

Movares

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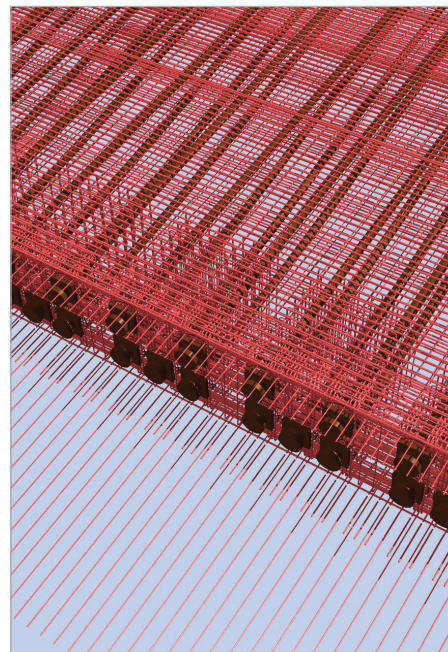
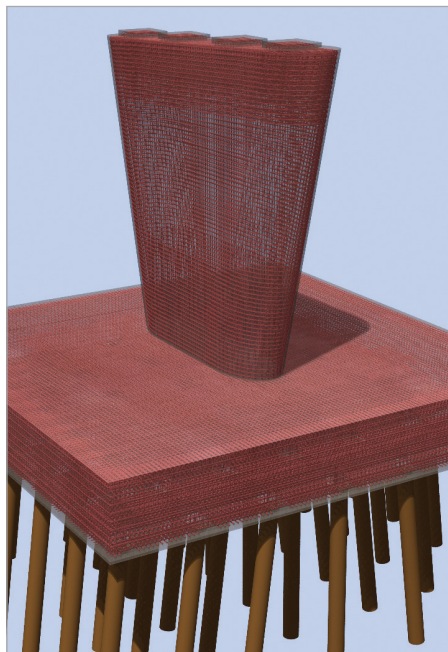


From concept to completion

Movares is an engineering consultancy providing solutions in the fields of mobility, infrastructure, building and spatial planning. Usability, future value and sustainability play a major role in the designs we produce and the advice we give. We contribute to accessibility through our unique combination of expertise. With some 1.400 members in their professional staff, Movares operates throughout Europe and has offices in the Netherlands, Germany and Poland.

Giving shape to mobility

Infrastructure is the backbone of development, both for the society and for economy. From the initial studies and the earliest planning phases to the design and execution of projects and on through to management and maintenance. Movares plays an active role throughout the entire consulting and engineering process. Our combination of knowledge, expertise and innovativity is summed up in our motto: 'Giving shape to mobility'.



Software: Allplan Engineering, Scia Engineer

Fly-Over - Kerensheide, The Netherlands

Background

Because of the economical crisis and the expected negative implications for the building industry in the Netherlands the Minister of Transport and Public Works issued a new law called "Spoedwet" (Emergency Act). By means of this Spoedwet an accelerated construction of rush-hour lanes and other road widening solutions at thirty locations is regulated. These thirty locations are well known traffic-jam locations in the Netherlands. The Spoedwet consists of several packages. One of the packages is Spoedwet E (also known as "SUBLIEM"). The contractor, and our principal, for Spoedwet E is Heijmans.

One of the constructions in Spoedwet E is a fly-over at the Kerensheide junction (A2-A76). The fly-over has a length of approximately 590 m and a width of 17 m. There are 11 sections which span up to 57.2 m. Movares and Heijmans both decided to take the use of BIM to a higher level in the fly-over project. The implementation of BIM in this project implies that designer, contractor and rebar company (Van Noordenne) have to be brought together in an early stage of the project. In this way it would be possible to make agreements about the products needed for the building phase, so double work and errors could be minimized.

Approach for BIM

The process for BIM started during the preliminary phase. In multiple meetings the following items were discussed:

- Template rebar drawings - How the layout looks like and what information should be on it
- Reinforcement detailing - Normally this is done by the rebar company, but now it needs to be done by Movares
- BVBS exchange format - These files are needed for the rebar bending machines

All above products are based on one 3D Allplan model that is used during all phases of the project.

Approach for the design

A sketch design, provided by the contractor, was used as input for the preliminary design phase. In this phase a drawing based on a 2D design was created. In a parallel

process the creation of a 3D model started as well. In the detailed design phase the 3D model was modified conform the latest demands and enriched with more details.

At the moment of writing this, the last phase (building phase) had just started. In this phase the 3D model was enriched with 3D rebars and the form and rebar drawings were created. Part of the modelling and creation of the form and rebar drawings is done by a third party, always based on our 3D model.

The use of Allplan Engineering / Scia Engineer

The fly-over was modelled with Allplan using plain solids for the abutments, foundations and columns. The deck was modelled using a Bridge/Civil Engineering object. For the creation of the template rebar drawings (BIM) the rebars were modelled for one foundation block and pillar.

Because conflicts were foreseen during the building phase between the reinforcement and the prestressing the prestressing was also modelled. With a tool (created by Movares) the export of the prestress software was imported into Allplan. The 3D model, containing the prestress, was exchanged with the third party responsible for the form and rebar drawings. This way the prestress could be taken into account while modelling the reinforcement. This way conflicts were solved during the modelling and not on the building site.

During the detailed design phase Scia Engineering was used for determining:

- Force distribution deck construction (vertical, horizontal) with 3D plate model and 3D beam model (arch)
- Force distribution abutments including piles and walls
- Force distribution pillars/foundation blocks/piles

In the building phase Scia Engineer was used for optimizing.

Because of the integrated approach from preliminary design to building design, the integration between Allplan, Scia Engineer and prestressing software as well as close cooperation between engineering consultancy, contractor and reinforcement company, savings in costs and time have been achieved.

Project information

Owner Rijkswaterstaat
 Architect Heusschen * Copier
 General Contractor Heijmans
 Engineering Office Movares Nederland
 Construction Period From February 2011 to July 2012
 Location Kerensheide junction (A2/A76), The Netherlands



Short project description

This project concerns a new fly-over at the 'Kerensheide' junction, this within the scope of the Emergency Act, issued by the Minister of Transport and Public Works. During the design process of the fly-over, the BIM concept was applied to gain savings in costs and time in the building phase. This implementation consisted of the engineer, contractor and rebar company coming together and making agreements on what information is needed and how that information can be exchanged. In practice this resulted in reusing design information and speeding up the process.

Quote of the Jury

"All project partners are involved in the project from the beginning to optimize the whole process and get maximum efficiency out of this project. The BIM process was well defined resulting in efficient data integration between the different used software packages. Also the technical and structural aspects are quite interesting. The presentation is on an excellent level. The example to handle complex projects in an integrated way."

