14 INNOVATIONS

FACE OFF FOR SAFETY AWARD 2019

Each year IADC gives the Safety Award to one innovation which proves it is the best in its class. This year, fourteen innovations addressing challenges faced within the dredging industry have been nominated to compete for the Safety Award 2019.

The Safety Award is an annual initiative conceived by IADC.

Combatting risk by increasing safety

As an association, IADC is committed to promoting safety in the dredging industry. Dredging activities can be risky operations with hidden dangers amongst heavy machinery. In response, the dredging industry proactively maintains a high level of safety standards. As a representative of contractors in the dredging industry, IADC encourages its own members as well as non-members participating in the global dredging industry to establish common standards and a high level of conduct in their worldwide operations. The IADC's members are committed to safeguarding their employees, continuously improving to guarantee a safe and healthy work environment and reducing the number of industry accidents and incidents to zero.

The Safety Award is an annual initiative conceived by IADC. By giving this award, IADC intends to encourage the development of safety skills on the job by rewarding individuals and companies demonstrating diligence in safety awareness in the performance of their profession. A particular project, product, ship, team or employees can receive the award, serving to recognise the exceptional safety performance which their innovation demonstrates.

Nominated for IADC's Safety Award 2019, fourteen solutions address the safety of equipment as well as routine processes and situations encountered in the workforce of the dredging industry.

Boskalis has integrated real-time sonar imaging on diving helmets to increase sight in zero-visibility conditions

Diving for marine projects is not a risk-free activity. Divers work in hazardous situations subsea and one of the basics for safe diving is understanding where you are and where you need to go, especially in an emergency. Divers sometimes encounter zero visibility under water. By integrating real-time sonar imaging technology in existing diving helmets, Boskalis is creating a helmet that provides vision in zero-visibility conditions, access to images and task plans subsea. This will keep divers safer and be more efficient and cost effective.

To understand, just imagine Google glasses for diving helmets. By integrating a HUD (Heads Up Display) into a diving mask and linking this to a sonar imaging system (mounted on the diving helmet), divers will be able to work safely and efficiently in zero-visibility conditions. By providing a display to the divers, other information becomes available as well. For example, real-time images of the online NAV screen, and drawings, dive plans and sketches at the worksite which otherwise would not be available on the subsea worksite.

The idea originated with the United States Navy, which has been investigating the technology. Some helmet suppliers are starting to provide options and Boskalis has taken the opportunity to be an innovator and early adopter by embracing this technology now. Technically speaking, the idea is feasible because it integrates existing technology and componentry into dive helmets.

Within Boskalis (and within the industry) diving incidents are in the top three risks and this innovation will improve safety. This innovative helmet is in the early engineering stages, as suppliers investigate technical restrictions on components available such as power requirements, data transfer and capture. Suppliers need to identify the best components on the market to integrate into the system (considering equipment cost, reliability, image quality and ease of integration. Once a design is complete, Boskalis plans to procure the components and integrate them into its existing helmet in order to test the equipment subsea. Extensive training will be needed. Development of a new product is an intensive process but well worth it as an integrated diving helmet will increase the divers' efficiency and help complete jobs more quickly and safely.

FIGURE 1

By integrating a HUD (Heads Up Display) into a diving mask and linking this to a sonar imaging system (mounted on the diving helmet), divers will be able to work safely and efficiently in zero-visibility conditions.

Bender Benelux's monitoring box for mobile generators prevents electrical shocks

During construction of offshore wind farms, windmills have no electrical source. The tower teams, who are installing cables leading to these windmills at sea, must carry their own mobile generators. But there is a problem – these generators are not sufficiently grounded because the yellow transition pieces are sealed in a coating meant to last for 25 years in a saline underwater environment. As a result, the standard circuit breaker is not adequate and this can lead to unsafe situations for workers as well as for equipment.

Recently, when Boskalis wanted to update their mobile generators, Bender Benelux, supplier of these generators, decided to investigate UK law and requirements. The supplier found that the present systems did not meet safety requirements so they set to work to build a new 'line insulation monitoring box' with specifications that meet present-day safety standards.

In building the wind towers at sea, small electrical winches to lift equipment to the windmill were running on mobile generators equipped with earth-leakage circuit breakers (ELCB) sensitive to 230V. The ECLB is a safety device used in electrical installations to prevent shock. It detects small stray voltages on the metal enclosures of electrical equipment, interrupting the circuit if dangerous voltage is detected. Bender Benelux determined that these mobile generators did not meet the safety requirements for the installation of cables in the sea.

FIGURE 2

The new line insulation monitoring box by Benelux Bender is a safety device for work in the vicinity of water.

Bender concluded that instead of 230V for the generator, the maximum should be 110V and that the standard ELCBs should be replaced with a line insulation monitoring box. This unique monitoring box continuously measures the insulation resistance in the electrical circuit. As soon as the resistance becomes too low (and voltage too high), the circuit is automatically interrupted. It serves as an extra fuse and, whereas the old system reacted after there was a short circuit, this box offers a proactive solution. It reacts before a shock occurs and using lower voltage is also safer because a shock from 110V is less likely to injure a worker if something malfunctions.

In principle, these line insulations monitoring boxes can be used in every industry as a standard precaution. Specifically, this new line insulation monitoring box is a safe application for work in the vicinity of water.

The Bender line insulation monitoring box has been installed in all Boskalis mobile generators and once installed, it did not entail any additional conditions of use. This innovative device could and should be easily applied to all standard generators or electrical installations industry-wide.

Cspect's state-of-the-art drones help in safely inspecting inaccessible spaces

FIGURE 3

CSpect's drones enable the workforce to stay out of harm's way.

CSpect's flying robot is making inspections by rope access, scaffolding and cherry pickers obsolete. The CSpect drone is an intuitive, reliable and precise indoor inspection tool that reduces the number of personnel needed and alleviates the administrative burden associated with inspections. By eliminating the human interface, operations with practically zero risk can be achieved. By using CSpect's drones, the workforce stays out of harm's way while reducing downtime and inspection costs.

CSpect drones enable remote visual inspection in any indoor environment and keep workers away from hazardous areas such as confined spaces, extreme heights, and places with energised equipment. CSpect robots can be prepared for visuals within a minute and an entire inspection is performed in a matter of hours instead of days. CSpect drones have conducted inspections in complex areas, such as: hopper walls; pipe lines with a diameter bigger than 500 mm; spuds from the inside; inside transition pieces and towers of wind turbines; cranes; storage, ballast tanks; jetties; areas at heights; bridges; large boilers; and towers.

CSpect's technology includes cutting-edge drone data capture capabilities, which ensures flawless inspections from the very first flight. A typical drone-based inspection starts with a reconnaissance flight, which identifies all areas of interest deserving a closer look. CSpect's experience gathered through a wide variety of missions has shown that for most infrastructures 10 minutes is sufficient to perform the reconnaissance flight. Based on the information gathered during the reconnaissance flight, further flights are planned to more deeply inspect defined points of interest through the capture of close-up images. After each segment of the inspection the drone is brought back to the operators to

review the images in detail and refine/update the inspection plan on-the-go based on actual data.

In addition, the CSpect drone is the first collision-tolerant drone and is equipped with an innovative wireless communication system that provides a live video feedback. This allows the pilot to bring the drone to the most inaccessible places up to multiple hundreds of metres beyond the line of sight. The video output is directly available to third parties, who can analyse the live footage.

The fact that the same scope of inspections is also available below water as above has been a bonus, providing sea-water cross-over inspections on board of vessels as well as ballast tank inspections. The combination of above and below water inspections makes CSpect drones unique in the market and suitable for use in the dredging and maritime industries. Most importantly, CSpect drones are approved by the major Classification Societies: Bureau Veritas, Rina and ABS, to perform inspections by means of Remotely Inspection Techniques (RIT).

MedAssist is an app for medical support at sea

No doctor on board? Ship owners agree: MedAssist gives needed medical support to ships at sea. The MedAssist Skills Application provides offline step-by-step instructions for basic medical skills and procedures on board a ship when there is no doctor present or the ship is at a remote location. The app is a low-cost way for the captain to improve his crew's medical care when they are far away from professional medical staff and facilities. It also helps maritime employers to comply with international safety regulations and legislation for medical care.

The initiative for this long-distance medical support grew from the experiences of doctors at the Emergency Control – Maritime Training (ECMT) – Training Center in Rotterdam, The Netherlands. At ECMT each year around 500 captains and officers from various companies are trained to perform medical procedures. The requests from clients for digital training and support materials for their ships, led to the development of this 'Skills app'. The Skills app contains the 18 most important (STCW) medical procedures that a captain or officer must be able to perform, such as stitching a wound, setting-up a drip, or stabilising a neck.

FIGURE 4

The MedAssist app presents information in an intuitive and simple way, using instructional audio, video and photos that give a step-by-step guide to the safe and professional preparation and execution of medical procedures and after-care.

FIGURE 5

The Skills app contains the 18 most important (STCW) medical procedures that a captain or officer must be able to perform.

The app presents information in an intuitive and simple way, using instructional audio, video and photos that give a step-by-step guide to the safe and professional preparation and execution of medical procedures and after-care. The instructions are based on the use of medical resources available on board.

Another application is the Heart App, which consists of an easy-to-use heart rate monitor and the accompanying software on a tablet. With this app, a captain or officer can make a hospital-quality electrocardiogram in a straightforward way, resulting in a PDF file. With one click this PDF can be sent to a doctor onshore to help making a faster and better diagnosis.

These apps also provide support for on board training for the crew. Personnel should take note of the topics on the apps and, for instance, with the electrocardiogram, time should be taken to practice doing this. The app also provides an overview of important phone numbers for contact with various Radio Medical Services and other practical information that may be urgently needed on board. The app also works offline and can be made available in 45 languages. At present, a patented 2-Way-Augmented Reality Application – called MedAssist Live- is being developed, so an onshore doctor can really work together with the captain to solve a medical problem in real-time.

The cost of the Skills app was only 200 euros per tablet per vessel per year, a reasonable price to pay to safeguard crew members. Ship owners have used these apps and see them as a useful addition to the mandatory medical training that their officers complete on a regular basis. Medassist.online's apps combine medical know-how, practical nautical experience and IT knowledge in a simple and effective way, taking into account the often limited bandwidth on board ships. The apps can be made available on a ship's server or on dedicated tablets in a rubber encasing.

Jan De Nul's Full Mission Simulator safely prepares crews for risky conditions at sea

The Full Mission Simulator (FMS) is a 360° simulator of a dredger's bridge where real situations can be practised in a safe environment. The simulator trains officers on project-specific ship power management of a designated vessel by setting up the parameters as they are known for a specific project area and scope of work. In this way, the crew gains an understanding of the ship and the project and can assess best approaches before operating in the real world.

In a cooperative operation amongst VDAB (the Flemish government), Jan De Nul and others at Zeebrugge, a dredging simulator was used to simulate a specific project risk. In this case, trailing suction hopper dredgers (TSHDs) needed to discharge full power through a spray pontoon on a Dynamic Positioning (DP) track. The TSHDs needed to sail with the same speed and heading, taking into account the floating pipeline forces, wind and current, in combination with limited power on the propellers. In total five sessions were organised to include masters and Officers of Watch (OOWs) of two TSHDs. The worst possible conditions were simulated in regards to power management, bridge resource management and third party pleasure vessels.

Using the Full Mission Simulator helped the crews be better prepared for the actual project risks, resulting in better operational control and thus improved safety. Based on the positive experiences of Jan De Nul and its partners, more of such exercises should be conducted when dredging close to the operational limits. This is no easy task, just as the daily work of dredging crews is not easy, and competent instructors are crucial to the successful use of the simulator.

The FMS, which was used to recreate conditions at Zeebrugge, dates from 2005 and the success of the operation led Jan De Nul to order a new model with expected delivery in 2020. The cost of the FMS is not prohibitive for the dredging industry and the results as reported by Jan De Nul, 'no incidents, no damages and no delays' makes the FMS as a safety tool worth the investment.

FIGURE 6

Using the Full Mission Simulator helped the crews be better prepared for the actual project risks, resulting in better operational control and thus improved safety.

Boskalis' remote control Floating Line Connecting System eliminates dangerous manual operations

FIGURE 7

The FLCS is based on another Boskalis innovation, the 'mooring actuator' and the coupling pontoons are specially designed for remote coupling.

Boskalis' in-house technical department has developed an innovative Floating Line Connecting System (FLCS), where floating pipes are connected safely by remote control, without the need for people to get close to the pipelines, eliminating manual operations entirely. This results in fewer crew transfers and fewer safety risks.

The high risk operation of connecting pipelines was identified by the crews doing the work and the consensus was, there must be a better way. The first step was developing a self-floating pipeline that could handle sharp materials. The flexibility of this pipeline meant that 100-metre-long pieces could be placed instead of 20 metres long as is normal with steel pipes. This meant an immediate reduction in the number of connection points so fewer people were put in risky situations less often. But still people were a necessary element. Brainstorm sessions led to various designs and demands, but it took ten years before all the pieces fell in place and a final design was made. A patent has now been applied for and the Boskalis inventors continue to look at ways to improve the design.

The FLCS is based on another Boskalis innovation, the 'mooring actuator' and the coupling pontoons are specially designed for remote coupling. The pontoons are brought into position without people entering the 'line of fire'. In so many ways, the new system represents a tremendous safety innovation. People are no longer at risk of injuring hands or fingers or come close the waterline. The system has already been applied to the project in Duqm, Oman and it will soon be rolled out and be applied to future Boskalis projects. But it is indeed a generic application for floating pipes that could be of value to others in the dredging industry.

At DEME, every day – rain or shine – begins with a Safety Moment

The search for ways to improve a safety culture is continuous. DEME's management team came up with a direct, simple proposal to make sure everyone is always aware of safety. The idea is to start every meeting with a 'Safety Moment' in which in the first few minutes of every meeting, a safety topic of choice will be discussed with all participants. To facilitate this idea, the QHSE-S department developed a straightforward tool to guide colleagues reminding them of safety when they enter the meeting room.

The instrument is simple: In the meeting room, a board with instructions, together with a branded cotton bag is placed on the wall. When participants enter the room they see the bag immediately. As this sight is not traditional, it immediately stands out, sparking conversation and interest. Next an individual takes the bag and passes it around the room for every employee to deposit his/her ID badge in the bag. An innocent hand then draws the lucky one who gets to present his/her prepared safety moment.

Like a pop quiz at school, you must be prepared in advance. Since the presenter is drawn randomly, all employees should have a safety moment of their choice ready at all times, so they can present it when chosen. While safety moments are by no means new in the dredging industry, DEME's approach adds an element of surprise. It forces all employees to be prepared at all times to hold a safety moment, which means that safety must be on everyone's mind all the time. By choosing a topic and researching it to give a short presentation, employees become more aware of the risks they face every day at work and the safety measures they should be taking. By sharing safety experiences and knowledge with others, employees start seeing their jobs and those of their colleagues in a different way.

DEME's 'Safety Moment' at the start of every meeting is a simple direct way to remind employees about safety and to emphasise the need for leadership, communication collaboration and engagement in staying safe.

FIGURE 8

To remind colleagues of safety when they enter the meeting room, colleagues see a branded cotton bag placed on the wall [A]. An individual takes the bag and passes it around the room for every employee to deposit his/her ID badge in the bag [B]. By choosing a topic and researching it to give a short presentation, employees become more aware of the risks they face every day at work and the safety measures they should be taking [C].

Van Oord's 'Safety News Alert' is a hard-hitting film followed by open, honest team discussions

An increase in accidents during Q1 2019 led Van Oord to seek a new approach to improving safety awareness worldwide. To start, an analysis was done of the root causes of the accidents, which occurred under all sorts of circumstances, during full scale work, during routine and non-routine jobs and in all business units. Extensive research resulted in a 'Safety News Alert' that was released throughout the entire organization. This was a combination of a hard-hitting film meant to inform, make an impact and inspire, followed by open and honest team discussions that were playful, inspirational and motivating.

Via a worldwide kick-off on 14 May 2019 in a 'news cast' film, the Executive Board emphasised the importance of safety and 5 accidents were highlighted and discussed by colleagues. These were accidents to which many colleagues could relate and the film was followed by team meetings during which colleagues from all offices, projects, vessels and yards discussed safety statements in an open and honest way and made clear team agreements. These agreements and group photos were actively shared on the Van Oord intranet. The involvement and commitment on all levels – from senior management to colleagues at all work locations throughout the entire organisation made this Safety News Alert an across the board success.

The statements and toolkits provided by Van Oord were tailored to a team's work location and were set up in a creative, playful and interactive way. By involving both projects/vessels/yards and office, the tools were available for an open and honest discussion that resulted in a variety of personal and relatable team agreements. Response and participation exceeded expectations.

The strength of the entire Safety News Alert (both film and follow-up team meeting) is the usability for all employees. Supplying local managers, who act as moderators, with a clear and easy to use manual enabled them to organise the Safety News Alert at any location.

The Safety News Alert concept can easily be used by others in the dredging industry. It is important to decide on a proper script about

FIGURE 9

Released throughout the entire organisation, the 'Safety News Alert' was a combination of a hard-hitting film meant to inform, make an impact and inspire, followed by open and honest team discussions that were playful, inspirational and motivating. Photo Van Oord

situations that have occurred within the company and to film these situations without any judgment, to determine dilemmas to stimulate safety discussions, to createa platform that encourages participation, and to exchange information within the organisation about the answers and actions taken by different teams.

At Van Oord the results have been clear: Since the kick-off, safety numbers are improving, safety awareness has increased and people are giving more feedback. Registrations for the safety leadership training have increased and loads of data from the team meetings has been delivered, giving Van Oord tangible data to act upon.

Falling overboard is always a danger but Jan De Nul's hopper crew found a solution

No one knows better than the crew of a dredger where the dangers lie on board a vessel. When the crew of the Capitan Nunez, a Jan De Nul trailing suction hopper dredger, pointed out that the area where the trunnion is located is a risky spot, management was listening. The trunnion is a part of a rotating joint that is inserted into cylinder that has moving parts. There are also open gaps in the railings at that spot because it is the exact location where the dredge pipe goes over the vessel's side. It is also the spot where human intervention, such as checks of the pipe heads, is needed. This gap in the railing at a point where people are actively working presents an obvious risk to someone falling overboard.

Acting on this observation, the crew of the hopper Capitan Nunez took it upon themselves to solve the problem and protect their own. Working with Jan De Nul's Technical Department, they invented a system to close the openings in the railing. They designed, constructed and welded a railing that opens and closes simultaneously with every movement of the dredge pipe. It creates a safe barrier between the working zone and the sea, without limiting the movements of the pipe. This system is automatic and needs no manual handling.

Recognising this is the most dangerous area on their ship, the crew solely invented this system and constructed this risk control. Crew of Capitan Nunez is rightly proud of this system and happy it is currently being implemented on board of other trailing hoppers as well.

FIGURE 10

On Capitan Nunez, an automated system creates a safe barrier between the working zone and the sea, without limiting the movements of the pipe.

Manual lifting is a thing of the past with IHC's hydraulic release shackles

IHC Handling Systems has developed an easy-to-use hydraulic release shackle device for lifting modules, templates, jackets and other objects, which is safer and more efficient than traditional manual handling of shackles.

A traditional shackle is a hinged metal loop secured with a quick-release locking pin that is used for lifting. The lifting operation is usually executed manually, often with multiple people working together to lift. It is a job that can be a safety hazard and which, because of the physical input from workers, increases occupational health risks significantly by increasing the chance of injuring hands and feet and putting extra burdens on backs and spines.

IHC's hydraulic release shackle device reduces these health risks to workers. By adding this hydraulic tool to a shackle it makes lifting objects in the range of 25-1,500t shackles easier and safer to handle and operate a shackle. The device is designed to be lifted above or beneath water and it is available in two versions – as a standard type, with maximum depth to 500 metres and as a deep-water type, with a maximum to 3,000 metres. Several different backup systems are possible (hot stab receptacle, double cylinders, accumulators and separate hydraulic circuits) as well as lifting pad eyes. The success of the device has led to the suggestion to make it available for a broader range of shackle weights. It is already available in the offshore industries for even bigger shackles. The device is able to work in salt laden and corrosive wind driven dust and heavy rain. And IHC is able to modify the hydraulic shackle device for a wide number of shackle brands.

FIGURE 11

By adding this hydraulic tool to a shackle, it makes lifting objects in the range of 25-1,500t easier and safer to handle and operate a shackle [A]. The device is designed to be lifted above or beneath water and it is available in two versions – as a standard type, with maximum depth to 500 metres and as a deep-water type, with a maximum to 3,000 metres. [B].

Safer and flexible, the CSpect mini ROV replaces risky diving teams

CSpect's mini ROVs are faster, cheaper and more flexible than the mobilisation of a dive team. Diving is and will always be a risky operation. Diving fatalities have a major impact on the family left behind, loss of income, lost business, insurance premium increases and high litigation costs.

CSpect uses and co-engineers world-leading mini Remotely Operated Vehicle technology to deliver a safe and cost-effective solution compared to inspections performed with divers. Their mini ROVs, which are merely the size of a basketball, are used to visually inspect underwater structures such as marine warranty; in- and out-hire surveys; hull inspections on damages, fouling, bottom doors, spud cans; quay inspections; tank inspections; touchdown monitoring; oceanography, seabed inspections and oil spill monitoring; and fish farming cages surveys. In addition, underwater inspections in lieu of dry dock for pontoons and vessels provided with azimuth thrusters (vessels where no clearances of rudder and propulsion shaft bearings can be measured) can be carried out. This is a direct saving for the customer because dry-docking a vessel for inspection can be replaced by an in-water survey, which is much cheaper to perform.

The mini ROVs are equipped with a GPS positioning system and Low-Light High Definition cameras supported by a dimmable light system with a maximum intensity of 5000 lumens, which provides superb video footage of the inspected area. A stabilised camera system is controlled by an Inertial Measurement Unit (IMU), in contrast to a camera attached to the face mask of a diver which is subject to the movements inherent to a diver. In addition, the video and images taken are not disturbed by the air bubbles of the diver, eliminating cloudy images and video recordings.

The mini ROV can dive up to 150 metre depth, can sustain 2.5 knots (whereas a diver is limited to 0.5 knots) and can stay submerged for longer periods than a diver. The mini ROV can be hand carried onto a plane and no Port Permits are required, so practically speaking, the mini ROV can be deployed almost immediately upon arrival on the worksite, without the heavy administrative burden attached to diving missions. In addition, the mini-ROV is approved by the major Class Societies (Bureau Veritas, Rina and ABS) to perform underwater inspections.

With the size and shape of a basketball, the mini ROV has a symmetric drag profile, which ensures that when the vehicle turns, it will hold its ground and not get swept downstream. It can also be equipped with a gripper, thickness gauge, spot cleaning system and micro sonar. Power is supplied by a battery system on the ROV which results in more stability. With an on board power supply, the mini ROV can work with an extremely thin tether cable, making the drag of the cable very limited compared to standard ROVs in the market.

Compared to dive teams, where a three-person operation is mandatory, the mini ROV can be deployed by one person, at any time, day or night, and can stay submerged for longer periods. Increased currents and depths are no threat and the risk of human injuries is decreased because there is no human interface underwater. The practical result is a zero risk of diving injuries and fatalities because fewer people are involved in the day-to-day operations and a safer work environment.

FIGURE 12

The mini ROV can be hand carried onto a plane and no Port Permits are required so the mini ROV can be deployed almost immediately upon arrival on the worksite.

Jan De Nul's hopper crew designed, built and installed a safety platform to protect their crewmates

After each dredge cycle on a trailing suction hopper dredger, the pipe operator must grease and/or inspect the underwater block of the hoisting dredge pipe. This is a dangerous job on a slippery and uneven surface. To carry out the work, the pipe operator normally needs to wear a 'fall arrest' harness and prepare extensive risk management paperwork, a time consuming task. This process on Jan De Nul's hopper Charles Darwin is now a thing of the past.

The crew of the Charles Darwin has designed, built and installed a platform, with railings, access ladders and grip polls that allow safer access to the dredge pipe's underwater block. The platform, ladders and railings are installed on the dredge pipe at the exact location of the underwater block, which reduces the chance of trips, slips and falls.

This intervention tremendously increases the safety level for the pipe operators and allows them to work more efficiently as well. According to the experienced crew of Charles Darwin, this was the best safety improvement onboard in the last year. Furthermore, it can easily be implemented onboard of all hopper dredgers without major costs. The installed platforms are designed to withstand all dredging conditions during project execution. The original design, sketched by the crew of Charles Darwin, was calculated and approved

FIGURE 13

The crew of the Charles Darwin has designed, built and installed a platform, with railings, access ladders and grip polls that allow safer access to the dredge pipe's underwater block.

by the Fleet Management to insure that the installation would be built to last and get the proper material, and to set up a maintenance regime. After approval, the crew set to welding, constructing and installing the platform themselves. This working process can easily be communicated to all crews on hopper dredgers. They are all crews with similar experience level as on the Charles Darwin and are perfectly capable of implementing this system as well.

Implementation of this improvement requires that the ship has a particular dredge pipe configuration and room to build the access platform. The costs are limited, needing some steel and grid mesh plus a day's work for the ship's welder.

The work of the pipe operator can now be done in 5 minutes instead of 20. Efficiency is higher and the risk 'cost' is lower. Simple safety solutions are often the most effective ones. Listening to the people in the field and giving them the freedom to come up with ideas is often the best way to improve safety in their working environment and conditions.

Van Oord's pre-assembled onshore 'CPS Storage & Handling system' avoids the risks of crane lifting

When a subsea power cable is laid, there is an area where the cable may be subjected to increased dynamic forces, which the cable is not necessarily designed to survive over the lifetime of the installation. A Cable Protection System (CPS) is used to protect the subsea power cables against these negative impacts over the long term. The installation of this protective CPS is traditionally done using an on board crane. The crane picks up all parts of the CPS independently from an open top container and then places the parts on the cable highway for installation. This is an operation that has many risks including dropping objects and suspended loads falling on workers. To improve safety and eliminate these risks during the lifting operations, including those caused by the assembly of CPS on deck, a special 'CPS Storage & Handling system' has been designed and mobilised on Van Oord's cable laying vessel 'Nexus'. This new system eliminates the need for offshore craning to install the CPS protection during cable installation.

With this new CPS Storage & Handling system the CPS are completely assembled onshore and placed as a whole in racks. Then, when the vessel is in port, the complete rack is placed on the vessel. This saves time and handling of different components and mitigates many risk factors. By eliminating offshore lifting there are no more suspended loads, no one walks below the suspended load and there can be no dropped objects. The system also features a vertical sliding ramp. This ramp, placed in front of the CPS rack is movable, and is pulled by a winch, avoiding the need for manual handling, and allowing workers to slide out any CPS at any time. In addition, the system is weatherproof because no lifting by crane is necessary, operations can continue regardless of whether wind speeds exceed the crane limits. All these factors have created a safer work environment during day-to-day operations.

The CPS rack can store up to 48 CPS systems, in different layers. Any CPS size can be installed at any time. This means there is more flexibility during cable installation, which results in higher production.

The system was designed digitally (in 3D) and after completion of the design, and all calculations were done, the system was directly built and installed on the Nexus. The system is operational and works as expected. Although the CPS is more efficient and installation is done more quickly, which leads to higher production rates and a shorter installation cycle, the real plus is the increased safety for crew.

FIGURE 14

The CPS rack can store up to 48 CPS systems, in different layers.

Boskalis reduces risk by securing containers with simple container twist locks

When mobilising for (short-term) projects, there are always a few things that cost time, and always recur, and are almost always last minute. One of these things is sea-fastening and securing containers twist locks. Normally a bolt or a piece of solid round welding is used to safeguard a container's twist lock. This process takes approximately 45 minutes per container. Boskalis has adopted new and simple system for securing container twist locks that requires no welding and no grinding, saves time and can be implemented safely during mobilisation.

A small thin plate of 1.5 or 2mm slides into the dovetail where the twist lock comes on top. As soon as the container is placed on it, you simply bend the lip up, and the container twist lock is sea fastened and secure. The idea to implement this came after doing several quick mobilisations in recent years. Although all containers were placed on the right spot, they still had to be secured. Realising that this is a recurring task that frequently has to be done at the last minute, Boskalis sought a more efficient method and found the answer by looking at the Logistics industry.

The system can be used on every project where dovetails and twist locks are used and container twist locks need to be sea fastened. It is especially useful on projects where the deck lay-out changes often. By using this simple secure plate, this task can be done more quickly, saving time and money, and the process is safer. Applying it to the dredging industry is straightforward and it is already being used by Boskalis on several projects.

FIGURE 15

To save time and work more safely during mobilisation, Boskalis has adopted new and simple system for securing container twist locks that requires no welding and no grinding.

The winner of the IADC's Safety Award 2019 will be announced at the IADC's Annual General Meeting in New Dehli, India on 17 October 2019.