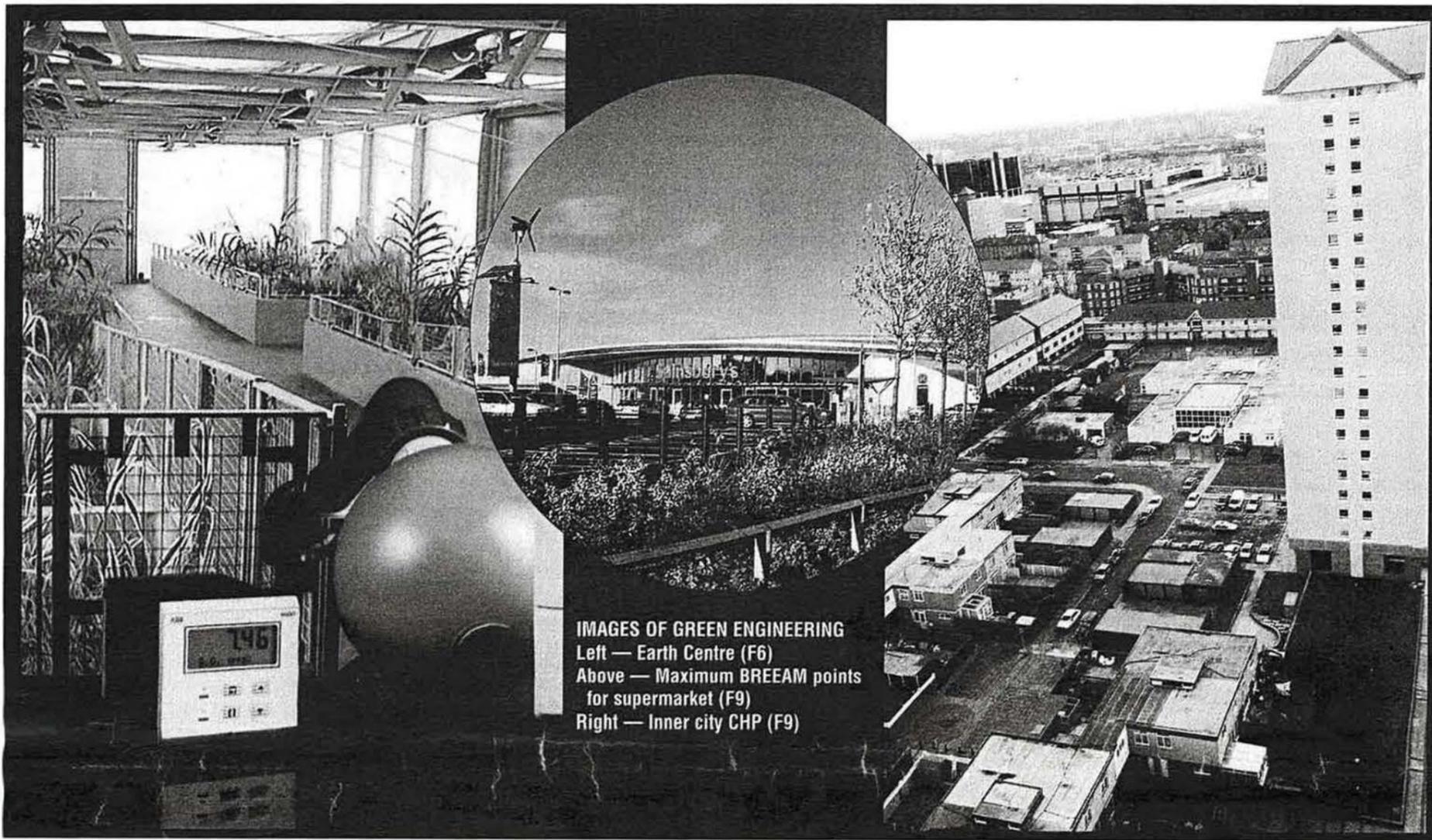


# GREEN ENGINEERING



IMAGES OF GREEN ENGINEERING  
Left — Earth Centre (F6)  
Above — Maximum BREEAM points for supermarket (F9)  
Right — Inner city CHP (F9)

## ASSESSMENT

# BREEAM — making buildings better

**ALAN YATES** EXPLAINS THE BREEAM SCHEME FOR REVIEWING AND IMPROVING THE ENVIRONMENTAL PERFORMANCE OF BUILDINGS.

**B**REEAM\* is the world's most widely used means of reviewing and improving the environmental performance of buildings. It takes into account their consumption of energy, water and building materials, etc. and the health and comfort of their occupants.

Since its launch by BRE in 1990, BREEAM has been increasingly accepted in the UK construction and property sectors as offering best practice in environmental

## BP sets a shining example with its use of solar power

Solar panels at BP's first solar-powered service station in Scotland can supply up to 20% of its electricity needs. That is enough to power the canopy lights and the pumps of the site at Calder Road in Edinburgh.

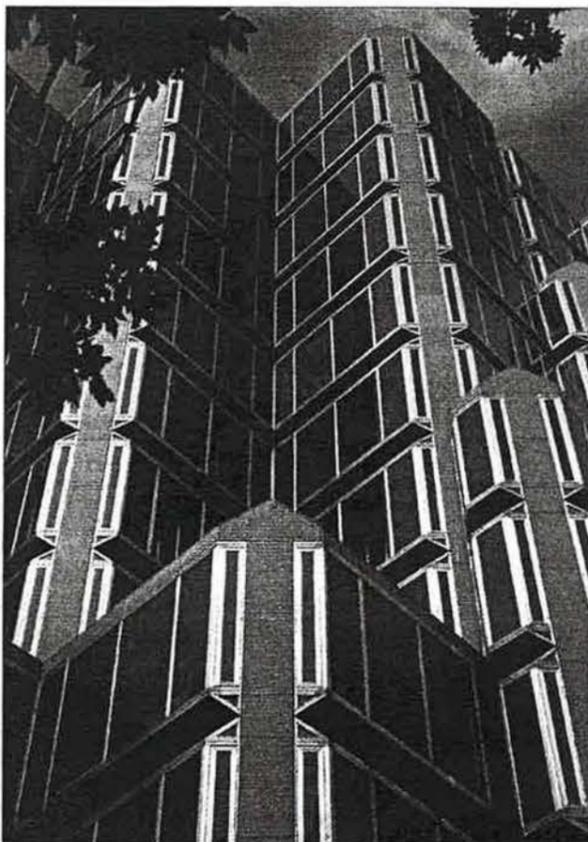
The use of solar energy is part of BP's commitment to tackle climate-change issues. Each kilowatt of solar-electricity capacity installed saves the equivalent of a tonne of carbon-dioxide emissions a year. Each solar canopy has a maximum power output 10 to 15 kW, so each installation eliminates around 12 t of carbon-dioxide emissions every year.

Following a pledge made for ITV's 'Year of promise', solar panels will be added to all new BP service stations in the future. The solar canopies are made by BP Solarex. They have been installed in 25 of BP's newest service stations across the UK. A further 40 are planned by the end of this year — making BP the biggest user of solar power in the country.

These British-designed canopies use up to 300 solar panels to convert sunlight into electricity. The solar system is connected to mains electricity, so there is no interruption to the power supply at night or in overcast weather.

The canopies were awarded Millennium Product Status by the Design Council

Reader Reply No. 118



**BREEAM in action — DETR's Ashdown House scored a 'very good' rating on its assessment.**

design and management. Some 400 major office buildings have been assessed, and there are also schemes for industrial units, supermarkets and superstores, and homes.

The success of BREEAM

reflects the continuing growth of concern about our environment. The Government is committed to a 20% reduction in carbon-dioxide emissions and recognises the need to optimise energy, water and materials use in the design, con-

struction and operation of buildings. Business clients and staff are also increasingly environmentally aware and are demanding better environmental management.

BREEAM is a practical tool for improving buildings which can help achieve many objectives.

- Demonstrate to clients and staff an organisation's commitment to environmental quality.

- Inform potential tenants and owners of a building's environmental performance.

- Reduce energy, maintenance and other running costs.

- Provide a healthier and more productive workplace.

- Facilitate continued improvement under environmental management systems.

- Pre-empt an increasing amount of environmentally led legislation.

BREEAM assesses buildings against a range of environmental issues and awards credits where the building achieves a benchmark performance for each issue. The building is rated excellent, very good, good or pass depending on the total score gained.

### UPDATED

The scheme is regularly updated to take advantage of new research, changing priorities, experience in the marketplace and amendments to regulations.

BREEAM 98, the latest offices version, replaced two earlier schemes, one for new and the other for existing offices — drawing them together to create an expanded and flexible assessment method that is valid throughout the life of the building. It comprises the three modules (Fig. 1). Assessments cover those modules that are relevant at the time, with core building issues assessed in all cases. The formal assessment, resulting in a report and certificate, is quick and relatively cheap to

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## FEATURE 2

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carry out. Assessments are carried out by independent, registered assessors, who can also offer a tailored consultancy service to aid with designing or managing the buildings.

### ISSUES

A few examples of the aims of BREEAM give an idea of the range of global, national and local issues covered.

1. Global — e.g. reducing emissions of ozone-depleting gases by avoiding their use as refrigerants, in insulation materials and in fire fighting systems and reducing the risk of accidental release from cooling plant.
2. National — e.g. reducing the consumption and leakage of water using an estimate of water consumption

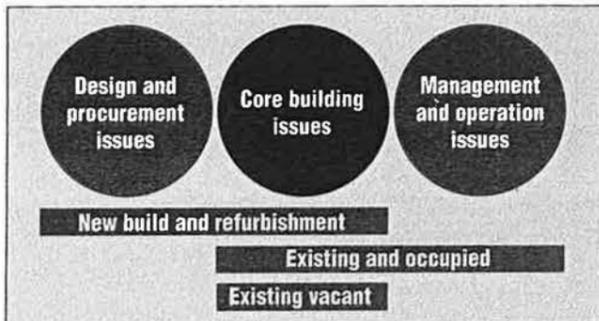


Fig. 1: Structure of the assessment process of BREEAM for offices.

to assess water economy. Credits are awarded when the predicted or actual water consumption is less than specific targets. Additional credits are awarded where monitoring and targeting are carried out.

3. Local — e.g. ensuring:
  - a high quality of indoor

air for occupants by awarding credits for, among other things, provision of fresh air in mechanical ventilation systems or trickle ventilators in naturally ventilated buildings, 'no smoking' policies, high performance cleaning and appropriate maintenance schedules;

■ that lighting provision is adequate for the purpose and minimises risks to health or comfort levels by awarding credits for, among others, good daylighting, having workstations with a view out, prevention of glare, personal control of lighting levels.

Other local issues include minimising the risk of discomfort from overheating of buildings, ensuring a comfortable and productive internal acoustic environment in office areas, and minimising health risks from legionellosis in domestic hot water systems and cooling systems.

Alan Yates is manager of BREEAM, BRE, Garston, Watford WD2 7JR.

\* Building Research Establishment Environmental Assessment Method.

## Weatherite continues energy-saving work with Tesco

Using high-output gas-fired modular heaters in rooftop packaged air-handling plant in the new Tesco store at Dalkeith near Edinburgh will achieve major energy savings compared with conventional low-pressure-hot-water systems.

Developed jointly by Weatherite and Powmatic, the units incorporate a newly designed slimline heat exchanger and burners with a turndown ratio of 5:1.

Jim Gale, managing director of Weatherite, explained that the units also have a smaller footprint than more conventional equipment — providing additional savings on capital cost.

The burners are designed to slot into the casework, reducing the overall size of the units by a metre. The Dalkeith store is the first to use these gas-fired heaters, and three units serve the sales floor.

Each of the heater units has five 20 kW indirect-fired burners controlled in sequence to maintain the required temperature on the sales floor. Direct-expansion cooling coils provide a total cooling capacity of 250 kW, using R407C. The units can each handle up to 23 m<sup>3</sup>/s of air.

Another benefit of these units is the avoidance of the big pressure drops that can occur with more conventional long-run duct heaters.

The Dalkeith installation is one of four contracts for Tesco completed by Weatherite in the last year involving the installation of new energy-saving technology developed after close collaboration with the company's own engineering team.

At Peterborough, energy-saving heat pipes were used for the first time with displacement ventilation at the Yaxley retail complex and the adjacent Serpentine Green Mall area.

The new store at Enfield was the first of its kind to use hydrocarbon refrigerant for cooling and refrigeration.

At Ledbury, Weatherite supplied one of the first installations of its kind involving an integrated rooftop air conditioner and refrigeration package which, like the Dalkeith plant, also saves space and cuts energy costs.

Reader Reply No. 119



Direct gas-fired heaters in air-handling plant for a new Tesco store will provide major energy savings compared with LPHW systems.

## An education in green engineering

TermoDeck's structural ventilation system has helped the Greenwich Millennium School & Health Centre meet the guidelines of the new DfEE Building Bulletin 87. This document specifies energy standards normally met by natural ventilation. The project also had to meet the sustainability challenges agreed for the Greenwich Millennium Village.

TermoDeck utilises the thermal mass of buildings to provide balanced ventilation with passive heating and cooling. Additional benefits include substantial reductions in energy use and carbon-dioxide emissions — typically up to 50%. Compared with air conditioning, the capital and running costs of a building are said to be significantly reduced.

John Cadell of Edward Cullinan Architects explains, 'Originally TermoDeck was only considered for the first floor and not on the roof level, but the long-term energy advantages of the system are so significant that it was specified on both levels.'

Other prestigious projects for TermoDeck include the new Docklands campus of the University of East London, the Royal Mail offices in Chesterfield and the Web of Life insect house and visitor centre at London Zoo.

The structural floor components of TermoDeck — precast hollow-core units — channel air around the building, assisted by a simple ducting system. The hollow-core unit is used as a thermal battery, radiating heat or coolth from the concrete slab. Intimate contact with the air in the room is achieved through the use of an exposed soffit.

Taking into account both the outdoor temperature and the function of each room, pre-heated or pre-cooled air is used to adjust the temperatures of the ceiling and floor surfaces. Desired room temperatures can thus be provided at all times and constant fresh air provided without noise or draught.

Reader Reply No. 120

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