

SAFETY

DREDGING INNOVATION:

FLOATING LINE CONNECTING SYSTEM

No one is in the line of fire anymore thanks to the Floating Line Connecting System developed by Boskalis. The innovation enables floating pipelines to be connected without using any manpower. All it takes is two hands to operate the remote control. The system was developed in-house by a diverse team and successfully tested on the Duqm port development project executed by the company in Oman.

We are continuously looking for ways of reducing physical labour for these types of operations and minimising risks involved.

Connecting floating pipelines is an operation involving many risks: the risk of hands and fingers getting caught in the ropes, the risk of falling off the pontoons, the risk of getting hit by a line in a snap-back zone. All risks that were apparently part of the job and the weather was the only factor on which you could base a decision: 'the wind is too strong and the waves too high, we'll wait, it's not safe'. All that is about to change, due to a revolutionary innovation called the Floating Line Connecting System (FLCS) that mechanises the connecting operation.

'We are continuously looking for ways of reducing physical labour for these types of operations and minimising risks involved', says Daan van de Zande, Operations Director of Boskalis' fleet of cutter suction dredgers, explaining the reason behind this development. 'Since the introduction of the Boskalis No Injuries No Accidents (NINA) safety awareness programme, people are more less likely to accept the label "accepted risk". We take responsibility for our own safety but we also take action if any unsafe situations arise.'

Four criteria

Van de Zande has been involved in the development of the system from day one. The first step was to make use of the developed twelve-metre-long self-floating pipelines suitable for pumping sharp dredged material. Due to the large bending angle, these pipelines could be used to assemble 100 metre sections rather than the 20 metre sections usually used for steel pipelines. This specifically meant that far fewer lines needed

The IADC Safety Award Winner 2019

This year the International Association of Dredging Companies Safety Committee and Board of Directors received fourteen outstanding safety nominations. After deliberations, the committee selected the innovative Boskalis Floating Line Connecting System as the winner. During a ceremony in mid-October at the IADC Annual General Meeting in New Delhi, IADC President Frank Verhoeven (right) announced the Safety Award 2019 winner and presented it to Hans Dieteren, Director of Boskalis Offshore (left) who accepted it on behalf of the company.

connecting. While this reduced the risks considerably, the actual connecting still had to be done by people, using the crane of the multicat.

Seeking to devise a method to mechanise this, various brainstorm sessions were held with people in the field. Van de Zande: 'This produced four design criteria: no one in the line of fire, no manual operations, no crew transfer, at least equal or higher workability than the conventional method. We made various designs based on these criteria but it always became too complex. Until, one day, I sat down with my colleague Bas Veenstra about the so-called Mooring Actuator – a system that makes manual mooring with lines obsolete – he had designed and the possibility of using it to connect floating lines. And it rolled on from there.'



Strength

Using the ball, the U-shaped bollards and the remote control from the Mooring Actuator the Boskalis team developed a three-winch system that draws the lines together and connects them hydraulically. 'The strength of the system lies in its simplicity', says Pieter Verbiest, Fleet Manager Auxiliary Equipment and member of the working group. 'It meets

How the Mooring Actuator Works

Secured to a backhoe's bollards with heavy lines, a barge assists with the transport of material dredged by a backhoe. The Mooring Actuator was developed to enable the mooring of these barges alongside backhoes without any manual intervention making this operation much safer: the risk of falls or injury is considerably reduced, there is no more lugging around of heavy lines and no more time is lost adjusting the lines.

A backhoe dredger is fitted out with two swivel arms more than eight metres long, both with two large steel balls attached to chains. On barges that are being positioned alongside the backhoes, U-shaped bollards (catchers) are installed which catch the steel balls. Working from the backhoe, the swivel arm with the ball is turned towards the barge as it approaches. The ball is caught by the catcher, linking the two units. Specially developed constant tension winches then roll up the line and pull the barge to the backhoe. The winches maintain constant tension in the lines and so the barge is kept stable in exactly the right place throughout the loading operation. The entire process of mooring and stabilising the barges from the backhoe can be controlled remotely by a single person using an operating system developed in-house by Boskalis. The system has two winches and two balls on each swivel arm, making it possible to moor a split barge with four lines.

all four of the criteria we had set. And if the system fails, you can always fall back on the old working method, meaning continuity is guaranteed.' A patent for the system has been obtained recently.

Optimising

'Ten years is a long time to spend on research but it was more than worth it', says Richard Vermeeren, who as Chief Skipper of the cutter suction dredger Taurus was involved in the testing of the system. 'No more people on the pontoons, no more working with ropes, that really is progress in terms of safety. The new method is easily learned and the colleagues are very skillful. Now it is a matter of further optimising the system. I went to the Boskalis headquarters in Papendrecht to share my experiences as a user and to discuss possible improvements. I favour this approach as it enables us to optimise the system and achieve the best possible result. Furthermore, this way of working and learning helps us to improve continuity and increase engagement.'



The Boskalis Mooring Actuator

Secured to a backhoe's bollards with heavy lines, a barge assists with the transport of material dredged by a backhoe. The Mooring Actuator – a nomination for the IADC Safety Award 2017 – was developed to enable the mooring of these barges alongside backhoes without any manual intervention making this operation much safer: the risk of falls or injury is considerably reduced, there is no more lugging around of heavy lines and no more time is lost adjusting the lines.