

QUALITY, HEALTH, SAFETY & ENVIRONMENT PERFORMANCE REPORT 2019

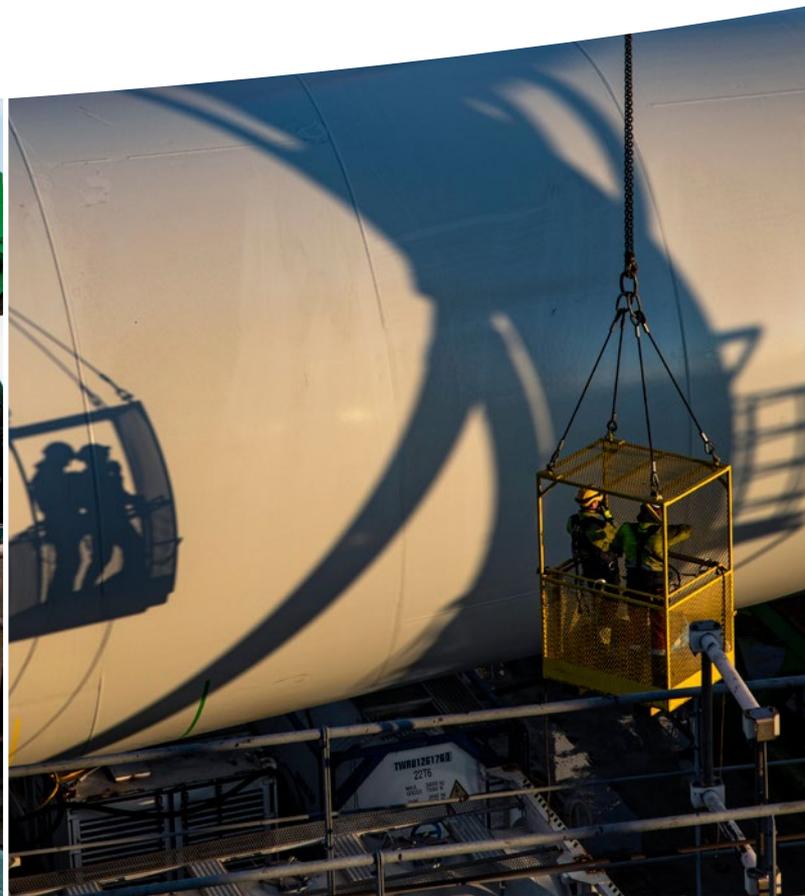
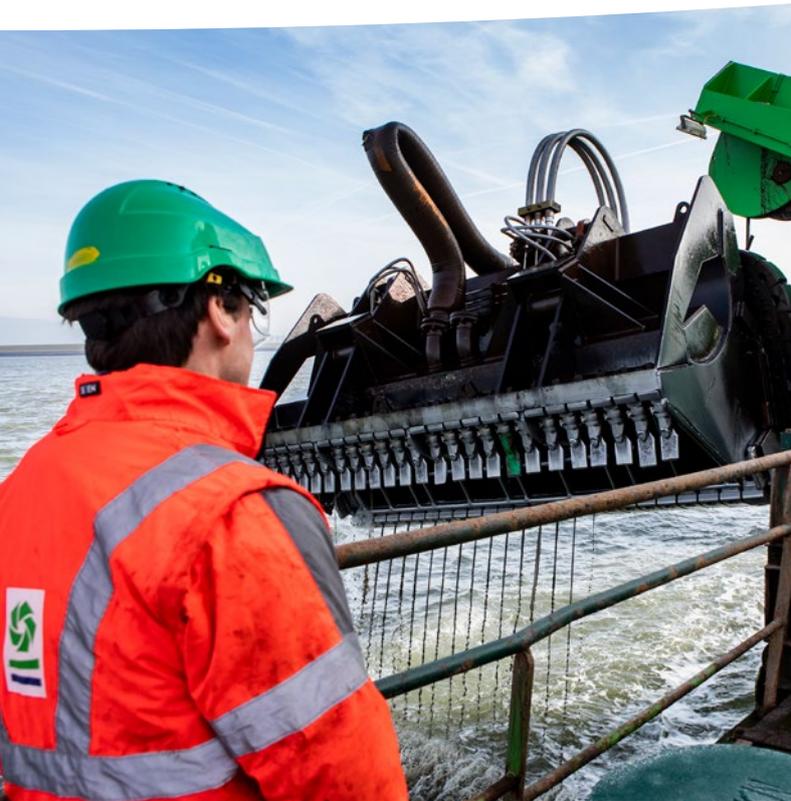




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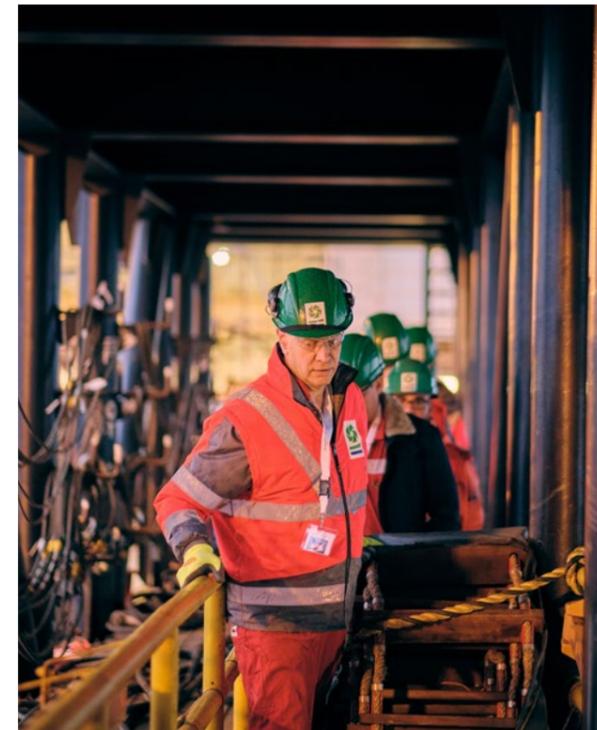
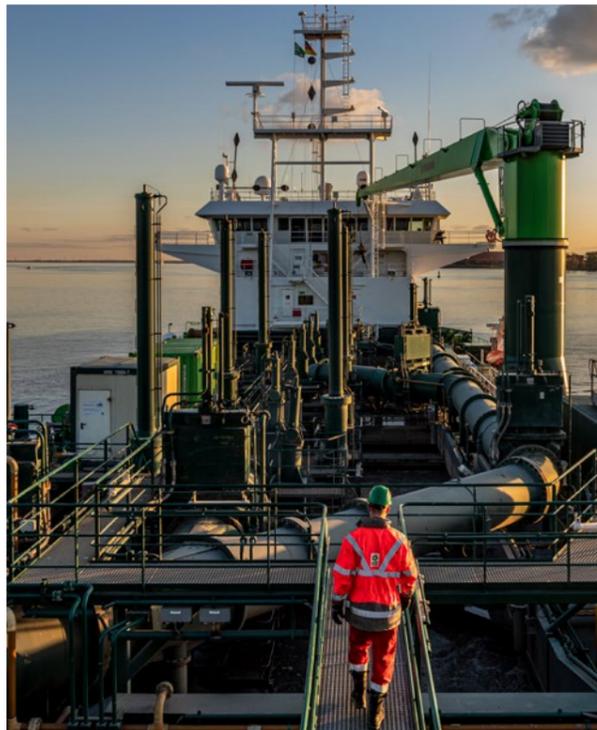
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MESSAGE FROM THE CEO

I am proud to present the second edition of our DEME QHSE Performance Report. It outlines how DEME takes care of each and every one of the employees and partners working for or with us, and makes it clear that every single person who is involved in our operational activities is important to us.

The report also explains how we are caring for the environment we work in and how we strive to deliver both quality and superior performance in our organisation. I am pleased to share with you the efforts we are making and the results we are achieving.

DEME's core values are summarised in the STRIVE acronym: Safety, Technical Leadership, Respect & Integrity, Innovation, Value Creation and Energy. These values offer guidance to DEME employees, as they cope with the large range of Quality, Health, Safety and Environment (QHSE) aspects linked to our organisation and the activities we engage in.

We are constantly adapting our organisation to the fast-moving, quickly evolving outside world. Flexibility, structure and centralisation (One DEME, one Team) is key in the four activity lines: Dredging, Offshore, Environmental and Infra. As such, we are dealing with QHSE risks and opportunities on both the operational execution and supporting processes level for each activity line's projects, vessels and operational sites.

It is thanks to the efforts and expertise of the process owners that we are able to continually improve our overall performance. This report therefore focuses on the specific QHSE performance improvements and achievements we are most proud of.

The multiple actions, campaigns and initiatives are an expression of our desire to maintain high standards and improve wherever possible. Each one has been developed according to 'risk and opportunity' based thinking at every level within the organisation.



We have detailed a number of our best QHSE performances, as we want to highlight some of the projects and people making a difference when it comes to QHSE.

What about the safety culture within the DEME organisation? We know that organisations with high QHSE quality levels are not simply following the rules, they are actively communicating and disseminating principles and basic concepts to their stakeholders, in a way that is comprehensible and actionable.

Please take your time to read this report. You'll understand how the DEME organisation does what is required to reduce risks and manage the opportunities to continuously improve our QHSE performances.

Luc Vandenbulcke
CEO DEME Group

CONTENT IN BRIEF

The QHSE policies and numerous action plans are based on DEME's core values (summarised in the STRIVE acronym).

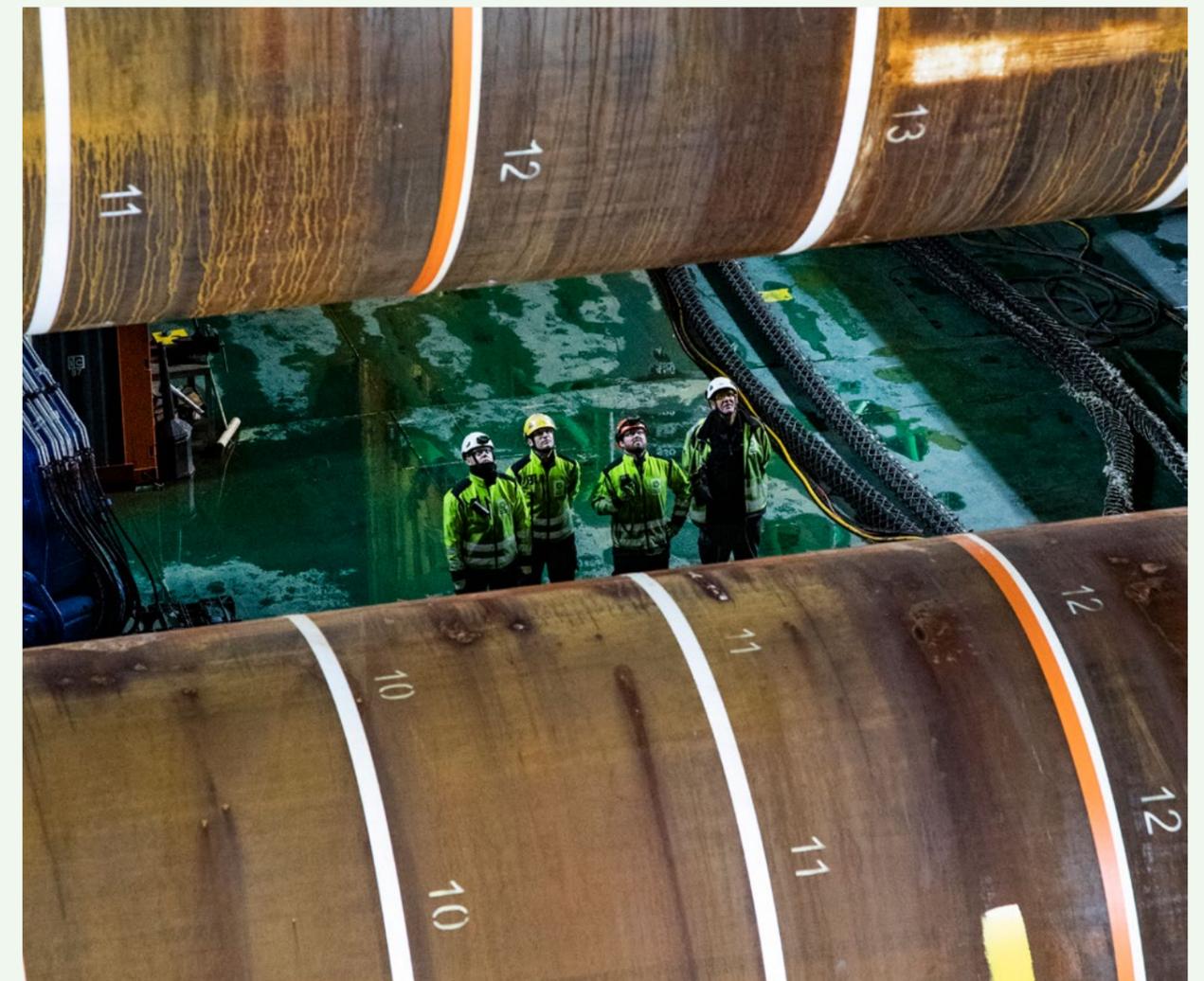
Our QHSE dashboards help us to manage our QHSE performance. On the one hand, we focus on those dangerous situations with a high potential to cause significant damage. On the other, we stress the positive actions within the company and towards our stakeholders - our green initiatives, for example.

This year DEME has published a brand-new Management System Brochure. It explains, in a structured and comprehensible way, how the QHSE management system is embedded in our organisation.

The most popular campaigns highlight the numerous specific action plans and detail the deadlines, priorities and responsibilities. The fact that there are multiple campaigns and initiatives shows how important QHSE is to DEME. The spotlight is put on the individual successes and DEME's way of managing high risk during operational activities.

The importance of emergency preparedness and response to it should never be underestimated. It's only when people experience emergency situations and simulate worst-case scenarios that they appreciate the importance of prevention.

—
Before you do it... Take
time to think it through.
—



POLICIES AND ACTIONS



MISSION, VISION AND VALUES

DEME's core values reflect our unshakable belief in the quest to deliver excellence. They serve as a compass that guides the way we work with our business partners, within communities, and with each other. Detailed information regarding our core values (STRIVE) is expressed in DEME's mission, vision and values statement.



SAFETY



TECHNICAL LEADERSHIP



RESPECT & INTEGRITY



INNOVATION



VALUE CREATION



ENVIRONMENT

MISSION, VISION AND VALUES STATEMENT



DEME
Dredging, Environmental & Marine Engineering

Our Mission
We aim to be a sustainable, safe and excellent world-wide dredging, environmental and marine engineering solution provider for the benefit of our customers and stakeholders.

Our Vision
We aim to create land and perform services for a sustainable future through the various activities of the DEME Group.

Our Core Values - STRIVE
We have established a set of standards applicable to our business units and subsidiaries worldwide. They are the centre of our commitment to consistently deliver excellence to our customers and value to our company. We also expect suppliers, subcontractors and partners to work to these standards.



SAFETY
The **personal safety and health** of employees and stakeholders is our greatest responsibility. Everyone has the right to work in a safe environment **free of risk** and injury at all times.

TECHNICAL LEADERSHIP
With an open mind and the **right team spirit**, we continue to improve all aspects of our work process and find **trailblazing solutions** to respond to the needs and challenges of our customers.

RESPECT & INTEGRITY
Our employees are trained and motivated to meet the challenges ahead. **Individuality and diversity** will be valued and performance is recognised. Our relationships with suppliers, subcontractors and partners reflect **respect, understanding and sound business practice**. We observe all applicable laws and regulations of the countries in which we are active. We respect **human rights** and prohibit unlawful discrimination.

INNOVATION
Innovation is the cornerstone of our achievements. We continuously **push our boundaries** by developing new, value-adding services and solutions.

VALUE CREATION
We make **result-driven** decisions in order to ensure **long-term growth** for the benefit of employees, customers and shareholders, including financial discipline to keep our company healthy.

ENVIRONMENT
We **protect the environment** and avoid adverse impact to the environment and the communities in which we do business.

This STRIVE statement is the basis for the more detailed policies developed by the DEME Supporting Services and Activity Lines. These Supporting Services and Activity Lines provide internal communication and follow-up, as well as regular review of the policies.



Luc Vandembulcke
Chief Executive Officer
DEME Group of Companies

DEME-MGT-STM-001
REV. 2019-05-23

POLICIES

DEME's mission, vision and values statement is put into practice by different policies. It is the responsibility of DEME's department managers to keep these policies in line with STRIVE.

Our four activity lines – Dredging, Offshore, Environmental and Infra - each have a more specific QHSE policy, in line with the sector, activities and industry standards.

In addition, some of our projects develop project-specific policies in collaboration with their clients and (joint venture) partners.

QHSE-S	HUMAN RESOURCES	COMPLIANCE
QHSE	Sustainability	Code of Ethics & Business Integrity
Security	Drugs & Alcohol	Anti-Corruption
Energy & GHG	Smoking at work	Anti-Trust
	Social Media	Outgoing payments
		Compliance charter
BISS	LEGAL	PURCHASING & LOGISTICS
ICT Monitoring	Contract management charter	Procurement

QUALITY, HEALTH, SAFETY AND ENVIRONMENT POLICY

Mission, Vision & Core Values - STRIVE
 This policy is based on DEME's STRIVE statement. In this statement we describe what we want to be, what we want to achieve and what we believe in. This QHSE policy states how DEME manages QHSE aspects with regard to design, procurement, construction, installation and maintenance of dredging and marine engineering projects.

Objectives - What we aim for
 We constantly strive for an ever higher association level in the field of QHSE, based on the standards that apply in the industry and branches. The principle behind the slogan 'Zero accidents and zero environmental incidents' is the target of our organization. Everything possible needs to be done and all necessary resources provided in order to achieve this target. Our priority is and remains the well-being of our employees and subcontractors by creating a high-quality, healthy, safe and eco-friendly work environment. Each employee is timely informed, instructed and trained as needed in order to execute his/her tasks. All subcontractors' activities are professionally coordinated and the employees are fully integrated in the project organization.

Our innovative attitude results in the deployment of state-of-the-art equipment, the use of prototypes and the development and application of new methods. This depicts the way DEME meets every new challenge with adequate solutions. DEME is constantly adopting additional measures in function of specific risks or opportunities. DEME also respects its customers' and suppliers' specific requirements or individualities.

The quality of the internal processes and of our management system is systematically evaluated and mapped, and continuously reviewed in order to improve.

Our system meets all legal obligations and requirements defined in the following standards:

- ISO 9001 quality management system
- ISO 14001 environmental management system
- SOCC Safety, health and environmental Checklist for Contractors
- ISM Code, International Safety Management Code for the safe management and operation of ships and for pollution prevention
- ISPS Code, International Ship & Port Facility Security Code
- ISO 45001 occupational health and safety management system (incl. well-being at work)

The industry safety and environmental regulations of the social partners in the VBKO ('Vereniging van waterbouwers in Baggen, Kust- en Overveendijk') Dredging and marine engineering associations are the minimum to achieve for DEME's QHSE performance. DEME's offshore activities are executed following the industry standards by IMCA (International Marine Contractors Association), RenewableUK, FPAL and the Offshore Oil & Gas Industry. The offshore wind activities follow the G-Global Offshore Wind Health and Safety Organization requirements.

For 'Environmental solutions' DEME relies on 'Werken in of met verontreinigde grond en wateromgeving' (groundwater) (Works in or with contaminated soil and (ground) water) published by the CROW, an independent knowledge centre for contractors and consultants.

To meet the safety and health requirements with regard to building activities, DEME adheres to the regulations of 'Construatie' for its civil engineering works.

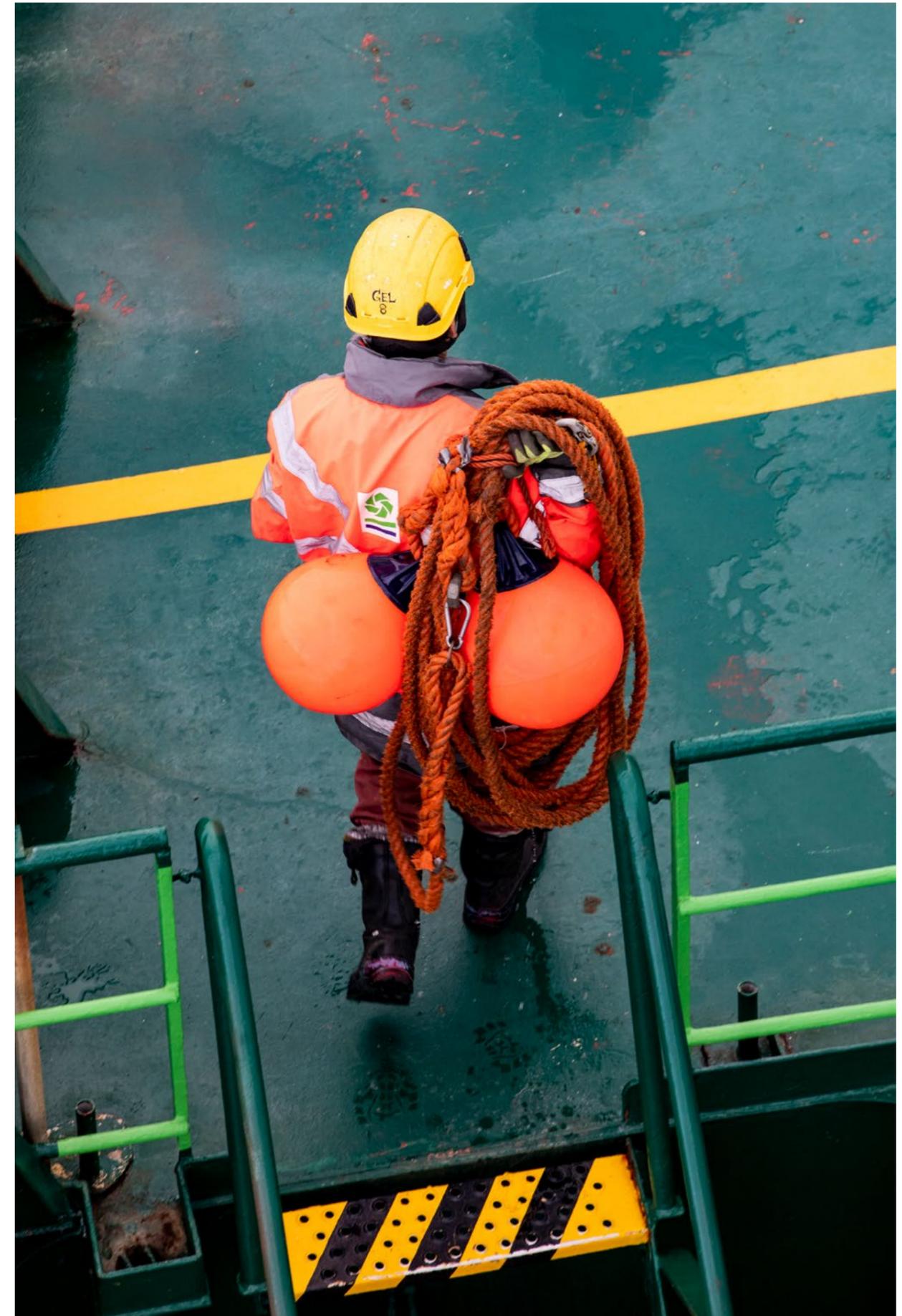
Moreover all applicable guidelines and standards recommended by IMO Class and Flagstate, are taken into account.

Karel Huybrechts
DEME QHSE-S Manager

Koen Vanderbeek
Deputy Operating Officer

Theo Van De Kerckhove
Chief Operating Officer

DEME-QHSES-POL-001
REV. 2019-04-24



ACTION PLANS

DEME has an overall Global QHSE-S Action Plan, a five-year plan that expresses the long-term trends. This plan is translated into activity line-specific Year Action Plans.

The Year Action Plans are filled with dozens of SMART actions, including responsibilities and priorities.

All these plans are updated at least once a year and evaluated during the management reviews of DEME and the activity lines.



2018-2022

GLOBAL ACTION PLAN

For Quality, Health, Safety, Environment and Security

DEME
Dredging, Environment
& Marine Engineering

- These 5 topics are further elaborated in year action plans and followed up through action lists.
- The Activity Lines and BUs develop year action plans and provide internal communication and follow-up.
- The evaluation is done during the Activity Line Management Reviews.

Karel Huybrechts
DEME QHSE-S Manager

Koen Vanderbeke
Deputy Operating Officer

Theo Van De Kerckhove
Chief Operating Officer

Creating land for the future

2019-2020

QHSE-S

YEAR ACTION PLAN

For Quality, Health, Safety, Environment and Security

Activity Line
Dredging & Land Reclamation

- 1. Quality** - Do it right the first time
 - 1.1 Digitization of induction
 - 1.2 Quick scan system for project audits
 - 1.3 Technical Department Shepherd and Subcontractor QHSE-S Management
- 2. Health** - A sound mind in a sound body
 - 2.1 DEME on the move
 - 2.2 Health topic communication
- 3. Safety** - Safety from the start is your best award
 - 3.1 Lifting management 2.0
 - 3.2 Transfer of People - on land, at sea and in the air
 - 3.3 Welfare and use of cranes
 - 3.4 Leadership by management
- 4. Environment** - A better environment starts with yourself
 - 4.1 Taking Green initiatives to the next level
 - 4.2 Set up data collection system of fuel consumption
- 5. Security** - Security is not complete without U
 - 5.1 Integration of cyber security aspect in the VMS
 - 5.2 Information processing guidance
 - 5.3 Digitizing IPS control

Eric Tonne
Managing Director
DEME Dredging & Land Reclamation

Philip Hermans
Managing Director
DEME Dredging & Land Reclamation

DD-QHSE-SAP
REV. 2019-04-24

2019-2020

QHSE-S

YEAR ACTION PLAN

For Quality, Health, Safety, Environment and Security

Activity Line
Offshore

- 1. Quality** - Do it right the first time
 - 1.1 Digitization of induction
 - 1.2 Inspection and test plans during (de)mobilisations
 - 1.3 Project document control standardisation
 - 1.4 Alignment of subcontractor & supplier selection and management
- 2. Health** - A sound mind in a sound body
 - 2.1 DEME on the move
 - 2.2 Health topic communication
 - 2.3 Health food cartage
 - 2.4 Working in cold environments
- 3. Safety** - Safety from the start is your best award
 - 3.1 Lifting management 2.0
 - 3.2 Transfer of People - on land, at sea and in the air
 - 3.3 Working at height
 - 3.4 Hot works awareness and guidelines
 - 3.5 Dynamic positioning operations program
- 4. Environment** - A better environment starts with yourself
 - 4.1 Taking Green initiatives to the next level
 - 4.2 Hydraulic resport equipment
 - 4.3 New chain analysis for CO₂ performance
- 5. Security** - Security is not complete without U
 - 5.1 Digitizing IPS control
 - 5.2 Information processing guidance

Hugo Bouvy
Managing Director
DEME Offshore

DD-QHSE-SAP
REV. 2019-04-24

2019-2020

QHSE-S

YEAR ACTION PLAN

For Quality, Health, Safety, Environment and Security

Activity Line
Bridg & Water

- 1. Quality**
 - 1.1 Digitization of induction
 - 1.2 Inspection and test plans during (de)mobilisations
 - 1.3 Project document control standardisation
 - 1.4 Alignment of subcontractor & supplier selection and management
- 2. Health** - A sound mind in a sound body
 - 2.1 DEME on the move
 - 2.2 Health topic communication
- 3. Safety** - Safety from the start is your best award
 - 3.1 Lifting management 2.0
 - 3.2 Transfer of People - on land, at sea and in the air
 - 3.3 Working at height
 - 3.4 Hot works awareness and guidelines
 - 3.5 Dynamic positioning operations program
- 4. Environment** - A better environment starts with yourself
 - 4.1 Taking Green initiatives to the next level
 - 4.2 Hydraulic resport equipment
 - 4.3 New chain analysis for CO₂ performance
- 5. Security** - Security is not complete without U
 - 5.1 Digitizing IPS control
 - 5.2 Information processing guidance

Eric Tonne
Managing Director
DEME Bridg & Water

DD-QHSE-SAP
REV. 2019-04-24

2019-2020

QHSE-S

YEAR ACTION PLAN

For Quality, Health, Safety, Environment and Security

Activity Line
DEC/Ecosystems/Purifier

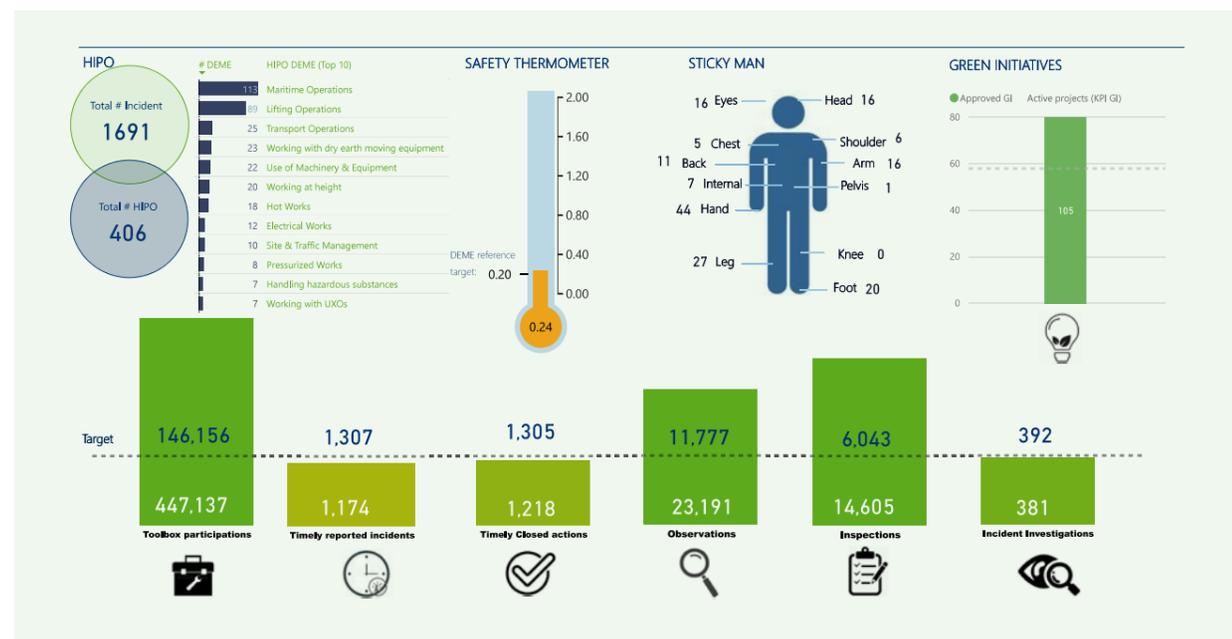
- 1. Quality** - Do it right the first time
 - 1.1 Launch of the new portal for the IMS (Integrated Management System)
- 2. Health** - A sound mind in a sound body
 - 2.1 Field testing of exhalators
 - 2.2 DEME on the move
- 3. Safety** - Safety from the start is your best award
 - 3.1 Campaign on the importance of work preparation
- 4. Environment** - A better environment starts with yourself
 - 4.1 Feasibility check of using renewable energy sources for the recycling centres
 - 4.2 Organizing training for staff regarding relevant legislation changes
- 5. Security** - Security is not complete without U
 - 5.1 Information processing guidance
 - 5.2 Integration of cyber security aspect in the VMS (Vessel Management System)

Dirk Poppe
Managing Director
DEME Environmental

DD-QHSE-SAP
REV. 2019-04-24

QHSE PERFORMANCE

DEME-QHSES-DASH-2019-Q1-Q4



KEY PERFORMANCE INDICATORS

Key Performance Indicators (KPIs) are in place at all levels of our organisation: activity lines, business units, projects, sites and vessels. The QHSE-S KPIs include both leading (Green Initiatives, observations, inspections, timely closed actions, toolbox participations timely reported incidents, incident investigations) and lagging indicators (safety thermometer) concerning QHSE.

The High Potential (HIPO) overview shows incidents that have a High Potential for damage to people, assets, quality, environment and reputation. In other words, it gives an indication of the activities that could cause harm to the DEME Group. The performance of our subcontractors and suppliers is included in this HIPO overview, as well as the other KPIs (except Safety Thermometer).

The status of the DEME QHSE-S KPIs is published in a dashboard and communicated to all employees on a quarterly basis. The KPI performance is also discussed on a regular basis during the relevant management teams where, if necessary, specific actions and initiatives are identified.

The overall QHSE performance evaluation, including KPI results, is managed by yearly management reviews. During these management reviews, QHSE-S KPIs and definitions are revised. The QHSE policy, objectives and Year Action Plans are also drafted taking the KPI results into account.

DEME-QHSES-HIPO-OVERVIEW



INCIDENT MANAGEMENT

Within DEME we apply a broad definition for incidents: an incident is a dangerous situation, near miss or incident with damage. An incident can be related to people, assets, quality, environment or reputation.

Over the past years, DEME has put increasing emphasis on High Potential incidents (HIPO). A HIPO is an incident that could have had severe consequences for people, assets, quality, the environment or reputation. Meaning, we focus on the potential consequences and severity of an incident, instead of what actually went wrong.

Each quarter, we carry out an extensive HIPO trend analysis for the entire DEME Group. Based on the findings from the analysis, we set up specific action plans and campaigns.

In 2019 several initiatives and campaigns were developed based on this trend analysis:

- Safety Week "Getting to your workplace"
- Safety Moment Day "Stop Work Authority"
- Lifting Management 2.0
- Taking Green Initiatives to the next level

DEME developed a wide customized internal incident investigation training for 2020. During this session the participants will:

- Get insights in the DEME requirements and how we can

improve the incident investigations,,

- Gain knowledge on the different steps of the incident investigation process, and
- Practice the DEME incident investigation toolkit during a case study.



GREEN INITIATIVES

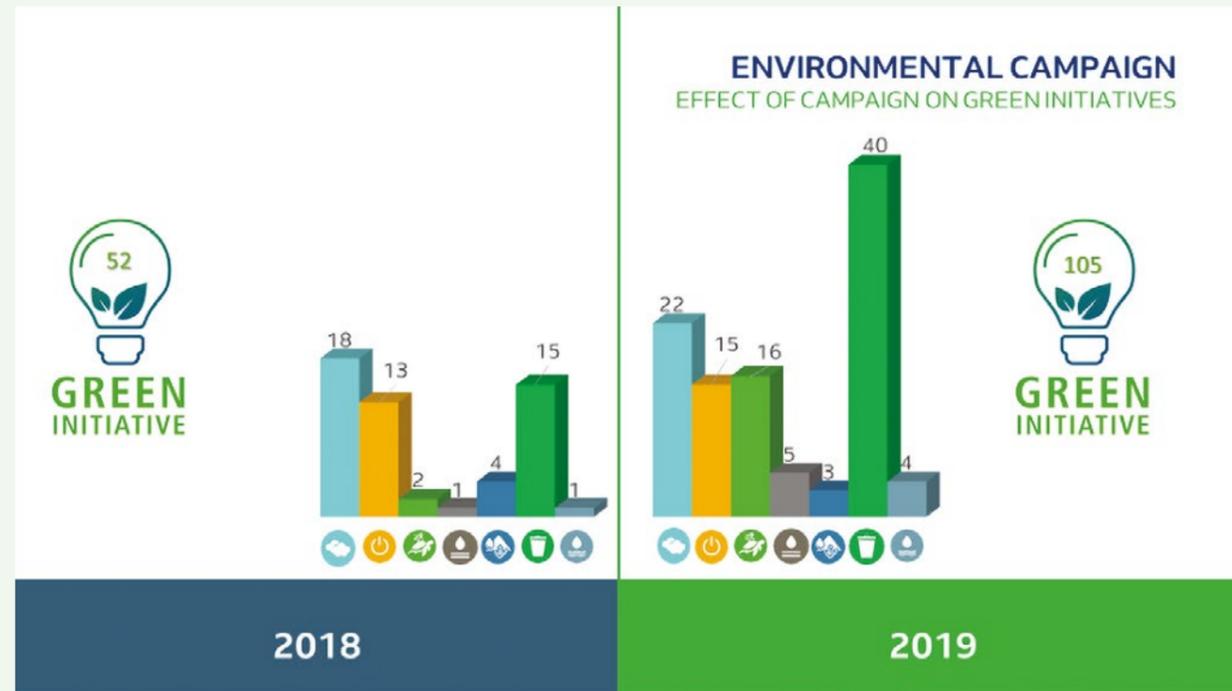
In 2018 we introduced the Green Initiatives to all DEME employees, projects, vessels and offices. "A Green Initiative is any initiative, change or modification to a process, equipment or setup that reduces the environmental impact of the project." At the end of the year we reached our KPI target. In 2019 our management set "taking Green Initiatives to the next level" as one of our targets in our year action plan. The target here was to further improve the quality of the GIs and to further raise awareness. The minimum target is still one Green Initiative per project (>3 months in operation) a year. If we compare the quantity between 2018 and 2019 (figure below), we see that approved GIs more than doubled in 2019. Also, the increase of waste-related Green Initiatives is due to the participation in the World Clean Up campaign we organised between 16 and 20 September 2019.

On the project level, it is important to always know what your energy consumption is. Measuring your energy consumption is key to seeing who and what the major consumers are. When you

know your consumption, you can start formulating reduction strategies and then implement them. Some projects monitor their consumption and present it in their project-specific weekly progress report. Other initiatives in the category of Energy Management can be installing solar panels, to produce and use local green electricity, e.g. for the use of lights, or the use of a hybrid generator.

We saw some excellent initiatives on the reuse of materials (see Lansink's Ladder) ensuring they don't go to waste, and by doing this we are able to work in a more circular way. For example, the use of scrap metal for making fences on the Seabird Phase-IIA at the Karwar Naval Base project in India. It is important that waste doesn't end up in rivers and oceans, as it also has an influence on local fauna and flora. In 2019 we had several initiatives organising local beach clean-ups. Involving the local population creates engagement and can lead to these clean-up campaigns being continued after the project is completed.

Comparison of approved GIs (2018 vs. 2019)



Pick order	Project	Activity Line	Environmental aspect	Impact	Initiative	Motivation
1	5697	ALD		CO ₂ emission monitoring.	Project's carbon footprint to be included in the weekly report.	Reducing targeted consumption is only possible after measuring what the consumption is. + More than one GI (Good Quality) + Awareness creation.
2	5413 - Moray East	ALO		SPMTs, forklifts and cranes are needed for the activities in the harbour. Fuel is needed for these vehicles.	Reduce the fuel consumption and emission.	More than one GI, not only energy consumption.
3	5447 - Rijnlandroute	ALI		Turning leftover concrete into new concrete blocks instead of concrete waste.	Every concreting phase has leftovers in the mixers. Normally the leftovers are left on site as waste or returned to the factory. Now the leftovers are placed in a formwork that produces concrete lego blocks which can be reused on site or sold and reused on other sites.	Reuse 'waste' stands high on Lansink's Ladder.
4	5432	ALD		Accumulation of metal waste increases environmental pollution, energy consumption and emissions.	Reuse of metal scrap for the purpose of protecting fixed monitoring points and making structures for JV traffic management.	Reuse 'waste' stands high on Lansink's Ladder.
5	5306	ALE		Reduction of non-green grid power.	Installation of solar panels and H2 battery storage system on site. Cable Cut ambition.	A major investment and a great initiative for sustainable energy production and immediately storing this on site in an energy carrier, namely hydrogen.
6	3933	ALE		Development of the fauna and flora on the Petit Try site.	Creation of permanent habitats on the Petit Try site in collaboration with a river contract.	One of the only initiatives for fauna and flora.
7	5504	ALD		Increase biodiversity.	Planting trees around the parking lot of the Naval base as green initiative. See explanation in document attached.	Increase of biodiversity on the project site. Every tree/plant counts.
8	5164	ALD		The marine water environment around the site, especially at the corners of the caissons, is polluted with rubbish, including plastics and other debris.	Sea water clean up of rubbish, including plastics on the project boundaries, especially caisson corners.	A beach clean up not only has a visual impact, but also reduces the plastic waste in the water.



MANAGEMENT SYSTEM



STRUCTURE

The DEME Group's management system consists of:

- One DEME structure
- Four activity lines
- Many process owners

The whole DEME Management System is based on a six-block structure; this is a recurring theme that makes it easy to

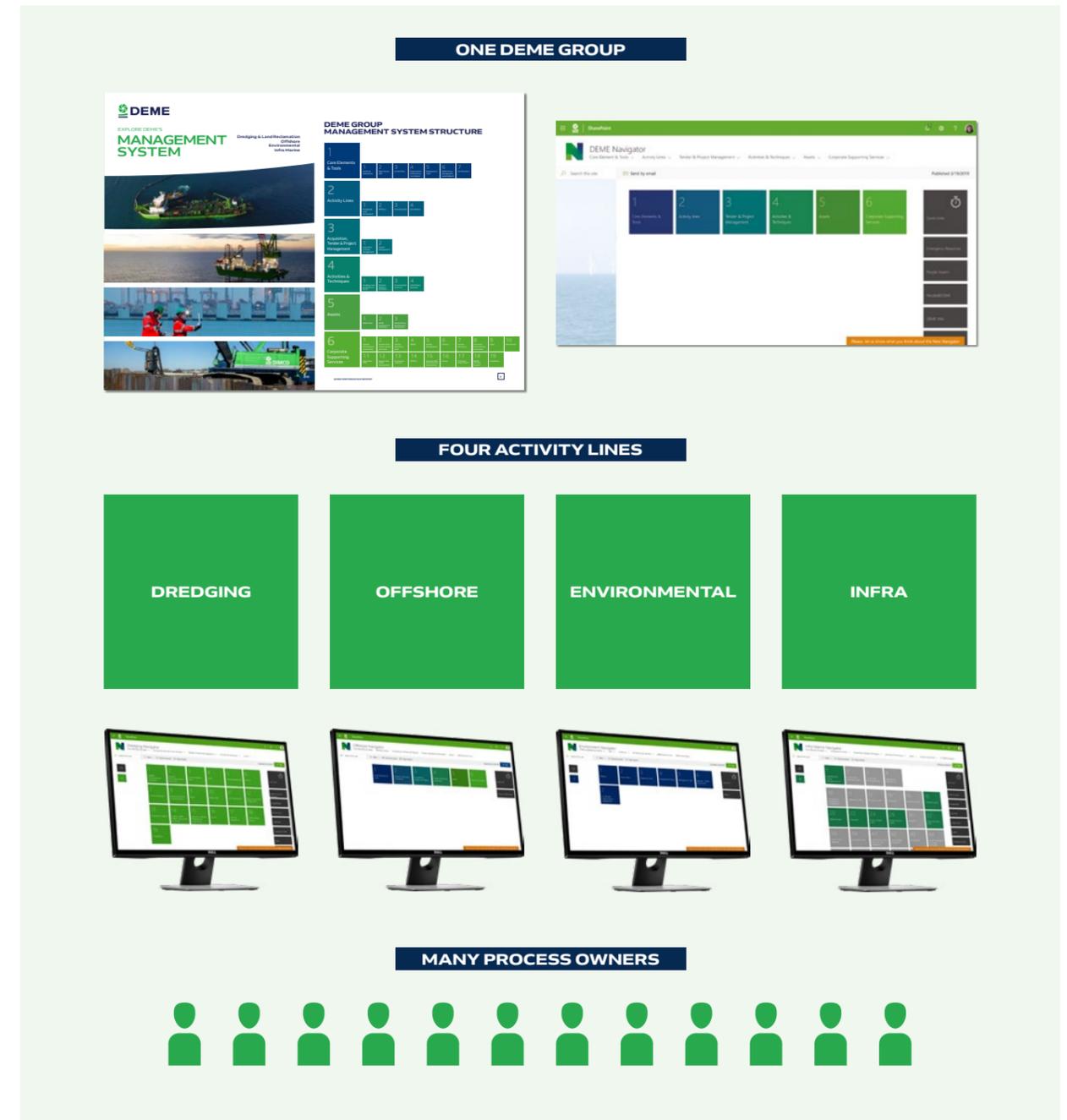
find the information you need. We strive for maximum transparency in the way our products and services are realised, internally for our own organisation, as well as for our clients and stakeholders.

Each activity line has its own management system. On the one hand, this reflects the diversity of activities, industries and clients that DEME works with. On the other hand, by building on the common DEME structure, it reflects our

unified approach when managing projects that contain a mixture of activities.

To keep the system efficient and effective, we have established different processes; each process is owned by a dedicated process owner.

An overview of the DEME Management System and how we are organised can be found in our Management System leaflet.



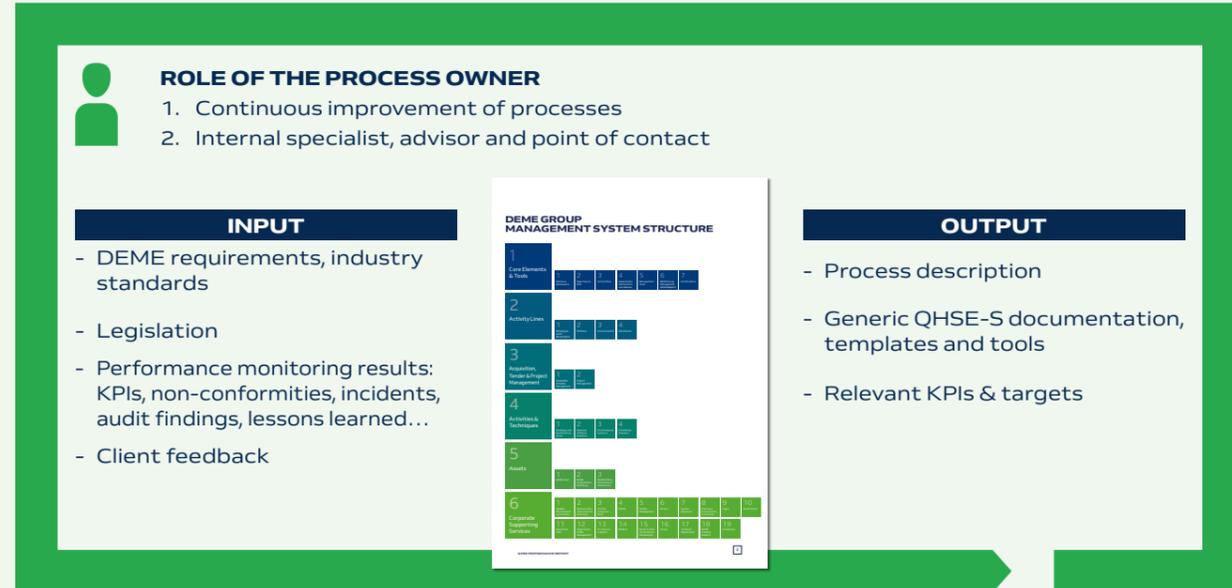
PROCESS OWNERS

DEME has introduced 'process owners' throughout the group, for all relevant processes of the supporting services, operational activities or production processes, and high-risk tasks. Today over 100 process owners function as a 'single point of contact' for their process(es).

Process owners are crucial for our organisation. They are the driving force behind the continuous improvement process. They focus on knowledge sharing within the company and provide services to all stakeholders. As specialists in their domain, they can give advice to all hierarchical levels within the organisation.

Their role is to set up and maintain process descriptions, generic risk assessments, work instructions and procedures, other useful documentation and tools. They also keep track of actions, and help management identify KPIs and targets. They can accept or reject changes to their process, and, if necessary, manage exceptions.

The process owners improve their processes by following internal and external requirements, industry standards and best practices. Other input that is taken into account are results from non-conformities, incidents, audit findings, lessons learned, and client feedback.



CERTIFICATES

The number of multidisciplinary projects involving different companies and integrated partnership structures is growing rapidly, alongside the complexity and ever-increasing level of requirements of these projects.

To fulfil the QHSE requirements, DEME holds a group certificate that brings over 50 operational and commercial entities together.

All certified entities have an integrated scope covering DEME's operational activities and are compliant with the following standards:

- ISO 9001 - Quality Management Systems
- ISO 14001 - Environmental Management Systems
- ISO 45001 - Health and Safety Management Systems

Additionally, our management system is assessed according to numerous other scope-specific standards, for example SCC** or SCCP (SHE Checklist for Petrochemical Contractors), Safety Schemes in Procurement (SSIP), Safety Culture Ladder, FPAL and the CO₂ Performance Ladder.





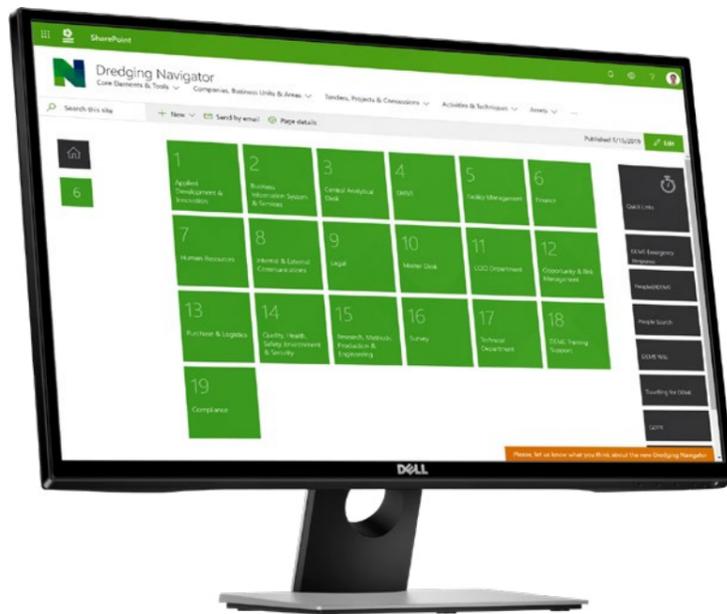
The Navigator is a platform used for communication, knowledge and information sharing. Modelled on the same structure as the DEME Group Management System, the Navigator includes six blocks on the home page – these make up the content directory for the entire platform.

Several activity-specific sites have been created that include the underlying business units, companies and areas. These are based on the same six blocks, thereby making them easy to recognise visually. In this way, everyone has a specific content file.

Thanks to the different Navigators, it is easy to find and share all kinds of information and documentation in a structured and user-friendly manner. In this way, it's possible, for example, to have several paths to the same information or documents. Links to other DEME internal or external systems can be integrated into the Navigator's structure. As a result, data and documents only need to be present in a single location.

A very important function has been given to the process owners. They have been assigned to the supporting services, the operational activities and High Risk Tasks. They are personally responsible for the documentation and information on their navigator page. Not only do they ensure the supply of information and keep it up to date, they also decide what content is relevant and what type of documents are needed to support their process.

To emphasise this down-to-earth approach quick links can be found on every page, enabling everyone to quickly find the important information they want for the day-to-day operations on the work floor.



Apprise means “to tell someone about something” and that is what we aimed to do when we created an interactive, operational and above all, highly flexible QHSE reporting tool for all projects and vessels. The goal is to get everyone working on our projects and vessels more involved in QHSE reporting and follow-up. In this way, we hope to encourage an increased number of useful QHSE reports and ultimately, a more proactive approach to QHSE.

By modernising the current QHSE software, we aim to:

- make it suitable to contribute to a paperless environment;
- expand functionalities and enhance current processes based on feedback received in recent years;
- fine-tune current processes with simplified input screens and workflows;
- improve reporting possibilities.



CAMPAIGNS



RECAP CAMPAIGNS 2018

In the first quarter of 2019, the DEME Group organised a recap of the major campaigns from the previous year. In 2018 two sets of five golden rules were introduced. The topics were standard lifts and fire safety.

By repeating these campaigns, we ensure that the message spreads throughout organisation, covering employees from different shifts and working regimes.

DEME QHSE-CHL-119

INSPECTION CHECKLIST: FIRE PREVENTION & FIRE SAFETY

Project:	Inspected by:			
Location/Project:	Date:			
Ref:	OK	Not OK	NA	Remarks
FIRE PREVENTION				
1. Is continuous housekeeping ensured?				
2. Are spills of flammable materials immediately cleaned up?				
3. Is the 'Smoking policy' respected?				
4. Are flammable products stored in fireproof or fire-resistant lockers, or in double-walled tanks?				
FIRE EMERGENCY PREPAREDNESS & RESPONSE				
5. Is the local emergency response plan (instruction, location of emergency equipment, ... known by everyone)?				
6. Are the extinguishers and hoses at hand as outlined in the fire & safety plan of the site/sector?				
7. Is the fire-fighting equipment easily accessible (not obstructed)?				
8. Are the fire extinguishers inspected and serviced, independently monthly or annually?				
9. Are fire doors kept shut (or provided with a mechanism that closes them automatically in case of fire)?				
10. Are the lifts carried out regularly (office & site, yearly/semi-annually or if 25% of the crew has changed)?				
ELECTRICITY				
11. Are the wiring, power strips and sockets in good working condition?				
12. Is the electrical installation checked periodically? And is this included in the maintenance program?				
13. Are the extension cords used correctly (not coiled, not connected to equipment that draws more current than the cord can handle ...)?				
14. Are junction boxes properly closed and protected from environmental conditions?				

Rev: 2019-02-25 | Uncontrolled if printed. Most recent version is available on DEME Navigator | page 1 of 2

5 GOLDEN RULES FOR FIRE SAFETY

1. A fire can only occur when **three elements** are combined in the right mixture: oxygen, fuel and heat.
2. A **site-specific risk assessment** is a necessary basis for fire safety.
3. **Remove or cover flammable materials.** This includes ensuring the good condition of containers and distribution systems for gasses and liquids.
4. Control potential **ignition sources.** For example, faulty or incorrectly used electrical equipment and installations, smoking outside of designated areas, ...
5. Always know the **emergency response plan** and have immediate access to **fire-fighting equipment**.



5 Golden Rules for Lifting

1. The **lifting plan** is a necessary basis for a safe lift. Every deviation of the steps to be taken has to be approved by the (Lifting) Supervisor (for heavy/offshore lifts).
2. It is **prohibited to bypass or switch off** the safety functions on a crane or lifting device.
3. Only use **inspected and approved lifting equipment** and rigging points.
4. Convince yourself that your material is **suitable for lifting** (e.g. forklift is not a lifting crane, not all winches are lifting winches ...).
5. Always use a **lifting bag or lifting cage** for small loads such as tools and gas bottles.



DEME SAFETY WEEK

Getting to your workplace

'Getting to your workplace' was 2019's annual Safety Week topic, based on our HIPO trend analysis.

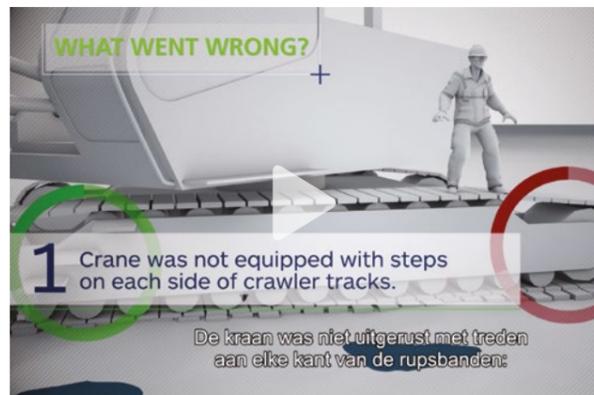
The managing directors of all four activity lines introduced the subject, highlighting the specific risks of each type of workplace. For example, stepping on board a crew transfer vessel from the quayside requires a different work preparation to driving over an environmental remediation site with a vehicle.

Special attention was also given to office workers, more and more of whom now come to work on electric bicycles, as there is now a greater chance of falling and sustaining more severe injuries than with traditional bicycles.

Employees could learn from five different scenarios through video presentations, all covering different HIPO incidents that happened in the company. Additionally, posters were distributed to be used in toolbox meetings and to promote the campaign.

Part of 'Getting to your workplace' safely is improving access to the workplace. The Infra activity line has started installing several fixed boarding points on its pontoons. The newly built-in stairs make getting on board via crew transfer boats much easier and safer. In case of an emergency and a man overboard situation, these stairs can also be used to get back on board. Three pontoons (De Bever, Dordtsche Kil and GEKA 21) have already been tackled. In the course of 2020, the remaining pontoons will also be equipped in a similar way.

During the (de-)mobilisation of cable cranes, people must move on the boom of the crane when it is horizontally positioned. To make this workplace safer, Infra activity line has ordered that its cranes be fitted with a double lifeline and absorber next to the walkway on the boom. This, in combination with the correct use of PPE (a fall harness with double positioning lines), will make falling off the boom impossible.



qhse.link/sw19

SAFETY MOMENT DAY

License to Stop

With the 2019 Safety Moment campaign we renewed our "Stop Work Authority: License to Stop". Our CEO, Luc Vandenbulcke, gave a clear message: "The Stop Work Authority has to be used by each of us, whenever our safety is not guaranteed."

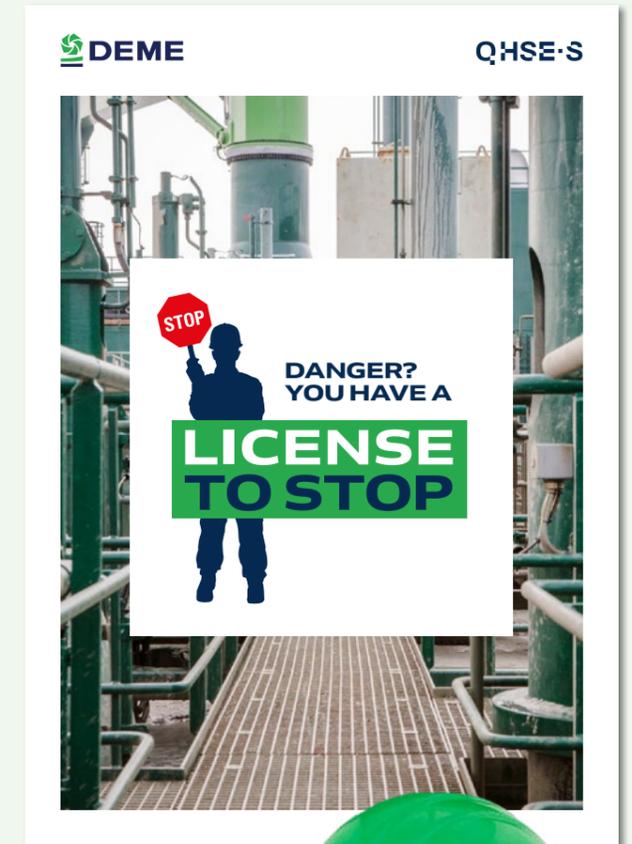
Each and every employee working for the DEME Group (including interns, temporary workers and subcontractor personnel) has the authority to stop any task that is unprepared or unsafe.

We also need to focus on work preparation: the better our projects and daily work are prepared, the less need there will be to stop the work.



Employees who participated in the toolbox sessions about the License to Stop got a sticker to wear on their work helmets. With this sticker they demonstrate their personal commitment to keeping themselves and their colleagues safe.

A launch event was held at our head office, where behavioural psychologist Mischa Coster, MA MSc, made a fascinating presentation on "the psychology of safe behaviour". He explained the different biases that prevent people from using their License to Stop, and most importantly, how to counteract these biases.



qhse.link/stop

24-28/06
QHSE

DEME SAFETY WEEK

GETTING TO YOUR WORKPLACE

1

MONDAY
TRANSFER QUAY WALL/
FLOATING EQUIPMENT

2

TUESDAY
GETTING (IN)TO
EQUIPMENT

3

WEDNESDAY
VERTICAL LADDERS

4

THURSDAY
BIKING TO WORK

5

FRIDAY
TRAFFIC MANAGEMENT -
SITE ACCESS & CONTROL

All campaign material can be found on the DEME Navigator: [🏠 > 6 > 14 > 2 > 7](#)

ENVIRONMENTAL CAMPAIGN

During last year's management review, DEME decided to take the Green Initiatives to the next level in our Year Action Plan.

This was the starting point for the DEME Environmental campaigns. Linked with our DEME Sustainability Framework and based on our daily activities, we identified 7 Environmental Aspects on which we have an influence, bearing in mind that we want to excel in our operations in the most sustainable way. Material on 4 different environmental topics - including posters, informative videos and a quiz - is available. Our operational managers spread the environmental campaign within their team.

Compared with 2018 we saw both the number and the quality of the Green Initiatives improve. Examples are:

- Data monitoring of the energy consumption presented in a project dashboard;
- (Re)using recycled materials on the projects;

- Protecting and/or enhancing fauna and flora;
- Installing a solar panel to provide local green energy;
- Organising local beach clean-ups, thereby contributing positively to society:

- » Germany: Elbe Deepening project and Stadtwaldsee in Bremen,
- » Nigeria: Port Harcourt Base DISN, clean-up of base premises, quays and jetties.

We are satisfied with the results and continue to strive for creativity and commitment from everyone to develop high-quality Green Initiatives. In 2020 we plan to publish the next 3 Environmental Topics.

A GREEN FUTURE STARTS WITH GREEN INITIATIVES START WITH YOU

THE MOST SUSTAINABLE ENERGY IS SAVED ENERGY

qhses.link/ec19

DEME ENVIRONMENTAL CAMPAIGN

SOIL EMISSIONS PREVENT AND CONTROL

- Use bio-friendly products
- Maintain & inspect equipment
- Correctly store & handle
- Use response plans, spill kits & training

DEME DEME Navigator: > 6 > 14 > 14 QHSE

DEME ENVIRONMENTAL CAMPAIGN

ENERGY CONSUMPTION THINK, ACT, SAVE

- Reduce energy demand
- Use sustainable energy
- Use energy efficiently

DEME DEME Navigator: > 6 > 14 > 14 QHSE

DEME ENVIRONMENTAL CAMPAIGN

WATER EMISSIONS PREVENT AND CONTROL

- Use of bio-friendly lubricants & hydraulics
- Limit turbidity
- Maintain & inspect hydraulics
- Monitor & control effluent water quality
- Use response plans, spill kits & training

DEME DEME Navigator: > 6 > 14 > 14 QHSE-S

DEME ENVIRONMENTAL CAMPAIGN

AIR EMISSIONS MINIMIZE THE IMPACT

- Use clean fuels & additives
- Tune & improve your engines
- Avoid excessive idling
- Use bikes or public transport

DEME DEME Navigator: > 6 > 14 > 14 QHSE

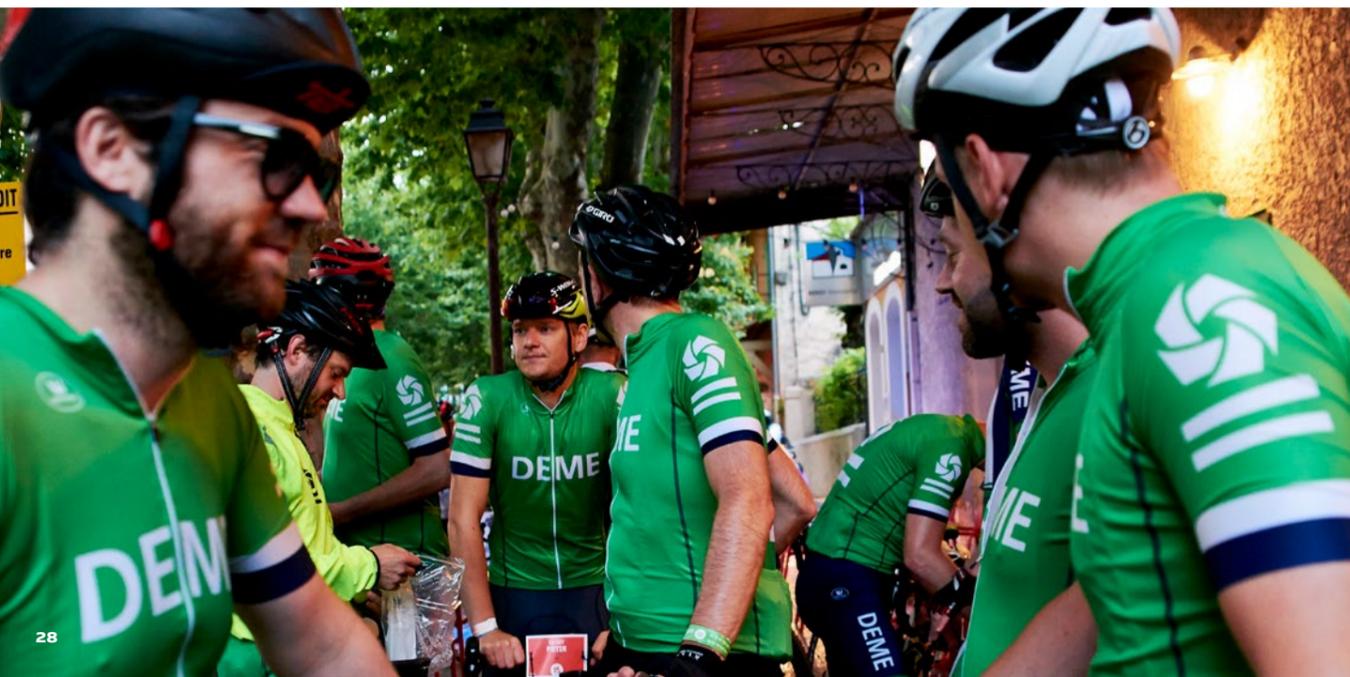


ENERGY@DEME: SPIRIT GOES GLOBAL

After celebrating its 15th anniversary, the Energy@DEME programme continues to attract more and more employees to participate in challenging sports events across the globe. While they enjoy competing, more importantly, they enjoy coming together, meeting new colleagues and having fun. As well as individual sporting activities, many of our people are also inspired to adopt complete changes in lifestyle to improve their overall well-being. This year- 12 colleagues took part in our DEME Heroes programme, where they decide to switch to a sportier lifestyle. With personal guidance and coaching, our heroes got ready to cycle the legendary Mont Ventoux in France or run the Brussels

half marathon, while being cheered by crowds along the way. Separately, more than 100 DEME colleagues actually took on the challenge of climbing Mont Ventoux.

This year- the sporting calendar was packed full of every type of sport, from marathons in several countries to rowing dragon boats in Belgium, football in Asia to weekly yoga workouts. From Singapore to Russia, from the Netherlands to India, 2019 saw our people get active highlighting how the Energy@DEME spirit has certainly gone global!



LIFTING 2.0

When it comes to lifting operations, DEME approaches incidents with a HIPO classification. This HIPO classification showed a growing trend in lifting incidents, and this resulted in dedicated lifting campaigns such as 'Hazard Hunt' and the 'Lifting Management Course.' A thorough incident analysis concluded that there were opportunities for improvement within the lifting management process, leading to the requirement of a dedicated action plan for future operations.

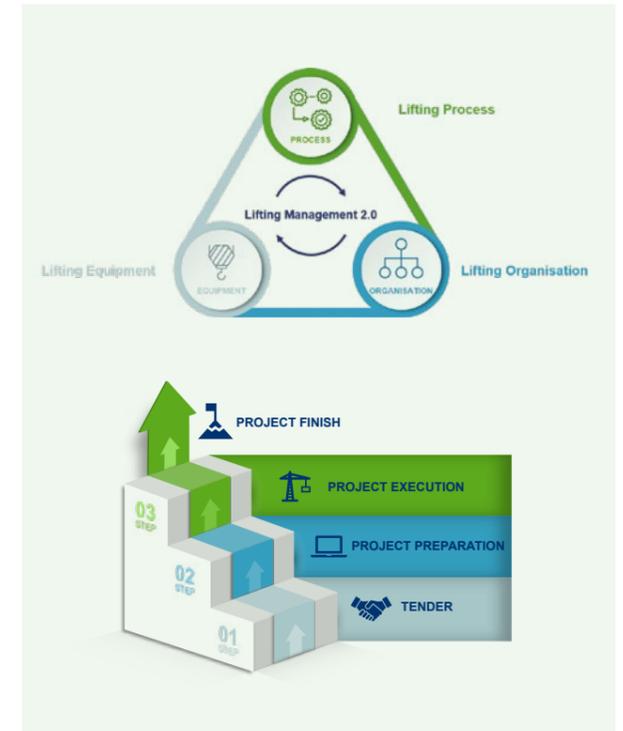
In 2019, the development of the Lifting Management 2.0 procedure was successfully started, and by the end of the year the document package was ready for review.

Lifting Management 2.0 consists of 3 major components:

1. Lifting Process
2. Lifting Organisation
3. Lifting Equipment

The objectives are to make sure that every lift is properly planned, risk assessed and executed as planned. Every lift must be carried out by competent personnel, and clear roles and responsibilities within the lifting team are to be well defined and understood. Finally, every lift must be executed using proper certified and maintained equipment.

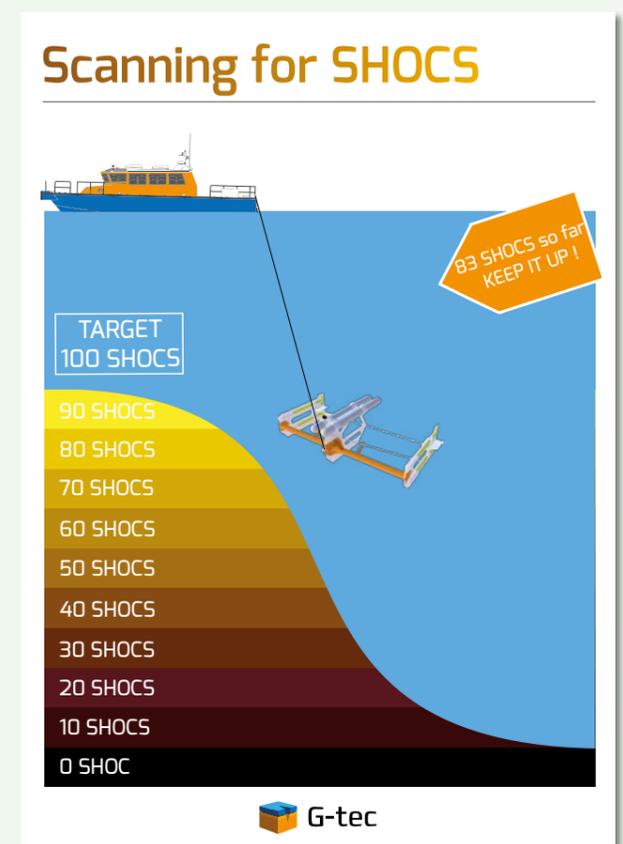
Lifting 2.0 covers every part of the lifting operation, starting from tender all the way up to the end of the execution (lessons learned).



SHOC CAMPAIGN "Scanning for shocs"

The 'Scanning for SHOCs' campaign was launched at the Milmort office and the geophysical projects. An app was made for filling in the SHOCs. By scanning the QR code on a sticker you were directly linked to a SHOC form. The goal of this campaign was to increase the number of SHOCs.

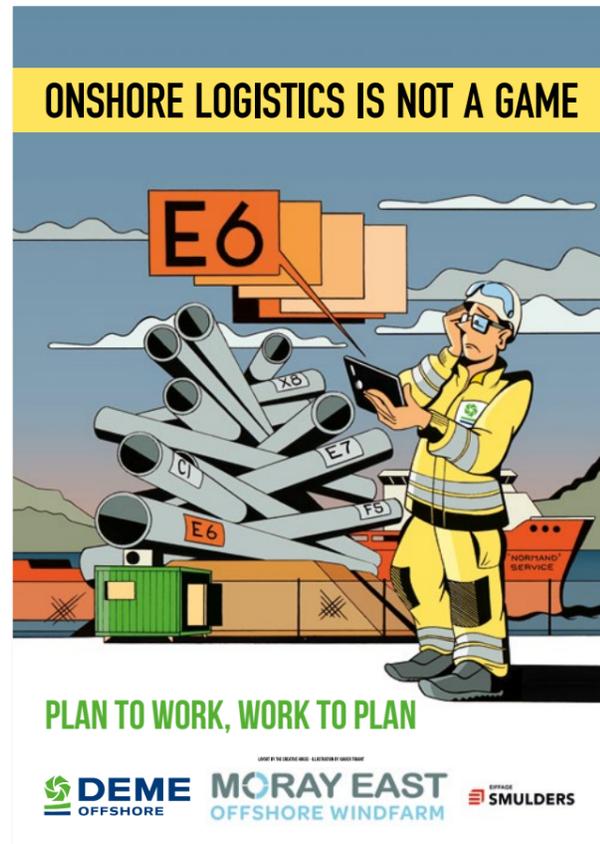
Each month the best 3 SHOCs were awarded.



MORAY EAST SAFETY TOPICS CAMPAIGN

On the Moray East project, safety posters were made to create awareness of specific safety topics. These safety topics were based on crucial activities or risks that were expected during the project.

At the start of the project, two safety posters were created: one for Apollo regarding slips and trips, 'Don't let safety slip away', and one for logistics, 'Plan to work, work to plan'. During the pre-piling, activities the topic 'hose handling' was requested by Apollo and the poster 'Stay alert, don't get hurt' was created.



WINTERISATION AND ACCESS

During the Borssele 01 & 02 project, a winterisation and access campaign was launched. The goal of this campaign was to raise awareness by proactively involving every person on the project, including subcontractors and client. The campaign content, prepared in cooperation with all of the subcontractors and the client, empowered all employees to work towards the same goal.

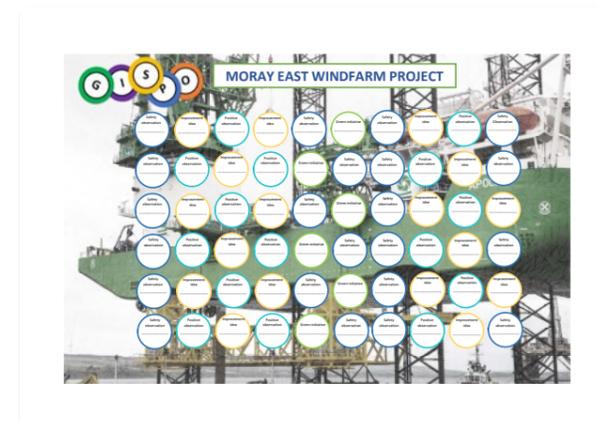
The campaign covered several topics such as safe access to structures, safe access to ladders or stairs and preparing for winter. It consisted of a poster with cartoons of project members and subcontractors, as well as some purpose-built checklists and toolbox talk forms including predefined topics and text.



GISPO CAMPAIGN Green Initiatives, Improvements, Safety and Positive Observations

The GISPO (Green Initiatives, Improvements, Safety and Positive Observations) campaign was launched on board the Apollo during the pre-piling campaign on Moray East.

The main target of the campaign was to increase the number of Safety Hazard Observation Cards (SHOC) and the Green Initiatives on board the vessel. To encourage everyone on the vessel to submit SHOCs, a monthly personal reward for the best SHOC card is handed out. A team on board decides on the best SHOC. The good SHOCs and Green Initiatives are written on the big 'GISPO' poster, a type of bingo card. When this poster is full, a reward is given for the entire vessel.



INITIATIVES



TASK FORCE

The Task Force team that was initiated in 2018 was further developed in 2019. The team visits our vessels and helps the crew to determine improvement actions with the purpose of lifting the operational safety on board our vessels to a higher level.

In the two years:



VESSELS VISITED

41

1,0001



ACTIONS LOGGED

OF WHICH MORE THAN 800 ARE CLOSED



SUGGESTIONS FOR NEW-BUILT

132

112



LIFTING TRAININGS GIVEN



MORE THAN

2008

TOOLBOXES GIVEN

DEALING WITH LIFTING
MANAGEMENT & RIGGING,
WORKING AT HEIGHT AND
WORKING IN CONFINED SPACES.

QHSE 4 SPECIALISTS

Every year the QHSE-S department organises an in-company seminar for the four activity lines called QHSE 4 Specialists. During this three-day event, topics such as the major HIPO incidents of the past year and changes in processes or in the organisation are discussed, combined with an educational aspect.

New to this edition was the introduction of speaker duos: a QHSE colleague from a project presented a topic of their choice, together with one of the project engineers or a representative from the project management. Presentations covered all topics of quality, health, safety and environment, with speakers shining a light on the safety challenges of dockings, DEME's solution to the 'Plastic Soup' and tools for lean project management.

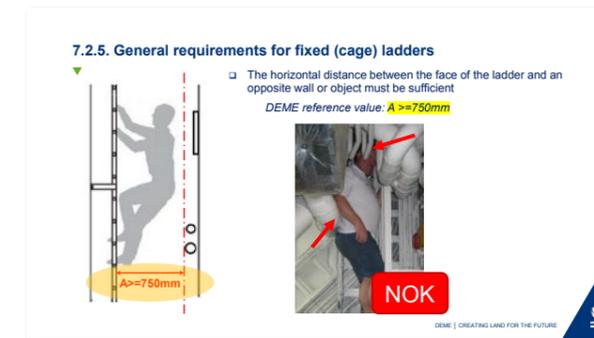
Awards were handed over for excellent process owner, incident investigation and Green Initiative.



SAFETY BY DESIGN GUIDE

At the same time, the QHSE-S and Technical department collaborated on the development of a Safety by Design Guide. This guide serves three purposes:

- It is used to help the designers of our new vessels apply the highest and most relevant safety standards, taking into account our know-how, experiences and lessons learned.
- It helps centralise and provide a record of the remarks of the masters and chief engineers on design inefficiencies of the past.
- It supports our inspectors during the new build phase of a vessel to verify if the execution of the erection works are according to the plan and the philosophy of DEME's Safety by Design Guide, before it is too late to take appropriate actions.



H2S ACTIVATED CARBON FILTER

To protect the crew from H2S gas (hydrogen sulphide) set free during dredging operations, DEME has designed a 'universal filter' using activated carbon.

A recent experience of TSHD 'Nile River' on the Old Doha Port project shows both dredge and site were well-equipped to deal with the levels of H2S, a frequent presence in dredged soil. Untreated, H2S can be drawn into air supply units with detrimental effect.

Two different activated carbon filter systems have been adopted to treat H2S: a drawer system and a box system.

The drawer system was developed by Joris Claes for TSHD 'Minerva'. This system consists of horizontal drawers on two levels. Air containing H2S gas is drawn in at the bottom and forced past two beds of active carbon. During passage, as much H2S as possible is retained at the surface of the activated carbon. The two-layer structure provides added safety in case the first layer becomes saturated. The installation can be mounted on the forecastle deck, as far away as possible from where the H2S comes in to the open (the hopper). A second unit on the aft deck is recommended for filtering the air of the engine control room.

A box system was developed by Jan Peers for TSHD 'Congo River' on the Manila Bay project. The simplified and effective design, in which each set of drawers is replaced by a single box, was driven by the urgency of the project. Unfortunately, the box needs to be dismantled for renewal of the activated carbon filter. However, in this particular

case, the amount of activated carbon was enough to complete the project.

DEME is cooperating with a company, specialised in the matter, to make a final standard design for an H2S filter. This effort is cross-departmental, with TDI, QHSE-S and BOOS-T all working together.



LOAD BALANCERS

The dramatic increase, in both dimensions and power, of cutter suction dredgers has led to a corresponding increase in the size of cutterhead systems — the cutterhead itself, the adapters and the cutter teeth. The cutter teeth have become so large and heavy that they can't be lifted and mounted by hand any more. This led us to search for suitable teeth lifting tools and resulted in the selection, by a sub-committee for the 'Spartacus' projects, of the Zero Gravity Load Balancer.

This tool is a computer-controlled pneumatic load balancer. The system is equipped with a load cell, which provides the required

data to the computer. The computer steers the pneumatic load balancer in such a way that the operator can handle the load up and down without having to use an up/down control, and without having to fear a 'whiplash' upon releasing the load.

The figure below shows the standard-issue Zero Gravity Load Balancer. On CSD 'Spartacus', the unit will be mounted in a weatherproof protection unit and suspended from jibs attached to the cutter platform. These units will allow the crew to install new teeth and remove and dispose of worn teeth without having to bear the mass of the teeth.



PARTICIPATION AT WORLD RESOURCES FORUM

The Environmental activity line and its partners were given the opportunity to present the Blue Gate Antwerp project at the 2019 World Resources Forum. Highlighted by the theme "Closing the loops", they started with a presentation showing the circularity aspect of the project.

- Maximum reuse of land and soil, by focusing on onsite remediation, and reuse of the remediated soil
- Reuse of the historical heritage by integrating the historical infrastructures (warehouse, overhead pipelines, etc.) in the redevelopment infrastructure of the project
- Connecting fragmented ecologies through an ecological corridor
- The GRI reporting of Blue Gate Antwerp based on the SDGs in cooperation with CIFAL

The circularity aspects of Blue Gate Antwerp were made tangible for the public via a "Blue Gate Antwerp Safari tour", where an interested group of 20 people was given the opportunity to visit the site and experience the sustainability concepts for



HSE BOOKLET

The SeaMade project created an HSE Booklet covering several topics and handed it out to everyone involved. These topics range from DEME objectives and KPIs to general project information. Additional specific information on local ports and the communication structure for the vessel marine coordination are included. The booklet also covers reporting information

of SHOCs, incidents and green initiatives, specific information on the emergency response plan, safe work procedures and Personal Protective Equipment. This booklet is not only used to give the HSE introduction to the project, but also gives the project team supporting information throughout the entire project.

SAFETY AND LEANNESS

In order to optimise processes related to improved production and safety, our Infra activity line started to make time-lapse movies of some activities. One of these was the changing of a thermoplastic joint in a hydraulic impact hammer.

The time-lapse movies are then reviewed by all the different parties involved: operators, QHSE-S department, project engineers and operations management. This way of working results in a number of improvement ideas and step-by-step working instructions. The intention is to organise this exercise for all core activities.



PLASTIC COLLECTION AT DEME OFFICE

During a walk, two colleagues of the Environmental activity line noticed that the Scheldedijk in Zwijndrecht was littered with cans, paper and other debris due to people throwing their garbage out of the car or it flowing in from somewhere else. They decided to be proactive and began meeting monthly to pick up the waste they found between gate 1 and gate 2 (approx. 150 m) of the DEME head office. Aided by DEME Group, which provided pick up-

sticks, they kept this up every month. Over time this became a regular social activity for the dozen Environmental activity line employees who volunteered to do the clean-up.

21 September 2019 was World Cleanup Day, in honour of which the volunteers widened the scope of their initiative considerably. An invitation was sent to all

DEME Group sites worldwide asking them to reserve an hour of their day to clean up a nearby street, beach or shore. About 20 projects from France, Nigeria and Brazil responded.

In Dordrecht as well, a team of dedicated Infra activity line employees rolled up their sleeves and tackled the litter to be found around the office.



PROJECTS IN THE SPOTLIGHT



DREDGING

CONSTRUCTION SAFETY AWARD at Ayer-Merbau Phase 2

In 2019, DIAP-SHAP JV was awarded the prestigious Construction Safety Award for the Ayer-Merbau Phase 2 project in Singapore. This award is in recognition of the constant and consistent efforts of the project team to maintain high safety standards and productivity levels.

By upholding a safety culture built on leadership commitment, training to empower employees, an open communication channel between all levels and trust, a high-level safety system was established and maintained on the project.

Or, to put it in the words of the project director: "Productivity and Safety are not competing interests, they enable one another."



INCIDENT INVESTIGATION TRAINING on Elbe deepening project

To improve the quality of the incident investigations on the Elbe deepening project, a project edition of the recently developed incident investigation training was launched in early 2020.

The participants were a diverse group consisting of supervisors, project engineers, barge masters, project managers, surveyors, QHSE engineers, etc.

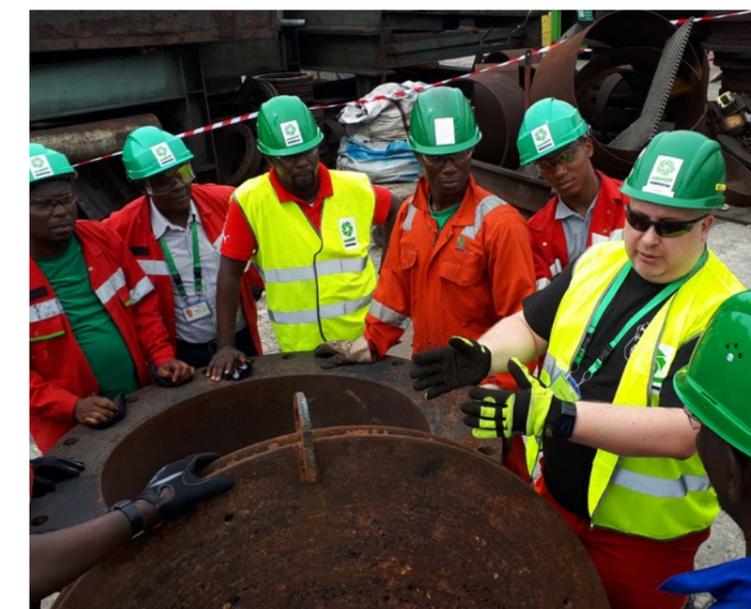
As one of the participants said: 'Incidents can have a huge impact on the day-to-day operations, therefore it's important to conduct incidents investigations in the correct way to determine the root causes and define the SMART actions required in order to prevent reoccurrence in the future.'

LIFTING TRAINING DISN at DISN

Based on the HIPO analysis of 2018 for DISN, area and local management together with the QHSE-S department elaborated and implemented a QHSE action plan in 2019. One of the revelations of the analysis was an increase in incidents related to lifting; therefore initiatives regarding lifting and rigging were established. The Dredging activity line process owner of the high-risk task lifting operations rolled out a hands-on lifting training in Nigeria.

The training consisted of a theoretical explanation of the do's and don'ts of rigging, followed by practical training. During this session, various ways of lifting and rigging different types of objects were demonstrated and practiced.

The training was organised in Port Harcourt Base, on Bonny project and Onne project at the end of April. A total of 65 employees followed the internal training and received a certificate of participation.





RISK MANAGEMENT on New Lock Terneuzen project

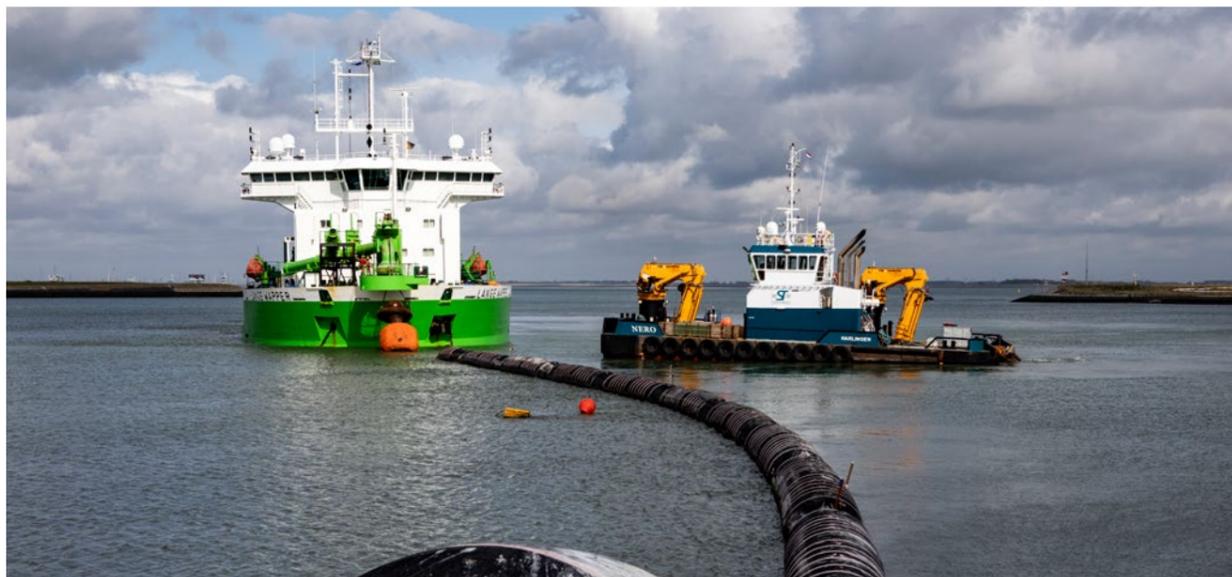
The New Lock in Terneuzen will increase the capacity for inland and sea-going vessels going between the Netherlands, Belgium and France, and promises to give an economic boost to the Zeeland region and Flanders. The lock is going to be just as long and wide as the renovated locks in the Panama Canal, with dimensions of 427 x 55 x 16.44 metres.

DEME has been involved in this complex and multidisciplinary project. To improve the QHSE performance, the project team focuses on risk assessments starting in the early work preparation phase. By using 4D modelling, the project aims to detail the design and construction phases of the project. Risk assessment sessions are organised, at least twice, for each major work scope in the project. The first risk assessment is organised during the design phase. A second risk assessment takes place six months prior to the start of the execution phase. Internal stakeholders, in particular delegates of the execution and design teams, participate in these risk assessment sessions, which are led by the project risk

manager. Major risks are identified based on the phasing of the work scope and mitigation measures discussed during the session.

As a result, the risks, quantification of effects on health, stakeholders, quality, planning and financial, and mitigation measures are filed in a central system (Relatics). This information is linked to work method statements and work packages (of the Work Breakdown Structure) to make sure that the risks are taken into account during the preparation and execution of the work.

The joint venture internally and the client externally, independent of one another, define quarterly audit scopes, both process and product checks, based on the risk register and major risks at that stage of the project. During these audits, the auditors focus on the implementation and use of the quality management system and the reliability of the contractor's records. This work method is called System and Risk-oriented Contract Management.



OFFSHORE

QHSE CHARTERS on Borssele project

During the Borssele 01 & 02 project, a joint cooperation was established between contractor (Offshore activity line) and client (Ørsted) with regard to QHSE. A QA and HSE charter was set up together and joint goals were defined for the project. Several workshops were also organised which focused solely on Quality and HSE. This close cooperation increased open communication between the parties and avoided misunderstandings during execution.

In general, an increased focus on quality was established by the quality of documentation, detailed execution of the management of change process and by explaining to project engineers the benefits of having a strict quality system in place.

Improvements for the future which we deem to be important for the company are:

- A clear central quality vision and strategy;
- Creating awareness within project teams and departments regarding quality;
- Avoiding that every project has to reinvent the wheel or start from scratch.





GREEN INITIATIVE SESSION on Saint-Nazaire project

The Saint-Nazaire OWF is located in France, in the department of Loire Atlantique, approximately 15 km west of the town of Saint-Nazaire and at a short distance of 12 km from the coast. The OWF area is approximately 78 km² and water depths at the site vary between approximately 10.5m and 24.0m LAT. The wind farm, which will comprise up to 80 wind turbines with a capacity of 6.0 MW each, will have a maximum capacity of 480 MW.

A big challenge for the Offshore activity line is the hard soil to be found in some areas. It means we will need to combine drilling and grouting operations together with drilling and hammering to install the MPs. This summer we will start with our first installation, the pre-piling campaign for the OSS.

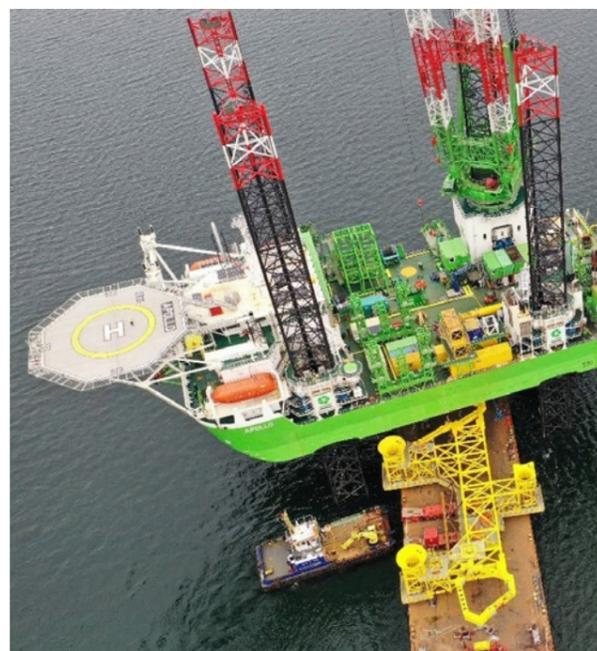
During the current preparation phase, Saint-Nazaire organised a Green Initiative session with the entire project team to come up with well-supported Green Initiatives from a multi-disciplinary perspective. These sessions demonstrate the project's dedication to environmental issues and sustainable development.

SCAFFOLDING SOLUTION on Moray East project

The Moray East offshore wind farm, located 22km off the Scottish coast, consists of 100 WTG foundations and three OSS foundations. With a total turbine capacity of 950 MW, this will be a challenging project with fabricators and suppliers spread across the world.

On the Moray East project, scaffolding is necessary to build the Transition Pieces. Offshore activity line advised the manufacturer to ensure a lean design that was safer, cheaper and faster to assemble. The upgraded lean and ergonomic design has resulted in improved working conditions due to more headroom and tool storage space, and in significant savings in both man-hours to erect the scaffold and in materials used.

Through this initiative, both safety and production have improved, while costs were reduced.



BEFORE



AFTER



ENVIRONMENTAL

REDUCTION OF NOx EMISSIONS On IJburg phase 1 and 2 project

Together with a joint venture partner, the Environmental activity line has made good progress with the Landmaken Strandeiland project (Land Reclamation Beach Island) in IJburg, Amsterdam. The phase 1 delivery date is 1 May 2020, while phase 2 is expected to extend to mid-2021.

The operation is one of big numbers:

- Providing and processing 9.5 mio m³ of sand. This involves – on a weekly basis – handling respectively 95,000 and 145,000 m³ of sand.
- Delivering and processing approx. 3,500 kilometres of vertical drainage
- In addition, the operations need to be geotechnically monitored on an on-going basis. For this, dozens of piezo-, inclino- and extensometers are placed, in addition to approx. 100 settlement rods and approx. 1,000 meters of a settlement-measuring piping.
- In order to protect the edges of the area that are sensitive to erosion, approximately 55,000 tonnes of gabions with armour stone will be applied.

An especially interesting QHSE development is the modification of our equipment with a Selective Catalytic Reduction (SCR) installation. A total of eight ships, including the ZZ TEXEL and the soil compressor Rhenus, have been modified to ensure a reduction of NOx emissions. This reduction was a strict requirement both

according to the contract and the Environmental Protection Law (NB-wet), which stipulates that a maximum of 140 tonnes of NOx emissions is allowed for phases 1 and 2.

The SCR system converts NOx into water vapour and nitrogen (without oxides). In addition, with the aim of reducing CO₂, this NOx reduction also contributes towards making our operations more sustainable.

Significant advances in safety measures were made in response to a relatively high incident rate for the IJburg project which involves a lot of land/water zone operations. These zones were all too often accessed by third parties (including holidaymakers and people engaging in water sports) who were unaware of the potential dangers. In cooperation with the client, the IJburg combination has worked hard to prevent such incidents, taking several extra measures, including:

- Better communication by the client in the area and with parties involved.
- More law enforcement requests to Rijkswaterstaat/police.
- Placing and maintaining extra markings and floating demarcation lines to increase the visibility of the project.
- More inspection at and around the operations.

All of this has led to a sharp decrease in the number of incidents. In addition, the knowledge acquired will be applied in phase 2.



MARINE LITTER The Plastic Soup project

Marine litter is currently one of the greatest environmental challenges that humanity is facing. The Environmental activity line has launched the 'Plastic Soup' project in an effort to fight this form of pollution.

In the course of our global activities we are almost always confronted with waste in rivers and oceans. During dredging works, for example, we come across large quantities of plastic. For the Environmental activity line, which specialises in, among other things, soil, sludge and water remediation, it is a logical step to use our expertise to actively cooperate on solutions for the global waste problem.

Every year, more than 8 million tonnes of plastic waste enters the oceans, of which 90% comes from just 10 rivers. By collecting plastic in rivers we can avoid it landing up in our seas and oceans, where it is a more difficult problem to tackle. By cooperating with the Vlaamse Waterweg we can thoroughly test the operation of the plastic collector and see whether we can use the technology, on a larger scale, in rivers, river deltas and ports.

In 2020, we will start a pilot project on the Scheldt River, which consists of a fixed installation that passively collects floating and suspended waste from the water, and a mobile system that

actively collects bigger pieces of waste. The test phase is being carried out in cooperation with the University of Antwerp and the Institute for Nature and Forestry Management (Instituut voor Natuur- en Bosbeheer).

The mobile installation consists of a smart detection system, a workboat that can navigate autonomously and a charging point. Floating waste is detected using artificial intelligence connected to smart cameras that are installed on the old Temse bridge. An autonomously navigating workboat, the "Marine Litter Hunter", intercepts waste and pushes it to a collection pontoon, where the waste is retained, and a crane equipped with a grab transfers it into a container. The fixed crane is operated remotely by an operator using virtual reality and 3D vision technology. When the container is full, the workboat autonomously takes it to the docking station, where it is unloaded by a transfer crane on the quay. The "Marine Litter Hunter" is fully CO2-neutral and moors autonomously at the docking station to charge.

The fixed installation located downstream of the Temse bridge will be tested by DEME to collect floating and suspended waste. This installation will consist of a V-shaped frame with a collection pontoon.



QHSE CHALLENGES on Fort Filips project

The historical site and 19th century fortress "Sint-Filips" on the riverbanks of the Scheldt River has been used for the disposal and incineration of an estimated 48 million litres of waste.

The Environmental activity line will remediate the fortress and surrounding land while simultaneously building embankments (flood protection for the Scheldt River), several outflow constructions and a dyke in the river that will create a low-dynamic estuarine environment. Communication, traffic management and planning are key to successfully and safely completing this project with all its different aspects and on-site teams.

The many unknowns regarding the stability of the earth covered fortress combined with the heterogeneous and explosive mixture of pure product makes this remediation the biggest single QHSE challenge on site. Structural integrity will be safeguarded by a phased approach and air monitoring will be used to keep all people working in and around the site safe.

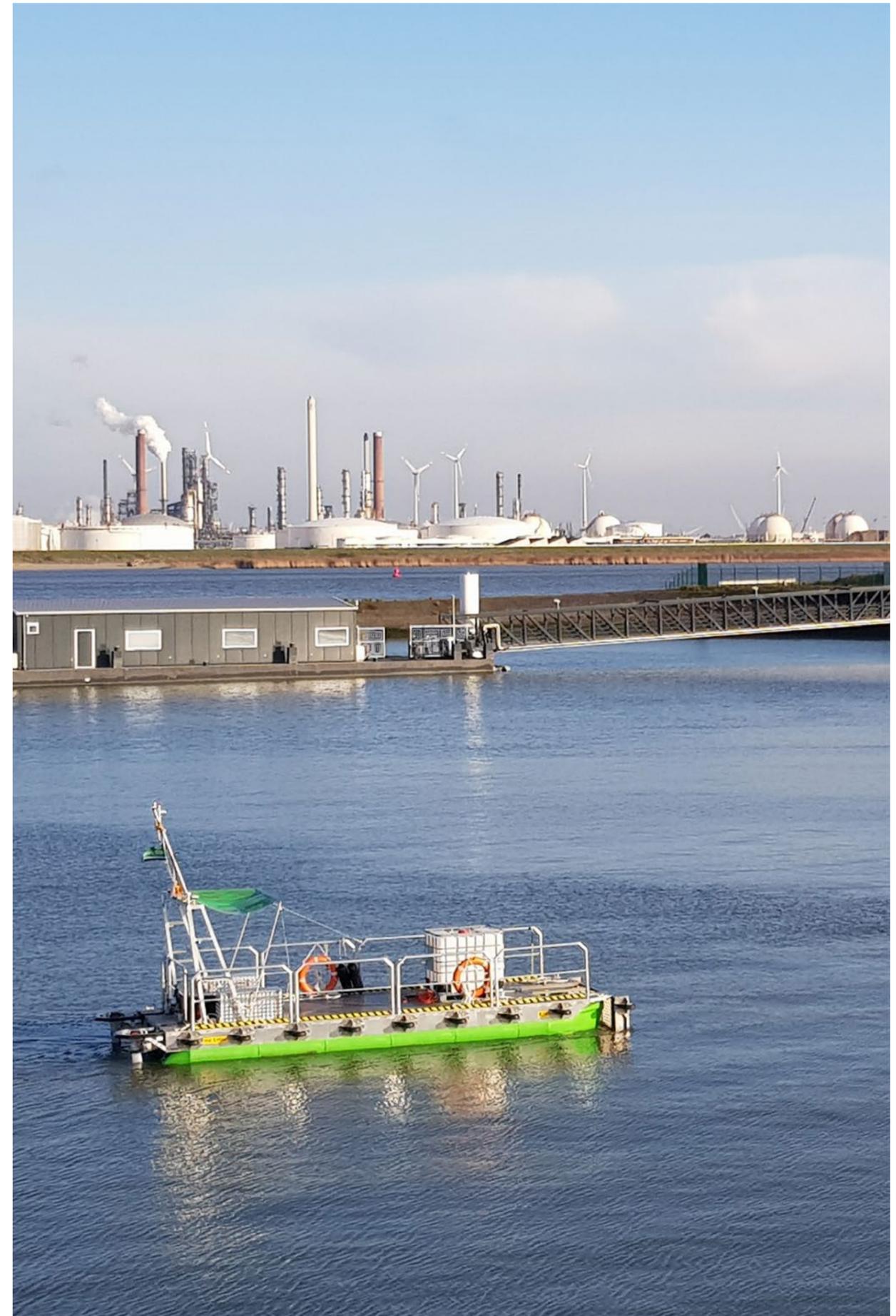
ENHANCED LANDFILL MINING in the Ghent channel area

On the premises of a chemical company in the Ghent channel area in Flanders, the Environmental activity line performed a large-scale remediation last summer. A historic dump of 3 hectares in size, with 160,000 tonnes of uncovered waste, was carefully excavated, sorted and recycled where possible. This is Enhanced Landfill Mining (ELFM) at its best.

The concept of ELFM is based on the notion that landfills can be treasure troves of new raw materials and energy. In addition, via ELFM we not only engage in recycling, but also create new space and eliminate environmental risks for the future.

It's an expensive operation, but the ELFM option was chosen for sustainability reasons and because of the added value of the cleaned site.

Almost 2000 UXOs (Unexploded Ordnances) were found during this remediation and professionally removed under the supervision of a UXO expert.



SDG AWARD at Blue Gate project

Blue Gate Antwerp is located nearby the Scheldt River and close to the Antwerp city centre. It was, at the beginning of the 20th century, one of the largest petrochemical ports in Europe. Following the relocation of these activities, the site was abandoned and became waterlogged and heavily polluted.

In 2018, the “Blue Gate Antwerp Development” PPP entity, with the Environmental activity line as the main shareholder and contractor, together with its partners, started work to remediate, sustainably redevelop and commercialise the site. The 17 Sustainable Development Goals (SDGs) drawn up by the United Nations in 2015, and a cornerstone of DEME’s mission, were the guiding principles of this project.

Blue Gate aims to be the first climate-neutral, eco-effective, water-related business park in Belgium. Companies wishing to establish themselves there must commit to engaging in eco-effective and circular-based activities.

Last year, in recognition of the project’s integration of the SDG principles in both their concept and daily operations, Blue Gate was presented with an SDG award by CIFAL, part of the Belgian branch of the United Nations.

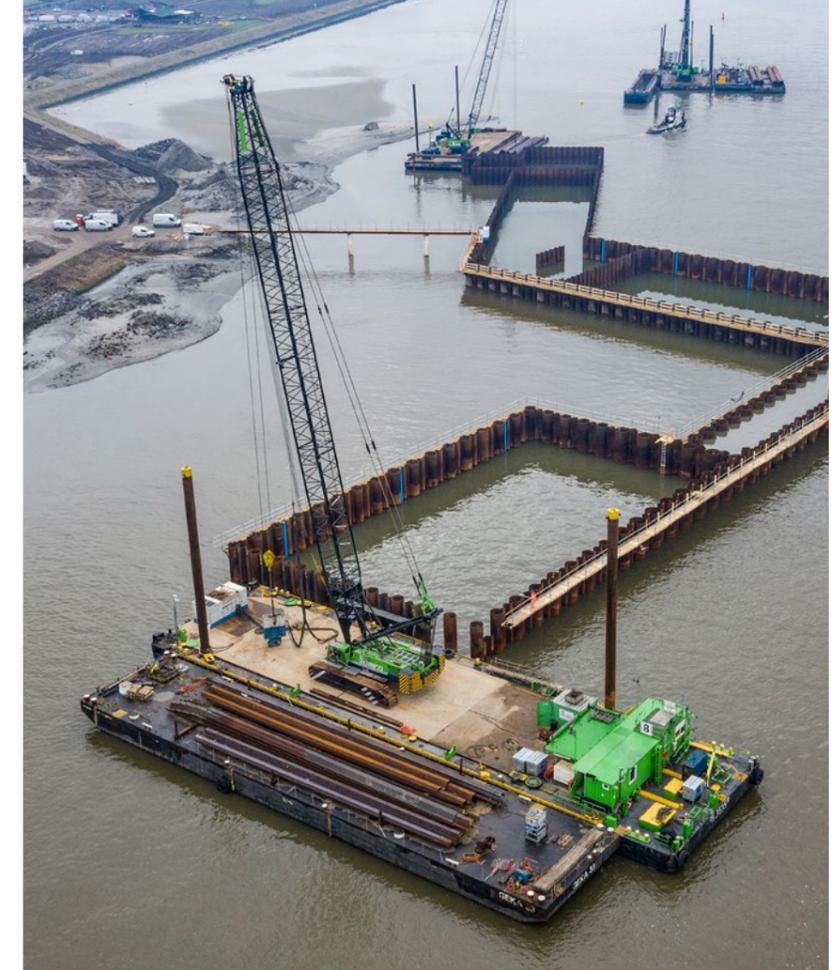


INFRA

4D ANALYSIS on Blankenburg connection project

The Blankenburg connection requires a tunnel to be immersed in the river “Het Scheur”. In order to reduce the number of elements to be immersed, the project team conceived an innovative way to construct the tunnel elements straight above the tunnel entrances. With this approach a multitude of complex construction phases need to be carefully studied and planned for. In order to be able to grasp the complexity and reduce associated risks, the construction process is fully modelled in a so-called time-based “4D” analysis.

During the high-risk activities concerning working on and near water, e.g. piling of steel retaining walls, the project provided a permanent motorboat rescue team. A ‘man overboard’ drill was held to test the reaction time and to make the people working on the pontoons aware of the risks and the procedure to follow in case of an emergency.

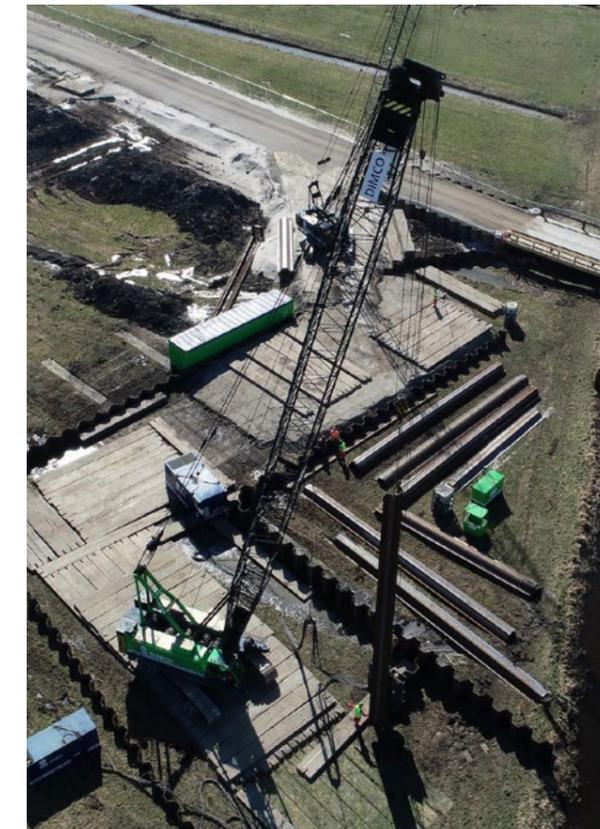


TREATMENT OF “PFAS” at GRC

PFAS is a collective name for a certain group of chemical substances that do not naturally occur in the environment. They have good characteristics – e.g. they are non-flammable and grease-repellent – that lead them to be used in many applications such as lubricants, fire extinguishing foam, non-stick layers on pans, and clothing. However, PFAS spread very easily in water and in the soil and pose a risk to the health of humans and the living environment.

For the first time, GRC in Kallo (Port of Antwerp) has cleaned up a large amount of soil that was heavily polluted with high concentrations of PFAS. A hybrid soil washing concept was developed, so that this substance with special characteristics could be physico-chemically cleaned, a far more complex process than simply washing soil contaminated by more traditional pollutants.

GRC applied the necessary modifications to the installation and the water purification, and is now ready to deal with larger volumes of PFAS-polluted soil in the future.



EMERGENCY RESPONSE CONTAINERS on RijnlandRoute Project

Due to the vastness of the RijnlandRoute project, a large infrastructure project containing a new road connection and a bored tunnel, the construction sites and locations change constantly over time. It requires planning for quick access to appropriate assistance in the event of an incident. Therefore emergency response containers are implemented, which in addition to the alarm card (with emergency information) contain essential tools needed to carry out interventions. The keys to the containers can be found in key cabinets (with an appropriate code: 0112 ...), while the containers can be lifted and therefore moved easily and, if necessary, placed within the construction pits, close to the activities.

In the tunnel, a wireless network is also provided, built up by means of a number of multi-functional cabinets that are arranged along the trajectory. These cabinets include facilities for locating the tagged workers and mobile equipment. In this way crucial information is available for intervention services in the event of an incident.

In addition, the cabinets are equipped with a number of functionalities (alarms, means of communication) and can be expanded as required with, for example, gas detection, etc. The wireless operation ensures that if one of the components fails, due to damage or another incident, the system remains functional, which is crucial in a tunnel.



QUALITY INSPECTIONS at New Lock Terneuzen

For the execution of quality inspections, the project team chose to implement the tool BIM 360 field. This tool links inspection test plans with a 3D model. By selecting the element on the 3D drawing in the mobile app, the user can view the specific inspection document on a tablet. This method of inspection allows the as-built file to be prepared quickly and efficiently.

In Terneuzen, a mooring dolphin has to be installed in front of an existing jetty. The specific soil conditions on site require the new pontoon Dordtsche Kil to be equipped with two different cranes and an installation to perform grouting. The complete operation, including the movements of the different cranes, is modelled before execution. As input to the model, the pontoon and crane were scanned with a point-cloud scanner, thus producing a reliable 3D-model of the equipment.



QHSE Initiatives on RSN project (Renovation of locks and weirs)

Together with joint venture partner Siemens Mobility, the Infra activity line is performing various activities on the RSN project, including the replacement of all railings up to the top of the engine rooms; after all, staff safety — when using handrails on spiral staircases — requires extra precautionary measures.

Furthermore, the company Rope Access Group has been commissioned by the Infra activity line to provide advice on working at heights, as well as conducting a training rescue exercise.



SAFETY AWARDS

For their continuous efforts to keep safety standards high, several Infra activity line colleagues received a safety award on their project:

- Nourdin Marguoum - RSN project
- Rudy Rasschaert - RijnlandRoute project

Congratulations, and keep up the good work!

PUSH & PULL POLES on a Shell project

One of Infra activity line's customers in the petrochemical sector, Shell, demanded extra measures to ensure safety during lifting and hoisting activities.

Push & pull poles were used for this. These allow you to guide loads in a simple way and still keep a sufficient distance from them. The poles are made from fiberglass with a nylon end that can be used to push away or pull loads. The Push/Pull Poles are 1.3 meters long and have an ergonomic handle and weigh less than one kilo.



CONCRETE LEGO BLOCKS on RijnlandRoute Project

After every concreting phase, there are always concrete leftovers in the mixers. Normally the leftovers are treated as waste on site or are returned to the factory. On the project RijnlandRoute ('COMOL 5' consortium), the project created a formwork using the Lego block principle. As such, the formwork is filled with the leftovers of the ordered concrete. The produced concrete Lego blocks are then used on site (e.g. as partition walls for the storage of materials). They can also be sold or reused on other sites.

DOCKINGS AND MAJOR REPAIRS

Docking preparations are proving their ability to raise safety to a higher level on Major Repair projects.

Gaps between DEME requirements and shipyard regulations are now covered in a DEME Bridging Document. As a result, agreements about safety standards are signed by both parties before any work starts on an MR project. To achieve this, potential shipyards and subcontractors will be audited systematically in advance of MR projects; in fact, MR preparations will be examined in advance by QHSE-TD staff. A dedicated QA engineer focuses on Quality Control during MR projects in order to raise quality issues in a systematic way, allowing the vessel to leave the shipyard in top condition.

To improve our QHSE and technical performance during major repairs and dockings, the DEME Technical Department wants to focus more on work preparation. Before works begin, the docking team, together with a QHSE engineer, selects the high-risk tasks included in the work list that require detailed work instructions and method statements. A work location plan is set up to determine possible interfaces in advance. The crew is consulted during vessel visits and potential shipyards and subcontractors are audited. The agreements made with crew, shipyard and subcontractors are communicated during kick-off meetings. Once the works start, the HSE performance of the overall project is monitored through weekly reports, which are centralised on the Navigator (our intranet).



EMERGENCY PREPAREDNESS AND RESPONSE



SHIP/SHORE EMERGENCY EXERCISE

To comply with the ISM and ISPS requirements, yearly emergency exercises have to be done including testing of communication, coordination, available resources and response.

One of those ISM-ISPS exercises involved the vessel 'Ambiorix' and the entire DEME emergency response team at the head office in Zwijndrecht.

Although the exercise was prepared on board, it remained unannounced. The scenario was based on an uncontrollable fire in the engine room during anchorage at Kakinada, India; of the 19 persons on board, one was reported missing and one had serious burn wounds. The other crew members were physically unharmed.

With the collaboration of the local emergency services, a multidisciplinary exercise was organised on board the vessel Amazone in the port of DEMA in Zwijndrecht. A fire in the engine room was simulated resulting in two missing persons. The local fire brigade got to exercise on board a vessel and evacuate victims from enclosed spaces in complete darkness. This specific situation and the collaboration with the emergency medical service gave this exercise an added dimension which made it quite extraordinary.

Thanks to the collaboration of all parties involved, the exercise was a success and only a few things have to be redefined.

INTERVENTION TEAM HEAD OFFICE

The DEMA intervention team consists of 20 volunteers (nine female and eleven male members, an almost even distribution) coming from 12 departments.

EXPERTISE

The training requirements for the team are adapted to the hazards and risks within our organisation. Refresher courses are organised on a yearly basis in order to comply with the changing 'code of good practice' and ensure that everyone can correctly intervene in case first-aid treatment is necessary.

The evacuation exercise held in 2019 was a success thanks to the excellent collaboration between the team and head office employees.

INTERVENTIONS

Unfortunately, during the whole of 2019, the team had to intervene on 54 occasions/incidents to treat cuts and scrapes, burns, bruises and illnesses, five of which were more urgent and required the support of an external ambulance service. The incidents included spill interventions, fire detection alarms and one lift evacuation on the premises of the head office in Zwijndrecht.



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