

Innovation & Research



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Innovate to Survive: Engineers for a One Planet Future®

The Institution of Civil Engineers' flagship event, *Innovate to Survive: Engineers for a One Planet Future®* will take place on 28–29 June 2010 at One Great George Street, and IRF readers can register at a discount.

The event will allow delegates to explore the important issues facing the industry today, all in the context of understanding that to ensure a transition to a low carbon economy, significant effort has to be made in terms of innovation within engineering. Covering a wide range of topics within the four key areas of energy, transport, resilient community, and food and water security, this event will allow delegates to engage and debate with their peers on the major issues facing the industry.

IRF readers can benefit from a discount to the event by calling +44 (0)20 7665 2226, quoting IRF 1.

Attracting support from the National Geographic, The Times, WWF, as well as a large number of dedicated engineering publications, the two-day event boasts a senior line up of speakers including:

- Professor Paul Jowitt, President of the ICE
- John Armitt, *Chairman*, Olympic Delivery Authority
- Gerald Schotman, *Chief Technical Officer*, Shell
- Ania Grobicki, *Executive Director*, Global Water Partnership
- Brian Collins, *Chief Scientific Advisor*, Department of Transport
- Adam Freed, *Deputy Director for Long Term Planning and Sustainability*, City of New York
- Andre Navarri, *President*, Bombardier Transport.

ICE has also joined up with EPSRC to offer students of engineering the opportunity to enter a poster competition outlining their innovative solutions to the problems facing the planet today.



The combination of client and supply side speakers will make Innovate to Survive one of the most exciting events of 2010 and will really position ICE as a key influencing body in the field of innovation.

For further information and to learn more about the event, to register, and to view the full speaker line up, visit ice-innovate-tosurvive.com



DRUM creates a bang

A new tool has shaved weeks off a roadworks project in Bolton. Does it have the potential to save the Highways Agency millions of pounds in the future?

No one likes carriageway restrictions on our motorways, but they are an inevitable fact of highways maintenance life. However, the Highways Agency has recently trialled the use of an innovative tool called DRUM – the Dynamic Road-space Utilisation Manager – and could now revolutionise the way lanes are closed when works are taking place. There is the potential for saving significant amounts of time and money without adversely affecting Journey Time Reliability (JTR).

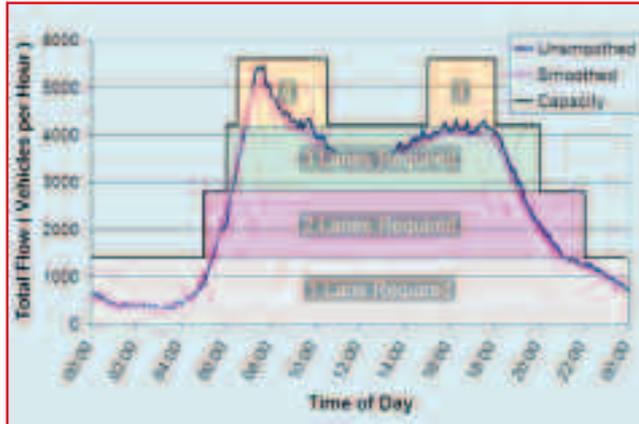
DRUM is a web-based system that uses historic traffic information and real-time traffic information to enable road workers to maximise lane closures without impacting traffic flows.

After successful pilots on the M25 and M27, it has just had its first proper trial on the £4.1m scheme between junctions 3 and 4 on the M61 in Bolton. The results have been eye-opening – Highways Agency Project Sponsor John Mather estimates the Agency has saved a massive £250,000 and shaved two weeks off the original 18 week programme.

“Using DRUM, we managed to fit in 20 extra hours work at the weekends,” John said. “That allowed us to have one specialist contractor working in the daytime, and one in the night time on the same length of road, so they didn’t get in each other’s way. And clearly a more efficient site is a better site.”

DRUM is the brainchild of a meeting between contractor Costain, transport consultancy TRL and technology supplier MTS. The whole system was developed and made available to the Agency after two months.

DRUM is implemented in two stages. The first stage uses existing traffic data from HA-TRIS (HA Traffic Information System) to



(Top) Drum planning tool
(Above) Trailer mounted radar sensor

produce a specific web-based planning tool that forecasts the number of lanes that are needed to accommodate traffic demand; this is developed specifically for each scheme by TRL, and can be accessed from site or office.

The second stage of DRUM involves the use of trailer-mounted radar sensors to ac-

quire live, real-time data on traffic flow. By combining this fresh information with historical statistics, specially designed software then calculates the optimum time for lane closures, thus improving the pace at which roadworks can be undertaken.

DRUM has clearly demonstrated its potential and is already being rolled out on other suitable Highways Agency schemes where Aone+ is the MAC agent.

“We’re now using DRUM on the junction 11 to 12 M62 concrete barrier replacement,” John Mather added.

“We do not expect quite such wholesale benefits as before, but an hour saved here and there will still make a significant difference over the life of the project. The other benefit is that our customers will see fewer unmanured roadworks, which can be a major gripe.”

DRUM is receiving plaudits across the board. Howard Dukes is the Traffic Management Manager at Costain and he utilized the system at the Bell Common Tunnel project on the M25. “Using DRUM is a no-brainer,” Howard said. “It gives me a greater ability to plan each working day more efficiently.”

DRUM secured the Product of the Year award at the Highways Magazine Excellence Awards 2009. Steve James, Group Manager at TRL, said: “This is a powerful example of legacy research being applied to produce an effective operations tool for the benefit of road users, road works managers and the Highways Agency.”

For further information please contact John Mather of the Highways Agency (0161 930 5692; E-mail: john.mather@highways.gsi.gov.uk).

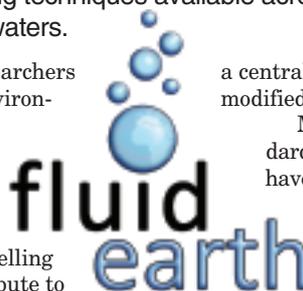
WATER, ENVIRONMENT & MODELLING

FluidEarth modelling platform and community



Integrated modelling is a procedure growing in uptake for linking separate numerical models in a dynamic, interactive manner. Two key drivers are the need for more realistic catchment modelling and its use in river basin management, and predicting the consequences of environmental change. In any catchment there are many interacting processes involved (e.g. how floods interact with urban drainage, water quality, groundwater, etc), which can be better simulated if the interactions between them can be reproduced. FluidEarth makes integrated modelling techniques available across water and environment processes found in catchments, estuaries, and coastal and offshore waters.

FluidEarth is first and foremost a community of researchers interacting with practitioners from the water & environment industry in order to develop integrated modelling solutions needed for water & environment processes. FluidEarth includes representatives from the UK water & environment industry, as well as providing linkages out to initiatives in other countries that are also contributing to the effort to develop integrated modelling solutions. Its community of academic researchers contribute to



a central shared collection of software that has been suitably modified (wrapped) for inclusion.

Models that have been ‘wrapped’ using the European standard OpenMI can be linked together, even though they may have been developed at different organisations and may use different programming languages. The tools developed under FluidEarth enable such modified models to run in parallel and to exchange data with each other on a timestep-by-timestep basis. The feedback the models re-

Costs and benefits of multiple use water services DFID

Department for
International
Development

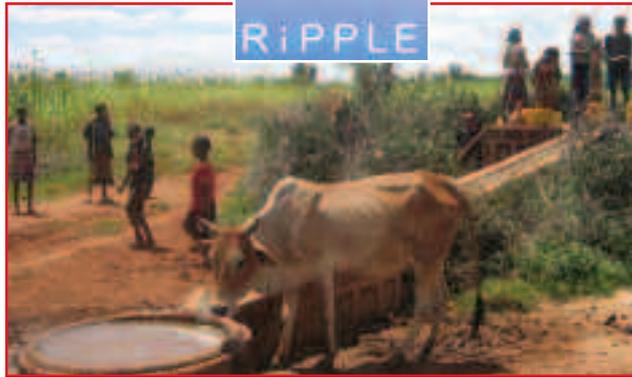
Ethiopian villagers use water for several different purposes including drinking and cooking, personal hygiene, laundry, watering livestock and irrigating plots. However, most systems are designed with a single use in mind. For example, water points are often designed only to provide enough water for drinking and washing. People then either over-use these systems, which can deplete water resources or cause schemes to break down, or they must spend a lot of time fetching water from elsewhere. Multiple-use Water Services (MUS) is an approach that incorporates both domestic and productive uses in the design and delivery of water supply services from the start. In practice, this means going beyond the traditional single-use approach of either providing safe drinking water (health focus) or increasing agricultural productivity through small-scale irrigation (income focus). Instead, MUS aims to meet both these needs in an integrated way, creating benefits such as time saving for productive work or schooling.

A recent cost-benefit analysis compared a number of different approaches. The study examined the costs and benefits of three pathways to MUS: 'domestic plus' (domestic system with a productive use add-on), 'irrigation plus' (irrigation system with a domestic use add-on) and 'MUS-design' (a combined system that meets both domestic and productive needs). Each path involved inputs into infrastructure and new institutional arrangements. The three cases had the same starting point: an unimproved spring already used for collecting drinking water, watering animals and traditional irrigation. Direct outputs were changes in water quantity, quality, reliability and accessibility – all of which can stimulate changes in water use and lead to changes in consumption, production and income.

Costs and benefits were analysed at household level (contributions and benefits) and service level (design costs, construction, operation and maintenance, system support and benefits). Generally, service-level costs were higher for irrigation plus, in comparison to domestic plus.

MUS-design systems required significantly lower initial investments and running costs than a set of single-use systems providing for the same uses. Costs to households are higher because MUS-designed systems are more complex. However, findings showed that costs to households increase only slightly when moving from single-use to domestic plus or irrigation plus. The largest household benefit occurs when a domestic water component is added to systems, as this brings improvements to health and time savings.

The study confirmed that the benefits of MUS systems significantly outweigh the costs, with the cost-benefit ratio for domestic plus higher



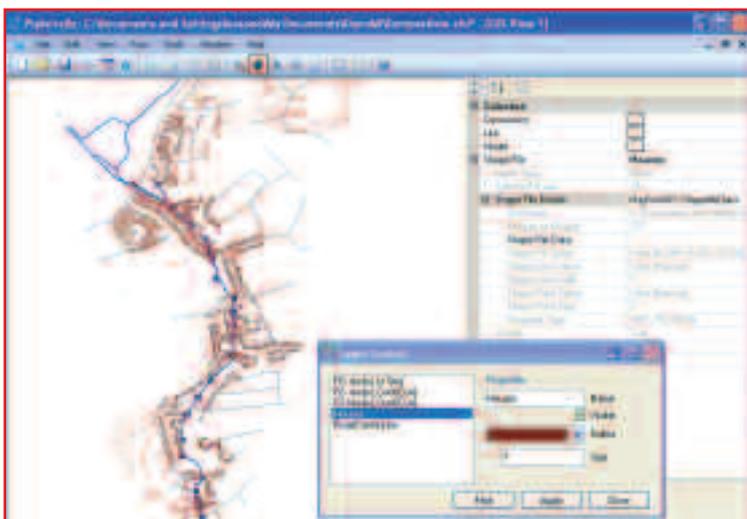
Additional facility for livestock watering, separated from the protected water collection point for human consumption in Babile wereda, Oromia Region.

than that for irrigation plus. Providing domestic supply has a more direct impact at household level, but less clear-cut effects at community level, whereas providing irrigation provides tangible benefits for those with access to irrigated plots. However, not everyone benefits equally from irrigation. In contrast, all community members benefit from improvements in domestic water supply.

Integrated planning is also important for sustainability. Population growth has a large impact on water use and on costs and benefits per capita. Systems are often over-designed in anticipation of population growth. This may encourage users to increase water consumption, leading to conflict when the population grows and per capita water availability reduces. Taking account of water demands for different uses, and how these may develop over time, can help to minimise such conflicts, where available water resources permit.

This study was conducted by Research-inspired Policy and Practice Learning in Ethiopia and the Nile region (RiPPLE), a research programme consortium funded by the UK Department for International Development (DFID). It is conducting evidence-based learning on water supply and sanitation focusing specifically on planning, financing, delivery and sustainability and on links between sector improvements and pro-poor economic growth in Ethiopia. RiPPLE is led by the Overseas Development Institute (www.odi.org.uk).

For further information please contact Peter Roberts at DFID (E-mail: p-roberts@dfid.gov.uk), or Roger Calow, RiPPLE Director (E-mail: r.calow@odi.org.uk); or visit the RiPPLE website www.rippleethiopia.org.



ceive from each other means that each time their calculations are carried out they are updated about interacting processes. This enables complex hydraulic and environmental situations to be accurately simulated.

The FluidEarth platform (accessible at <https://fluidearth.net>) provides UK researchers with access to wrapped software they can link to their own wrapped software and develop their own integrated modelling compositions. Recent developments have added the capability to manage the remote linking of models, and remote access to data-archives or online instruments, QA tools and data presentation tools. FluidEarth provides a repository for wrapped and unwrapped software and the tools to combine them.

For further information please contact Geoff Pearce, FluidEarth Coordinator, HR Wallingford (01491 822439; E-mail: g.pearce@hrwallingford.co.uk).

(left) FluidEarth's link and run environment tool, Pipistrelle. Its GIS window visualises how the nodes of an urban drainage model (shown as red dots), are linked to the (blue) nodes of an independent river model.

Clean technology take-up through community innovation

To achieve the CO₂ emission reductions believed to be necessary to avert catastrophic climate change, many feel that we need a new industrial revolution, a transition from a low-efficiency, high-carbon, fossil-fuel based energy system to one that is high-efficiency and low-carbon, based on renewable sources. There also needs to be a very significant reduction in energy demand, through increases in efficiency and changing current practices and behaviours. How can such a transition be achieved?

Many governments around the World, including the UK and USA, have published “transition plans” (e.g. http://decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx), outlining initiatives and schemes to reduce their country’s emission levels and dependence on foreign oil and gas imports. Ambitious targets include the electrification of all ground transportation, massive improvements in energy efficiency (30% of the total energy demand in the USA today could be saved by energy efficiency measures) and significant deployment of clean technologies and uptake of low carbon behaviours in the domestic sector.

To achieve the latter, support for community groups is being made available to help them determine which energy efficiency measures and clean technologies are right for them. However, a recent report by the UK’s Institute for Public Policy Research (IPPR) has revealed that such initiatives are causing large sections of UK society to disengage from the climate change agenda, citing being made to feel guilty of their lifestyles and the inappropriateness of certain new technologies as major reasons for inaction.

Initiatives such as the UK’s Low Carbon



Community discussion of options

Communities Challenge attempt to engage the public only once technologies have been developed. What is clear from the IPPR report is that people make choices on which technologies to use based on a variety of reasons, from those that are purely aesthetic, to those that involve cultural, traditional and other personal values. Hence, these values must be met in the design of clean technologies if we are truly to engage communities in their use.

This would necessarily involve the engagement of communities throughout the design and development process. This would allow exchange of ideas and feedback at each stage of the process, so that the resultant technology is not only clean either in itself or the behaviour it promotes (in terms of carbon



Solar water heating panels

emissions), but is also held to be appropriate and attractive to the community it is designed for. Only then will we see wide-spread deployment of clean technologies.

This work is being sponsored by the Royal Academy of Engineering’s Global Research Award – details from Misty Palmer at The Royal Academy of Engineering (020 7766 0600; email: misty.palmer@raeng.org.uk).

For further information please contact please contact Professor Stefaan Simons, Executive Director of the Centre for CO₂ Technology, University College London (E-mail: stefaan.simons@ucl.ac.uk).



MATERIALS & DESIGN

Revised approach for controlling cracking in concrete **ice**

Following the publication in February 2007 of CIRIA C660 (an updated version of *Early-age thermal crack control in concrete*), the author observed that some of the basic assumptions behind the cracking model of BS8007 (now adopted by EN1992-3) may be incorrect. Furthermore, EN1992-3 uses fundamentally different methods to design for cracking under end restraint and continuous edge restraint. A study was therefore initiated (see *IRF* Issue 73 of May 2008) to develop a unified model for (primarily) early-age thermal cracking that reflected the cracking mechanism more reliably, and which would be applicable to members subject to either end restraint or edge restraint.

The project was undertaken by Dr Phil Bamforth (an independent consultant) and Parsons Brinckerhoff, supported primarily by ICE Research & Innovation Enabling Fund with additional funding from the Highways Agency and the Concrete Centre.

The unified approach assumes a two stage cracking process. Initial (Stage 1) cracking is estimated using a calculation based on the current method of EN1992-3 for end restraint, revised for the effect of edge restraint. Subsequent crack growth (Stage 2) is based on the continued contraction of the concrete relative to the reinforcement.

In contrast to the current approach of BS8007 (and EN1992-3), which assumes that increasing edge restraint will lead to wider cracks, the revised method assumes that higher edge restraint will limit the crack width by taking account of the effect of edge restraint in both attracting part of the load

from the concrete when a crack occurs and in controlling the subsequent development of the crack. This assumes that edge restraint acts in the same way as the reinforcement to control both crack width and crack spacing.

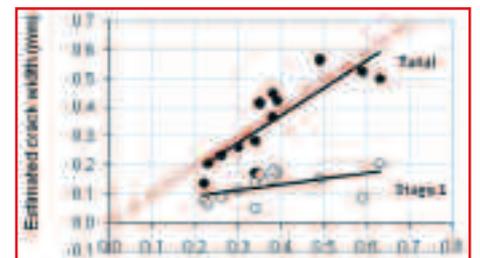
A comparison of estimated crack widths with values observed in the field indicates that the proposed unified method provides

a basis for the development of a new approach to design for reinforcement for controlling crack widths caused by restraint to contraction.

For further information please contact Dr Phil Bamforth (E-mail: phil.bamforth@btopenworld.com).



Early-age thermal cracking in a box section tunnel



The relationship between observed crack widths and values estimated using the revised approach

Overnight bridge lift hailed a success

Overnight work to lift new bridge beams into place over the M1 as part of the project to widen the motorway between Junctions 25 and 28, has been hailed a success.

The bridge replaces a 42-year-old structure, which was demolished in January 2009, that used to carry farm vehicles between Knowle Park Farm and a field on the opposite side of the motorway.

To enable the installation of the new bridge, the M1 was closed along a five mile section between Junctions 25 and 26 from 9pm on Saturday 19th September 2009 to just before 9am the following morning.

A 500-tonne crane was set up on the northbound carriageway to lift a 38.5m pair of girders weighing 57 tonnes into position while a smaller 250-tonne crane was set up on the southbound carriageway to lift a second pair of girders weighing 41 tonnes and 29 metres long.

The Highways Agency Project Manager at the time, Paul Tully said: "A total closure of the motorway is a rare occurrence and a major undertaking. We have to get things right and have to make sure the road can be reopened in good time. From our point of view, things went very well and we can now start constructing the concrete deck, waterproofing and surfacing it, and then add kerbs and parapets ready for the bridge's completion."

During the closure, the Highways Agency took the opportunity to carry out other works including gantry construction, surfacing and top soiling works.

The story was recently covered on the BBC's early evening programme *The One Show*. Anthony Beeby from Major Project Communications has provided the following account of the media coverage for the evening:

"I worked with *The One Show* to produce a special one-off feature named 'Britain after Hours'. The finished feature covered a major bridge construction on the M1 J25-28 widening, completed over a single night so the road could be opened for business as usual the following morning.

Before the film crew set foot on site, weeks of planning were needed to get everything ready. The starting point for this was a break down of what the construction team would be doing on the night, an assessment of what could be filmed, levels of access for the film crew and who was available for interview along with facts and figures about the project itself for background.

Watching both sides of the motorways shut down for the first time in 50 years and seeing the traffic on a major motorway slowly disappear is a very strange experience, and something that seems, in all honesty, quite eerie. What was perhaps more surreal was filming on the motorway itself, watching the presenter stand where, on a normal day, over 160,000 cars would pass.

The construction of the bridge got under way a few hours later and was an impressive engineering feat to witness. Two cranes lifted over 100 tonnes of steel bridgework into place, which was then guided into position by the workforce at ground level. To make sure that everything was captured, the film crew had set up a time lapse camera which ran throughout the work, as well as filming the works from various angles to get enough footage for the final broadcast piece.

The final results were broadcast in November 2009 to celebrate the 50th anniversary of the M1 opening to the public. It was a lot of hard work, but the planning and preparation was worth it when considering how smoothly everything went on the night".

*For further information please contact Project Manager Andrew Hitch on 0121 61898145 email - Andrew.Hitch@Highways.gsi.gov.uk or for information regarding the media coverage for *The One Show*, contact Anthony.Beeby@highways.gsi.gov.uk.*



Before construction started, 25th of August 2009



Nighttime work



The bridge in place, 21st September 2009

Innovative pre-cast wall structures



Design codes have, historically, relied upon empirically or semi-empirically derived design methods for structures such as load-bearing pre-cast walls. As a result, the regulatory guidance has restricted the industry's ability to innovate in mix design, high strength concrete products and manufacturing processes that could deliver more-structurally-efficient elements. The new Eurocodes, however, endeavour to be less prescriptive, allowing the structural solution and design to be 'assisted by testing' – with the structural performance derived from experimental research enabling the benefits of novel developments to be realised. Structherm, part of the Hanson-Heidelberg cement group, is undertaking a variety of research and development projects in collaboration with the Centre for Innovative and Collaborative Engineering at Loughborough University to establish the benefits and methods of integrating the new regulatory guidance into practice.

Structherm's Fast-build product is a flexible system of prefabricated concrete panels with a bespoke system of fixing brackets and channels for rapid on-site assembly. It thus allows economical and sustainable structures to be erected rapidly.

More specifically the collaborative research programme aims to understand better the

performance of pre-cast concrete structures in resisting disproportionate collapse. The research work aims to develop better methods of assessing and ensuring a building's resistance to a progressive failure and whether current best practice or alternative approaches offer any unexploited benefits.

Because the failure mechanism depends on the type of structure, it is challenging to



Use of Structherm's Fastbuild system on a confined inner city site

develop an all-encompassing measure of robustness or get agreement on an appropriate method of assessment and design. It is hoped, however, that the adoption of a suitable assessment methodology, specifically focussed on pre-cast construction methods, elements and connection types, will deliver design optimisation, improved detailing, simplified construction and cost efficiencies.

Further information about Structherm is at www.structherm.co.uk, and on Hanson at www.heidelbergcement.com/uk/en/hanson/home.htm.

For further information about this research please contact Gary Robinson at Loughborough University (E-mail: G.P.Robinson@lboro.ac.uk).

Structherm Ltd has been providing solutions to the construction industry for over 25 years, with significant technical expertise in the manufacture and supply of innovative building solutions, of which Structherm Fastbuild™ is just one. Structherm is part of Hanson Building Products, which in turn is part of the Heidelberg Cement Group.

MATERIALS & TRAINING

EQUESTA trials on-line training



EQUESTA is the acronym for a project funded by the Leonardo da Vinci Lifelong Learning Programme, concerning European steel training and assessment, which concluded in 2009. Part of the project concerned initiatives to harmonise professional standards for engineers across European countries, and a second part concerned the development of electronic resources to support technical training. The third aspect of the project concerned delivery – how to deliver cost-effective technical training across a very large geographical market place and to facilitate the contributions from technical experts from across Europe. The answer is clearly to use on-line facilities, and the project identified the software needed.

The software Microsoft Live Meeting allows live delivery, with audio and video, the sharing of resources and opportunity to communicate with attendees in a single package. The software also provides the opportunity to set surveys and pose questions, with automatic analysis tools. The system was trialled a number of times during the project, with important lessons for all the participants.

Firstly, a user manual was needed for the Live Meeting software. With no manual previously available, one of the most useful deliverables from the project is a user guide for others wishing to use the software. It is available from the EQUESTA website <http://www.equesta.eu>. The user guide sets out how events can be set up and administered



and how the software can be best utilised.

The second important lesson concerned the interaction between tutor and participants. Whilst the delegates can see the tutor, the lack of visible "class" demands a new discipline from the trainer. Timely requests to the delegates to indicate a change in their "status" by changing the colour of their place round a virtual conference table shows that they are at least still present.

Shorter training sessions were found to be more appropriate for on-line tuition, split with exercises, which may be simple surveys or technical challenges which can be downloaded. The software allows audio and text

communication from the delegates but in practice attempting to manage several incoming communications is too difficult for the tutor. Instead, comments and questions are assembled and responses given at the end of the training session.

Despite the rather different disciplines, the possibilities of sharing a whole range of resources, with the opportunity to present globally, with both tutors and delegates in disparate locations, make this a very exciting development for future use. After these encouraging trials, SCI hopes to run several training modules using this system in 2010.

For further information please contact David Brown, Associate Director, SCI (+44 (0)1344 636535; E-mail: d.brown@steel-sci.com).

Review calls for greater industry engagement in ground and structural engineering research

Increasing industry involvement in engineering research was a key finding in a recent review of the strengths and weaknesses of the UK Universities' ground and structural engineering research base. The review was undertaken to address the need to develop more-ambitious, longer-term, transformative research in ground and structural engineering, addressing the UK's current and future challenges.

The review found strong links between the ground and structural engineering research community and industry, with professional bodies playing an important role in bringing industry and academia together. There was also a clear path for knowledge transfer in terms of development of design codes and standards. Intermediary organisations (such as CIRIA, SCI, The Concrete Centre, TRADA and BGA) are playing an important role in facilitating the development of design guidance.

The review team recommended, however, that industry should be encouraged to strengthen its involvement with academic research beyond current levels, and develop a stronger ethos for working with academia, as seen in aerospace engineering. Industrial engagement should be particularly encouraged in areas such as materials, and monitoring the performance of large projects.

As part of the review, undertaken by a joint industry and academic panel, three online surveys were undertaken aimed at the UK academic, UK industrial and international academic communities in ground and structural engineering. As well as providing views on current academic research, respondents were asked to give examples of where research in ground and structural engineering had had a significant impact.

Overall, the surveys found strong evidence that ground and structural engineering research in the UK is considered world class, but there is concern that UK research is perceived as becoming less competitive on the world stage.

Although in ground and structural engineering safety is of paramount importance, with an emphasis on robustness, reliability, insurability, resilience and compliance with regulations, there is scope for greater creativity in research. While transformative research is important, incremental research is also required.

The review called for a longer-term vision and ambition for research in ground and structural engineering in the UK, whilst acknowledging the opportunities for ground and structural engineering researchers to get



Survey respondents identified a number of examples where UK research had had a significant impact in practice. These included research in field monitoring, as illustrated, novel materials (for example composites), the use of ICT for monitoring information flow, improvement of construction processes, use of construction waste, and in fire engineering.

There were also examples of testing (for example, the Cardington fire tests) where the data collected had had a transformative effect on practice. Others highlighted work on ground movements for tunnelling of the Jubilee line, and work on crowd-induced vibrations which will impact on the stadia that will be built for the London 2012 Olympics.

involved in the important challenges now being faced by the UK and worldwide.

From the research challenges identified in the survey, the panel identified a number of overarching themes relating to the wider challenges of climate change, demographic growth, resource depletion and energy security, and the drive to achieve sustainability.

- **Sustainable construction and infrastructure.**

Adopting a whole life cycle approach, including commissioning of projects (including planning, design brief, and design and modelling stages); the construction process; exploitation and use; and de-commissioning.

- **Resilient infrastructure.** New and existing infrastructure needs to be resilient to a number of hazards, both natural (such as those from extreme weather, climate change and geohazards) and man-made (such as incidents of blast and fire).

- **Monitoring and field investigation of existing infrastructure.** The provision of long-term field data, both in use and at the end of use, to close the design cycle. This has clear links to the Sustainable Construction

and Resilient Infrastructure themes.

- **Novel materials and novel use of materials.** Advanced materials are required to reduce embodied carbon and energy in use, to reduce resource consumption and waste, and for adaptability and durability.

The panel also recognised human factors and the relationship between people and infrastructure are important elements of the challenges faced.

In addition to encouraging industry and client engagement, and greater creativity in ground and structural engineering research, the study made three other main recommendations.

- The need for the UK academic research community to explore opportunities to disseminate to, and collaborate with, researchers overseas, and identify the potential research areas in which the UK can establish future international leadership. EPSRC should look at funding mechanisms to encourage international collaboration.
- The academic community should continue to undertake, and EPSRC support, research to support the innovative part of the construction industry. EPSRC should look at how research feeds into the production of design guidance and standards, and ways this can be facilitated.
- EPSRC should explore potential knowledge exchange models (for example, industrial fellowships which include 50% time spent in academia and 50% in industry) and seek to address barriers to career progression for interdisciplinary experts in ground and structural engineering. The report "EPSRC Review of Ground and Structural Engineering Research" is available to view at www.epsrc.ac.uk/pubs/reports/Pages/pes.aspx.

For further information contact Matthew Davis, EPSRC, Polaris House, Swindon, SN2, 1ET (matthew.davis@epsrc.ac.uk) or visit <http://www.epsrc.ac.uk/ResearchFunding/Programmes/PES/GSReview/default.htm>.

Testing new flood protection products



One of the results from the summer 2007 floods, which occurred due to exceptional rainfall in parts of the UK, has been a re-appraisal of the number of properties that are at risk of flooding. This assessment has identified around 5.2 million properties, or 1 in 6 of the total UK housing stock, as at risk from all sources of flooding. Over half of these, some 2.8 million properties, are susceptible to surface water flooding alone, and may therefore not benefit from the protection afforded by major defence schemes. For these, other forms of protection need to be considered, such as the use of flood protection products.

In order to ensure consistent standards in such products, a new test facility – the Flood Protection Test Centre – has been developed by the Environment Agency, in partnership with British Standards Institution (BSI) and HR Wallingford. It features two 15 m³ tanks in which flood protection products can be set up and tested.

During the certification testing, the products are subjected to conditions that simulate a severe flood. Importantly the facility simulates waves and currents as well as static water. The facility provides improved flexibility of testing, thereby holding down the costs of testing for new (or re-certified) products.

The products are tested against the new industry standard (PAS1188) and, if successful, are awarded the BSI Kitemark – giving householders, organisations and businesses reassurance about the flood products that they may one day depend upon.

Defra's £5m property-level flood protection grant scheme is aimed at high flood-risk areas that do not benefit from community-level defences. It is enabling them to purchase flood defence products, such as those being tested in the new centre. The new facility and industry standard will help those at risk make informed choices about the products they buy, as well as encouraging new product development.



The Flood Protection Test centre in the Froude Modelling Hall at HR Wallingford

For further information about the Flood Protection Test Centre, please contact Andy Tagg, Floods Group Manager, HR Wallingford (01491 822332; E-mail: a.tagg@hrwallingford.co.uk).

SPONSORING ORGANISATIONS

GOVERNMENT

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