

JDN

2018

annual report



Jan De Nul
GROUP

200

projects

37

countries

6,458

employees

1.7

turnover (billion Euro)

3.3

order book (billion Euro)

JDN 

annual report

CONTENT

- 4 **PREFACE**
- 52 **WHO WE ARE**
- 62 **CONTACT**

6

PRINS HENDRIK- ZANDDIJK (NL)

DREDGING

Nature-Based Solutions to reinforce the Prins Hendrik-Zanddijk.

14

BEATRIX- LOCK (NL)

CIVIL

Expansion of the Princess Beatrix lock complex.



22

BORKUM RIFFGRUND 2 (DE)

OFFSHORE

Transport and installation of 36 wind turbine foundations in the North Sea.

38

NORTH EUROPE

DREDGING

Project cluster in various countries in the north of Europe.

28

BENIN (BJ)

DREDGING

Preventing erosion along the coast of Benin, by implementing an ingenious concept.

48

CIRCULAR SOLUTIONS

ENVIRONMENT

Envisan, for a better planet.

CONFIDENT ABOUT THE FUTURE

“Our confidence in the future was also confirmed by the order of the *Voltaire*, a very large next-generation jack-up installation vessel.”

We hoped for better news, but it was no real surprise that in 2018, market conditions remained quite challenging.

The political instability and increasing protectionism in international trade worldwide created a lack of confidence among consumers and investors alike and resulted in rather disappointing economic growth worldwide. Obviously, Jan De Nul Group also faced this reality, manifesting itself in a very weak investment climate. Overall, within this difficult economic context, we are pleased to report that we succeeded in producing satisfactory results for 2018.

For several years in a row, our international dredging activities have faced a tight market due to lack of both public and private investment. This has resulted in a turn-over decrease, and increased pressure on project margins. The Jan De Nul Group civil activities held their ground thanks to a strong real estate market, in combination with the traditional infrastructure market. In geographical terms, the civils business focused on increasing its presence in the Netherlands and Luxemburg, particularly for large infrastructure projects.

In 2018, the oil and gas market showed little recovery, which had a negative impact on our offshore operations. We also had to wait to Spring 2019 to notice signs of a slight improvement in some specific segments (fall pipe vessels).

The renewable energy business on the other hand is driven by a persistently strong market in Europe and also by a rapidly emerging market in Asia. Obviously, Jan De Nul Group continues to focus on further growth within the European offshore wind market, plus in 2018, we also won, as one of the first contractors, major projects for the construction of offshore wind farms in Taiwan and the United States.

The environmental activities, our smallest niche market served by our subsidiary company Envisan, showed a stable performance.

For Jan De Nul Group in 2018, these rather challenging market conditions resulted in a consolidated turnover of more than 1.7 billion euro with an EBITDA margin of 277 million euro or 16.22 % (of turnover). This performance is in line with the sector average margin of 15.86%.

Jan De Nul Group continues to distinguish itself from its competitors by its extremely strong balance sheet, with capital and reserves of over 2.8 billion euro and a solvency ratio of no less than 73%. Furthermore, the group can boast a persistently strong liquidity position with a net cash surplus of 376 million euro.

Also in these difficult market conditions, Jan De Nul Group continues to invest in its future: at the end of 2018, our current investments in newly built vessels represent a total investment value of 400 million euro. In July 2018, we purchased the offshore jack-up installation vessel *Taillevent*, which immediately enabled us to offer increased capacity to offshore wind customers. Our confidence in the future of the offshore wind market was further confirmed by the order, earlier this year, of the *Voltaire*, a very large next-generation jack-up installation vessel. This new installation vessel, due for delivery in early 2022, will be able to install the next generation of wind turbines with blades, that reach up to 270 metre above sea level. It goes without saying, that all these recent vessel investments will be fitted out as Ultra Low Emission vessels (ULEV).

The vision, activities, and results of Jan De Nul Group, are driven by a group of over 6400 highly committed employees. Every single one of them contributes to the success of the group. We have also continuously invested, for many years, in high-quality training and individual support programmes. In addition, our proactive integrated management system ensures that risk, quality, safety and environment all receive the focus required to deliver successful projects. Operational control and a strong focus on the safety and wellbeing of everyone involved, helps to guarantee success.

The 2018 outcome makes us confident about the future. We can continue to make a difference, also in more challenging and, as we may expect, quite volatile market conditions as clearly shown by our increasing order backlog of 3.3 billion euro, an increase of 27% compared to the end of 2017.

The Board of Directors

FIELD OF ACTIVITY

Dredging

LOCATION

Texel, one of the Dutch Wadden islands.

CLIENT

Hoogheemraadschap
Hollands Noorderkwartier.

ASSIGNMENT

Reinforcement of the Prins Hendrikzanddijk (Prince Hendrik sand bank) using Nature-Based Solutions.

NOTABLE

In addition to building the dam, Jan De Nul launched five ecological enrichment projects. All of them kick starters for nature creation.

5.5

million m³ of sand

2,025,000

helmet plants

10,000

meter anti-drift screens of willow branches

PRINS HENDRIK- ZANDDIJK

In Texel, a province of North Holland, Jan De Nul offers a Nature-Based Solution for reinforcing the Prince Hendrik Sand Dike. The island will become bigger and more beautiful with additional natural habitat, and the residents will keep their feet dry.

The solution is in the ecosystem itself

When faced with extremely high water levels, the Prince Hendrik Sand Dike protecting the Dutch island of Texel was in danger of major failure. To prevent this from happening, the responsible local body, 'Hoogheemraadschap Hollands Noorderkwartier', started looking for an innovative concept, aware that this would be one of the biggest dike reinforcement operations in the Netherlands ever. Jan De Nul Group found the solution: make use of and enhance the local natural habitat.

DREDGING

Texel, one of the Dutch Wadden Islands, has fertile soil for growing flower bulbs, the popular tourist destination welcomes about 1 million visitors every year. It is also a crucial resting place and foraging area for birds on their migration routes between north and south and the surrounding water is the ideal habitat for thousands of seals. One problem though: the dike separating Texel from the Wadden Sea is leaking like a sieve.

Project Lead Dredging Works Benelux Geert Vanwesenbeeck: "This dike was in a very poor condition, probably the worst of all Wadden Sea dikes. Therefore, Jan De Nul is building a new water barrier in the Wadden Sea off Texel. We will make Texel bigger and more beautiful with additional natural habitat. And





Bartolomeu Dias at work in front of the coast of Texel.

“Sand is a more sustainable solution than a water barrier made of hard materials.”

Geert Vanwesenbeeck
Project Lead Dredging Works Benelux



the residents will keep their feet dry.” A major focus point for Geert, who is also Jan De Nul’s Community Engagement Manager and as such responsible for establishing and maintaining a close dialogue with the residents: “The farmers in this polder landscape live from growing flower bulbs. For the cultivation of these flower bulbs, they need fresh water. However, the agricultural land behind the dike has a very complex soil hydrology. The groundwater layer is salt but also has a thin freshwater lens on top of it. Preserving the balance between salt and fresh water is a difficult exercise because as we are adding sand to this place, extra salt water will seep into the hinterland. That is why we’ve installed a dewatering system to pump salt water back into the sea.”

“To explain what we do and how we do it, we organised information sessions for farmers and other residents, this included excursions, monitoring meetings with neighbours and weekly coffee sessions with farmers. We

got very positive reactions to this.” Close to the project office, Jan De Nul built a viewpoint, which is also warmly welcomed by both islanders and tourists. “It is a sea container in which we created a passageway connecting to a footpath and bicycle path. Inside, information panels provide more explanation on the project. From the balcony on top of the container, people have a fantastic view over the whole project area.”

Sailing away from birds

The fact that the Wadden Sea is a UNESCO World Heritage site makes the whole project extra delicate. Our planning was prepared so that the works would be ready before winter set in. On the other hand, we had to wait until after the breeding season before giving the go-ahead to start the works. “We have many ecologists’ eyes fixed on us. Within the whole project area, there were only three nests of breeding pairs but we had to wait for



the permission of a bird ecologist to start the works. We even trained people in spotting birds that have their habitat on the sailing route from the Wadden Sea to the North Sea. As soon as they noticed a bird at less than one and a half kilometres, we had to adjust our sailing route to be able to maintain this distance, which was rather absurd because these birds are curious and come flying to our vessel themselves. Still, it's a good thing that these issues are strictly monitored."

The vessel arousing the birds' curiosity is the *Bartolomeu Dias*, which is deployed for reclaiming 5.5 million m³ of sand. The large size of the vessel ensures that the project team is able to do a huge amount of work within a limited period of time. Perhaps even more striking is the mantra 'the right sand in the right place'. Through a 4D monitoring portal with 27 KPIs, Jan De Nul closely monitors the sand grain size, sand drifts, the groundwater and surface water and the ecological development of the nature reserve.

"We are building a water barrier with sand", confirms Geert. "For this, the grain size must be just right. It is one of the reasons why we remain responsible for maintenance during a 5-year period."

Nature-Based Solutions

In Texel, it can get quite windy, causing sand drifts that may interfere with the works. "To keep the sand in its place, we use several techniques: we reclaim wet sand, use paper pulp and put up anti-drift screens with thin sprigs of willow. But to tackle drifting sand on a more permanent base, we plant marram grass. Thanks to this indigenous plant, the wind cannot reach the sand, dunes are preserved and are given a more natural character at the same time. Marram grass would grow by itself but this would take much, much longer." In this way, Jan De Nul lends nature a helping hand. It is a perfect example of the principle of Nature-Based Solutions.

“The best thing we ever did”

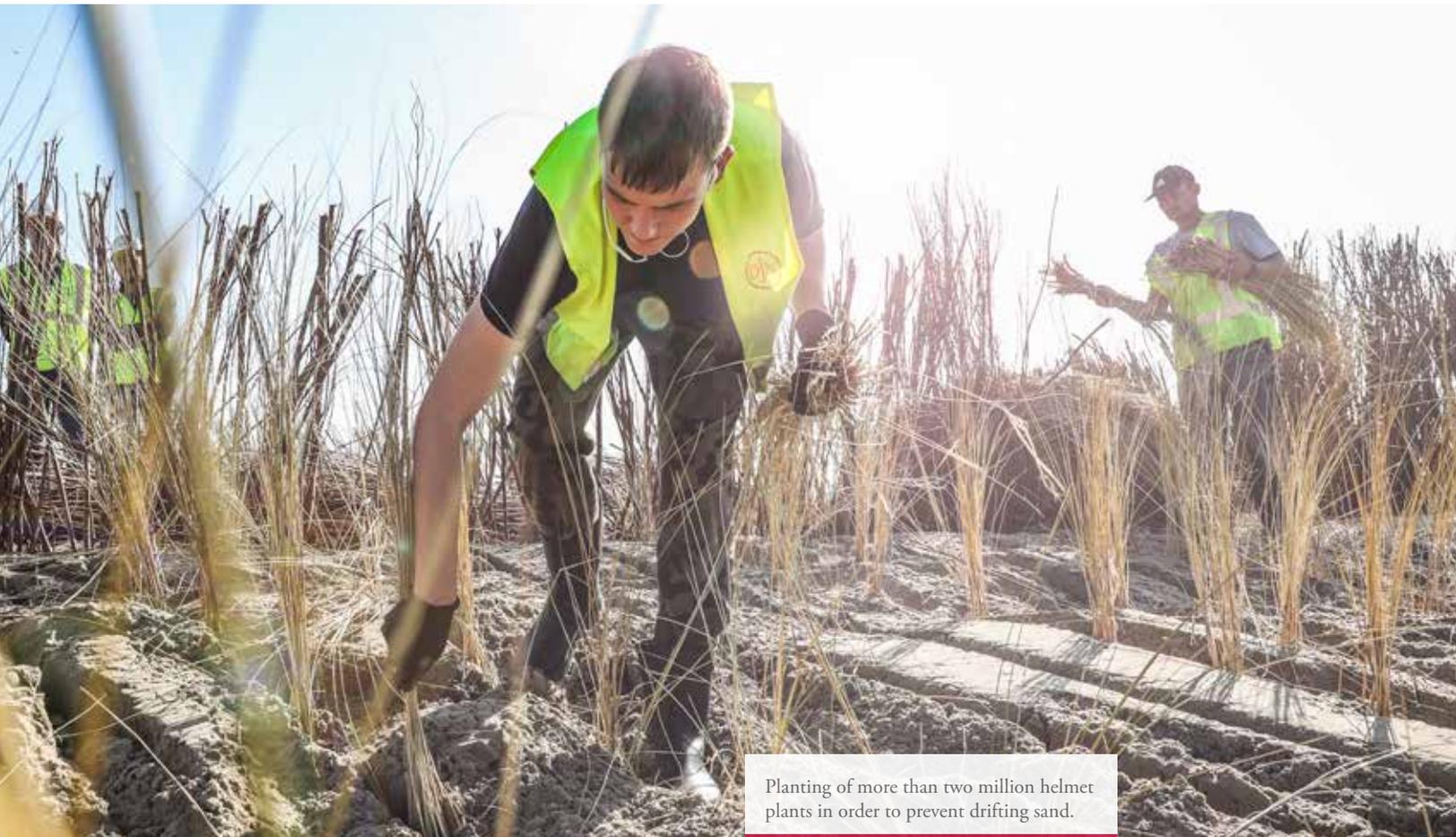
A Belgian company that wins a prestigious project from our northern neighbours, where Dutch dredging companies usually take the lead, that is remarkable to say the least. Initially, six companies competed for the project. In the finals, there were three left : including us.

Bart Praet, Manager Dredging Works Benelux, who was in charge of the tender for Jan De Nul, explains: “For tenders, usually only the lowest price applies. For this project however, the price only counted for two thirds. A third of the result was assessed for quality, to which 8 points were attributed. This is called the BPQR-principle: best price-quality relationship. We obtained a score of 7.4 out of 8. Jan De Nul’s plan of approach was globally assessed as ‘absolute added value’.”

“Although we had a good feeling when submitting our offer, we did not dare to make any simulation that suggested this high score. In this sense, it was a success. It is the best we ever did.” To the satisfaction of the ‘Hoogheemraadschap Hollands Noorderkwartier’, Bart knows : “After awarding the tender, the client confided to us that our proposal clearly stood out above those of our competitors. They repeated this during interim evaluations of the project. We have certainly confirmed their confidence.”



Emile Lemey, Engineer Marine Environmental Department (Mared), is responsible for the environmental management of dredging and offshore projects, also focuses on these Nature-Based Solutions for solving climate related problems. “During the preparation of our project file, we set ourselves a goal to create as much added value as possible”, Emile starts explaining. “As such, the Prince Hendrik Sand Dike project was given a double purpose: coastal protection by way of a water barrier and creating a nature reserve for humans and animals. Also the location lends itself perfectly for a soft Nature-Based Solutions outside the dike itself instead of the traditional dike reinforcement. In the latter option, part of the agricultural area and even some dwellings would have had to go.” Geert agrees: “Sand is a more sustainable solution than a water barrier made of hard materials. And if in future maintenance works are needed, it is much easier to restore a sand dike into its original state than a hard seawall.”



Planting of more than two million helmet plants in order to prevent drifting sand.

Ecological enrichment projects

The beauty of Nature-Based Solutions is that after an initial human intervention nature can develop and preserve itself without requiring continued human efforts. Apart from building the water barrier, Jan De Nul also launched five pilot ecological enrichment projects, every one of them being kick starters for nature creation. “The most southern tip of the project area was a natural mudflat and salt marsh area”, explains Emile. “To make sure that the area would not be buried under the sand dike, we ‘transplanted’ a salt marsh. We used natural elements that were already present in the project area to accelerate the ecological development of the area. In literature, you won’t find examples of this type of transplantation. We achieved a first in saving such a habitat.”

“A second pilot scheme was our ‘benthos banks’: these are layers of fine sand that are placed onto sand with a larger grain diameter

because this sediment contains bottom-dwellers, which are a culinary feast for wading birds. We also added shellfish banks onto a peninsula that are important for the Sandwich tern. This is a protected bird species that needs these shells as a habitat for its nests. The fourth enrichment pilot we are creating are embryonal dunes. The fifth and final pilot scheme focuses on developing eelgrass. Eelgrass is a plant species that is found in the southwestern delta area and the Wadden Sea but its population is decreasing every year. We are creating a new sheltered area in which we transplant eelgrass, hoping that afterwards the population will be able to sustain itself. With this variety of measures, Jan De Nul is delivering natural sustainable solutions for the Prince Hendrik Sand Dike with a positive impact on man, animal and environment.



READ MORE ON
[ANNUALREPORT.JANDENUL.COM](https://www.jandenul.com/annual-report)

FIELD OF ACTIVITY

Civil

LOCATION

Lek canal between Rotterdam and Amsterdam, at Nieuwegein.

CLIENT

Rijkswaterstaat

ASSIGNMENT

Reduce the bottleneck at the Princess Beatrix lock complex, by means of construction, widening and renovation works.

NOTABLE

As a member of the consortium Sas van Vreeswijk Jan De Nul pays a lot of attention to the integration of the project into the environment, with respect for heritage and landscape architecture.

3rd

lock chamber

276

meter long

2

existing chambers thoroughly renovated

120

meter widening of the Lek canal

27

years of maintenance

BEATRIX- LOCK

Near Nieuwegein, Jan De Nul is working on the extension of the most important inland navigation lock complexes of the Netherlands. As a member of the consortium Sas Van Vreeswijk, we are offering an overall solution that respects the historical heritage and architecture of the surrounding area.



Thanks to adapting the Princess Beatrix locks, the waiting times for ships will be shorter.

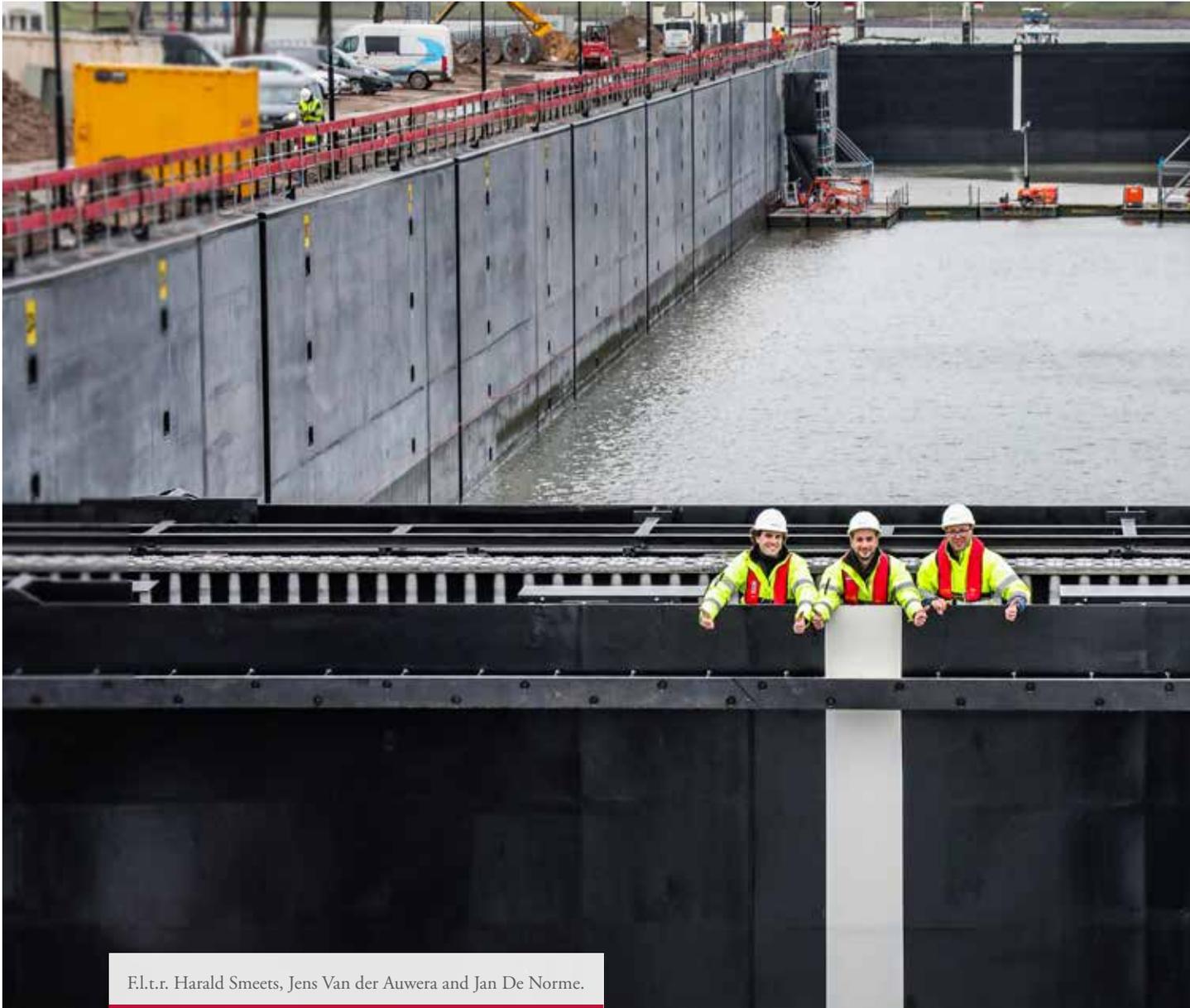


Strong foundations for the future

Traffic on the Lek canal, a major waterway link between the ports of Rotterdam and Amsterdam, is steadily increasing. Every year, 50,000 ships pass through the Princess Beatrix locks, the only lock complex on this route. Waiting times are becoming longer and ships that have too deep a draught must make a detour. The Dutch Waterways and Public Works Agency wanted to eliminate this bottleneck and signed a DBFM contract with the Sas van Vreeswijk consortium.

CIVIL

Sas van Vreeswijk is a project entity composed of both Belgian and Dutch companies. The name underlines the historic bond between locks, shipmasters and local residents and refers to the Belgian share ('sas' is a frequently used Flemish word for lock) in the joint venture. Jan De Nul, Besix and Heijmans are responsible for the construction, widening and renovation works on the Princess Beatrix complex. Together with investors Rebel Valley and TDP, they are also responsible for financing the project. A DBFM (Design, Build, Finance and Maintain) contract makes the consortium responsible for the design, construction, financing and a 27-year maintenance period.



F.l.t.r. Harald Smeets, Jens Van der Auwera and Jan De Norme.

XL locks

In addition to the existing twin lock, the consortium is building a third lock chamber. Both ends of the lock chamber feature a double set of lock doors: double rolling doors. The reasoning behind the double rolling doors is that, when a door needs repairs or maintenance, there is always a spare door available. These double doors offer an additional advantage. When both inner doors are closed, the lock chamber measures 276 m. When only the outer doors are used, the chamber length increases to 300 m, allowing two 135 m-vessels to pass through the lock simultaneously, thus reducing the waiting period.

Overall solutions

This is the first major hydraulic engineering project for Jan De Nul in the Netherlands. Project Engineer Civil Works Jens Van der Auwera is the intermediary between the design team and operational staff. He does this job as representative of Jan De Nul on behalf of the joint venture Sas van Vreeswijk: "This project shows that the Netherlands appreciate our expertise in lock and waterway construction works."

"Through our daughter company Soetaert, we have comprehensive in-house expertise in foundation techniques. This enabled us to perform the major part of the foundation works for the new lock chamber ourselves. We opted for diaphragm walls rather than driven



piled walls. In this way, we limited the nuisance from vibrations and noise that is inevitably from driven piled solutions. Where sheet pile walls were required we used a low-vibration process based on high-frequency vibratory hammers with a variable moment. We were able to further reduce the vibrations by pre-drilling holes in advance of inserting the piles. Clients are increasingly looking for joint ventures that can offer a wide range of expertise. Jan De Nul and its partners successfully demonstrated this flexible approach using modern environmentally sensitive techniques on this project.”

After the construction of the third lock chamber, the two existing lock chambers will be fully renovated. Sas van Vreeswijk will also widen the Lek canal to the south of the lock



Very high quality standards

The production of four steel lock gates each of 26 m wide, 14 m high and 6.5 m thick came with very strict quality standards. Harald Smeets, Technical Superintendent Vessel Maintenance at Jan De Nul, followed up the works in Shanghai, China, for a whole year. “According to European regulations, we are compelled to adhere to NEN-EN 1090, the standard for steel constructions. We chose for execution class 4, the highest category. This means that every root fusion weld must be checked 100%, both ultrasonically, visually and magnetically, and every fillet weld must be checked 100% visually and 20% magnetically. The Dutch authorities added their own Directives for the Design of Engineering Structures to this, i.e. 1200 pages of extra standards and obligations. We, in turn, added specifications in terms of the workplace and safety, among others with a ban to work outside.”

A consequence of the strict requirements was that the tolerances amounted to a mere 5 mm. Whereas the steel sheets were initially still measured with a tape measure and were cut in a CNC-machine, we later used a theodolite to set out reference points which were incorporated into a coordinate system. The biggest challenge, according to Harald, was the size of the lock gates: “If they would have been a little bit bigger, we would have had to built them in several segments. But the size of the gates allowed us, if only just, to make them in one piece. Even though, this created a major challenge for transporting them from Shanghai to their final destination. In the end, everything went well. We had a stopover in Rotterdam, where we repainted the minimal paint damage and fitted electrical cabinets. Subsequently, we transported the lock gates by the Nieuwe Maas and Lek canals to Nieuwegein, where we installed them on underwater rolling frames into the gate chambers using a 700-tonne crane with a 42 m high boom.”

“This project shows that the Netherlands appreciate our expertise in lock and waterway construction works.”

Jens Van Der Auwera
Project Engineer Civil Works

complex by an extra 120 m over a distance of 1 km to give ships plenty of space for manoeuvring into the new lock chamber. This will be carried out simultaneously with the demolition of the old dike. A new dike will be constructed before removing the existing dyke so that the area is protected during high tides. To the north of the locks, the canal will be widened over a 2 km distance by an extra 45 to 90 m to create extra berths.

Award for landscape integration

The works on the Princess Beatrix complex are not just another civil engineering contract. Sas van Vreeswijk paid much attention to integrating the project into the environment, with due respect for the heritage and architecture of the surrounding area. From a distance, you won't even see the new lock. "This is the major difference with locks in an industrial setting", says Jens. "The new lock chamber has been designed like a cut in the landscape to preserve a clear view of the monumental lifting towers of the old lock chambers. Also the characteristic white lifting towers and white lock keeper's dwellings, in which the new control room has been integrated, were restored to their original state." A further

bonus comes from the solar panels that allow the lock complex to operate in an energy-efficient way.

It was on no account an easy task to preserve the original appearance of the project area. To accommodate the widening works, the consortium had to move some of the structures of the New Dutch Water Line. Three casemates or bunkers each with a weight up to 1,600 tonnes were moved further inland and the same was required of a small lock, a culvert and a group of piles. "This was a very complex operation but with a successful result. All elements were re-installed outside the dike, along a public access route for cyclists and tourists."

Apart from the panorama and historical heritage, Sas van Vreeswijk also consider the local wildlife. Close to the lock complex, we created crossing zones for bats. The lighting at the Princess Beatrix locks would cause them huge disturbance during their nocturnal outings. "We installed bat-friendly lighting that doesn't confuse the little animals but still offers sufficient light to the users and operators of the lock. We also installed bat cabinets as temporary habitats and preserved rows of adjacent trees, which act as a means of orientation."





The efforts to integrate the whole project into its local environment have definitely succeeded. The Dutch Waterways and Public Works Agency (RWS) awarded Sas van Vreeswijk with the prize for landscape integration to acknowledge the respect that we showed for history and the environment.

More than a technical solution

The experience that Jan De Nul has gained as a member of Sas van Vreeswijk will be very useful for executing more projects in the Netherlands within the near future. "Which we are doing already", confirms Jens. "We're working, among others, on a tender for extending the A15 near Arnhem, which is also a major DBFM contract. Here we will offer more than a mere technical solution to the problem. We go for solid added value."



READ MORE ON
ANNUALREPORT.JANDENUL.COM

Maintaining the overview in a project management system

Our client, the Dutch Waterways and Public Works Agency, imposed extra strict quality, process and environmental requirements. To supervise and streamline the whole project trajectory, Sas van Vreeswijk appointed Jan Denorme as Process Manager. His task: setting up an overall project management system that showed how the consortium could deliver the project in a controlled manner. The system, called *Relatics*, also includes a requirements management programme. "During the design and construction phase, almost 200 people from different parties were working on the various project parts. In such a situation, it is important to maintain a good overview. This allowed the works to be planned as efficiently as possible, while at the same time the client was able to keep permanently abreast of the progress, potential deviations and the decision process for any necessary changes."

For the Beatrix project, the management system, which must meet the certifications established in the contract, consists of partial plans and process diagrams. The project achieved the ISO 9001 certificate and the management system must meet certain capability levels from the ISO 15288/15504 standard. This standard describes 25 systems and software engineering processes.

The consortium also developed a performance measuring system that shows the availability and reliability of the locks per quarter. "This enables us to confirm to our client, the Dutch Waterways and Public Works Agency, that we meet their requirements. Initially, we planned to develop a generic system but we soon realised that the specific requirements required a project-specific solution. Still, it's a good basis for the future."

FIELD OF ACTIVITY

Offshore

LOCATION

In the North Sea, at 38 km from the German Wadden island Borkum.

CLIENT

Ørsted

ASSIGNMENT

Transport and installation of 36 foundations for wind turbines, with associated erosion protection.

NOTABLE

Jan De Nul worked for the first time with the *Noise Mitigation System* for driving the monopiles.

36

foundations

100

installation days

provide

460,000

families with green power

450

MW on the German electricity network

BORKUM RIFF- GRUND 2

Following the success of the Nobelwind project, Jan De Nul continues to strengthen its tier one position in offshore wind with a successful Borkum Riffgrund 2 installation project. Deploying the *Vole au vent*, 36 monopiles were driven into the seabed, while fully complying with the very strict German noise standards.

Hammering in silence

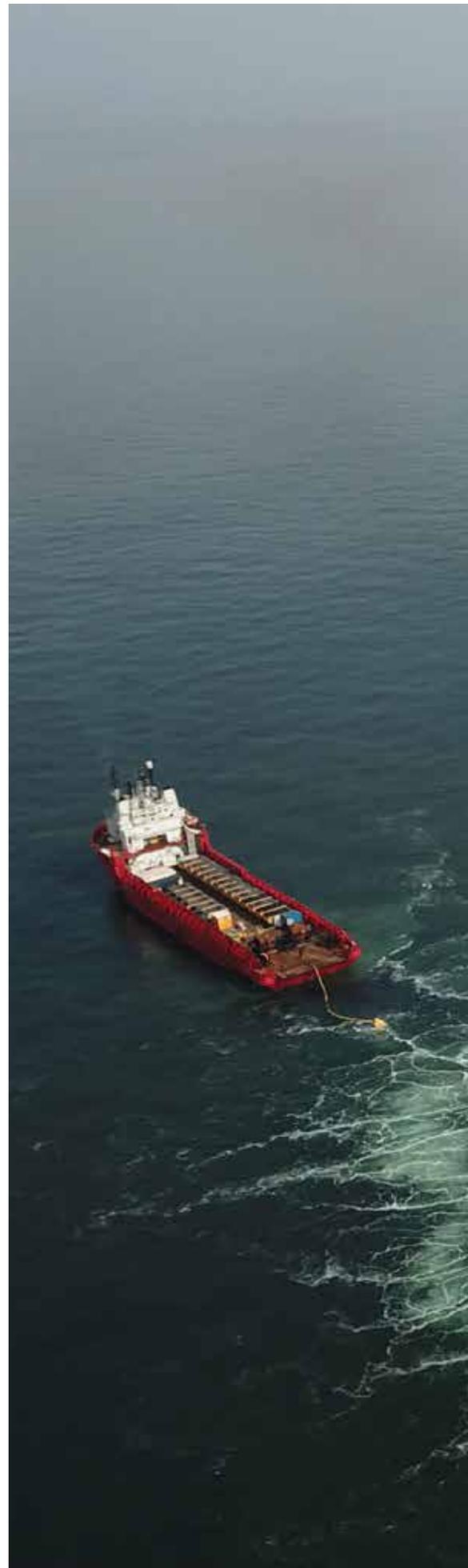
The *Vole au vent* sailed out for the installation of 36 wind turbine foundations in Borkum Riffgrund 2 project, an offshore wind farm in the German North Sea. The wind farm will have a total output capacity of 450 MW, generating green energy for 460,000 families. The client for this project was the Danish renewables industry leader Ørsted. Jan De Nul was responsible for the transport and installation of the foundations.

OFFSHORE

The engineering works started in 2017, in our offices in Aalst. Here, we made all preparations in terms of HSE plans, equipment design, method statements, and subcontractor appointment. The next stop was Eemshaven, where the offshore installation vessel *Vole au vent* was converted using project-specific equipment. Senior Project Engineer Offshore Paolo De Temmerman remembers it all too well: "The *Vole au vent* arrived with only the sea-fastening structures on board. In only six days, we brought all the extra equipment on board and installed it."

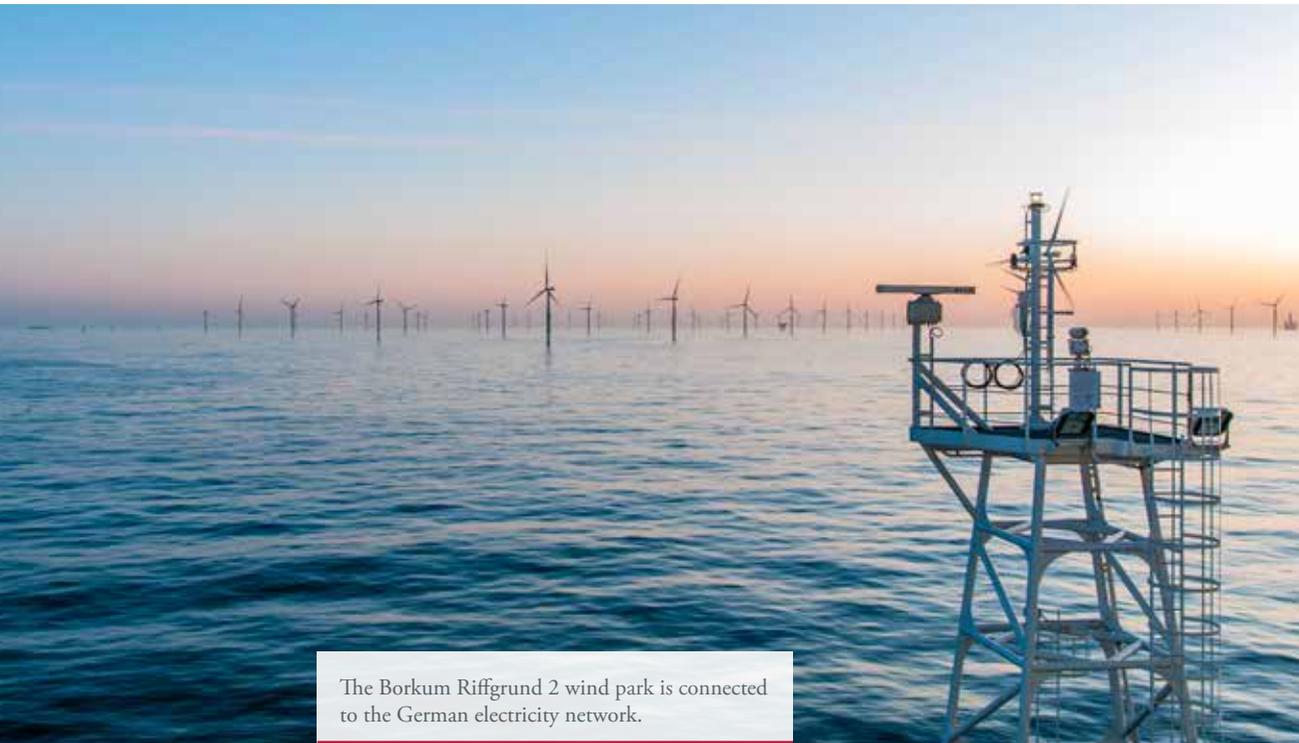
Curtain of air

For this assignment, we manufactured new tools, the production of which was closely monitored by Project Engineer Offshore Arno Soetaert. "For installing a foundation, you need





Sound waves are broken by means of a bubble curtain around the ship.



The Borkum Riffgrund 2 wind park is connected to the German electricity network.

lifting tools, in combination with a hydraulic hammer to drive the monopiles into the soil. What was special about this project was that we needed a *Noise Mitigation System* (NMS) because German noise standards are very strict to help reduce any impact on marine life. The main NMS is a soundproof heavy steel sleeve that slides over the monopile, down to the seabed, to dampen the vibrations from hammering. “We were to stay below the *Sound Exposure Level* (SEL) of 159 decibels so we combined this system with a bubble curtain, a pneumatic hose full of holes, that was placed onto the seabed. By blowing air into the hose, large volumes of bubbles appear and rise to the surface and in doing so break and further reduce the sound waves.”

In February 2018, the actual installation works started. The foundations consisted of a monopile with an anode cage, and a transition piece to be bolted on top of the monopile. The different parts must fit together perfectly, which required prior tests on land. Paolo De Temmerman explains: “We performed simulations using real assets in mock-up tests. We looked for the best system to mount a transition piece onto a monopile, without damaging either transition piece or monopile,

and making sure the bolt holes align perfectly, with millimetre precision. The installation was a success and we can now apply this valuable experience in other offshore projects. It was also a perfect example of how we put our ITA strategy (*Imagine. Think. Act.*) into practice: as good preparation is often the key to success.”

After having installed the different components, everything was bolted together. “Here as well, we developed a project-specific bolting strategy, making sure the bolts were mounted and torqued with the correct tightening moment.”

Quality assurance

The survey team played a crucial part in this project. Ellen Van Den Bogaert was Senior Surveyor and was involved in all stages of the process. “We were already present during the construction of the monopiles and tools, checking everything: dimensions, quality, execution, etc. A very exciting phase for the survey department was the mobilisation of the *Vole au vent*. All tools were brought on board and we had very little time to install and test everything.”

“Thanks to monitoring, we can guarantee Jan De Nul quality.”

Ellen Van Den Bogaert
Senior Surveyor



When installing monopiles, it is crucial to drive the pile at exactly the right location, under the correct gradient and at the correct height. “For this project, we also had to take into account the new NMS, monitoring and re-measuring it every step of the way. We also gathered all data for our client report and to warrant to ourselves and the client, Jan De Nul quality,” concludes Ellen.

After the installation works, Jan De Nul also installed the scour protection for the foundations. Paolo De Temmerman: “In 2017, we had already laid a layer of rocks to prepare the seabed with the *Simon Stevin*. In the actual installation process, we drove the monopiles through this layer and then in a second phase, we came back with the *Adh mar de Saint-Venant* to install an extra protecting rock layer.

Ever expanding offshore experience

This was Jan De Nul’s third major monopile offshore foundation installation project. In every new project, the team leverages previous experience to plan work even more efficiently. “This enabled us to complete the works two weeks earlier than scheduled. Thanks to the team spirit, efficient methods and exemplary cooperation between staff, crew and the onshore team, the whole installation took us less than hundred days and adds to the offshore knowledge bank”, concludes Paolo.



READ MORE ON
[ANNUALREPORT.JANDENUL.COM](https://www.jandenul.com/annualreport)

FIELD OF ACTIVITY

Dredging, offshore, environment

LOCATION

Ouidah, Benin, along the coast of West-Africa.

CLIENT

Ministère du Cadre de Vie et du Développement Durable (MCVDD) in Benin.

ASSIGNMENT

An innovative and sustainable solution to end the erosion problem along the coast of Benin, in view of the development of a flourishing tourist sector.

NOTABLE

The innovative concept of a submerged breakwater parallel with the coastline is based on the principle of natural reefs along the coastline.

6

km long breakwater and beach reclamation (4 km + 2 km) consisting of

1-3

ton heavy rocks on a filter bed before the coast

3

million m³ beach suppletion on the eroded coastline

BENIN

Jan De Nul controls coastal erosion in Benin through an innovative solution, conceived, developed and constructed in-house.

An integrated project using the company's competences, both technically, environmentally and financially.



The future of Benin

The West African coast is being ravaged by erosion. That includes Benin, where the incoming swell of the Atlantic Ocean hits the coastline, eroding to three metres each year. Without human intervention, climate change and the rising sea level will continue to erode the beaches of Benin. Structures that are typically proposed to stop erosion are groyne fields and dykes to prevent sand movement. Generally these types of preventive works have a mediocre efficiency, and move the problem to other coastal segments, or even have adverse effects for the development of the beaches, environmentally, socially or for tourists. Jan De Nul, on the other hand, proposed a sustainable and innovative solution inspired by nature: the functioning of coastal reefs.

DREDGING

Envisioning touristic developments along the Benin coast, the Government of Benin ordered the Ministry of Environment and Sustainable Development to search for an innovative answer to stop the erosion problem without creating an imbalance along the coastline.

Underwater breakwaters

Jan De Nul has devised the concept of an underwater breakwater parallel to the coast combined with sand replenishment destined



to restore the current beach to its original state. Senior Project Manager Dredging Jan Moens explains: "The energy of the incoming ocean swell will be reduced by the underwater breakwater before reaching the shore. We drew our inspiration from coral reefs, which are also located in shallow water in front of the coast. Due to their position and structure, these reefs break the erosive power of the ocean swell and protect the coastal areas and islands." Imitating nature is a fine example of sustainability, all the more so because of the flexibility of the concept. Even if the sea level rises further than expected, the structure can easily be adapted. "This innovative concept is surely unconventional in the maritime world and has never been applied before on this scale. It is an idea that Jan De Nul has conceived, developed, engineered in detail and implemented."

Conceptual design

A project of this scale obviously requires thorough planning and preparation. Jan De Nul conducted preliminary and conceptual design studies for this project, including geotechnical and geophysical site investigations, hydrometeorological analyses and numerical simulations. Next, detailed engineering studies were conducted, verifying performances and stability of the structure, first by theoretical calculations, followed by physical model tests in both a wave flume and a wave basin. Scaled versions of the structure including a mobile sand bed, were tested and subjected to normal and extreme conditions. Project Leader Development Conceptual Design Pieter Degroote: "We tested the theory in



collaboration with an international university where we checked the design parameters in a real setting; firstly, in a 90 m long wave flume, and then in a wave basin with dimensions of 20 meter by 20 meter.

There, we tested the stability of the breakwater and the beach reclamation in project conditions and studied the morphodynamical response of the shoreline. Those hydraulic model tests showed that the underwater breakwater absorbs between 20 - 55% of the wave energy. Obviously, some of the energy passes the structure, maintaining the existing dynamic coastal system. No lagoon will be created, but more of a sheltered area. The only thing that will change, is the reduction of the sand movements behind the breakwater, and this in balance with the surrounding coastal environment. Finding this balance was a difficult exercise, which we wanted to see confirmed first in the tests." Pieter calls it an integrated project to which almost every



department has contributed. “The preparation comprised concept creation, site investigations, a complete environmental and social impact assessment, after which our design engineers started the detailed calculations. Meanwhile, the financing arrangements for the project were finalized, and preparations of the actual construction works could start, including the modification works of the side stone dumping vessel *Pompei* by the technical department (see frame piece). It has become a really multidisciplinary project, thanks to the expertise of the different departments within Jan De Nul.”

No time to waste

From early 2018 and the next three years, Jan De Nul will be transporting rocks to the stockpile south of the port of Cotonou. Two thirds of the rocks come from quarries in Benin, 150 km further inland, whilst the rest

“It’s the first time that the concept of an underwater breakwater has been implemented on this scale.”

Jan Moens,
Senior Project Manager Dredging

Reducing impact

Whilst dumping rocks might not be new, creating a breakwater with 1 to 3 ton rocks up to a depth of -1 m certainly is. Since a crane works too slowly to meet the tight deadlines, Jan De Nul has converted its side stone dumping vessel *Pompei*. The vessel has a normal loaded draught of 3,6 m, so a special hull protection of the vessel had to be foreseen.

“The fuel tanks of the vessel are situated just above the bottom of the *Pompei*,” Project Engineer Technical Departement Pieter Vanhulsel points out. “In order to protect both the environment and the vessel, we have furnished 80% of the hull with a boarding structure similar to the railings along a motorway. Our hull fender construction is capable of absorbing a much larger impact in the same way, thanks to the sandwich plate system. The fender construction weighs 250 tonnes, but also contains 270 m³ of air, which creates an increased rock carrying capacity.”

The distance between the original hull and the outside of the fender construction is 30 cm. That makes the ship wider and deeper and it behaves differently in the water. “We have connected the boarding structure in such a way as to retain the hydrodynamic qualities, allowing to sail almost as quickly as originally. The *Pompei* remains functional, but it is protected from eventual damage caused by the rocks.”

Finally, Jan De Nul has designed two automated arms with multibeam echosounder sensors which fold outwards from the ship deck and which are operated from the bridge. “Usually, those sensors are located on the bottom of the ship, but, obviously, that’s impossible in this project,” Pieter explains. “The shallow positioning of the rocks had several implications and unusual factors to consider. It’s the first time that we’ve done these kind of modifications, but that’s typical for Jan De Nul: we make sure that it works.”





Two thirds of the rock comes from the local stone quarries, the rest from abroad.



“It has become a multidisciplinary collaboration, using the in-house expertise of Jan De Nul in several fields.”

Pieter Degroote,
Project Lead Development Conceptual Design



comes from abroad. "All the rocks required for the first construction year were at the stockpile zone when our vessel *Pompei* arrived in November 2018", Jan Moens explains. "We don't have any time to waste, because it's only during the dry season, 3 to 4 months per year, that the ocean offers workable conditions. In each season, we install a stretch of 2 km of breakwater, which consists of a bottom layer with quarry run of up to 500 kg and an armour layer with rocks from 1 to 3 tonnes. The breakwater crest will be at 1 meter below low water level. After two years, the 4 km long breakwater in Avlékété will be finished. In the

third year, we will construct a 2 km breakwater in Djègbadji, which is 20 km further. As soon as a breakwater is ready, we will replenish the beach with a total of three million cubic metres of sand to widen the beach from 30 to 100 m."

The result of the project is threefold. Jan De Nul stops the erosion along the coast and restores the sand balance of the coastal system. The second benefit is aesthetic: the coastline and beaches are retored without visible obstructions, since the breakwaters lie underwater and are therefore almost invisible. That obviously brings us to the third benefit. A wide strip of coast which is not susceptible to erosion opens the door to tourism and recreation development. "A number of renowned hotel groups are conducting negotiations and some of them have even already signed a contract to develop on the coast in Ouidah," Jan says. "We are proud that this project contributes to the future of Benin."



READ MORE ON
[ANNUALREPORT.JANDENUL.COM](https://www.jandenul.com/annualreport)

FIELD OF ACTIVITY

Dredging

LOCATION

Various locations in the North of Europe.

CLIENT

Various contracting authorities.

ASSIGNMENT

Maintenance of ports
Deepening of access channels to ports, building of a quay wall and dredging of sand and peat.

NOTABLE

Jan De Nul communicated in seven languages in as many countries and anticipated winter conditions on each of the project locations, despite short start-up periods.

7

simultaneous projects in Northern Europe

8

hectares of storage area for, amongst others, our dredging pipelines in open-air warehouse in Zelzate

NORTH EUROPE

Apart from the usual challenges associated with dredging projects, this particular cluster of projects in Northern Europe also posed climatological, linguistic and time-related challenges to Jan De Nul. Through constant meticulous planning, we maintain control over every assignment.

United in diversity

Jan De Nul operates on a global scale. Having a concentration of dredging equipment in a specific region increases the competitive edge and may yield a cluster of similar projects within the same region, which – almost as often – goes hand in hand with a number of similar challenges. Take Northern Europe for instance, where Jan De Nul has worked in Iceland, Finland, Denmark, Poland, Latvia, Lithuania and Germany. Where we had to consider difficult weather conditions, contracts in the local language and, more than once, little time to set up the project. Below, the respective projects are explained.

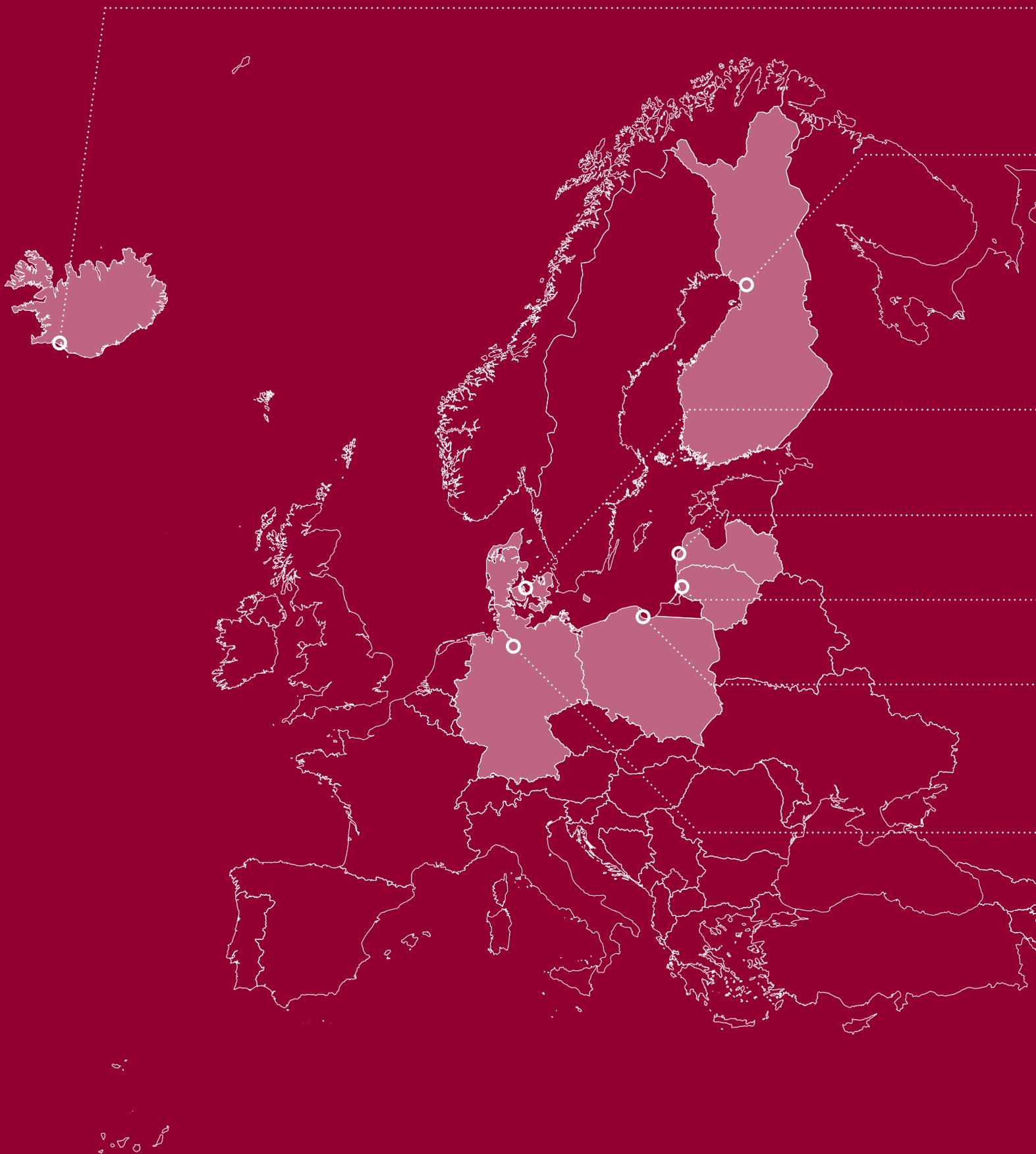
DREDGING

The Westman Islands, south of Iceland, are home to 3,000 people who live mainly by fishing. The ferry to export fish sailed twice a day the natural deep-water port to the mainland. Thanks to the construction of a small harbour in Landeyjahöfn on the mainland, the ferry now sails 11 times a day, generating a huge boost to tourism and the local economy. However, the new harbour suffers from a great deal of sedimentation. Since 2016, the trailing suction hopper dredger *Galilei* has been working there 6 months a year to keep the access to the ferry harbour open. During the other 6 months, Jan De Nul carried out other dredging works all around Iceland.





The port of Reydarfjörður, Iceland.



Iceland
Landeyjahöfn

Finland
Oulu

Denmark
Odense

Latvia
Liepāja

Lithuania
Klaipėda

Poland
Gdansk and Gdynia

Germany
Hamburg

Creative planning

In fast-track projects, it is of vital importance that equipment can be mobilised rapidly and be sent equally smoothly to its next destination. For the assignment in Odense in Denmark, we mobilised a trailing suction hopper dredger and the smallest cutter dredger from the Jan De Nul fleet within a short term. Geert De Brouwer and Ludwig Mertens from the logistics department helped us in realising a rapid start-up.

“There are a number of criteria that always play a part when searching for the best possible solution: time, cost and the size and weight of the goods”, Geert explains. “We individually assess every assignment but with all projects currently being executed in Europe, this exercise is becoming increasingly complex as we are falling short of the necessary equipment. In Odense, we needed 80 rubber hoses but this amount was not available in our outdoor warehouse in Zelzate, where we have over 19 acres of storage space for all on-shore pipelines and bigger pieces of equipment. We found a creative solution by sending part of the goods that had to be returned from a project in Filyos in Turkey directly to Denmark. Considering the urgency, the equipment was transported by road.

Ship loaded on a pontoon

While the project team in Odense had already begun to build an on-shore pipeline with the hoses already available to them, a transport ship conveyed the rest. The logistic department also organised the transport of parts from a project in Finland. “There have been a great many logistic flows to get all equipment in Denmark in a timely manner”, confirms Ludwig. “For instance, because our smallest cutter dredger *Hendrik Geeraert* is too small for a sea trip all by itself, we organised a tow with a pontoon of 80 m long and 20 m wide, on which, together with extra cargo, we loaded the vessel in one part.”

“It all took quite some doing but it was a fast and solid mobilisation”, says Geert in retrospect. “The pontoons were crucial. Without this solution, the whole project would have fallen apart.” Ludwig agrees with his colleague: “For Odense, we didn’t get any order that wasn’t urgent. In addition, the demobilisation of all this equipment came with very strict deadlines. We had no minute to waste when dismantling the pipes because the *Hendrik Geeraert* was needed elsewhere. We can be satisfied with the result.”

Well-oiled chain

Planning, organisation, execution. Jan De Nul Group never refuses to take up a challenge. Geert and Ludwig are unanimous: “We are not afraid to tackle the most outrageous challenges. The opportunities that you get here are unique; you will not find them anywhere else. Everyone appreciates you for your contribution. At Jan De Nul, every employee is a link in a well-oiled chain. If the chain does not run smoothly, a project cannot be started. We are all aware of this.”

“Jan De Nul tackles the most insane issues!”

Geert De Brouwer,
Transport Supervisor



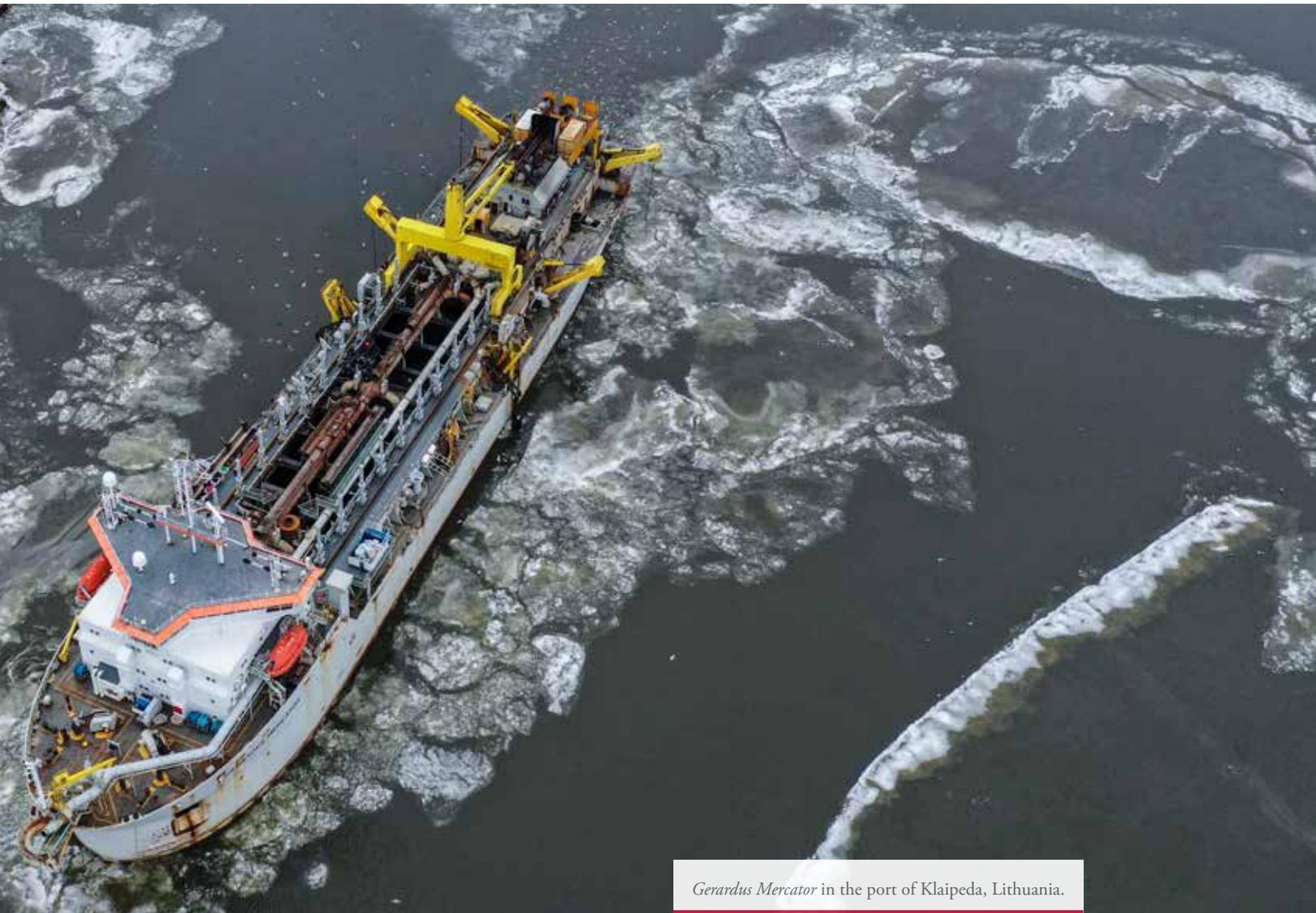
Strict environmental requirements? Envisan offers the solution

In Finland, we won a contract for deepening the access channel to the port of Oulu, 150 km below the Arctic Circle. Our choice for heavy equipment, i.e. the cutter dredger *Fernao Magellan* and the trailing suction hopper dredger *Alexander von Humboldt*, enabled us to complete the works within the natural deadline, i.e. before the harbour froze over. This heavy equipment required the supply and timely removal of a great many pipelines and dry equipment.

In addition, the project had very specific and strict environmental requirements imposed in terms of turbidity, the measure for the amount of suspended particles in water. To be able to execute this project within the pre-set standards, we turned to the environmental experts of our group company Envisan. Together with

the client, we developed a working method that completely met all the turbidity requirements. The method entailed a very accurate, precisely metered addition of certain chemically active substances that enhance the natural bonding of particles and thus result in faster particle settling. Furthermore, we suspended large underwater silt curtains in the settling basin to catch particles and silt, and ensure that the settling was accelerated and could be kept entirely within this basin. Thanks to the efficient cooperation with our Environment Division, the project could be completed within time and according to the strict environmental requirements! (see p.48-52)

Jan De Nul is designing and building a 900 m quay wall with berths and quay surfaces in Odense, Denmark. The site soil contains a lot of peat, an extremely compressible material that is not suitable for reclamation and must be dredged very accurately to restrict the



Gerardus Mercator in the port of Klaipėda, Lithuania.

loss of dredged sand that can be used to the maximum extent possible. (cf. box text)

The rapidly growing container terminals at the Polish Baltic Sea ports of Gdansk and Gdynia require access channels to be deepened to -18 m over 4 km to take the biggest container ships. True to the circular economy philosophy, dredged sand is used to replenish beaches on the peninsula Hel to the north of Gdansk, at a sailing distance of 60 km. Here as well, our decision to use the mega-trailing suction hopper dredger *Cristobal Colon* allowed us to submit a highly competitive offer but at the same time, this choice raises major logistic challenges in the preparatory phase.

Jan De Nul is also active in Latvia, Lithuania and Germany. The port of Liepaja (Latvia) has corn as its main export product. Jan De Nul is deepening the access channel to -14.5 m so that large corn exporting vessels can leave the

port full to the brim. In Klaipėda (Lithuania) and in Hamburg (Germany), we are responsible for maintenance dredging works in the port. In Cuxhaven, we are involved in the preparations for deepening the Elbe, building a 7-km underwater depot for storing dredge spoil.

Harsh winters

The cluster of projects is united in diversity. For each of the above-mentioned contracts – except for Denmark, where the working language is English – Jan De Nul communicated with its clients and suppliers in their native language. Both for verbal and written communication, we work wherever possible with in-house staff speaking the local language. Where this is not possible, we engage experienced local employees to strengthen and support the project teams.



Fl.t.r.: Ludwig Mertens, Kim Oostvogels and Geert De Brouwer.

The protection against winter cold requires specific measures for every project activity, ranging from personal protective clothing to very specific operational measures, for instance to prevent water pipelines from freezing up.

Meticulous planning to maintain control

Kim Oostvogels is such a work planner. "I started working for Jan De Nul in 2007, assisting in various missions, amongst others as Works Manager and Project Manager for offshore and dredging projects. After having worked abroad for 10 years, I felt I could offer added value as an intermediary link between the calculation efforts, the actual awarding of the contract, Area Managers and on-site personnel. It is my job to organise operational support during the initial stages of a project and to facilitate the communication between

the various departments involved. Our motto is: 'plan to maintain control'."

A work planner is usually assigned to projects for which a great deal of mobilisation is required. The planning is almost as labour-intensive as the execution of the works itself: "We start with collecting all available information from the various departments in an action list consisting of 800 questions. Every department fills in a designated part of the questionnaire. It is important that everyone is on the same wavelength and that all persons involved know how we will handle the project", says Kim, who will then establish in detail how Jan De Nul will address the works and what the team needs for this. Upon the actual start of the works, he hands over to the project team.

Particularly in fast-track projects, there is no time to lose. "In Finland, we had to be ready and demobilised before the canal would freeze



“The fast internal communication between the various departments enables a smooth execution of the entire project.”

Kim Oostvogels,
Operations Support Manager

over”, explains Kim. “That was a tight deadline, so we had to start early. Between the moment we were awarded the contract and the actual start-up, we had hardly two months in which we had to plan and execute the mobilisation of ships and equipment. This requires a considerable degree of understanding and preparation, but it is the only way to gain time. The internal communication between the various departments is a great bonus for bringing the entire project to a successful conclusion.” *Quod erat demonstrandum* because all our assignments in Northern Europe went smoothly.



READ MORE ON
[ANNUALREPORT.JANDENUL.COM](https://www.jandenu.com/annual-report)

OUR ANSWER TO ENVIRONMENTAL ISSUES: **ENVISAN**

We cannot escape it. The climate, the environment, recycling, clean-ups and the circular economy are hot topics. Now, let these hot topics be the core business of Envisan, Jan De Nul Group's Environment Division.

Circular Solutions for a better planet

This tagline perfectly fits Envisan's remediation and valorisation activities. This is what Envisan has on offer.

First word: circular. That's obvious. With its solutions, Envisan contributes to a circular economy, always aiming at valorisation and a maximum re-use of raw materials. Sometimes, clients may not always follow us in this pursuit, for economic or budgetary reasons. But, in principle, maximum re-use is always the primary goal.

Second word: solutions. Equally obvious. Envisan is not just another contractor, it thinks along with the client. Thanks to major R&D efforts, Envisan is able to deliver unique innovative solutions for the treatment of polluted soil and sediments. *Soilutions*, in other words. After a comprehensive analysis, a concept is defined and then realised. This can be done on a *stand-alone* basis, but also in support of or in cooperation with other Jan De Nul Group companies.

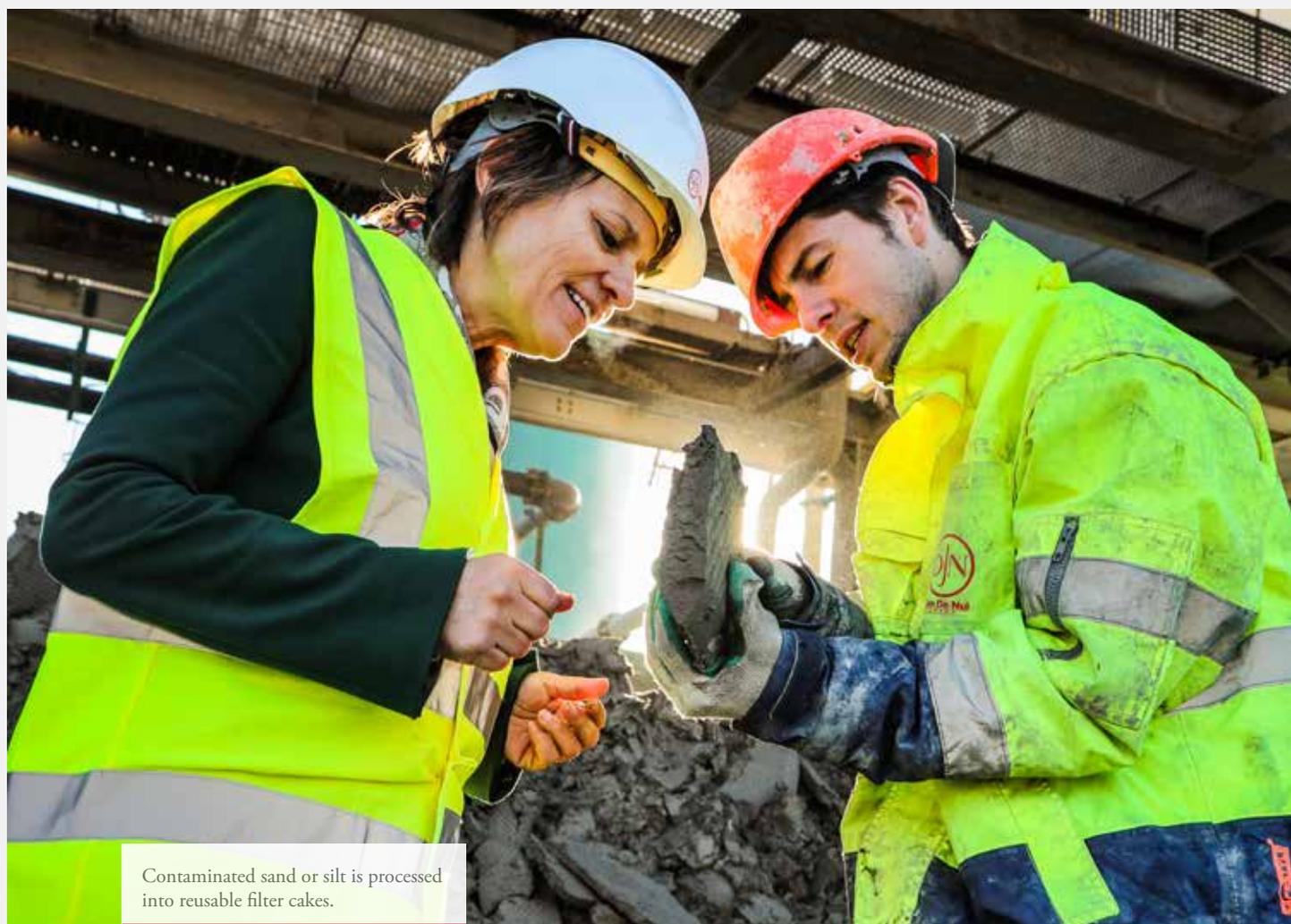
A better planet. Indeed. Not just 'a cleaner planet'. We don't stop after having cleaned up sites. We redevelop sites, both in ports and on land. Brownfields, such as the former gas

plant site in Lier, a black spot within the landscape, are redeveloped into beautiful residential and living areas amidst a garden park, by the water. An ecological blackspot turned into an economic hotspot!

Maximum circularity

Land, ports and waterways: we clean up and redevelop. It's what Envisan stands for.

In national or international areas of economic interest, space is becoming scarce whereas demand is increasing. Former polluted factory premises or dumpsites are remediated and redeveloped into residential and/or commercial sites, together with our partner PSR, into energy parks, industrial sites or even into woodland and nature reserves. There is a growing trend among companies towards outsourcing, also when it comes to their environmental history. That's when Envisan comes on the scene, taking over the whole picture, including remediation worries and/or duties. Here as well, our focus is on the maximum re-use of raw materials. It's not just the plot of land itself that is re-used (Brownfield turned into Greenfield), after an innovative treatment process, the contaminated soil can be re-used as a secondary raw material. Think,



Contaminated sand or silt is processed into reusable filter cakes.

for instance, of stones and sand for infrastructure works. A fine example of how Envisan embraces the circular economy.

Next to cleaning up, remediating and redeveloping polluted sites, Envisan does exactly the same for contaminated ports, docks and waterways. In a first phase, the polluted sediments are removed, a process also referred to as 'environmental dredging'. The next phase is the remediation programme: the re-use of these purified sediments in infrastructure works. Maximum re-use. Again! For this, we use, among others, two semi-mobile Soil and Sediment Washing Plants, which treat polluted sediments in a physical/chemical process. A unique procedure, for instance in the south of France, which recently made us a preferred partner in this region.

“ We do not stop at the clean-up, we redevelop.”



Focus on innovation, commercialisation and the international market

Envisan has developed its own innovative solutions and has distinguished itself through the execution of these solutions. It's precisely this innovation that makes Envisan stand out. We're facing new types of pollution that call for new solutions. Customised circular *soil*utions. The climate, the environment, recycling,

clean-ups and circular economy are hot topics. Envisan fits in nicely in this list. Envisan offers solutions that can make a difference. Also on an international scale, cooperating with other Jan De Nul divisions that already have an established local foothold.



READ MORE ON
[ANNUALREPORT.JANDENUL.COM](https://www.jandenul.com/annualreport)

Beaches in the South of France

At the end of October 2018, two ships collided with one another off the coast of Corsica, resulting in a fuel tank leak. Part of the oil spill could be captured in the Mediterranean Sea but another considerable part washed ashore onto the beaches of Saint-Tropez. Thirty-seven beaches at the Cote d'Azur had to be closed. A genuine environmental disaster ... and one that needed the expertise of Envisan.

The combination of our expertise and high-end equipment ensured we could offer the ideal circular solution in response to this environmental disaster. For this environmental disaster in Saint-Tropez, we made use of our soil and sediment treatment centre in La Seyne-sur-Mer, near Toulon. This recently built Soil and Sediment Washing Plant delivers a tailored solution where the polluted sand is subjected to a physical/chemical treatment: where every polluted fraction is physically separated, washed and – if the client so wishes – re-used. Together with the local environment authorities we are currently examining whether it is possible to re-use the purified sand to replenish the excavated and polluted beaches.

If reuse permission is given, we will really have come full circle. Another fine example of how Envisan embraces the circular economy. It's what Envisan stands for. It's the future.



The soil and sediment remediation centre in La Seyne-sur-Mer.



6,458

employees

200

projects

37

countries

WHO WE ARE

With more than 6,000 people in 37 countries, together we are sustainable and innovative, FIT, ITA as well as experienced and creative.

CSR. Corporate Social Responsibility.

In 2017, our first extended CSR report was published. It listed the numerous sustainable initiatives that are currently in process within Jan De Nul Group. Following this, we have now engaged our first CSR manager to develop and strengthen Jan De Nul CSR awareness.

Our CSR story is everyone's story, the commitment of all our employees is a major priority. For the short term, we've established three pillars, meanwhile setting the target to finalise our CSR strategy in the course of 2019. First, we will examine how we can reduce our impact on water and air (air quality, fine particles and CO₂ emissions, submarine biodiversity...) during all our activities. Secondly, we continue to invest in human capital, both in our own employees by way of training courses and FIT initiatives and in the local communities. And we also remain committed to meeting all regulations and standards that promote sustainable entrepreneurship. Last but not least, innovation and engineering remain our answer and remedy to keep our impact as small as possible: Nature-Based Solutions, our ULEv vessels, research initiatives on wind energy, etc.

To improve and guard our ecological responsibility, social solidarity and economic sustainability, we strive for a good balance between the 5 Ps (People, Planet, Prosperity, Peace en Partnerships). We apply the sustainable development goals of the United Nations as a compass for defining our CSR policy. These are 17 ambitious sustainable development goals that must encourage us to take action in domains that are crucial for humanity and the planet. You can read more about all this in our new CSR report.









FIT. Food, In Balance and Training & Sports.

2018 marked the second year of this internal wellbeing campaign, which shows how Jan De Nul invests in its people. It was a good FIT year, with teething problems being resolved. What's more, our FIT programme is in great shape, and available to everyone.

In 2018, we launched a survey into the use of FIT on-board of our vessels. The wide ranging survey polled for the commitment and interest in our FIT programme. The results were very interesting and after discussions with our captains we will start rolling out in 2019 the projects that have been identified as having top priority. These include: expanding the sports equipment, offering healthy snacks and updating our offer of contemporary leisure activities after working hours, both individually and in groups. A healthy mind in a healthy body. For all our crew!

FIT is becoming increasingly popular, not only on-board of our vessels but also on projects and in offices worldwide. For sites abroad, we've drawn up guidelines as to which initiatives may be awarded the FIT label.

Meanwhile, in Aalst and Luxemburg, we've been hiking, cycling, playing volleyball, cooking, tasting tea, swimming, rowing, sailing, we then did some more hiking and cycling, for good causes, as arranging twice a week yoga sessions for extra participation. Building up one by one these positive initiatives we strive to get the best out of our people and our teams.

The highlight of 2018 was undoubtedly the FIT family day. 400 colleagues and 850 family members had an absolute field day in sun-drenched Pairi Daiza, building bridges between work and private life and between colleagues worldwide. A great teambuilding event that in 2019 will no doubt have a sequel!



ITA. Imagine. Think. Act.

Whatever we do, we never lose sight of our goal: solutions you can build on, working safely and efficiently, delivery within time and budget, unburdened clients.

How do we do this? We imagine where we want to go to 'IMAGINE', think about how we will do this 'THINK' en turn words into deeds to achieve results 'ACT'. In this way, we always maintain operational control.

It is how we work.

This is not an empty slogan. Our ITA programme actively supports our corporate culture. More, it is the core of who we are and makes several building blocks of our culture tangible;

- Our *Just Culture*, through which we focus on motivation, learning and improving. Time and time again.
- Our ITA ambassadors embody our corporate culture. One by one, they are driven by their will to improve. Always thinking critically about how we work. Eager to learn and share experiences. With a relentless enthusiasm and a no-nonsense mentality. We've nearly reached the milestone of 400 ITA ambassadors.
- Our ITA challenge, through which we give the floor to our colleagues on ships and projects worldwide, who show us how they came up with efficient, safe and solid solutions. More than once, these solutions result from intensive interdepartmental cooperation.
- That is our *One Team. One Plan.*-approach. Together with our clients and subcontractors, we strive for operational excellence.

In 2019, we will continue to promote and strengthen our culture, which enables us to work together with enthusiastic colleagues, satisfied clients and happy stakeholders.

IMAGINE. THINK. ACT. This is how we work. This is who we are.

KPI. Knowledge. Processes and innovations.

K. Knowledge. The capital letter K of knowledge is one of the three building blocks of our KPI team. Our objectives are crystal clear: on the one hand we aim to keep on learning new things and, on the other hand, we want to share our experience with colleagues across the boundaries of our different departments. Within the JDN Academy, we offer a wide range of training courses. Year after year, to an ever increasing number of people. In the long run, every colleague – in the office, on a site or on a vessel – will be given his or her own tailored profile. The follow-up of these courses is organised by JDN's eAcademy. On this platform, we also offer e-modules. The first modules have been launched in 2018. 2019 will be crucial with the introduction of at least 50 new modules.

Also in 2018, we tested the Expert Academy, an online knowledge management platform on which colleagues can swiftly share knowledge and retrieve the required expertise for our projects.

P. Processes. These may become disrupted or may no longer be geared to one another. If so, they will not serve their purpose, i.e. guiding people in performing their job as efficiently as possible. For this reason, we are constantly streamlining and optimising our business processes: data collection and processing, data dash-boarding, project action lists, project management manual, etc.

I. Innovation. A word that is sometimes used too easily. We, however, are innovation. Since 2018, all our projects – both internal and external ones – are mapped and geared to one another. This not only provides us with a better overview, it will also give us a higher and broader return. Only in this way, we can raise awareness, within and beyond our company.



CONTACT

BELGIUM

Jan De Nul NV
 Tragel 60
 9308 Hofstade-Aalst | Belgium
T Nat. Div.: +32 53 73 15 11
 Int. Div.: +32 53 73 17 11
F +32 53 78 17 60
 +32 53 77 28 55
 info@jandenu.com

LUXEMBOURG

Dredging and Maritime Management SA
 34-36, Parc d'Activités Capellen
 L-8308 Capellen | Grand Duchy of Luxembourg
T +352 39 89 11
F +352 39 96 43
 info@dmmlux.com

MAURITIUS

Jan De Nul Dredging Ltd.
 Suite 308, St James Court
 St. Denis Street, Port Louis | Republic of Mauritius
T +230 210 69 97
F +230 210 66 61
 mauritius.office@jandenu.com

ARGENTINA

Hidrovia SA
 Corrientes 316, Piso 2
 (C1043AAQ) Buenos Aires | Argentina
T +54 11 43 20 69 00 **F** +54 11 43 20 69 11
 argentina.office@jandenu.com
 dragado@hidrovia-sa.com.ar

AUSTRALIA

Jan De Nul Australia Pty. Ltd.
 Level 3, 9 Colin Street, West Perth, WA 6005
 P.O. Box 142, West Perth, WA 6872 | Australia
T +61 8 9226 1882 **F** +61 8 9481 5922
 australia.office@jandenu.com

BRAZIL

Jan De Nul do Brasil Dragagem Ltda.
 Av. das Américas, 3500
 Edifício Londres, Bloco 1, Salas 515 e 516
 22640-102 Barra da Tijuca
 Rio de Janeiro, RJ | Brazil
T +55 21 2025 18 50 **F** +55 21 2025 18 70
 brasil.office@jandenu.com

FRANCE

Sodraco International SAS
 28, rue de Dunkerque
 Lot A03, rez-de-chaussée
 59280 Armentières | France
T +33 3 20 18 82 70 **F** +33 3 20 46 49 07
 info@sodraco.com

GERMANY

Jan De Nul Nassbaggerei und Wasserbau GmbH
 Hauptstraße 68, 28865 Lilienthal | Germany
T +49 151 216 09 431
 germany.office@jandenu.com

HONG KONG

Jan De Nul Hong Kong Branch
 Unit 1604, 16/F Aitken Vanson Centre
 61 Hoi Yuen Road, Kwun Tong, Kowloon | Hong Kong
T +852 2951 9567 **F** +852 2951 9568
 office.hongkong@jandenu.com

INDIA

Jan De Nul Dredging India Pvt. Ltd.
 Capitale, 10th Floor, 554/555 Anna Salai, Teynampet
 Chennai 600018 | India
T +91 44 2435 2350 +91 44 4858 2350
F +91 44 2435 2351
 info@jdnindia.com

ITALY

Jan De Nul (Italia) S.p.A.
 Via Carlo Matteucci 38/F, 56124 Pisa | Italy
T +39 050 54 24 35 **F** +39 050 97 39 03
 italy.office@jandenu.com

MEXICO

Mexicana De Dragados SA de CV
Paseo de las Palmas 405 – Desp. 1104
Colonia Lomas de Chapultepec
Delegación Miguel Hidalgo
C.P. 11000, México Distrito Federal | México
T +52 55 53 95 59 60 **F** +52 55 53 95 58 75
info@mexicanadedragados.com

THE NETHERLANDS

Dredging and Contracting Rotterdam BV
P.O. Box 18024 | 4601 ZA Bergen op Zoom
Zuid-Oostsingel 24H | 4611 BB Bergen op Zoom
The Netherlands
T +31 164 26 61 44 **F** +31 164 26 04 54
info@dcrnل.com

NIGERIA

Dredging and Reclamation Jan De Nul Ltd.
10th Floor, Foreshore Towers,
2a Osborne Road, Ikoyi, Lagos | Nigeria
T +234 817 920 9502
nigeria.office@jandenuل.com

PANAMA

Jan De Nul Panama SA
Williamson Place, Building 762, Apto./Local 2
La Boca, Ancon Panama | Republic of Panama
T +507 314 18 59
panamacity.office@jandenuل.com

PHILIPPINES

Jan De Nul (PHILS.) Inc.
The Excelsior Building, rm 303
161, Roxas Boulevard, Baclaran
Parañaque, Metro Manila | Philippines
T +63 2 879 8042/43 **+63 2 879 8009**
F +63 2 879 8239
philippines.office@jandenuل.com

RUSSIA

Jan De Nul NV Russian Branch
17, Butlerova Str.,
NEO GEO business centre, 3rd floor, office 3003
117342 Moscow | Russian Federation
T +7 495 280 15 51
russia.office@jandenuل.com

SAUDI-ARABIA

Jan De Nul Saudi Arabia Co. Ltd.
P.O. Box 76616, Al-Khobar-31952
Kingdom of Saudi-Arabia
T +971 4 335 55 47 **F** +971 4 335 53 56
saudiarabia.office@jandenuل.com

SINGAPORE

Jan De Nul (Singapore) Pte. Ltd.
400, Orchard Road, # 18-06 Orchard Towers
238875 Singapore
T +65 6235 2790 **F** +65 6235 2791
singapore.office@jandenuل.com

SOUTH AFRICA

Jan De Nul Dredging Ltd. South Africa Branch
Spaces, No. 1 Bridgeway Road
Bridgeways Precinct, Century City, 7441
Cape Town | South Africa
T +27 21 830 5976
southafrica.office@jandenuل.com

TAIWAN

Jan De Nul NV Taiwan Branch
Hung Kuo Building
5F, No. 167, DunHua North Road
Songshan District, Taipei City 105 | Taiwan (R.O.C.)
T +886 2 8712 0616 **F** +886 2 8712 1678
taipei.office@jandenuل.com

UNITED ARAB EMIRATES

Jan De Nul Dredging Ltd. Dubai Branch
Office 116, Sultan Business Center
P.O.Box 28805, Bur Dubai, Dubai | U.A.E.
T +971 4 335 55 47 **F** +971 4 335 53 56
middle.east.office@jandenuل.com
jandenuل@emirates.net.ae

UNITED KINGDOM

Jan De Nul (UK) Ltd.
Richmond House, High Street
Ascot Berks SL5 7HG | United Kingdom
T +44 1344 627 010 **F** +44 1344 627 139
uk.office@jandenuل.com

COLOPHON

RESPONSIBLE EDITOR

Jan De Nul Group [Sofidra SA]
Luxemburg
info@jandenulgroup.com
www.jandenul.com
annualreport.jandenul.com

SOCIAL ADDRESS

34-36, Parc d'Activités Capellen,
8308 Capellen | Luxemburg

LAY-OUT AND TEXT

Cantilis
p/a Foreestelaan 1, 9000 Ghent | Belgium
hello@cantilis.be | www.cantilis.be

PHOTOGRAPHY

© Jan De Nul Group | Sofie Beirens (cover, p.2-3, p.9-13, p.18-20,
p.27, p.30-33, p.36-37, p.46-47, p.49-50, p.54-55, p.56-57)
Flying-eye.eu (p.16-17) | NEP (p.34-35, p.44-45)
OZZO (p.40-41) | Menno Mulder (p.60-61)

For more information on this annual report, please contact:
Paul Lievens, Financial Department
paul.lievens@jandenul.com

Dit rapport is ook beschikbaar in het Nederlands.
Ce rapport est également disponible en français.
Este informe también está disponible en español.

FLEET

Trailing Suction Hopper Dredgers

CRISTÓBAL COLÓN

Hopper capacity: 46,000 m³
2009



ORTELIUS

Hopper capacity: 6,000 m³
2020



LEIV EIRIKSSON

Hopper capacity: 46,000 m³
2010



CAPITAN NUÑEZ

Hopper capacity: 6,000 m³
1977/1998



VASCO DA GAMA

Hopper capacity: 33,000 m³
2000



FRANCESCO DI GIORGIO

Hopper capacity: 4,400 m³
2003



CHARLES DARWIN

Hopper capacity: 30,500 m³
2011



TACCOLA

Hopper capacity: 4,400 m³
2003



8700

Hopper capacity: 18,000 m³
2020



MANZANILLO II

Hopper capacity: 4,000 m³
1988



GERARDUS MERCATOR

Hopper capacity: 18,000 m³
1997



DE BOUGAINVILLE

Hopper capacity: 3,700 m³
2006



JUAN SEBASTIÁN DE ELCANO

Hopper capacity: 16,500 m³
2002



DE LAPÉROUSE

Hopper capacity: 3,700 m³
2010



PEDRO ÁLVARES CABRAL

Hopper capacity: 14,000 m³
2012



AFONSO DE ALBUQUERQUE

Hopper capacity: 3,500 m³
2019



BARTOLOMEU DIAS

Hopper capacity: 14,000 m³
2013



DIOGO CÃO

Hopper capacity: 3,500 m³
2019



JAMES COOK

Hopper capacity: 11,750 m³
1992



TRISTÃO DA CUNHA

Hopper capacity: 3,500 m³
2019



FILIPPO BRUNELLESCHI

Hopper capacity: 11,300 m³
2003



AMERIGO VESPUCCI

Hopper capacity: 3,500 m³
1985



FRANCIS BEAUFORT

Hopper capacity: 11,300 m³
2003



ALVAR NUÑEZ CABEÇA DE VACA

Hopper capacity: 3,400 m³
2011



ALEXANDER VON HUMBOLDT

Hopper capacity: 9,000 m³
1998



SEBASTIANO CABOTO

Hopper capacity: 3,400 m³
2011



AL-IDRISI

Hopper capacity: 7,500 m³
2012



PINTA

Hopper capacity: 3,400 m³
1997



VITUS BERING

Hopper capacity: 7,500 m³
2012



NIÑA

Hopper capacity: 3,400 m³
1997



SANDERUS

Hopper capacity: 6,000 m³
2019



Cutter Suction Dredgers

WILLEM VAN RUBROECK

Total installed diesel power: 40,975 kW
2019



MARCO POLO

Total installed diesel power: 16,115 kW
1979



J.F.J. DE NUL

Total installed diesel power: 27,240 kW
2003



VESALIUS

Total installed diesel power: 9,260 kW
1980



IBN BATTUTA

Total installed diesel power: 23,520 kW
2010



KAERIUS

Total installed diesel power: 8,330 kW
2007



ZHENG HE

Total installed diesel power: 23,520 kW
2010



HONDIUS

Total installed diesel power: 8,330 kW
2007



FERNÃO DE MAGALHÃES

Total installed diesel power: 23,520 kW
2011



DIRK MARTENS

Total installed diesel power: 2,370 kW
1972



NICCOLÒ MACHIAVELLI

Total installed diesel power: 23,520 kW
2011



PETRUS PLANCIUS

Total installed diesel power: 1,300 kW
2008



LEONARDO DA VINCI

Total installed diesel power: 20,260 kW
1985



HENDRIK GEERAERT

Total installed diesel power: 350 kW
2006



Backhoe Dredgers

POSTNIK YAKOVLEV

Total installed diesel power: 4,126 kW
2009/2013



GIAN LORENZO BERNINI

Total installed diesel power: 2,150 kW
2014



MIMAR SINAN

Total installed diesel power: 4,100 kW
2008/2013



IL PRINCIPE

Total installed diesel power: 1,800 kW
2005



VITRUVIUS

Total installed diesel power: 4,100 kW
2007



JEROMMEKE

Total installed diesel power: 993 kW
1994/2012



Heavy Lift Vessels

GULLIVER

Lifting capacity: 4,000 ton
2018



RAMBIZ

Lifting capacity: 3,300 ton
1995



Offshore Jack-Up Installation Vessels

VOLTAIRE

Max. payload: 14,000 ton
Lifting capacity: + 3,000 ton
2022



TAILLEVENT

Max. payload: 6,000 ton
Lifting capacity: 1,000 ton
2011



VOLE AU VENT

Max. payload: 6,500 ton
Lifting capacity: 1,500 ton
2013



Multipurpose Vessels

ADHÉMAR DE SAINT-VENANT

Deadweight: 6,200 ton
2017



DANIEL BERNOULLI

Deadweight: 6,200 ton
2017



Subsea Rock Installation Vessels

JOSEPH PLATEAU

Deadweight: 36,000 ton
2013



TIGER

Deadweight: 6,310 ton
2012



SIMON STEVIN

Deadweight: 36,000 ton
2010



POMPEI

Deadweight: 1,850 ton
1988



LA BOUDEUSE

Deadweight: 6,310 ton
2005



Split Hopper Barges

L'AIGLE

Hopper capacity: 3,700 m³
2005



TIGER

Hopper capacity: 3,700 m³
2012



LA BOUDEUSE

Hopper capacity: 3,700 m³
2005



VERRAZZANO

Hopper capacity: 2,000 m³
1979



L'ÉTOILE

Hopper capacity: 3,700 m³
2006



MAGELLANO

Hopper capacity: 2,000 m³
1979



LE GUERRIER

Hopper capacity: 3,700 m³
2007



CONCEPCIÓN

Hopper capacity: 1,800 m³
2009



LE SPHINX

Hopper capacity: 3,700 m³
2007



SANTIAGO

Hopper capacity: 1,800 m³
2010



ASTROLABE

Hopper capacity: 3,700 m³
2010



TRINIDAD

Hopper capacity: 1,800 m³
2010



BOUSSOLE

Hopper capacity: 3,700 m³
2011



VICTORIA

Hopper capacity: 1,800 m³
2010



ARENT

Hopper capacity: 3,700 m³
2011



GEELVINCK

Hopper capacity: 1,800 m³
1974



LEEUIJ

Hopper capacity: 3,700 m³
2012



WESELTJE

Hopper capacity: 1,800 m³
1974



MARQUIS DE PRIÉ

Hopper capacity: 3,700 m³
2012



Water Injection Dredgers - Oil Recovery Vessel

HENRI PITOT

Total installed diesel power: 4,693 kW
2019



GIOVANNI VENTURI

Total installed diesel power: 4,693 kW
2019



HENRY DARCY

Total installed diesel power: 4,693 kW
2019



PIETER COECKE

Total installed diesel power: 1,529 kW
1992/2011



Cable and Umbilical Installation Vessels

ISAAC NEWTON

Deadweight: 10,700 ton
2015



WILLEM DE VLAMINGH

Deadweight: 6,500 ton
2011



