

Low-carbon cooling for refurbished buildings

Chilled ceilings and beams can often provide effective comfort cooling when refurbishing existing buildings — as **John Staunton** explains.

Refurbishing existing building stock is essential to meet the UK's target of reducing greenhouse gas emissions by 80% by 2050 — simply because the annual rate of construction for new buildings is only 1 to 2% of the stock. This point is emphasised by the former president of the British Council for Offices, Gordon Carey, commenting that the 'retention and improvement of existing building stock is one of most sustainable and energy-efficient methods that can be explored'.

The environmental performance of an organisation's built assets is a key factor in its sustainability credentials and carbon footprint. Architects and M&E consultants are seeing chilled ceilings, chilled beams and integrated service modules (ISMs) as part of the solution to meeting organisational sustainability targets.

A solution that adds to a building's 'sustainable credentials' and reduces 'whole life costs' is now increasingly demanded by end users, specifiers and architects. With higher chilled-water temperatures of 14 to 17°C, chilled ceilings, chilled beams and ISMs offer a cost-effective, energy-efficient and low-maintenance alternative to traditional air-conditioning systems.

As a result, specification can lead to a reduction in energy consumption and the size and cost of the central plant. Owing to their increased energy efficiency, chilled ceilings, chilled beams and ISMs can help achieve good EPC (Energy Performance Certificate) and DEC (Display Energy Certificate) ratings as well as help a building achieve a higher BREEAM and LEED (Leadership in Energy & Environmental Design) ratings.

A recent report undertaken by Cyril Sweett for the Investment Property Forum stated, 'the advent of EPCs means commercial landlords can no longer ignore the inefficiency of existing stock.' It went on to highlight an example of refurbishment, where the 'replacing of fan-coils units with [a] chilled beam installation' could reduce annual CO₂ emissions by 11.2 kg/m².

Integrated service modules

The first active integrated service modules to incorporate Micro Prism Optic luminaires were installed as part of the refurbishment of the headquarters of Places for People's on Gray's Inn Road, London.

The feeling of height is achieved by positioning ISMs above desks and meeting room tables. This location also ensured correct environmental comfort and illuminance levels are met.

As ISMs are fixed directly to the concrete soffit, the thermal mass of the building is exposed. Additionally night purging through the ISM is used to pre-cool the concrete slab, reducing the installed cooling capacity required.



The energy-saving potential of chilled ceilings and beams — John Staunton.

A solution that provides a flexible means of delivering excellent comfort control and low energy consumption in a discreet way and without the space-demanding duct work associated with air conditioning is highly attractive.

The installation of an all-water chilled ceilings and passive chilled beams system does not require the bulky ductwork associated with all-air systems. This results in an installation tight to the soffit, maximising the floor-to-ceiling height. Current guidance from the British Council for Offices recommends a minimum floor-to-ceiling height of 2700 mm.

ISMs on the other hand can leave large areas of the soffits exposed. As a result the maximum floor-to-soffit height and feeling of space is achieved.

While not appropriate for every project, there is no reason why this technology cannot be applied to most new and refurbished commercial developments, as well as within projects in sectors such as education, healthcare and transport.

Chilled ceilings with low ceilings

Chilled-ceiling systems can be installed with a ceiling void as low as 100 mm, maximising the floor to ceiling height and, in turn, making spaces more attractive to potential tenants.

During the redevelopment of 25/27 Queen Anne Street in London, a building with a façade dating from 1906, a radiant chilled ceiling solution was specified in conjunction with a raised access floor for exactly this reason.

The building has low slab-to-slab heights, with an average floor-to-ceiling height of 2600mm, but is now air conditioned for the first time.

