Ingenieursbureau Stendess N.V.

Contact Jurn De Vleeschauwer
Address Grote Baan 18
9920 Lovendegem, Belgium

Phone +32 9 370 71 25
Email mail@stendess.com
Website www.stendess.com

Ingenieursbureau Stendess N.V., a steel and concrete engineering company

The engineering firm Stendess was founded by an experienced team specialising in the study and design of steel constructions. From its establishment Stendess has made high quality and full service provision its top priority. Thanks to this integral service, where the design of the metal superstructure and the concrete substructure are calculated and drawn by experts in the same office, the building owner and principal contractor retain 100 % control over the complete structure.

Stendess can follow up on cross-border projects in accordance with most standards and codes: Eurocode, NBN, NEN, DIN, NF, AISC, British Standards and specific national codes.

Key activities

- Industrial buildings: steel factories, power plants, depots, etc,
- Other buildings: service buildings, concert halls, sport facilities, swimming pools, apartment buildings,
- Bridge constructions: arch bridges, cable –stayed bridges, suspension bridges, bascule bridges, swing bridges, orthotropic bridges, mixed steel-concrete bridges…
- Off-shore projects: lock gates, Roro, oil rigs…
- Industrial equipment: silos, cranes, crane ways, storage tanks…
- Erection engineering: longitudinal and transverse repositioning, skidding, lifting, bridge launching…

Locations of the constructions: Belgium, the Netherlands, France, Germany, United Kingdom, Spain, Sweden, Saudi Arabia, Greece, Singapore, Chile, Brazil, Cameroun, Russia, Thailand…

Short Description

Cable stayed bridge, Dilsen-Stokkem

The bridge of this project is built to cross over the Zuid-Willemsvaart between Dilsen and the new industrial zone of Lanklaar, the IQ-park. It can also be considered as the "missing link" in the renowned and busy bicycle route network of Limburg.
The 88 meter long bridge deck is supported by 2 x 8 cables which are connected to the top of an A-framed curved pylon. The curved pylon is 43 m high and has a width of 11,50 m at the base.
The stability of the pylon is guaranteed by 2 x 3 cables which are going backwards to a big concrete foundation.
The pylon and bridge were completely assembled in the workshop. Two pontoons have transported the two pieces to the site and were used for the erection. After the assembly of the pylon, bridge deck and cables, the concrete slab on the deck was finished.

Project Information

Owner: Dilsen-Stokkem
Architect: Arcadis Belgium
General Contractor: TV Superbeton
Laeremans N.V. and Iemants N.V.
Engineering Office: Ingenieursbureau Stendess N.V.

Construction Start: 2007
Construction End: 2008
Location: Dilsen-Stokkem, Belgium

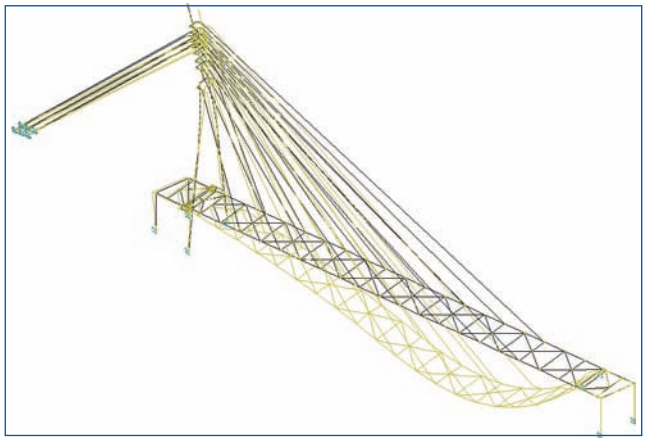
- Type: Cable stayed mixed concrete-steel bridge
- Location: Dilsen-Stokkem, Belgium
- Total steel weight: ± 340 tons
- Total length: 123.50 m span: 88 m Width: 5 m Height Pylon: 42,5 m

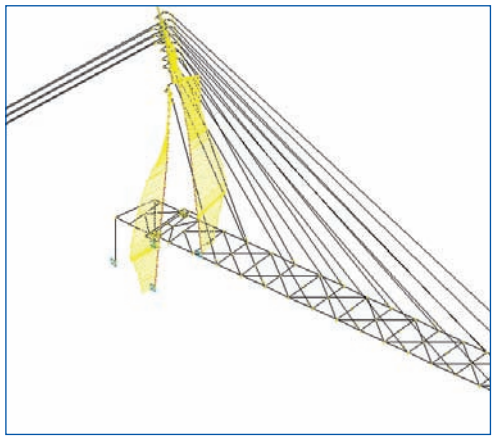
Description of technical questions to be solved with ESA-Prima Win

Both, for the dimensioning of the bridge in the traffic situation and the erection engineering of the bridge, ESA-Prima Win was used.

From an engineering point of view this project has several challenges.

Firstly, there were the curved cross-sections of the main beams. The possibility of input and the use of the graphical section by ESA-Prima Win was a big advantage.
Secondly, there was the limitation of the reactions on the bridge end supports. Also here ESA-Prima Win proved its possibilities.
Thirdly, there was the simulation of the realistic behaviour of the cables. The cables were simulated





Used software: ESA-Prima Win

Cable stayed bridge, Dilsen-Stokkem

as classic bars, but with the E-modules of the tension bar material in relation to the inclination of the tension bars (this means they were considered as cables with a fictive E-modulus). Because the linear calculations resulted in compression in the tension bars a non linear calculation was needed.

Fourthly, there was a second order calculation needed for the check of the curved pylon based on a stability calculation.
Fifthly, engineering the different construction stages had to be examined for the erection and a severe erection manual for the mounting and the pretension of the cables was needed; this to achieve the theoretical form of the bridge deck.
And finally, the dynamic behaviour of the bridge had to be checked.

Description of how our experience with ESA-Prima Win proved its completeness

- Dimensioning a 3D structure consisting of different materials (steel, concrete).
- The possibility of using and combining the results of ESA-Prima Win in a flexible way.
- The possibility of calculating graphical sections.
- The possibility of using tension only elements for the modelling of the cables.
- Stability calculation and second order calculations.
- Checking the dynamic behaviour of the structure by calculating the Eigen values of the structure.

This project proves the great diversity of ESA-Prima Win in checking the structure and the use of materials.

Used modules

- Base
- 3D frame
- Dynamics
- Steel code check (EC)
- Stability
- Physical non linear conditions