Chilled ceilings:

The BSRIA's Ivy Lai looks at current developments in the European market for chilled ceilings and displacement ventilation.

the market potential

In recent years, increasing awareness of thermal comfort and air quality has led building services designers to look for alternatives to conventional air conditioning systems. Chilled ceilings, be they panels or beams, and displacement ventilation are among the systems that have attracted a great deal of interest among consultants and end users.

Originating from Scandinavia, chilled ceilings and displacement ventilation systems have been adopted in Germany and Switzerland with great enthusiasm, and sales are also growing rapidly in the UK and Holland (table 1).

The Scandinavian market is now dominated by chilled beams and most of the key chilled beam manufacturers in Europe are of Scandinavian origin, including Halton from Finland and Stifab/Farex, ABB Fläkt and Cooling System from Sweden.

German and Swiss consultants, however, believe that levels of comfort are lower with chilled beams because their cooling effect is generated mainly by convective airflows. Chilled panels are therefore more popular in Germany and Switzerland.

A recent survey by the German magazine *CCI* carried out among 16 leading manufacturers and suppliers showed that 810 000 m² of chilled ceilings had been installed in Germany by 31 December 1994. In addition to the Scandinavian imports, the market is served by indigenous German manufacturers Trox, Krantz, Industrie Companie and Zent Frenger.

In Scandinavia displacement ventilation is mainly installed as a stand-alone system in industrial buildings with high thermal loads and, in the last few years, in office space with lower thermal loads. However, chilled ceilings combined with displacement ventilation systems are gaining in popularity in German and Swiss offices to provide a comfortable environment with a high cooling capacity.

In markets such as Scandinavia and Germany, chilled ceilings and displacement ventilation systems are supplied as standard components and most installations are now carried out by contractors without specialist support.

In newer markets such as the UK and Holland, suppliers have to offer the complete system and provide a large degree of technical support, sometimes appointing specialist contractors to eliminate installation errors. Technical support is important for suppliers hoping to win business in these less developed markets, whereas in Germany and Scandinavia competitive pricing is much more important since the product is more standardised.

Most suppliers blame lack of awareness for the slow development of the UK market. As there are not many installations for consultants or end users to inspect and compare, many accept the idea in theory but remain sceptical about the performance in practice.

Lack of standardised test methods and incompatible laboratory results offered by suppliers also make it difficult for end users to compare the performance of different systems. Current test procedures are based mainly on cooling outputs which do not provide detail on thermal comfort.

Displacement ventilation as a stand-alone system has been accepted in Scandinavia and Germany, but its market share lags behind that of mixing ventilation by a considerable degree. Typically, it is specified only where there is physical difficulty in installing mixing ventilation or where there is much heat or contamination to be removed.

Displacement ventilation is sometimes applied as an alternative air conditioning system in offices in Europe to provide some cooling. Critics argue that most offices do not have the necessary floor-to-ceiling height to create the vertical displacement effect. Also, floor or perimeter space is often taken up by supply air terminals with space planning further compromised by the need to avoid siting desks too near to outlets because of the risk of draughts and cold feet.

According to BSRIA research, the market for displacement ventilation as a stand-alone system in the UK is small (£2 million). There is little opportunity for manufacturers to sell into industrial buildings because of low cooling requirements so displacement ventilation mainly competes in the office sector. In the UK, the argument against chilled ceilings is mainly on cost. Developers believe that the initial cost for chilled ceilings is significantly higher than other approaches.

Provisional results from a new BSRIA market research study indicate that the potential sales for chilled ceilings and chilled beams are roughly the same at around £2.5 million each, with numbers of chilled beam installations probably slightly higher than numbers of chilled panels. Demand for both systems is growing strongly and competition between the two systems is expected to continue.

The majority of chilled ceiling and displacement ventilation installations in Europe are in new buildings. Suppliers believe this is because existing buildings with high cooling loads already have some form of air conditioning installed. The cost and work involved to convert part of the existing system to make way for chilled panels/beams or displacement ventilation would be unattractive compared to straightforward replacement of worn-out parts.

However, there are opportunities in the refurbishment sector where the level of building activity in the UK is expected to be relatively high over the next five years. Here, the low ceiling void required by chilled panels/beams is seen as a positive selling point.

As more and more electronic equipment is in use these days, suppliers are also expecting an increase in sales of chilled panels/beams and displacement ventilation combination systems to cope with a high cooling load.

In the BSRIA's recent research, suppliers and consultants thought that the market for chilled ceilings would continue to increase at the expense of conventional systems. Over the years, the market for vav has been taken over by fan coils. Along with the increased awareness of chilled ceilings and displacement ventilation, it is very likely that the vav market will decline even more with a small effect on fan coil sales.

The development of chilled ceilings and displacement ventilation in the UK has mainly been led by suppliers and a number of leading consultants. Suppliers have suggested that co-ordinated promotion could help to increase the general level of understanding of such systems and their appropriate applications.

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Table 1: Dominant chilled ceiling systems in Europe

Country	Chilled beams*	Chilled panels	Displacement ventilation	Displacement ventilation +chilled beams/panels
Scandinavia[1]	●	–	●	–
Switzerland	–	●	–	●
Germany	–	●	–	●
Holland[2]	–	●	–	–
UK[2]	●	●	–	–

*including ventilated chilled beams

[1]In Europe more than 70% of chilled panels/beams and combination systems are installed in offices. Displacement ventilation as a stand-alone system is mainly installed in Scandinavia, primarily in industrial buildings.
[2]These are new and undeveloped markets at present – the situation may fluctuate according to a few major installations.

Note: There is a small number of chilled panel/beam and displacement ventilation installations in other European countries, for instance in Belgium and France. However, their number is tiny in comparison with conventional air conditioning system installations.

Source: BSRIA (based on supplier interviews)