WINNER

Tauw

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WINNER

Tauw

Creating sustainable solutions for a better environment

Tauw is an independent European company in the field of environmental consultancy, spatial development, civil engineering and the monitoring of environmental quality. We want to contribute to sustainable solutions for a better environment.

We advise, design and measure in order to develop, improve and maintain the physical environment, natural environment and the infrastructure.

Tauw has offices in the Netherlands, Belgium, France, Germany, Spain and Italy. Through our participation in the CAT Alliance Tauw can be deployed worldwide. In multidisciplinary teams we are working on projects for a broad range of clients: public authorities, private companies and non-governmental organisations.

Dedicated consultants

Tauw is a firm of dedicated consulting engineers who are independent, open and innovative. We attach great importance to working on projects for government and industry for a more attractive, cleaner and sustainable environment. We are committed to solutions that contribute to this end.

In addition to technical solutions we reflect on and test our clients' assignments in a social context. We advise our clients with regard to their own clients.

Our professionals deliver top quality and have the experience, skills and craftsmanship to successfully complete projects and manage processes. Tauw has created a business environment that enables our staff to develop on a personal and professional level.

Tauw's vision is that the best solutions come from passionate cooperation at an early stage of the planning process. That is why we work from regional offices across Europe, close to our clients, using our knowledge of the local context.

Our services

To meet the needs of our clients we have a comprehensive range of services, products and expertise:

- Contaminated land management, including soil remediation
- Water management and engineering, including rural development
- Environmental management and engineering, including waste management
- Civil engineering and infrastructure
- Spatial planning and site development, including brownfield regeneration
- Strategic consultancy and studies, including process and project management

Short Description

Extension and renovation 'Katwijk pumping station'

In order to provide enough capacity for the pumping station, a fourth pump will be built next to the present pumping station. In this way the design and the superstructure of the storage pumping station, dating from 1954, will be preserved. In addition, the existing diesel engines will be replaced by electro-motors and several renovation activities will take place. When the operations are finished, there will be four, electromotor-driven, hydraulically identical, pump units.

Project Information

Owner: Hoogheemraadschap van Rijnland
Architect: Aletta van Aalst & partners BV
General Contractor: GMB
Engineering Office: Tauw BV

Construction Start: 01/04/2008
Construction End: 01/01/2011
Location: Katwijk, Netherlands

Quote of the Jury

"This project distinguishes itself by the complex geometry and the large scale of the structure. The software has been used in an ideal manner for the complete design process: from the initial 3d model to the fully detailed reinforcement drawings. The benefits of BIM are also strongly manifested in the project."

'Olim hic ostium Rheni' ('Here was once the mouth of the river Rhine')

The Katwijk pumping station plays a crucial role in the water management of the Rijnland Water Board. Therefore the Water Board has decided that this pumping station will be the first of their four main pumping stations to be adjusted to present-day requirements and equipped with modern techniques. Tauw will sign for the design and project management. Since Tauw is in charge of both the design and the project management, unforeseen circumstances during implementation can be responded to optimally.

In 2011 the Katwijk pumping station must have the capacity to discharge 75 m³/s into the sea in periods of large-scale excess water at high sea water levels. Now this is only 54 m³/s. Under normal circumstances the pumping station should be able to discharge 94 m³/s to sea. In this respect Rijnland also expects to be able to store water in the near future at the water storage locations in the Haarlemmermeerpolder and the Nieuwe Driemanspolder near the city of Zoetermeer during severe precipitation.

The measures to be taken are necessary in order to cope with the climate changes. More precipitation, urbanization with increased paved surfaces and sea-level rise as well require actions.
In order to provide enough capacity for the pumping station, a fourth pump unit will be built next to the existing pumping station. The substructure and the superstructure of this storage pumping station, dating from 1954, will be preserved and reused. In addition, the existing pump drives (two diesel engines and one electric motor) will be replaced by new electro-motors and several renovation activities will take place.
When the operations are finished, there will be four, electromotor-driven, hydraulically identical pump units.

Fish migration

For the upstream fish migration facilities are made both at the pumping station and at the outer discharge sluice. The downstream migration will take place via the pumps. Because of the large impeller passage and low impeller speed fish injury hardly can takes place.

Allplan application

3D-Model

In view of the complexity of the design geometry it was decided to create the drawings in 3D. During the earlier design phases of the pumping station all drawings had been rendered in Autocad. During these phases it

Extension and renovation ‘Katwijk pumping station’

soon became obvious that in the implementation phase drawing had to be done in 3D. 3D-Modelling has several advantages:

- A more insightful design is rendered, since the designer can clearly visualize what the design will look like “in reality”. Consequently, bottlenecks within the design can be traced and solved much earlier.
- Sections and views can be generated quickly and accurately at random places.
- Since an indirect interface continues to exist between the created views / sections and the 3D-model, changes can quite easily be carried out correctly anywhere.
- By reinforcing in 3D the risk of errors can be reduced here as well. From the 3D-reinforcement model reinforcement drawings can be generated easily and quickly, if required including reinforcing bar bending schedules.

The plan drawings were imported to model of the pumping station. In this way the drawings could be used to create the 3D volumes. In this project we mainly worked with ‘3D-Modelling’, because it consists of complex concrete forms. Since we were working in the detail engineering phase, the number of modifications were limited to applying and/or adjusting recesses, and further working details.

Building components

First of all a 3D-overview was made of the entire design. The entire design was subdivided into building components, and each building component was given a name. In the 3D-overview it can easily be seen where each component is located in the overall picture. Each building component is rendered by means of an isometric view. During implementation this has frequently turned out to be very illustrating.

As soon as the model was finished, the (concrete) quantities could be presented by means of the ‘List Generator’. Each building component is automatically listed with the correct name, isometric reproduction and concrete quantity.

Shell

After the entire model had been finalized, views, sections and further working details were generated. Today Allplan BIM 2008 has a host of solutions to render views and sections. In the case of the Katwijk pumping station, we employed the ‘Shell’ method. One project staff member was appointed for the model as Model Administrator, who carried out modifications to the model. In this way operations could proceed smoothly. By working with several formwork models, more staff could work on the project simultaneously. In addition, clear agreements were made with regard to the file set structure. The current ‘Building Structure’ would have been an even more perfect method, but this only became available in the Allplan BIM 2008.

Delivery of drawings

In addition to the standard delivery of hard copy drawings, the contractor requested digital files such as *.pdf and *.dwg. The conversion of drawings into the requested files was simple, without data loss.
Besides delivering standard form- and reinforcement drawings, as the contractor is used to, Allplan has made it possible to deliver a 3D-PDF, which creates a finer visual image of the ultimate design and its feasibility.

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