

Witteveen+Bos

Contact Gert Karrenbelt
Address Van Twickelostraat 2
7400 AE Deventer, The Netherlands
Phone +31 570 69 79 11
Email a.karrenbelt@witteveenbos.nl
Website www.witteveenbos.nl



Witteveen+Bos Consulting Engineers

The company 'Witteveen+Bos Consulting engineers' is based in the Netherlands and works with approximately 1.000 professionals worldwide.

The many projects that we have successfully completed over the years are evidence of our effective expertise. We are able to keep abreast with changes in society and thus with the needs and preferences of our Clients. We always aim to be creative and innovative while offering cost-effective solutions. Our engineering expertise

extends to economic, social and institutional aspects, which, in our view, are essential for successfully undertaking complicated engineering projects.

Specialists in projects

Witteveen+Bos can handle the full scope of consultancy services from conceptual (policy) studies, to design and engineering, to maintenance management and personnel training.

Offshore Island Drilling Centre - Caspian Sea, Kazakhstan

Introduction

The Kashagan field is the largest oilfield discovered in the North Caspian Sea. It is considered to be the largest oil find of the last thirty years worldwide. The owner/customer is the North Caspian Operating Company (N.C.O.C.) which comprises a consortium of Eni, KazMunayGas, ExxonMobil, Shell, Total, ConocoPhillips and Inpex. Its development represents one of the greatest current challenges of the petroleum industry given its deep, high pressure, high sulphur content reservoir, shallow ice bound waters and a sensitive environment with a variety of internationally protected species of fauna and flora. In the shallow water of the Caspian Sea during the winter period there are large, wind generated ice movements that impact on assets. Given the environmental conditions the oil and gas companies have chosen the construction of an artificial island which will accommodate the drilling rig and the supporting installations for the exploration and recovery of oil and gas.

Construction

WBK (Witteveen+Bos Kazakhstan) is involved in the design of the artificial offshore islands. These artificial islands consist of a sheet piled rock substructure to create a robust foundation island. To prevent accidentally spills flowing into the Caspian, the substructure contains a subsurface drainage system.

The topside contains concrete trenches and foundations for the installation of pipes and buildings for the drilling and production of the oil and gas. After transportation the elements are placed on the correct position on the island.

In case of an emergency the island is equipped with a fire water and sea water system. The fire water and sea water system consist of a buried pipeline system, water intake pits and hydrants.

For the interface with the transportation pipelines riser islands are installed adjacent to the drilling islands. The risers are protected against ice and wave loading by rock embankments.

To prevent major ice build up along critical parts of the island, ice protection barriers are installed some distance off the quay. These rock barriers have to

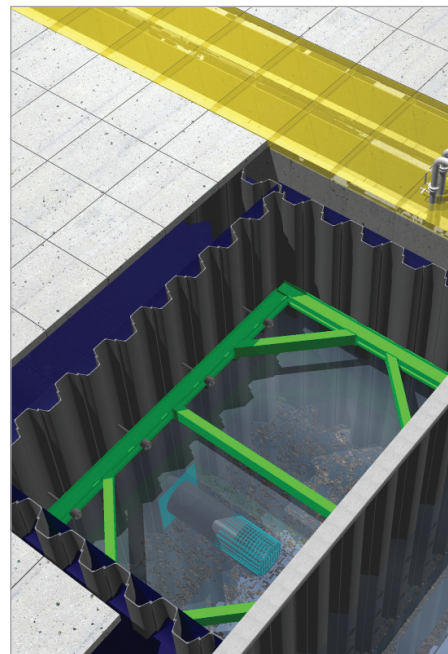
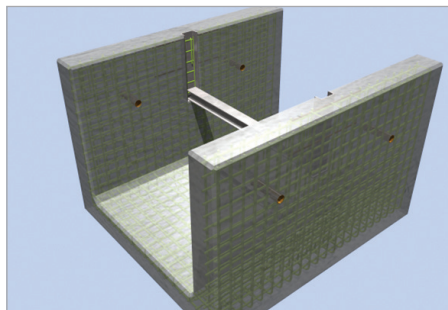
sustain major ice loads and will also reduce waves at the quay walls. The reduction of wave heights increases the uptime of the quay wall.

Lastly, because of the harsh conditions the construction season is only 7-8 months per year. To make it possible to construct as many as possible during this period most of the concrete works consist of prefabricated elements.

Allplan Engineering

The construction of the substructure and the topside induce many engineering challenges to the designers. The islands contain many items on a small area to allow for the different functions. Allplan is used to detect clashes between the substructure (anchor walls and geomembrane) and the topside foundations, trenches and buried pipelines. The different structures need to be incorporated within a minimal area to reduce environmental footprint with a max. construction depth of approximately 3 meters. Because of the harsh conditions during the winter the construction window is very small; each clash reduces the productivity in that window. That's why WBK also uses the Allplan reinforcement module to create a flawless bending schedule. Another example to show the strength of Allplan is the easy way to extract quantities of rock and other materials for this project and provide construction phases for sensitive construction activities.

Our Client sees a major advantage in the fact that their engineers also design in 3D (for example piping with PDMS). In previous projects the Client has had to create his own 3D model from our 2D drawings. Using Allplan we can provide a 3D model and at the same time we can identify conflicts between the different models in an early stage. In spite of the varieties of constructions within the project, our experience is that Allplan is suitable for the complete designing job.



Software: Allplan Engineering

Offshore Island Drilling Centre

Caspian Sea, Kazakhstan

Project information

Owner N.C.O.C. (North Caspian Operating Company)
General Contractor SDK (Shell Development Kashagan) - ENKA
Engineering Office Witteveen+Bos Kazakhstan
Construction Period From August 2010 to August 2011
Location Caspian Sea, Kazakhstan



Short project description

The project is about the design and construction of an artificial foundation island for the drilling and production of oil and gas in the Caspian Sea. Harsh conditions (such as ice, waves and settlements) in combination with strict oil and gas HSE regulations require specific engineering. The engineering works for the Drilling Centre include the design of a rock substructure, including sheet pile walls and anchoring, as well as foundations for topside structures for oil production and drainage systems.

