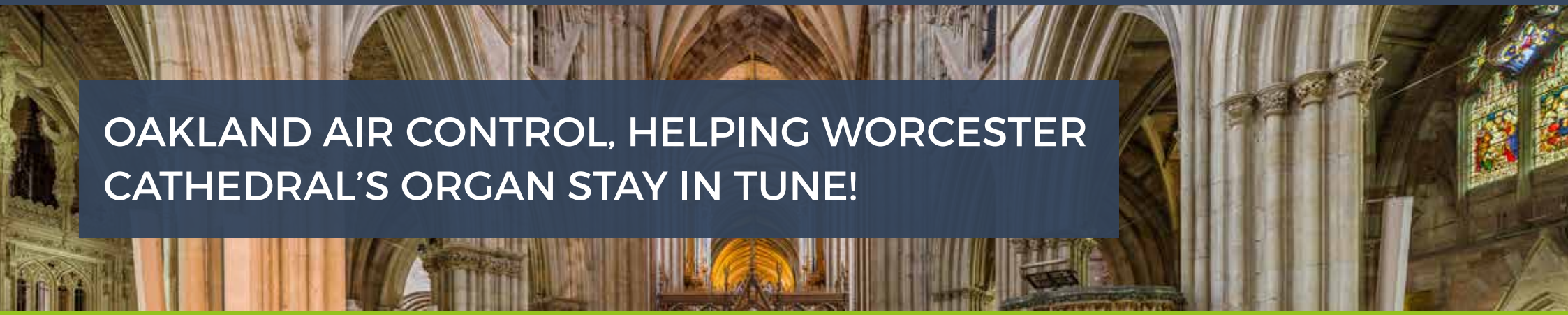

OAKLAND AIR CONTROL, HELPING WORCESTER CATHEDRAL'S ORGAN STAY IN TUNE!

PROJECT DETAILS

Client
Worcester Cathedral

Completed
January 2017

Oakland Business Line
HVAC Installation

Objective
Historic building heating, cooling and ventilation

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THE BEAUTIFUL CATHEDRAL IN THE CENTRE OF WORCESTER NEEDED THE TECHNICAL HELP OF OAKLAND AIR CONTROL LTD TO RECTIFY A PROBLEM WITH TEMPERATURE CONTROL IN THEIR ORGAN LOFT. THE LOFT AND THE MAIN CATHEDRAL MUST BE MAINTAINED AT CLOSE TO THE SAME TEMPERATURE AS ONE ANOTHER, TO ENSURE THAT THE ORGAN STAYS IN TUNE.

A previous installation (by others) was so badly designed and implemented that the solution had failed, so oakland were called in the first instance to produce a report as to what had gone wrong, and what could be done to rectify the situation.

The Club has recently undergone a £10m redevelopment which included upgrades to its functions and hospitality facilities. The result of this was The View, a multi purpose function suite. To ensure comfort 365 days a year, the decision was taken to install a new HVAC system that met the wide ranging thermal requirements in a way that also enabled the multi purpose use of the space.

Oakland Air Control, was contracted to install, test and commission a series of Daikin SkyAir Seasonal Classic Roundflow Cassettes. These individually controlled units with a high COP were connected to roof-mounted outdoor inverter units.

> **"Others were asked to attend the problem and their solution was to drill a hole in the lower ductwork thereby allowing the condensate to drip onto an internal roof which was not water proof!"**

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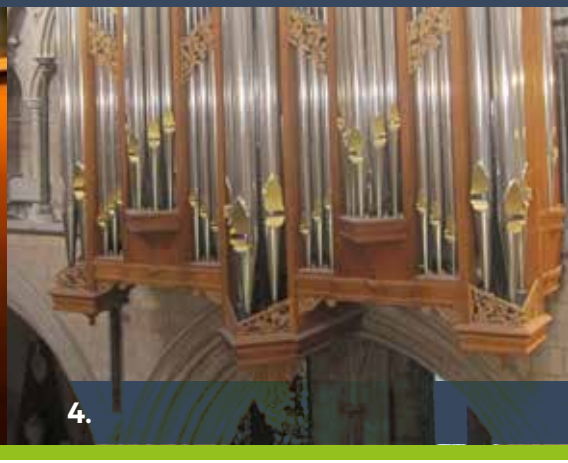
4.

PROJECT DETAILS

Key to photos...

1. Wrongly installed unit!
2. Previous ductwork installed through door!
3. A view of the organ from inside the Cathedral
4. A view of the pipes from inside the Cathedral

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The main findings were:

The existing void mounted heat pump unit had been installed in the vertical plane (see photo 1.) instead of horizontally meaning the drip tray (which catches condensate dripping from the coil when in cooling mode) was also vertical (therefore incapable of catching anything!). Consequently, the condensate dripped onto the filters, wetting them out and blocking airflow, and water damaged the unit's PCB. The condensate then pooled in the bottom of the ductwork which stopped the unit.

Others were asked to attend the problem and their solution was to drill a hole in the lower ductwork thereby allowing the condensate to drip onto an internal roof which was not water proof!

The installation also had unclipped pipework, no lagging on any of the ductwork outside the Pipe room, and the ductwork had been routed through a door (see photo 2.) rendering access to the unit for maintenance very difficult. Eventually the unit failed completely.

Cathedral Tower

Here is a picture showing how the previous installations return ductwork blocked the door, meaning that access to the unit for maintenance purposes could only be gained via a hatch in the roof!

Our works comprised the following:

- The stripping out and removal from site of the existing, failed AC and ductwork
- The supply and fitting of a new Mitsubishi Ducted Heat Pump Unit. Mitsubishi Electric Mr Slim Void Mount PEAD RP60JAQ with outdoor unit PUHZ ZRP60VHA
- The supply and fitting of all new ductwork both in the Plant area and in the organ loft (High main ducting run with Low Level 'dropper' ducts)
- The insulation of all ductwork
- To Supply and Fitting of a new 4" Fresh Air Supply Fan to the return Ducting to positively pressurise the Organ loft
- Supply and installation of a new Trend Controller
- To connection to Network Point and configuration for remote control and graph viewing
- On-site training on Web based controls

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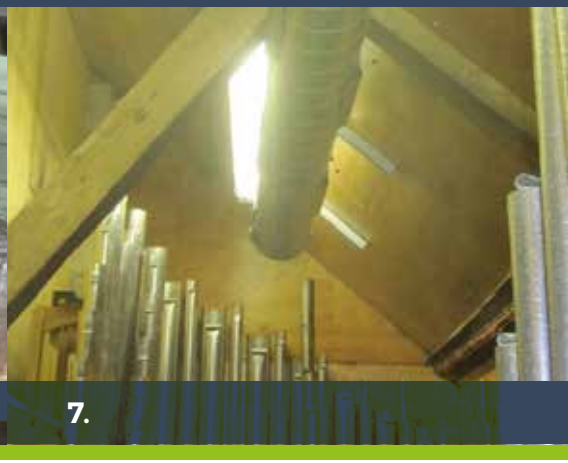

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PROJECT DETAILS

Key to photos...

5. The Organ Loft prior to Oakland's installation. Note the door to the plant cannot be used!

6. Oakland's finished installation

7. Pipe room ducting

Rear access was made via the existing wooden wall of the rear loft area so access to change the filters could be gained without entry by engineers into the sensitive and delicate Organ Pipe area. This unit would allow cooling down to 18˚C with the ability to offset the sensor on the unit so cooling to 16˚C would be possible.

We also re-routed the return ducting (previously going through the door) to the area above the door, thereby returning the use of the door for easy access to the new installation. All ducting in the plant area was insulated for efficiency and new supply ducting was fitted to take the conditioned air and deliver it evenly, at high and low levels thereby providing the most even temperature spread.

A new 4" Fan was supplied and fitted to bring outside fresh air into the return ductwork. This fresh air allows the organ loft to be slightly pressurised, pushing any dust laden air away from the organ loft and ensuring the cleanest of environments in the loft.

To complete the new installation, we supplied and fitted a new, intelligent Trend BMS Controller to accurately and reliably control the pipe area and loft to the same temperature as the Cathedral. This controller would be web enabled with on-board web pages so that with a simple Cat5 or 6 Business Network Connection set points can be viewed and changed by any PC running a web browser on the same network.

Graphs of sensors can also be viewed directly from the controller and in the event of a unit fault or a larger than expected temperature deviation an alarm email can be sent out to multiple recipients. To enable this, we extended the nearest Network point up into the Organ loft and terminated the cable into a network outlet box.

We ran a report using the output from the Trend sensors, monitoring the temperature differential between the Cathedral Interior and the Organ loft /pipe room over an 11-day period. The temperatures varied between 14˚C and 18˚C in the cathedral, and the new installation kept the temperature difference between the 2 areas to within a constant 1˚C.

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