CASE STUDY

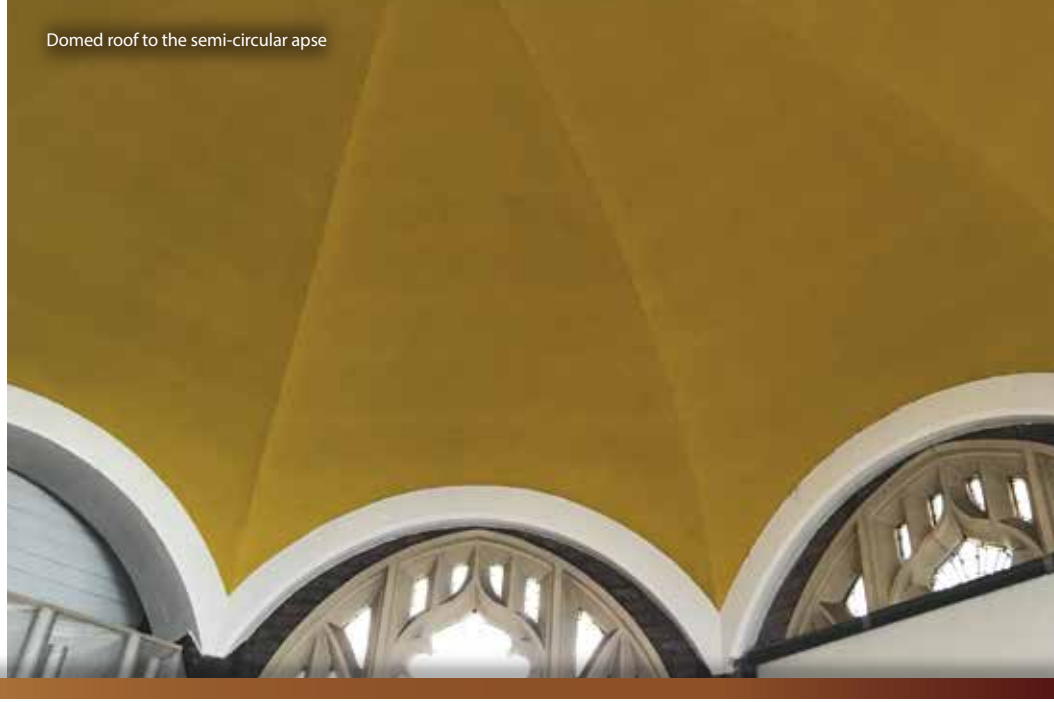
# Manchester Church

Manchester, England

HUNTSMAN
BUILDING SOLUTIONS

The Home of Insulation

Barrel vaulted roof and apse during restoration



Domed roof to the semi-circular apse

## Huntsman Building Solutions Spray Foam insulation for Vaulted Church Roof Restoration

Contractors working on the restoration and modernisation of an early 20th century Church in Manchester, were faced with a difficult insulation challenge to reduce on-going heat loss through the double skinned roof above the worship area, comprising a ceiling vault, roof void and dual pitched roof over.

Originally built in 1931, Christ Church, on Parrs Wood Road, South Manchester, had deteriorated over the years and needed major restorative work to bring it back up to an acceptable standard.

Timber framed additions to the original structure were nearing the end of their working life and access facilities were felt to be unsatisfactory. Consequently, Architects Mattin MacLean of Buxton Spa, were brought in to oversee the work which included reconfiguration of the building, removal of the problem areas and general upgrading of the Church, including the installation of underfloor heating and other essential services. Part of the works involved insulation of the roof void above the barrel-vaulted worship area and semi-circular apse. Project Architect, Roddie MacLean explains. “We saw heat loss through the fabric of the building as a major issue. A new underfloor heating system, driven by an Air Sourced Heat Pump was specified, so it was important to also upgrade the insulation levels – particularly to the roof area”

He continued: “the problem we faced was the curvature of ceiling areas. Conventional, rigid board insulation could not be made to fit and we couldn’t guarantee that layers of flexible, mineral wool insulation would actually stay in place after installation. We needed an insulation material that would follow the curvature of the vaulting and fill the voids created by the complex geometry of the apse dome and roof structure above”.

### Spray applied insulation

Locally based Main Contractors, Armitage Construction, brought in specialist insulation contractors, Green Horizon Energy Solutions to assess the project. They suggested a spray applied, foam insulation system from Huntsman Building Solutions (HBS).

Matt Lawford of Green Horizon takes up the story. “HBS is a spray applied system that expands instantly on application. It’s specifically designed to get into difficult to fill areas where traditional insulation materials just don’t work. It closes off gaps and holes, reducing air leakage, but because it has a soft, yielding texture, it puts only minimal pressure on the structure so its just right for work on historic building like this”

Green Horizon used HBS H2Foam Lite (LDC 50) system, which is an open cell foam that allows the building to breathe naturally, resisting internal condensation.

According to HBS, air leakage is responsible for up to 40% of a buildings heat loss and the system’s ability to close off small structural gaps and service holes, creating a “sealed box” environment, makes it one of the most efficient and cost-effective means of heat-loss mitigation in a building. In this instance, the roof void above, including the original roof timbers, remained naturally ventilated.

A 200mm thick blanket of HBS LDC 50 foam was sprayed to the back of the ceiling

Access to the void between the roof and ceiling to the worship area was difficult for the Green Horizon, Icynene contractors

HBS also points out that, unlike urethane foams of 20 years ago, modern spray foams like H2Foam Lite (LDC 50) use water as the blowing agent.

The reaction between the chemical components produces $CO^2$ which causes the foam to expand. As the foam expands the cells burst and the $CO^2$ is replaced by air.

As a result, H2Foam Lite (LDC 50) has a global warming potential [GWP] of 1 [One] and an ozone depletion potential [ODP] of 0 [Zero]. Furthermore, HBS does not emit any harmful gasses once cured and is completely inert.

## Restricted workspace with difficult access

Access to the ceiling vault was one of the most difficult challenges to the insulation process, explained Matt Lawford. “We were on a very near vertical incline at the sides of the dome and had to manoeuvre across the timber roof joists, in difficult tight spaces, taking extreme care not to damage the ceiling of the church below. The workspace on the sides was only a few feet wide in places but it opened-up a little as we climbed up onto the arch”. H2Foam Lite (LDC 50) insulation foam was sprayed to a thickness of 100-200mm directly on to the back of the ceiling structure. Green Horizon’s objective was to create a minimum blanket of 100mm over the entire ceiling back – roughly 450 square metres, with additional depth used to fill areas where adjoining arch planes met. Installation of the HBS insulation was completed over a seven-day period.

## The right material in the right place

Commenting on the insulation of the Church, Roddie MacLean added “We looked at a variety of different options for what to use and where to insulate but HBS emerged as the ideal answer. It was the right material in the right place”.

*See also YouTube video:*
*https://youtu.be/xn4ZHQJLWHM*

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