

AMBIRAD

HEATING AND VENTILATION SOLUTIONS

RAF Brize Norton - Base Hangar Case Study

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"Following the installation of the new Nor-Ray-Vac radiant heating system into Base Hangar at RAF Brize Norton the complexion of the environment has changed significantly. The improved heating in conjunction with a program of refurbishment has transformed Base Hangar into a more welcoming and pleasant working environment for the different users of the facility. I am sure also that RAF Brize Norton will see a significant heat efficiency saving from Base Hangar which will not only see running costs reduced which is good for the taxpayer but also there will be benefits to the environment also." Chief Technician David Craven GCGI MinstLM, Base Hangar Operations Manager, RAF Brize Norton.



David Craven
Chf Technician, Base Hangar
Operations Manager.

Case Study: RAF Brize Norton - Base Hangar

The Base Hangar at RAF Brize Norton was built in the late 1960's to house the air tanker fleet VC10's. The unique cantilever structure of; 300m long x 60m deep and 18.5m high, laid out in 6 bays, thus allowing 6 VC10's to be housed in the hangar at any one time.

Today, the Station is as busy as ever, being home to the entire RAF's Strategic and Tactical Air Transport (AT) and Air-to-Air Refuelling (AAR) forces. Aircraft depart 24 hours a day, 7 days a week on worldwide operations, and any world hotspot or crisis invariably sees the arrival of C-130J Hercules, A330 Voyager or C-17 Globemasters from RAF Brize Norton. In the future, as in the past, RAF Brize Norton will continue to play its part on the world stage, providing support and relief wherever it is most needed.

AmbiRad were first called in by the Station Energy Manager back in 2004 to discuss the heating in the Base Hangar that was in use at the time, which was considered to be very in-efficient. The heating was warm air provided by both roof & wall mounted units around the hangar together with wall mounted angled de-strat fans at the rear of the hangar.

Back in 2004 the £327K cost of gas for the warm air units was of concern to the Station Energy Manager, by 2006 had risen to £400K per year (15,771,436kWh of gas) with minimal benefit to the internal environment of the hangar, and by 2012 the costs had risen to £800K per year! This was an un-sustainable situation and as the new Airbus A400M Atlas needed hangarage the decision was taken by the Station to initially replace the heating in 2 of the 6 bays.

Once the Nor-Ray-Vac systems had been installed in Bays 5 & 6, the Station then decided to extend the contract so that the 4 remaining Bays also benefitted from a new Nor-Ray-Vac gas fired radiant heating system together with new lighting.

With RAF bases typically on exposed sites the rapid response to changed conditions when hangar doors are opened required a heating system which was highly efficient, offered rapid heat recovery time and promised considerable cost savings over its life cycle was ideal; the Nor-Ray-Vac system

fits the challenging requirements of heating a hangar having been used extensively across many civilian and military hangars including two previous installations at RAF Brize Norton:

- > Air Tanker Hangar
- > C-130J Hangar.



Economy and effectiveness are the two key factors required when selecting a heating system for an aircraft hangar. An aircraft hangar environment is too hostile for some forms of heating. Warm air heating, for example, would not be an appropriate solution. The system would not only consume fuel attempting to heat the entire volume of air in the hangar, but the temperature stratification would be enormous. This volume of warm air would then only be replaced instantly with colder external air when the doors are open to allow aircraft movement in and out, bearing in mind that many aircraft maintenance operations occur at night.

Blanket heat coverage is therefore a prerequisite in aircraft hangars. The ideal heating system – one which answers the prime requirements for economy and effectiveness – will be capable of heating the complete hangar area, but it should also be capable of being zoned by design to heat specific areas for when and where necessary, and have a rapid response to change conditions.

Radiant tube heating answers all these needs. It is one of the most energy efficient forms of space heating available; it burns fuel (natural gas or LPG) at the point of use so there is no loss of efficiency in distributing heat around the building. Most importantly in the case of aircraft hangars, the warmth from the radiant system felt by personnel is less affected by cold air influx through doors opening and closing, but also the ability of the heating system to rapidly respond to changed conditions is

paramount.

SSE Contracting were employed to install the Nor-Ray-Vac system in the Base Hangar with each bay comprising; 17 x 46LR burners with 2 discharge fans, arranged in 4 temperature zones.

All burners and end vents were supplied with ducted fresh air from outside to comply with the Crown Fire Standards for operational military aircraft hangars.

The estimated gas usage of the Nor-Ray-Vac system (complete hangar) was 3,948,637kWh which represents a potential saving of 75% over the previous warm air system.

Installation Summary

- > RAF Brize Norton invested in Nor-Ray-Vac continuous Radiant Tube heating system, for their Base Hangar.
- > Uniform Blanket heat coverage; minimised effect of any cold spots.
- > Highly efficient with rapid heat recovery times
- > Zoning capabilities produces considerable fuel economies and cost reductions
- > Operative temperature 20 °C
- > Potential savings of 75% equivalent to 2,170 metric tonnes of CO₂.

Technical Summary

- > Product Nor-Ray-Vac system installed at 15.5m above finished floor level
- > Heaters 102 x 46LR Nor-Ray-Vac burners in 24 Zones and 12 Discharge Fans

Project start date: May 2014
Project Finish Date: May 2015



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