

FINDING INNOVATIVE SOLUTIONS TO IMPROVE SAFETY

When individual employees, teams and companies view everyday processes and situations through a continuous lens of safety, they can each contribute to making all aspects of operational processes, whether on water or land, safer. For the 2021 Safety Awards, IADC's Safety Committee received 15 submissions. Each one is assessed on five different categories; sustainability; level of impact on the industry; simplicity in use; effectiveness; and level of innovation.

Affirming the importance of safety

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. 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.

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.

Recognising advancers of safety

IADC conceived its Safety Award to encourage the development of safety skills on the job and reward individuals and companies demonstrating diligence in safety awareness in the performance of their profession. The award is a recognition of the exceptional safety performance demonstrated by a particular project, product, ship, team or employee(s).

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As of this year, two IADC Safety Awards will be granted: one to a dredging contractor (also non-IADC members) and one to a supply chain organisation active in the dredging industry. This concerns subcontractors and suppliers of goods and services. In total, 15 submissions were received. Each one aims to improve routine processes and situations encountered in the dredging industry.

The winners of both awards will be announced during IADC's virtual Annual General Meeting on 16 September 2021.

Dredging contractor safety award submissions

SIMOPS between two TSHD dredgers by Jan De Nul

Jan De Nul's first submission is a tool that visualises and controls the maximum distance between two TSHD dredgers based on the length of a floating pipeline and live position of both ships. This allows for greater control in the challenging operation of pumping dredged material between two vessels. Due to the nature of the works on a project in Germany, JDN's dredgers TSHD Pedro Álvares Cabral (PA) and Tristao da Cunha (TC) had to be connected by means of a floating pipeline. Dredged material was then pumped via the pipeline from the larger TSHD (PC) into the smaller TSHD (TC).

The operation, carried out on the river Elbe, presented several challenges, primarily maintaining the vessels positions with difficult site conditions. Other challenges included the smaller TSHD being pushed out of position due to the current, changing weather conditions and having to maintain a certain length of floating pipeline. Coordination of the relative movements of both TSHD dredgers is crucial in this type of SIMOPS. The position of the TSHD (PA) was transmitted in real time to the TSHD (TC) by means of Rajant wireless network set-up, making it possible to ensure the bow of the

TSHD (TC) remained within the predefined circle. The diameter was adjusted when current or weather conditions changed.

By means of this active monitoring system, increased forces at the couplings and in the floating pipeline could be prevented. Additionally, the smaller TSHD (TC) did not have to drop its anchor, resulting in reduced cycle times without compromising on operational control. Crew, having used the tool consistently on the project, found one of its greatest benefits is its use at night when no direct visibility of the pipeline was possible.



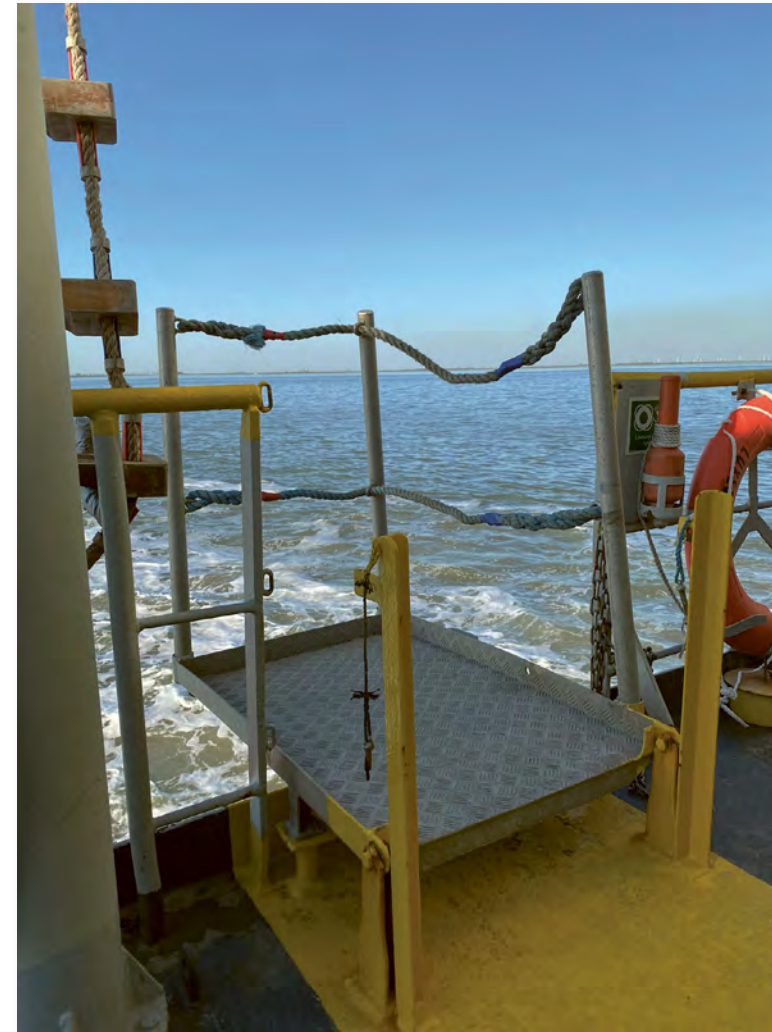
Self-moving traffic barrier by Boskalis



The idea of a Self-Moving Traffic Barrier (SMTB) came about during Boskalis' Houtribdijk project when, due to ecological restrictions, it was not possible to move barriers during the night. This meant everything had to be done during the daytime, which not only caused traffic congestion but also, on occasion, unsafe situations.

The Self-Moving Traffic Barrier (SMTB) is a barrier that can easily be moved and creates a safe work environment for all its employees. The design of the barrier is robust making it a safe construction and its use can also prevent having to close a road, in turn avoiding possible inconvenience to road users.

A prototype has since been built for the A9 project, a major motorway in the Netherlands, where its implementation will play a role in the safe continuation of the project activities next to regular traffic. Dredging projects with infrastructure related aspects can also benefit from the SMTB.



Gangway platform by Jan De Nul

The risks involved with marine transfer are numerous. Jan De Nul's design of a gangway platform increases safety and reduces the risk of falling in the water. During marine transfer, the standard pilot ladder remains in place and the removable gangway platform is added, creating a stable and easy way of stepping on board. The platform is easy to deploy and store when not needed. It is already in use and will be equipped on every new vessel build within the JDN fleet.

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CSD mobilisation at the beginning of the COVID-19 pandemic by Dredging International and Van Oord

At the start of the COVID-19 pandemic and with the situation uncertain, it appeared impossible to continue with project activities. Nevertheless, the joint-venture team of Dredging International and Van Oord managed to mobilise a cutter suction dredger (CSD) to the 'Modernisation of the Świnoujście – Szczecin fairway' project site to begin dredging and reclamation activities.

Implementation of increased measures to protect the health of employees at a time when there was not yet a standard practice and no clear information on the actual exposure risks, made the task extremely difficult. Strict follow up of the determined safety measures put in place were maintained throughout the project duration. During a 12-month period, the project managed to continue without any delays due to the COVID-19 pandemic.



Bollard step by Jan De Nul



Jan De Nul's bollard step provides a solution that is both easy and quick to use, and is low on maintenance. Designed by crew, the bollard step transforms mooring equipment into a safe and secure step on which to make marine transfers.

is quick and easy to use is reflected in the way it is mounted: two people can effortlessly carry the step and put it in place without extra securing measures. Not being a fixed structure also provides an operational advantage: the deck space is not restricted as the bollard

The main materials used are steel and anti-skid grating. The latter creates a safe surface from which a safe vessel-to-vessel or ship-to-shore transfer can be made. The fact that the bollard step

step can be dismantled at any time (e.g. when cargo needs to be lifted on deck), nor does it need to interfere with mooring operations.

There are several step designs to cope with different locations and scenarios, all of which can be used on a variety of vessels. The simple and clever design solution is adjustable to different types of bollards, creating a safe and steady platform where there could never be a step-over zone. The innovation will also increase safety of crew transfers on small CTVs. In addition, CTVs that otherwise might not be suitable during a project could be used thanks to the bollard step, resulting in potential savings.

Draghead access platform by DEME



Access to the draghead for maintenance or repair purposes is usually done by climbing a steep ladder with no attachment point for a fall harness. Climbing on the draghead to carry out such works carries many risks when working on heights. Dragheads usually have lots of (jet)pipes, cables and other obstacles that need to be navigated. After investigating and trying several different possibilities, DEME came up with the design of an access platform that provides a safe working space during maintenance and repair works.

DEME's simple and effective custom-made, lightweight platform attaches to the side of the draghead, providing easy access. Made from aluminium for easy manipulation and assembly, the platform is designed with collective protection to improve the work area.

To access the platform, a tailor-made ladder attached to the platform is used instead of a steep ladder. The platform provides a safe area in which to work with increased manoeuvrability and workability of crew. The designed platform is lightweight, easy to manipulate and removable when not in use. Additionally, it is within reach of the on-board crane, which allows storage within one movement of the crane.

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Aerial drone to monitor excavation works by Jan De Nul

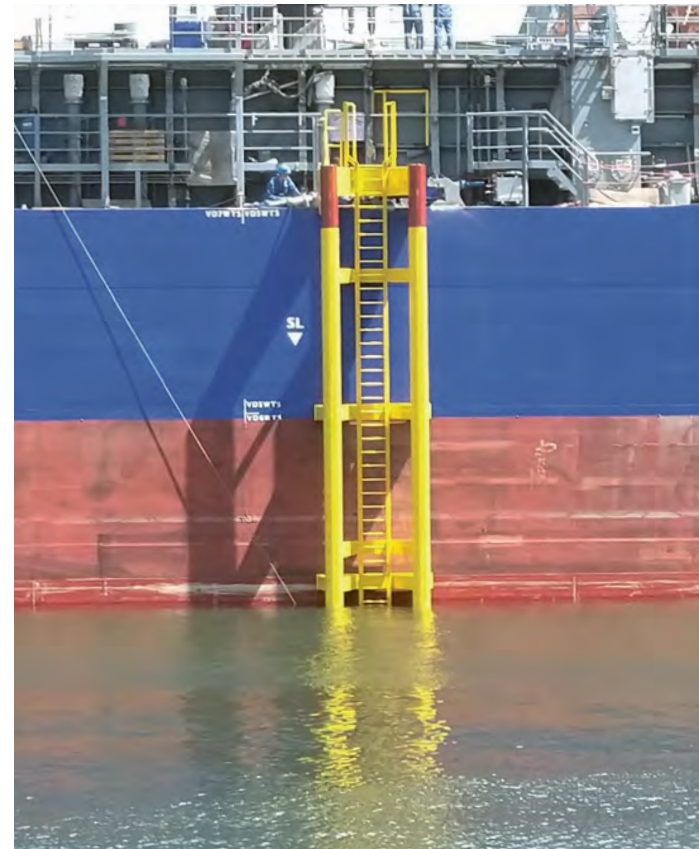
An excavation operation is typically monitored by topographical surveyors. Jan De Nul employed the use of aerial drones to monitor the excavation works of soil contaminated with asbestos. By using an aerial drone, possible SIMOPS with heavy equipment is avoided. Additionally, the topographical surveyor does not need to walk or work on contaminated soil.

The use of drones in such activities is part of Jan De Nul's QHSE values: to provide a safe environment for all persons working for or on behalf of Jan De Nul Group, taking into account physical and mental health.

What makes this innovation unique is that the project team did not rely on standard survey procedures, but utilised a solution that guaranteed the safety and health of the topographical surveyor. Using this technique is relatively easy and can be used after a day's in-house training.



Retractable boat landing by Van Oord



Using a boat landing at sea normally requires manual handling, which is a high-risk operation. Sometimes many vessel-to-vessel transfers are required and the conditions at sea can be challenging. Van Oord therefore came up with a design to provide a safe alternative for vessel-to-vessel transfer.

Its design of a retractable boat landing, which can be deployed without the use of a deck crane, means high-risk operations, such as rigging and hoisting at sea are avoided. The boat landing is deployed by the push of a button, therefore eliminating the manual handling element. The hydraulically driven system is integrated into the vessels' installation and deployment of the landing takes about a minute.

Aside from the safety element, another benefit is that since the boat landing can be stored easily on deck and is deployed in a time efficient manner, it can be used frequently even during short stretches of sailing, reducing drag and thus saving fuel.

A unique piece of equipment to the industry, Van Oord is the first to have the retractable boat landing installed on one of its vessels. Fitted on flexible fall pipe vessel Bravenes, it has been in use for one year. The boat landing has been built according to the standards in place and can be used during the entire operational life of a vessel. The only requirement for fitting is having the necessary deck space required.

Pipeline walkway by Jan De Nul and DEME

SeReAnt (a joint venture between Jan De Nul and DEME), co-designed and delivered a floating pipeline approx. 200 metres long equipped with a walkway to facilitate the safe transfer of personnel to a CSD during the AMORAS project. The pipeline and walkway are hinged and able to rotate, and serve as a hang-up system for the high-voltage electric cable powering the CSD.

The innovative, multifunctional floating pipeline allows for (1) the pumping of dredged material to shore, (2) the safe and healthy transfer of personnel on and off a CSD and (3) power connection from shore to the CSD.

The walkway provides a unique way to transfer personnel from ship to shore

and can be used during any weather conditions where CTVs are limited. The multifunctional floating pipeline both decreases the risk of falling into the water and provides a positive impact on fuel consumption and CO₂ emission compared to traditional methods of marine transfer.



Retractable ladder for track excavators by DEME

Stepping on and of machinery is not without risks. Following an LTI, DEME carried out a thorough investigation and found a lot of operators had scars on their shins caused by contact with the tracks when stepping on and off track excavators.

The existing steps on an excavator are located inside the boundary of the tracks, which is the cause of many injuries and near misses. Bringing the steps outside the tracks is not an option however, since this creates other risks both operational and for transport.

The solution – a retractable ladder that can be folded up just above the upper structure of the crane cabin. The area between the tracks and upper cabin stays completely free so there is no contact with sand or mud sticking on the



tracks. Located on a safety area besides the excavator door, this innovative design needs almost no maintenance.

The ladder is made out of one piece of metal and retracts by itself after use. It can be positioned in the location of the original platform and both a bolted or welded



connection is possible. The benefit of the design is that you only need one type of ladder. DEME foresees one standard ladder with a maximum length that can be adjusted on smaller type of track excavators.



Wire shield for marine barge winch by Hyundai Engineering and Construction

Marine barges are installed with a winch made of steel wire rope used for barge anchoring and hauling weights during operation. Seawater corrosion and abrasive wear cause the winch wire to degrade over time, thus increasing the likelihood of breakage. Winches are widely used in the marine industry without, however, proper protection or covers.

The marine barge winch stores a tremendous amount of energy under load. In the case of breakage, the wire can violently snap back in a whiplash effect, potentially causing serious

injury to those involved in the winching procedure and anyone nearby. Wire breakage related accidents happen often in the marine industry and pose a high safety risk. Hyundai Engineering and Construction therefore took the initiative to introduce a wire shield for the marine barge winch to protect marine crews in the event of a wire breakage.

One of the main factors considered during the design of the innovation was that it had to be strong and easy to use for marine crews. Consideration was also given to the

maintenance aspect to ensure maintenance works can easily be carried out without any safety lapses. This is achieved via the modular design of the winch shield.

Hyundai Engineering and Construction is monitoring the effectiveness of the shield during its reclamation project in Singapore. The company has made it mandatory for marine barges to be installed with the winch shield and has also put in place stringent daily pre-operation checks of the winch to ensure its safety and effectiveness.

Tetris challenge campaign Jan De Nul



When the Zurich police published a photo of all the equipment that they carry in a patrol car, you would have thought that this was nothing special. However, they placed the material in such a way that it all fitted perfectly together in the picture frame and so the Tetris Challenge was born.

Refraining from the idea of lining up all its vessels to create the best Tetris challenge

picture ever, Jan De Nul wanted to focus on what really counts – the safety of its people.

As the dredging industry is typically characterised as a busy and demanding work environment, very clear and visual communication is a key for success. The existing means of communications, such as safety posters, QHSSE notices and incident bulletins are an effective way to transfer

information but with this Tetris challenge, Jan De Nul triggered its employees on another level.

Trends come and go and social media advances at a speed that even the company's design department cannot follow. They quickly jumped aboard with the trend and reached employees with a safety message in a way that they maybe did not expect.

Supply chain organisation safety award submissions



Quick coupling floating pipeline by APT Global Marine Services

APT Global Marine Services' quick coupling system creates a safer, faster and watertight floating pipeline connection. The innovative system for floating pipeline reduces the manual handling to one single operation. Furthermore, the pipelines are floating during the coupling, which results in minimal use of the crane and excludes any (heavy) lifting. All this while the connection is solid and watertight.

By excluding lifting operations, the potential safety threat from working underneath the pipeline is eliminated. In addition, the hands-free connection reduces the risk of hand injuries from the flanges. Furthermore, the connection of two sections of pipeline is established by one single spanner operation in a matter of minutes, which reduces the amount of handling to the bear minimum.

The system is both simple and intuitive for crew to use and operate. The male and female part of the quick coupling attaches to the existing flanges of a pipeline, meaning no additional equipment is necessary.



Safety Plus Programme and National WSH Vision 2028 by Keppel FELS

Anchored in its Safety Plus Programme and Singapore's National WSH Vision 2028, Keppel FELS continues to consistently improve and enhance its existing Health, Safety and Environment (HSE) management systems. Safety is a key priority in its operations and the company is committed to ensuring everyone goes home safe at the end of each workday.

Keppel FELS has robust HSE management systems in place and invests in building HSE competency and capabilities through training, outreach activities and empowering every individual in its workforce to intervene and stop any unsafe acts. The shipyard adopts a set of 10 lifesaving rules and performs an assessment of high impact risk activities (HIRA) prior to the execution of work.

Technology and innovation are ingrained in the culture of Keppel FELS. It is essential in building a strong safety culture and constantly enhancing safety standards for work processes. The company invests in its design, engineering, planning and construction processes by adopting digitalisation and smart asset technology to further value-add to its products by simplifying processes, tracking operations, improving safety considerations and supporting its customers.

Non-nuclear Slurry Density Meter (SDM) by Rhosonics

The Rhosonics Slurry Density Meters (SDM) are a new sustainable solution for the mineral processing industry. The ultrasonic-based measuring instrument can determine the slurry density in real time to check the amount of solids in a liquid.

This innovative way of measuring slurry densities is challenging the status quo, i.e. the radiation-based instruments currently used in the industry. The Rhosonics SDM operates in the same accuracy and repeatability ranges as the nuclear density gauges, however the device is safe to use, can easily being calibrated and has a more compact design.

For radiation safety reasons, the nuclear source is located in a capsule surrounded by a source holder (a radiation protection shielding). This shielding is usually made of lead and can weight up to 500 kilos or more to protect the employees working with those instruments. The SDM is always the same weight, which is only 6.8 kilos and the size is very compact as well, since it is an all-in-one design. The transmitter and transducer are connected by



a tri-clamp, therefore no cables are used in between the SDM sensor and analyser.

The SDM is a real game-changer for slurry density measurement applications, especially in the mining and dredging industries, where it is increasingly being used to optimise processes.