PLATINUM PARTNERS

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1 INNOVATION IS AT THE HEART OF THE DEME GROUP

DEME
Dredging, Environmental & Marine Engineering

Dual-Fuel Fleet Additions Are a Highlight in 2017

Despite the challenges brought about by historically low oil prices for most of the year, and the consequent dip in some parts of the offshore market, 2017 was a busy year for the DEME Group, and one that saw a number of fleet additions and an important acquisition in the offshore wind industry.

Innovation and pushing the boundaries continues to be at the heart of DEME and it is actually one of the company's core values. DEME understands that innovation gives the company an edge in this increasingly competitive environment.

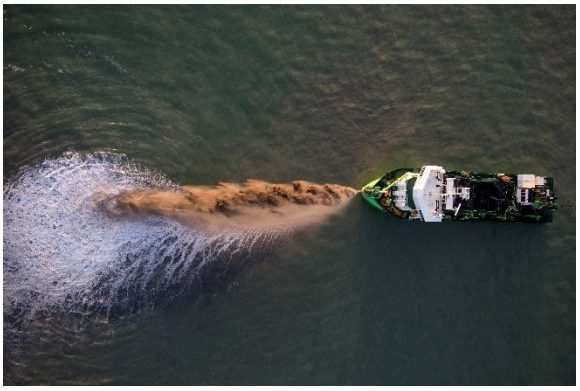
This drive was highlighted when the prototype, deep sea mining vehicle 'Patania' successfully completed its first expedition offshore in May, and when several ground-breaking (diesel and LNG) duel fuel vessels joined the fleet.

DEME's investments in new technology prove just how important innovation is to the company. In 2017 the company's brand new Trailing Suction Hopper Dredgers, 'Minerva' and 'Scheldt River' entered the fleet. These are the first LNG-powered TSHDs in the world. Not only do they satisfy customer requirements, they also anticipate changing legislation and emission reduction targets.

1.1 LNG-Powered TSHDs

Arriving early in the year, the 3,500 m^3 'Minerva' is the first dredging vessel in the world equipped with dual-fuel engines. The vessel has a 'Green Passport' and 'Clean Design' notation. 'Minerva' was then followed by the TSHD 'Scheldt River' in September.

The 8,400-m^3 'Scheldt River' is the second dredger in the DEME fleet equipped with dual-fuel engines. 'Scheldt River' boosts great dredging performance in shallow waters and exceeds all current emission regulations, even in the emission control areas such as the North Sea.



'Minerva'

'Scheldt River'

Naming ceremony 'Minerva'

Naming ceremony 'Scheldt River'

'Scheldt River' is equipped with two speed propulsion gear boxes and combinatory mode propeller thrust control, which will result in at least 10 % fuel savings during dredging operations. The vessel also has a Dynamic Position & Dynamic Tracking system, further enhancing manoeuvrability and position keeping. The dredge pump is driven by a hybrid drive-diesel direct plus electric motor. Efficient power management solutions are made possible, and the dredge pump is achieving an excellent performance both in trailing and in shore discharge mode. 'Scheldt River' also features a one-man bridge operation, increasing efficiency and ease of handling.

These two new LNG dredgers are part of DEME's multi-year, fleet investment programme, focused on further increasing efficiency, both in terms of productivity and environmental performance. When the total fleet investment programme has been realised, DEME will be one of the very few shipowners capable of using clean LNG as a fuel at such a large scale. In the next two years the dredging fleet will be further reinforced with the TSHD 'Bonny River' (2018) and the giant Cutter Suction Dredger 'Spartacus' (2019).

1.2 Mega Cutter Suction Dredger 'Spartacus'

'Spartacus'

'Spartacus', ordered in March, will be the world's most powerful Cutter Suction Dredger. The combination of power, size and new innovations make the mega cutter a new benchmark in the dredging industry. Built at Royal IHC in the Netherlands, she will be delivered in the summer of 2019.

With a total installed capacity of 44,180 kW, the vessel's power will enable her to cut harder soils at speeds that have not been possible before. This means that works can be taken on by the cutter dredger, rather than having to use dynamite and blasting techniques.

'Spartacus' will be able to dredge in waters of up to 45 m, compared to the 35-m depth which is presently the upper limit in the market and the dredger is capable of operating in very remote locations with limited infrastructure, given her fuel autonomy and accommodation capacity.

1.3 Create Own Market

DEME believes this exceptional vessel will create its own market, by achieving what has been impossible until now.

The 164-m long ‘Spartacus’ will also be the world’s first LNG-powered Cutter Suction Dredger. The environmentally friendly CSD will also have other new innovations on board, such as a waste heat recovery system that converts heat from the exhaust gases to electrical energy.

1.3.1 TSHD Bonny River – Effective in Shallow Water and Hard Soils

In addition, DEME has ordered the TSHD Bonny River, which will be trendsetter for coastal protection and dredging hard soils, and again, environmental optimisation was vitally important: she operates with minimal turbidity and dual-fuel engines.

Thanks to the combination of unique characteristics such as an extremely long suction pipe, a large transport capacity with limited depth and an additional heavy duty, rock drag head, the multidisciplinary ship can be used effectively in both shallow water and in hard soils. Given the hull's optimised design and a transport capacity of 24,000 tonnes, the vessel has a limited draught when loaded, making the ship highly suitable for coastal protection assignments, even in regions with shallow beaches.

1.3.2 Sand Extraction at Greater Depths

With the 'Bonny River', DEME is responding to the macroeconomic trend of maritime sand extraction at greater depths and further offshore. A long suction pipe with a built-in submersible pump facilitates sand extraction from more than 100 m deep. An additional asset is the second, shorter suction pipe for dredging works on a harder seabed. By equipping the vessel with a 75-tonnes drag head, the 'Bonny River' is multidisciplinary and can also remove hard soil, which wasn’t possible to dredge in the past.

'Bonny River' will be able to minimise the turbidity generated by process water and enables dredging in environmentally vulnerable areas. Moreover, the hydrodynamic hull and the dual-fuel engines ensure further optimisation of the fuel consumption and a minimal CO_2 footprint.

1.3.3 Next Generation Offshore Installation Vessel ‘Orion’

‘Orion’

Meanwhile, in addition to the expansion of the dredging fleet, in March this year, DEME ordered the next generation offshore installation vessel 'Orion'. She will feature an unrivalled combination of exceptionally high transport and load capacity, impressive lifting heights and green technology. The vessel will be built at COSCO in China and is set to be delivered in 2019.

'Orion' will be deployed by DEME's subsidiary GeoSea for the construction of the largest offshore wind farms, to service the oil and gas industry and for decommissioning of offshore installations.

With a total installed capacity of 44,180 kW 'Orion' will be equipped with a high-tech crane with a lifting capacity of 5,000 tonnes at more than 50 m. The loads can be lifted to an unrivalled height of more than 170 m. The vessel can take the heaviest monopiles, jackets, wind turbine components and structures in a single shipment. With this unmatched combination of high load and lifting capacity, 'Orion' can transport and install the next generation of giant wind turbines. The 216.5 m long Orion, also has dual-fuel engines, DP3 and can accommodate a crew of up to 131 people.

1.3.4 'Living Stone' Joins Tideway Fleet

DEME's cable laying and multipurpose vessel 'Living Stone' will join Tideway's fall-pipe fleet in 2018. 'Living Stone' is extremely versatile with two 5,000-tonne cable turntables located below the main deck. The vessel features more than 3,000 m^2 of unobstructed deck space. This is coupled with a substantial rock dumping ability of 12,000 tonnes. Built as a dual fuel vessel, 'Living Stone' also has a relatively limited draught.

1.4 Sustainable, Deep Sea Mining

Expedition Pacific Ocean – GSR

And as well as pushing the boundaries at sea, DEME is pushing them underwater too. 2017 marked a milestone year for Global Sea Mineral Resources (GSR) – DEME's sustainable, deep sea mining specialist.

As the world continues to see the impact of global warming and the increase of CO_2 emissions, the DEME Group believes that it is vitally important to address this issue with pragmatic solutions. One possibility to mitigate the impact is to explore the potential of deep sea mining. This led DEME to establish its own seabed mining company GSR.

In 2013, the International Seabed Authority and GSR signed a 15-year contract for the prospecting and exploration for polymetallic nodules. Under the contract, GSR has exclusive rights for the exploration of 76,728 square km of seabed in the Central Pacific Ocean. The type of deposit consists of polymetallic nodules that are on the surface of the seabed at a 4,500-m water depth.

Through its PROCAT project, GSR is well on the way to developing the world's first tracked nodule collector. 2017 was a very exciting year as several important milestones were achieved. After many months in development, the so-called tracked soil-testing device (TSTD) 'Patania' successfully completed its first expedition offshore in May.

1.4.1 World's First Tracked Nodule Collector

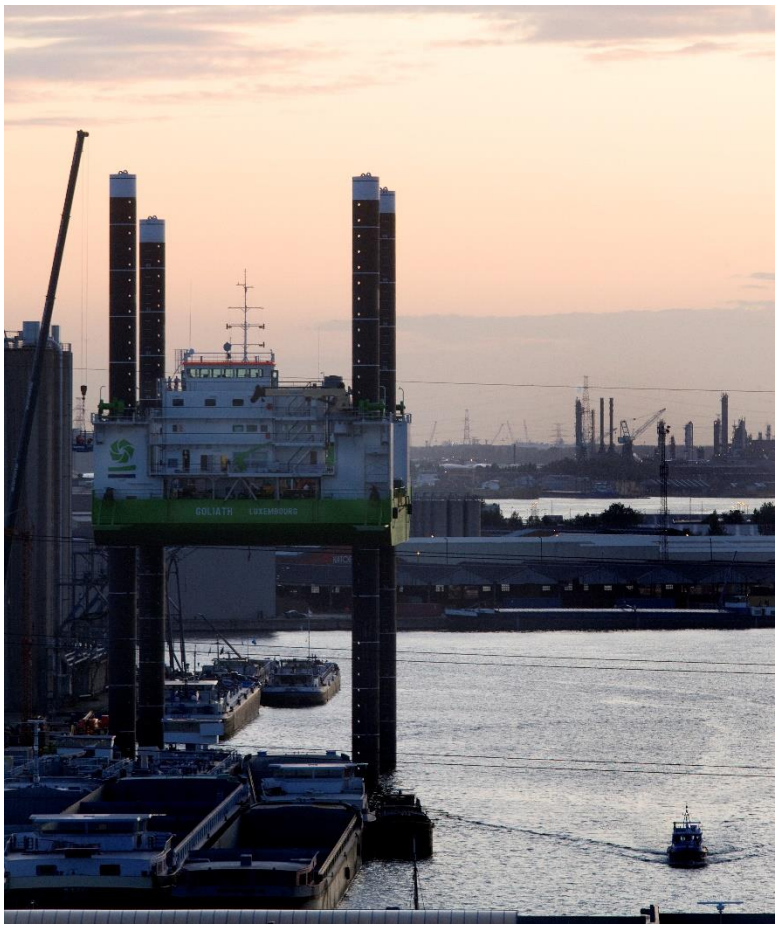
At the same time, 'Patania 2' is under development. GSR and its partners have built a dedicated test facility in Antwerp to validate a new type of suction head, designed to balance energy consumption, pick-up efficiency and plume generation. Detailed engineering is expected to be completed in early 2018 and then 'Patania 2' has to be ready in October to be shipped out to the US to embark on the next expedition in 2019.

'Patania'

1.5 Diverse Projects Across the Globe

In terms of activity in 2017, DEME's projects were wide spread – in all corners of the globe – and in many different industry sectors.

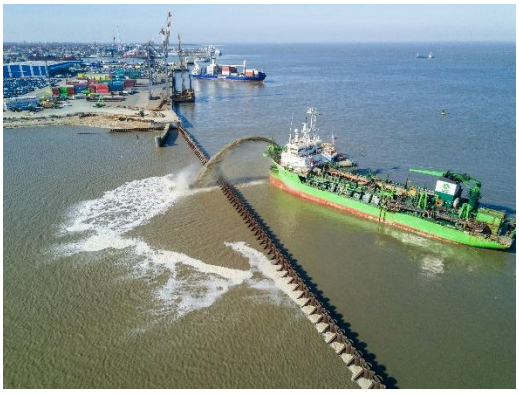
In May, the DP2 jack-up vessel 'Goliath' set sail for China for the first offshore wind projects. DEME and COSCO Shipping, the largest shipping company in the world, are partnering in a unique joint venture to develop offshore wind energy in China.



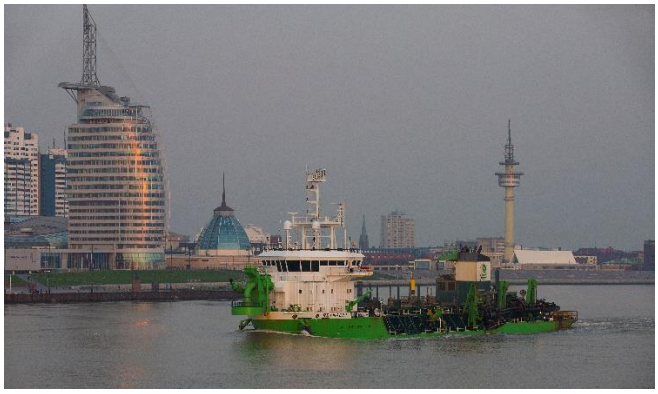
'Goliath' – GeoSea

Then, in the same month and on another continent, DEME was awarded several important dredging and land reclamation contracts in Africa in Angola, Benin, Ghana, Ivory Coast, Liberia and Nigeria.

These followed key awards in Europe when DEME acquired new dredging contracts in Germany, France, the UK and Spain. DEME's German subsidiary Nordsee Nassbagger- und Tiefbau GmbH acquired the maintenance dredging contract for the River Elbe in a JV. DEME will maintain the whole 116-km long fairway of the Elbe between the North Sea and Hamburg. Nordsee Nassbagger- und Tiefbau is also executing a two-year, maintenance dredging contract on the River Weser.



River Elbe



River Weser

DEME acquired several new contracts in France in the ports of Calais, Boulogne-sur-Mer, Brest and Bordeaux. And in the United Kingdom, DEME's UK subsidiary NewWaves Solutions Ltd was awarded a contract for the dredging and beach recharge works at Dawlish Warren (Cornwall). In Spain, DEME secured a contract for dredging works in the port of Barcelona.

Across the other side of the world, DEME saw several new awards for dredging and land reclamation works in India and the Maldives. In India DEME will be carrying out dredging works for Project Seabird Phase II in a joint venture. It is one of the largest naval infrastructure projects in India. DEME also returned to the Maldives for major land reclamation works at the Emboodhoo Lagoon.

Meanwhile, in the Middle East and Asia DEME won contracts for the Old Doha Port Redevelopment project in Qatar and Ayer Merbau Reclamation Phase 2 in Singapore. Besides the Jurong Island and Tuas View Extension reclamation projects, Dredging International Asia Pacific Pte Ltd (DIAP), DEME's subsidiary for the Southeast Asia region, is executing the Jurong Island Westward Extension reclamation, as well as the Tuas Terminal Phase 1 Project.

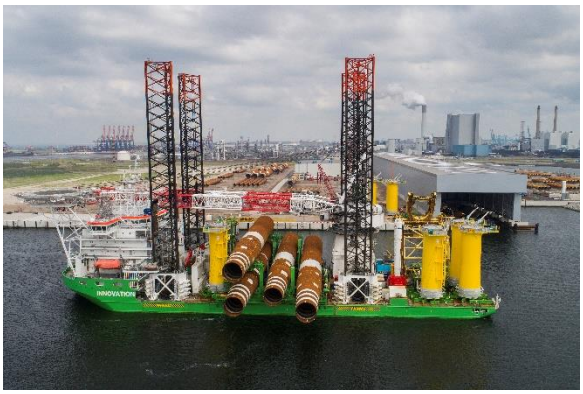
And right at the end of the year DEME was awarded a deepening and maintenance dredging contract for the Canal Martín García between Uruguay and Argentina in a joint venture.

1.6 Offshore Wind

Offshore wind activities also ensured a busy year. For example, DEME's subsidiary GeoSea was awarded a contract to install offshore foundations for the EnBW offshore wind farm Albatros in Germany. GeoSea is Siemens' EPCI partner, which enables Siemens to provide a full-scope project (offshore wind turbines and OTM, including foundations) to EnBW.

GeoSea has also been active at many other offshore wind farms in Germany including Nordsee One, Godewind, EnBW Baltic II, Borkum Riffgrund I, Amrumbank, Butendiek, Alpha Ventus and Borkum West II.

In 2017, GeoSea was also awarded a contract to design, manufacture and install 71 turbine foundations for the Hohe See offshore wind farm in Germany.




Innovation – Rentel – GeoSea

1.7 Key Acquisition

GeoSea also made a key acquisition in the offshore wind sector. In August, the company completed the acquisition of A2SEA from DONG Energy and Siemens. A2SEA, operating out of Denmark, is specialised in offshore wind turbine installations. And in November GeoSea took a majority stake in G-tec, the Liège (Belgium)-based contractor specialised in offshore geotechnical and geological site investigations, marine geophysical and environmental surveys and deep sea engineering services.

It is easy to see how innovation and planning for the future are always at the heart of DEME. Alain Bernard, Chief Executive Officer, recently stated: “Without innovation, DEME would not be able to continue growing (nor even exist) over the next five to 10 years, particularly when the competition, technology, disruption, etc. is becoming increasingly fast and fierce. Change and agility is the key to our future!”. 2017 certainly highlights this.

Helen Hill

2 JAN DE NUL IN 2017

Dredging and Maritime Works

Worldwide, Jan De Nul Group executes dredging and land reclamation projects from start to finish: design, development and maintenance of ports, deepening of channels, land reclamation and shore protection works, dredging in the most diverse conditions. Often, these dredging activities are part of a comprehensive port infrastructure project entrusted by the client to one contractor.

The company already completed numerous prestigious projects across the world, such as the construction of a second runway for the airport of Brisbane in Australia or the construction of the second Suez Canal in Egypt.

Jan De Nul Group owes its position as global leader above all to its technical know-how and very diverse fleet. By investing in its own installations, machines and vessels, the Group has today the world's most modern dredging fleet at its disposal. Meanwhile, its employees continue to look for new opportunities...

2.1 Europe

In Belgium, Jan De Nul Group executed maintenance dredging works in the Belgian seaports Zeebrugge, Ostend, Nieuwpoort, Blankenberge and their maritime access channels. Capital dredging works in the Albert II-dock in the port of Zeebrugge were finalised. The Group, part of a joint venture, is responsible for the development of an ecosystem-based protection against coastal erosion.

In France, the Group, together with a number of partners, continued with the extension of the port of Calais. This turnkey project includes the building of a 3.6-km long breakwater, the dredging of a an entrance channel and turning basin to -10 m, reclamation works for new port areas, quay wall construction and revetment works, mooring and loading facilities for the ferries, important pavement works and all terminal buildings. Upon completion, larger ferries will be able to use the Calais-Dover passage.

Extension of the port of Calais – CSD Fernão de Magalhaes (France)

Maintenance dredging works commenced in the approaches to the port of Lübeck and in the port of Hamburg, Germany.

Since April, Jan De Nul Group is present in the second smallest country in the world, Monaco. For the creation of extra housing and living space, 6 hectares of land is reclaimed at sea in between two marine environment reserves. Thanks to the Group's study, the client Bouygues, could convince the authorities that environmental impact of dredging in manageable. The turbidity, the sedimentation, as well as the precipitation of the sand are critically and strictly observed, even after the works.

Reclamation works at sea (Monaco)

Jan De Nul Group successfully finalised the two dredging projects in Iceland. The third phase of the maintenance dredging works in the port of Landeyahöfn, the ferry port in the shadow of the volcano Eyafjallajökul which serves the Westman Islands, as well as the small dredging and reclamation project in the north of the island, Siglufjordur, were completed.

Port of Landeyjahöfn (Iceland)

2.2 Middle East

In August, Jan De Nul Group, as part of a joint venture, got awarded the Old Doha Port Redevelopment project in Qatar. To comply with the growing cruise tourism industry, the port will be redeveloped. It will serve as a cruise terminal and will accommodate the largest cruise ships of the latest generation. Dredging works will be executed for the realignment of the access channel and a new mooring dolphin structure will be constructed. The works will commence in 2018.

2.3 Asia

In 2017, Jan De Nul Group returned to the Arctic port of Sabetta, on the Yamal Peninsula in Russia, to execute the last capital dredging campaign in the new seaport of Sabetta. The access channel was further widened to its final width of 495 m and -15.1 m deep. The last campaign was successfully finalised in only 2 months.

Port of Sabetta

Capital dredging works for the access channel and port basin of the green port of Kuryk - CSD Vesalius (Kazakhstan)

In Kazakhstan, the Group completed the capital dredging works for the access channel and port basin of the green port of Kuryk. The newly built port on the Caspian shore will be similar to Azerbaijan's Baku International Sea Trade Port. Being located at 100 km from Aktau, Kuryk port's main objective is the transportation of transit cargo from China to Iran, Turkmenistan, Azerbaijan, Turkey and further to Europe. The capacity of the port is expected to reach a total of 4 million tonnes of freight per year.

Capital dredging and reclamation works in the port of Taipei – TSHD Taccola (Taiwan)

In the port of Mailiao in Taiwan, the Group continued the maintenance works in the access channel to a design level of -24 m. The works will be finalised by the end of 2017. TSHD 'Charles Darwin' and CSD 'J.F.J. De Nul' were mobilised to Taipei Port to execute the capital dredging of the access channel. The dredging and reclamation works have been successfully completed end of August. Dredging works at the Port of Linkou were started in August, as well as the associated reclamation works at Taipei Port. Works are scheduled to be completed by latest mid of 2018.

Jan De Nul Group, in joint venture, acquired the contract for the widening and deepening of the access channel towards Jawaharlal Nehru Port in Mumbai, India. The areas to be dredged include the 35.5-km long access channel and various turning basins and anchorage areas. In total more than 40 million m^3 sand, silt, clay and rock will be removed. Jawaharlal Nehru Port is the largest container handling port in the country. Upon completion of the project the port will be able to accommodate larger container vessels.

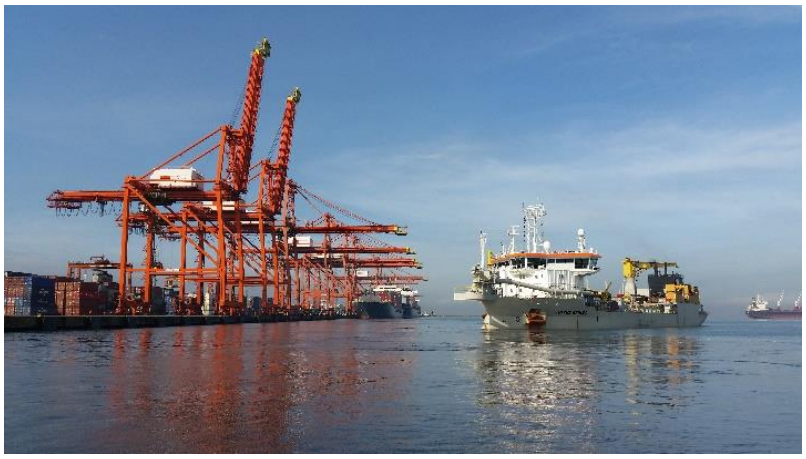
In the Pulau BaaiPort in Bengkulu, Sumatra, Indonesia, the Group mobilised TSHD 'De Lapérouse' to execute maintenance dredging and reclamation works. The entrance channel was deepened to -10 m and the dredged sand was used for beach nourishment. In Makassar, Sulawesi, the Group is carrying out the dredging and reclamation works for the container yard and the causeway of the Makassar New Port. The works are scheduled to be finished at the beginning of 2018.

Maintenance dredging and reclamation works in the Pulau BaaiPort, Bengkulu – TSHD De Lapérouse (Indonesia)

A 150-year-old dream comes true with the Black Sea port of Filyos in Zonguldak, Turkey. The Group mobilised TSHD's 'Al-Idrisi' and 'Francesco di Giorgio' to dredge the trenches under the future breakwaters and to start dredging the future Port Basin. Filyos Port is expected to have a loading and unloading capacity of 25 million tonnes per year.

In Vietnam, the Group was responsible for the maintenance dredging of the Soai Rap River Channel near Ho Chi Minh City.

In October, TSHD 'Vitus Bering' was mobilised to Manila for a maintenance dredging campaign at MICT Access Channel and Basin in the Philippines.



Maintenance dredging of the Soai Rap River Channel – TSHD Vitus Bering

Maintenance dredging works at MICT Access Channel and Basin – TSHD Vitus Bering

2.4 Africa

In 2017, Jan De Nul Group executed several projects in Africa. The Group mobilised 7 vessels of its fleet for the construction of the new container terminal in the Nador West Med Port, Morocco.

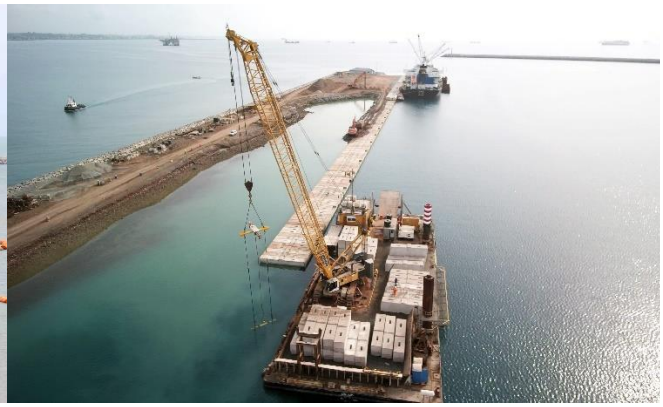
Construction of new container terminal in the Nador West Med Port, CSD Zheng He & SHB LAigle (Morocco)

In Algeria, for the construction of a new container terminal in the port of Djen Djen, the Group was responsible for the main capital dredging works. The scope included the deepening of the 3-km long access channel to a design depth of -19 m, the deepening of a turning circle inside the port and the deepening of the port basis. The project was successfully finalised during the summer with TSHD 'Vasco da Gama' and CSD 'Zhengh He'.

TSHD 'Francis Beaufort' executed dredging works for the construction of a new bauxite terminal in the port of Kamsar in Guinea. Reclamation works were executed to raise the existing Port Terminal Platform.

In the harbour of Takoradi in Ghana, Jan De Nul Group is creating of a fully new harbour basin over a period of 5 years. The existing breakwater is being extended by 1.1 km, the harbour is to be deepened to -16 m, and a 600-m long and 16-m deep quay wall is being constructed. This project was scheduled to be completed in March 2018.

Quay wall construction for the extension of the harbour of Takoradi – CSD Ibn Battuta (Ghana)



Quay wall construction for the extension of the harbour of Takoradi (Ghana)

The Group successfully completed the reclamation project for the Dangote Lekki Refinery in Nigeria. The contract involved the creation of 2,500 hectares of new land for the construction of a future oil refinery and fertilizer plant, by pumping ashore 52 million m³ of sand.

Dredging and reclamation works for Dangote Lekki Refinery (Nigeria)

In Congo, CSD 'Leonardo da Vinci' executed the second phase of the Eastern Extension of the Port of Pointe-Noire. Capital dredging works were executed and reclamation works were done for the future storage areas in the port.

Capital dredging and reclamation for the second phase of the Eastern Extension of the Port of Pointe-Noire (Congo)

In Mozambique, the Group continued deepening the main access channel to the Port of Maputo. The project was completed in January 2017.

Port of Maputo (Mozambique)

2.5 Central and South America

Jan De Nul Group was present in a series of countries in Central America. The dredging and civil construction works for the second phase of PSA Panama International Container Terminal at the Pacific Side continued in 2017. The works included the construction of 800 m Post Panamax quay wall and the dredging of its approach. The project is scheduled to be delivered end 2017 – beginning 2018.

PSA Terminal (Panama)

The capital dredging works in the turning basin and berthing pocket for the LNG terminal of the Costa Norte Power Plant and in the turning basis and navigation channel of the Manzanillo International Terminal (MIT) were successfully completed. Furthermore, some maintenance works were executed for different terminals in Panama, such as PPC Balboa, PSA Phase 1, PATSA and Colon 2000.

Dredging works for expansion and/or maintenance of ports were also performed in Mexico, Costa Rica and the Bahamas. Zooming in on Mexico, for the construction of a new port next to the existing port of Veracruz, the Group executed dredging and reclamation works. The scope includes the dredging of an entrance channel and turning circle and the reclamation of the areas for the new port.

The Group continued dredging for the first stage of the development of the Kingston Container in Jamaica. These dredging works include the realignment and deepening of the existing navigation channel, and the deepening of the Port of Bustamante, the internal channel and the East Channel.

Kingston Container Terminal (Jamaica)

Maintenance dredging (Costa Rica)

Maintanance and deepening of Río Parana and Río de la Plata (Argentina)

In South America, Jan De Nul Group executed several maintenance dredging campaigns, mobilising Trailing Suction Hopper Dredgers, as well as Cutter Suction Dredgers to ports in Colombia (Barranquilla,Puerto Nuevo and Buenaventura), Peru (Melchorita) and Argentina (Terminals alongside Río Parana). The Group continued the 26-year concession for the maintenance of the Río Paraná and Río de la Plata. Furthermore, Jan De Nul Group executed the deepening works of the access channel of Buenaventura and started with the preliminary dredging works for the new container terminal of DPWorld in Posorja, Ecuador.

Capital dredging project in the Río Uruguay (Argentina-Uruguay)

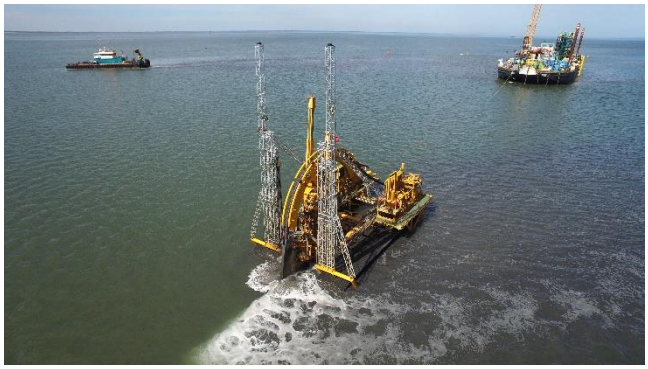
In the province of Buenos Aires, maintenance dredging campaigns were executed in the port of Quequén. In the Port of Bahía Blanca, the inner access channel was deepened while in the outer channel and in front of the quay walls maintenance works were executed. In February, the capital dredging project in the Río Uruguay, in binational Argentinian and Uruguayan waters, was completed.

2.6 Offshore Services

Jan De Nul Group offers a range of offshore services for the installation of submarine structures, cables and umbilicals for the oil, gas and renewable energy market. These services included: the preparation of the seabed, dredging of trenches, installation, rock placing for stabilising and ballasting of submarine pipelines, cables, umbilicals, foundations, platforms and complete wind farms. All these services are offered according to the specific needs and requirements of our respective clients including as a comprehensive Engineer-Procure-Construct-Install (EPCI) package.

In Finland, the jack-up installation vessel 'Vole au vent' installed the very last blade of the wind turbine at the Tahkoluoto offshore wind farm. The first wind farm designed for icy conditions. Jan De Nul Group was responsible for the seabed preparation works, the installation of all ten 4.2 MW turbines, including the foundations.

Blyth Offshore Demonstrator project (UK)



DN120 & ITV Moonfish – Racebank Offshore Windfarm Project (UK)

In September, the offshore division of Jan De Nul Group timely completed the installation and burial of the export cables for Ørsted's Race Bank Wind Farm in the United Kingdom. The Group successfully installed two export cables of 70 km across England's most important natural habitats and linked the two Offshore Substations with an interconnector of 6 km. For this project, the Group designed and constructed two low ground pressure trenching machines that weren't available on the market yet, the 'Sunfish' and the 'Moonfish' to cover the final 8 km of the cable trajectory in the tidal area of the Wash nature reserve. In 2016, the Group even won the **DPC Innovation Award** for Innovative Open Water Dredging Project for its in-house engineering and construction of the two tools. In 2017, also for the design and construction of these tools, Jan De Nul Group pocketed the Offshore Energy Young Engineer Award, which was presented by Navingo.

Sunfish – Racebank (UK)

Tahkoluoto offshore wind farm (Finland)

Jan De Nul Group's jack-up vessel 'Vole au Vent' installed the fifth and final 8.3 MW turbine at the Blyth Offshore Demonstrator Project in the United Kingdom. The Group is one of the first to install the largest wind turbines ever manufactured in the world. Upon completion, the wind farm will provide approximately 34,000 homes of renewable energy.

2.7 Civil Works

Civil engineering works, that's where it all started for Jan De Nul Group. Today, it is still an important part of the company activities, the focus having been shifted to complex projects. To this purpose, the Group has set up a structure that offers its clients an overall package to deliver projects.

From design up to execution, all key activities are executed by our own employees and equipment, regardless whether it concerns the construction of locks, quay walls, bridges, tunnels, roads, buildings, water treatment plants, sewer systems or pipelines. The Group is also an experienced foundation contractor through its subsidiary Soetaert-Soiltech, and a major player in the market of large PPP projects. Thanks to this approach, combined with technical expertise and years of experience, Jan De Nul Group is now among the absolute top companies for civil works.

In the course of 2017, Jan De Nul Group executed several civil works in Belgium. In West Flanders, the new highway A11 between Bruges and Knokke-Heist was completed and officially opened in August. In Courtrai, the construction of the hospital AZ Groeninge was finalised and inaugurated mid-September. The works on the new lock in Harelbeke continued according to plan. In Mechelen, a joint venture with Jan De Nul Group was responsible for the construction of a new railway line of 2.5 km long for high-speed trains. This rail bypass was combined with the creation of a new road tangent. The construction works on the Orsi Academy were in full spill. This expertise and innovation centre for robot and minimal invasive surgery is located in Melle. In different corners of the country, the Group was constructing or renovating residential homes: Aalst, Lovendegem, Meise, Ternat, Jabbeke, Jemeppe-sur-Sambre, Maurage, Grace Hollogne, Soumagne.

Construction of a new highway A11 (Belgium)

Construction of hospital AZ Groeninge (Belgium)

Jan De Nul Group carried on with the construction of the Beatrix lock in the Netherlands. The contract includes the construction of a third lock alongside two existing locks, the widening of the approaching Lek Canal and the construction of a 1,200-metre berth in the same Canal.

Construction of a third lock for the Beatrix Lock complex (the Netherlands)

In Panama, the Group continued executing excavation, piling and construction works for an 800-metre quay wall extension by order of PSA Panama International.

2.8 Environmental Works

Soil and groundwater remediation, environmental dredging and sediment treatment, treatment and valorisation of waste and brownfield development: through its subsidiaries Envisan and PSR Brownfield Developers, Jan De Nul Group can offer comprehensive experience in all environmental technology areas. It is actively working on the sustainable development of ports, harbours and waterways. Jan De Nul Group goes for an integrated approach, from design to execution, making maximum use of in-house equipment and its own network of geographically well-spread treatment centres.

In 2017, the environmental subsidiary of Jan De Nul Group, Envisan, executed environmental dredging and sediment treatment projects throughout Europe. In Belgium, the dredged material coming from the deepening of the river Meuse between Flémalle and Seraing was disaggregated and managed. Also in the Walloon region, a 4-year framework contract for the maintenance dredging and treatment of the sediments on the Scheldt river and the Canal Nimy-Blaton started. In Ghent, maintenance dredging works in the Ghent-Terneuzen canal commenced.

In Sweden, Envisan continued working in the port of Oskarshamn for the removal, dewatering and disposal of contaminated sediments, including the treatment of process water by means of an adapted water treatment plant.

Removal, dewatering and disposal of contaminated sediments in the port of Oskarshamn (Sweden)

Envisan also commenced a dredging project in Malta, more specific in the Port of Valetta, for the remediation of the polluted port area. In a first phase, the contaminated top layer was dredged by means of a Backhoe Dredger. For the transportation and disposal of these sediments, a Sediment Transfer Unit was designed and constructed to transfer the sediments at high densities from the dredging barges to the transport ship. TSHD ‘Gerardus Mercator’ was mobilised to transport the contaminated sediments. In the second phase, the channel was dredged to -10.5 m. TSHD ‘Pinta’ was deployed for this part of the project which consisted of clean sediments.

For this project, Jan De Nul Group won the DPC Innovation Award 2017 for best Innovation in Dredging Equipment.

3 VAN OORD IN 2017

We are a Dutch family-owned company with over 150 years of experience as an international marine contractor. We value open communication with our clients and stakeholders. Our company culture is one of entrepreneurship and engaged employees. We think and act with responsibility and focus on the long term.

3.1 Vision

Our vision is to create a better world for future generations by delivering Marine ingenuity. This is driven by four main drivers. The growing world population needs more space. Maritime transport requires new and improved infrastructure. Climate change is asking for better coastal protection. The demand for energy is growing and a renewable energy system is essential to provide the energy needed for the future.

3.2 Mission

As a global maritime contractor, we focus on dredging, oil and gas infrastructure and offshore wind. We work safe and closely with our clients and stakeholders to create innovative and sustainable solutions.

Say YES to safety.
A simple, but powerful and positive message that indicates Van Oord is embracing safety

3.3 Dredging

More than half of the world's population lives in cities. The world's urban population currently stands at 3.7 billion people and is, with an expected to double by 2050. This has resulted in a growing worldwide demand to create more living space. Van Oord is adapting to these changing market conditions with our global marine engineering projects.

Dredging is our signature talent, one that we have perfected continuously since our business was founded. We maintain our position in traditional dredging markets and in our home markets thanks to the best dredging equipment and operational experience, supported by our local branches.

3.3.1 Contract Awarded for Land Reclamation in Angola

The consortium consisting of Van Oord and Urbinveste – Promoção e Projectos Imobiliários, S.A. has been awarded the contract for the design and construction of the Marginal da Corimba project in Luanda, Angola.

3.3.2 Van Oord Joint Venture Awarded Dredging Contract Santos Port

Van Oord has been awarded a contract by the Brazilian Ministry of Transport, Ports and Civil Aviation for the capital and maintenance dredging of the port of Santos. This project in the largest port of South America will be executed in a joint venture with Boskalis.

3.3.3 Three-Year Maintenance Contract for Van Oord in India

Van Oord has won a contract to keep the approach channel to the port of Kandla, India, up to depth for the next three years. The approach channel is a crucial gateway to the port of Kandla, which is one of the major ports in western India. The contract was awarded by the Client Kandla Port Trust (KPT).

3.3.4 Van Oord Wins Contract for Iconic Waterfront Project

Van Oord has been awarded the contract for Dubai Harbour marine works, a prestigious mega project in Dubai. The project is the next step in achieving 'Dubai Tourism Vision 2020', Dubai's strategy to attract 20 million visitors per year by 2020. A strategy to which Van Oord has contributed since 2001 by building amongst others Palm Jumeirah, The World and many other artificial islands

3.3.5 Mozambican Dredging Contract Awarded to Van Oord

Van Oord has been contracted to carry out emergency dredging works in the Port of Beira, Mozambique. CFM, the ports and railways company of Mozambique, is the client. Reinstating the port access channel to its charted lines and levels is of great importance to facilitate the growing maritime transport in this region.

3.3.6 DPC Innovation Award for Van Oord's Maldives Project

DPC Innovation Award for Van Oord's Maldives project

Van Oord has been awarded a DPC Innovation Award for its innovative and sustainable approach to a land reclamation project in the Maldives. During the award ceremony in London, Van Oord won the award in the 'Innovation in Project Design – Open Water/ Coastal Dredging' category.

3.3.7 Van Oord Completes Expansion of Taiwan's Largest Port

Van Oord completed the expansion of the port of Kaohsiung. The client, Taiwan International Ports Corporation (TIPC), awarded the contract in 2015. The work was completed eight months ahead of schedule. In less than two years' time, trailing suction hopper dredgers Vox Máxima, Volvox Terranova, and Rotterdam created 250 hectares of new land for the Kaohsiung Intercontinental Container Center Phase II.

Van Oord completes expansion of Taiwan's largest port

3.4 Offshore Wind

Climate change and the need to reduce CO_2 emissions are drivers for the rising demand of renewable energy sources. With proven experience and an impressive 15-year track record, Van Oord is leading the way in the energy transition towards renewable energy by constructing offshore wind projects. We are the proud builder of the Gemini Offshore Wind Park, one of the largest offshore wind projects in the world. With its 150 wind turbines, it supplies 600 megawatts of renewable energy to 785,000 households.

3.4.1 Specialised Offshore Wind Equipment

Our vessels are solid evidence of our Marine ingenuity. With our specialised offshore wind equipment, we remain competitive in the fast-growing offshore wind market. Van Oord's offshore installation vessel Aeolus, which we designed in-house, is purpose-built to transport and install foundations and offshore wind turbines. Heavy lift installation vessel Svanen is the largest crane vessel in the world, with a lifting capacity of 8,000 tonnes. The Nexus, Van Oord's first cable-laying vessel, is equipped with a deck layout that was designed and developed in-house to anticipate of future market requirements for challenging cable installation works.

Like our clients, Van Oord operates according to the highest Quality, Health, Safety and the Environment (QHSE) standards. Our latest safety programme, say YES to safety, reflects our attitude about working safely.

3.4.2 Van Oord Signs Contract for East Anglia ONE Offshore Wind Farm

Van Oord has been awarded the contract for East Anglia ONE offshore windfarm by ScottishPower Renewables (part of the Iberdrola Group) for the transport and installation of 102 three-legged jacket foundations. This is the largest amount of three-legged foundations in a wind farm ever installed worldwide.

3.4.3 Gemini Offshore Wind Park Operational

The Gemini Offshore Wind Park was officially opened in May 2017. Pieter van Oord, CEO of Van Oord, expressed his pride in Van Oord's involvement in Gemini and thanked all of the shareholders for their support. The grand opening was held in Eemshaven, the Netherlands. Once the home of the project offices, Eemshaven is now the home of the Onshore High Voltage Station. With its 150 4-megawatt wind turbines, Gemini Offshore Wind Park is by far the largest offshore wind farm ever built in the Netherlands, and the second-largest in the world.

3.4.4 Van Oord's Top Duo Aeolus and Svanen Have Successfully Completed Work on the Walney Extension Offshore Wind Farm

Van Oord has finished the Walney Extension offshore wind farm for DONG Energy to transport and install 87 foundations. Van Oord's installation vessels Aeolus and Svanen completed the project in 4.5 months.

Van Oord's top duo Aeolus and Svanen have successfully completed work on the Walney Extension offshore wind farm

3.4.5 Van Oord Awarded Contract to Construct Deutsche Bucht Offshore Wind Farm

Subsequent to the announcement that Northland Power's 252 MW Deutsche Bucht offshore wind farm has reached financial close, Van Oord is pleased to confirm that it is contracted for the Balance of Plant scope. The project was originally developed by Highland Group Holdings Ltd.

3.4.6 Svanen Completes its Work on the Arkona Offshore Wind Project

Van Oord's heavy lift installation vessel Svanen successfully completed the installation of 60 monopiles at the Arkona offshore wind project, making the first contours of the 385 MW wind farm in the German Baltic Sea visible.

3.5 Offshore Oil and Gas

The growth of the world economy and population is driving the global demand for energy. To meet this demand, Van Oord delivers ground-breaking projects in a challenging offshore market. Our offshore oil and gas activities provide integrated solutions with a focus on the installation, stabilisation, and protection of offshore oil and gas infrastructure. Van Oord has led the market in subsea rock installation for more than thirty years. We have managed to maintain that position by continuously challenging ourselves and improving our expertise.

Van Oord is a niche specialist in two services.

3.5.1 Subsea Rock Installation

We are market leader in the seabed intervention technique Subsea Rock Installation (SRI). Our fleet of flexible fall pipe vessels enables us to stabilise and protect pipelines, cables, and other installations.

3.5.2 Offshore Pipeline Installation

We provide integrated solutions for the installation of nearshore pipelines, cables, and offshore constructions. With over fifty years of experience in this niche market, Van Oord offers the best specialists on the job.

3.6 Other News

3.6.1 Rotterdam Promotion Prize

CEO Pieter van Oord has accepted the Rotterdam Promotion Prize from Rotterdam mayor Ahmed Aboutaleb. According to the judges, Van Oord 'significantly contributes to Rotterdam's good reputation as a city that is home to high-quality international craftsmanship.' The prize was awarded for the 44th time on 17 February 2017 at Rotterdam City Hall.

3.6.2 Partner in PortXL Innovation Platform

The port of Rotterdam and the city itself are very attractive for people and companies with innovative ideas. The PortXL accelerator programme responds to that by offering port-related start-ups the opportunity to kick-start their ideas over a three-month period. Since PortXL started in 2015, Van Oord has been closely involved in its development. During the final event on 22 June, Van Oord announced its collaboration with as many as five very promising start-ups.

3.6.3 First LNG-Powered Crane Vessel

Van Oord has ordered the construction of a new crane vessel. This vessel, which will be named Werkendam, will be Van Oord's first LNG-powered vessel. It will generally be deployed to Netherlands-based projects executed by subsidiary Paans Van Oord.

3.6.4 First Coral Engine Operational

Van Oord has reached a major achievement in environmentally responsible maritime infrastructure development with the formal delivery and handover of the first coral engine in the Bahamas. The in-house developed innovation is ground-breaking in the maritime industry.

Van Oord's first coral engine operational

4 PORT OF ROTTERDAM IN 2017

Green Patrol

The Netherlands is facing the challenge of creating an almost CO_2-neutral economy and society within 30 years. The Port of Rotterdam Authority aims to take a leading role in this, making the port a notable example in the global energy transition. It goes without saying that the focus mainly lies on the development and large-scale application of technologies to reduce CO_2 emissions in the industrial and logistics sectors to virtually zero. But potential improvements in many other areas are also being examined. That is why the Port of Rotterdam Authority's latest patrol vessel is a hybrid vessel. After all, it's important to set a good example.

The 25-metre-long inspection vessel's most important innovation is its parallel hybrid propulsion system. "This enables efficient patrolling to take place at low speeds and a reduced number of hours operating diesel engines at low load", stated Marcel van Mourik, Port of Rotterdam Authority Project Manager. "The system enables diesel-electric operation up to 25 kilometres per hour on one of the main engines. At higher speeds the vessel switches to diesel operation on both main engines. This means that the engines always run at full load, resulting in a more efficient combustion process and less polluting emissions."

Hydrofoil

It is not only the hybrid propulsion that results in fuel savings and lower CO_2, particulate and NO_x emissions. The hull design is developed to minimise vessel wake and reduce the vessel's general resistance. The design is a combination of the Fast Displacement Hull Form (FDHF) and the Hull Vane. This is a fuel-saving device in the form of a fixed foil, located below the stern of a vessel. This 'hydrofoil' influences the stern wave pattern and creates hydrodynamic lift, which is partially oriented forward. Model tests demonstrated a power reduction of some 25 per cent at 20 kilometres per hour, when operating without the Hull Vane.

RPA 8 in the port of Rotterdam (Willem van Kasteren)

8,000 Trees

The innovative hull design also enables the installation of smaller main engines while still achieving the prescribed top speed. Van Mourik: "All in all this means that, assuming 5,600 operating hours per year, the 'RPA 8' will consume some forty per cent less fuel, reducing CO_2 emissions by 162 tonnes." This is roughly equivalent to the annual CO_2 absorption of 8,000 trees.

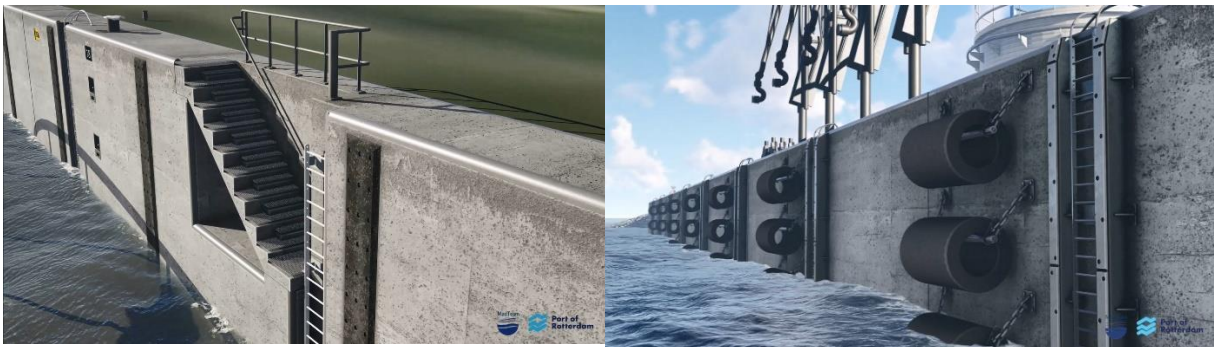
Professional Specialism

The hybrid 'RPA 8' is not a stand-alone vessel but is part of an RPA fleet investment programme, which includes a Refit project in which incident management vessels 'RPA 10', 'RPA 11', 'RPA 12', 'RPA 13', and 'RPA 16' are being given an upgrade. The '10' and '11' are also being fitted with hybrid propulsion.

HES Hartel Tank Terminal Operational by End 2019

First Oil Terminal with Cylindrical Fenders

Construction of the HES Hartel Tank Terminal has started on Maasvlakte. This includes the construction of 1,100 metres of new quay wall by the Port of Rotterdam Authority. This quay wall will be equipped with cylindrical fenders instead of cone fenders with panels. A first for an oil terminal in the Port of Rotterdam.



Artist impressions of the piano steps (left) and cylindrical fenders (right) at the HES Hartel Tank Terminal.

The HES Hartel Tank Terminal will be an independent state-of-the-art storage terminal at which clients can store and transfer oil products. Energy company BP is involved in the project for a longer period, including plans for pipeline connections between the BP refinery and the terminal. 52 tanks are planned for the 27-hectare site, with a capacity of around 1.3 million m^3.

Clean Petroleum Products

So-called 'clean petroleum products' are stored at the terminal, including diesel, gasoil and petrol. The tanks vary in size from 5,000 to 50,000 m^3 and are suitable for storing various products. Supply and distribution will take place partly via pipelines, but mainly via vessels. For this reason, the Port of Rotterdam Authority is constructing a 1,100-metre quay for three large or five smaller sea-going vessels. "All sizes of sea-going vessels will be able to berth at the quay, even VLCCs with a draught of 21 metres", explains Stefanie van der Wee, Project Manager on behalf of the Port of Rotterdam Authority. "There will also be a further nine berths for inland shipping vessels."

Integrated Service Steps

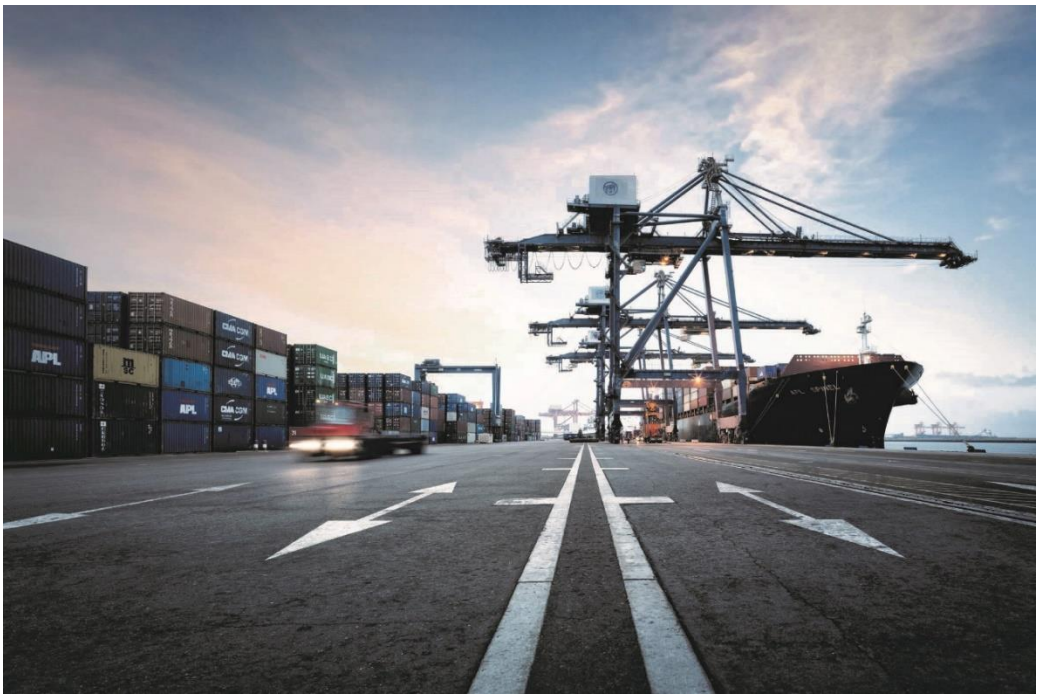
A new quay also offers the opportunity to use innovative concepts to further improve quality and convenience for the terminal and visiting vessels. "For each inland waterway vessel berth, service steps have been integrated within the quay wall", states Adriaan Smitsman, Project Engineer at the Port of Rotterdam Authority. These are also known as 'piano steps' because of the black and white colour scheme. "This makes it considerably safer to step on and off vessels as the steps enable lateral boarding, whatever the vessel's level."

Less Downtime

Another first for the new quay at HES Hartel Tank Terminal, is that it is the first oil terminal in Rotterdam equipped with cylindrical fenders, following the previous installation of these fenders at the LNG Small Scale terminal. Erik Broos, Senior Engineer at the Port of Rotterdam Authority: "TNO conducted research for us on the maximum vessel hull stress and with cylindrical fenders, this falls well within the safety margins." This means that cone fender panels will no longer be used. "It's a great improvement as these panels are often and easily damaged. We have very good experiences with cylindrical fenders, and these will also result in less berth downtime as a consequence of maintenance or repair. And that is, of course, great news for the terminal."

Port Authority Steps Up Its International Activity

If the Netherlands wants to maintain and increase its current level of prosperity, the Dutch private sector will need to take a more active approach to internationalisation. To position the Netherlands as a 'premium brand', we need standard bearers that already enjoy an excellent international reputation. The port of Rotterdam is willing and able to fulfil this role. That is why the Port of Rotterdam Authority will be actively investing in the ongoing development of its international activities – to contribute to the creation of added value for the Dutch maritime and logistics sectors as well as companies established in Rotterdam's port area.



Sohar Port

Last year the Dutch Trade & Investment Board's 'Promotion of International Trade, Innovation and Investment' Steering Committee published a perceptive analysis of the international position of the Netherlands. "Disruptive technology and the advance of robotisation have created unprecedented dynamism. We are on the eve of a global energy transition. Strong population growth and the rise of megacities in Africa and Asia have led to the development of new growth markets, which present a wealth of export opportunities. However, our current system is insufficiently geared toward taking full advantage of these opportunities and contributing to the realisation of the Sustainable Development Goals. This demands that we take a new approach to international enterprise – one in which we position the Netherlands as a global player that brings excellent location factors and indispensable knowledge to the table. Moreover, the international expansion of Dutch companies and knowledge institutes needs to constitute a greater share of our national economic growth. By 2030, 40 percent of our income should be earned abroad." In addition, the Steering Committee notes that when it comes to recognition, reputation and public image, the Netherlands's performance is suboptimal in comparison with other European countries.

Trailblazer

"The port of Rotterdam already enjoys an exceptionally strong reputation around the world", says René van der Plas, the Director of Port of Rotterdam International. "Thanks not only to our strong port infrastructure, effective port management and wide variety of cargo flows and industrial activities, but also – indeed, specifically – thanks to our pioneering role in the area of innovation. I'm referring particularly to activities like digitalisation and the energy transition." This position creates unique advantages for the Port Authority when it comes to gaining a foothold in foreign markets and supporting the international expansion of Dutch maritime and logistics sectors and other companies established in the port of Rotterdam via its commercial network. Van der Plas: "We can serve as a trailblazer for the international investment agenda of the Netherlands."

9 Billion

By 2040, the world population will have increased to 9 billion. This means that emerging economies in Southeast Asia, the Middle East, Africa and Latin America in particular will need to invest in ports and other infrastructure to accommodate the projected growth – economic and otherwise. “In many cases, these local parties lack the knowledge and experience to develop competitive port and industrial complexes”, explains Van der Plas. “The Netherlands has topped the World Economic Forum’s ranking of port infrastructures six times in a row, so we are a logical party for governments and other port developers to turn to for support. And in our wake, this creates huge opportunities for the Dutch logistics, industrial and maritime sectors and for Dutch hydraulic engineering.”

Corporate Social Responsibility

“Our added value lies in the areas of port development, port management and our commercial network – but we also have more and more to offer in the field of digitalisation.” In each case, the Port Authority is invited to contribute as a consultant/trainer, manager and/or investor to projects at foreign ‘green field’ and ‘brown field’ sites. Van der Plas: “At the local level, this value creation will mainly take the shape of an increase in jobs and trading. However, our international activities are subject to certain prerequisites: they need to yield a return on investment for our shareholders and be in keeping with our corporate social responsibility policy. In concrete terms, this means that the projects need to align with the country’s local culture, challenges, laws and regulations and be executed with respect for people and the environment. These prerequisites are set down in our business strategy.”

From Indonesia to Argentina

The Port of Rotterdam Authority’s international activities go back a long way. And over the years it has built up an impressive portfolio. For example, the Port Authority holds a 50 percent share in the ‘Sohar Port and Freezone’, an integrated port and industrial complex in Oman. Over 50 million tonnes of cargo are put through this port every year. Two members of the port of Rotterdam network, Hutchison Port Holdings and the C. Steinweg Group, have also already unfurled activities in Sohar. The Port of Rotterdam Authority is also active in Brazil, contributing as a partner to the development of Porto Central, among other projects. It is currently examining its options to participate in the port of Pecem. In addition, the Port of Rotterdam Authority serves as a ‘trusted adviser’ for a number of government agencies and port authorities for projects in the port of Jakarta, Kuala Tanjung on Sumatra, the Bay of Tungue in Mozambique and the port of Buenos Aires and for the Gujarat Maritime Board in India and the Suez Canal Special Economic Zone.

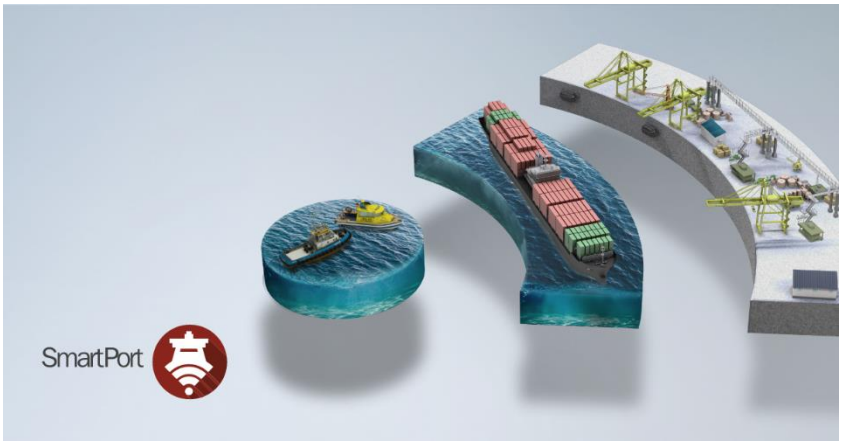
Sohar Port

5 TRELLEBORG'S MARINE SYSTEMS OPERATION: 2017 YEAR IN REVIEW

As the marine industry faces the increasing globalisation of operators, increasing the scale and utilisation of vessels, and the expectation of ever-improving efficiencies, shipping and port operators must work smarter together, to address and deliver against these expectations. This will require vessels, ports and hinterland transport to become part of a connected ecosystem.

Trelleborg's marine systems operation occupies a unique position at the interface between ship and port. In line with the theme of the 2018 PIANC World Congress, 'Connecting Maritime Hubs Globally', Trelleborg's focus for 2017 was the evolution of its SmartPort platform, which automates, manages and optimises the crucial interface between ship and port.

5.1 Optimising operations with SmartPort



Trelleborg is evolving its business model by building on its current core competencies – from vessel approach, through docking, mooring, transfer and departure – so that it is best placed to support the Port of the Future. This is called SmartPort. SmartPort uses the latest in data powered marine technology to connect assets, collect data and provide real-time insights that support ports and terminals in their drive towards the Port of the Future vision.

Trelleborg crafted its SmartPort platform around the interface between ship and port, because the process of port approach, berthing and transfer of cargo or oil, and finally departure, each demand clear communication between both parties, given each stage is potentially highly dangerous and prone to operational inefficiencies.

2017 saw the addition of a major new SmartPort product line. AutoMoor is a rope-free, automated mooring system that uses smart technologies to enable a faster berthing process and improve safety levels within the port environment. Using vacuum technology to rapidly attach to, and secure, a vessel at berth, it reduces vessel motions and continuously monitors all mooring loads acting on the vessel. This provides live data to the operator while minimising personnel involvement and improving safety.

Trelleborg is looking to optimise the use of tug boats with the evolution of SafePilot, which offers the latest in navigation, piloting and port systems. Using state-of-the-art software and smart technology, it helps pilots and ports optimise safety and efficiency in their day-to-day operations.

SafeTug is a complete Category (CAT) system that, via the SafeTug app, facilitates real-time data sharing between tugs and pilots with regards to situational awareness, to ensure safe and efficient tug operations.

Additionally, Trelleborg recently integrated an Adaptive Under Keel Clearance (AUKC) system within SafePilot to enable more productive ship and port operations. As ship sizes grow and waterways become more constrained, the need for precision tools grows. AUKC systems are used to calculate the amount of water between the ship's keel and the seabed. This is mostly used to determine the optimum time for passing a constrained waterway, or the tidal window. There are a number of challenges associated with determining UKC, such as ship motion affecting displacement, accuracy of seabed survey, and prediction of weather, tide and sea state. The AUKC system uses third party integrated data to overcome these challenges, by providing a planning tool to develop a Passage Plan that is specific to the vessel and its journey. It will then provide real-time measurement to ensure that the plan is still valid throughout the approach, updates when conditions change and alert if there is a risk that AUKC will be too small further down the route.

In May 2017, Trelleborg hosted a technical seminar and workshop designed to help marine pilots keep up-to-date with smart technology, to ensure the efficiency and safety of navigation and piloting operations. The event saw Tommy Mikkelsen, Managing Director of Trelleborg's marine systems operation in Denmark, join President of the American Pilot Association, Captain Jorge Viso, as well as representatives from both the Association of Maryland Pilots and San Francisco Bar Pilots (SFBP), to discuss Trelleborg's SafePilot solution and the evolution of piloting technology.

5.2 Notable Contracts

2017 was a successful year for Trelleborg, with a number of contracts secured globally for a variety of solutions within its ever expanding SmartPort enabled product portfolio. For instance, in order to optimise efficiency and reduce downtime at a port in Oman, a complete, real-time overview of port approach, vessel berthing and departure was required. Trelleborg had previously supplied the port with Quick Release Hooks (QRHs), Docking Aid Systems, fenders and SafePilot Portable Pilot Units (PPUs). While each solution provided a touchpoint for data collection, they were supplied across disparate projects, so were not integrated and were manually managed.

The port was determined to take a more holistic approach to operations and so, to optimise efficiency and reduce downtime, it was clear that it required a complete, real-time overview of port approach, vessel berthing and departure. Integrating each of the port's previously disparate port operations and with information presented in real-time, SmartPort provides the holistic oversight required to analyse the performance of assets and identify areas for optimisation to enable efficiency gains.

The pilots navigating Orient Overseas Container Line *(*OOCL*)* Hong Kong, the largest container ship in the world, relied on SafePilot technology to ensure safe navigation into port at Felixstowe, on its first ever trip to the UK. The OOCL Hong Kong is as long as four football pitches and has a deadweight tonnage of around 190,000 metric tonnes.

Trelleborg's SafePilot system also safely navigated MS Ovation of the Seas, the equal fourth largest cruise ship in operation in the world, in to dock at Napier Port on Hawke's Bay in New Zealand. With no room for error when berthing the Ovation of the Seas at Napier Port, accurate information on speed, rate of turn (ROT), and clearing distances was vital. SafePilot was an integral part of the operation right from the planning stage, and the real-time information it provided was critical to the safety and success of the manoeuvre.

Ovation of the Seas

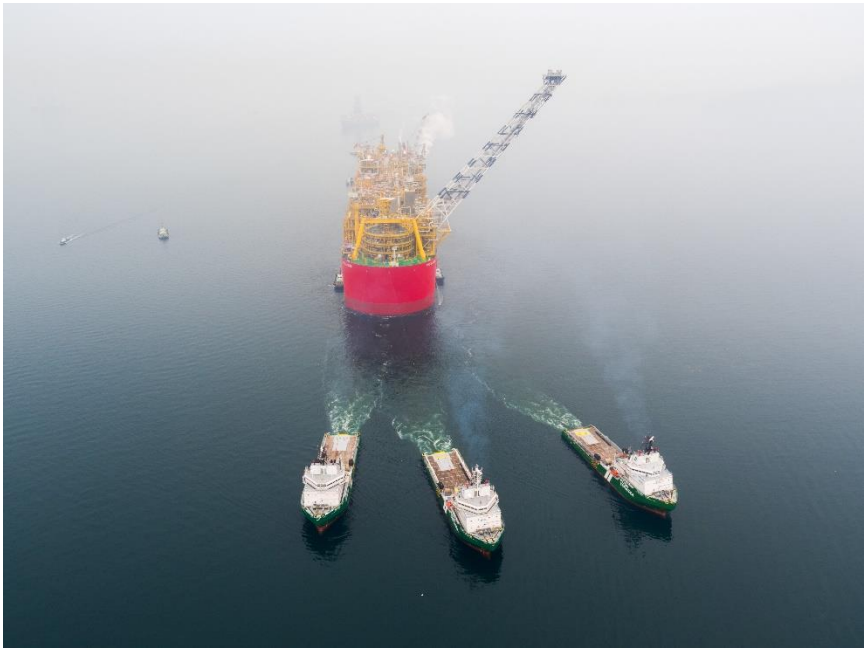
Cat II and software

In addition, Trelleborg has been awarded a contract to supply its SafePilot technology to a maritime pilot *group* in northern California. With an influx of ultra-large container vessels (ULCVs) requiring navigation to many ports within the area, which is renowned for heavy fog, the safety and efficiency of the group's piloting and port operations are key. Trelleborg will supply the SafePilot CAT ROT XT to support existing daily route piloting software, and SafePilot CAT II, a precise, reliable tool for the navigation and berthing of ULCVs in the areas' confined and busy waterways and ports. Trelleborg will also supply its SafePilot PPUs and associated software, which utilises touch-screen technology built on an intelligent kernel for multi-layer handling, as well as its SmartPort Engine.

Trelleborg will also supply its SafePilot technology to a maritime pilot group in Louisiana in the U.S. Trelleborg will supply many of the group's pilots with SafePilot PPUs and associated software. The system provides pilots and port personnel with real-time access to information on current traffic based on AIS, remote monitoring and electronic interactions with on-duty pilots.

2017 has seen Trelleborg further strengthen its position as a world leader in the design and manufacture of high performance, advanced marine fender systems with multiple contract wins. For instance, Trelleborg was recently awarded a contract to supply its Super Cone (SCN) 1,600 and 1,200 fenders with frontal panels and a special chain system to a multi-purpose terminal located along the Suez Canal Special Economic Zone in Egypt. Despite working closely with as many as nine contractors responsible for the construction of the 5-kilometre long quay wall, Trelleborg was able to supply its solutions in accordance with the project's demanding time frame. As a result, the quay wall is now able to *accommodate* the berthing of a variety of sizes and types of vessels.

Trelleborg supplied its Donut fenders to a newly constructed cargo offloading facility in western Kazakhstan. The facility is part of a project that has seen the creation of a maritime access channel in the Caspian Sea to a new remote oilfield development. To accommodate shallow draft vessels which are typically light and so have a low allowable hull pressure, Trelleborg designed and delivered bespoke Donut fenders with an ultra-low reaction force.



Shell Prelude FLNG

5.3 Evolving Fender Best Practice

Over the last five years, Trelleborg has undertaken substantial research into the production and testing of rubber, foam and pneumatic fenders, highlighting concerns with industry practices and making recommendations for change and improvement. With a new wave of low cost suppliers across the industry in 2017, Trelleborg called upon ASTM International, a globally recognised leader in the development and delivery of voluntary consensus standards, to review its current standard for rubber, foam and pneumatic fender testing, ASTM F2192- 05, which was reapproved in 2011. As a result, Trelleborg is currently working with ASTM to help facilitate more stringent testing across the industry to guarantee only quality fenders are supplied.

Trelleborg is also currently assisting in drafting an improved Chinese standard for cone fenders. Not only does the current standard not cover all available fender sizes across the industry, but it doesn't meet the guidelines set out by PIANC for fender selection and testing. What's more, the current Chinese standard doesn't encompass the new analytical and chemical tests to determine fender composition.

Trelleborg has also developed a fender selection tool which, using PIANC endorsed calculations, will assist in calculating berthing energy and create a robust specification for specifiers. Simplifying the typically lengthy fender selection process to just a few clicks, the tool will provide users with a testing plan for all components in even the most demanding environments.

5.4 An Evolved Pneumatic Fender Offering

Trelleborg has also joined forces with Teekay Marine Solutions, one of the world's largest marine energy, transportation, storage and production companies, to launch HALO Fenders, a new premium pneumatic fender offering focused on meeting the demands of the Ship to Ship (STS) transfer market and the wider marine industry. The offering combines the strength and experience of two industry leaders, bringing together Trelleborg's manufacturing capability and Teekay's operations expertise.

The HALO offering provides customers with a single point of contact from product specification, to delivery, through to comprehensive field services, including fitting of chain tire nets, maintenance of fenders and provision of all required certification and documentation to meet major oil company requirements. A wide range of HALO Fenders, fully compliant with ISO 17357-1:2014, are stocked in strategic locations around the world, allowing fast and convenient delivery. Fenders will be available to buy or rent and backed up by exceptional technical and service support.

5.5 Strengthening Our Partnership With PIANC

Having long supported the work of PIANC, Trelleborg has extended its history of collaborative work by presenting at PIANC Australia's Technical Workshop on Fenders in June. This saw Global Technical Director, Mishra Kumar, present on the subject of 'Ensuring Fender Performance through Physical and Material Testing Specification'. Trelleborg was also the Platinum Sponsor of PIANC's 2017 Annual General Assembly (AGA) in Cairns, Australia.

PIANC Australia: Technical Workshop

Trelleborg also joined a two-day PIANC (Vietnam) seminar in July, discussing the role of port and terminal equipment optimisation in enhancing maritime safety. Organised by Trelleborg, Surbana Jurong and KASI Malaysia, the seminar discussed the latest in planning and design, marine risk assessment and vessel traffic management technology.

Trelleborg Regional Sales Manager (Marine Fenders, Asia) William Tan detailed the role of advanced marine *fender* systems in port, terminal and vessel safety. While Trelleborg Sales Director (Docking and Mooring, China and SEA) Ron Lee, presented a case study on the Spirit of Tasmania II to emphasise the need for ports to adopt automated mooring to make mooring operations safer. He also highlighted the need for a holistic view of operations to improve safety.

5.6 Industry Body Work

In addition to supporting PIANC's efforts in evolving best practice guidance in an effort to drive up *standards* across the industry, Trelleborg will head-up the American Society for Testing and Materials (ASTM) 'Standard for Liquefied Gas *Ship Shore Links'* (*SSL*) standardisation group, after Technical Director, Andrew Stafford, was appointed as Task Group Leader.

Linked ship-shore *Emergency Shut-Down* (*ESD*) systems have been a recognized safety feature of traditional LNG carrier transfer operations for many years. However, provisions of linked *ESD* systems in the emerging trades of LNG FSRU and LNG bunkering, as well as the non-methane gas distribution between ships and terminals, are being hampered by the lack of an accepted industry standard for equipment, to achieve the required connection. To that end, Andrew and the team will look to develop an industry-wide standard, covering the minimum requirements for the safe transfer of liquefied gasses using SSLs. Ultimately, providing recommendations for steps forward in evolving the inter-connection of ESD systems for universal adoption.

5.7 2018 and Beyond

2017 has proved yet another extremely exciting and successful year for Trelleborg's marine systems operation. With PIANC continuing to set best practice guidance for the industry, Trelleborg looks forward to continuing its support of this important organisation throughout 2018 and beyond, as well as further building out its SmartPort platform in support of ports and terminals in their drive towards the Port of the Future vision.

Trelleborg is the Platinum Sponsor of the 34th PIANC World Congress 2018 in Panama (7-11 May 2018).

6 SHIBATAFENDERTEAM: ON THE SAFE SIDE IN 2017

True passion is the driving force in the creation of an excellent product. At ShibataFenderTeam, we are passionate about our core competence: fender design. It's not just a business unit, but the heart and soul of the company. We have devoted ourselves to designing and producing fenders of the highest quality to such an extent that fenders have become part of our DNA.

It is not only this dedication that sets ShibataFenderTeam apart as a true specialist and one of the leading fender manufacturers in the world, but also our group's more than 50 years of combined experience in the field.

ShibataFenderTeam acts as a real industry partner, providing excellent products as well as technical expertise.

The group has produced high-quality rubber products for about 100 years and also maintains production facilities dedicated to steel panels and foam fenders. But our role goes beyond that of a true designer and manufacturer. We consider our clients part of the team, supporting them as partners. As such, we are with them each step of the way, from engineering customised fender solutions to the manufacturing and installation of the fenders.

With our unparalleled know-how comes a particular sense of responsibility for the industry. Our company has supported PIANC for many years as an active member in Japan and Europe. Know-how, experience and responsibility, always driven by real dedication to outstanding fender solutions – this is the definition of engineering excellence we live by.

6.1 Engineering Excellence

Engineering excellence means that our partners can be confident in expecting the best from us in all areas. Our commitment to each project begins with consulting and continues even after the order has been completed to our client's satisfaction. To ensure we meet the highest standards, we adhere to strict quality requirements from the first minute of production – for every order, every day.

We are keenly and proudly aware that we supply safety-critical products that must, without fail, prove deserving of our clients' trust. Our products protect port infrastructures, ships and people. Countless individuals rely on the quality of our work and materials, which we monitor continually. We not only see the trust placed in us as one more reason to strive for excellence in all we do – it's also the foundation of any partnership. And there can be no trust without reliability. Thanks to our global presence, clients everywhere can rely on us. At every stage of our joint efforts, all over the world.

6.2 Setting the Course for the Future

Looking back on 2017 also means looking to the future. During the past year, we set the course for important future developments that will allow us to support our clients in more and better ways.

Not only is worldwide demand for safety equipment on the rise, clients are also in need of more efficient and reliable berthing structures than ever. In light of this, our mission is clear: always keep improving. To fulfil the demands of tomorrow, we must keep moving, just like ships keep moving through our clients' ports.

This is why we invest all of our resources in providing our clients with the best fender solutions, continuously optimising every step from consulting to manufacture.

6.3 A Milestone Development

2018 will see a true a milestone in the company's history. This summer, production is set to begin at our new cutting-edge mixing plant for rubber compounds and fender production in Malaysia. "The steep

growth in demand for ShibataFenderTeam's high-quality rubber fenders was the catalyst for this far-reaching investment decision, which will further strengthen our global position as a leading fender manufacturer", explains Hiroto Suzuki, Director at Shibata Industrial in Japan and Managing Director at the ShibataFenderTeam office in Malaysia. It's an important step for us, but also for our clients: With the new plant, ShibataFenderTeam will become the first fender manufacturer to use the latest generation of compound mixers and associated technology.

Fast mixing processes currently practiced by other fender manufacturers could stress and damage the rubber molecular chains, negatively affecting compound quality and consistency. As it has a great influence on the quality of the fenders, a perfect mixing process has always been of paramount importance to us. Our two-stage mixing plant is a natural consequence of that priority – an investment that once again underscores our commitment to quality products and to the market.

Rubber compound ingredients

6.4 Quality Standards that Go Above and Beyond

Questioning and monitoring one's own efforts is vital when striving for quality. Not only do we hold our plants and production processes to the highest standard, we also test the quality of every single product we manufacture. In 2017, we purchased a combined shear and compression test press to complement our state-of-the-art testing equipment. It allows us to offer combined testing for even the largest cone fenders available, a service very few other manufacturers provide.

Compression and shear test press

Tests are conducted at the point of manufacture, often under the supervision of an independent and qualified third party or our clients. That, too, is part of our responsibility – and we know that our products stand up to scrutiny. All of ShibataFenderTeam's testing equipment and processes meet the most stringent industry standards as well as the calibrating requirements set forth by PIANC.

6.5 Leadership Means Responsibility

As one of the world's leading fender specialists, we consider it our responsibility to do our part for the industry by sharing our know-how with engineers and end users alike. As in previous years, we organised seminars all over the world in 2017, passing on our design and manufacturing experience. Since rubber units are largely standardised, the greatest challenge lies in understanding the steel panels, chains and corresponding anchorage. This is why we look at the entire fender system in our seminars. The unanimously positive feedback we've received from participants proves the value of our approach and encourages us to keep organizing our seminars in the future.

We are deeply committed to our role as PIANC Platinum Partner. Together with PIANC, we are working on improving industry standards as well as PIANC recommendations, for instance through intensive efforts in the PIANC Working Group 145 'Berthing Velocities and Fender Design'. As a long-time participant in PIANC World Congresses, Shibata Industrial and ShibataFenderTeam will be present in Panama in 2018. Speaking of Panama, ShibataFenderTeam has designed and supplied 55 fenders for PSA Panama International Terminal at the Pacific entrance to the Panama Canal, adding an interesting project to our more than 1,300 fenders in service in Panama alone.

6.6 A Global Presence, Nearby

ShibataFenderTeam is active worldwide, and yet we are always at our client's side. We value being able to stay in close contact with our clients, with regular and direct communication. Growing demand for our products in certain regions has prompted us to strengthen our presence in these locations. In the past two years, we have opened new offices in Spain and Malaysia to better serve these markets. Maintaining a strong presence means being familiar with local conditions, standards and regulations. It also means supporting and guiding all stakeholders through every stage of the project, no matter where in the world. Our clients increasingly rely on direct exchange and customised solutions – and we can deliver both thanks to our global network and our flexible, efficient approach. Our network ensures that our clients always have a competent contact person within reach – and that ShibataFenderTeam is represented in all corners of the world.

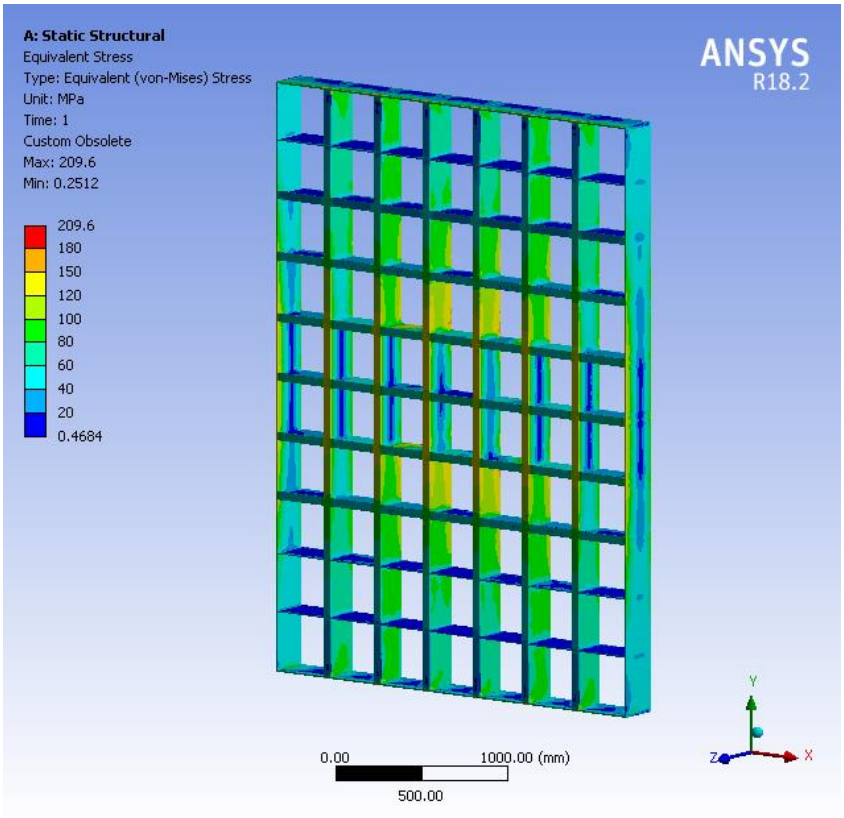
Close contact and exchange is important to us internally, too. At our biennial Agent Meeting, all our agents gather to stay informed on industry developments and keep up our high internal quality standards, all so we can be the best consultants for our clients. Our 2017 Agent Meeting took place in Berlin, and as every time, we cherished the opportunity to meet face to face with the people who represent us worldwide. Direct contact with our agents plays a vital role in our group's development.

Agent Meeting 2017 – Berlin, Germany

6.7 Value Engineering

Creating and protecting value – this is the essence of what our products are meant to do. To ensure they're up to the task, we design our fender systems with an eye for the big picture, while paying attention to every little detail. The rubber unit is a crucial component of the system, but it is only as good as the system's overall design. Each project is unique, so our experts analyse every condition on site in detail to design the most suitable fender system. Our experienced and highly skilled colleagues all around the globe are value engineers, in a sense, creating solutions that are ideal for the client and on-site conditions.

Since our main goal is to tailor everything to the needs of our clients, we don't go for the first solution that presents itself; we design the first-class solution. There are many details to consider, such as the minimum and maximum standoff distance, the maximum deflection and multiple contact requirements. Careful planning is essential when striving to create the perfect fender system for every project.



Finite Element Analysis

The design process is highly complex, but only excellence creates real value. As a multinational company, ShibataFenderTeam delivers German and Japanese precision and accuracy, both in engineering and manufacturing. With our own facilities for steel, composite and foam fender production in Germany and rubber production in Japan and Malaysia, the excellent quality of our products sets us apart from our competitors.

The quality requirements of our clients have grown steadily. This development matches what has been ShibataFenderTeam's guiding principle for many years: "High-quality marine fender systems at competitive prices."

6.8 Our Projects

2017 was the most successful year in our company's history. But even if we look further back, we can do so with pride in our accomplishments. We completed almost 5,000 orders with around 100,000

delivered fenders in the past decade. There are not only figures to cite – we are pleased to take a closer look at some projects:

6.9 Yamal, Russia

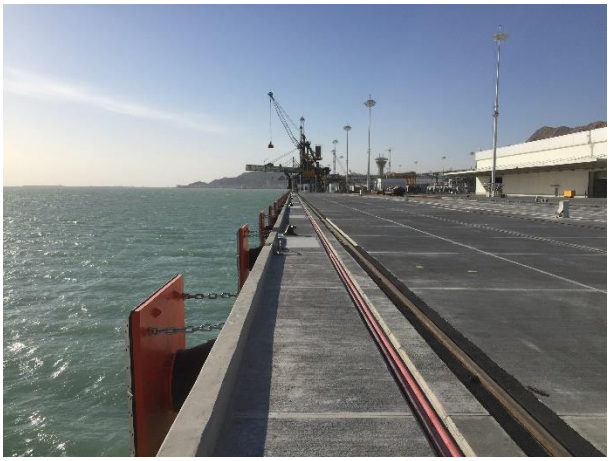
A challenging project on the Siberian Yamal Peninsula for the new Yamal LNG terminals, with a contract value of more than three million US dollars. Personnel and materials had to withstand temperatures as low as -55 degrees Celsius. The solution was a dedicated rubber fender compound and special steel grades for the panels, which were all tested at operational conditions. The project includes a total of 12 sets of double CSS 2000 fenders for the berthing dolphins and 27 sets of CSS 1600 fenders for the loading platforms.

LNG Terminal, Yamal, Russia

6.10 Pengerang, Malaysia

This project saw us break a record with the CSS 3000 fender, the largest molded rubber product in the world. We supplied it to the largest independent deepwater oil terminal in Pengerang, Malaysia. The steel panels for these fenders have a size of 6.2 m x 7.5 m. Due to these enormous dimensions, the steel panels were produced in Malaysia and transported to the site on a barge. With a contract value of more than four million US dollars, it was the first large order processed by ShibataFenderTeam Malaysia, and our successful delivery marked an excellent start for our Kuala Lumpur office.

6.11 Turkmenbashi, Turkmenistan



We were awarded with the supply of fender systems for the entire new port at Turkmenistan's Turkmenbashi International Seaport, on the eastern coast of the Caspian Sea. Among the new port's features are a shipyard as well as passenger, container, ship loading, and dry bulk terminals – and we have delivered fender systems for all of them. This includes more than 300 cone fender systems, custom ferry pier fender solutions, PU corner fenders and wheel fenders for ship lift entry. A challenging project with a contract value of more than six million US dollars, which we were entrusted with due to our many years of experience.

New port at Turkmenbashi

These are three projects we consider especially noteworthy, but ultimately every project is a unique experience. We look forward to the fender challenges of decades to come. Every order is an opportunity for us to keep evolving and gain more expertise to better serve our clients. They have come to expect nothing less and rely on us to deliver the best quality. Or rather: excellent quality. We call this engineering excellence.