CASE STUDY

Dream

St Helen's, Merseyside

Engineer:	Arup
Contractor:	Cheetham Hill Construction
Designer:	Jaume Plensa
Market Sector:	Patterns and Moulds for Precast Concrete and Glass Reinforcement Composites
Product:	GRP Moulds

Dream is a 20 metre-high landmark sculpture created by world-renowned Spanish artist Jaume Plensa. It sits on the Sutton Manor site on the edge of St. Helens, Merseyside and takes the form of a girl's head with her eyes closed, seemingly in a dream-like state. Cordek's involvement in the project was to create multiple unique moulds for the chosen material to be cast into, which would eventually reveal the final envisaged profile.

Project Scope

The artwork itself was commissioned by St Helens' council in partnership with Arts Council England and the Art Fund. The public art project was proposed and driven forward by ex-miners, and was featured as part of Channel 4's Big Art Project. The scale and design of the artwork, together with the nature of the site and former spoil heap, presented considerable technical challenges. The chosen material was a bespoke mixture of white cement, Spanish dolomite, and titanium dioxide pigment which also added to the build challenge. Engineering firm Arup was appointed as the lead consultant responsible for the technical design, tendering and overseeing the construction process, with Civil engineering contractor Cheetham Hill Construction appointed as the principal contractor.

The Solution

Cordek were invited to supply the numerous individual moulds needed for the concrete to be cast into. When extracted, these sections would eventually come together to form the final piece. Initial workshops involving all parties were used to establish a joint pattern for the precast units. Various alternatives were considered until an optimum solution was achieved that met the artist's aesthetic requirements, the engineer's structural design and the construction team's manufacture, transportation and installation limitations.

Full 3D modelling was required in order to calculate the complex geometries involved and facilitate both the pre-cast concrete moulding process and the assembly of the artwork.

In order to translate the design from model to mould, the artist's sculpture was digitally scanned and then refined by Arup using Rhino software, to re-create the original surfaces and provide an

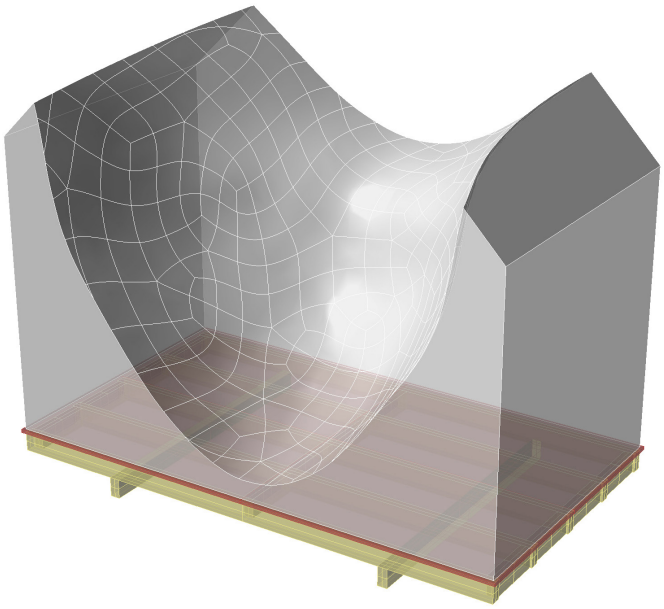
internal void. Panel sizes, joint and fixing types and locations, plus handling, loading and transportation requirements were paramount. This was the starting point for the manufacture of the moulds.

The Process

Due to its size and weight, the eventual configuration was made up of 54 individual panels for the head element of the sculpture, each one determined both by artistic requirements and the two-fold connection system used to hold the panels together and in effect create an integrated monolithic structure.

Cordek's in-house specialist design team digitally created the 3D mould profile required to support the concrete pressure, which was in excess of 50kN/m2. Profile blocks of high density expanded polystyrene were laminated to a plywood bed ready for routing. Using a 13m long five axis router the surface of the profiles were machined back to a level 10mm below the final sculpted surface. A layer of dense polyurethane foam, approximately 20mm thick, was then applied to the surfaces. Once the coating had cured the moulds were ready for the final machining. This involved machining with a 10mm-diameter routing tool and a 1-2mm step over between passes. To achieve the detail and accuracy required, this operation took up to 20 hours for a single unit. The final process for the sculpted surface of the mould was to seal the foam with an epoxy resin to facilitate the striking of the moulds.

The unique moulds, together with plywood stop ends, were shipped to Evans Concrete within three months, where they were used to create the individual concrete/dolomite panels composing the sculpture.



Summary

The sculpture has now established itself as a landmark to the area, bestowed with numerous awards and attracted of thousands of visitors every year.

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