(Photo: DaeWha Kang Design)

The OWO Courtyard Pavilion

Factory made precision: a special project for a specialist design & build company

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In the heart of London, within the historic Grand Courtyard of the OWO (the former 'Old War Office'), a strikingly, contemporary restaurant pavilion has been realized, contrasting with the existing neoclassical surroundings. Designed by DaeWha Kang Design, the structure blends architectural poetry with technical precision. Realized by Octatube, this circular restaurant pavilion is a showcase of what can be achieved when architecture, engineering and manufacturing converge in a controlled environment. Beyond its elegant appearance lies a deeper story: nearly every component of this structure was born not on-site, but in a factory. From its initial fabrication to its meticulous preassembly, the OWO Courtyard Pavilion exemplifies the power of factory-controlled construction to deliver architectural excellence and demonstrates how factory-made precision allows for innovative geometries, minimal tolerances, and seamless installation.

This project was one of those special projects, where every millimeter of the design was meticulously considered. The result is a highly precise execution with minimal tolerances on a circular, single-story building measuring 15 meters in diameter and 4 meters in height.

Figure 1: Roof segments in the factory (Photo: Octatube)

Pre-assembled steel structure to fit on standard transportation
The basis of the structure is an umbrella-like roof structure, engineered to work independently from the facade. Concealed behind the sculptured interior is a prefabricated steel structure, which was designed to fit on standard transportation trucks. This steel framework consists of five tree-like columns with branches and ten triangular roof segments (see *Figure 1*). When coupled on-site, these roof segments together create compression and tension rings in the roof, where the circular beams function as infinite beams on multiple regularly spaced supports. Combined with the triangles created with the branches in the tree columns, stiffness and stability in the structure are achieved.

3D-Formed mirror panels with technical craftsmanship
The main eye-catching elements are the approximately 200 mirror panels on the roof, which are mainly engineered and pre-assembled in Delft (see *Figure 2*). With the help of subcontractors, the 3D-shaped stainless-steel panels are created in multiple stages with millimeter precision. The stainless-steel base plates with a thickness of two millimeters are mirror polished, hydraulically 3D-pressed, and laser cut to size. Because the pressing process causes stretching in the surface and dulls the mirror finish, a second repolish was necessary for the final mirror finish.

A 20 millimeter edge gives the thin panels a thicker, more solid look, giving them a luxurious feel. Behind this visual effect lies a carefully engineered Z-shaped substructure. For this substructure, inspiration was drawn from another well-known technique: Insulated Glass Units. The method of creating double-glass panels with the use of structural silicone in between the layers is used to fix the mirror panels to the substructure, as bolted connections were aesthetically out of the question, and welding would cause visible color distortion. However, a small stud weld and tethering are implemented in one corner of each panel as a safety measure to prevent the panels from dislodging in the case of failure. The structural silicone is applied in-house in Delft under controlled conditions to ensure the necessary quality with the challenging shape of the panels. Following the transport in custom made cases, black painted bolts are used in the shadow gaps – the 20 millimeters deep seams between the panels - where they remain concealed and allow rainwater to flow down.

Figure 2: Manufacturing of the roof panels (Photo: Octatube)

Bespoke facade columns with hidden functionality

Following the flow of the rainwater brings us to the bespoke columns in the facade (see *Figure 3*), which also accommodate multiple provisions for the different requirements. In the pavilion's perimeter, a combination of convex and concave corners forms the circular sawtooth shape of the facade. The convex columns are very thin and slender, unable to carry any load from the roof due to their susceptibility to buckling. On the contrary, the concave columns are thicker. These concave columns have a pinned connection to the roof, making them roof supports and preventing uplift, but also reducing the movements in the dilation between the roof and facade. Additionally, they house the rainwater downpipes, which are enclosed in the thermal insulation layer in the column. This design allows the downpipes to be smaller in size by placing them in every second facade column in the concave corners, rather than having one big downpipe.

Figure 3: Specialized column design in the factory (Photo: Octatube)

All these precise design decisions also impact the production process, particularly the welding. Since welding introduces heat into the material and can cause curving and warping of the column webs, the columns were produced in a curved set-up to end with a straight result.

The flower-shaped roof light: a transparent centerpiece

The cherry on top is the flower-shaped roof light; a transparent enclosure of the pavilion's oculus. It is a separate, stand-alone weld-assembly, fully pre-assembled in Octatube's factory in Delft. The flower-petal-shaped insulated glass panels and weather sealing were already applied to simplify on-site work. This specific part needed to be approached as an oversized piece, yet it was still transportable by truck. Upon arrival in London, it was installed in a single hoisting action, aligning perfectly with the steel framework (see *Figure 4*).

Installation strategy and intentionally delayed finishing

After installing the main frame, skylight, and facade, the second

Figure 4: Assembly on-site (Photo: Octatube)

phase of installing the roof panels was temporarily postponed. There were concerns that the ongoing courtyard stonework might damage the mirror finish. The already completed work was properly protected, and the roof panels were kept in storage for a few months. When the panels were eventually installed, the pavilion was finally transformed from a digital render to physical reality in approximately 24 months (see *Figure 5*).

A reusable, demountable, and sustainable design

Reusability was a guiding principle. The pavilion was constructed entirely with bolted connections and no on-site welding, making it fully demountable. It can be fully relocated, thereby extending the potential material lifecycle and minimizing waste. This approach reinforces the pavilion's sustainability credentials and can inspire future architectural projects striving to balance innovation with environmental responsibility.

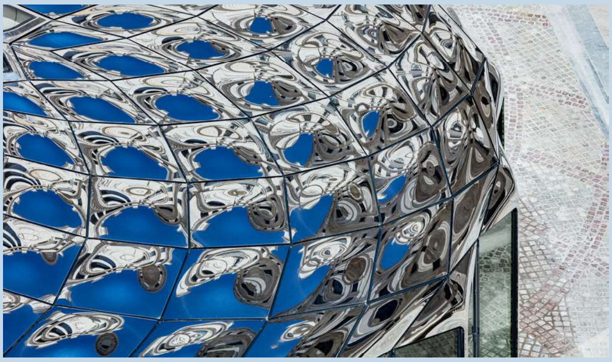

Figure 5: Final view of the roof structure (Photo: Kyungsub Shin)

By completing as much of the work as possible in the factory, Octatube maintained the exceptionally tight tolerances set for this project, bringing watchmakers' precision to steel construction. To quote the Jury of the Dutch Steel Award, which honored the pavilion with the Award in 2024: 'With these kinds of aesthetically pleasing projects, there is almost no desire to deconstruct or tear down these structures, giving them an additional sustainability value'. The result is a true masterpiece, highlighting the expertise in both design and build of all parties involved. ◀