Recent publications

Books

Non-traditional houses – Guide to identification (BR 469)
A wealth of information and advice from the leading experts is brought together in this comprehensive and highly illustrated reference of nearly 1000 pages on non-traditional houses. It provides the surveyor, engineer and architect with a unique practical resource detailing 450 house types classified by form of construction. £270 (£220 for Connect members).

Sloping glazing – Understanding the risks (BR 471)
Describes the main types of glazing used in sloping glazing, and the factors associated with glazing failures. Risk assessment and management is fully covered, and an example assessment is included. £37.50 (£27.50 for Connect members).

Digests
Concise reviews of building technology.

Digest 489:
Wind loads on roof-based photovoltaic systems
Reviews wind loading information appropriate for roof-based PV systems, and gives recommendations and guidance for roof-based PV system design.

Digest 490 Structural fire engineering design: aspects of life safety
This Digests is part of a suite of related documents containing guidance for the construction industry on structural fire engineering design. The intention is to produce performance based guidance that brings together fire engineering and structural engineering, providing a framework in which designers are free to develop site specific solutions based on real performance criteria.

Good Building Guides
Practical guidance on building design and construction.

GBG 61 Lighting
Part 1: General principles
Describes the general principles and gives an introduction to what is available.
Part 2: Domestic and exterior
Describes an internal domestic lighting scheme, exterior lighting, and maintenance of luminaries and lamps, and provides a lighting design aide-memoir.

Information Papers
The latest BRE research information and how to apply it.

IP9/04 Maintaining good air quality in your home
Advice on achieving good air quality in the home by properly using features designed give adequate ventilation, and on the sources of pollutants that may be present or introduced into the home.

IP10/04 Whole Life Value: sustainable design in the built environment
Outlines the concept of Whole Life Value (WLV) and describes the WLV Framework – a web-based tool that provides an integrated framework for the variety of design tools that deal with the issue of sustainability in the built environment.

IP11/04 Perimeter chilled beams
Presents the findings of a research project that has investigated the performance of perimeter chilled beams and developed guidance on avoiding the design pitfall. See page 9.

IP 12/04 Concrete with minimal or no primary aggregate content – The MAGCON pilot study
Describes the results of a pilot study to investigate ways of reducing the volume of primary aggregates in concrete.

Prices
Digests and Good Building Guides are £12 each (£8 for Connect members), or each part. Information Papers are £9 each (£6 for Connect members).

Where to get them
These publications are available from:
- www.BREBookshop.com
- Phone 01344 404407
- Fax 01344 714440
- email BREBookshop@IHSRapidoc.com

BREbookshop.com

Diary of forthcoming events

3 November 2004 in London
Innovation in construction
A one-day event aiming to give delegates a practical understanding of the innovation process in the context of the construction industry, so that they can undertake development projects with more confidence, with a higher chance of success and more efficiently. (See also page 4).

4 November 2004 at BRE, Watford
Introductory course to fire and fire testing
A general introduction to fire and the fire testing of plastics, rubbers and textiles. Describes the effects of fire parameters on burning behaviour, the various types of fire tests and their selection to specify materials and products of reduced flammability.

9 November 2004 at BRE, Watford
The LPCB fire detection conference
A conference for smoke and heat detector manufacturers, fire consultants, fire brigades and detector installers, covering forthcoming European Standards and current Directives.

10 November 2004 in East Kilbride
Energy and construction
Seminar covering: the requirements of current building regulations and those that may develop in the future; the Energy Performance of Buildings Directive and how this will impact on the management of buildings; energy audits and management issues, and the potential for incorporating renewable energy in buildings. (For other CPD events in Scotland see page 6.)

11 November and 1 December 2004 at BRE, Watford
Smart homes need smart controls
A one-day workshop describing the benefits of the European Installation Bus (EIB) – one of the market leaders in European integrated home control systems with over 100 manufactures producing EIB compliant devices – focusing on applications and giving a practical insight into technical operation.

17 November 2004 at BRE, Watford
SIPs – The future generation of housing?
SIPs (Structural Insulated Panels) are lightweight building panels that combine two high-density facings bonded to either side of a low density polymeric core. SIPs can be a very cost effective form of construction, with potential for fast mass production that will drive down costs. They are manufactured to quality standards and are quick to construct, requiring less skilled labour than traditional build. This conference aims to show designers and clients the housing benefits of SIPs. (See also page 6.)

18 November 2004 in Edinburgh
Stone in construction and maintenance
A set of expert speakers will cover sources of stone, new build issues, repair and maintenance, and performance. This event is being run in conjunction with the Natural Stone Institute and the Scottish Stone Liaison Group. (For other CPD events in Scotland see page 6.)

22–26 November and 13–17 December 2004 at BRE, Watford
Building services integration with EIB
European Installation Bus (EIB) technology delivers building performance through building services integration, reducing energy costs, enabling remote management and introducing life style benefits. This five-day course allows delegates to effectively deliver the benefits of EIB, and provide value-added service to clients. The course provides them with an understanding of the key elements of design, installation and commissioning of EIB systems.

30 November 2004 at BRE North East
Fire, impact and weathertightness performance testing of building envelope systems
Half-day seminar to discuss the second edition of BR 135 *Fire Performance of External Thermal Insulation for Walls of Multi-Storey Buildings*, and the issues related to the fire performance of external cladding systems.

1 December 2004 in London
Security Solutions for the 21 Century office
This one-day conference will tackle the security dilemmas confronting those investing in, developing and occupying offices in the highly globalised, post-September 11th era. (See also page 3.)

7–8 December 2004 at BRE, Watford
BREEAM Offices assessor training course
Two-day training course to become a BREAM for Offices assessor, covering the technical content of BREEAM for Offices and the details of the assessment process.
Contact: 01923 664462, breeam@bre.co.uk

Further information
For further information on these events and training courses contact (unless otherwise stated) BRE Events – 01923 664800, email events@bre.co.uk or visit www.bre.co.uk/events

BREconnect

BRE Connect is a subscription scheme that gives unrivalled access to BRE's expertise on buildings, construction, energy, environment, fire and risk.

For £130 a year BRE Connect subscribers receive:
- all BRE Digests, Good Building Guides, Good Repair Guides and Information Papers such as those listed on this page – totalling at least 50 publications each year – all building to form an invaluable reference tool
- a CD-ROM each year containing every BRE publication from that year in pdf format
- preferential pricing on a range of BRE books and other publications – such as those listed on this page – for which subscribers pay a significantly reduced price
- discounts on a programme of BRE events. BRE Events are accredited to Continuous Professional Development (CPD).

For more information –
Claire Allen, 01923 664761, Email ClaireAllen@emap.com

BRE

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BRE

constructing the future

Part L and the EU Energy Directive

Perimeter chilled beams
Construction Lean Improvement Programme
Budgeting for sustainability

Waste management and recycling
Waterfront developments

AUTUMN 2004 ISSUE 22

BRE

overview

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For a free subscription to *Constructing the future* telephone 01923 664303

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Cutting through the greenwash

Some of the UK's leading architectural practices have become extremely adept at portraying their non-domestic buildings as being energy efficient, when in reality they are anything but!

The ODPM recently published its proposals for amending Part L of the Building Regulations and implementing the EU Energy Performance of Buildings Directive. If fully implemented, the proposals should make it much more difficult for developers and architects to make extravagant or exaggerated claims regarding the energy performance of new buildings.

The adoption of a single National Calculation Method for assessing the energy performance of non-domestic buildings will ensure that new designs are assessed in a consistent and repeatable manner. This will address the current anomaly where new houses are assessed using the well established Standard Assessment Procedure (SAP), but with no equivalent being available for the assessment of non-domestic buildings.

Many observers consider that the absence of a non-domestic SAP makes building regulations compliance assessment almost impossible for large complex buildings, leading to the construction of highly energy inefficient non-domestic buildings. This is exemplified by the current proliferation of fully glazed air-conditioned buildings in the UK – the new regulations may possibly sound the death knell for this type of building.

The introduction of building energy labelling (as a consequence of implementing the EU Energy Performance of Buildings Directive) will cut through much of the greenwash. From 2006, prospective purchasers or tenants will be provided with an energy Asset Rating with the rating being produced in an independent manner using the National Calculation method.

A summary of BRE's initial response to ODPM's proposals for amending Part L of the Building Regulations and implementing the EPBD is provided on page 7.

David Strong
Managing Director, BRE Environment

A fresh approach to energy efficient design

A new, integrated approach to building design, called Catalyse, aims to help architects, building services engineers and quantity surveyors to work together to meet client needs – and the demands of existing and new legislation – by improving the energy performance of new office buildings.

Being developed by the INREB (Integration of New and Renewable Energy in Buildings) Faraday Partnership, Catalyse will support key design professionals through a flexible CPD package that builds the knowledge and skills needed to deliver improved sustainability. The areas covered will include:

- the drivers for sustainability
- the impact of different procurement methods in achieving sustainability
- the importance of integrated working and partnership engagement in the design process
- key issues for developing low carbon office buildings
- achieving holistic solutions
- new and renewable energy technologies.

Office buildings with better energy performance have tangible benefits for both clients and occupiers, including increased property values, lower operational running costs, improved comfort levels and the associated increases in staff productivity. Delivering these benefits requires, not only major technical innovations, but also the development of practitioner skills and the implementation of integrated team-working approaches by those responsible for the design and delivery of buildings.

Catalyse will develop the knowledge and skills needed in the construction industry to enable professionals to work effectively together, improve the energy performance of new office buildings and ultimately deliver a more sustainable built environment.

Catalyse is a Carbon Trust funded programme led by Loughborough University and BRE. Anyone wishing to have a say in how Catalyse training develops, and/or to be kept up to date on the project's progress, should complete the questionnaire at http://tele.bre.co.uk/forms/Catalyse.pdf.

For more information –
Contact INREB 01923 664512
Email enquiries@inreb.org

Extreme construction

The British Antarctic Survey (BAS) team need to replace their existing base on the Brunt Ice shelf over the next 5–10 years.

The construction and living conditions are so unusual and extreme that, in order to encourage innovative concepts for the new structure, BAS are working with RIBA Competitions before they reach a decision on the final design.

An independent team of advisors is judging the proposed solutions. The jury panel includes two BRE experts who are advising on whole life performance and costs, sustainable energy and energy efficient services.

The competition attracted 86 entries, from which six were asked to submit concept designs. An exhibition of the short-listed designs will be displayed at a special exhibition at RIBA from 15 November–8 January 2005.

The current research station, Halley V, is the UK's most isolated facility. It stands on an ice shelf that is 150 m thick, flows at a rate of 0.4 km per year and, at irregular intervals, calves off as vast icebergs. The current research station could be lost due to a calving event in the next decade, and so a replacement station is planned for operation by 2008/09.

The design teams will need to overcome numerous problems. The movement of the ice shelf towards the sea and the annual 1.5 m build-up of snowfall and snowdrifts present challenging conditions. Average temperatures are –5°C in midsummer, dropping to –30°C in winter when there are 55 consecutive days of winter darkness.

There is currently only one main re-supply by ship each year, from which supplies are unloaded onto the ice shelf and towed on weight limited sledges to the research station some 12 km distant. Any maintenance must be undertaken by the resident research team, which is restricted to 15–20 during the Antarctic winter, rising to 50–60 during summer. Construction can only take place in the summer, which is often less than two months – although there are 24 hours of daylight available.

The Antarctic Treaty requires that all construction materials are removed from site when the building is finally decommissioned. There are also restrictions on the amount of energy that can be used at the site, and for each litre of fuel that is put to use at the base, 10 litres are required to get it there!

The current station comprises buildings that are on jackable steel legs, and smaller movable structures on skis. Previous designs include timber structures (Halley I and II) which were engulfed by the snow after approximately six years, and underground structures (Halley III and IV) which became distorted and suffered other physical problems below accumulated layers of snow and ice.

For more information visit
www.bas.ac.uk/Living_and_Working/Stations/Halley/index.php

Unlocking innovation

A new initiative will help construction industry companies gain greater commercial success from both their own innovative ideas and practices, and the latest research and development in the construction and other sectors.

The Innovation Discovery Programme is a collaboration between BRE – with its extensive technical expertise and knowledge of the construction sector – and Inventa Partners – a company with wide experience of guiding companies through the process of unlocking their own innovations, and exploiting the latest ideas from elsewhere.

With the UK research and development base valued at more than £60 billion, there is considerable scope for greater development of new products and processes. But finding new ways to access technical solutions, and create new and improved products on the back of them, can require companies to invest significant time and money. It is for this reason that BRE and Inventa Partners have created a unique approach to enable companies to unlock innovation efficiently and effectively.

'The problem for UK product manufacturers is that when they carry out research and development themselves, they need to claw back the investment in the prices they charge', says Gideon Davenport, Executive Director at Inventa Partners. 'That makes new products more expensive and customers may be unwilling to pay a premium – this can stifle innovation. BRE and Inventa will look across the existing research base (within the construction industry and outside) to see if there is anything that can be applied to our clients' problems.'

'We see this as a natural extension to the services we offer to our clients,' says Martin Wyatt, BRE's CEO. 'Ultimately they are only interested in what research and innovation can bring to their company, and often not in the science itself – that's our job.'

For further information on this initiative to bridge the gap between research and development, and commercial and competitive success –
Matt Dickinson 01923 664658
Email innovation@bre.co.uk

News from BRE Certification

Part P – Competent Persons

The last issue of *Constructing the future* reported that BRE Certification has received Government approval to run the Competent Person Self Certification Scheme for Part P of the Building Regulations. Part P stipulates that as of 1 January 2005, all electrical works in domestic premises (with the exception of work that does not require new circuitry) must either be inspected by local Building Control or be carried out by a 'competent person'.

BRE Certification has received more than 130 applications from companies/sole traders, and is expecting many more to flood in nearer the January deadline.

LPCB enters domestic market

LPCB introduced its approval scheme for domestic fire alarms at the end of last year, and there are now several LPCB approved smoke, heat and carbon monoxide detectors available in the marketplace (such as B&Q).

LPCB's objective is to 'grow' the LPCB brand in the domestic market, and the first phase of this strategy has now been completed. ODPM produces a series of leaflets promoting the use of fire alarms to the public, and has just released a new leaflet (that displays the LPCB mark) entitled *Working smoke alarms save lives*, which urges the public to chose a product bearing a quality mark.

Secure storage units/safe cabinets

prEN 14450 *Secure storage units – Requirements, classification and methods of test for resistance to burglary – Secure safe cabinets* has received a positive vote by CEN and will be issued as a full EN by the end of this year.

LPCB is fully prepared for the introduction of this standard and can accept applications now for approval of secure safe cabinets and storage units. Applications are likely to involve units such as hotel safes, and the small home-safes that are available in retail stores.

Recent technical approvals

Metsec Limited recently gained approval for the Metframe/SFS Building System, which is suitable for use in the construction of both residential and commercial buildings. The approval covers the following performance characteristics: thermal transmittance and condensation risk, acoustic performance, behaviour in relation to fire, weathertightness and durability, factory production control, and site installation.

Hepworth Plumbing Products have renewed their Technical Approval for the Hep2O plastic waste valve. The product is suitable for closing the waste connection below a sanitary appliance to prevent the escape of foul sewer air back into the building. It has also been assessed for use with sanitary appliances as an alternative to water seal traps and air admittance valves. In addition it can also be used for safety discharge from tundishes serving unvented water storage systems, where it is not practicable to install a dedicated discharge pipe to an external safe and visible location such as a gulley.

For further information on any of the above contact the Helpdesk 01923 664100
Email enquiries@brecertification.co.uk
or view www.redbooklive.com

Energy Performance of Buildings Directive – how will it impact on your business?

The European Energy Performance of Buildings Directive (EPBD), which comes into force in the UK in January 2006, will have major business and strategic implications for all owners, operators, designers and developers of new and existing buildings.

An online network giving members up-to-date information and guidance on the EPBD and how it will impact their business, will be established by BRE on behalf of DIAG – the Directive Implementation Advisory Group. DIAG is a high-level working group that was established by key professional bodies and trade associations to advise the UK Government on the energy performance of buildings and implementing the EPBD.

The EPBD network is due to go online in the Autumn. 'The benefits of subscribing to this service,' says David Strong, DIAG's Chairman, 'include regular access to the very latest information regarding implementation of the EPBD. This will allow organisations to plan effectively and fully exploit the new business opportunities arising from the Directive'.

The web-based network will have an area dedicated to subscriber services, including a news service where individual members will receive alerts specific to their needs. Another section of the web site will be a moderated bulletin board, for on-line discussion as well as the usual FAQs and other networking initiatives.

Further news about the EPBD Network will be announced on the DIAG web site at www.diag.org.uk.

Issues for potential inclusion in the network should be sent to Mike Perry, EPBD Network Manager, BRE, Garston, Watford WD25 9XX, Email epbd@bre.co.uk

Security in the post-9/11 office

A conference tackling the security dilemmas confronting those investing in, developing and occupying offices in the highly globalised, post-September 11 era, is being held in London on 1 December 2004.

Distinguished speakers will cover the issues from key points of view, including those of the:

Security expert – David Veness, Assistant Commissioner Specialist Operations (including protection, terrorism, security and organised crime) in the Metropolitan Police, will give the keynote address

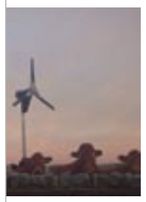
Architect – Lee Polisano, President of Kohn Pedersen Fox, will discuss designing for successful security

Building occupier – Professor Roger Scruton, philosopher and writer, will deal with human issues and security.

With other prominent speakers, they will present expert analyses of: designing to minimise security threats in tall buildings, public spaces and single and mixed-use environments; insurance and certification issues; contingency planning and disaster recovery; tenant and landlord responsibilities; and contending with threats to information infrastructure.

In recognising the need to push security up the corporate priority list, one of the key aims of this conference will be reconciling effective security and business success.

To register for the conference, which is being hosted by BRE and the British Council for Offices (BCO), at Lovells, Holborn Viaduct, London EC1 on 1 December 2004: T 01923 664532, Email events@bre.co.uk or visit www.bre.co.uk/events



Clear Skies ahead

Energy Minister Mike O'Brien has announced that the Clear Skies scheme for funding renewable energy use in communities, not-for-profit organisations and households, has been extended to March 2006 with £2.5 million of additional funding.

This brings to £12.5 million, the total Clear Skies funding from DTI, for a range of projects involving solar thermal, wind turbine, hydro turbine, ground source heat pump and biomass technologies, for generating renewable energy in homes, schools, hospitals and other community buildings.

'The extension of the Clear Skies initiative follows its great success to date in promoting and funding renewable energy use at the community and household levels,' says the scheme's manager, Chris Roberts. 'This is reflected in the results of the recently completed sixth round of applications, in which funding has again been offered to renewable energy technology projects throughout the country.'

Following round 6 (for which the closing date for applications was 30 July 2004), 42 projects, representing all of the renewable energy technologies being promoted, have been awarded a total of nearly £700,000. The deadline for the next round of applications is 29 October 2004, and dates of further rounds will be published as soon as they are confirmed.

The Scottish Executive has put up £3.7 million to fund its own parallel scheme, see www.est.org.uk/schri
or call 0800 1388 858.

Further information is available from www.clear-skies.org or the Clear Skies Helpline 0870 243 0930.

Buildings failing airtightness test

Around a third of buildings tested by BRE are failing the airtightness test more than two-and-a-half years after the introduction of Approved Document L2.

'A large number of companies still appear to be unaware that Building Control have to be satisfied that a building is airtight before it can be signed off,' says Mike Jaggs, Head of BRE's Airtightness Service. 'This means that designers and contractors are not addressing the issue at the start of a project when it is very often quite simple to put in place the right design and workmanship principles.

'Failing the test means having to go back and re-do work in the final stages of construction,' says Mike Jaggs, 'and this is very costly, both in time and money. It comes as quite a shock to clients when they suddenly realise they haven't designed or built for airtightness.'

According to Jaggs, the ruling is quite straightforward. All non-domestic buildings have to demonstrate that they are airtight, either by reviewing designs with Building Control or by putting the building through an airtightness test in the final stages of construction. 'For buildings over 1000 m^2, ODPM recommends testing,' says Jaggs.

In BRE's experience, companies that manage the process properly have no problem in getting their buildings through the test. 'It's a matter of attention to detail; everyone needs to know what has to be done and why. And, success doesn't depend on building type – complex buildings can pass and simple buildings can fail.'

However, there seems to be some inconsistency in the way building control bodies are applying the air permeability requirements – some being more lenient than others – and BRE feels that this could be improved. 'It is important to iron out these differences and have everyone working to the same standards,' say Jaggs. 'They aren't difficult to achieve, its just a matter of learning what to do on your first building and then rolling the process out on following projects.'

For more information –
Mike Jaggs, 01923 664500
Email jaggsm@bre.co.uk
or see www.bre.co.uk/airtightness

Help for housebuilders

A new database has been developed to make it easier for housebuilders to adopt different methods of construction.

There is considerable pressure on the housing sector to increase the number of houses built by 'Modern Methods of Construction' (MMC). The Housing Corporation, for example, has ring-fenced a significant proportion of its Approved Development Programme budget for innovative projects in the South East, and English Partnerships is typically requiring 50% of dwellings on its Millennium Communities sites to be built using MMC. In addition, some housebuilders in the private sector are considering modern methods as a way of overcoming skills shortages in the construction industry.

Despite these strong drivers some builders find it difficult to change to new forms of construction, because a lack of familiarity with the technologies makes it difficult to plan projects in terms of resource requirements and timescales.

The new database, which is called the Library of Housing Construction Packages (or simply, Library of Packages), has recently been completed by BRE under a Partners in Innovation project funded by DTI.

The project has developed a library of measured process and resource data related to construction packages and tasks for a range of construction forms. The data was extracted from BRE archives related to housing projects monitored with BRE's efficiency tool 'CALIBRE*.

The Library of Packages contains:

- around 200 data packages from 14 different projects
- resource inputs (man hours) broken down by the four CALIBRE activity categories
- process maps for each package
- issues that affected the construction process
- digital photographs illustrating the various packages.

The database can be used to examine and compare information for different forms of construction for the main elements of house construction (groundworks, shell, fit out). It is designed to reduce any uncertainty associated with trying out different forms of construction.

The Library of Packages is freely available at http://projects.bre.co.uk/library, and will continue to be maintained and updated as more projects are monitored with CALIBRE.

*CALIBRE

CALIBRE is an efficiency tool that measures and assesses the use of resources and provides rapid feedback to enable real-time improvements to the construction process.

The whole construction process is mapped in terms of the sequence of work. All work packages, and the individual tasks that make them up, are identified and coded. Each operative is also given a code, according to his function/trade, as is each location on the site.

Independent observers record the activity of all operatives on site at regular intervals during a working day. Each record contains data on which operative is involved in the activity, what is being done, and where and when, and whether or not the task is being carried out productively – this is described with four activity codes:

- **Added Value** (activities that progress the build operation)
- **Support** (activities that enable added value activities to take place)
- **Statutory** (eg carrying out health and safety-related activities, taking a break etc.)
- **Non-added value** (any wasteful activity such as being absent from the workplace, making good or repeat work etc.)

The reason for the non-value added time is recorded, allowing the site team to identify the most significant causes of waste.

In brief

Name change for BRE's parent company

The Foundation for the Built Environment (FBE), a registered charity that funds research and education in construction and associated fields, has changed its name to BRE Trust to reflect the fact that it is the owner of BRE.

'The name "BRE" carries a reputation for authority and independence that has been built up over many years,' say BRE Trust Chairman, Hugh Try CBE. 'The adoption of the new name emphasises the benefits that BRE brings to the charity both in terms of financial support and the significant contributions it makes to the delivery of the charity's objectives.'

The BRE Trust invests the profits from its subsidiary companies (which include BRE Certification and FBE Management in addition to BRE) principally into full-time PhD scholarships and strategic research.

For more information about BRE Trust activities visit www.bretrust.org.uk

Dates set for energy technology showcase

Following the success of this year's resource04 energy technology exhibition and conference, resource05, a major three-day demonstration of renewable and innovative energy efficiency technologies for buildings will be held at BRE, Watford on 13–15 September 2005.

The event includes practical demonstrations of fully operational renewable – and other innovative – energy systems, along with a series of daily seminars. As well as providing delegates with a showcase of the latest advances in low-carbon building systems, the event offers opportunities for companies to exhibit and act as sponsors.

Anyone wishing to attend, exhibit at or sponsor resource05 can obtain more details at www.resource05.com or from T 01923 664531.

Innovation in construction

A event for construction engineers and project managers with an interest in the latest innovations is being held in London on 3 November 2005.

Innovations in construction are too often associated with high-risk and failed projects. Although there have been many successful innovations in materials, systems, structures, processes and design techniques, much of the industry still regards innovations with deep suspicion. While other sectors have prospered on the back of investment in R&D, construction often continues offering traditional solutions and making modest profit margins.

Organised by the Construction and Building Services Division of IMechE and supported by BRE, the Innovation in Construction event will include expert presentations and case studies.

For more information –
020 7304 6829
Email a_payton@imeche.org.uk

Using industrial waste as aggregate

The added value* attributes of industrial waste, when used as aggregate in bulk construction materials like asphalt and concrete, will be investigated in a DTI/WRAP funded project being conducted by BRE, NISP (National Industrial Symbiosis Programme) and MiniWaste Faraday.

The aim of the project is to reduce the disposal of industrial wastes to landfill by demonstrating that these materials can offer real benefits over their primary aggregate alternatives – for example:

- superior abrasion resistance
- enhanced thermal properties
- beneficial effects on reinforcement corrosion
- durability enhancements.

Demonstrating added value will allow these materials to be positioned advantageously in the marketplace.

Following an initial desk study and industry workshop, the project will conduct practical demonstrations on a selection of materials not previously used in construction**. Results will be disseminated early next year in published papers, and via the WRAP AggRegain website and the BRE website.

'Feedback from waste industry stakeholders is vital to ensure that this work is effective,' says Flavie Moulinier of BRE. 'So I'd like to invite anyone wishing to express a view on the potential of particular wastes to add value as aggregate in concrete or asphalt, to contact me.'

For more information on the project, or to provide feedback please contact –
Flavie Moulinier 01923 664560,
Email moulinierf@bre.co.uk

*Added value
Added value encompasses materials that offer:

a) Improved or equal technical performance relative to primary aggregate alternatives. This could include properties such as superior abrasion resistance, enhanced flow properties, beneficial effects on reinforcement corrosion, freeze thaw or other durability enhancements.

b) Economies (for example, properties allowing use of less binder).

c) Environmental enhancement (for example, aesthetic appearance, energy savings, etc).

**Excluded materials
The materials in established uses already identified by Symonds (2001), *Survey of Arisings and Use of Secondary Materials as Aggregates*, are excluded from the scope of the project.

Social responsibility in business

A new publication, *Thinking business space: benefiting from more socially responsible decisions* (funded under the DTI Partners in Innovation scheme), will provide free guidance to businesses in keeping social responsibility in mind when choosing new premises.

Intended for businesses choosing new premises for the first time, or that do so infrequently, the guide gives practical, business-focussed information on how to go through the process with a concern for the social and environmental impacts of the decisions made.

The benefits of building social responsibility into decision-making are highlighted – these can include: better staff retention, less sick leave and higher staff productivity; lower fuel bills; and reduced environmental impact. Good practice examples of businesses that have benefited from putting social responsibility into practice are also included.

The guide can be downloaded free of charge from **www.bre.co.uk/csr**. Copies will also be available from the project partner organisations*. Other bodies who advise companies on their property decisions (property agents, planning authorities, financial institutions, etc) will be able to distribute copies to their clients.

* Project partners:

South East England Development Agency (SEEDA), RICS Foundation, Small Business Service, CIRIA, Constructing Excellence, Federation of Small Businesses, Gerald Eve, Institute of Directors, English Partnerships and Royal Institute of British Architects (RIBA).

Reducing building site waste

A DTI and industry supported partnership project is working to cut the high levels of waste on construction sites, improve health and safety and reduce environmental impacts.

At present around 15–20% of all materials delivered to construction sites ends up in skips, costing the industry hundred of millions of pounds a year. Wasteful sites are also often untidy and disorganised, which impacts on their safety levels. The Health and Safety Executive reports that almost half of construction site accidents result from untidy, messy or badly laid out sites.

A barrier to improving this situation is the lack of a framework in which construction workers and supervisors can work together with building professionals and employers, to improve environmental and safety performance, and enhance business competitiveness in the process.

This project is using partnerships to develop channels of communication – between all those involved in construction projects – on improving working practices to reduce waste and accidents. It will provide construction companies with tools to ensure that everyone joining a site learns about waste and safety issues, along with tools to manage and maintain partnerships, and a framework for reporting problems and successes.

'We believe that significant cost savings, reduction in accidents and minimising environmental impacts – the three components of sustainable development – can be achieved through a well organised and neat construction site,' says Project Manager Uly Ma of Greenfile Developments Ltd, 'coupled with teams that know how to spot waste and resolve waste problems'.

The project is being undertaken by a partnership led by the national construction trade union , UCATT, and comprising key construction companies and organisations*, including BRE which is contributing to the communications, partnerships and waste management aspects. The partnership has gained DTI support under its Workplace Partnerships initiative.

For more information –
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*Project partnership: UCATT, Laing O'Rourke Scotland, Mowlem Building, CITB Constriction Skills, Construction Confederation, Greenfile Developments Ltd, BRE, Niall Marroitt Associates, Engineers Against Poverty.

SIPs – the future generation of housing?

In a recent meeting with senior industry figures, the Deputy Prime Minister John Prescott urged the industry to embrace modern methods of construction like SIPs so that housing targets can be achieved.

SIPs (Structural Insulated Panels) are lightweight building panels that combine two high-density facings bonded to either side of a low density polymeric core. First introduced in the USA in the 1950s, SIPs are today established in USA housing construction as main loadbearing members throughout the building, ie as floors, roofs and walls (internal and external).

SIPs can be a very cost effective form of construction, with potential for fast mass production that will drive down costs. They are manufactured to quality standards and are quick to construct, requiring less skilled labour than traditional build – an important issue given the current skills shortage in construction.

In addition SIPs are highly thermally efficient – they contain very few thermal bridges and have closed cell insulation material that enables them to achieve U values as low as 0.2 W/m^{2}K. Airtightness as low as 1m^3/hour/m^2 can easily be achieved in SIP buildings, compared with a national target of 10m^3/hour/m^2 in the amended Building Regulations 2000.

Despite these benefits the UK has yet to embrace SIPs. Interim findings of a DTI-funded study suggest that the key to growth in the SIPs market is making authoritative, independent guidance and information available to all stakeholders. Published information about the performance levels of the various systems is scarce – the advantages and potential applications of SIP systems need to be established and disseminated.

The outputs of this project will be available in the latter part of 2005, including a guidance document focussing on the client perspective and based on case studies drawn from the 3000 SIP developments in the UK.

Particular concerns about SIPs and other modern methods of construction involve issues of future maintenance and alterations, site processes and health and safety issues. BRE is currently drafting a new housing standard for MMC and traditional build, which addresses these issues and will be launched in December.

To help disseminate the benefits of SIPs, an event, *SIPs: the future generation of housing?* is being held at BRE, Watford on 17 November.

For more information –
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BRE Highlands office in the premises of Inverness and Nairn enterprise council within Highlands and Islands Enterprise.

'A recognised Centre of Excellence will give fire research a much needed boost,' says Professor Alamdari.

News from Scotland

BRE Highlands

Highlands and Islands Enterprise is supporting the establishment, in Inverness, of a new office giving access to BRE services in the Scottish Highlands and Islands.

Working with the Regional Development Agency, local authorities, other government and quasi-government bodies, and private sector clients, BRE Highlands will focus on:

- helping businesses to improve processes and reduce waste
- supporting innovation and commercialisation of ideas
- infrastructure improvements for land and property projects
- advising on sustainable design and energy efficiency in buildings.

BRE has been working in the Highlands on a number of projects, in particular, helping the local forest industries to implement innovations and access the markets. It is these local successes that have led to the establishment of the BRE Highlands office in the premises of Inverness and Nairn enterprise council within Highlands and Islands Enterprise.

For further information –
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New Centre of Excellence in Fire Safety Research

A new national Centre of Excellence in Fire Safety Engineering has been established by the University of Edinburgh and the BRE Fire Division (FRS). Based at the University, this joint initiative aims to bring a fresh research and educational impetus to the field of fire safety engineering.

The Centre will include a new University Chair, jointly funded by the BRE Trust and the Royal Academy of Engineering (RAE). The position has been advertised and will be known as the RAE/BRE Trust Chair in Fire Safety Engineering.

Headed by the new Chair, with members drawn from FRS and the University's Fire Safety Engineering Group, the Centre will be a national focus for fire engineering research. It will also facilitate a much greater level of cooperation between fire engineering and structural engineering, a key issue in the drive for performance-based fire safety engineering design solutions.

'Establishing a recognised Centre of Excellence will give fire research a much needed boost,' says BRE Chief Scientist Professor Farshad Alamdari, 'allowing FRS and Edinburgh University to jointly exploit research opportunities and attract funding from both national and European sources.'

Close partnerships between academic and research institutes are quite common in some other countries, but much less so in the UK. However, the Centre of Excellence in Fire Safety Engineering is only the first of a number planned collaborations between BRE and universities, with construction and environmental centres of excellence already being considered.

For more information –
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Email alamdarif@bre.co.uk

CPD Forum

BRE Scotland has set up a CPD Forum to help building professionals keep up to date with their professional development. The Forum runs CPD events that provide training in new developments, emerging standards and regulations, important topical issues, and applying the results of recent research. The remaining events in the current series are as follows:

Energy and construction
East Kilbride, 10 November 2004

This seminar will cover the requirements of current Building Regulations, and those that may develop in the future. It will also look at the Energy Performance of Buildings Directive and how this will impact on the management of buildings. In addition, it will cover energy audits and energy management issues, and the potential for incorporating renewable energy in buildings.

Stone in construction and maintenance
Edinburgh, 18 November 2004

A set of expert speakers will cover sources of stone, new build issues, repair and maintenance, and performance. This event is being run in conjunction with the Natural Stone Institute and the Scottish Stone Liaison Group.

Construction law
20 January 2005, Stirling

Fraser McMillan of law firm Masons will give a presentation on what construction professionals and clients need to know about construction law – an important issue, especially in an increasingly litigious society.

Glass in construction
17 February 2005, East Kilbride

This event will cover the use of glass in building developments, and results of the latest BRE research. Speakers include Brian Waldron of Pilkington Glass, and Stephen Garvin and David Kelly of BRE.

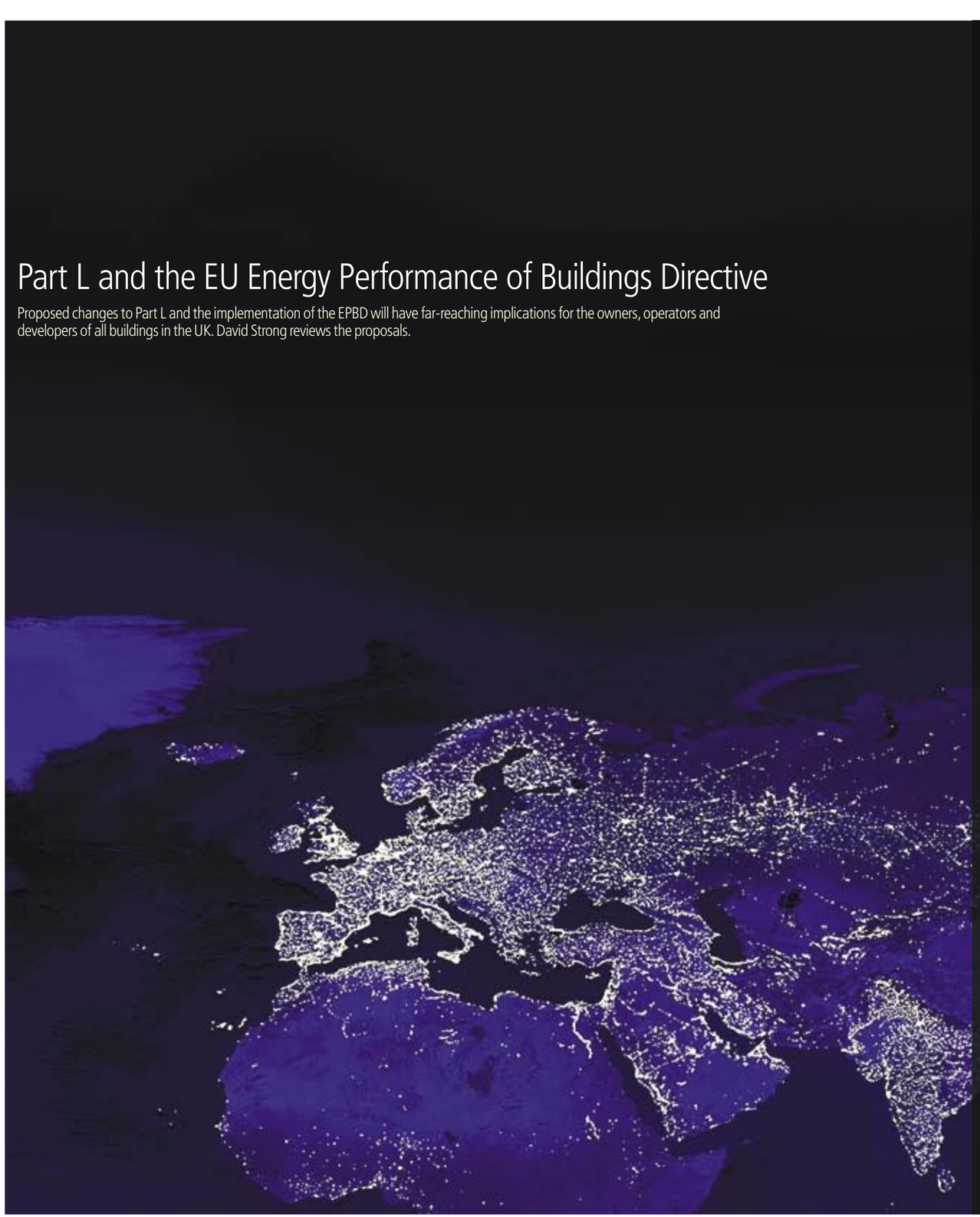
Construction safety
17 March 2005, Glasgow

Currently, too many accidents and fatalities occur in normal construction practices. This presentation will cover the legal requirements of companies and individuals, methods of improving safety and innovations that are removing risks from sites.

For further information –
Ian Begbie at TMT Ltd 08700 501 210
Email ian@tmtltd.com

Part L and the EU Energy Performance of Buildings Directive

Proposed changes to Part L and the implementation of the EPBD will have far-reaching implications for the owners, operators and developers of all buildings in the UK. David Strong reviews the proposals.



Two-and-a-half years on from the last revisions to Part L, the industry has been commenting on further suggested changes to the Building Regulations* and recommendations regarding the implementation of the Energy Performance of Buildings Directive (EPBD).

The 332-page consultation document contains several ideas that will make a very positive contribution to the reduction of carbon emissions. Other areas however, are of concern and will need further careful deliberation if they are to provide real material benefit.

At BRE we particularly welcome the greater inclusion of existing buildings within the scope of Part L. We believe the introduction of mandatory pressure testing of new buildings will result not only in more energy efficient buildings, but also in improved construction quality. In addition, growing concerns about Corporate Social Responsibility and brand equity mean that the introduction of building energy performance certificates from January 2006 is likely to dramatically change the tenant/landlord relationship and provide a very positive new incentive, which will deliver demonstrably more energy efficiency buildings.

However, we are concerned at the reliance placed on the Housing Bill and on the Secure and Sustainable Buildings Act to provide legislative vehicles for implementation. If either of these bills fall, many of the proposals will be significantly delayed. Also, there remain many unanswered questions associated with a new National Methodology for assessing the energy performance of non-domestic buildings.

Drivers

There are two principal drivers for the current review. The first is the Government's aim contained in the Energy White Paper, to reduce CO_2 emissions by 60% by 2050, with real progress by 2020. Energy efficiency was identified as the 'cheapest, cleanest and safest' way of delivering its policy objectives. Since approximately half the CO_2 emissions arise from buildings, improvements in Building Regulations are seen as a major contributor towards achieving this aim.

The other driver is the European Energy Performance of Buildings Directive (EPBD) which must be implemented by January 2006. This requires that minimum energy performance standards are set for all new buildings (and for large buildings being refurbished). The EPBD also requires energy performance certificates to be provided whenever buildings change ownership/tenancy. There are also requirements for regular inspection of boilers and air conditioning plant.

Housing

The consultation contains two draft Approved Documents dealing with new buildings. ADL1A applies to new dwellings and requires a minimum energy performance standard for the building. The Dwelling Carbon Emissions Rate (DCER) is determined using the Government's Standard Assessment Procedure (SAP 2005). The elemental method and target U-value method will no longer be permitted.

While this will still allow flexibility to vary properties of the building, such as U-values of different elements and air permeability of the envelope, these are constrained by a set of worst acceptable values. The aim is to ensure the performance of the dwelling will be reasonably robust against future alterations. Sample pressure testing is required in most cases to confirm that a reasonable standard of airtightness has been achieved, and it is also suggested that these results would act as a useful proxy for general construction quality.

Non-domestic buildings

ADL2 covers non-domestic buildings and replaces the familiar elemental approach with a national calculation methodology. This determines the CO_2 emissions from a notional building that is the same size and shape as the proposed building, complying with given elemental standards, generally in line with those in the 2002 edition of ADL2. The emissions target for the actual building is then derived by reducing the emissions calculated for the notional building by a given improvement factor and by a renewables benchmark. This aims to encourage use of building integrated renewables and other low carbon strategies such as CHP. This flexible approach to low and zero carbon systems is very much to be welcomed and gives an important pointer towards the future.

However, the national calculation methodology for non-domestic buildings is not as well advanced as the SAP for dwellings and much work still needs to be done on its development. A major section of the consultation document discusses the issues, proposing an asset rating as a measure of the intrinsic performance capability of the building, calculated using the national calculation methodology. In addition, an operational rating as a measure of the in-use performance of the building (based on actual metered energy consumption) may be included on those certificates, produced for public display purposes. This approach has much merit but needs further development.

The ADL2 proposals also make pressure testing for non-domestic buildings a legal requirement, rather than just guidance. This is a most welcome move as there is evidence that the previous guidance was often not followed.

25% improvements

All in all, it is estimated that the new proposals will lead to a 25% improvement in the energy efficiency of new buildings, and a reduction of 25% in the CO_2 they would otherwise have emitted.

However, the majority of the buildings that will be emitting CO_2 in 2010 are already in existence and this question must be addressed if real progress is to be made. The new proposals therefore extend provisions made in the 2002 edition of Part L on various controlled services and fittings, and now encompass controlled elements – parts of the thermal envelope of the building such as walls, roof or floor. Minimum U-values for replacement elements are given.

In addition, opportunities should be taken to improve the energy efficiency of the building as a whole. For example, when a dwelling is being extended and building work costs exceeds £8,000, not only must the extension meet current standards, but cost effective improvements to the existing part of the building, such as increased insulation of loft spaces, filling cavity walls or replacing the central heating boiler, could also be required. Although some of these measures may be unwelcome by some on cost terms, they would be cost effective and provide pay-back in a short time.

Energy Directive

Section 7 of the consultation document covers the Implementation of the Energy Performance of Buildings Directive and refers to the inspection of boilers and air conditioning systems.

The DEFRA strategy paper on boiler inspection suggests that the lowest cost route would be to provide simple inspection and advice for dwellings and for commercial building owners with boilers less than 100 kW (possibly during the routine annual boiler maintenance visit). For commercial properties with boilers over 100 kW self-assessment by the building owner or energy manager may be an option.

However, questions remain over the qualifications and training of the advice providers and just how effective this approach will be at reducing energy consumption. For air-conditioning there is no alternative to inspections, but the issue is a complex one and it may be preferable to extend the time to develop the inspection method properly, rather than to rush it.

BRE's general view on the question of independent inspections and certification for boilers and air conditioning is that important decisions must be made soon. This is because the schemes will need to be developed and tested, quality assurance frameworks put in place and independent experts trained to provide the qualified assessors called for by Article 10 of the EPBD.

On the question of enforcement and compliance, there needs to be significant training and raising of awareness if the planned energy savings are to be achieved. The industry needs to be motivated to learn the new requirements. Whilst experience has shown that enforcement has not been effective in the past, BRE believes that if it is seen to be rigorously applied, it will provide the right impetus (the introduction of mandatory pressure testing will help in this respect, as it will provide a simple objective pass/fail test of compliance).

An important element of compliance will be development of further competent persons schemes and self certification. The document clearly states that there is a need for substantial additional resources for a successful dissemination strategy, but it is unclear where these will come from.

Of major concern, is the fact that the draft Approved Documents relies on the industry and the professions to provide approved technical references to support the changes. Without this input, specific requirements may be unclear and application could prove difficult. Support will be needed in the preparation and publication of these documents, as well as in training of inspectors and other professionals.

Time is short

In conclusion, while the higher energy performance standards contained in the proposed amendments will make a valuable contribution to reducing carbon emissions, there is still much to be done.

In particular, time is running out with regard to putting in place the necessary training, qualifications and quality assurance framework for the EPBD independent experts (to undertake building energy certification and plant inspection). Significant further investment will be needed in developing the non-domestic building methodology if the EPBD is to start being implemented by January 2006.

BRE is also concerned that many of the changes will be resisted by organisations opposed to delivering higher construction quality and energy efficiency, and it would be unfortunate if the proposals contained in the consultation are weakened, as a consequence of lobbying from these groups.

Much useful background information on the EPBD can be found on the Directive Implementation Advisory Group website: www.diag.org.uk

*Proposals for amending Part L and Implementing the Energy Performance of Buildings Directive has been posted in the Building Regulations section of the ODPM website: www.odpm.gov.uk. The consultation period ran from 21 July to 22 October 2004.

New design guidance for perimeter chilled beams

Chilled beams offer low-cost, energy-efficient and noise-free cooling that requires little maintenance. However, investigations have shown that they frequently fail to perform effectively due to a lack of understanding of air flow behaviour in perimeter zones. Recent mock-up tests at BRE have led to a better understanding of the problem and the development of design guidance that will help maximise the effectiveness of this cooling system.

Chilled beams

Chilled beams are very simple devices for cooling buildings. They consist of finned elements through which chilled water is passed, thereby cooling the air moving around them.

Passive chilled beams do not have fans or filters and can provide cooling with relatively high chilled water temperatures – 14°C or 15°C are typical water supply temperatures and in some cases water temperatures as high as 17°C are used. This makes the chilled beam a highly cost-effective and energy-efficient device, with very low maintenance costs and virtually noise-free operation.

The high water supply temperature also increases the opportunity to use 'free' or environmental cooling sources such as dry air coolers ('blast air coolers') or ground water.

But it is vital that chilled beams are installed so that room air can freely circulate through the device. This means that the units must either be installed below an open soffit, or installed above a suspended ceiling. The ceiling tiles below should have a large free open area.

Perimeter chilled beams

Perimeter chilled beams are installed close to glazed façades or windows, to reduce the warming effects of the sun. In offsetting these solar gains in the perimeter zone, they minimise the depth of the area that is likely to become uncomfortably warm, and therefore maximise the useable floor area.

Another advantage of locating chilled beams in the building perimeter is that the plume of warm air rising from the window enhances the temperature difference seen by the chilled beam, and so raises its cooling performance without changing the size of the chilled beam or lowering the chilled water supply temperature. In some cases, a second row of chilled beams is installed where the perimeter solar gains are too great for one row.

Design issues

As perimeter chilled beams rely on the warm air plume from the window passing up to and through the device, their effectiveness will depend on where and how they are installed, and especially the interaction of the plume with building elements such as ceiling tiles and soffits.

A common factor that can adversely affect performance and thermal comfort in the perimeter zone is the architectural/aesthetic requirements of commercial building designs. Architects and clients often expect a continuous suspended ceiling with uniform appearance and height right up to the façade. This can conflict with the requirement for unhindered air paths around the chilled beam and for effective capture of the thermal plumes from the window.

The building frame can also have a significant impact on perimeter chilled beam performance because its width determines how close the chilled beams can be to the top of the glazing, and how much space there is for a gap between the building frame and the chilled beam. These factors affect how well the thermal plume rising from the glass and window blind is captured by the chilled beam.

With a wide-framed building, there is often pressure from architects to minimise the width of the slot at the ceiling perimeter that forms the ceiling void entrance, as its position is beginning to intrude further into the interior ceiling area. Laboratory mock-up tests have shown that this causes a greater proportion of the thermal plume to miss the entrance to the ceiling void and continue moving across the underside of the ceiling.

Good perimeter chilled beam design

Ceiling tile type

In some buildings, the client and architect are happy for chilled beams to be visible to the room. But it is probably more common for a perforated suspended ceiling to be installed to obscure the beams and chilled water pipework, and present a flat overall ceiling surface. Unfortunately the perforated ceiling tiles will restrict air flow between the chilled beams and the room, depending on the free open area and actual hole dimensions.

If a suspended ceiling cannot be avoided, it is important to select a tile with a high free hole area and a large hole size. It is recommended that louvred tiles, or tiles with a free area no less than 50% and hole size maximised (for example 10 mm diameter), are specified.

Effect of window blind type

Windows that are susceptible to solar gains are normally fitted with some form of shading or glare-control device. Where external shading is not provided, it is usual to provide either Venetian or roller blinds on the room side of the window.

Venetian blinds

Tests with mocked-up Venetian blind have shown that when the slats are closed the thermal plume on the window side of the blind is physically constrained. When the slats are partially or fully open the plume can pass through, causing more rapid growth of the warm air plume on the room side. This has an important influence on how much of the plume enters the ceiling void and passes through the perimeter chilled beam, and therefore on the thermal comfort in the p3 the room.

Roller blinds

Tests with roller blinds show that the plume is more constrained than with a closed slatted blind. When a roller blind is down, there is usually a small (typically 19 mm) gap between the top of the blind and the underside of the building frame. This results in a narrow jet of hot air issuing from the space between the window and the blind, a significant proportion of which enters the ceiling void via the perimeter gap.

It is therefore recommended that a fabric roller blind is specified in preference to a horizontal slatted type. If a roller blind is used, it is important that the gap between the top of the blind and the underside of the building frame is minimised. If horizontal slatted blinds are specified then clear operating instructions and occupant buy-in are required if perimeter chilled beam performance is not to be compromised.

Lowered ceiling

A significant factor in the performance of perimeter chilled beams is how well the thermal plumes from the window and blind are captured and fed to the chilled beams. The underside of the building frame at the top of the façade has a tendency to deflect the thermal plume past the perimeter slot and therefore miss the ceiling void. By lowering the ceiling and chilled beams relative to the building frame, the plume can be captured and fed into the ceiling void.

Further advice

Other design options, such as angling the beams or placing them perpendicular to the façade, were also found to improve cooling performance. All of this information, together with detailed design advice for narrow, wide and shallow frame buildings, is included in a recently published Information Paper, *Perimeter chilled beams* (IP11/04), which can be purchased from www.brebookshop.com, or T 01344 404407, Email BREBookshop@IHSRapidoc.com.

Acknowledgement

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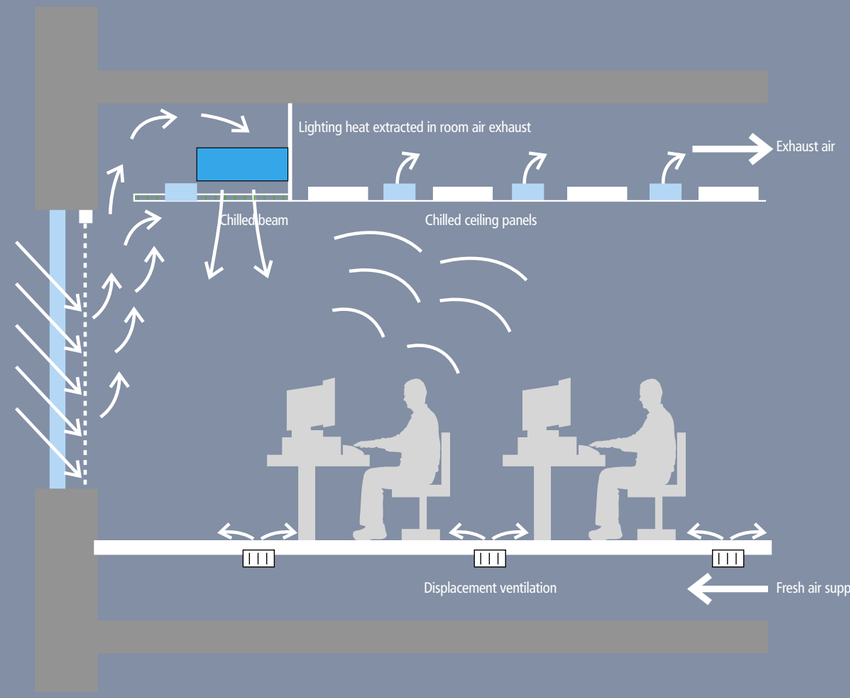


Typical perimeter chilled beam scheme
An additional advantage of perimeter chilled beams is that they minimise the disruptive effect that solar gains can have on air temperature and air circulation away from the perimeter. This is especially important where displacement ventilation and/or chilled ceilings are used

Smoke visualisation of the thermal plume with a wide framed building
A significant proportion of the plume misses the ceiling void and continues moving across the underside of the ceiling

Lean, not mean

Lean thinking is not about making cuts and squeezing more out of what's left. The lean approach minimises activities that don't add to customer value, leaving more time for those that do.

Much of what we do at work that seems necessary, actually adds little to the value of products and services in the eyes of our customers. So it stands to reason that these activities could and should be minimised.

This is the basis of Lean thinking, an approach that allows businesses to change the way they operate in order to improve quality, reduce costs and deliver on time. The term *Lean thinking* was coined by Jim Womack and Dan Jones of Cardiff Business School when they were studying the success of the Japanese car industry. Jones says, 'It's a way to do more and more with less and less – less effort, less time and less space, whilst providing customers with exactly what they want.

Too good to be true?

While this all sounds too good to be true at first, on reflection many of us would probably admit that we could be working more efficiently, if only we had time to get better organised.

So how is it done? Not with more training courses and process consultancy, or at least not in the traditional sense. The key to Lean thinking is that it works through direct intervention – a Lean Improvement Engineer helps a team from the company involved to make practical improvements. This is a crucial feature because it means that change is immediate, obvious to the people who will have to sustain it, measurable and directly related to the actual needs of the business.

Other keys to the success of Lean thinking include: working on clearly defined areas of operation, identifying a change team of 10–15 company people to work with, emphasising performance measurement, and ensuring that supplier companies and the project and company management are enthusiastic about what is going on.

Lean thinking hones working practices so that people, materials and resources operate in balance to eliminate waste – waste being anything that does not contribute to the value of the product and prevents a project running at optimum efficiency. But what Lean thinking is not about, is steamrollering in and stripping everything back to the bare essentials and then squeezing more out of what is left. The idea is to work smarter, not harder.

Lean thinking in the construction industry

Lean thinking was first applied, with considerable success, in the UK car industry. The Department of Trade and Industry (DTI) recognised that this success could be replicated elsewhere using a common approach. Today, 15 UK industry sectors have DTI supported lean programmes, including aerospace, ceramics, metals manufacturing, and other less obvious ones like hospitality and leisure, and red meat processing.

DTI now supports a lean scheme specifically for the construction industry, called the Construction Lean Improvement Programme (CLIP). CLIP is a strategic partnership between BRE and Constructing Excellence, and operates across the whole construction supply chain, from raw materials processors to clients.

The programme kicked off with a pilot scheme, involving seven construction companies, with very encouraging results. A year later, 35 companies had been through the programme, including main and specialist contractors, and manufacturers and distributors of construction products. Improvements achieved have been little short of astonishing and include:

- 20–40% productivity improvements in the targeted operations and processes
- leading to overall improvements of up to 15%
- pre-construction lead times halved
- refurbishment times for social housing projects halved
- one company has achieved annual cost savings of £220,000 in an activity of only £785,000 turnover.

How does it work?

The fact that CLIP is financially supported by DTI means that companies can implement lean thinking without paying commercial consultant rates.

All companies embarking on a CLIP programme work with a CLIP engineer who, working with a team from the company, devises practical improvements and provides training by example.

The CLIP activity begins with a detailed diagnosis that identifies the most inefficient areas of the business. The knowledge gained from this stage is then put into action in a structured approach to devise and apply tools and evaluate progress. The process can be summarised as follows:

Pre-diagnostic – setting the aims and training the team in lean tools and techniques.

Diagnostic – practically applying the tools to analyse the situation.

Improvement activity – looking at the data for opportunities to improve processes.

Follow up – identifying barriers to success and setting improvement actions in place.

CLIP can be applied to any process in construction – specification, design, procurement, site operations and others. And it will work on a single construction project, in a single company, for several companies in a supply chain or for a cluster of companies working for a single customer.

The outcome

One of the companies to have been through a CLIP programme is J & S Seddon (Building) Ltd (see the case study, right, for further details). 'Seddon is involved with a number of partnering contracts,' says Barry Thompson a Director at Seddon. 'We recognised that CLIP could help with the continuous improvement process, and become a real benefit to both our clients and the company.'

'Everyone involved in our projects, including the client, management team, workforce and sub-contractors, now understands and is involved in the process improvement objectives – they have a different mindset,' explains Thompson. 'Before we begin any new contract the first thing we do is ask ourselves, 'is there anything we have learned from the CLIP Masterclass that we can use to benefit this contract'.

For further information contact the CLIP programme manager
Martin Watson 01923 664638
Email watsonm@bre.co.uk or visit
www.constructingexcellence.org.uk/service/clip

CLIP at J & S Seddon (Building) Ltd

J & S Seddon (Building) Ltd is involved in a long-term partnership with Keele University, in which it is responsible for the refurbishment of Keele's student accommodation.

Seddon undertook a 15-day CLIP Masterclass to enhance the service it provides to Keele, and to provide a better system of working for its employees.

The aims set out during the pre-diagnostic stage were to:

1. generate a detailed programme of events covering planning, construction and the post-contract phase.
2. capture the best method of working that is flexible
3. improve communications on site and make it visible
4. include sub-contractors in the programme at an early stage
5. ensure a continuity of labour on site
6. generate team work between sub-contractors.

These expectations were reviewed at the end of the CLIP activity and ticked off as being achieved.

Various techniques and tools were identified, including:

- Pre-activity programme
  Earlier refurbishment work had been delayed because asbestos had been found. The CLIP team put together a pre-activity programme that includes an asbestos assessment prior to starting on site – this will ensure such delays won't happen in the future. This pre-activity programme is now being applied to other projects.
- Refurbishment timing plan
  Process mapping revealed a lull in work in the middle of the refurbishment, then a significant acceleration towards the end with the site operating seven days a week to finish the job. The team and sub-contractors worked together on a new approach which was also mapped. The new process map highlighted a potential reduction of 12% in the number of hours required to complete the refurbishment.
- Visual management
  Seddon's team now meet all the trades on site once a week to communicate the next 4 weeks plan and discuss in detail the tasks for the week ahead. This ensures everyone on site knows what everyone else is doing. It also allows communication of any health and safety issues. This meeting is held around the visual management board in the site office.
- Delay and disruption log
  The site now logs delays and disruptions. This, for example, allowed a claim back of approximately 450 hours from a window supplier.

The team at Seddons were quick to pick up and use the tools and techniques applied at Keele University. They are now applying these to other projects.

Snagging reduction

It was possible to compare the occurrence of snagging in the previous phase of the project with those following the CLIP Master class. Snagging was reduced by 69%.

The CLIP activity included an analysis of waste during floor laying using video footage of the process. This highlighted a variation in techniques which impacted on quality, together with health and safety issues that were dealt with immediately. Floor related snagging was reduced by 80%.

National Green Specification waste management and recycling

Katherine Adams reports on a new source of advice for specifiers and designers.

More than 300 specifications for recycled products are being produced by a two-year, DTI funded project. Contract clauses for construction (new build), deconstruction and demolition waste management activities occurring on site, are also being developed by the project, which is being carried out by BRE in partnership with Architectural Specification Writing Services (ASWS).

In addition, there will be clauses addressing procurement methods for minimising the transportation of materials, workmanship clauses and guidance notes for recycled products, and methods of validation, visual inspection and tests for recycled, reused and secondary materials.

The specifications and clauses will help designers and specifiers to make informed choices in respect of environmental protection, material resources, life expectancy and durability. They will be freely available from the National Green Specification website (NGS) website (www.greenspec.co.uk) for the duration of the project, and will be compatible with the current National Building Specification (NBS) and other published specifications, giving designers access to many sources of recycled materials in one location.

The website currently has over 200 draft specifications, and will also provide construction professionals with much information on how to include sustainability aspects in the built environment.

The project will also provide valuable information in line with the recent recommendations published by the Sustainability Buildings Task Group, *Better buildings – better lives*, which recommends that the revised Building Regulations should specify a minimum percentage by value (at least 10%) of re-used/reclaimed /recycled materials in building projects.

A key requirement of the project is the dissemination of its activities to encourage the greater uptake of specifying recycled materials in the construction industry.

The aim is to increase the demand for recycled materials, and in turn drive increased levels of recycling, diverting materials away from low value applications and landfill.

The partnership represented in this project encompasses key stakeholders from all of the construction sectors involved, including architects, producers of recycled materials, specifiers, quantity surveyors, demolition, research based organisations, consultancies, trade bodies and the waste industry. A User Group comprised largely of architects is testing and providing feedback on the specifications.

Getting involved

If you are a manufacturer
The project would like manufacturers of recycled products to provide information on their products so that they can be advertised on the NGS website (free service). A web page will be produced for each product, containing an image and brief summary, a link to a downloadable specification, guidance notes, literature, and links to the manufacturer and suppliers.

If you are an architect, specifier or client
The project would like architects, specifiers and clients to become involved in testing specification clauses and providing vital feedback on the practicalities of using the clauses on construction projects, for the further development of NGS.

For more information about the project, or to include a recycled product on the NGS website, contact
Katherine Adams 01923 664478 or
Email adamsk@bre.co.uk

The BRE Centre for Resource Management, which is managing this NGS project in partnership with ASWS, works to:

- demonstrate and promote best practice in construction and demolition waste management
- research and demonstrate the use of reclaimed and recycled materials in construction
- to further develop and manage The SMARTWaste System, a web-based set of waste auditing tools found at www.smartwaste.co.uk

ASWS has much experience in writing for projects including Royal Yacht Britannia's Ocean Terminal, New British Library and Bluewater Retail and Leisure Park. ASWS is responsible for the wider NGS programme which aims to create and sustain a readymade specification for green products and methods of construction. It is primarily intended for use by the construction industry's professionals which include architects, civil and structural engineers, manufacturers, suppliers, contractors and sub-contractors, self-builders, clients, and financiers.

Budgeting for sustainability

Bruce McVean from CABE and Kate Mills from BRE outline the process involved in budgeting for sustainable public procurement.

It is a core belief of CABE and BRE that any procurement process can deliver good quality sustainable design, and that an early investment in design quality will generate added value for all involved.

With the government undertaking the largest public-sector building programme for a generation, it is essential that construction projects deliver whole life value for money, along with environmental, social and long-term economic benefits.

The starting point must be for public-sector clients to stop letting tenders on a lowest cost, rather than Best Value, basis. Clients must consider whole life values and sustainability issues when developing their budget.

There is a host of evidence that demonstrates the direct impact of design quality and sustainability on public service delivery. For example, classrooms with plenty of natural daylight help raise educational achievement, and an external view from a hospital window will greatly improve the quality of a patient's experience and may even reduce the length of that patient's stay.

Over a building's lifespan – often 30 years or more – the initial capital cost (bricks and mortar) will be tiny in comparison to the cost of delivering the service. The Office of Government Commerce calculates that construction costs represent approximately 2–3% of total lifetime costs, while the cost of providing the service is at least 85%. Design accounts for less than 0.3% of the lifetime costs, but it has a profound effect on that 85%.

While a lot of rhetoric surrounds the concepts of sustainability and whole life value, there is a wide range of practical guidance available to enable the public sector client to successfully achieve their objectives, within budget and on time. Budgeting for Sustainability is a joint BRE /CABE website (www.bre.co.uk/sustainableprocurement) core funded by the DTI's Partners in Innovation programme. It provides a focused information resource to aid clients and their partners in the assessment of the economic, social and environmental benefits of an investment in good design.

Covering all forms of procurement, the site provides a searchable reference database that will signpost public sector clients to methods of, and guidance on, budgeting for sustainability. Documents are ranked in order of usefulness and, where appropriate, the database links to web-based versions of documents. The site also provides details of the overarching issues with regard to delivering sustainability, including:

- a comprehensive list of sustainability issues at key stages of the budget setting process
- strategic definitions of sustainability
- details on setting and meeting targets, and complying with statutory requirements
- advice on selecting a project team that will deliver sustainability.

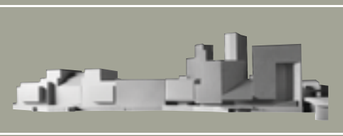
Considering whole life value is particularly important for those involved in the private finance initiative. PFI is one of the most complex forms of public procurement, bringing together a range of issues that are generally separated in more traditional procurement methods. When you consider this, and the fact that most clients involved in a PFI scheme will never have dealt with a large-scale capital procurement project before, it seems little wonder that design quality and value for money is, at times, compromised.

Regardless of procurement route, the consideration of whole life values and the acknowledgement of the added value of good design will enable us to deliver high quality, sustainable public buildings that benefit staff, users, visitors and the wider community alike.

For more information –
Kate Mills 01923 664290
Email pfi@bre.co.uk
www.bre.co.uk/sustainableprocurement

On the waterfront

Pedestrian wind environment studies – often needed as part of the environmental impact assessment of new developments – examine safety and comfort issues, but wind conditions and comfort criteria for waterside developments differ from those in urban settings. Shyam Singh looks at the issues designers need to consider for waterfront projects.



From Docklands to Dubai, waterfront sites can offer opportunities for constructing prominent, high-value buildings with splendid views and desirable surroundings, often making use of previously derelict land.

But waterside developments present particular challenges and involve dealing with more troublesome wind environments than would be found on most inland sites. Winds crossing unobstructed water surfaces or channelled along rivers or estuaries, for example, can move at greater velocities than those crossing land surfaces.

Waterfront sites tend to be of a linear shape that influences the pattern of buildings on it. But buildings constructed in a linear pattern can channel and increase the speed of wind flows, causing discomfort and even danger to pedestrians. Buildings need to be staggered or positioned in a way that breaks up wind flows. If possible, they should be designed so as to present a variety of profiles to the wind.

As well as considering the impact that wind will have on a development, designers must also take account of the possible effect the development could have on the local wind environment. The impact on an adjacent river or lake area, for example, may affect recreational water activities such as sailing.

Wind assessments
Pedestrian wind environment studies are now generally required by planning authorities as part of any environmental impact assessment. Whilst desk studies and computer modelling can assist, wind tunnel testing is the only definitive way of establishing the wind environment in and around a proposed development.

The nature of wind flow around a site depends on the size and layout of the development, the geometry and relative size of the buildings, the neighbouring area and the characteristics of the approaching wind. The complex interactions of flows over and around buildings and structures can cause localised gusting that will affect pedestrians. Wind tunnel testing provides the means of teasing out these complexities and identifying any potential wind environment problems inherent in a design.

A scale model of the development and surrounding area is placed in the wind tunnel and exposed to winds with the same characteristics as those approaching the site. Initial tests with sand-like particles or smoke show the overall wind patterns in and around the development, and pinpoint locations where increased wind speeds are likely. Wind speed measurements are then made and analysed in conjunction with local meteorological data to determine the Beaufort wind speeds for each location examined.

Pedestrian comfort
Whilst people expect waterfront sites to be windier than inland areas, tolerance levels depend largely on location and activity. People exiting a building, or standing or sitting for lengthy periods, are most likely to suffer discomfort. Similarly, strolling pedestrians wanting to enjoy the surroundings will be more affected than people walking at a faster pace from one point to another. Entrances and exit routes, key pedestrian walkways, seating and recreational areas should therefore be particularly targeted in any wind assessment.

Wind conditions are usually described in terms of the Beaufort Wind Scale. For example, Beaufort Force 3 (B3) is a gentle breeze (with a wind speed in the range of 3.5–5.4 ms^{-1} at a height of 10m) strong enough to extend a light flag. B8 is a gale (17.2 to 20.7 ms^{-1}) with strong enough winds to impede a pedestrian's progress. The Beaufort Scale alone is too coarse to assess the impact of winds on pedestrian comfort, so comfort criteria have been developed that take into account the frequency with which various Beaufort Scales occur and vary according to pedestrian activity (sitting, walking, etc). These criteria are defined as:

- unacceptable – unpleasant conditions that should not normally be allowed to occur
- tolerable – conditions that would be described as windy but that would be tolerated
- acceptable – conditions that will elicit no adverse comments.

For example, for a strolling pedestrian at a waterside development, a wind speed exceeding B5 for more than 2% of the time is classed as unacceptable; a lighter wind exceeding B4 for more than 2% of the time is tolerable, and less wind is acceptable. For objective walking, somewhat higher wind speeds are acceptable and tolerable, and for long-term sitting lower wind speeds are required. With inland sites, the wind speed and percentage tolerances would be lower.

If wind tunnel tests find locations with unacceptable conditions, the design will need to be amended. Often, relatively simple remedial measures will mitigate adverse conditions – canopies, balconies, or landscaping incorporating features that act as wind breaks. This is not too difficult to deal with at the design stage, but can be problematic, time-consuming and expensive after construction. Ideally, designers should consult with wind engineers at concept stage when problem areas can be identified in advance of tests and the need for design changes minimised.

For further information on wind tunnel testing of proposed waterfront or other developments, contact
Shyam Singh 01923 664461 or
Email singhs@bre.co.uk