OV Terminal, Arnhem

Design and build of new public transportation hub

The OV-Terminal Arnhem is the centrepiece of the Arnhem Central Masterplan, bringing together its different levels and program components. The terminal is a complete integrated transportation hub providing direct access to trains, taxis, buses, bicycles, a carpark, offices and the town centre.

The existing natural height differences in the site area allowed us to merge pedestrian flows, different transport systems and structural elements in one fluent utilitarian landscape. This facilitates optimal transfer flows, clear sightlines and light penetration deep into the underground floors.

The design is characterized by large double curved, geometric building components, constructed according the ship-building principles. This is reflected by the use of a thin skin plate (mostly 10 mm), stiffened by underlying ribs. The central element of the main hall is the 'Twist', a beautiful twisted column which bears a large part of the roof.

Client;
ProRail

Contractor:
JV OV-Terminal Arnhem vof
(Ballast Nedam and BAM)

Design team:
Architect: UNStudio
Structural design: BAM Advies & Engineering

Supply chain:
Steelstructure: CIG Centraal Staal

Value: €37.5m

Completion: November 2015

Area: 21,750m^2

Key Features:

- 3D multi-disciplinary design and engineering
- Direct data exchange from 3D model towards finite element structural design application
- 3D model based work preparation and method statements
- Measurement on site full based on 3D model data (no 2D drawings)

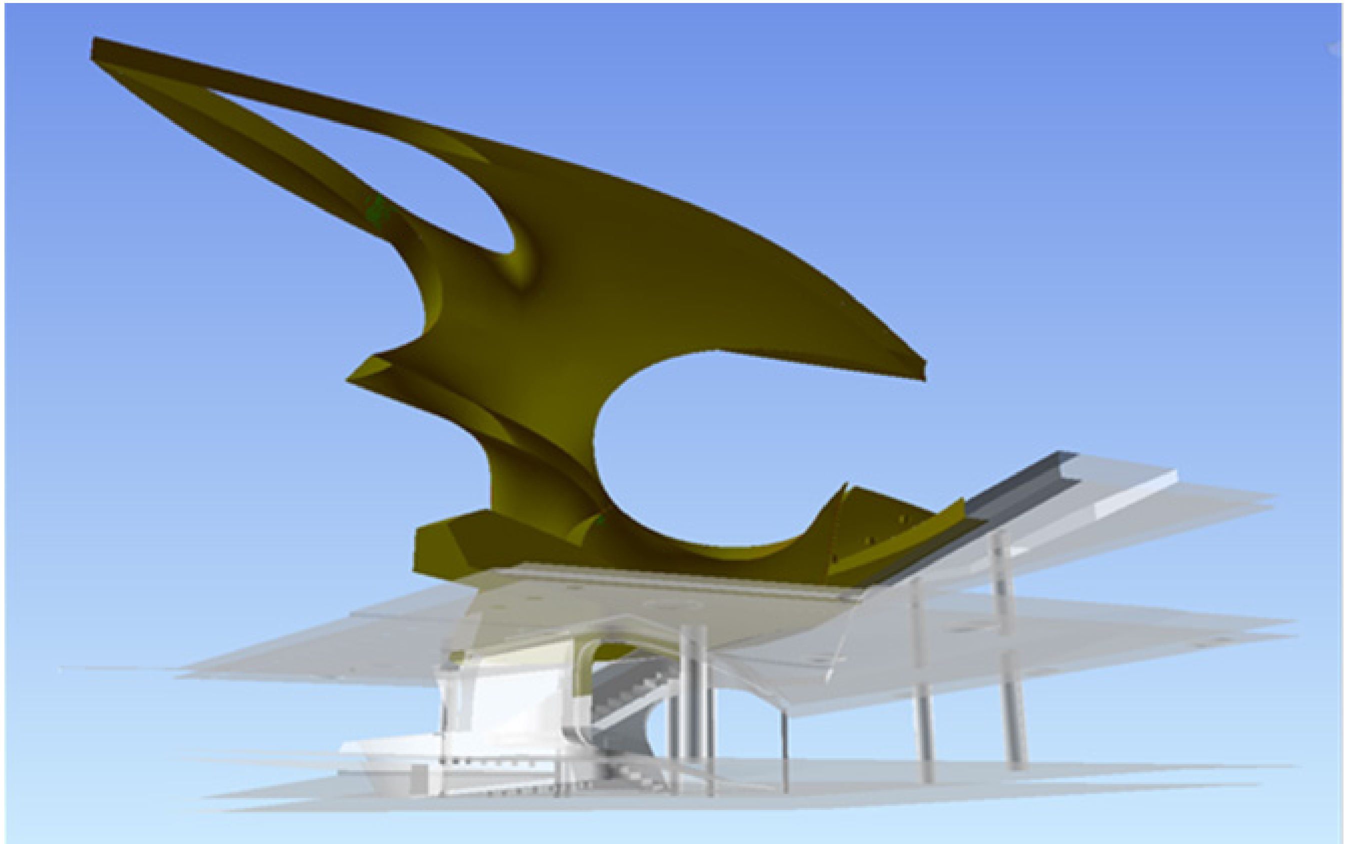
Because of the complex shape of the roof the architect defined the final shape in the 3D modelling application Rhinoceros. All sub design and engineering models were generated and co—ordinated using the geometric data from the Rhino model. Even the required geometric data for the structural analysis was directly transferred form the 3D models to the finite element structural design applications of both BAM Advies & Engineering as well as the steel supplier.

New ways of working were explored and realized using “fully integrated BIM” during the design, engineering and execution phases.

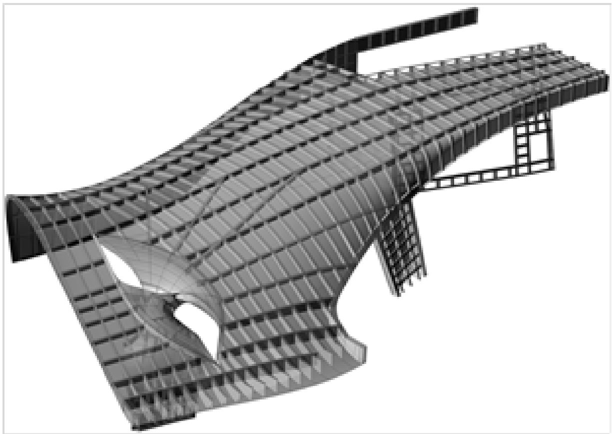
3D models were used instead of the traditional 2D drawings and all temporary supports, inserts, formwork were defined and coordinated in specific 3D models. Supplier related material quantities were also derived directly from the models.

4D modelling techniques were used to analyse, optimize and communicate the time schedule, the phasing and the method statements. For the complex measurements on site continuous data transfer was applied between the 3D model and the electronic theodolite stations.

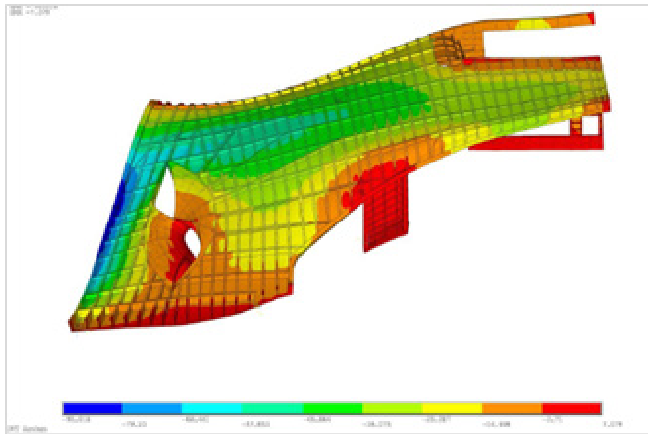
For a complex building like this, the use of very detailed, multidisciplinary and integrated 3D models benefited all of the parties involved. The BIM information - in specific objective related formats -constantly supported and improved.



The twist



Structural 3D model



Finite element model