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BESIX builds

Europe's tallest radar tower

BESIX is building on Neeltje Jans the new Scheldt Radar Tower for the Dutch highways and waterways authority Rijkswaterstaat. At 115 metres, it will be the highest in Europe. Han Polman, the King's Commissioner in Zeeland, officially launched the construction operation on May 27th, 2014. In the presence of numerous dignitaries, he unveiled a plaque that will be given a prominent place in the building.

With the Scheldt Radar Tower the Rijkswaterstaat wants to gain a better overview of shipping in the North Sea, particularly in the important De Steenbank anchoring area some 40 kilometres off the coast of Zeeland, where vessels wait until they can be 'piloted' up the Westerschelde. The exceptionally high tower is intended to make traffic smoother and safer to and from ports in the Netherlands and Flanders. The strategic siting of Neeltje Jans, the artificial island that forms part of the Eastern Scheldt barrier, will certainly contribute to this.

State-of-the-art radar tower

The new nautical radar tower is unique in that it is the highest in Europe, rising no less than 119 metres above the sea. It is also equipped with the most advanced radar antenna and is part of the Flemish-Dutch Scheldt Radar Chain (SRK). BESIX will complete construction work in autumn 2015.

| CIVIL ENGINEERING

Radar tower Neeltje Jans

A BEACON PROJECT IN ZEELAND

Neeltje Jans, an artificial island in the Oosterschelde, is home to Deltapark, a leisure park showcasing the history and operation of the Delta Works, the greatest engineering feat in Dutch history. Since September 2015, the tiny islet has a new attraction: a fully operational, 115-m radar tower, boasting a record range of 40 km.

STANDING GUARD OVER THE SCHELDT

On a mole jutting 1.5 km out into the sea near the Oosterschelde storm surge barrier in Zeeland, the slim silhouette of the Neeltje Jans radar tower is a welcome sight for the many ships using these busy shipping lanes. The tower, the latest addition to the Belgian-Dutch chain of radars in the region, is able to observe and track shipping movements at a distance of up to 40 km.

RIGIDITY IS A MUST

The concrete tower, which was built with climbing formwork, has a particularly high structural rigidity and ensures a stable radar image, making needle-like Neeltje strong enough to brave the elements for the next 100 years.

Excessive wind speeds up to 250 km/h around the head of the tower were measured on a 1/75 scale model during a wind tunnel study. Turbulence would result in a complete shutdown of the radar system and reduce its life expectancy. The radar is consequently positioned in a nonturbulent area, at nine meters above top of roof.

Using a 3D BIM-model, the traditional preliminary design and the final design phase are blended. This allows us to detect and solve design issues at an early stage: a significant added value for a slender construction with important technical installations.

PATRIEK DEPUYDT
Senior Project Manager Engineering,
Civil Works, BESIX

"The antenna is the crucial part of a radar system and must remain operational under all environmental conditions. To limit deviations of the radar signals, extremely strict requirements were applied to the design in terms of angular displacement and torsion.

That is why we have paid particular attention to the rigidity of this slim tower. Vertical post-tensioned cables equipped this slim tower until mid-height. The concrete mix C53 / 65 is specially designed to ensure an increased modulus of elasticity and a functional design life of 100 years."

RADAR TOWER NEELTJE JANS
OOSTERSCHELDE, THE NETHERLANDS

Fast Facts
- 115-m-high tower
- 3.5 m concrete is poured in a climbing form at each stage
- Record range of 40 km

Design & Build
BESIX

Client
Rijkswaterstaat

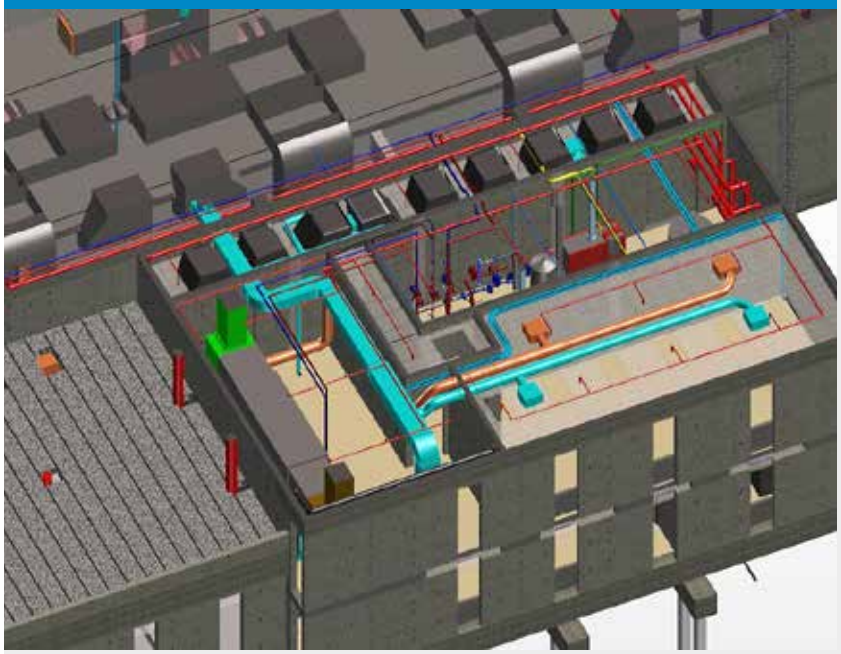
Architect
Quist Wintermans Architecten

Period
April 2014 – September 2015

Betonprijs 2015

In 2015, the Neeltje Jans radar tower was awarded the 'Betonprijs' in the category 'Constructive Design'. This prestigious biennial award is sponsored by the Dutch Association for Concrete Construction and celebrates projects in which concrete is applied in a special or innovative way.

BIM



BIM 3D VIEW STIB HAEREN
Haeren, Belgium

Innovation remains a key strategic driver for BESIX Group. Building Information Modeling (BIM) plays a leading role in finding and developing innovative solutions in the construction business.

This virtual information model allows for more efficient construction management, through the detection of problems at an initial stage, the determination of the most cost-effective quantities and improved communication. One of the most significant organizational developments in terms of BIM this year, was the increasing use of models for trade coordination.

Clash detection sessions have helped to considerably decrease on-site problems on projects such as the Grand Egyptian Museum, the Mall of Egypt, the STIB Maintenance Center in Haeren (BE), and the Water Treatment Plants of Monaragala (SRI), Putte and Ossendrecht (NL). Thanks to leading-edge 3D-modeling techniques we were able to identify new optimization opportunities for geometrically challenging projects like the Malabo cliffs in Equatorial Guinea.

Neeltje Jans

The 115m Neeltje Jans radar tower, which will stand as the tallest nautical radar tower in Europe, has been designed with a post-tensioned shaft using a tailor-made and highly durable C55/67 concrete mix to ensure it will last 100 years, even in punishing marine conditions.

In order to pinpoint its optimum position on top of the tower to avoid wind turbulence and potential radar interference, the Engineering Department conducted aerodynamic tests on a 1/75-scale model of the tower in the CSTB boundary layer wind tunnel.

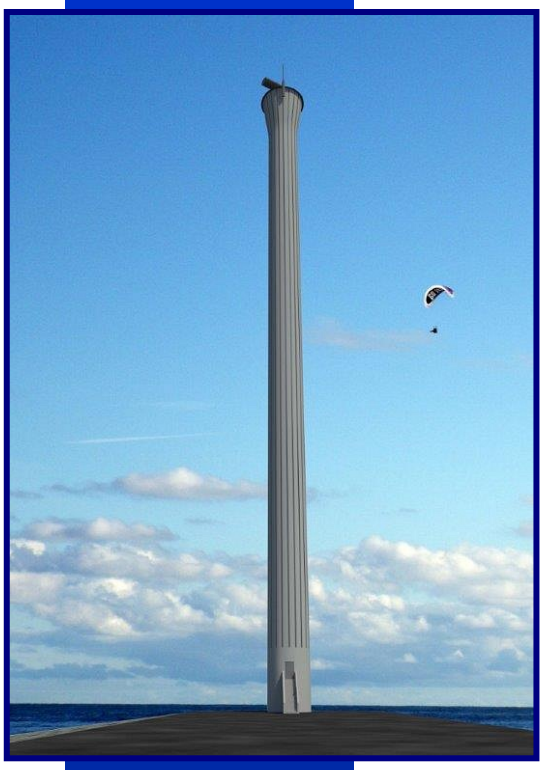
Concrete drawings and BIM visualizations, finally, enabled us to coordinate the civil design and the building-related systems and equipment.

Buildings

Radar tower

Radar Tower Neeltje Jans

The Netherlands



Design and construction of a new Radar Tower.
Rijkswaterstaat wants to get a better view of shipping in the North Sea at the important anchor area 'De Steenbank'.

That's why we build an unmanned Schelde radar chain tower on Neeltje Jans. The advanced antenna on the new radar tower gives a better overview of the shipping. This gives the following achievements:

- safe navigation in all weather conditions;
- smooth flow of shipping to and from the ports on the (Westerschelde) Schelde;

The 115 meter high tower is part of the Flemish-Dutch Schelde radar chain.

The concrete tower is the highest nautical radar tower in Europe and has one of the most advanced civilian radar antennas in the world.

A climbing formwork is used for the construction. The concrete tower is being constructed in thirty phases. At each stage 3.5 meters concrete is been poured in a climbing form. Once the concrete has hardened, the formwork is removed, lifted up and filled with concrete mortar. Essentially, the required concrete is delivered from a facility in Zierikzee,

location	Neeltje Jans The Netherlands
client	Rijkswaterstaat
engineer	BESIX
participation	BESIX 100%
construction period	01/04/2014 – 24/09/2015
contract amount	€ 3,150,000 $ 3,996,752

quantities

Sheet piles	135	t
Concrete	1,400	m³
Excavation	400	m³
Post tensioning	1,100	m
Pretensioning	12	strings

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