kenc
OIL AND GAS

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News Update

MANAGING DIRECTOR'S WELCOME

Good Performance Track Record

2015 has been a good year. Since our first issue in 2014, KENC has been awarded several challenging large projects. During the past period Van Oord awarded KENC a design and fabrication equipment project for its Flexible Fall Pipe Vessel Stornes. This issue describes just one of the multiple sub-projects awarded: the design and fabrication of trolleys for the automated handling of flexible fall pipe buckets. Our next newsletter will handle other sub-projects. Besides these activities, we have also been involved in outfitting a pipelay barge for a pipeline renewal project. You can read about this project in our newsletter.
Project engineer Rick Zegger has joined our company and strengthens our team with his valuable experience in lifting and rigging. At our new premises in Poznań and Oldenzaal, we have room to expand over the coming years. Our flexible workstations enable us to work closely together on projects, increasing overall efficiency. Besides our team, we have invested in additional FEM software which allows us to carry out advanced fatigue analysis of structures. Our stress engineer Niek Oldeboer explains exactly what this software does.

Enjoy our newsletter. We look forward to your feedback.

Eric Buining – Managing Director

Breaking new ground with pipeline renewal

Outfitting the pipelay barge

Leading contractor for dredging, marine engineering and offshore energy projects, Van Oord, was completely satisfied by KENC's performance during a pipeline renewal project. KENC succeeded in the design, pre-fabrication and outfitting this project required within a short time frame.

No ordinary project

Van Oord had been commissioned to replace a Sea Line and Pipe Line End Module, which marine tankers use to fill the refinery. This partial oil pipeline renewal was no ordinary project with a standard solution; Van Oord had to develop its own string barge concept and replacement method, taking into account both limited 'shut down' time and Health and Safety Executive (HSE) authorities' environmental regulations. Preparations involved outfitting a stock barge to store, handle and weld the 97-metre strings from 12 metre pipeline sections.

Van Oord turned to KENC to design concepts, pipe strings and components used on the barge, and to carry out detailed engineering and structural analysis of the barge.

KENC project manager Kees Durk van der Kooi with a pipe hold back clamp.

These 12 metre sections were welded into 97 metre strings in the Netherlands. The barge is outfitted to transport these 97 metre strings and can weld these strings into a five kilometre line.

Solid designs and engineering analysis

Van Oord turned to KENC to design concepts, pipe strings and components used on the barge, and to carry out detailed engineering and structural analysis of the barge. SOLIDWORKS was used to create a 3D CAD model of the barge including equipment and materials used on board. The lay-out of the barge was devised and drawn up together with a Van Oord dedicated project team and the barge's workability was tested and checked for flaws.

KENC carried out both hand and FEM calculations, to analyse the impact of forces during lifting and stacking, as well as misalignments in the firing line supports on these strings. This data was used for guidelines on alignment tolerance and lifting points for gear, stack supports and firing line supports. To determine whether differences in the height of support structures were satisfactory, KENC measured the barge deck's surface flatness.

And that's not all; KENC also designed the deck interfaces responsible for placing equipment and supports on deck. The structural integrity of the deck interface and barge was checked accurately using FEM analysis.

String pull procedure in a nutshell

The barge-based discharge system, comprised of four 40 tonne SWL gantry cranes and a roller track, stacks strings four tiers high. One remote handles four simultaneously operating gantry cranes in lifting the pipe string into the firing line. For both onshore and offshore pulls, a crane using a pipe clamp and set of pulleys can manoeuver the string lengthwise into the welding station, located at the bow and stern of the barge. For offshore pulls, a pull barge is outfitted with a linear winch, which exerts a force, pulling strings into the river, over the seabed to the end of the new pipeline.

The barge, with stored 97-metre strings sailed to the project location in April 2015, beached there to unload and welded the 120-tonne strings together. They will be used for the new five kilometre pipeline.

Automation improves safety on board FFPV Stornes

International dredging and offshore contractor Van Oord's FFPV (Flexible Fall Pipe Vessel) Stornes uses a fall pipe to install stone rocks on the seabed. These subsea rock installation activities are carried out in order to protect and stabilise offshore structures. For instance, a rock cover is laid over a pipeline.

The Stornes crew was enthusiastic about this new system now that manual operation is no longer necessary.

On board the FFPV Stornes buckets were launched and recovered, requiring a lot of manual handling, thereby increasing the risk of accidents. Van Oord asked KENC to come up with an automated system to replace its manual handling operations.

Suspended from a fall pipe tower situated in the centre of the vessel, the flexible fall pipe consists of hundreds of cone shaped buckets joined together by two chains. The buckets are stored in a bucket storage container and moved from the bucket storage container to the fall pipe tower and visa versa.

KENC designed, fabricated, delivered and commissioned five trolleys to move buckets safely. In the Tower Control Room (TCR) the pilot can operate all trolleys. The six installed cameras on each of the trolleys together with additional static cameras give the pilot a total overview of everything that is happening on the Bucket Storage Container (BSC). The pilot sees the images on the screens in front of him. KENC configured the positions of these cameras using 3D design software prior to installation.

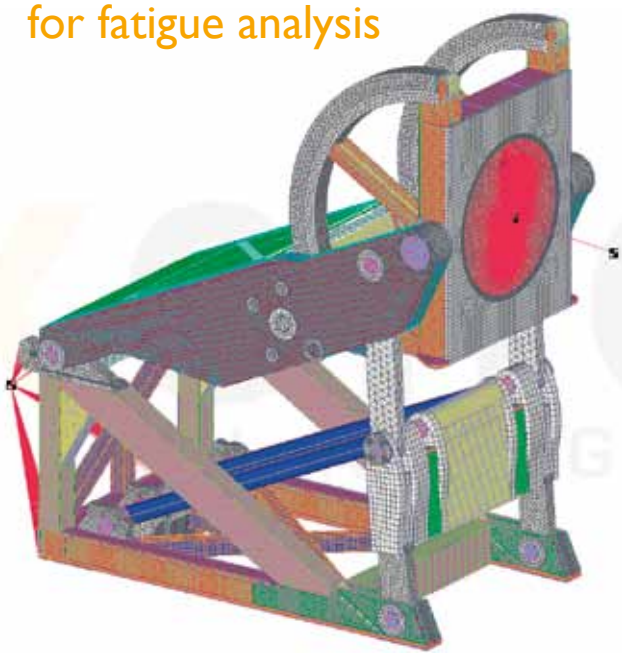
One of the challenges was the limited space in the existing structure. There was little room for components on the trolley itself. Besides electrical components, the trolley is equipped with a hydraulic system for an optimal force distribution from the driving trolley to the bucket strings. This hydraulic system also ensures that should a crash occur, none of the components or structures are damaged.

A tight schedule was kept in order to have the trolleys ready before the Stornes docked.

A tight schedule was kept in order to have the trolleys ready before the Stornes docked. The trolleys were constructed in the BSC during the docking period. The cables were also laid and connected at this time. The trolleys were put into service together with the help of the Stornes crew and were delivered on schedule and according to budget.

Now employees no longer have to be physically present at the BSC to monitor it. The Stornes crew was enthusiastic about this new system. They really value the fact that manual operation is no longer necessary. Being able to sit inside the TCR during bad weather is another great advantage!

New SDC Verifier software for fatigue analysis



New software enables KENC to perform detailed fatigue analysis on offshore equipment we have designed. Having expanded our programme recently with an additional solver, SDC Verifier, enables us to do fatigue analysis in addition to our current linear static and buckling analysis. For the past couple of years, KENC has used the Finite Element Modeling And Post-Processing programme (FEMAP) and solver NX Nastran to do linear static analysis on designed equipment with respect to stress and deflection as well as buckling analysis.

"The advantage of this new solver is that the current model used for static analysis can also be used in the new solver for fatigue analysis," explains Stress Engineer Niek Oldeboer. "This new solver allows us to identify and qualify all welds within the model." Based on pre-defined load criteria, the allowable stress with respect to fatigue is determined. There are several options to choose from regarding the frequency and intensity of the load. The four different categories range from light loads used periodically to full working loads in continuous operation. Once a load option has been chosen, fatigue analysis of the model and in particular the welds can take place according to DIN standard 15018.

Rick Zegger

PROJECT ENGINEER

Rick Zegger has worked for KENC as Project Engineer for the past ten months. The 26 year old from Deurningen was no stranger to KENC. Rick wrote his Mechanical Engineering bachelor's thesis five years ago when working as an intern for KENC.

After receiving his degree, he worked five years for Wagenborg Foxdrill in Oldenzaal on projects involving new rigs, rig moving, derrick modifications and a variety of other projects. During this time he gained experience in the oil and gas industry.

His new role entails designing new equipment from concept phase to detailing using SOLIDWORKS 3D CAD software. "My ambition is to engineer special tools for oil and gas industry projects. I'm looking forward to adding value to sophisticated customised equipment projects for the oil and gas industry. I'm up to the challenge of completing a design well and learning how to meet customers' expectations. Being part of the KENC team, I'm confident this will happen!"

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