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 2022 Safety Awards, IADC's Safety Committee received 11 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 among 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).

No submissions were received this year for the safety award granted to a supply chain organisation active in the dredging industry. This concerns subcontractors and suppliers of goods and services. In total, 11 submissions were received for the dredging contractor safety award. Each one aims to improve routine processes and situations encountered in the dredging industry. The winner will be announced during IADC's Annual General Meeting on 15 September 2022.

Dredging contractor safety award submissions

RETRACTABLE LADDER FOR TRACK EXCAVATORS BY DEME

Stepping on and off 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 can be 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.

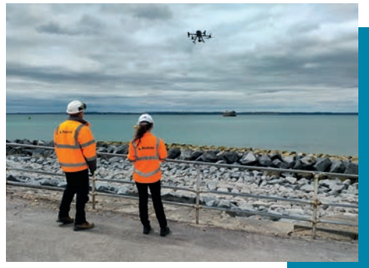
The ladder is made out of one piece of metal and retracts by itself after use. It can be positioned in the location of the original platform and both a bolted or welded connection is possible. The benefit of the design is that you only need one type of ladder. DEME foresee one standard ladder with a maximum length that can be adjusted to smaller track excavators.

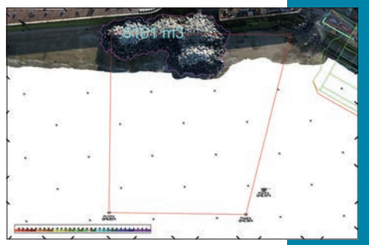
HATCH SAFETY COVER BY JAN DE NUL

The hatch safety cover is a crew initiative that was built and installed on board Jan De Nul's trenching and offshore support vessel, Adhémar De Saint-Venant. Designed to increase safety on board, the cover ensures protection of the access ladder between decks. It prevents people falling through the opening and stops objects from falling down to lower decks.

It is a solution both easy to build, install and use. The design encompasses two vertical poles that remain in place and on which hinges are welded to hold the removable horizontal bars when the hatch is open. Chains attached to the permanent vertical poles are then connected to safely secure the hatch cover when opened. The horizonal bars can be stowed on hooks on the hatch cover when the hatch is closed.

Cost efficient, the hatch cover was built on board by the crew with available materials. The design can easily be adjusted to fit larger and smaller openings between decks, and can be implemented on any vessel.





UNMANNED AERIAL VEHICLE (UAV) FOR SURVEYS BY BOSKALIS

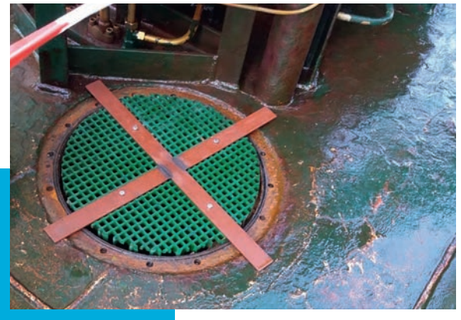
During the South Sea Coastal Scheme (Sea Defence) project, Boskalis used an Unmanned Aerial Vehicle (UAV) for photogrammetry to fulfill the survey requirements of a coastal area. Use of the technology began in early 2017 and was introduced to the project in 2021. Over time, the team further developed and enhanced the ways of working. As confidence in the data improved, the project team substituted traditional survey methods for the new technology. Improvements in the technology also helped to improve the survey accuracy using the RTK (Real Time Kinematic) drone.

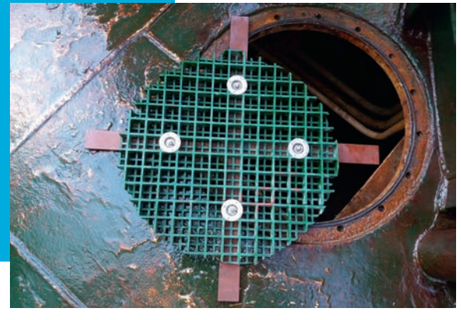
Use of an UAV presents many safety advantages. It eliminates field hours, thus reducing the time team members spend outside and therefore reducing the risk of trips and falls. Surveys can also be carried out away from uneven terrain and more importantly, away from potentially dangerous areas, for example, near heavy machinery or close to water.

Data collected allows the project management team to create an overview of the site on a regular basis. The final image is created from multiple photos stitched together into one orthomozaic image. This information helps support the project by acting as a daily planning tool for site activity and (sub)contractor coordination. It supports activities for safe design of work methods and collaboration on site, an indirect benefit for the project. In addition, the drone provides images of the status of the works, highly appreciated by the client.

Team members undertook a 5-day course to operate the drone and acquire the necessary licences from the local flight authority. Each drone flight is submitted to a website so that other drone flyers or stakeholders know when and where a drone is being deployed.

MANHOLE COVER BY DEME

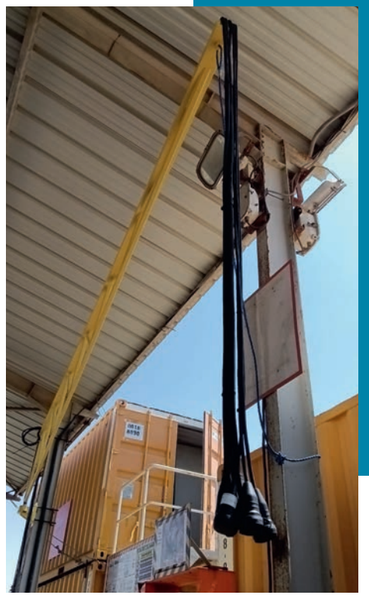




During regular maintenance and inspections on board vessels, manhole covers are often removed to ventilate confined spaces below. During this ventilation process, a safety risk arises from the possibility of crew falling into the opened manholes.

To mitigate this risk and reduce the number of incidents, a manhole cover was custom-made using metal grating. A simple cross brace is then secured to the circular grate to hold the cover in place. The result is the ability to be able to ventilate confined spaces without the risk of falling incidents.

The custom-made covers can be made in the workshop on board any vessel. They are both inexpensive and easy to create, as well as easy to apply.



USE OF DAVIT CRANE FOR CABLE MANAGEMENT BY JAN DE NUL

During cutter head repair and other related welding works, electrical cables lay across workshop floors posing trip and fall hazards. The cables also often get damaged due to contact with metal plates, sharp objects and movement of other equipment on the workshop floor.

To address this issue, Jan De Nul adapted exisiting equipment to meet its needs. Instead of using the davit as a lifting device, it uses it to efficiently manage electrical and welding cables overhead. Able to rotate 180°, which makes them easy to use, the davit's swinging radius means the entire workshop area can be covered. Its use not only eliminates cables on the workshop floor, therefore reducing electrical risks and eliminating trip and fall hazards, it also protects cables from damage.

This significantly contributes to improve general housekeeping of the workshop area. From an ergonomic point of view, the davit bears the weight of the welding cables and thereby reduces the weight to be carried by the welder. This simple, cost-effective concept is a way of efficiently managing hazards as well as space management. The design can be used on all dredging vessels where hot work is carried out and in places where electrical and welding cables need be moved frequently therefore causing potential trip and fall hazards.

Future improvements include: increasing the capacity of the davit cranes so more welding cables can be used on each davit; applying a hinge in the middle of the davit crane to make it more mobile; and adding a gear system to keep the davit fixed in a desired position.

INSPECTION HATCH BY VAN OORD

Opening an inspection hatch in a suction line towards the pump is a frequent activity. Originally a bolted hatch, the opening of an inspection hatch is labour intensive. First, several nuts and bolts need to be loosened before lifting gear is then used to remove the hatch. After inspection, the same routine has to be carried out to close the hatch and enable dredging activities to continue.

Van Oord came up with a design to improve the existing bolted hatch to enable quick inspections, making the process less labour intensive and eliminating the need for lifting equipment. The new system uses a cantilever to allow the inspection hatch to be operated by a single person. It eliminates the need to use power tools to loosen nuts and bolts as well as the necessity to operate lifting gear, for example a deck crane, for removal and installation of the hatch.

The innovative application of this idea in this environment is both creative and unique; the use of this kind of cantilever in the suction line environment on board a vessel is not done at this scale and size of suction lines. The inspection hatch is currently installed on the suction pipe of Van Oord's new vessel, Vox Arianne. Extremely easy to use, the design can in principle be copied straight onto other vessels.

SEAGOING UNMANNED SURVEY VESSEL BY JAN DE NUL

Jan De Nul identified that smaller survey vessels, which were performing hydrographical measurements on coastal and shallow dredging areas, required a safer, greener and more cost-effective replacement. After carrying out extensive market research, the company decided upon a well-proven and hybrid Mariner Unmanned Surface Vehicle (USV) as the first step towards unmanned and autonomous survey operations.

The vessel, named Beluga 01, will be deployed worldwide for hydrographical and environmental surveys on marine and offshore construction projects. The Beluga 01 is based on the innovative Maritime Robotics' Mariner class USV, which for years has proven its mobility and seaworthiness for data acquisition under rough conditions. It is a user-friendly, cost-effective and low-risk platform for data acquisition at sea and serves as an alternative or addition to larger manned vessels.

By executing unmanned surveys, Jan De Nul fully commits to improving safety and operational control during its survey activities, to reducing carbon emissions and to acquiring data more efficiently.

IMPROVED TRAINING PROGRAMME BY NMDC

Since the dredging industry requires specific HSE information to be delivered to the workforce, NMDC developed customised training programmes based on the lessons learned from incidents, unsafe observations and health and safety data from internal and external sources.

New material for ten in-house training programmes was developed to include information related to the dredging industry. In addition, the company sent 13 HSE staff to follow the American National Standards Institute (ANSI) Train the Trainer course to gain accreditation from a world-leading accredited training body. ANSI was also asked to audit the entire training process including resources, trainers and course content before they accredited the ten programmes to ensure that all the required steps were fulfilled.

The company's 13 Train the Trainers are all from different nationalities with different dredging backgrounds to ensure the competency and understanding of its entire workforce. NMDC knows that by providing effective and comprehensive training programmes, employees' knowledge and skills systematically improve.

NMDC became the first dredging company to be accredited by ANSI National Accreditation Board (ANAB) for the training content it developed. Over the last 3 years, the training programmes have resulted in a reduction of incident individual factors by 50%.

TRUCK DE-TARPING STATION BY NMDC

A project scope involving the transport, reclamation and ground improvement of 10.2 million m³ of material presented NMDC with a challenge, from which came the design of a truck tarping station. With approximately 253,000 truck trips to the project location, the trucks needed to be covered with tarpaulin sheets to avoid sand blow out while in transit via public roads.

The traditional way of removing tarpaulin from the top of a truck involves the driver climbing to a height of 3 metres. Although a climbing ladder is fabricated within the truck for this purpose, the project team assessed the working at height risk as very high since the probability of occurrence was two times for each of the 253,000 trips.

To minimise this risk, NMDC's engineering team together with project team designed the de-tarping structure by utilising 40-feet shipping containers to provide a safe platform from which to carry out the procedure. Handrails provide a fall protection system around the platform and fixed stairs provide access. The platform height is the same level as the truck to avoid the de-tarping crew having to over reach. The platform structure is also equipped with lighting to allow safe operation during darkness and an overhead structure provides shelter from the elements.

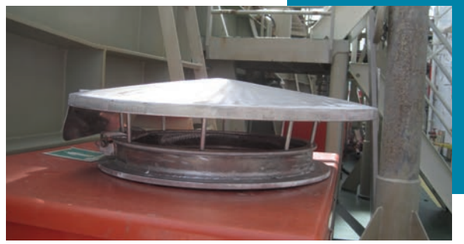
Working in pairs with one worker deployed on each platform, a crew can remove the tarpaulin cover in just 3 minutes. The new safety design not only eliminates climbing on top of the truck but is more than three times faster than the original method. A red and green traffic signal is placed in front of each de-tarping bay and controlled by the crew on the platform. Once the tarpualin has been removed, the driver receives the green light that it's safe to move the truck. By implementing this new safety design, zero incidents related to truck de-tarping and working at height have been reported on the project.

ROBIN HOOD COVER BY BOSKALIS

During repairs to vessels, which can take multiple days, the manhole covers on the weather decks need to be opened for tank inspections and ventilation. Usually, when it starts raining, a cement barrier is placed around the manhole to prevent water and dirt from flowing into the confined space and the opening is covered up. This is often not done however, resulting in the need for someone to go into the confined space to clean it.

To find a solution to this problem, Boskalis designed the Robin Hood; a manhole cover that can be opened and closed while preventing water ingress and enabling continuous ventilation of the tank. By using the Robin Hood, the tank stays clean during the repair period and the need for people to enter into the potentially dangerous area is limited to the bare necessity. When necessary, air hoses for forced ventilation of the confined space can be inserted between the bars of the manhole cover. As a result, the Robin Hood can still be closed (and opened), reducing the risk of confined space accidents.

Made from aluminium, the Robin Hood can be made to fit every type of tank cover. The cover is lockable when in the opened position to prevent it from falling shut. When in the closed position it both ensures proper ventilation while closing off access and preventing water ingress. Its durable material also means it can be used for many years.



SWINOUJSCIE-SZCZECIN FAIRWAY MODERNISATION BY DEME AND VAN OORD

After 2.5 million man-hours on the modernisation of the Swinoujscie-Szczecin Fairway in Poland, the project was completed with zero Lost Time Injuries (LTI's).

From the beginning in September 2018 until completion in March 2022, the team demonstrated exceptional safety performance through their commitment to the health and safety of themselves and everyone involved in the project. Safety became embedded within the project team, achieved through a systematic approach and the understanding that, as people, everyone is different and learns in different ways.

Simplified working processes and procedures were clearly communicated. The bridging of two management systems (DI & VO) to create one and the translation into the local language allowed for clear communication of the safety systems. Working together with so many cultures, nationalities and languages can present many challenges. However, through different forms of communication and understanding, everyone involved in the project found a common goal – to go home safe.

The clearing of hundreds of Unexploded Ordnances (UXOs) from WW2 within the active channel with zero LTI's also demonstrates not just the team's commitment but also the Polish Maritime Office's commitment to improving society's safety. The Szczecin works is a landmark project for Poland providing prosperity and development, and an enrichment of the environmental habitats. The reuse of dredge material to create nature habitats also adds greatly to the sustainability of the project and provides an environment for wildlife to thrive.