

Arts & Leisure Case Study

Contact Theatre - Manchester

At the newly rebuilt Contact Theatre in Manchester, the cost of keeping audiences comfortable will be far less than at most theatres of its size. Designed by Max Fordham & Partners, its simple but innovative assisted natural ventilation system consumes a mere fraction of the energy that would have been used had mechanical ventilation been installed – and it will be much cheaper to maintain. Moreover, it does not pose a noise problem. Providing highly stable control of the theatre's heating and ventilation is a Trend building management system supplied and engineered by Westminster Controls Ltd of Leeds.



Contact - a theatre for young people - has recently been transformed by a Lottery-funded redevelopment and expansion programme.

Architects Short and Associates have created a virtually new building, which is visually stunning and has much improved facilities.

Most areas of the theatre are naturally ventilated – the 360-seat auditorium, a 100-seat adaptable space, a large rehearsal room, the foyer, restaurant and bar. In the auditorium, fresh air enters a plenum beneath the tiered rows of seating and diffuses into the space via grilles beneath the seats. It is exhausted via four towering H-pot stacks (being drawn out by the thermal effect that these induce). When there is demand for cooling, dampers in the air intake and stacks are progressively opened up to increase the air flow rate. In each stack there is a low power fan, which is used for night cooling and to assist ventilation in very hot weather. Heating of the air, when required, is provided by underseat convector heaters.

The 100-seater space, which also has H-pot stacks, operates in the same way. In all the other naturally ventilated areas, air is extracted via rooflights and/or high level windows.

The building management system designed by Westminster Controls basically comprises four Trend IQ intelligent controllers and a Trend NDP operator interface. It provides direct modulating control of every element of the natural ventilation systems – the intake and stack dampers, the stack fans, the openable windows and rooflights and the convector heaters – as well as controlling the building's boilers, office/workshop heating and external lights. The IQs apply different space temperature setpoints according to whether demand is for heating (system setting 20oC), cooling (22oC), fan-assisted cooling (26oC) or night cooling (18oC). The latter comes into play when the outside temperature exceeds a pre-set limit on the previous day.

If sensor measurements indicate deteriorating air quality in an area, the system opens the dampers/windows further to increase ventilation. There is also a manual override for each area that allows theatre staff to change the air flow rate – eg, if they feel it is becoming stuffy. Through the NDP operator interface, authorised staff can also adjust the heating temperature setpoint. However, manual changes of either sort are automatically cancelled at the end of occupancy and default settings re-

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instated. Furthermore, whenever the heating setpoint is altered, the system adjusts the cooling/ventilation settings by the same amount, thus maintaining the necessary differential. As a consequence, heating and cooling can never occur simultaneously in the same area.

When it is windy or raining the Trend system limits the degree to which windows can open – or shuts them completely. In high wind conditions it also restricts the opening range of the dampers. To avoid the possibility of stack fan noise becoming intrusive in the main auditorium, the system prevents fan speed increasing above 70% of maximum during a performance. It should in any case be very rare for the fans to need to operate to assist ventilation.

Using system-collected data downloaded via modem, consultants Max Fordham & Partners will monitor the building for at least its first year of operation. Though the theatre opened in October and has not yet experienced a period of hot weather, heat tests have indicated that the ventilation plant and its Trend controls will cope successfully with peak summer conditions.

Westminster Controls can be contacted on 0113 244 8300.

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