

Bespoke Architectural External Feature Ceiling



Design & Display Structures

Location	Wembley Stadium, London
Description	A gently sloping 36m x 37m feature ceiling based upon a 4.5m square grid comprising illuminated conical shaped panels interfacing with porthole glazing in the walkway above to provide a highly flexible use well-lit activity space below the newly built Olympic Steps.
Partners	Design & Display Structures (D&D - Supplier), Dixon Jones (Architect), VolkerFitzpatrick (Client)
The challenge	<p>Taking a client's concept that appeared simple in plan but actually presented a wide range of technical installation challenges such as:</p> <ul style="list-style-type: none"> • Setting out and maintaining the correct grid for sloping panels. • Supporting central zones that couldn't be reached once other panels in place. • Raising preassembled 4.5m x 1.7m tall panel configurations in a meticulous fashion that both lined up with prepositioned hangers which tended towards a natural vertical situation as well as rising into the narrow 1.5m precast portholes. • Coordinating works with the fire break and lighting contractors. • Providing cranked condition along one elevation to tie in with existing stadium structures.
The solution	<p>D&D were responsible for the entire design, engineering, manufacture and installation of the 268 panel ceiling and its support system. Key to this scheme were the centrally positioned 36 No conical feature panels which were a substantial 4.5m square on plan x 1.7m tall. GRP offered a modular off site lightweight yet robust solution capable of incorporating a 1.5m dia hole to the top with collar to match in with the precast concrete portholes and a band of 12 No premoulded recesses within the curved conical surface at low level to receive the night time illuminating spot lights focused upon the centre point. A combination of bespoke fabricated brackets, clamps, anchor bolts, threaded bar and Unistrut components were initially fitted to the precast concrete slab above. Access to ceiling panel positions was only from below so a bespoke carrier frame was needed and fabricated in steel. The quarter conical panels, delivered to site via palletised deliveries, were carefully unwrapped and assembled at ground level on the carrier frame before being raised 5m high via hand controlled hoists at four positions. Where positions were not occupied by concrete support columns D&D provided circular infill access panels.</p>
Material used	<p>GRP cladding with integral core and prefinished light grey RAL 7047. Bespoke galvanised metal brackets, clamps, threaded bar and Unistrut components. Dow Corning 791 Grey mastic sealant. CNC cut foam spacing blocks. Steel fabricated installation carrier frames.</p>
Benefits	<p>Given the conical shape profiling and overall large grid size these ceiling feature panels would have been difficult to economically construct in other materials. In particular this GRP product delivered a significant weight saving at 400kg per 4.5m ceiling grid module compared to concrete or other stone type solutions. Due to D&Ds construction package capabilities the client achieved project savings knowing all the design development and interface issues would be handled and the components fit together to deliver a stunning scheme within a fixed price package. Offsite modular GRP manufacture translated to shorter on-site periods, in this case just 9 weeks, with further economies achieved through strategic planning of work sequence enabling other trade contractors, particularly the specialist lighting team, to easily work alongside.</p>
Further details	www.design-and-display.co.uk