, Awassa and Assosa and has strong links with Ethiopian partners including regional governments, the Ministry of Water Resources and the national Water

Research Advisory Council. See <http://www.ripplethiopia.org> for more information, resources and latest news.

For further information please contact Josephine Tucker, RiPPLE Research Officer (020 7922 0338; E-mail j.tucker@odi.org.uk; website www.odi.org.uk/wpp).

SPONSORING ORGANISATIONS GOVERNMENT

Department of Trade and Industry

Construction Sector Unit
Department of Trade and Industry
Bay 286, 151 Buckingham Palace Road
London SW1W 9SS
(020 7215 0848 or 0826)
Website: www.dti.gov.uk
E-mail: terry.boniface@dti.gsi.gov.uk

Department for International Development

1 Palace St, London SW1E 5HE
(020 7023 7000; fax: 020 7023 0072)
Website: www.dfid.gov.uk
E-mail: y-maini@dfid.gov.uk

Highways Agency

5th Floor, 123 Buckingham Palace Road,
London SW1 9HA
Website: www.highways.gov.uk
Email sarah.shaw@highways.gsi.gov.uk

RESEARCH ORGANISATIONS

British Cement Association

Riverside House, 4 Meadows Business Park, Station Approach, Blackwater, Camberley, Surrey, GU17 9AB (01276 608700)
Website: www.cementindustry.co.uk
E-mail: tdeaulles@bca.org.uk

Centre for Innovative and Collaborative Engineering (CICE)

Loughborough University, Loughborough, LE11 3TU (01509 228549; fax: 01509 223982)
Website: www.cice.org.uk
E-mail: j.c.brewin@lboro.ac.uk

Centre for Window and Cladding Technology

University of Bath, Claverton Down, Bath, BA2 7AY (01225 386541; fax: 01225 386556)
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