

CASE STUDY:

The Millennium Galleries, Sheffield



The galleries are designed to be lit with diffused natural light. They are roofed with a series of precast concrete barrel vaults spanning 15m. A band of clerestory glazing runs along the perimeter of each vault, admitting natural light which is reflected from external canted white-enamelled glass panels, and in turn is reflected from the white soffits of the vaults.

The vaults are supported by rows of precast columns at 14.5m centres which rise between the bands of clerestory glazing. A 1.8m wide precast gutter runs between each vault, suspended by 25mm diameter stainless steel hangers cast into the concrete beam which forms the base of the vault. The reflecting glass panels are canted over the gutter; they are hinged to the outside of the clerestory and can be raised flush with the glazing for maintenance. Direct sunlight is controlled by motorised venetian blinds in the cavities of the double-glazed clerestory windows.

The structure was designed to contribute to the environmental control system. The concrete vaults provide thermal mass. They were fabricated in two halves, insulated with 180mm mineral fibre insulation and clad with standing seam terne-coated steel. The columns are profiled to receive precast concrete ducts through which exhaust air is directed to plant in the basement. Between the columns runs a series of perforated metal bulkheads which house the gallery services - uplighters, downlighters, emergency lighting, public address system and fire alarm system. The services are operated by cables leading from the precast concrete ducts. The underside of each bulkhead is lined with acoustic absorbent material.