

## Vaulting Ambition

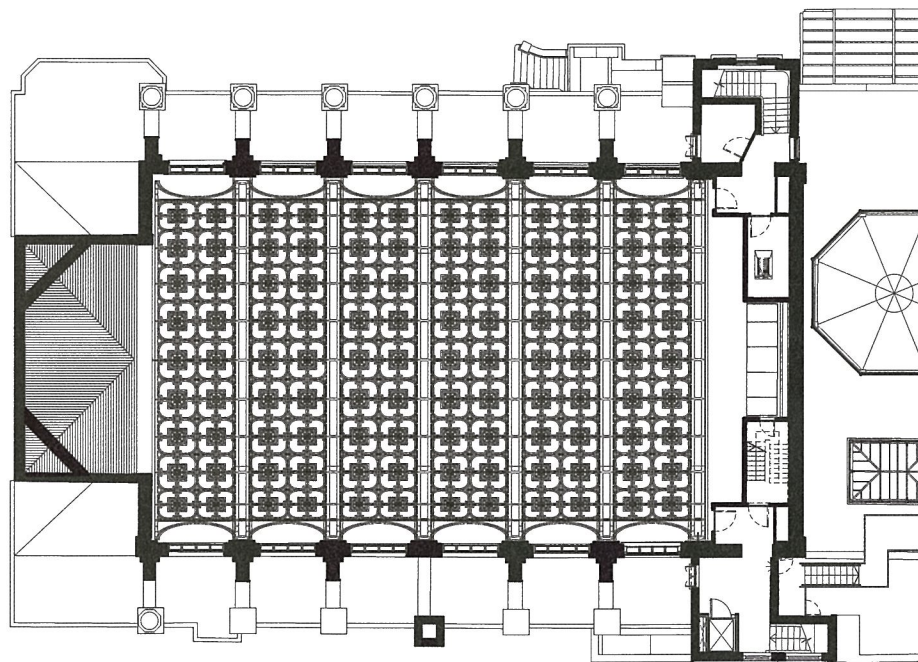
Haworth Tompkins' Grand Hall at the fire-damaged Battersea Arts Centre recalls both the building's original fabric and its recent past

Since 2006 Haworth Tompkins has been working with the Battersea Arts Centre (BAC) on a phased series of experimental projects that have transformed the grade-II\*-listed former Battersea Town Hall into an adaptive performance environment and a centre of local community life. On 13 March 2015, however, the project experienced a significant setback when the Grand Hall area of the building was severely damaged by a large fire. Undaunted, the BAC and its architect have rebuilt, remembering the original building in a wholly new interior.

The surviving structural brick shell was stabilised to support reconstructed roofs, while the original decorative fibrous plaster barrel-vaulted ceiling, lost in the fire, has inspired a new plywood lattice ceiling which springs from the flanking walls and follows the same curvature as the original.

The surfaces of the walls of the hall have been conserved 'as-found' in their "extraordinary, almost Pompeiian post-fire richness and complexity", says the architect. The organ, designed by Robert Hope-Jones, has been relocated to the balcony to enable more flexible use of the hall floor. Many of its original components were being restored off-site at the time of the fire and will be reinstated in a "more deconstructed arrangement" to showcase the mechanism, says the architect.

The original fibrous plaster ceiling of the Grand Hall was not conducive to a clear room acoustic, causing awkward sound reflections. A few openings had been made for rigging and lighting, but these were determined by the limited number of available locations within the pattern of the original plasterwork, and were far from ideal in terms of theatre requirements, says the architect. The new ceiling is based on the elliptical profile and pattern of the original, but is constructed as a lattice, open to the roof void above and acoustically 'transparent'. This enables rigging and lighting through the lattice in a greatly increased number of locations, accessed from a dedicated technical walkway grid integrated in the roof space. Retractable drapes can be deployed out of sight above the ceiling to vary the acoustic to suit a range of events such as spoken word, drama, gigs and orchestral recitals.



### Top right

Reconstructed Grand Hall with lattice ceiling (ph: Fred Howarth).

### Right

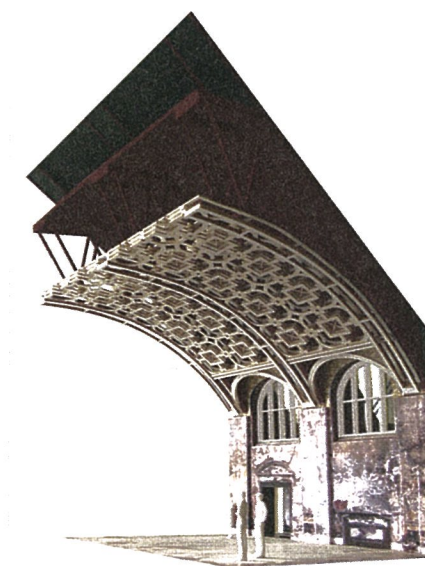
Grand Hall before and after the fire. Battersea Town Hall in south-west London was designed by EW Mountford in 1893 and has been home to Battersea Arts Centre since 1974 (phs: 8Build, Haworth Tompkins).

### Far right

A stack-effect natural ventilation system draws warm air through the lattice and exhausts through the roof turret via an attenuated plenum below the roof apex. An aspirating smoke detection system is also concealed in the roof space.

### Left

Reflected ceiling plan. The £11m renovation covered a gross internal area of 2396 square metres, of which the Grand Hall occupies 570 square metres. The hall is 36 metres long, 17 metres wide and 10 metres high, and can accommodate 1000 people standing, or 300 to 600 seated.



The relief surface of the original plaster mouldings is recalled in the new lattice design. Different elements of the pattern are offset across three plywood layers, spaced apart, with routed grooves in the face layer expressing finer detail. Each layer is made of 18mm-thick birch-faced plywood, cut to shape using CNC technology and vacuum-pressed into curved panels. The plywood is finished with a wood stain of the same hue as the natural tones of the scarred plaster walls. Decorative brass bolt fixings secure the panels to the steel roof structure above.

The lattice comprises six bays formed of 18 fretwork panels spaced apart by arched ladder segments, with six arched window heads along each long side. The design was developed using scale models and full-size prototypes, and Haworth Tompkins worked with a specialist fabricator to test construction techniques. "The elliptical curve was established using a point cloud survey of the surviving plaster frieze on the north gable wall", explains the architect. "These coordinates were analysed using mathematical software to establish a best-fit curve geometry that could be offset to set out the bottom chord of the new steel trusses. The widths of original plaster mouldings were approximated from photos as no original drawings of the ceiling were found, and fragments salvaged from the wreckage did not provide sufficient evidence."

Initially a single-layer lattice structure was proposed, but this "felt insubstantial compared to the mass of the retained masonry", says project architect Martin Lydon. Various pattern interpretations were explored using the proportions of the original pattern outline, and tested for effect using laser-cut iterative models. Structural deflection analysis for each plywood panel informed the fixing locations back to support steelwork and the positions of spacer blocks between panels. These were incorporated into the pattern as node points. At design stage the main fretwork panels were planned to be delivered to site as fully formed three-layer components, hoisted into place and fixed to the supporting steelwork. However, the existing doorways to the hall limited the choice of lifting equipment possible.

Instead, the fabricator proposed a modified bolt-fixing detail to allow the ceiling to be built layer by layer, piece by piece. A lighter plywood was also used so that each component could be easily manhandled while working from tower scaffolds. The ceiling was successfully installed in this manner by a two-person team in 12 weeks.

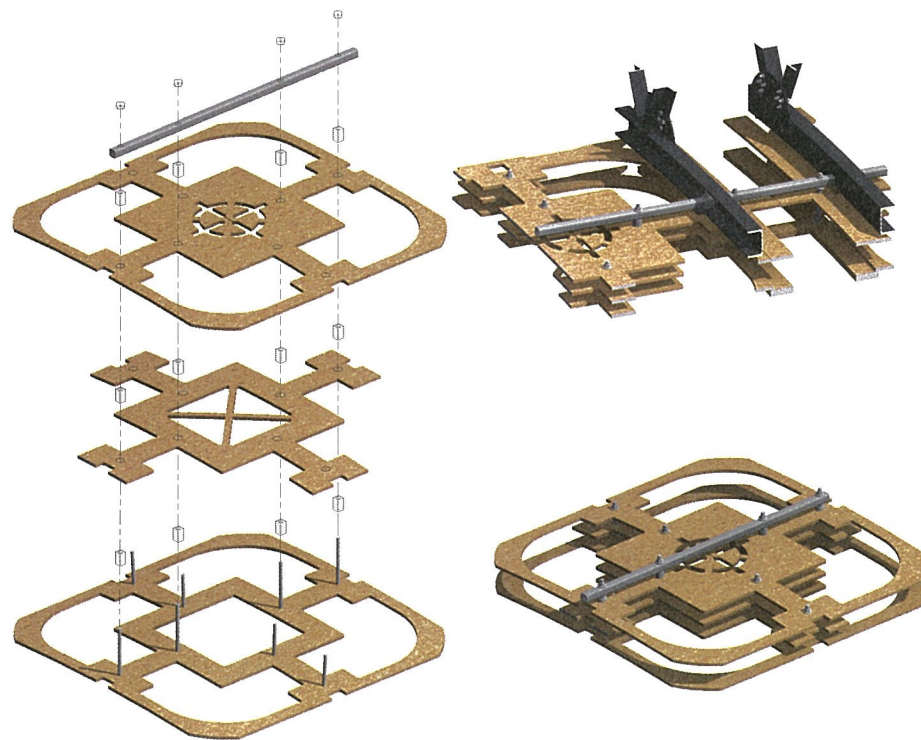
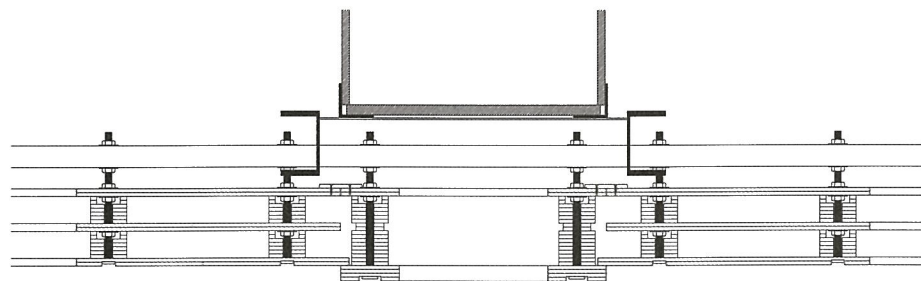
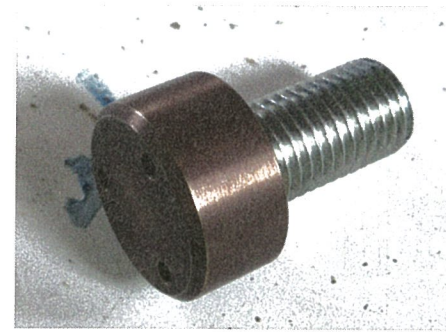
Three downlight fixtures are incorporated into the lattice apertures. For special lighting effects the appearance of the ceiling can be modified using theatre lighting bar positions located above and below the lattice to either 'foreground' its presence with uplighting from below, or to 'background' it as a silhouette by illuminating the pitch of the roof from above. **A**

#### Project team

**Architect**  
Haworth Tompkins  
**Contractor**  
8Build  
**Structural engineer**  
Heyne Tillett Steel  
**Services engineer**  
Skelly & Couch  
**Acoustic engineer**  
Gillieron Scott Acoustic Design  
**Theatre consultant**  
TheatrePlan  
**Quantity surveyor**  
Bristow Johnson  
**Contract administrator**  
TGA  
**Client**  
Battersea Arts Centre

#### Selected suppliers & subcontractors

**Fabrication and installation**  
Joinery Fixing & Finishing  
**9mm birch-faced poplar core plywood**  
IBL  
**Custom woodstain and class 0 matt lacquer**  
Symphony Coatings  
**Gold paint**  
Antique Gold Metallic by Bristol Paints  
**Lattice ceiling light fittings**  
GDS ArcSystem 1 cell with yoke  
**Prototype fabrication**  
Mike Smith Studio



**Top**  
Custom fixing bolt and plywood spacer  
(phs: Haworth Tompkins).

**Above**  
Grand Hall lattice ceiling design  
prototype (ph: HT).

**Left**  
Lattice ceiling assembly drawing  
(ph: Heyne Tillett Steel) and detail  
section through build-up (ph: HT).

**Right**  
Design development models (phs: HT).

**Far right**  
Grand Hall ceiling under construction  
(ph: Philip Vile).

