CASE STUDY

The Warburg Institute

Woburn Square, London







Main Contractor:	Quinn London Ltd
Sub-Contractor:	4SP Group Ltd
Architect:	Haworth Tomkins
Engineer:	Price & Myers
Market Sector:	Superstructure Formwork
Product:	Feature Formers

> ***"Having the moulds manufactured in advance gave us confidence that we could achieve our planned schedule and attain the high quality visual concrete finish that the architect had specified."***
>
> Tom Ronan, Site Construction Manager, 4SP

The Warburg Institute, one of the world's leading centres for studying the interaction of ideas, images and society, is undergoing a transformation dubbed 'The Warburg Renaissance' by project Architects Haworth Tomkins. A part of the University of London, it houses a collection of material dedicated to the survival and transmission of cultural forms of art, literature, music and science across borders and generations.

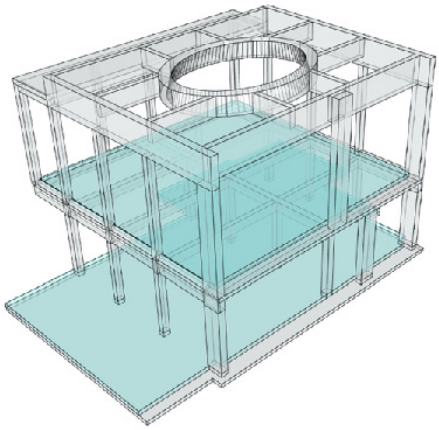
Project Scope

Refurbishment of the main building began in July 2022, and will culminate in the completion of a new two storey extension and courtyard area by Summer 2024. This extension has taken significant Architectural cues from the reading room of the original Warburg Haus in Hamburg and will provide a new 140 seat lecture theatre with an elliptical feature ceiling light that is visually similar to that of the original building. Cordek was approached by specialist sub-contractor 4SP Group to create the formwork for this stunning centrepiece.

The lattice of concrete ceiling beams was required to have an exposed NSCS Special Architectural finish. The curved elliptical formwork required to cast this shape would have been very difficult to achieve using traditional timber formwork. After initial discussions with 4SP on the construction sequence, it was recommended to use GRP moulds for the elliptical feature beam and to create the formwork for the surrounding straight beams on site using plywood formwork.



The original reading room of the Kulturwissenschaftliche Bibliothek Warburg (Warburg Haus)







The Solution

To create the GRP formers, a digital model of one half of the ellipse was CNC machined in two pieces from a high density Filcor polystyrene. This was hard coated and paint prepped to create a perfectly smooth half ellipse. A GRP mould was taken from this pattern, from which all four quadrant pieces of the GRP site moulds were produced.

These were laminated using a durable gel coat which is resistant to the aggressive nature of cement with a GRP matt and plywood stiffeners which were incorporated throughout each of the moulds to provide structural rigidity. Matched bolted flange locations allowed the elliptical former to be delivered to site in just four pieces and each of the units to be individually lifted into position before being bolted back together in position on the falsework deck thereby minimising the number of visible joints.

The flat ceiling above the ellipse would be covered by a bespoke lighting ring. Therefore, a cost saving measure was introduced by forming the ceiling over the ellipse using plywood on site. A small downstand detail was incorporated into the GRP mould to provide a ledge on which this could sit and create a grout tight seal.

The beams were completed in two pours using a specially designed self-compacting mix locally batched by *Hanson. The concrete was first poured level with the top of the beams and allowed to cure. All formers were left in position and a second pour formed the flat ceiling linking all of the beams together. A 60% GGBS content was used to replace OPC within the mix, reducing the embodied carbon of the structure and imparting a light colour to the finished concrete.





Summary

The high quality GRP moulds provided ensured an accurate solution that achieved the exposed visual concrete finish specified by the Architect. The formers struck out easily and required very little post finishing to achieve a smooth, regular concrete finish with sharp corners and even tonality throughout.

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