KENC OIL AND GAS

Issue 2 • 2016

News Update

MANAGING DIRECTOR'S WELCOME

Some Significant Projects

In the past year KENC has executed a number of major projects for well known customers. We were commissioned by Heerema to make workstations for the DCV Balder, resulting in safer and more efficient pipe laying. Another project was the development of a system enabling Van Oord to deposit rocks at greater depths. We have also engineered a pile grillage with sea-fastening for Jumbo Offshore, and for Boskalis we have made adjustments to a lifting hook for the Taklift4. In this Newsletter you can read about these projects in greater detail.
At our offices we have invested in supplementary software to further professionalise our equipment manuals. We have also invested in 3D Inventor design software to complement our SolidWorks licences. In spite of the challenging situation in the oil and gas markets, we have been able to execute some significant projects as well as expand our client base and attract new business. We have received some orders for challenging projects for the forthcoming period and we will naturally be putting all our dedication and effort into their execution. We will keep you posted.

Enjoy reading the Newsletter!

Eric Buining – Managing Director

Heerema DCV Balder Shelter Modifications

Heerema Marine Contractors (HMC) has been awarded the Kaombo project. This project requires pipe lay and related in-line or end-line structure installation in West Africa, which will be done by Heerema's DCV Balder. DCV Balder's pipelay equipment was overhauled in Dordrecht and reinstalled on DCV Balder in the Caland Canal in Rotterdam in Q1-2016.
Early 2015, KENC was asked to do a complete redesign of the Quad and Hex shelters. These shelters provide the working areas for all deck pipe lay production operations on board the DCV Balder, such as bevelling, welding, weld inspection and coating. The Quad shelter is used to connect two dual pipe sections to a single quad pipe section. In the Hex shelter a dual and a quad pipe section are joined together to create a single hex pipe section with a total length of 72m. The hex pipe section is then upended in the pipe lay tower from where it is connected to the existing pipe string and eventually lowered to the seabed using the J-lay method.

In comparison to the previous Quad and Hex shelters, the new shelters had to provide the following main improvements:

- Increased working space and equipment storage space within the same available deck area.
- Optimised working procedures and equipment handling
- Improved safety (no work allowed under suspended loads)
- Improved working area access and escape routes

– Integrated design of utilities such as lighting, electric power, compressed air, welding gasses, cooling water, dust and fume extraction equipment, swarf disposal and air conditioning.

The design challenges were extensive, but KENC succeeded in developing shelters that met all requirements.

The previous shelter design consisted of a structural beam frame, which was enclosed with metal shielding. The new shelter design comprises self-supporting shielding with integrated stiffeners, resulting in a lightweight construction with very high rigidity. It is only because of this design that it was possible to incorporate the permitted stresses in the deck foundation with a structure that has 10m of unsupported overhang.
It was a tight schedule right from the start of the project, but KENC has been able to implement all functional requirements by creating an innovative design that was established early on in the project.
The DCV Balder will start the Kaombo project in the second half of 2016.

Interview with Arthur van Opstal, Pipeline Production Coordinator of HMC, about the project.

What was the main goal of the project?
"The project was initiated to improve the production environment for the Pipe Handling and Multi Jointing Facility on board DCV BALDER. The existing shelters had been used almost continuously since 2002, during which period lessons were learned and suggestions for improvement were logged. As a result, HMC initiated a DCV BALDER improvement programme in 2012, dealing with various topics that were considered worthy of improvement. Among these topics was the above-mentioned Pipe Handling and Multi Jointing Facility. Initially, KENC was requested to develop a concept for the deck welding stations and overhead equipment shelters in early 2013. Later on, in 2015, KENC was asked to further develop one of the concepts into a detailed design with the aim to have the shelters fabricated by December 2015."

What was your role and what were your responsibilities?
"In my role as Pipeline Production Coordinator, I am involved in the development of production equipment for use on board our DCVs. Since the shelters are strongly related to that equipment and the associated production processes, I also became involved in translating the improvement suggestions into a new shelter design, together with KENC."

What difficulties and challenges did you meet?
"Although the earliest preparations started back in 2013, the time available to develop a concept into a detailed design was limited to approximately six months and took place in early 2015. Another major challenge was that in order to create a safe overhead storage space for production equipment (no overhead suspended loads allowed) the elevated floor space had to be increased significantly while keeping the added weight and structural loading to a minimum. Lastly, it was a challenge to get hold of all the requirements and existing data for the utility systems, as they were not readily available at the time."

Can you tell us something about the collaboration with KENC?
"KENC's earlier experience with HMC on the DCV BALDER A13 shelter refurbishment and the DCV AEGIR production equipment facilities concept design proved to be valuable in creating concepts for the new shelters within the short time available. In the first two months of the six-month design period, a basic design was quickly drawn up which could be reviewed and approved by various HMC departments."

What about the end result?
"The final design was compliant with all the suggested improvements as well as the requirements of a lightweight ship-structure design and finally resulted in the creation of large-volume structures without overloading the existing DCV BALDER deck structure. The shelters and utilities now offer an up-to-date working environment for the production crew."

Van Oord Stornes Halfway Hang-off Module

Subsea rock installation is an important service which Van Oord has been providing the offshore industry with for a long time. Flexible Fall Pipe Vessel Stornes has set a world record with the precise placing of rocks at a depth of 1,277m, starting a new era in subsea rock installation. The development of a so-called Halfway Hang-off Module enables installation at great depths. The module is placed half way along the flexible fall pipe and its design is based on the concept of suspending half the weight of the fall pipe separately from the existing fall pipe suspension mechanism. The patented module is also supplied with an overload protection mechanism, which can deflect new rock stones in the case of a blockage in the fall pipe. KENC was asked to assist in the development, which resulted in a scope of work that covered the complete design and structural checks of the module, under Bureau Veritas certification.
"At KENC we truly enjoyed this project because of the level of innovation and the difficulties that had to be mastered", says managing director Eric Buining. "Most of all, however, it was a pleasure to collaborate with the Van Oord project team. Van Oord showed a lot of involvement right up to the very detailed phase of the design. The collaboration was intensive, resulting in a successful end result. Within Van Oord, the project was even honoured with the ingenuity award. It's a pleasure to have been able to contribute to that success."

Profitable subsea rock placement at great depths and under harsh circumstances

COR HILBRINK, PROJECT MANAGER

Rocks are usually placed on the seabed by a so-called fall pipe. Because of the weight of the fall pipe itself together with the friction of the rocks against the inside of the pipe and adverse weather conditions, rock placement is restricted by the maximum volume of rocks which can be placed and the water depth.
In order to carry out projects profitably at greater depths and during harsh weather conditions, KENC was asked by Van Oord to develop the Halfway Hang-Off Module (HHM). This module is installed halfway along the fall pipe and takes up part of the forces that act on the fall pipe. An additional function of the module is its ability to discharge rocks when they are blocking the fall pipe or when part of the fall pipe is broken. After signalling these problems by means of load cells, the module re-routes rocks in the process of being discharged in order to prevent them from falling on the blocking rocks or broken fall pipe.

The big challenge for this project was to integrate the HHM into the construction of the vessel. The module should fit in the moon pool of the vessel, and both the fall pipe and the ROV cables must be able to pass through the HHM. For projects in shallow waters, the HHM must be easily removable from the tower and when needed again it must be replaceable without any effort. The module has to be capable of withstanding forces from the fall pipe, the ROV, vessel acceleration and the current. To find the best construction, nine different load-cases were calculated by means of FEMAP.

The next challenge was to find a good location for the HHM so that it could be sea-fastened while sailing. The possible location on the moon pool doors was already taken by the ROV and the top of the tower was reserved for the Umbilical Moon Pool Frame (UMF). The shape of the module meant that other locations on the tower were not possible for sea-fastening. In the end it was decided ❯

to hang the HHM below the UMF during sailing. However, the existing UMF was not up to this job and had to be adapted to guarantee a definite position for the fall pipe; this resulted in the UMF being completely re-designed.
The HHM as well as the UMF were constructed under the supervision of KENC. The HHM has been certified by Bureau Veritas. Thanks to the excellent communication between KENC and the manufacturer, production details could be discussed and approved very quickly. This resulted in fast turnaround times and the manufacture of products, which conformed both to the wishes of the client and the requirements of the certification bureau, and which also fitted effortlessly into the existing tower construction.

Graphic manuals

A new software package was used for the HHM and UMF manuals. This software gives instructions and directions graphically, reducing the amount of written material an operator needs to get through in order to understand them. The result is faster and more efficient execution of a maintenance or repair job. Van Oord was very satisfied with this solution; hardly anyone reads a manual, but they are more likely to if there is a visual explanation.

Jumbo – Heavy Lift Vessel Fairplayer

Jumbo recently completed their assignment for the mooring replacement on the Haewene Brim FPSO project in the Pierce Field in the central North Sea. The Heavy Lift Vessel Fairplayer was used for the transport and installation of eight 84" mooring piles, each having a weight of 85t. KENC was asked to provide the structural design checks of the pile grillage and Make Ready Station, including modifications. KENC also created the sea-fastening design.

Roy Jansen, Installation Engineer at Jumbo gives his remarks on the project:
"Jumbo Offshore was contracted the transportation and installation of eight replacement mooring legs for an FPSO in the central North Sea. The DP2 vessel Fairplayer was selected to perform the anchor pile and bottom chain installation. KENC had designed and engineered pile grillage and sea-fastening for Jumbo Offshore in 2014 for similar projects and because of the good results and collaboration back then, Jumbo decided to choose KENC again. The same grillage was used, however this time on a different position on the deck of the Fairplayer. Some small modifications made this possible. KENC also provided a new sea-fastening design for the piles and the structural engineering for two constructions with rollers to rotate the piles (the so-called Make-Ready Stations). As installation engineer for this project, I was responsible for finding a suitable and practical solution for the storage and sea-fastening of the anchor piles on the deck of the Fairplayer. Together with KENC, we managed to engineer a solution that matched both these criteria within a very short time-frame, but also with a high level of quality."

Lifthook for Boskalis

KENC was asked by Boskalis to provide the design of a Lifting Hook Part, based on a WLL of 700mt for the sheerleg Taklift 4. The Lifting Hook is designed in accordance with the Lloyds Register Code for Lifting Appliances in a Marine Environment, and was successfully load-tested.

kenc OIL AND GAS

NETHERLANDS
KENC Engineering B.V.
Zutphenstraat 39
7575 EJ Oldenzaal
T +31 541 533193
E info@kenc.nl

POLAND
KENC sp. z o.o. sp.k
ul. Romana Maya 1
61-371 Poznań
T +48 61 88 00 950
E info@kenc.pl