

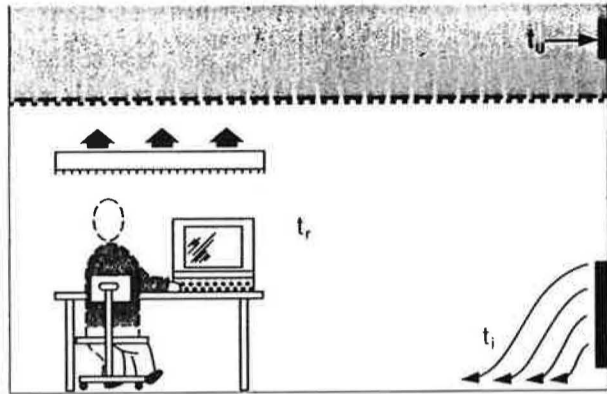
# Displacing tradition

**D**isplacement ventilation makes much engineering sense, but its take-up in the UK has been slow. Glen Hyson considers the factors that favour displacement ventilation.

The benefits of displacement-ventilation systems compared with more conventional designs such as VAV and mixing are already widely recognised for a growing number of applications, such as shops, auditoria, restaurants, factories and most recently offices.

## Fresh air

Displacement-ventilation systems work by supplying fresh clean air into the space at low level, and at a temperature only a few degrees lower than the required room condition. Once the air enters the room, it is warmed by people, machines, lights etc and rises — removing heat and contaminants as it does so. Utilising only fresh air, the system will create a comfortable, fresh, clean



Removing pollutants — tempered fresh air introduced at low level is warmed by people and incidental heat gains. As the air rises, it removes heat and contaminants before being removed through the ceiling.

indoor climate for the occupants by treating only the occupied zone.

As the supply-air temperature is almost that of the room, at say 19°C, with the required room temperature at say 22°C, the need for large refrigeration and ancillary plant during the summer is considerably reduced. Heat can also be reclaimed during winter via a heat exchanger in the air-handling plant.

As displacement ventilation works on the principle that hot air is allowed to rise, the high exhaust temperatures

created at roof level allow many installations to regenerate enough heat down to temperatures well below 0°C.

All the above principles are simple. Hot air rises so why do we insist on throwing air down to floor level, together with contaminants such as, dead skin, bacteria, dust, tobacco smoke etc.

## Viable

With all the energy-saving advantages gained by the use of displacement ventilation, the UK has been very slow to react. In

most cases where displacement could be utilised as a viable alternative, many engineers still opt for more conventional designs such as mixing, fan coil or VAV, even when the capital costs for the installations are similar or favour displacement.

**“Hot air rises, so why do we insist on throwing air down to floor level, together with contaminants such as dead skin, bacteria, dust and tobacco smoke”**

Obviously, not all applications are suitable for displacement ventilation. The major factors which have contributed to the lack of UK products are varied, but the poor aesthetic qualities of some floor-standing terminal devices have not helped convince design engineers and architects to change from

## Warehouse range is extended

After 12 months, the Trox Warehouse range has proved so popular that more products are being added to the list available for rapid delivery.

The latest additions are the JZ-G dampers, available on 10 to 14 days delivery. These are multi-leaf volume control dampers primarily for use in air conditioning systems. The aerofoil section blades are coupled by external linkage which provides either parallel or opposed blade operation. Standard sizes are up to 1000 x 1000 mm.

The range of eggcrate and adjustable blade grilles has been greatly extended, and the option of a white paint finish on certain types has proved popular with customers.

ALS slot diffusers, which have adjustable deflection blades and are suitable for vertical or horizontal air discharge, are now available in 1, 2, 3 and 4 slot configurations and can be provided with plenum boxes.

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conventional ceiling systems.

In stark contrast almost all our European counterparts have promoted the use of displacement ventilation wherever possible. Notably, the Scandinavian countries, for over 25 years, have installed thousands of displacement systems into every conceivable application, and found a dramatic improvement in air quality and running costs.

Most of the early displacement systems installed in the UK were industrial projects, such as printworks, laundries and foundries, where the aesthetic properties of the low-level supply terminals was not considered a problem. Auditoria and theatres were next to be given consideration due to their high occupancy and large fresh-air requirements, and a number of under-seat systems were installed, giving excellent conditions and good running costs.

**“Almost all our European counterparts have promoted the use of displacement ventilation”**

Today, with the advent of the unobtrusive floor-mounted swirl diffuser, which allows a greater flexibility for office and commercial premises, and the help of a growing number of architects who

are prepared to design in and co-ordinate terminal designs together with the building aesthetics, the number of displacement-ventilation projects being built or considered is growing rapidly.

Displacement ventilation in office buildings in conjunction with static cooling systems such as chilled beams and ceilings has been proved to create ideal internal conditions, and can return running costs confirmed by many years of testing of about 20% of those associated with more conventional systems such as VAV.

## Green issues

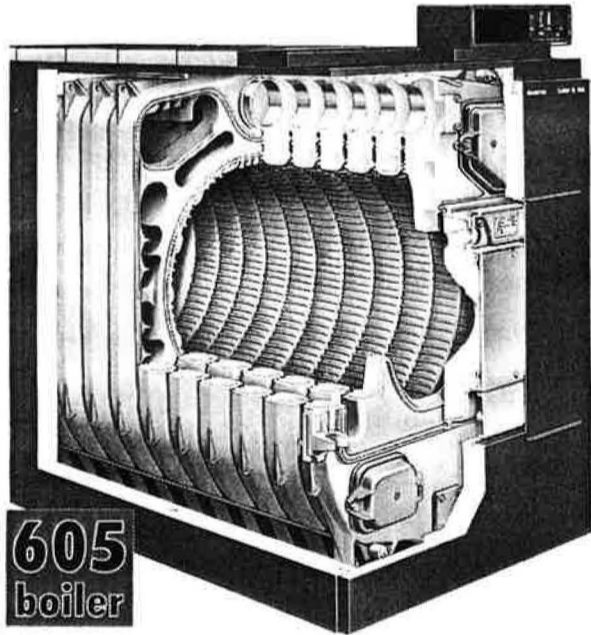
As we move into the age of energy conservation and the green issues, reducing the level of CO<sub>2</sub> emissions and the phasing out of ozone-depleting refrigerants must become priorities when designing building-ventilation systems. Cost-effective green buildings have now become a major European issue, and the UK has been slow to follow the leadership shown by its European counterparts. European legislation on energy consumption will shortly be introduced, and fuel prices for the industry and commerce are increasing steadily.

As these factors come to the fore, the market share of displacement-ventilation, static cooling and other energy-efficient environmentally friendly systems will dramatically increase.

Glen Hyson is technical director of Displacement Air Systems Ltd, Unit 7, Mill Race Lane, Stourbridge Trading Estate, Stourbridge, West Midlands DY8 1YL.

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