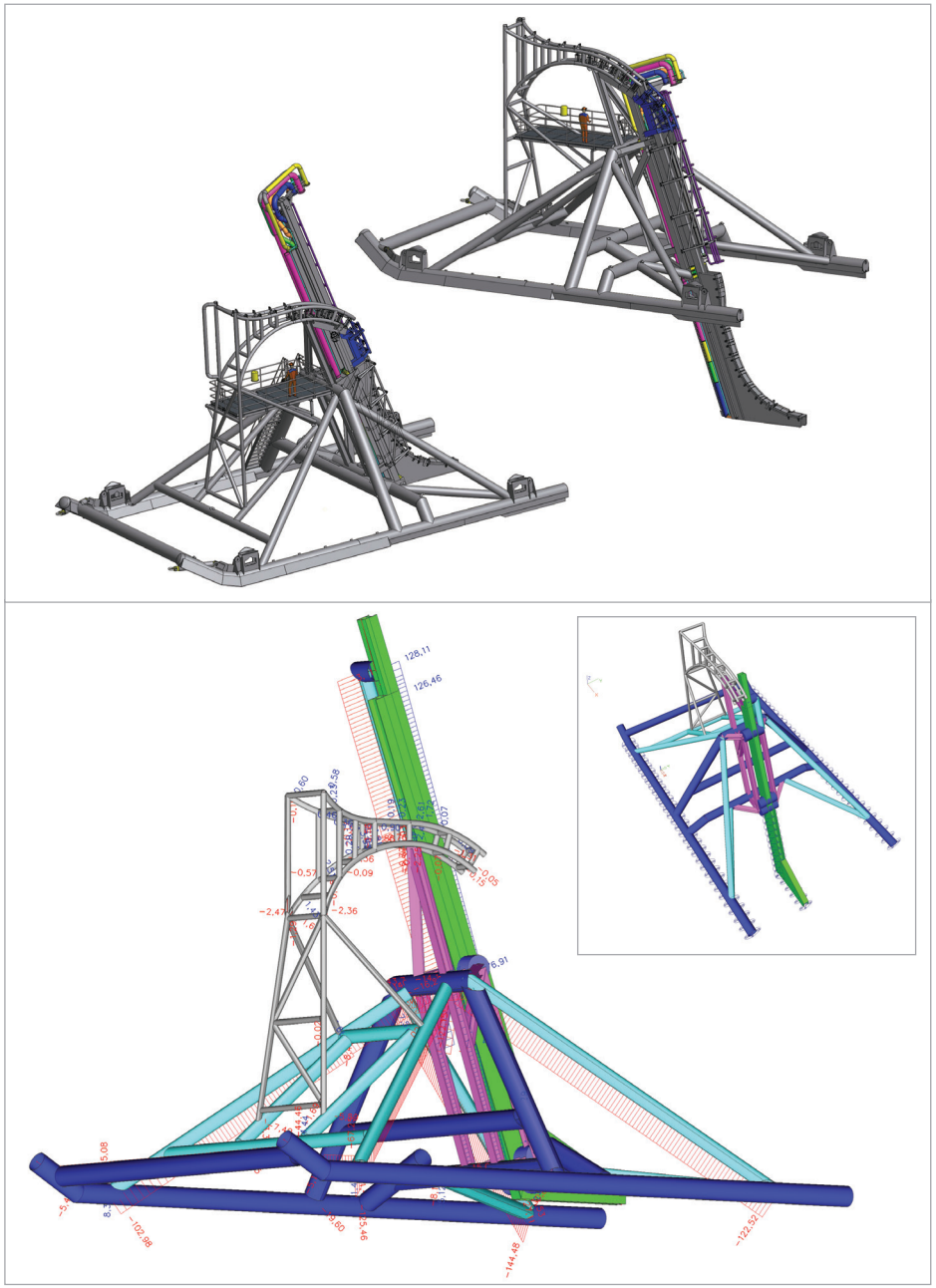
Burial Sledge System II - Rotterdam, The Netherlands



Software: Scia Engineer

Project description

When offshore windfarms are built, offshore cables have to be installed to transfer the energy to the shore. These cable routes frequently cross shipping lanes and for reasons of protection these submarine cables often have to be buried. Due to seabed migration, cable owners installing new cables more often demand an increase of the burial depth in order to reduce the risk of exposure to, and eventual damage and failure of, the submarine cable. Deeper burial depths are potentially problematic since there are few tools available to realise such burial depths. The Burial Sledge System II (BSS-II) is a system that can realise burial depths of up to 6 m under the seabed.

The submarine cable that has to be installed under the seabed is deployed from a cable-laying barge to the lance mounted on the sledge. Fluidising in front of the lance makes the soil weak enabling the lance to install the cable at the agreed depth. Because the jetting lance is mounted on a sledge which rests on the seabed, the cable burial operation is a lot less dependent on the actual sea state which makes the operations safer for the cable as well as the personnel.

Geometry

- Height: 18 m
- Length: 20 m
- Beam: 12 m

Specifications

- Max. pulling force: 100 t
- Burial depth: Max. 6 m under the seabed
- Weight of sledge: 50 t
- Weight of lance: 20 t
- Water depth: 0-30 m

Loads on the sledge

- Wave forces
- Current forces
- Soil reaction forces during burying
- Pulling forces on the sledge, while moving

Software used for this project

- Scia Engineer: structural analysis and design according to the Eurocodes.
- Autodesk inventor: 3D Mechanical Design Software.
- Orcaflex: dynamic analysis of offshore marine systems.

The use of Scia Engineer

The whole structure of the sledge, combined with the lance, was modelled with Scia Engineer.
The calculation included several aspects:

- The modelling of the complex BSS II structure.
- The modelling of the sledge soil foundation at the seabed-level with non-linear springs to schematise the soil.
- The modelling of the environmental forces (like waves and current forces, depending on the water depth) into static load cases (the dynamic calculation was performed with ‘orcaflex’).
- A non-linear calculation of different load cases and situations (different water depths, different lance depths under the seabed).
- A Eurocode check of the steel structure.

Challenges with Scia Engineer

- The complex structure.
- The modelling of the non-linear soil at the seabed level.
- The modelling of the non-linear soil under the seabed.
- The modelling of the environmental forces.

Visser & Smit Hanab bv

Contact Bertus Span
Address Rietgorsweg 6
3356 LJ Papendrecht, The Netherlands
Phone +31 78 6417222
Email b.span@vshanab.nl
Website www.vshanab.nl

Visser & Smit Hanab

Visser & Smit Hanab is a contractor which develops, builds and maintains connections, networks and installations for water and energy. Safety is a top priority. Our goal is to expand our position in the total building process, and to be the best in our professional field. Thanks to our staff, our advanced techniques and our customer-oriented approach, we are able to provide our customers with the optimum support to meet their needs. Together with our customers, we are making a contribution to a sustainable society. In everything we do, we are customer-oriented, progressive, honourable and professional.

Project information

Owner	VSMC
Architect	Visser & Smit Hanab
General Contractor	VSMC
Engineering Office	Visser & Smit Hanab
Location	Rotterdam, The Netherlands
Construction Period	03/2012 to 03/2013

Short description | **Burial Sledge System II**

When offshore windfarms are built, offshore cables have to be installed to transfer the energy to the shore. These cable routes frequently cross shipping lanes and for reasons of protection these submarine cables often have to be buried. Due to seabed migration, cable owners installing new cables more often demand an increase of the burial depth in order to reduce the risk of exposure to, and eventual damage and failure of, the submarine cable. Larger burial depths are potentially problematic since there are few tools available to realise such burial depths. The Burial Sledge System II (BSS-II) is a system that can realise burial depths of up to 6 m under the seabed.