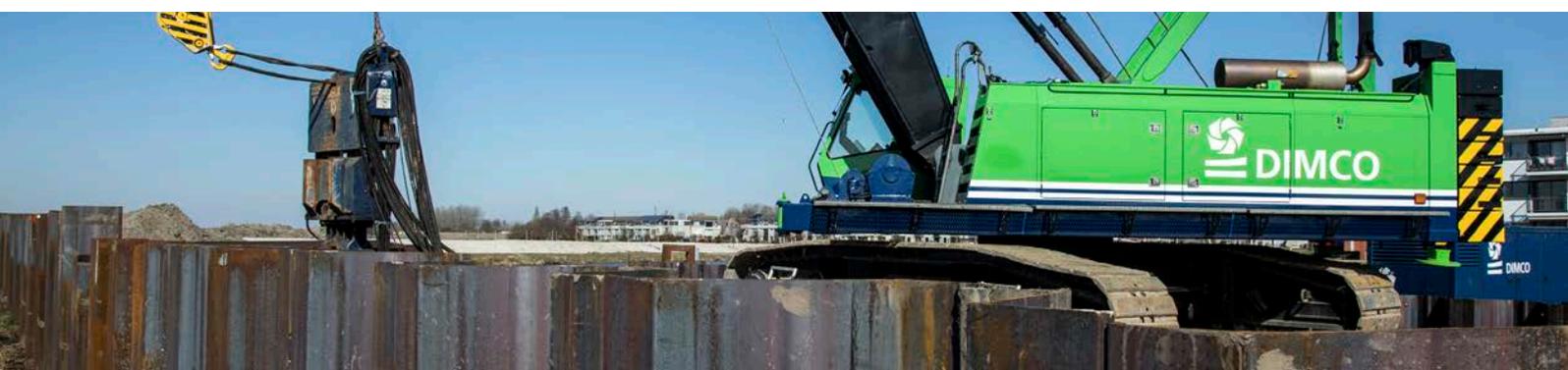


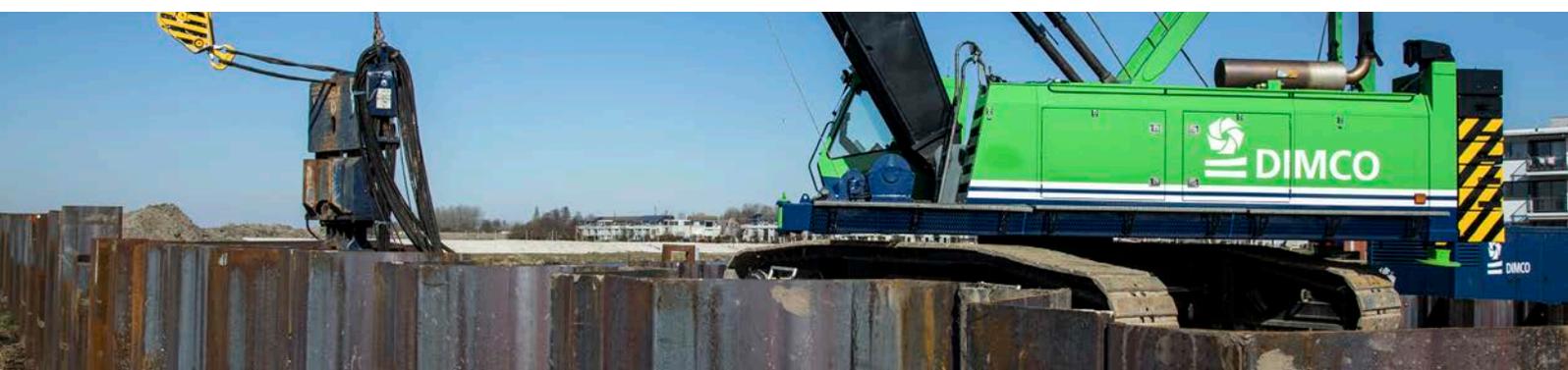


# QUALITY, HEALTH, SAFETY & ENVIRONMENT PERFORMANCE REPORT 2018-2019





QUALITY, HEALTH,  
SAFETY & ENVIRONMENT  
**PERFORMANCE REPORT**  
2018-2019



# QHSE

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# MESSAGE OF THE CEO

Here we present the first DEME Quality, Health, Safety and Environment (QHSE) performance report. This report gives a clear and sound overview of the way we care for our own employees and for each individual working for or with the DEME Group.

What we want to be, what we want to achieve and what we believe in is described in DEME's core values: safety, technical leadership, respect and integrity, innovation, value creation and environment. The core values are summarised by the acronym STRIVE and give guidance to our policies and the many QHSE aspects regarding design, procurement, construction, installation and maintenance of dredging and marine engineering projects.

The DEME Group is in constant evolution and we are able to adapt our course to the everchanging world when needed. This is why we introduced process and risk-based thinking throughout all of DEME's activities.

A multitude of processes are encompassed in DEME's management system. We believe in the strength of the continuous improvement of our processes and systems. We like to be challenged by our stakeholders - especially our clients and certifying bodies - to raise the quality of our services and products to an excellent performance level.

We are convinced that our dedicated process owners are a driving force.

We believe in the added value of action plans and Key Performance Indicators to manage our QHSE goals. These result in many campaigns and initiatives at the head office in Belgium and on our worldwide projects.

Finally, we have put a selection of projects from our different activity lines in the spotlight in this report. Please take your time to read it and get an impression of our DEME organisation and projects, and how we make a difference when it comes to QHSE.

**Luc Vandebulcke**  
CEO



# CONTENT IN BRIEF

DEME's mission, vision and values are summarised in the acronym STRIVE. STRIVE is the basis and the starting point of the QHSE **policies and actions**, which are updated yearly. A set of specific QHSE action plans express what we have to do.

Our QHSE dashboards are key elements in helping to manage our **QHSE performance**. We take onboard lessons learned from dangerous situations, near misses or incidents, and use these to improve our processes.

The DEME Group is a fast growing organisation, with a very clear and well-structured company **management system**. The process ownership is a guarantee for continuous improvement of our operational processes. The DEME Navigator, our intranet, guides us through the information.

Multiple **campaigns** have been developed, prepared and executed, established on a risk-based approach.

On top of the campaigns, we organise several **initiatives** to challenge our organisation and people to go for the highest level of QHSE performance.

Within DEME, the **projects** have always been considered 'the centre of the universe'. The involvement of and partnership with our subcontractors and suppliers are essential.

Investing in **emergency preparedness** is and will always be a key topic in our organisation.

**Luc Bertrand**  
CHAIRMAN



## A GREEN FUTURE STARTS WITH GREEN INITIATIVES



# POLICIES AND ACTIONS

# MISSION, VISION AND VALUES



## OUR CORE 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 with regards to our core values (STRIVE) are expressed in in DEME's mission, vision and values statement.



### SAFETY

The safety, health, and well-being of our employees and customers are DEME's number one priority. Everyone has the right to work in a safe environment free of risk and injury at all times.



### ENVIRONMENT

With respect for people and planet, we endeavour to develop our worldwide activities in a sustainable, responsible and protective way.



# 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 activit lines - dredging, offshore, environmental and infra - have a more specific

QHSE policy, in line with the sector, activities and industry standards. Some of our projects develop project specific policies in collaboration with their clients and (joint venture) partners.

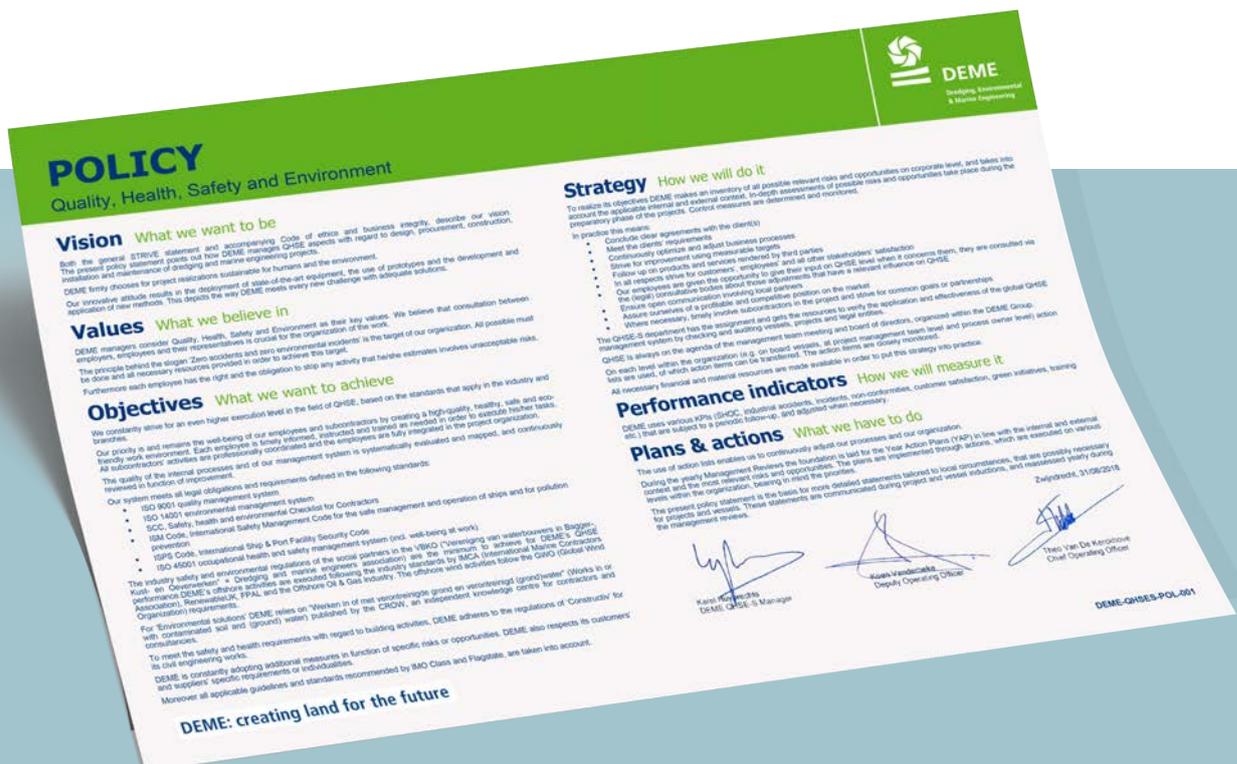


## DEME POLICIES

QHSE-S
QHSE
Security
Energy & GHG
BISS
ICT Monitoring

HUMAN RESOURCES
Sustainability
Drugs & Alcohol
Smoking at work
Social Media
PURCHASES & LOGISTICS
Procurement

COMPLIANCE
Code of Ethics & Business Integrity
Anti-Corruption
Anti-Trust
Outgoing payments
Compliance charter



# ACTION PLANS



- 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.

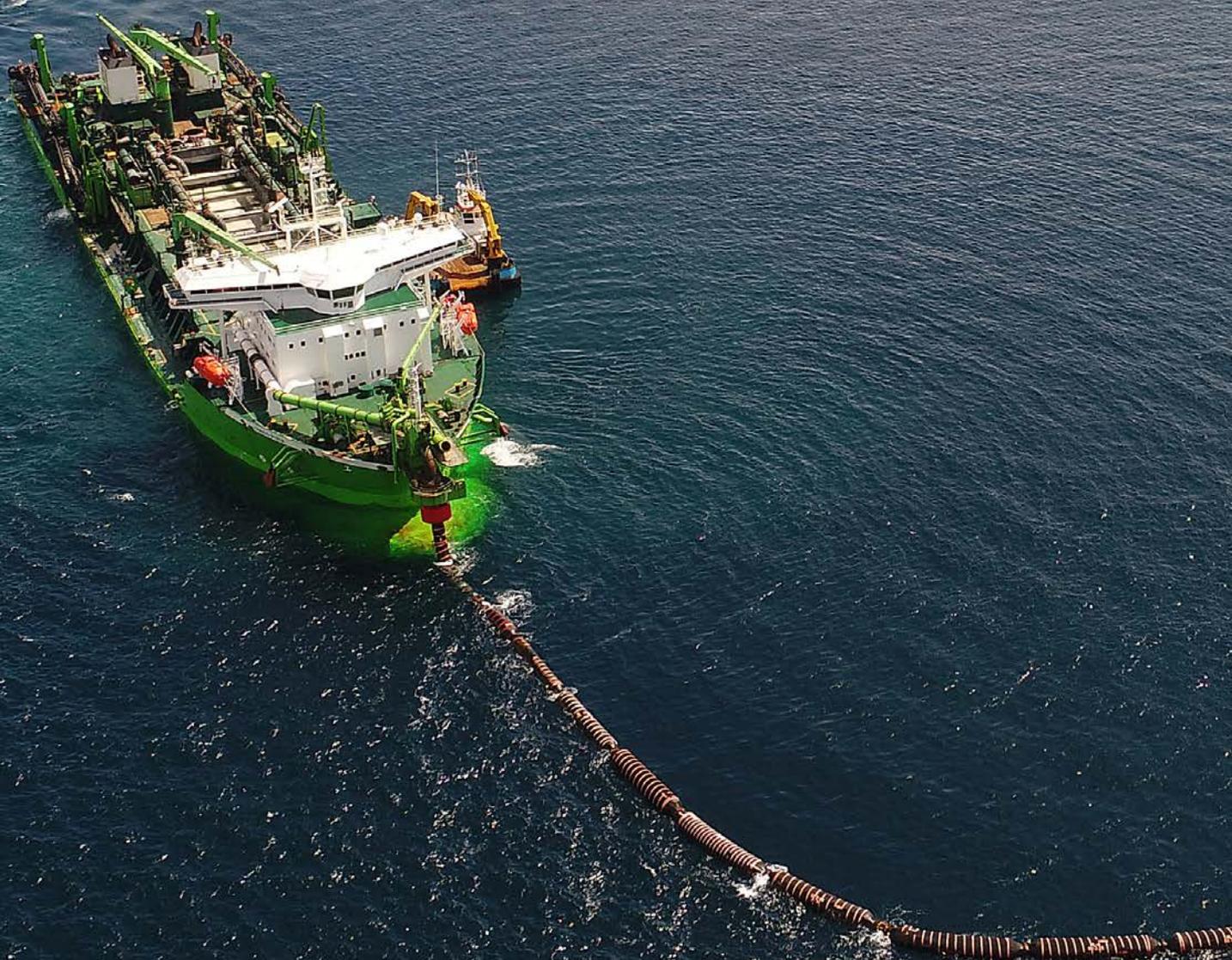
DEME has an overall Global QHSE-S Action Plan, a five-year plan that expresses the long-term trends. This plan is translated into activity line specific Year Action Plans.

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

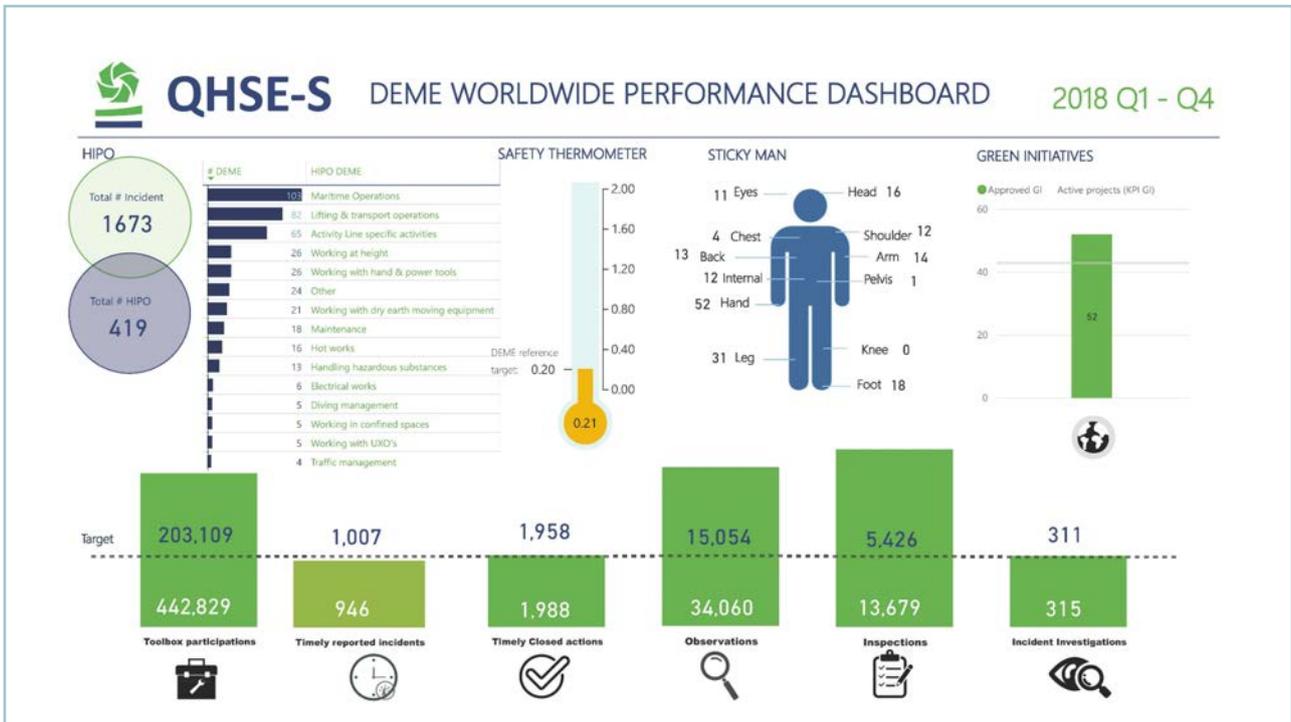
All these plans are updated at least once a year and evaluated during the management reviews of DEME and the activity lines.



# QHSE PERFORMANCE



# KEY PERFORMANCE INDICATORS



Key Process Indicators (KPI) are in place at all levels of our organisation. The QHSE-S KPIs and definitions are revised during the management review. The status of the DEME QHSE-S KPIs is published in a dashboard on a quarterly basis. **Last year, DEME introduced its renewed QHSE-S DEME Worldwide Performance Dashboard.**

New elements include the HIPO overview showing incidents that have a High Potential for damage to people, assets, quality, the environment or DEME's reputation. In other words, it gives an indication of the activities that could cause harm to the DEME Group.

Another new KPI is 'Green Initiatives'. **A Green Initiative is any change to a process, equipment or setup that reduces the environmental impact.** A Green Initiative can be related to different categories such as air emissions, waste management, energy consumption or spill management. This new KPI is intended to

increase the environmental awareness of all employees and to encourage projects to review their processes and identify environmental impacts.

Finally, we implemented one target line for the remaining QHSE-S KPIs that allows us to quickly see which KPIs are on target, exceed the target by far, and which KPIs are almost on target.

# INCIDENT MANAGEMENT

As strident efforts continue to improve DEME's quality, health, safety and environmental performance, 2018 was marked by an increasing emphasis on High Potential Incidents (HIPO).

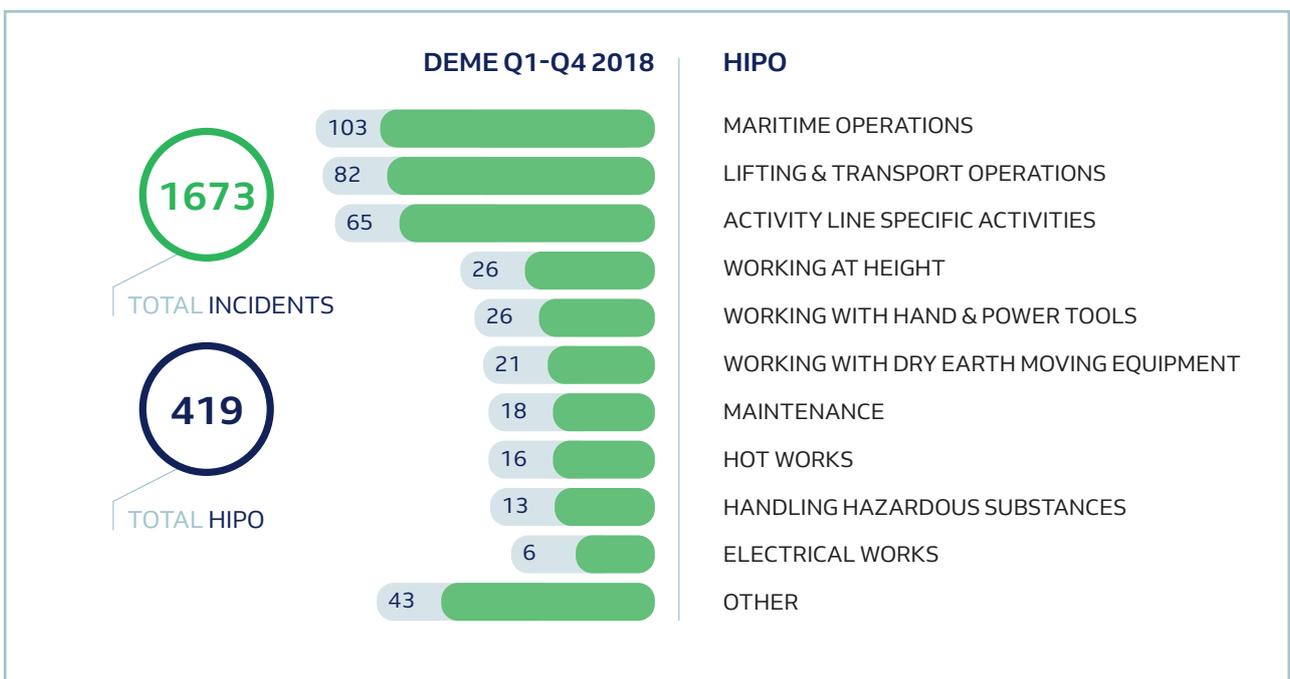
**A HIPO is an incident that could have had severe consequences for people, assets, quality, the environment or reputation.** Focusing on the potential consequences and the potential severity of incidents, instead of what actually went wrong, results in a more proactive and preventive approach. This way DEME continues to encourage its employees to constantly look for possible risks in their working environment.

The HIPO analysis concept was introduced in 2017, and is now carried out on a quarterly basis for the entire DEME Group. All types of incidents are included in the HIPO analysis: incidents with damage, near-misses and dangerous situations. By including third party incidents in this analysis, DEME also learns from its subcontractors, suppliers and clients.

Potential issues are flagged up and this information is used to develop targeted action plans. DEME employees – whether ashore or at sea – then take the appropriate measures.

In 2018 several initiatives and campaigns were developed based on those HIPO analysis:

- > Renewed rigging training
- > Safety week 'standard lifts'
- > Safety moment day 'fire safety'
- > Mooring campaign
- > Safety on cranes
- > Stop the drop campaign



# MANAGEMENT SYSTEM



# STRUCTURE

To accommodate the dynamic environment the DEME Group is active in, the structure of the Management System has been adapted. The management systems of the different entities are being aligned to set up an intelligent, flexible and well performing DEME Management System, which consists of:

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

The whole DEME Management System is based on a six blocks-structure, forming 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 shows our united approach when we are 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 different process owner.

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



# PROCESS OWNERS

Last year DEME introduced 'process owners' within the entire Group, for all relevant processes of the supporting services, operational activities or production processes and high risk tasks. This concept was already in use within offshore, where it has proven its merit. **Today over 100 process owners function as a 'single point of contact' for their process(es).**

Process owners are crucial to an organisation. They are the driving force behind the continuous improvement process. They focus on knowledge sharing within the company and provide service 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, and 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 corporate requirements, industry standards and best practices, and also by using results from non-conformities, incidents, audit findings, lessons learned, and client feedback.

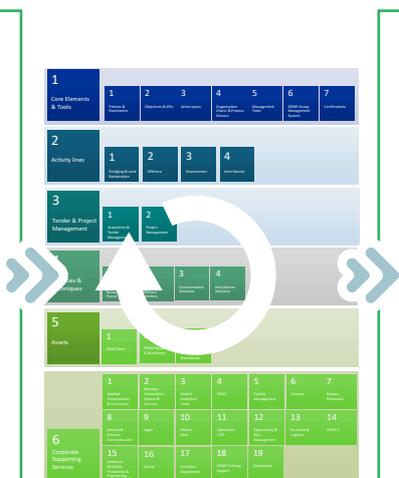


## ROLE OF THE PROCESS OWNER

1. Continuous improvement of processes
2. Internal specialist, advisor and point of contact

### INPUT

- DEME requirements, industry standards
- Legislation
- Performance monitoring results: KPIs, non-conformances, incidents, audit findings, lessons learned...
- Client feedback



### OUTPUT

- Process description
- Generic QHSE-S documentation, templates and tools
- Relevant KPIs & targets



## Certificate of Approval

This is to certify that the Management System of:

**D.E.M.E. N.V.**

Haven 1025 - Scheldedijk 30, 2070 Zwijndrecht, Belgium

has been approved by LRQA to the following standards:

ISO 9001:2015 | ISO 14001:2015 | ISO 45001:2018

P.G. Cornelissen - Area Manager North Europe

Issued by: Lloyd's Register EMEA

for and on behalf of: Lloyd's Register Quality Assurance Limited

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

Current issue date: 15 November 2018

Expiry date: 14 November 2021

Certificate identity number: 10147102

Original approval(s):

ISO 9001 – 20 November 1996

ISO 14001 – 28 January 2008

OHSAS 18001 – 12 April 2012

Approval number(s): ISO 9001 – 0016450, ISO 14001 – 0016447, OHSAS 18001 18001 – 0016448

The scope of this approval is applicable to:

Acquisition, design, engineering, procurement, construction, installation, execution and/or maintenance activities relating to:

- Dredging and land reclamation works,
- Environmental soils-, sediments and water treatment,
- Environmental remediation and development projects,
- Harbour and marine engineering works,
- Offshore renewable energy projects and offshore oil & gas industry support services,
- Pipe laying-, cable laying and rock placement projects,
- Civil infrastructure-, marine and hydraulic engineering projects,
- Extraction-, processing, and supply of marine aggregates.



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# CERTIFICATES

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

To fulfil the QHSE requirements, DEME holds a group certificate that brings more than 45 operational and commercial companies together.

All certified companies 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 Contractors), Safety Schemes in Procurement (SSIP) and the CO2 Performance Ladder.



# NAVIGATOR

The Navigator is a platform used for communication, knowledge and information sharing. It has recently been expanded, restyled and reorganised.

The structure of the Navigator has been set up in the same way as the QHSE-S Management System. The six blocks posted on the homepage make up the structure for the entire platform.

Several specific sites have been created per activity line including their business units, companies and areas.

They are based on the same six blocks that make them visually recognisable, creating a specific site for everyone.

**Thanks to the Navigators, it is easy to find and share all kinds of information and documentation in a structured and user-friendly way.**

A very important function has been awarded to the process owners. Process owners have been assigned for the supporting services, the operational activities and high-risk tasks. They are personally responsible for the documentation and information on their Navigator page. They ensure the supply of information and keep it up-to-date, and personally decide what content is relevant and what type of documents are needed to support their process.

To emphasise the down-to-earth approach quick links can be found on every page, enabling us to quickly find information that is important to us. In this way we want the users (including operational staff, crew and management) to get the information that they deem to be really important for the day-to-day operations.





# CAMPAIGNS

# DEME SAFETY WEEK



I would like to congratulate you on this campaign! As far as I'm concerned, a top performance. Instructive and clear, and the referenced manual was very easy to use during the planning phase of the work.  
*- Project QHSE Manager*



Scan QR Code to watch the movie.

# OFFSHORE SAFETY WEEK

In May 2018, the the Offshore activity line organised the 'Offshore Safety Week'. This campaign was launched as a result of the incident review in the first quarter of 2018, which showed an increase in both the number and the potential severity of incidents. **The goal of the 'Offshore Safety Week' was to inform everyone about this trend and to create awareness.**

Everyone received a daily message which included a movie about a HIPO incident that occurred on an offshore vessel or project site. The campaign started and ended with a statement from the general manager.

The HIPO trend analysis in the first and second quarter of 2018, showed that lifting, and standard lifts in particular, remain a critical, high-risk activity within all four DEME activity lines.

In response to this trend the DEME QHSE-S team launched the 'DEME safety week – standard lifts' in order to raise everyone's awareness.

**In one week, six movies about HIPOs were published in order to encourage discussions about these incidents during toolbox meetings on board of our vessels and within (project) work teams.** We concluded the campaign with interviews and statements from our employees and process owners.

Before you do it, take time to think through it!

These HIPO incidents were discussed during toolbox meetings.

The feedback on both weeks demonstrates that we found a sound and effective way to communicate QHSE events in order to increase safety awareness.



Congratulations with the Offshore Safety Week movies! They will contribute to further increasing awareness amongst our employees.  
*- Crew member offshore installation vessel*



## SPORTS AND WELL-BEING

This year we are proudly celebrating the 15th anniversary of our Energy@DEME sports and well-being programme.

**Across the globe we come together to run, cycle, play soccer, row, climb or do yoga.**

In 2018 we once again participated at the Climbing for Life event in France, which provides challenges for cyclists, runners and walkers. Almost 200 employees from across the globe joined, with the event being a yearly highlight to meet and participate in sports with colleagues. DEME also sponsored the event and the accompanying diabetes awareness campaign.

The event was also the crowning glory of the work done by the 2018 selection of DEME Heroes. Every year we select a group of DEME Heroes to get more employees on board the Energy@DEME programme. The Heroes took the challenge to embark on a life changing journey and received medical and nutritional coaching throughout the year to climb the summits in the French Vosges.

At the legendary Dragon Boat Race in Antwerp,

Belgium two DEME teams proudly took home the trophies for the first and second place. Plenty of running events took place, with many employees taking part in runs like the Antwerp 10 Miles in Belgium, the Standard Chartered Marathon in Singapore, the Chennai Sketchers Marathon in India, the Singelloop in the Netherlands or the Bristol 10K in the UK. In some countries our people even come together on a weekly basis for a healthy workout.



# SAFETY MOMENT DAY '18

In 2017 DEME's safety awareness programme CHILD reached its 5-year milestone. Great progress has been achieved in addressing safety. Yet a strong safety culture has to be further promoted. Therefore DEME launched CHILD5, its rejuvenated programme with the objective to make a transition from safety awareness to a DNA Safety Culture. CHILD5 fosters a culture where safety awareness becomes second nature.



It has already become an annual tradition to organise CHILD5's 'Safety Moment Day' at the end of November.

**The topic 'Fire Safety' was chosen based on the HIPO incident analysis.**

A set of 'campaign ingredients', such as videos and posters, were distributed. Project sites, vessels and offices worldwide dedicated time to raise awareness regarding the selected topic by organising toolboxes, exercises, drills, training etc. The Infra Marine activity line produced a 3D animation containing a practice exercise for their employees: 'fire safety on pontoons'.



Scan QR Code to watch the movie.





## STAIRS CAMPAIGN

### HEAD OFFICE

Besides our focus on high risk activities, actions as simple as holding a staircase handrail also deserve our attention.

In 2018 we launched a campaign at the DEME headquarters to make employees - all taking stairs several times a day – aware of the risks involved.

All outside staircases have been refitted. An awareness campaign was developed, consisting of several waves of posters and video messages, to promote the use of handrails. As a result the use of handrails increased during the course of a year. Meanwhile employees take their responsibility and address each other about not using the handrails on stairs.



Scan QR Code to watch the movie.

### AREA EUROPE

The Europe Dredging management decided to launch a 'use handrails' campaign for its projects and offices as an answer to incidents related to stairs.

All resident and project managers actively supported the campaign through our monthly safety meetings.



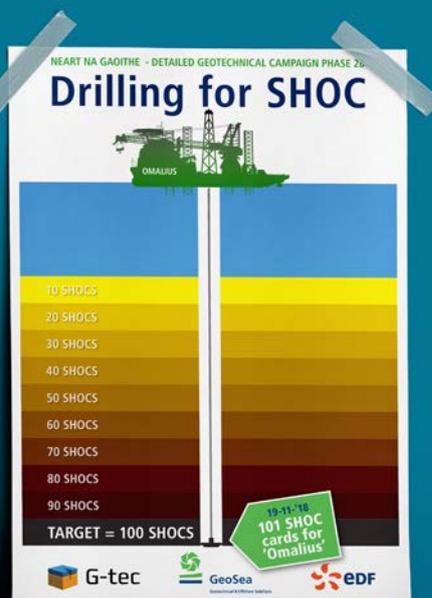
## CAMPAIGNS

# DRILLING FOR SHOC

The 'Drilling for SHOC' campaign was launched on board of the 'Apollo' and 'Omalius' during the soil investigation project in Nearth Na Gaoithe.

The main target of the campaign was to increase the number of Safety Hazard Observation Cards (SHOC) being submitted during the execution of the project. The importance of the SHOC registrations cannot be underestimated as they are a vital source of information regarding prevention of incidents and improvement of work methods.

During the project, special awards were given each month to the best three SHOC registrations.



# TOUR DE SHOC

On a project of the Offshore activity line, a campaign called "Le Tour de SHOC" was launched when over 250 cards had already been submitted just five months into the project.

For this campaign five different t-shirts were designed similar to the jerseys of the "Tour de France". A yellow one stands for best 'unsafe situation observation', a green one for best 'environmental observation', a white one for best 'observation by young engineer', a red one for the best 'quality observation' and a polka dot one for best 'working at height observation'. The names of the winners of these t-shirts were posted on the notification boards of the vessels.



# MOORING POSTER

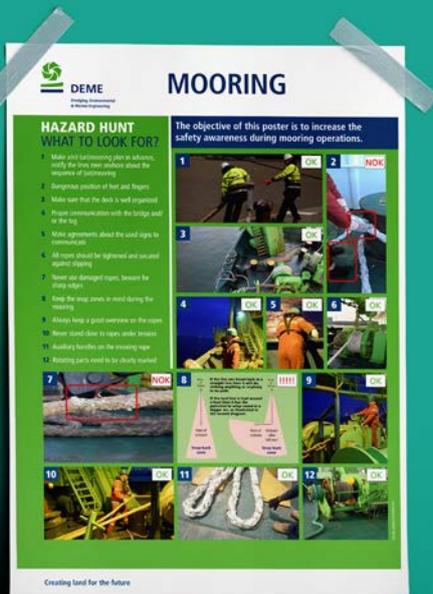
A significant amount of the HIPOs that occurred on DEME projects during maritime operations, are related to mooring.

In response we developed a poster campaign to raise awareness about good mooring practices.

The poster and an overview of all mooring-related HIPOs of the Dredging activity line has been published as a hardcopy and digitally.

People reading this poster should remember a mooring incident, whether it be a near-miss or an accident.

The poster reminds us that mooring and casting off should always be well planned.



# STOP THE DROP CAMPAIGN

In response to high potential incidents with falling objects, the Infra Marine activity line launched a specific safety campaign 'Stop the drop'.

For the campaign, five "golden rules" were developed based on the findings from the incident investigations. Furthermore, the campaign material included a toolbox, a QHSE-S flash, posters and a 'Stop the drop' card, which were distributed to all projects.



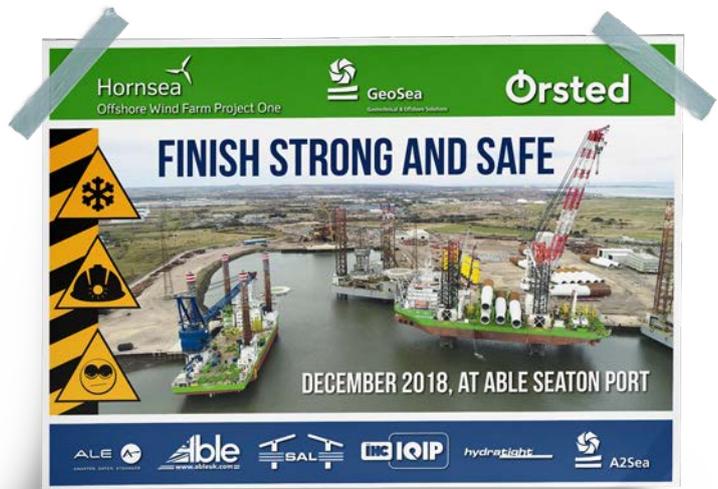
CAMPAIGNS

# FINISH STRONG AND SAFE

In order to stimulate all the teams working on the vessels 'HVL Svenja', 'Sea Installer' and 'Innovation', DEME Offshore and our client Ørsted took a joint initiative: **A campaign under the umbrella of 'FINISH STRONG & AND SAFE' to keep the focus on safety till the very end.**

The campaign was launched on 12 December 2018 in Able Seaton Port with a first event where people from all the stakeholders shared their experiences and commitments, supported by 'peer-to-peer' panel discussions focusing on the different safety aspects of the job. In preparation for these discussions a camera team was sent to the vessels and sites to capture the operations and conduct interviews on several subjects.

As a motivational factor both Ørsted and DEME also established an incentive programme per vessel to finish the job in a safe way.



The prize money was divided: one part was for the winning team to purchase a welfare item for on board (coffee machine, pool table, fitness equipment etc.). The other part was given to two charity organisations.

# TAKE 5 / LMRA CAMPAIGN



**STOP**  
**CHECK**  
**START**



In autumn of 2018 the Environmental activity line launched a campaign to promote 'Take 5', DEME's Last Minute Risk Assessment (LMRA). All business units and their subsidiaries were involved and toolbox talks on 'Take 5' and on avoiding shortcuts were hosted at all project sites. **Site management and staff members engaged in face-to-face 'Take 5' talks to assess and improve the efficiency and quality of the 'Take 5' tool at the workplace.**



# INITIATIVES

# GREEN INITIATIVES



## INTRODUCTION

In 2018 the Green Initiatives campaign was launched within the whole DEME Group.

**This new KPI is intended to increase the environmental awareness of all employees, and to encourage projects to review their processes and identify and decrease their environmental impact.**

The minimum target is one Green Initiative per project per year. For 2018, 63 initiatives were submitted. The initiatives can be categorised into different groups: waste management, fauna/flora disturbance, emissions (soil, water, and air), consumption (water and energy) and tackling ocean plastics.

## AIR EMISSIONS

It's not only about CO<sub>2</sub> or greenhouse gas. With our activities we also create particulate matter, nitrogen oxides and sulphur oxides. These emissions have an impact, both on the environment and human health. Initiatives were taken to limit the impact by looking at more ecological transportation means (using bikes and public transport) and by using more environmentally-friendly equipment (electrically driven machinery, alternative fuels, fuel additives and diesel exhaust treatment systems).

## WATER CONSUMPTION

Tap water is a very valuable resource and should be used sparingly. Therefore some projects switched from tap water to rainwater for dust control of contaminated ground.

## CLEAN-UPS AND PLASTICS BAN

The first step towards a solution for plastic pollution is to reduce plastic use. Many Green Initiatives aim to eliminate plastic waste by using refillable personal drinking bottles, mugs instead of plastic cups and water dispensers, thus thus generating less plastic waste. As plastic pollution is a global problem some project sites even organised clean-up initiatives together with local volunteers to raise awareness about the issue.

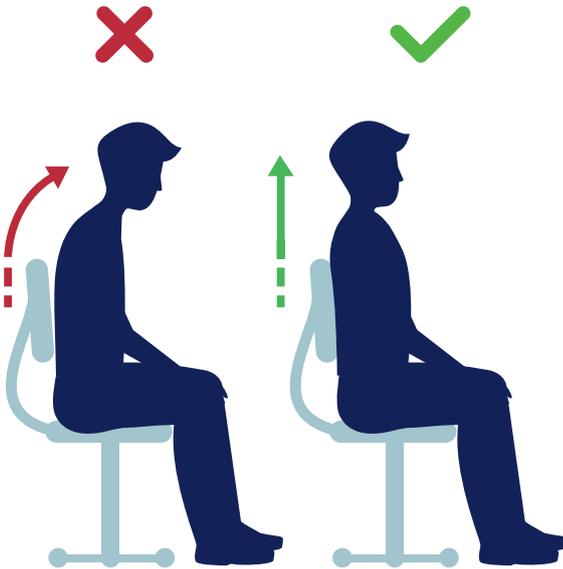


## ENERGY-SAVING MEASURES

The energy we rely on comes from finite natural resources and is subject to depletion. The impact of fossil fuel consumption on global warming is well understood by now. Fuel use within DEME is a significant environmental aspect and therefore measures in this field are very opportune. A major step in energy management is to reduce the energy demand by avoiding waste and implementing energy saving measures. In 2018, many projects contributed to our Green Initiatives through the installation of solar panels, motion sensor cameras and use of LED bulbs. Furthermore, for the maintenance dredging project of the Belgian coastal marinas, DEME even put a special electrically driven cutter into operation, fully powered by green energy.



## ERGONOMICS OFFICE WORK



Working in an office, most of us spend the significant part of our day behind a computer screen.

An uncomfortable position can be caused by the wrong body posture or an unsuitable set-up of the workstation, resulting in medical problems.

**In January 2018 the QHSE-S department launched the 'Screen ergonomics project', offering tips and the necessary means to organise a work station as ergonomically as possible.**

At our head office more than 200 employees have already had personalised advice from a professional in order to improve their workstation.

## ERGONOMICS LIFE JACKETS

Working all day long with a lifejacket can have an influence on your posture. A while ago DEME switched from the 150N type of life jackets to 275N. After receiving neck and back complaints, **our Purchase & Logistics and the Infra Marine QHSE-S department cooperated to improve the design of the lifejacket.**

First the existing lifejacket was adapted by letting it rest on the shoulders instead of solely on the neck.

Then, in close consultation with the manufacturer, a new type of lifejacket was designed to improve the ergonomics. The shape of the jacket was adjusted to completely cover the shoulders thus relieving the pressure on the neck. Additionally reflective striping was added on both sides in order to improve the visibility, as well as a mark to denote the presence of a Personal Locator Beacon (PLB) at the front.

OLD JACKET



NEW JACKET



**This optimised life jacket is now standard within DEME.**

## INITIATIVES

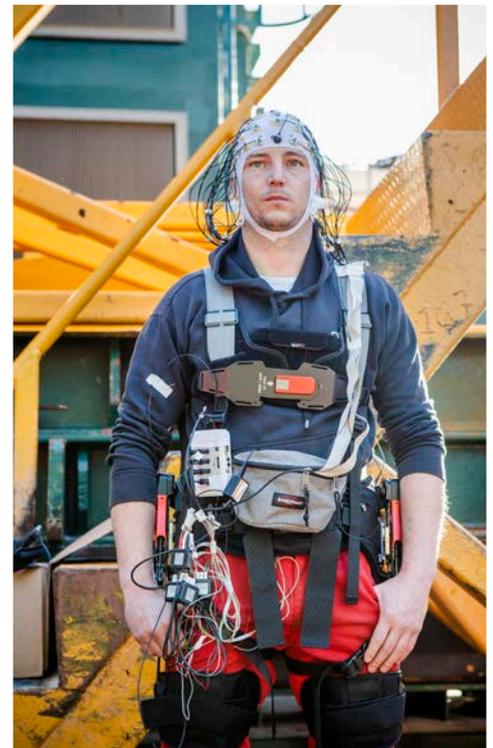
# EXOSKELETON INNOVATION PROJECT

Checking the feasibility of using exoskeletons was one of the entries in DEME's 'Innovation Diver' competition. **Exoskeletons potentially prevent or reduce back strain and fatigue, and increase productivity in various activities requiring manual handling.** They can keep employees from having to abandon their job prematurely and can prevent others from developing back problems. Three types of exoskeletons were purchased and tested under controlled conditions in cooperation with Brubotics/VUB (University of Brussels) and were used to assess::

- > Physical load (muscle activation, exertion, heart rate)
- > Cognitive load (emotional valence)
- > Biomechanics (pressure points, movement patterns)
- > Social acceptance



The test results will be available in 2019. Successful testing will result in an awareness and promotional campaign, and active use of exoskeletons for dedicated tasks.



## LONE WORKER SAFETY SOLUTION



The Infra Marine activity line invested in a specific GPS device for all personnel working in isolation, especially land surveyors.

**The device allows us to track personnel who are working alone, and in the case of an emergency, to send out a two-way alert (victim to emergency services and vice versa).**

# TASK FORCE

In 2018 we fully developed our task force team. **The team visits our vessels and helps the crew to determine improvement actions with the purpose of lifting the operational safety on board of our vessels to a higher level.** The team members:

- > Give tailor-made toolboxes about operational topics.
- > Provide training for specific tools and equipment on board.
- > Interview crew members and communicate their feedback to the head office.

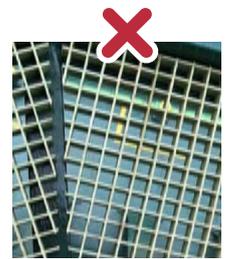
37 / 63 VESSELS VISITED



HATCHES



SAFETY GATES & LADDERS



GRATINGS

# SAFETY BY DESIGN GUIDE

37 / 63 VESSELS VISITED



HATCHES



SAFETY GATES & LADDERS



GRATINGS

**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 to apply the most relevant and the highest safety standards, taking into account our know-how, experience and lessons learned.

It helps to centralise the remarks of the masters and chief engineers on design inefficiencies of the past.

It supports our inspectors during the newbuild phase of a vessel to verify if the execution of the construction works are going to plan and are in line with DEME's Safety by Design Guide, before it is too late to take appropriate action.

## NEW ASSETS

**In 2018 our ambitious, multi-year fleet investment programme continued, with the arrival of some truly pioneering vessels. We always aim to make continuous improvements in terms of productivity and environmental performance so we can serve our clients more efficiently and in a more sustainable way, and this is demonstrated by the new fleet additions.**

We are taking the lead in the industry with vessels featuring innovative and green technologies. We want to make sure that our fleet is futureproof and exceeds the current environmental regulations. Most of our new vessels are equipped with dual fuel engines, which are capable of running on liquefied natural gas (LNG). As well as the 2018 additions, several new vessels are being built, such as 'Spartacus', the most powerful CSD in the world, and the giant, DP3 offshore installation vessel 'Orion'. These are just a few of our pioneering vessels that will be making a difference in the coming years.

These are just a few of the features:

- > DEME has the world's first dredging vessels equipped with dual fuel engines
- > 'Living Stone' and 'Orion' are equipped with DP3 (Dynamic Positioning 3) to continue safe operations in the most challenging conditions
- > Have a high standard of accommodation facilities for crew and passengers
- > Use hybrid drive-diesel direct plus electrical motors for dredge pumps
- > Have waste heat recovery systems for exhaust gases
- > Comply with the strictest environmental standards for sea and air discharges
- > Use biodegradable oil and grease
- > Have Green passports and Clean Design notation
- > Generate power by solar panels and wind turbines
- > Have shore power facilities

DEME also invested in two new cable cranes. **The accessibility of these new cranes was a very important item.** Based on the studies for the new ones the existing crawler cranes were equipped with collective protection to ensure safe access.



'Living Stone'



'Minerva'



'Crawler Cranes'



'Scheldt River'



'Apollo'



'Orion'



'Spartacus'

# OBSERVATIONS

**DEME wants to create an interactive, operational, environmentally-friendly and above all, highly flexible QHSE reporting tool for all projects and vessels.** Therefore we are currently modernising our QHSE software, at the same time contributing to a paperless environment.

By implementing an instant, flexible inspection form suitable for tablets linked to a central database, we believe that everyone working on our projects and vessels will be challenged to carry out even more inspections, thus contributing to a more proactive QHSE approach. Some inventive and innovative ideas have already proven their added value:

## LOCAL SHAREPOINT ENVIRONMENTS, OFFSHORE VESSELS AND PROJECTS

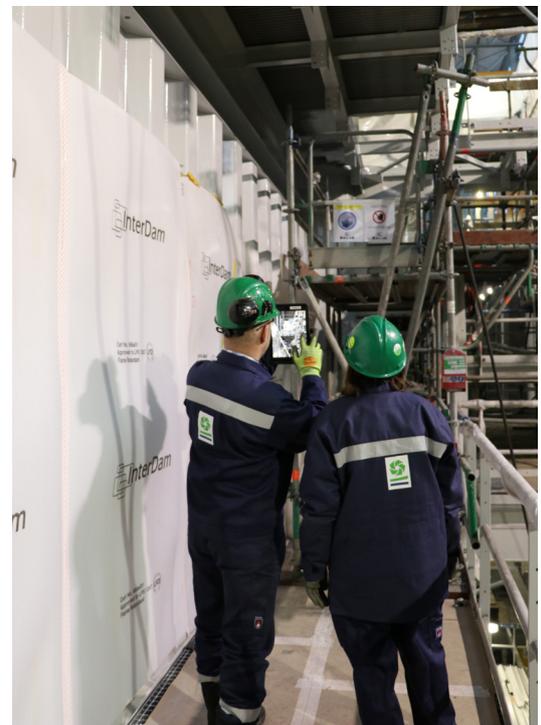
On board of our offshore vessels, local SharePoint (SP) servers have been installed making it possible to work with the SP functionalities without being reliant on internet connections.

They are used for production and incident reporting, performing HSE inspections, the creation of as-built documentation etc. Project follow-up can easily be done on the spot.

## APROPLAN OWF MERKUR

As soon as the project control team of the Merkur project became aware that it would require a lot of manual input, and thus be a very costly task to manage and follow-up the long Excel list of open items, they decided to scan the market for a better solution.

It resulted in the use of the mobile app 'Aproplan', a cloud-based construction and maintenance software application, which was provided to all inspectors, subcontractors, fabricators and the client. The use of the app resulted in a considerable reduction in paperwork. At the end of the project nearly 20,000 items had been rectified.



## ACONEX FIELD, MULTIPLE DREDGING AND OFFSHORE PROJECTS

For the same reasons as described, Aconex field is used on dredging projects in Singapore, offshore projects in Germany, and on board of several vessels. Aconex Field is a cloud-based solution to perform inspections.

Aconex Field is a powerful tool strong tool to follow up on actions and accessible in and outside our organisation. Combined with the main Aconex for document management, it can manage all project information and documentation.

## E-SHOC VALLØY

Developed at the Valløy Remediation project, the e-SHOC is an efficient tool, based on a reliable and inexpensive technology multimedia text message, to report photographically identified hazards in the field. The four-digit e-SHOC number is easy to remember and the message received within seconds by several team members triggers a prompt reaction. Anybody with a basic cell phone with a camera can use the tool, including visitors or short-term workers. No need to have a smartphone or to download an app!



INITIATIVES

# QHSE 4 SPECIALISTS

Each year we organise a three-day seminar during which ideas and experiences are shared, and knowledge is gathered about the activities of the DEME Group.

Coming from all parts of the world and representing more than 15 different function profiles in the department, more than 110 colleagues participated in 2018. To engage this diverse audience, both internal speakers and external consultants were asked to chair workshops, presentations, breakout sessions and site visits.

Participation in the 'QHSE 4 Specialists' gives the opportunity to share knowledge and experience about the challenges involved in all types of projects. The breakout sessions provide expert knowledge on topics we come across in our jobs.



# DEME OFFSHORE MARINE SEMINAR 2018



In 2018 the Offshore activity line organised a seminar for the vessel management of the Offshore fleet. Masters, Chief Engineers and First Mates were invited, as well as Marine Coordinators and Operations Managers. During this two-day seminar, a variety of workshops and presentations were organised on specialist maritime topics and people management, as well as a panel discussion with the relevant corporate supporting services.

**PARTICIPANTS WERE VERY POSITIVE ABOUT BOTH SEMINARS, WHICH WILL RESULT IN A BETTER COLLABORATION AND GREAT IDEAS FOR THE FUTURE.**

# PROJECTS IN THE SPOTLIGHT

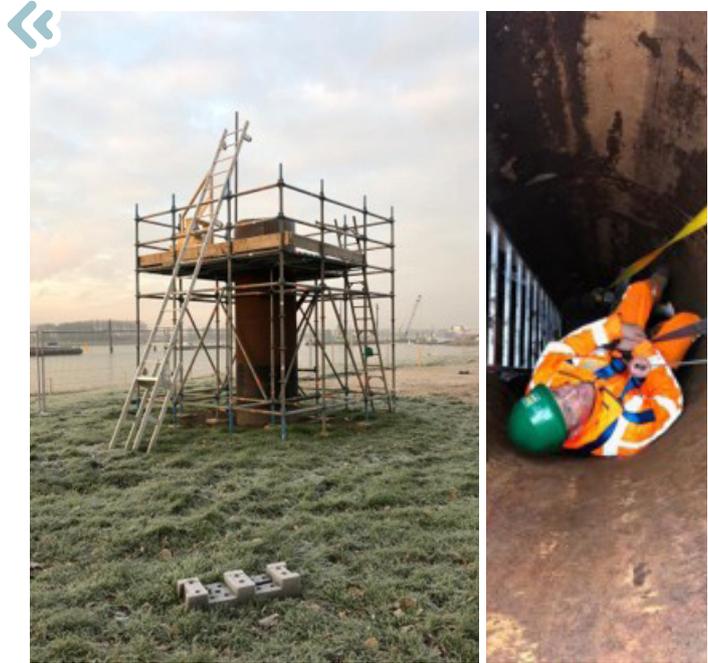


# INFRA MARINE

## BLANKENBURG CONNECTION - ROTTERDAM ('BAAK' CONSORTIUM)

The Blankenburg Connection consists of a new highway, a land and submerged tunnel, and several bridges, which are integrated in the environment. The project design is fully modelled in 3D.

These 3D models are used to incorporate 'Safety in Design' and evaluate proposed work methods at an early stage. Specific attention was paid to items such as working in tubular piles (confined spaces), crane movements and possible clashes during execution. To further optimize the execution, a mock-up model was made for training purposes.



## NEW LOCK – TERNEUZEN ('SASSEVAART' CONSORTIUM)

To implement safety throughout the entire process, the principle of 3S was applied to the project. 3S stands for "Safe Design, Safe Building, Safe Maintenance".

The "Safe Design" is divided into three phases: System Design, Technical Design, Design Execution. During these three phases, proactive risk sessions are organised with the various stakeholders (design leaders, project managers, site superintendents, H&S team etc.). The outcomes of these sessions are implemented by the various disciplines and subprojects, resulting in a safer execution and maintenance.

## ETT PROJECT – TANK FOUNDATION – ROTTERDAM

Euro Tank Terminal Rotterdam awarded our project team and subcontractors for the safe installation of 888 piles. This occasion was celebrated with a lunch break ceremony, where everyone received a polo shirt with the ETT logo and safety slogan.



# DREDGING & LAND RECLAMATION



## NAVAL BASE AND ACCESS CHANNEL – ALEXANDRIA, EGYPT

For this project we carried out dredging and reclamation works with TSHD 'Breughel' and the CSD 'D'Artagnan', which handled 6.3 million m<sup>3</sup>.

One of the challenges of the site was the UXOs: we encountered much more than expected, and noticed that the UXO awareness training was insufficient. Therefore we decided to review the UXO response before the start of the second project phase: we further detailed the UXO response plan and re-evaluated the presence of UXOs through **an additional magnetometric survey.**

## DEME BUILDING MATERIALS (DBM)

Marine aggregates are used for beach replenishment and land reclamation, but are also of utmost importance for the concrete industry.

Planning, environmental assessment, permit allotment and monitoring of aggregate winning at sea have evolved considerably.

The marine aggregate industry has implemented several 'best practices' in order to maximally reduce CO<sub>2</sub> emissions and the impact on the environment.

By deploying high-tech vessels, optimising sailing cycles, selectively extracting granulates, designating winning zones on the seabed... the conservation of the marine environment is continuously taken into account – from prospecting to the acquisition and exploitation of the winning areas.



## JIWE PROJECT SINGAPORE

The JIWE project in Singapore was awarded the very prestigious SHARP (Safety and Health Award Recognition for Projects) by Singapore's Workplace Safety and Health Council. **This award recognises projects that have achieved excellence in safety and health performance, and in management systems**, based on the following criteria:

- > Projects with more than 1,500,000 man hours injury-free
- > Projects scoring high results in the Construction Safety Audit Scoring System
- > The Culture SAFE programme
- > The LIFE programme, resulting in high scores on observations via mobile applications



## CUTTER SUCTION DREDGER 'BLANEU'

Cutter suction dredger (CSD) Blaneu is a diesel electric cutter suction dredger to be deployed in marinas and harbours to dredge sludge at high density (in-situ) without causing any turbidity. **It can be fully electrically powered, which eliminates emissions and considerably reduces noise and odour.**

The environmental burden, nuisance to surroundings and pollution is minimised by:

- > Limiting the bunkering of diesel
- > The EIAPP (Engine International Air Pollution Prevention Certificate) certified diesel engine
- > The use of biodegradable oil on board
- > A powerful dredge pump and automation of the dredging process resulting in a more efficient suction process
- > Noise muffling throughout the whole dredging process



### EDULIS - BELGIUM

**Edulis studies the feasibility of mussel cultivation at offshore wind farms, 30 to 50km off the Belgian coast.**

In 2017 mussel culture systems were installed in the C-Power wind farm and the Belwind concession. The mussel seed capture and growth are being monitored. The forces, exerted by the sea on the mussel longline, are measured by means of integrated force meters. By linking regular mussel sampling results to the prevailing currents and wave conditions, the minimum requirements for a mussel culture system can be determined and the system design can be optimised.

### COASTBUSTERS

Several parties, including DEME, joined forces to develop a new natural way of coastal protection. **Coastbusters is a project that will design and test nature-based solutions for coastal defence.** It tries to generate underwater biogenic reefs by using bio-builder species: bivalves, seagrass, seaweed and tube building worms. If successful it might lead to new means of coastal protection by reinforcing nature and improving biodiversity.



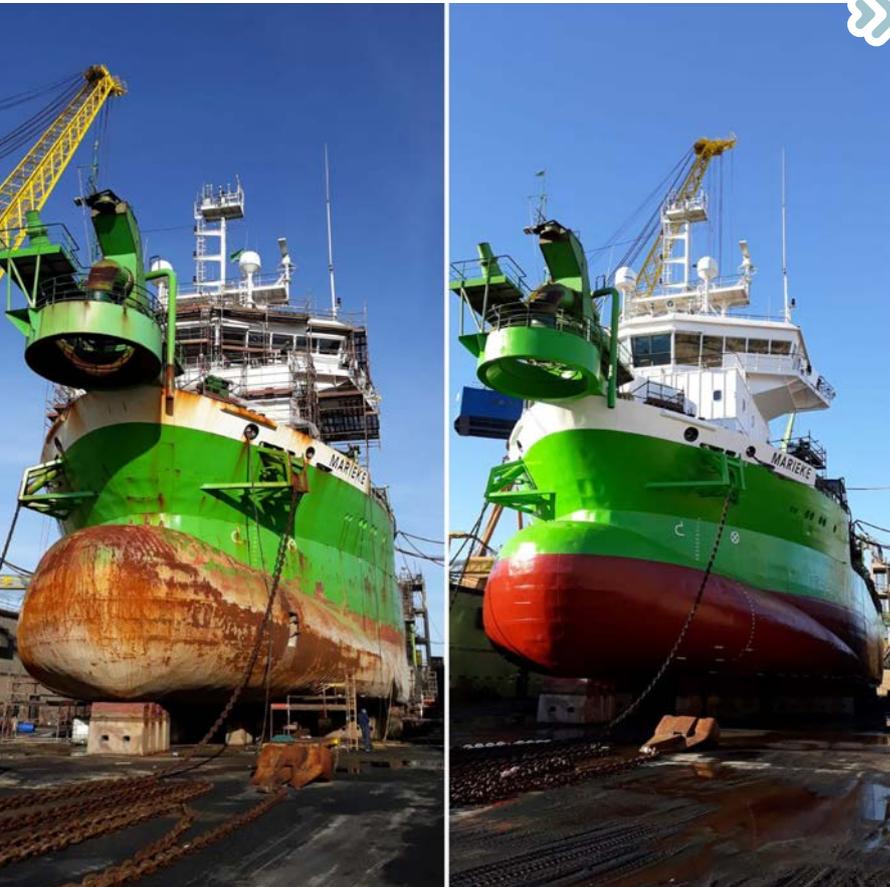
### BEACH NOURISHMENT COTONOU-SIAFATO

Reclamation and coastal protection works present severe risks to the employees involved. **As our projects are sometimes located in areas where medical emergency care is not always readily available or up-to-standard, project management decided to contract a local medical service provider.**

A fully equipped medical container and ambulance were brought onsite and staffed 24/7 by medical professionals. In the case of a medical emergency, we can reach the reclamation sites in a matter of minutes.

If a patient is transferred to a local hospital, the medical service provider will take care of all local administrative requirements and make sure our employees get the best medical care available.

# DOCKINGS AND MAJOR REPAIRS



To improve our QHSE and technical performance during major repairs and dockings, the DEME Technical Department wants to focus more on work preparation.

Before the start of works, 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 our intranet (Sharepoint).

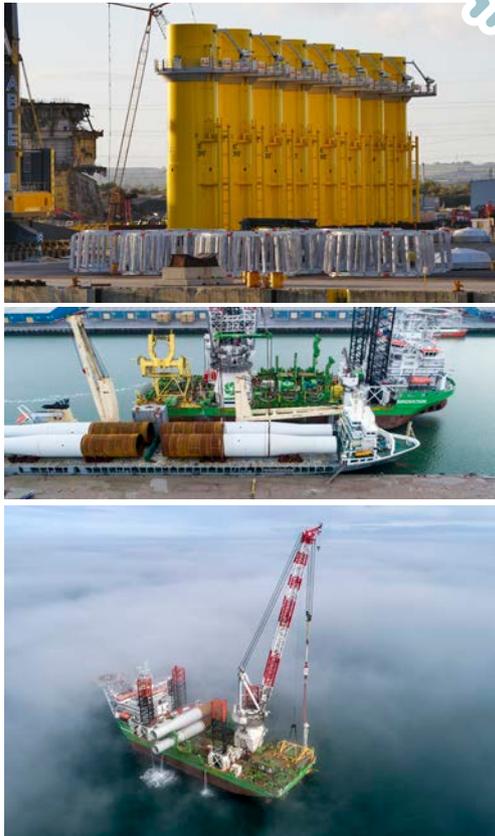


# OFFSHORE

## SAFETY CULTURE LADDER PILOT PROJECT

The Safety Culture Ladder (SCL) is an audit system, owned by NEN and based on the five steps Culture Maturity Model. **This model is also known as the Parker model and has been used by Shell for the well-known 'Hearts and Minds programme'.** During an SCL audit the level of different cultural aspects of an organisation are mapped in an objective way. Several renewable industry clients reward contractors in the tender process depending on their SCL level.

In June 2018 Tideway, now called DEME Offshore, successfully completed the SCL implementation pilot project with a Level 4 certificate.



## HORNSEA ONE - UK

The Hornsea One offshore wind farm is the largest in the world, consisting of 174 foundations, and will be equipped with 7 MW WTGs, and three offshore substations. This complex and multidisciplinary project is a leading example of integrated services provided by DEME affiliates by DEME:

- > Dredging activities with TSHDs 'Pallietier' and 'Scheldt River' to allow smooth access for installation vessels,
- > Pre-installation of the scour protection with DP fallpipe vessel 'Seahorse',
- > Dredging, burial and cable installation of the export cables to shore,
- > Transport and installation of the foundation structures (monopile, anode cage and bolted transition piece),
- > Transport and installation of some of the wind turbines with the jack-up 'Sea Challenger'.



## RENTEL - BELGIUM

The Renteil offshore wind farm is located approximately 34 km off the coast of Zeebrugge (Belgium). DEMA has been involved in this complex and multidisciplinary scope.

From the beginning we focused on meeting the ambitious overall project schedule. We managed to achieve both a timely completion of the design and timely fabrication of high level quality products. Subsequently we realised a smooth transport and installation of the foundations, cables, turbines and offshore substation.. **The offshore wind farm was realised well ahead of schedule and without any major incidents.**

After completion of the wind farm our specialist maintenance team took over to ensure the successful operation of the wind farm during its lifetime, and executed a first intervention in 2018, exchanging a nacelle for Siemens-Gamesa deploying the 'Sea Challenger'.





## GLOBAL SEA MINERAL RESOURCES

Global Sea Mineral Resources (GSR) is a leading deep-sea exploration and exploitation specialist.

**In order to mine those polymetallic nodules, GSR is putting a lot of effort into research and development into how to get the nodules to the surface in the most environmentally-friendly way.**

In 2013, the International Seabed Authority and GSR signed a 15-year contract for prospecting and exploration for polymetallic nodules. Under the contract, GSR has exclusive rights for exploration for polymetallic nodules over 76,728 square kilometers of the seabed in the eastern part of the Clarion Clipperton Fracture Zone

of the Central Pacific Ocean.

**In 2019, the Patania II will be tested in-situ, in the harsh environment of the deep sea, 4,500 m below the ocean surface.**

In collaboration with the Massachusetts Institute of Technology (MIT), the size, concentration and behaviour of the turbidity plume created by the Patania II will be measured across different operational scenarios. From an environmental perspective, these trials will be a major opportunity to improve the understanding of the impact of future seabed exploitation activities. The results will lead to an optimised design of a nodule collection vehicle with minimal environmental impact.



**This Awareness Day was not only a promotion for subcontractor days, but also definitely for the Green Initiatives.**

## BORKUM RIFFGRUND 2 - GERMANY

Project after project we see that our subcontractors play an important role. They are part of the project team but often have a different QHSE culture and working methods. This is why our Borkum Riffgrund 2 project team organised a Subcontractor Awareness Day. The aim is to create a common QHSE approach and mindset with our subcontractors, and together reach the goal of zero incidents.

For this event, we decided to focus on the environment. Our project team and subcontractors critically checked all planned activities and considered how we could minimise the impact on the environment, taking into account their environmental impact, lessons learned and past incidents. Some examples of our initiatives are:

- > Use of project bicycles
- > Use of LNG cars from Belgium to Cuxhaven (feeder port)
- > Use of biodegradable oil
- > Installation of solar panels at fabrication location
- > Use of LED lighting on site in Cuxhaven
- > Waste management improvement for backfilling material

# ENVIRONMENTAL

## AVENUE COKING WORKS - UK

The Wingerworth Park on the outskirts of Chesterfield is part of a 98-hectare brownfield development on the site of the Avenue Coking Works – thought to be one of Europe’s most contaminated locations. DEME is a partner in the VSD Avenue Joint Venture, which delivers the reclamation and landscaping works.

The remediation work carried out has been recognised and given an excellent quality rating by CEEQUAL, an independent industry organisation. To gain a CEEQUAL Award, projects and contracts are assessed and verified against specific environmental and social criteria by appointed personnel.



## DEEPENING OF MEUSE RIVER - VENLO, NETHERLANDS

To enable larger barges with more load capacity to easily navigate, we deepened and widened the Meuse River near Venlo.

UXOs from the second World War are known to be found on a regular basis in the Venlo region including the Meuse’s riverbed. This required the necessary care from both DEME our client authority ‘Rijkswaterstaat’. **After having conducted a survey and having mapped possible suspicious material, a specific project plan was developed stipulating how to deal with UXOs.** Thanks to the involvement of the different disciplines and specialists, our project team was able to safely achieve the desired outcome.



## PROJECTS IN THE SPOTLIGHT ENVIRONMENT

### VALLØY - NORWAY

The Vallø project is an important soil remediation project outside of Tønsberg in Norway for one of the major oil companies. Our project team and JV partner Veidekke had to align our own stringent HSE approach with the client's system. Both systems are behaviour based and as such share their core elements.

All staff dedicated to the project – including contact persons at head office – had to follow extensive training and received formal approval.

During a Veidekke management group meeting in 2019 our project received the Scandinavian Veidekke's HSE award for 2018.



### BLUE GATE - BELGIUM

Blue Gate is a complex remediation project, where a former 66-ha petroleum harbour is being transformed into a sustainable business park.

For the production and storage of sustainable energy, we are investing in a pilot project at Blue Gate: Tiger Power Cable Cut. Three sets of solar panels to generate renewable energy, and a hydrogen cell to store energy surplus will be installed, thus creating a future, durable, circular industrial site.



## RADIOACTIVE DECOMMISSIONING AND REMEDIATION PROJECTS

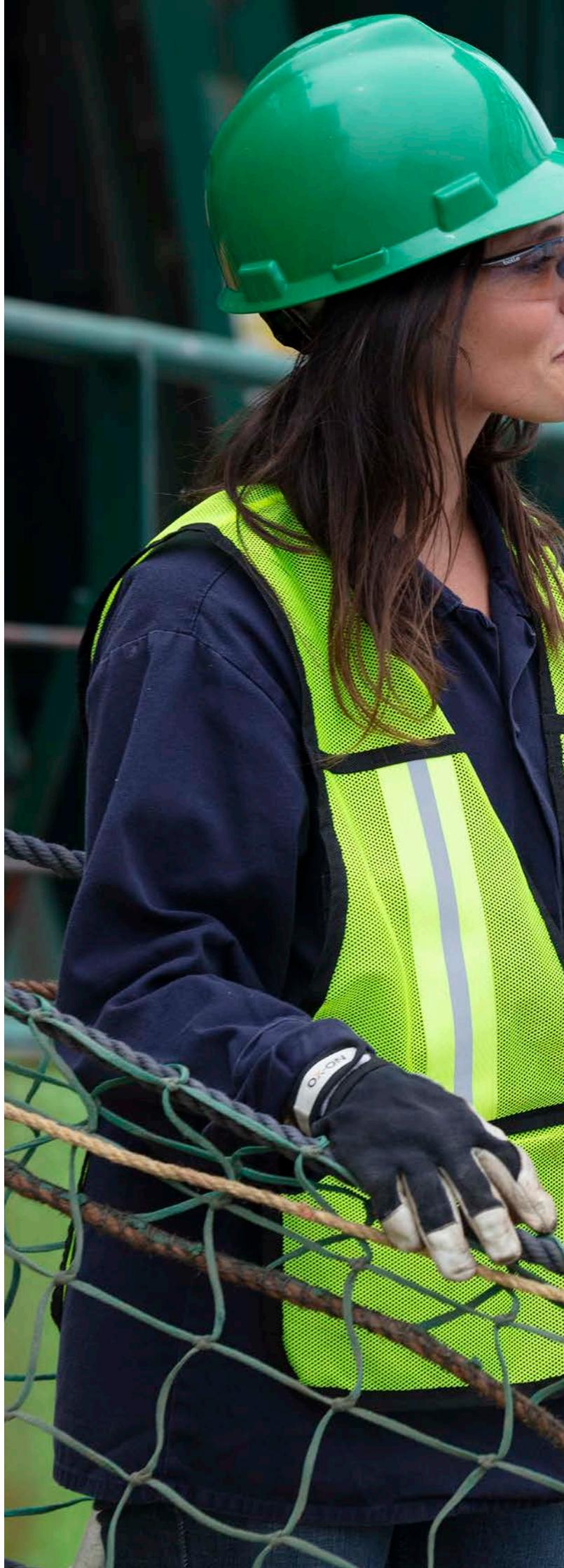


Naturally Occurring Radioactive Material (NORM) and Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) exist in many places, ranging from phosphate fertiliser plants and oil & gas production sites to water treatment plants. Our Environmental activity line is involved in several radioactive decommissioning and remediation projects including::

- > Decaying ammonium phosphate production unit in Ghent (Belgium): in collaboration with the Federal Agency for Nuclear Control (FANC), we undertook a complete remediation of the NORM liabilities to redevelop this brownfield site.
- > Decommissioned reprocessing installation for nuclear fuel in Dessel (Belgium): the soil at the site was contaminated with various radioactive isotopes. In cooperation with the Belgian Agency for Radioactive Waste and Enriched Fissile Materials (ONDRAF/ NIRAS) and Belgoprocess, we developed a pilot project for the extractive remediation of the radioactive soil contaminants through soil washing. Reduction efficiencies of 60% to 80% for the most relevant radionuclides were recorded.

**These kinds of projects involve close cooperation with the nuclear regulators, specific project design, a decommissioning plan, precautionary measures and a monitoring plan, to be approved before the works can start. The works are strictly controlled and assessed and a medical surveillance programme has to be put in place.**

Through training and awareness sessions, operational personnel are kept up-to-date on the latest topics and good practices concerning exposure to NORM/TENORM and decommissioning activities. These efforts paid off: no incidents occurred.





**EMERGENCY PREPAREDNESS  
AND RESPONSE**

# SHIP/SHORE EMERGENCY EXERCISE



In compliance with the ISM and ISPS requirements, yearly emergency exercises are organised which include the testing of communication channels, coordination, resource availability and response.

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

The exercise was prepared on board but remained unannounced. The scenario involved the kidnapping of three crew members in Batam (Indonesia) while the vessel was anchored, and a re-enactment of the negotiations with the kidnapers. **Thanks to the collaboration of all parties involved the exercise was a success and only a few issues needed defining.**



Another exercise was organised on board of the vessel 'Amazone' in our port in Zwijndrecht (Belgium). The local emergency services collaborated and practiced specific scenarios on board, which lifted the multidisciplinary exercise to another dimension.

A fire in the engine room was simulated resulting in two missing persons. The local fire brigade evacuated victims from enclosed spaces in complete darkness and emergency medical service was provided.





## INTERVENTION TEAM HEAD OFFICE

Our DEME intervention team consists of 20 volunteers coming from 12 different departments.

### Expertise

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

**The evacuation exercise held in 2018 was very successful thanks to the excellent collaboration between the team and our head office employees.** The local fire brigade simulated a starting fire in one of the buildings and it only took 3 ½ minutes to evacuate all personnel, including sweeping of the buildings.

### Interventions

In 2018, our team intervened on 52 occasions, ranging from treatment of cuts, grazes, burns, and sprained feet, to some more urgent incidents that required an ambulance. The team is also involved in spill interventions at our head office.

### Promotion

During the DEME Safety Moment Day the Intervention Team was present at the head office event informing visitors about their working and entertaining with a small quiz on when to call the internal emergency number 5555.



