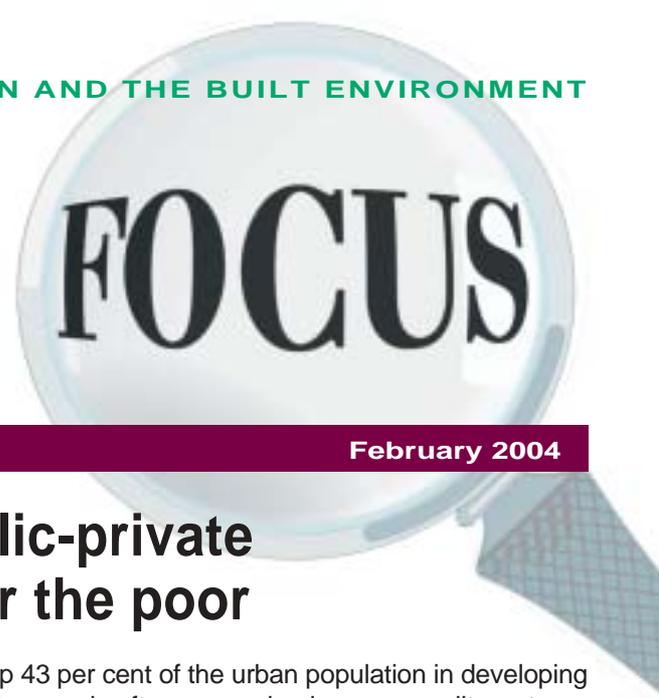


Innovation & Research



Issue No. 56 February 2004

IN THIS ISSUE

| | |
|--|---|
| Buildings | |
| Advanced energy in buildings | 7 |
| A new life for buildings | 3 |
| Steel solutions to Part E | 2 |
| Demolition | |
| Sustainable resource management | 4 |
| Environment | |
| Advanced energy in buildings | 7 |
| Flooding | |
| Sustainable management of urban rivers | 2 |
| Housing | |
| Best use of construction materials | 5 |
| Innovation | |
| IRF on the web | 3 |
| IT | |
| Construction and mobile IT | 6 |
| Materials | |
| Best use in housing | 5 |
| Steel solutions to Part E | 2 |
| Sustainable resource management | 4 |
| Waste paper as mulch | 7 |
| Maritime works | |
| Jetties and piers | 6 |
| Rock in hydraulic engineering | 8 |
| Rivers | |
| Rock in hydraulic engineering | 8 |
| Sustainable management of urban rivers | 2 |
| Sustainable resource management | 4 |
| Waste & recycling | |
| Sustainable resource management | 4 |
| Waste paper as mulch | 7 |

Regulating public-private partnerships for the poor

For the slum dwellers who make up 43 per cent of the urban population in developing regions of the world, access to water supply often means buying poor quality water from small scale vendors who have to charge a high price for their services. Meanwhile richer consumers with access to the convenience of a household connection pay much less per cubic metre to the often subsidised public provider.



L to r: *Osward Chanda, Director, National Water Supply & Sanitation Council (Regulator NWASCO), Zambia; Philip Fletcher, Director General of Water Services, England and Wales; Achmad Lanti, Chairman, Regulatory Body of Jakarta Water Supply Provision, Indonesia*

Incentive-based economic regulation of water supply is proving to be one of UK's more popular exports thanks to the nearly 15 years' experience of Ofwat. This DFID-sponsored research is responding to what UN Secretary-General Kofi Annan refers to as the urbanisation of poverty. It is investigating how regulation of both private and public providers can be adapted to serve the needs of the 'illegal' slums and the multi-occupancy tenements to achieve the benefits of some sort of household connection.

Attempting to enhance regulation for the poor, without choking the necessary flexibility in service provision, the research is specifically looking at: how to define a Universal Service Obligation, which the regulator can require from service providers; how to incorporate the small scale vendors; and how to enable the poor to have a reasonable and realistic voice in service provision. Empowerment and job creation are critical for development and poverty alleviation.

At the recent Inception Workshop held at

Cranfield University's Silsoe Campus, researchers from six countries explored the issues with water regulators from Jakarta and Zambia, including a presentation from Philip Fletcher (who in the new Water Bill will have a duty to further the consumer objectives of those on low-incomes), along with private water companies, NGOs and government officials from Nigeria and Jordan.

Over the next two years, research will be carried out in ten countries with a diversity of cultural settings and existing regulatory arrangements. The resulting output will provide guidance for water regulators to require, facilitate and monitor the early achievement of the universal service obligation.

For further information please contact Dr Richard Franceys, Institute of Water and Environment, Cranfield University (01234 750111; Email: r.u.a.franceys@cranfield.ac.uk).



Sustainable management of urban rivers and floodplains (SMURF)



The European Water Framework Directive (WFD), which came into force in December 2000, requires a holistic approach to water management and land use, based on river catchments. It aims to achieve 'good ecological status' for all surface water bodies (rivers, lakes, estuaries) and 'good' status for all groundwater bodies, Europe-wide by 2015. An Environment Agency-led partnership involving Birmingham City Council, Severn Trent Water, Staatliches Umweltamt Herten, University of Birmingham, King's College London and HR Wallingford is considering how to manage urban rivers more sustainably within a 3-year project known as SMURF (Sustainable Management of Urban Rivers and Floodplains).



The River Rea, part of the Tame system, which runs through the middle of Birmingham.

SMURF addresses issues of both water quantity and quality. It will investigate how the principles of river basin planning, encapsulated in the WFD, can be applied to highly modified and degraded catchments. The project, which started in 2000 and is supported by the EU LIFE programme, takes as its demonstration study the River Tame catchment in the West Midlands. The River Tame rises close to heavily urbanised areas in the north and west of Birmingham. It is a classic urban river, subject to fly-tipping, pollution and development pressure and it falls into the 'most degraded' category of the Environment Agency's river classification system.

Each SMURF partner covers a different section of the study. HR Wallingford is developing a GIS tool that can be used to support planning catchment-wide, and which will be operated and shared by the three main partners (EA, Severn Trent Water and Birmingham City Council). There is a mass of data available amongst the project partners, covering drainage, river flow, water quality and flooding, and a crucial element of GIS development will be linking these.

Work on SMURF continues until 2005, but three reports have already been published. The development and use of the GIS planning tool will be discussed at the Interim Conference to be held in Birmingham on 8–9th March 2004.

Further information of the project, along with the text of the reports and conference details, can be found on the SMURF website: www.smurf-project.info.

BUILDINGS & MATERIALS

Steel solutions to Part E



A series of research-based Technical Information Sheets from the SCI demonstrate how steel solutions meet the requirements of Part E of the Building Regulations.

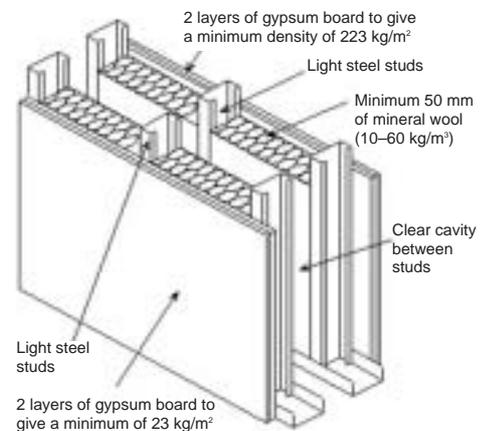
The July 2003 revision to Part E of the Building Regulations sets out more-demanding standards for the acoustic performance for separating walls and floors between dwellings. These extend to other buildings that contain 'rooms for residential purposes', such as hotels, hostels, student residences – any place where people sleep.

One of the biggest technical changes has been that the single figure rating for airborne sound gives more weight to the adverse effect of low frequencies. However, of more significance may be the changes to process. Pre-completion site testing to demonstrate compliance is now a requirement for at least 1 in 10 of every type of separating wall and floor, in both purpose-built residences and buildings adapted for residential use. This means that previously recognised solutions for all materials will need a serious re-think.

Because of the onerous nature of site testing, the government gave the go-ahead for the House Builders Federation (HBF) to develop Robust Standard Details (RSDs) as an alternative way of showing compliance for new houses and flats. RSDs comprise standard details that have undergone a thorough development and testing procedure and have been shown to have acoustic performance considerably in excess of the minimum standards of the Building Regulations. The excess is intended to cover for variability in construction quality. A consultative document covering both the potential process and proposed details was published by the Office of the Deputy Prime Minister in August 2003. It includes steel floor and wall options.

The SCI's Technical Information Sheets that demonstrate how steel solutions can meet these new demands are *Acoustic performance of light steel framing systems* (P320)*, *Acoustic performance of Slimdek®* (P321)* and *Acoustic performance of composite floors* (P322)*. The information contained in these sheets reflects considerable knowledge of how steel solutions perform, derived from extensive testing. The proposed range of RSDs reflect the knowledge included in these sheets.

Prices for all three sheets are £10 (for SCI



(top) *Beaufort Court, Fulham, was designed to comply with the Part E and was chosen as a test site for the new Robust Standard Details. Separating walls and floors were tested by Napier University and found to be well within compliance parameters. (Courtesy Michael Barclay Partnership)*

(above) *Typical double leaf separating wall construction*

Corporate Members and £20 for non-members, plus p&p. Purchase online at <http://shop/steelbiz.org> or telephone 01344 872775.

For further information please contact Dr Graham Couchman, The Steel Construction Institute. Tel: 01344 623345. E-mail: g.couchman@steel-sci.com.

Buildings: a new life

The current emphasis on energy and renewable resources can, although important, distort the understanding of what really makes a building sustainable and could even sometimes be counter-productive. Considerations such as fashion, location and cultural importance also have a bearing on sustainability and, for a genuine and complete assessment, it is essential to adopt a triple approach considering economic, social and environmental factors. A number of problems are caused by the failure to properly address the different interests of the 'internal' stakeholders' (users, owners and funders) and 'external' stakeholders (the local and global community).



(Top) The Old Town Hall, Gateshead
(Above) Rodboro buildings in Guildford Surrey

A project partly funded by DTI's Partners in Innovation Programme set out to discover how best to create a real awareness of the wider issues. The research team, led by Damond Loch Grabowski Architects and including Kingston University, Howard de Walden and King Sturge, was conscious that, while there are many excellent tools for assessing specific issues, there was a need for a simple overall approach that took all the different aspects into consideration.

The project started with a study of the relevant literature followed by the preparation of a matrix of issues, which was then tested by a wider advisory group drawn from all sides of the property development industry. At this stage the topics were split into three parts: economic, social and environ-

mental, with separate evaluation for the internal and external stakeholders.

Using the matrix to establish the key issues, a questionnaire was circulated to a representative group of users, developers, consultants, planning officers and academics. The results of this indicated some significant variations between the different groups, which reflected the different interests of the internal and external stakeholders in a way that confirmed the original premise. Even more interesting, however, was the fact that, both in the initial studies and in the results from the questionnaire, environmental and energy-saving issues were well down the list of things that contributed to a building's sustainability. An interim report was published summarising the results of the survey.

A series of case studies was undertaken in parallel on a range of buildings of different types and in different locations: the Rodboro buildings in Guildford, The Old Town Hall in Gateshead, Warehouses at 1&2 West India Dock, London, 141 Euston Road London and The Astoria Cinema in Ashford. These studies supported many of the conclusions outlined above but also brought out the significance of issues such as legal constraints on the continued life of a building.

It was clear that while, as expected, some areas had benefited from very detailed studies with easily quantifiable results, there are many other issues that are less easy to analyse but which nevertheless play their part in a building's sustainability. It was impossible to balance out all these issues. So the focus was turned towards producing a mechanism which would serve to highlight

the areas where there were conflicts of interest on the part of the stakeholders. This helped to reconcile the differences and to reveal the other benefits that a building or its redevelopment could offer to all.

The results of the study have been written up by Professor Anthony Walker Davis of DLG, Professor Sarah Sayce of LU and Dr Angus McIntosh of KS, under the title *Sustainability in the Balance* and will be published by the Estates Gazette in 2004. The aim has been to set out the economic, social and environmental aspects of sustainability, to explain the Building Sustainability Assessment Tool (BSAT) and to provide a summary of the research and a comprehensive bibliography of relevant publications. The work confirms the need for a wider range of issues to be addressed in order that the indications are sufficiently accurate to achieve lasting sustainability and these have been listed for convenience as the six 'L's: Longevity, Loose-fit, Location, Low Energy, Likeability and Loveability. Together with an appreciation of the important economic, social and environmental constraints, the satisfaction of these six criteria is fundamental to a building's survival.

For further information please contact Anthony Walker, Damond Loch Grabowski Partners (020 7426 3630; Email: a.walker@dlg-architects.co.uk)

INNOVATION

IRF on the web

We would like to remind readers that each issue of *Innovation & Research Focus* is available on the web at www.innovationandresearchfocus.org.uk.

It can be viewed and searched, and individual articles and whole issues are downloadable. From time to time, additional materials will be downloadable from some articles. In addition, wherever a project reported in the Newsletter has its own website for further information, a suitable link is provided.

All of the still-current articles from the last five years' issues of *Research Focus* have been added to the site, and all can be searched by keywords or free text.

New tools for Sustainable Resource Management



Two recently completed projects supported by the ICE R&D Enabling Fund aim to support a step change in the sustainability of resource management for the construction and demolition industries. One outcome is a web-based information system to identify the best ways of dealing with waste materials, taking full account of the options available at a user's location. The second is a Demolition Protocol whose wide adoption would stimulate the supply and demand for recycled and recovered construction materials.



THE DEMOLITION PROTOCOL

The Demolition Protocol – developed by EnviroCentre, London Remade and the ICE – shows how the production of demolition material can be linked to its specification as a high-value material in new buildings. The protocol also shows how this process can be driven through the planning process by, for example, the development of Regional Planning Guidance, Supplementary Planning Guidance, Planning Conditions and Agreements. The model describing how this works is shown in the diagram above right.

This model therefore presents two key components, around which Supplementary Planning Guidance and planning negotiations can encourage increased use of demolition recycle:

(i) Demolition Recovery Index – The protocol shows how an audit can be used to generate a Demolition Recovery Index (DRI). The DRI allows project teams to identify the potential for cost-effectively recovering material from demolition. In addition, the DRI provides planning authorities with a tool for ensuring that demolition methods reflect national and local policies on waste management and sustainable development.



Detailed guidance now available on dealing with waste at any UK location



(ii) New Build Recovery Index – The development of new standards, for example through the Construction Products Directive, means that the potential for specifying demolition recycle in new buildings is continually increasing. The protocol's New Build Recovery Index (NBRI) provides a tool for establishing the potential percentage and quantity of recovered materials that can be specified in a new building or other structure. Where a project involves demolition and new build, the NBRI can be linked to the DRI to provide project teams with a model for assessing the efficiency of resource use for the whole project.

The protocol emphasises the importance of auditing buildings for demolition, as part of the process of identifying the potential value of demolition recycle. Through a number of building types the protocol describes where segregation of materials during demolition will provide added value by minimising contamination.

All of the protocol documentation, including a set of implementation documents, is available from the ICE (www.ice.org.uk) and London Remade (www.londonremade.com) websites.

BREMAP & SalvoMIE

BREMAP (www.smartwaste.co.uk) is a web-based geographical information system (GIS) developed by BRE. It is linked to SalvoMIE (www.salvomie.co.uk), a web-based materials information exchange. BREMAP and SalvoMIE work together to provide an interactive network of tools to help users define the best practicable environmental option for waste. BREMAP and SalvoMIE offer various waste solutions depending on the location of site, company, materials or products.

BREMAP and SalvoMIE provide industry with complimentary data. BREMAP has been developed by BRE and funded by Biffaward through landfill tax credits in addition to the ICE grant. It provides the location, names and addresses of reputable businesses dealing with collection, storage, haulage, re-use, reclamation, recycling, waste to energy and disposal of construction and demolition (C&D) wastes. SalvoMIE provides an advertising and trading ground for a selection of available materials. These range from large quantities of scrap demolition timber and recycled aggregates, to smaller quantities of new bricks and plasterboard off-cuts left over from a building project, or shrubs and topsoil from a landscaping project. SalvoMIE was originally funded by the Department of Environment Transport and Regions and is now being managed by Salvo.

BREMAP has been populated with information from a range of databases, literature and journals but also from representatives of industry such as Salvo and the Institution of Demolition Engineers. It covers landfill sites, transfer stations, incinerators, recycling sites, reclamation companies, composting facilities and manufacturer take-back schemes.

Approximately 9,000 companies are already registered on the website but there is sufficient capacity for more. Anyone wanting to edit their company details or add their company to BREMAP can complete the registration form available at www.smartwaste.co.uk or send an e-mail to bremap@bre.co.uk.

Entering a user's postcode into BREMAP brings up a map of the different waste services – see illustration – and available materials and products. A basic search could look for waste management facilities within 20 miles of a user's postcode. An advanced search could look for waste facilities dealing in timber pallets within 20 miles, but restricted to a county or region.

Currently, there is no charge for BREMAP as it is a component part of the SMARTWaste system but there is a small charge for using some of the facilities on SalvoMIE.

For further information on the Demolition Protocol please contact Brian Menzies, EnviroCentre, 28 High Street, Stonehaven, Aberdeenshire, AB39 2JQ (01569 760661; Fax: 01569 760662;

E-mail: bmenzies@envirocentre.co.uk.

For further information about BREMAP please contact James Hurley or Michelle Leong at BRE (01923 664675 & 516 respectively; E-mail hurleyj@bre.co.uk or leongm@bre.co.uk).

Best use of construction materials in housing

BRE and the Co-Construct* partnership are working on a one-year programme to promote the best use of construction materials in the housing sector.



A one year programme aims to make better use of construction materials research in the housing sector and thus reduce waste.

In recent years, construction materials research has produced huge amounts of information, which in many cases remains under-used. With the support of DTI and industry partners, this programme aims to encourage the much fuller use of research findings to improve the competitiveness of materials' suppliers and their clients, by developing carefully targeted outputs and promoting more-efficient and effective materials solutions.

A housing sector strategy document will be developed, after wide consultation with all housing stakeholders, to identify the:

- key areas where existing research outputs can be better exploited;
- barriers to better use of existing materials research; and
- knowledge gaps in current information on materials in construction.

Programme Director Dr Peter Bonfield says, 'For the first time, this project brings together organisations from the various construction material sectors to address industry information needs in a truly collaborative fashion. By

focusing on a specific sector (housing), BRE and Co-Construct have the opportunity to make real impacts over the next year. The aim is that these impacts will include:

- more efficient and reliable use of materials and products in construction;
- improved interfacing and interactions between materials;
- faster exploitation of new materials and techniques;
- reduction in cases of inappropriate use of materials;
- improved co-operation between different materials supply sectors;
- greater take-up and appreciation of research by industry;
- materials information that more closely addresses industry needs.

The initial findings were discussed at a workshop at BRE on 12 December 2003. Other project outputs will include guidance documents, case studies and an information website.

When this programme on the housing sector is complete, the programme partners plan to seek funding to extend this work to other construction sectors.

For more information please contact Keith Quillin of BRE (01923 664893, E-mail quillink@bre.co.uk).



* Co-Construct is a partnership made up of BSRIA, CIRIA, the Concrete Society, SCI and TRADA www.construction.co.uk.

COMIT: Construction Opportunities for Mobile IT



September 2003 saw the start of a new project part-funded by the DTI's Partners in Innovation Scheme entitled COMIT: Construction Opportunities for Mobile IT. Arup, alongside BSRIA and Loughborough University, will lead a consortium of 25 construction, technology, research and dissemination organizations.

To genuinely improve construction project performance against key DTI policy criteria (time, cost, quality, safety, the environment and respect for people), organizations in the construction supply chain must become more integrated through increased internal and external collaboration.

Currently, many people in construction are prevented from efficiently and effectively contributing to the information flows that are crucial to any business. Error rates in data collection are high; the speed and immediacy of data receipt, capture and feedback require significant improvement; information exchange is expensive; and audit trails are certainly not automatic. Delays, variable productivity, accidents, and quality problems are therefore frequent.

IT has changed the ways we design, procure and construct buildings, but now communication and knowledge-sharing techniques at and between points-of-activity offer great potential for increased productivity, faster construction, higher quality, and lower cost.

Recent DTI-funded projects have illustrated definite interest and enthusiasm across the construction industry and mobile technology providers. Mobile IT is now a regular topic in the construction press, and there have been several major conferences in 2003 addressing this issue. As a result, construction professionals are becoming aware of the benefits that Mobile IT could bring to their



COMIT ... On site information at your fingertips

work activities, but they are often unsure how to implement them on their projects and unwilling to take the risks associated with being an early adopter, such as implementing unfamiliar technologies and the uncertainty

about the return on investment.

Technology providers are very aware that the construction industry provides ample opportunities for their tools. They are committed to entering the market, with many firms now targeting construction. However, all too often they have difficulty in persuading construction professionals to try something new. We believe this arises from their inexperience in supplying our industry, and therefore their lack of understanding of the market.

COMIT will bring the construction and technology specialists closer together, enabling a better understanding of each other's needs and values, and providing effective solutions both technically and commercially. COMIT aims to reduce the risks associated with the first implementation of Mobile IT in the UK construction industry, which in turn will increase future confidence, provide a body of knowledge, and prove the business benefits that are made possible.

Your help is needed: do you know of any construction projects that are currently using mobile technologies? If so, please let Sarah Bowden know – details below.

To respond to the call for help or for further information please contact Sarah Bowden, Senior Project Manager and Arup Research Engineer at CICE, Loughborough University (020 7755 3177 email:sarah.bowden@arup.com)

MARITIME ENGINEERING

Jetties and piers – new research into wave forces



Jetties are of key importance to coastal trading nations. Many are built in sheltered locations, but with the development of businesses such as the Liquid Natural Gas (LNG) industry, there is a trend towards developing large, single use, industrial terminals. These are often located in remote areas, where shelter is limited, or several kilometres offshore in deep water, where it is impractical to protect them fully with breakwaters. In other cases, jetties are built close to the water level – with deck heights dictated by the requirements of loading and offloading operations. Such jetties are therefore at risk of direct wave attack.

Staff at HR Wallingford have recently completed a DTI-funded Partners in Innovation project researching wave forces on these structures. Project leader Kirsty McConnell explains. 'Feedback from the industry showed that methods for predicting wave uplift forces on jetty and pier decks were limited, and were complex to apply. The aim of our project was to develop practical, easy-to-use design guidance.'

Physical model tests of a typical jetty head were carried out at a scale of 1:25 in a 2D random wave flume at Wallingford. Force transducers were fitted to the jetty beams and deck elements to log responses. 'Once we had a set of test data, we compared it against figures obtained using prediction methods



Typical exposed jetty

currently available in the literature' explains Kirsty McConnell. 'These tended to under-predict the forces acting on the structure.'

Test results were analysed and presented in graphical format. Along with a set of prediction formulae, these provide practical design guidance for wave forces on jetty and pier decks.

The results are due to be published in Spring 2004 by Thomas Telford Ltd. They should prove valuable to anyone involved in jetty design and construction.

For further information please contact Kirsty McConnell at HR Wallingford (01491 822304, email: kmcc@hrwallingford.co.uk)

Waste paper as a vegetation mulch

TRL's Regional Office in Wales has recently completed a research project to assess the benefits of Excel Fibre Technology's Phytofibre cellulose mulch. The research was carried out under a project led by Cardiff University's Geoenvironmental Research Centre at the Geoenvironmental Research Park (GRP), a research and development facility at Baglan Bay near Port Talbot that is part-funded by the European Union's Objective 1 programme.

Cellulose fibres from waste paper can be used as vegetation mulch. The mulch carries and protects grass seed and, once sprayed (hydroseeded), retains water with the fibres knitting together to form a protective covering. Inoculation of the mulch with selected microbes is believed to enhance the rate of fibre degradation, providing a carbon source for the vegetation and stimulating and enhancing rates of germination and growth.

Large-scale outdoor trials at the GRP involved twelve months' monitoring of test beds containing a poor quality sub-soil treated with the Excel mulch, grassed with a standard seed mix. Grass growth and development was assessed against other standard soil mulches, for example peat and wood fibre, and performance on an untreated high quality topsoil. The findings have shown that the waste paper mulch significantly outperforms the wood and peat mulches, providing grass growth and spread that almost equals performance on high quality topsoil.

Inoculated waste paper used as a mulching compound in hydroseeding applications is expected to be a sustainable and cost-effective alternative to traditional techniques in both grassed landscaping and engineering applications. The mulching of low grade soils has been shown to be a more effective alternative for grass establishment than other seeding practices and is particularly suited to vegetating highway embankments and cuttings.

For further information please contact John Lewis at TRL (01639-820526, fax 01639-821978, email: jlewis@trl.co.uk)



The Phytofibre Trail Beds at the GRP in South Wales

BUILDINGS & ENVIRONMENT

Advanced energy in buildings



One of the missions of The Royal Academy of Engineering is to strengthen links between industry and academia and a particularly important scheme in achieving this is the sponsorship of Research Chairs. A good example of this is the joint funding by BP and The Academy in supporting Professor David Fisk CB FREng at Imperial College in 'Engineering for Sustainable Development'. This is a 5-year appointment and is already making an impact in current thinking about energy usage.

The future of buildings and cities could be very different as climate change and fuel security policy begin to influence energy choice, one of the built environment's fundamental drivers for sustainability. David Fisk's work at Imperial funded by BP is based on the argument that innovations in buildings have a well-defined technology pathway that starts from an industrial application, travels through commercial buildings and finishes in social housing, often taking 20 or so years to make the trip. So, he argues, innovations for buildings in 2030 are already hiding in industrial laboratories.

Professor Fisk has organised with BP an Advanced Energy in Buildings Programme at Imperial College London, which provides leverage funding to advanced technologies being explored elsewhere on the campus that could be candidates for future inclusion in building services. The output of this work gives BP a better feel for the type of energy market that there might be for their products at the edge of their exploration horizon 30 or so years from now. It also exposes some new ways of looking at energy generation, energy storage and use.

The work includes stationary fuel cells, superconductor power stores, solid state lighting, photonic and surface physics, organic film photovoltaic cladding components, power control devices, ultra low energy PCs and fluid dynamics.

David Fisk is particularly interested in



"Earth Centre conference facility: Low Tech or High Tech Low Carbon Futures?"

exploring synergistic effects between these embryo technologies. This includes re-thinking the philosophy of stand-by generation and load control when buildings can be net suppliers of energy. The work is also looking at interactions between possible future changes in the transport fleet and buildings if, through new

technology, both sectors were to use the same fuel.

At the same time Professor Fisk has been instrumental in setting up an engineering for sustainable development module within the new Imperial Civil Engineering MSc. Its first students are now deep in the study of systems engineering to see how engineers can anticipate SD problems before they arise.

The Royal Academy is supporting two other Research Chairs in this area: Professor Peter Guthrie OBE FREng, in Engineering for Sustainable Development at Cambridge and Professor Marcus Newborough, in Energy & Environmental Engineering at Heriot-Watt University. They are jointly supported by The Academy and DEFRA and by AEA Technology and Scottish Power respectively.

For further information on all The Academy's Research Support schemes, please contact Mr Rob Barrett, Manager, Research Support, The Royal Academy of Engineering (020 7227 0500; E-mail: barrettr@raeng.co.uk website: www.raeng.org.uk).

Using rock in hydraulic engineering: new guidance being developed



Rock is one of the main materials employed in marine and fluvial construction works to prevent scour and erosion, and to limit wave overtopping and flooding. It is estimated that at least 10 million tonnes of armour stone per year are used in construction across Europe (approximately 1 million tonnes in the UK), with an estimated value of £500m. Yet today many engineers still adopt traditional techniques and fail to gain the benefits of industry experience or new research.

One of the most widely used guidance documents for working with rock has been the 1991 CIRIA/CUR *Manual on the use of rock in coastal and shoreline engineering*, commonly referred to as 'The rock manual'. Since the writing of that manual, significant research has been done to improve understanding of how rock behaves and to determine improved practices for hydraulic engineering. Consequently, a second edition is now in development with a widened scope that includes the use of rock in fluvial engineering and increases the focus on environmental and sustainability concerns. New research that will be incorporated within the second edition will include:

- wave overtopping results from UK and European research;
- information on use of the new European armour stone specification;
- the effects of rock packing and armour



Isle of Eigg Harbour, Scotland. Courtesy of K. Larson.

density on stability and hydraulic performance of armour layers; and

- practical experience of designing, constructing and maintaining low cost structures.

A new chapter on construction will be included, which will refer to recent research on safety and construction risk. An updated chapter on maintenance and management will concentrate on practical experiences and approaches to post-construction monitoring and repair of structures.

The project will publish its results in the summer of 2005, providing the guidance in both English and French as a paper report, CD-Rom or downloadable files from the web.

The manual is being updated by a joint UK, French and Dutch team of over 100 industry specialists. CIRIA is also working with a body of international experts who will review the material and provide access to global research and case studies. The UK project team is led by CIRIA with HR Wallingford as Lead Research Contractor. Imperial College and Halcrow are also providing technical expertise to the project. UK funding has been provided by the DTT's Partners in Innovation scheme, the DEFRA/Environment Agency flood and coastal defence programme, STEMA Shipping, RMC Aggregates Ltd, Van Oord ACZ and Network Rail.

For further information please contact CIRIA (020 7549 3300; fax 020 7253 0523; email: irf@ciria.org; website: www.ciria.org).

ABOUT INNOVATION & RESEARCH FOCUS

also on the web at www.innovationandresearchfocus.org.uk

Aims – The aim of *Innovation & Research Focus* is to promote the application of innovation and research in building, civil engineering and the built environment by disseminating new information as widely as possible. Its articles on current research and innovation are written for a wide-ranging audience, including practising engineers, architects, surveyors, environment specialists and their clients. Its sponsors wish to promote the benefits of research and innovation, improve contacts between industry and researchers, encourage investment by industry in research and innovation and the use of results in practice, and facilitate collaboration between all the parties involved. Articles may be reproduced, provided the source is acknowledged.

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If you would like to be able to contribute articles about your own innovation or research, please contact the Editor.

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RESEARCH ORGANISATIONS

British Cement Association

Century House, Telford Avenue, Crowthorne,
Berkshire, RG11 6YS
(01344 762676; fax: 01344 761214)
Website: www.bca.org.uk
E-mail: library@bca.org.uk

BRE

Garston, Watford, Hertfordshire, WD25 9XX
(01923 664000; fax: 01923 664010)
Website: www.bre.co.uk
E-mail: enquiries@bre.co.uk

Centre for Innovative Construction Engineering

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

Centre for Window and Cladding Technology

University of Bath, Claverton Down, Bath,
BA2 7AY (01225 826541; fax: 01225 826556)
Website: www.cwct.co.uk
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CIRIA

Classic House, 174–180 Old Street, London, EC1V
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HR Wallingford Ltd

Wallingford, Oxfordshire, OX10 8BA
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Website: www.hrwallingford.co.uk
E-mail: hrinfo@hrwallingford.co.uk

The Steel Construction Institute

Silwood Park, Ascot, Berkshire, SL5 7QN
(01344 623345; fax: 01344 622944)
Website: www.steel-sci.org
E-mail: reception@steel-sci.com

TRL Ltd

Old Wokingham Road, Crowthorne, Berkshire,
RG45 6AU (01344 773131; fax: 01344 770356)
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PROFESSIONAL INSTITUTIONS

Institution of Civil Engineers

1 Great George Street, Westminster, London, SW1P
3AA (020 7222 7722; fax: 020 7222 7500)
Website: www.ice.org.uk
E-mail: enquiries@ice.org.uk

Institution of Structural Engineers

11 Upper Belgrave Street, London SW1X 8BH (020
7235 4535; fax: 020 7235 4294)
Website: www.istructe.org.uk
E-mail: mail@istructe.org.uk

Royal Academy of Engineering

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Southern Testing Laboratories
Wilde & Partners