

Diesel-electric for optimal efficiency and flexibility

Abis Shipping is a young shipping company that has only been in business since 2007. In 2012, the ABIS Dublin and the ABIS Dover were added to the by now fourteen-strong fleet. In 2013 two more ships of the same type are due to be added. The company's core business is the transport and supply of wind turbine parts to jack up vessels involved in the installation of wind farms at sea, as well as other offshore services. These ships may also be used for not only large project cargo, like oil rig parts and oil pipeline components but for general cargo, including containers, as well. One of these vessels' important features is that they are certified for 'open top' sailing; which is a particularly important feature in the offshore industry.

When being used in offshore, the ships' manoeuvrability and operational reliability are of vital importance. In addition, major fluctuations in power demand during dynamic positioning require a propulsion system that will continue to operate efficiently regardless of the hugely varying circumstances. In order to safeguard said flexibility, it has been decided that the ABIS D-type vessels are to be equipped with diesel-electric propulsion for their two main propellers and their two bow-thrusters.

Generally, in shipping, when opting for diesel-electric propulsion, a number of AC (alternate current) generators is used. They supply power to the AC Mainboard, which in turn distributes the power to the rest of the ship. For the first time, on the ABIS Dover, it has been decided to use a DC (direct current) instead of an AC plant. On-board fuel consumption will be reduced for the following reason. When using diesel engines, harmonic distortion can be a major problem (e.g. causes flickering lights). Harmonic distortion of frequency and power takes place because of non-linear stresses on the required frequency transformers. In an AC system, a large amount of additional equipment, like heavy transformers, will be needed to counter this disruption. The DC plant on board the ABIS D-type ships requires less high-maintenance and energy-guzzling equipment to distribute power across the ship.

In addition, it allows for the optimisation of power generation according to the needs of different operational situations and the already present capacitors create a power buffer. It even includes an option to actively generate power if and when the propellers are turning in the current while the ship is stationary. The Power Management system is a dual installation. It offers a choice of generators thus providing maximum operational reliability. Should any propulsion problem occur in the course of an operation, for instance near an oil rig, and steering be compromised an automatic switch to another generator will take place thus reducing the safety and environmental risks to a minimum. Hence, maximum efficiency and reliability as well as maximum flexibility have been realised.

www.abisshipping.nl



Anthony Veder

Coral Energy: the next level of small-scale LNG transport

Anthony Veder is the owner of the world's very first dual-fuel directly propelled LNG tanker with a 1A ice class rating: the Coral Energy. This new ship was named by Princess Maxima on 7 December 2012 in Rotterdam and it takes small-scale LNG transport to the next level. The Coral Energy will be deployed in the provision of gas to those remote regions of the world that have no local gas supplies and/or lack suitable infrastructure.

Since the middle of December 2012, the Coral Energy has been carrying out a regular service from the Norwegian Skangass gas liquefaction plant in Stavanger (Norway) to Stockholm in Sweden. The particular structure of Sweden's geography makes it difficult to establish a sound pipeline infrastructure. For areas like this, the supply of gas by means of small and mid-scale gas tankers is an attractive option. The future supply by ship is set to replace Sweden's current energy production near Stockholm, which generates a higher level of pollution.

The Coral Energy (154.95 x 22.70) is able to carry 15,600 cubic metres of LNG on each trip to Stockholm. In order to calculate the amount of natural gas involved, this number is to be multiplied by 600. This tanker's system of direct propulsion is remarkable and leads to increased efficiency. In using direct propulsion, less power is lost during transmission to the propeller. Because the engines use LNG, emissions will be kept to a minimum. Auxiliary power, too, is to be provided by dual-fuel Wartsila engines.

Anthony Veder and their Coral Energy are taking small-scale LNG transport to the next level. Given that small-scale LNG transport tends to take place in remote areas, the vessel has a 1A ice class rating, giving the ship's owner access to a wide range of localities, including to the Northern areas around the Arctic Circle.

www.anthonyveder.com



A promising concept for heavy lift vessel ballast water

Dockwise, located in Breda, is developing a method to reduce the amount of treatment needed by ballast water before it can be safely discharged at sea. The International Maritime Organisation (IMO), so far has responded positively. This idea might just provide the eco-friendly solution for heavy lift vessels. In any case, in principle the process is to be applied on one of Dockwise's semi-submersibles in the course of 2013.

Taking in, carrying and discharging ballast water, though necessary, causes problems worldwide because, with the water, exotic marine organisms are being spread around. They may potentially cause significant disruption to the local ecosystems in which ballast water is being discharged. In order to prevent this happening, IMO has adopted a Ballast Water Management convention. Said convention has set standards for the treatment of water that is taken in in one location and discharged at another. According to the convention, ballast water taken in and discharged at the same location will not have to be treated.

When loading oil platforms and other extremely heavy objects, semi-submersible vessels, like those owned by Dockwise, need to be submersed and re-floated within a short period of time. In this process –which takes place at one and the same location– large quantities of ballast water are taken in and discharged again. Said ballast water does not need to be treated. But, given that a small amount of ballast water has to stay on board during the passage there and back, that water will still need treatment. However, current ballast water treatment systems have proven to be unsuitable for treatment of these, still relatively large, quantities of water within the short period of time available. An additional factor is their use of intake filters, which pose a great operational risk for this type of vessel as well.

The concept developed by Dockwise, therefore, only treats the ballast water that stays on board during the passage there and back. The advantages include the elimination of delays during the process of submersion and prevention against the risks of intake filters. Moreover, a much smaller ballast water treatment system will be required that uses much less auxiliary power. Consequently, the amount of energy consumption on board is clearly reduced, as are ships' emissions, including those of carbon. The exact amounts can only be determined after Dockwise's initial use of the method in 2013. Preliminary estimates have predicted a reduction of around 80% compared to a scenario where all of the water taken in is to be treated; it will be accompanied by a decrease in actual expenses, including those for energy, of around 16%.

www.dockwise.com



Flinter

Reducing carbon emissions and fuel costs

The Flinter shipping company is a provider of maritime transport and all related services. They manage and operate a fleet of 50 modern cargo ships of varying capacity, with a maximum of 11,000 ton. The major part of the fleet consists of multi-purpose vessels. Said type of ship has been designed to transport a number of different kinds of dry cargo, with the option of combining different types of dry cargo. Virtually all of the vessels have been reinforced to withstand ice and the fleet transports more than five million tons of cargo annually.

Most of the vessels are operated under the company's management but the container feeder vessels are available to container operators for long-term charters. As is the custom on the charter market, fuel expenses are paid by the charterer but the cost of implementing fuel-saving modifications are payable by the owner. This conflict of interests results in chartered vessels using more fuel, on the whole, than an identical vessel that is managed by the owner himself.

Two container vessels managed by Flinter and chartered to a British container operator, have been equipped with a fuel and power monitoring system through the agency of Flinter Management. This system makes it possible to link the amount of power generated directly to the amount of fuel used, showing clearly any potential excess fuel consumption. Following a number of readings a package of measures was designed and presented to the charterer. As well as a new application of anti-fouling, cleaning out the bin coolers in order to increase the amount of power generated. All this will save on fuel costs and reduce carbon emissions. In view of the fact that the charterer will benefit most by these measures, shipowner and charterer have reached an agreement to split the refitting expenses. This arrangement is unparalleled within the charter market and has resulted in an additional vessel being chartered by this charterer.

In order to reduce fuel consumption even further, currently trials are being run on two vessels. Each of these uses a different type of anti-fouling. One is a conventional type and the other a more expensive silyl acrylate. Over the next period, readings are to indicate whether the additional expense of the dearer anti-fouling measures are warranted by the energy economies achieved by a cleaner hull. The bin coolers, too, have been fitted with a new anti-fouling device which operates by ultrasound rather than the conventional (ICAF) 'sacrificial metal'. Said system is to prevent the accumulation of deposits in the bin cooler and therefore combustion at higher power will be improved because of the reduced purge air temperatures resulting in reduced fuel consumption. An additional benefit is that this way no copper deposits are released into the water.

www.flinter.nl



Winner 'clean shipping company' award/Crowned as a clean shipping company

On average, Holland America Line (HAL) passenger ships carry 1,700 guests. Each week, said guests consume around 50,000 kilos of food and beverages. Multiplied by the hundreds of cruises to, often vulnerable, natural sites in Alaska, Norway and the Antarctic, it may be said that the company faces a number of sustainability challenges!

HAL is what is termed a 5-star cruise company. Since 2009, all systems on board any HAL ship have continually met the most stringent ISO 14001 Lloyd's Register Quality Assurance (LRQA) requirements aimed at the protection and preservation of eco-systems. The ISO 14001 standard controls, and if possible reduces, the environmental risks posed by companies' operations.

And HAL's environmental policies go the extra mile. They range from the use of clean low-sulphur fuel and the use of electrical facilities ashore to eco-friendly soy-based printer ink; from the recycling of waste heat to 'green' cleaning materials. The ships' laundries use an eco-friendly laundry detergent based on orange extracts and save energy by the use of an innovative drying process.

The HAL's environmental managers are also responsible for the superior waste water treatment systems, water-saving equipment and the separation of cans, paper and other waste materials. By collecting drainage water and water containing oil residue in double treatment systems, not a single drop of oil is dumped overboard. The propellers use a type of bio-degradable oil, which minimises the environmental effects.

Of course, the human element is also present in green shipping. Staff on board, from the bottom up, are being trained to carry out the environmental policies the way they are intended. Green shipping has become ingrained in this company's thoughts and actions. The cruise company –operating fifteen ships under the Dutch flag– has received many environmental awards in the United States, and for good reason!

www.hollandamerica.com



New standards for bulk carriers

Six new double-hull bulk carriers, commissioned by Hanzevast Shipping, have been designed with a focus on sustainability. The resulting vessels –so far three of them are operational and another three are being built– manage to combine low fuel consumption and high cargo efficiency.

Said state-of-the-art ships have double hulls for additional passive safety. Below the waterline, a coating of an innovative type of paint has been applied to promote hydrodynamic conduction. Its manufacturer has guaranteed a saving on fuel consumption through the use of said coating. The shape of the hull has been designed to have a relatively shallow draught. This allows the ships to call at smaller ports while carrying large cargoes. Because of this, voluminous transports can still be carried out by a single ship. The number of transports needed is reduced even further by a reinforced tank top which allows the loading of double the quantity of steel the current generation of handysize bulk carriers can carry. Once again, this contributes to a reduction in carbon emissions.

Hanzevast has made extra investments in their crews' awareness of sustainability, specifically for this new bulk fleet. Prior to each passage, on-board management will carefully plot the most economical sailing speed. Captain and chief engineer will determine the optimal combination of speed and low fuel consumption. The use of meters to monitor speed, torsion and consumption allows them to make meticulous assessments of ships' optimal trim –its balance– in relation to engine use and fuel consumption.

In the near future, crews will be able to operate even more accurately. They will have a software programme at their disposal that will provide concrete, 'real time' data to achieve perfect harmony between (weather) conditions, load, trim and engine thrust. Hanzevast's prediction is that this will lead to fuel economies of at least three to four per cent.

The company is also in the process of producing a new type of propeller housing, intended to optimise water flow to the propeller. Once the new housing is in use, fuel consumption will be reduced by an additional four to five per cent. Calculations are also being carried out for a type of new propeller blade that will potentially save another 2,8% of fuel.

www.hanzevastcapital.nl



Reduction of under-water noise levels

The latest Heerema Marine Contractors (HMC) Deep-water Construction Vessel (DCV), the AEGIR, is to be deployed in the installation of complex infrastructure and pipelines at sea. Said pipelines can be up to 81cm in diameter; a full coil may weigh as much as 3,000 tons. Said coils are lifted on board by cranes able to lift up to 4,000 tons. Ultimately, the pipelines are installed in depths of as much as 3,500 metres.

It goes without saying that this new vessel meets all national and international requirements regarding environmental protection as well as HMC's vision. On board the AEGIR, an inventory of hazardous materials has been taken and this will be kept current in accordance with the "Green passport" requirements, a certificate for which has been issued by Lloyds Register.

The AEGIR has been designed with a moon pool which the pipeline is fed through. In order to reduce fuel consumption during shipment, the moon pool will be partially closed off with a moon pool bottom hatch. This will reduce drag during sailing and will have a positive effect on both fuel consumption and emissions. HMC is also carrying out a number of efficiency studies on board its vessels, including those on the efficiency of Gyro, DP3 and thrusters in order to achieve ships' optimal deployment.

Like Heerema's other vessels, the AEGIR will be using low-sulphur marine gas oil for her main engines. Heerema supports several research projects on matters like the reduction of under-water noise levels aimed at a minimal disruption of marine life and operational activities in sensitive areas and ecosystems.

www.heerema.com



Jumbo Shipping

Heavy lift, light on flora and fauna

The Gorgon Gas Project's home base is the Barrow Island nature reserve in Western Australia. The location provides sub-oceanic gas fields and houses an LNG plant while at the same time being one of the world's most carefully protected natural sites. In 2012, Jumbo Shipping, governed by a strict regime of quarantine, transported a number of offshore installations to the area. Said operation was considered to be impressive. The commissioning company, DB Schenker, praised Jumbo's efforts to protect Barrow Island's flora and fauna.

Jumbo Shipping (a.k.a. Kahn Scheepvaart) in Rotterdam carries out heavy lift and special transports with its fleet of fourteen unique vessels. They often travel to faraway places, like the Australian nature reserve.

In the Gorgon Gas Project, Jumbo used expensive but environmentally friendly low-sulphur fuel exclusively. In order to prevent unintended contamination of the nature reserve by exotic organisms in their vessels' ballast water, Jumbo developed a special ballast water treatment plan. On the one hand, the plan made sure that only low-risk ballast water was taken on board. On the other hand, it ensured that any external exchange of ballast water within the nature reserve was eliminated altogether, while at the same time maintaining minimal draught.

One of the other important environmental measures was the anti-fouling paint used to treat the outside of the hull prior to starting the work. Both the paint and the under-water inspections carried out throughout the entire project prevented seeds, substances and organisms hitching rides on ships' bottoms.

Thanks to measures including the ballast water treatment system and the anti-fouling paint, Jumbo completed the Australian offshore transport with a remarkably high score. Zero safety incidents, zero loss of time and, above all, zero environmental incidents.

www.jumbomaritime.nl



KOTUG

Tug becomes E-KOTUG

KOTUG, an international maritime service provider located in Rotterdam, earned respect all over the world with their Rotor@Tug: a tug equipped with a third propeller instead of a skeg. The result was that said tug was extremely manoeuvrable in narrow waters. In 2012, KOTUG impressed the world again. This time it was with their E-KOTUG, Europe's first fully electrically propelled tug.

Care for the environment is embedded in the company's DNA. The ISM standards, which were introduced for bigger vessels following the Herald of Free Enterprise disaster, were implemented by KOTUG on a voluntary basis. KOTUG was one of the first companies to switch to low-sulphur fuel and, in 2009, the company won the Dutch fuel competition for nautical service providers. In 2010, the fuel competition for individual vessels was won by one of KOTUG's ships. The arrival of the E-KOTUG hybrid tug is fully compatible with this tradition.

Tugs use less than thirty per cent of their full power for 60% of the time. That may be considered to be highly inefficient. The use of electric engines saves on fuel and reduces emissions of harmful substances.

The E-KOTUG has a modular design. She has three main diesel engines and two diesel auxiliaries, three electric motors and a large battery pack. When, and only when, the really heavy work needs to be done the three main (diesel) engines are on full power and the electric motors are used as generators to charge the batteries. The tug's electric propulsion is sufficient to cruise on battery power and the on-board electronic equipment provides the tug with electricity. While berthed, the E-KOTUG's batteries are good for seven hours, before having to re-start the diesel engines.

E-KOTUG has achieved significant savings on fuel consumption and a reduction of damaging carbon dioxide, nitrogen oxide and particulate emissions of more than 50 per cent. An added benefit is that when full electric propulsion is being used, the tug is virtually soundless. Maintenance to the main engines, too, has been reduced considerably. After all they are now in use for about 50 per cent of the time only.

www.kotug.nl



Sponsoring sustainability

Q-Shipping, located in Barendrecht, is a full service provider for the maritime industry. Their services include ship management, crew management and compliance management for bulk carriers, general cargo vessels, multi-purpose ships, container vessels, ro-ro ships, tankers and commercial yachts. Sustainable thinking is their first priority. "If you want to leave future generations a habitable planet, it is something you have to work on right now, and on a daily basis too", according to Q-Shipping's reasoning. "So, always, in every situation, ask yourself: can this be done more efficiently and/or cleaner".

Q-Shipping operates under the ISO 14001 environmental management system. In said system monitoring the use of raw materials, waste disposal processes and emissions is structurally embedded in a company's management system. Any and all operational processes have been geared to this and, for all employees, 'thinking and acting green' has become second nature.

The latter frame of mind is partly due to the continuous marine environmental awareness training provided by the ProSea Foundation, located in Utrecht. Q-Shipping has been working with the ProSea Foundation since 2010. In 2011 the training concept, developed by the foundation, was promoted to IMO prototype course for the STCW convention (Standards of Training, Certification & Watchkeeping). The inclusion in the STCW code has resulted in ProSea's course becoming a mandatory one for all future seafarers.

Q-Shipping's company policy includes a 'zero spills to the sea' clause. ProSea was an excellent partner in this objective. Both organisations are fully convinced that sustainability is a matter of and/or. Both investing in technology and procedures that make shipping 'greener' and investing in the competence aspect of the human element: those in offices as well as on board, in order to increase their awareness of their actions' impact on the (marine) environment.

The result of said increased awareness will be that all personnel will care for the environment and protect it. Indirectly, this will also reduce the company's operational expenses. Awareness also leads to solidarity. Q-Shipping is adamant that future seafarers understand that their actions may also have a positive effect on the marine environment and that they have the knowledge to make a personal contribution to a cleaner shipping industry. Relatively small disruptions, even, can have a detrimental effect on mankind, animals and the environment. Q-Shipping is eager to do their bit for our planet's future.

www.q-shipping.nl



Short sea shipping captain/owner with a super-efficient vessel

Captain/owner Cees Schot, of the eponymous Schot shipping company, has developed a super-efficient general cargo vessel. It is named 'Meridiaan' and has been operational since 2010. Compared to similar vessels of 2010 vintage, carrying identical quantities of cargo (8000 dwt), this vessel needs a reduced main power of 3000 kW (-25%) to achieve an increased speed of 14,5 knots (+21%). The new design has retained the A1 ice class rating, including minimum main power and strength (including weight) requirements concerning the ship's hull. Because of the application of an improved hull shape and a larger propeller, propulsion stresses are being more efficiently distributed over a larger propeller surface. For that reason, the propeller's capacity for transmitting thrust to the water has been improved. The result is a significant reduction in fuel consumption, which benefits both the shipowner and the environment. On a daily basis, it achieves a reduction of almost nine tons in carbon emissions.

Further carbon reductions may be achieved by decreasing the ship's speed to around 70% of the engine's maximum power, which amounts to a speed of 9,5 knots. An even lower speed would deviate too much from the diesel engine's design and that of the interaction of big propeller and hull shape. Moreover, it would mean too great a loss of time and make the vessel less competitive within the market.

The vessel has a further innovation in the main engine's cooling system. In this cooling process a number of heat exchangers are used, in order to prevent corrosion and to minimise environmental risks. The engine will, therefore, never be touched by (corrosive) seawater. These so-called box coolers consist of High Temperature tubing (80 degrees) and Low Temperature tubing (40 degrees). It is impossible for fouling by micro-organisms to take place at 80 degrees. Fouling, however, can occur at 40 degrees. In order to prevent this, in general, anodes of lead, zinc or copper are used. To prevent said fouling at 40 degrees the Thermal Antifouling System (TAS) uses the high temperature water to flush the Low Temperature tubing. Fouling by microbes cannot occur under those circumstances. Because the 'Meridiaan' uses this system, metals are no longer being released into the marine environment.

www.schotship.nl



Seatrade

Hybrid reefer ships: more cargo at the same fuel costs

Seatrade has had two of its vessels converted into hybrid reefer ships. Both the Atlantic and Pacific Reefer have been fitted with partitioned-off open container holds situated in between the existing enclosed holds. In addition to pallets containing perishable goods, due to the conversion (cold storage) containers may now be carried as well. Seatrade's intention is to offer a fast and flexible container service on their existing trade routes, thanks to this modification.

The container market is being severely affected by the current economic recession. In order to reduce fuel expenses, large container vessels tend to apply the slow steaming method, which slows down container shipment. The need for a fast service, particularly for fruit and other perishable goods, continues to exist, however. For that reason two reefer vessels have been converted into hybrid reefer/container vessels. Said ships now travel between North Western Europe and New Zealand, where they load kiwi fruit, apples and onions. A fast (cold storage) container service is provided for ports in between.

The newly created hold is 30 metres in length. The vessels' overall dimensions have therefore been increased to 175.72 metres in length and 17,300 mt deadweight. The new hold has room for two bays of forty foot containers. The holds' container capacity has therefore been increased from 61 to 226 FEU (40 foot container). All of the containers may be connected to the on-board power supply for cooling purposes. In order to accommodate the extra energy demands, additional auxiliary power has been provided.

Remarkably though, these vessels do not need additional power to achieve the same speed as before the refit. This means more cargo at the same level of fuel consumption, reducing the carbon footprint for each ton of cargo significantly: by 28%. The Pacific and Atlantic Reefer are not one-off projects. Seatrade intends to have more of their reefer ships converted into hybrid vessels. Future newbuildings, too, may well be built according to this configuration. In the future, Seatrade also intends to extend this service to other routes and geographical areas, wherever there is a demand for fast transport of (cold storage) containers.

www.seatrade.nl



Scrubbing at sea

The Spliethoff Group and their fleet of over one hundred multi-purpose and heavy lift vessels, ro-ro ships and coasters is a leading worldwide carrier of general cargo like wood, paper and pulp, extreme heavy lift cargoes, project cargo like pipelines, industrial machines, steel structures and yachts. The company, located in Amsterdam, makes it a point of pride to limit the effects of their shipments on the marine environment to a minimum. And those are not just empty words. Spliethoff has raised the bar for their vessels' design and operation to considerable heights. If and when at all possible they like to be at the forefront of developing techniques for environmental protection. The company has made considerable investments in equipment to remove sulphur from ships' engines' exhaust gases: a scrubber.

The scrubber uses plain seawater to treat the exhaust gases. Said seawater is nebulised in the scrubber and ships' exhaust gases have to pass through the fine spray of water. Around 99% of sulphur and soot contained in the gas will adhere to the water droplets. The wastewater is then collected and cleaned before being discharged. The wastewater that is discharged naturally meets all the legal standards. The residue that has been filtered out is disposed of in port. When ships are in port, the scrubber can store the wastewater for several days on end.

The scrubber is considered to be one of the solutions for '2015'. At that time ships in the North Sea, the Baltic Sea and the English Channel will have to use low-sulphur fuel or use an alternative method to drastically reduce their sulphur emissions. Spliethoff is one of the first shipping companies in the Netherlands that is willing to take a chance on the technical and operational risks of a large experimental project like the integration of scrubbers. In addition, the scrubber that has been installed is the first of its kind because it can service four engines simultaneously.

In any one year, the scrubber in question is expected to trap around 612 ton of sulphur and to prevent 2,544 net tons of carbon emissions.

www.spliethoff.nl



Winner of the 2012 KVNRR Shipping Award 2012 for their use of electrical facilities ashore

The Stena Line ferry company has made considerable investments in their two super ferries, which are extremely economic to run and have a low impact on the environment, thanks to an ingenious system of fuel injection (common rail). In June of 2012, Stena Line moved to a new level of 'green'. They are the first multinational shipping company in the Netherlands to have access to electrical facilities ashore. Hook of Holland residents in particular are delighted. The air quality in their direct environment has improved by leaps and bounds; noise levels on the quay, too, have been significantly reduced. The KVNRR Shipping Award's panel of judges consider this a shining example for other ports to follow. They declared Stena Line to be the winner of the 2012 KVNRR Shipping Award.

Passenger vessels, like Stena Line's in Hook of Holland, are floating hotels. For that reason alone their power requirements are enormous (up to 2.5 megawatt) for air conditioning and lighting facilities. Until recently, the diesel engines had to be kept running, even when ships were berthed, to supply this power.

An electric socket on the quay? It sounds so simple, and would be if it were not for the fact that oceangoing ships need 60 Hertz and power supplies ashore provide 50 Hertz. Transformers are extremely expensive. To have the necessary modifications implemented on board, Stena Line had to pay more than €750,000. For each ship. In addition, it took quite a bit of doing ashore too. Not least of this was to create an electricity supply on the terminal's quay; for large quantities of electricity. Fortunately the Port of Rotterdam, whose intention is to turn Rotterdam into the world's most sustainable port, came to the rescue. They financed the installation of the required high-voltage cable of 15,000 volts (supplying a total of 3.5 megawatt) all the way from the Nieuwe Waterweg's storm surge barrier to the Stena terminal's quay in Hook of Holland.

Network manager Stedin took care of the necessary cables locally. A special derrick has been developed to lift the cable on board as soon as the ship reaches the quay. The Ministry of Infrastructure and the Environment and the City of Rotterdam, too, each carried part of the financial burden. The installation of these electrical facilities ashore has led to an annual reduction in carbon emissions of around 7,500 ton. Annual emissions of nitrogen oxide (NOx) and particulate matter (PM10) too have been reduced by 120 and 4 tons respectively.

www.stenaline.nl



Van Oord

Innovative natural building

Van Oord are leading international contractors specialising in dredging, marine engineering and offshore projects (oil, gas and wind). They are also an innovative partner for their clients and, for over one hundred years, have been helping to create the infrastructure for tomorrow's world.

In 2011, Van Oord participated in a Dutch consortium that carried out the innovative pilot project Zandmotor, off the coast of Zuid-Holland. It is the first time, anywhere in the world, that a coastline has been expanded and protected in this natural way. The Zandmotor consists of 21.5 million m³ of sand that has been deposited in the shape of a hook, attached to the coast near Ter Heijde. Because of the effects of wind, waves and currents the sand will spread along the coast over the next 20 years, thus causing the coastline to expand naturally, contributing to long-term coastal safety and creating more space for nature and recreation.

The project used the principle of so-called 'natural building'. The smart use of the natural assets available, combined with the efficient use of ships, has minimised the effects on nature and the environment. In the years to come, the sand motor will be monitored carefully. The experience gained by this project will be used in other parts of the Dutch North Sea coast, and very likely elsewhere in the world too.

Van Oord makes use of new technological developments wherever possible. These include the modification of injection systems with cylinder heads and the replacement of older engines' pistons, piston rings and linings by newer types. All this results in a reduction in fuel consumption and the use of lubrication oils. Van Oord has also equipped its vessels with fuel monitors, allowing crew to observe fuel consumption in real time over the course of the operation. Van Oord records the amount of their annual carbon emissions and produces annual reports on this subject. The objective is to have improved operational energy efficiency by at least 5% compared to the benchmark year 2010.

www.vanoord.com



Wagenborg

Smart hull reduces carbon emissions

Royal Wagenborg has been developing, managing and operating its fleet for more than a century. Today, the fleet consists of around 180 dry bulk vessels ranging from 3,500 to 23,000 ton and a number of ferries, tugs and offshore vessels. New ships are developed under the company's own management, often after consultation with clients, and they are built at selected shipyards. Wagenborg strives to keep its fleet young. For that reason new vessels are continually being built and older ships are sold.

The average age of one of Wagenborg's dry bulk vessels is only seven years. For that reason the ships always meet the most recent environmental requirements. In addition, Wagenborg aims to reduce emissions of harmful substances and fuel consumption. The relationship between fuel consumption and various draughts combined with ships' operational profiles receives particular attention. The result is unconventional hull shapes and propulsion concepts. The most recent example is the Vlieborg. This ship has been fitted with a ducted propeller and an innovative bow. The interaction between the propeller and the shape of the hull is improved by the ducted propeller, resulting in additional thrust. The innovative bow's performance over the entire range of draughts, and in bad weather in particular, is excellent.

IMO, the International Maritime Organisation, has raised the standards for the shipping industry's efficiency, with accompanying requirements. One of these is the Energy Efficiency Design Index (EEDI). Said index determines the maximum amount of carbon emissions for to be constructed ships. The amounts are based on benchmarks for different types of vessels, represented in tons of carbon emissions per ton/mile of cargo carried. Said benchmark values will be made incrementally more stringent in 2015 and 2020. In 2025 emissions will have been reduced by thirty per cent compared to those of the current generation of ships.

Thanks to her unconventional design, the Vlieborg's fuel consumption is so low, that already her performance outstrips the 2025 IMO standards! Naturally this trend is to be continued and the ships that Wagenborg currently has in development will be even more efficient than their predecessors. Wagenborg and their newest ships are a shining example of a shipping company that is far ahead of the rest of the field.

www.wagenborg.com



Wijnne Barends

Cooperation results in innovative and efficient sea-river ships

In 2012, the Wijnne Barends shipping company in Delfzijl commenced operations with the fourth ship of their innovative and efficient “Lady A” series. Wijnne Barends was established in 1855, and is one of the oldest shipping companies in the Netherlands. The company’s sphere of operations includes general cargo and bulk shipping, as well as shipment of wood and steel products. Their main geographical areas of operations are Scandinavia, the Baltic States, Western Europe, the White Sea, the Black Sea and the Mediterranean region.

The ‘Lady A’ series consists of highly specialised vessels: the so-called BIBU ships. They have been designed for use both as coastal ship and for inland shipping on the North Sea, the River Seine, the River Rhine and the British tidal ports. They may also be deployed in the Baltic Sea and the Mediterranean region. Their main cargo will be dry bulk and general cargo like wood products, grain and steel.

As well as preventing expensive transshipment in port, these vessels are also extremely efficient. But above all, their nautical qualities are excellent. They are very stable, and therefore able to carry large volumes of cargo. The low wattage of their engines of only 746 kW (1015 hp) makes for extremely low fuel consumption. Their innovative design is the result of intensive collaboration between the commissioning company, a number of design agencies and a number of research institutes. Accordingly the resultant series of ships is one whose performance has already outstripped expectations and the performance of comparable ships. Fully loaded, speeds of 10,8 knots can be achieved. These vessels’ performance is already 40% better than the EEDI Phase 3 standards that will not come into force until 2025.

In other areas too, the environment has been taken into account. The ships have been equipped to recycle engine rooms’ waste heat. The engines’ cooling water is recycled by using heat exchangers and subsequently used to heat the crew quarters. Because their captains co-own the vessels crews’ active commitment to reducing ‘their’ ships’ detrimental effects on the environment while operational, is guaranteed.

www.wijnnebarends.nl

