BULK TERMINALS *international*

WINTER 2019/2020

THE OFFICIAL MAGAZINE OF THE ASSOCIATION OF BULK TERMINAL OPERATORS

DRY RUN

Why Chinese demand continues to dominate the dry bulk market

DUSTING DOWN

New solutions to prevent dangerous dust build-up

COVER UP

How the latest hull paints improve vessel performace

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FUTURE PERFECT?

BY SANDRA SPEARES

As shipping prepares for the entry into force of the new sulphur regulations in January, there has certainly been a flurry of activity by suppliers offering solutions, as well as new approaches to development in the future

This year has been one of considerable uncertainty, not just in terms of geo-political events that have impacted on the bulk markets, but also in terms of predictions of what is likely to happen to bulk trades over the coming few years.

At the centre of things has been how the Chinese market is going to play out in the months ahead and how this is going to impact on segments that have been relying on contracts to ship essential supplies of commodities such as iron ore to feed Chinese demand.

This begs the question of how the capesize market will operate if there is a substantial drop in demand and, in particular, how this will impact on independent operators, as mining companies secure their own fleets of vessels.

Coming up with solutions to the move away from fossil fuels has sparked many new innovations, from paints to newbuilding designs. As far as ports are concerned, they are increasingly under the spotlight, particularly as far as their environmental performance is concerned. The port of Amsterdam's decision to phase out coal handling for environmental reasons may be a prediction of what is likely to happen elsewhere. It has, however, underlined that port facilities adopting this approach need to come up with solutions that will not discourage investors from taking on a role in ports for fear they may find their contract terminated a way down the line.

Ports are equally having to tackle the demands of reducing their energy bills and improving their performance as far as limiting the propagation of dangerous substances such as dust from cargoes that they handle. They also have to ensure that bulk cargoes are fit for use, and be prepared to tackle effectively cargo degradation coming from a number of different sources. Safety, of course, remains paramount.

ABTO's recent conference in Amsterdam offered an opportunity to discuss these and many other issues affecting operators in the bulk port arena. It also reminded those present that long-time safety concerns such as the dangers of liquefaction or deaths in enclosed spaces are far from being resolved.

The need for innovative solutions to tackle climate change, safety concerns and increasing automation have been the incentive for firms to come up with an impressive array of new products. This year alone has seen the launch of a number of new marine coatings that aim not only to improve the hull's efficiency through the water, but also to deter the transfer of invasive species.

As ships have rushed to fit scrubbers to vessels this year, the open loop/closed loop debate continues to run. One question that remains to be answered is how individual countries will react to the implementation of the new sulphur rules from January 2020 and how aggressive they will be in taking to task those who do not obey those rules. Will less scrupulous operators try to "wing it" and hope they do not get caught? Will ports have the manpower available to ensure that they are in a position to throw the book at those ships that do not comply?

One thing is certain. These rules are not going to go away, in particularly given the public's increasing concern about environmental issues.

I hope you enjoy reading about all this and more in this latest edition of *Bulk Terminals International* – and look forward to a lively 2020.

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To register an interest in attending and further course details, please contact Simon Gutteridge **events@bulkterminals.org** **+33 (0)321 47 72 19** or see more details at **bulkterminals.org/events/courses-and-training.html**

PUBLISHED BY abto ASSOCIATION OF BULK TERMINAL OPERATORS

EDITOR: SANDRA SPEARES
SPEARES1@AOL.COM

DESIGNER: JUSTIN IVES
JUSTINDESIGN@LIVE.CO.UK

PROJECT DIRECTOR: JONATHON FERRIS
JONATHON.FERRIS@BULKTERMINALS.ORG

PROJECT MANAGER: ALEX CORBOUDE
ALEX.CORBOUDE@BULKTERMINALS.ORG

SUB-EDITOR: SAMANTHA ROBINSON
SAM.ROBINSON.JOURNALIST@GMAIL.COM

PUBLISHER: BILL ROBINSON
PRODUCTION@BULKTERMINALS.ORG

ABTO
35 BEACON DRIVE
NEWTON ABBOT
DEVON
TQ12 1GG

CHIEF EXECUTIVE: SIMON GUTTERIDGE
CE@BULKTERMINALS.ORG

TECHNICAL ADVISER: IAN ADAMS
TECH@BULKTERMINALS.ORG

EVENTS: KIRSTIE THOMPSON
EVENTS@BULKTERMINALS.ORG

PR: PATRIK WHEATER
PR@SEABORNECOMMS.COM

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JOINT VENTURES

SIMON GUTTERIDGE, CHIEF EXECUTIVE ABTO

The successful Bulk Terminals 2019 conference saw a memorandum of understanding signed between ABTO and ICHCA International – a partnership that will go from strength to strength

ABTO's annual conference, *Bulk Terminals 2019*, was held this October in Amsterdam. We were delighted to be welcomed to Amsterdam by Femke Brenninkmeijer, director of energy, cargo and off-shore at the Port of Amsterdam Authority.

The Port of Amsterdam's sustainability strategy aims to stop handling coal by 2030. It was a difficult decision to make because it was a major bulk stream in the port. The port has worked very closely with dry-bulk-handling terminal Overslagbedrijf Amsterdam (OBA) to work out what changes needed to be made and how both their businesses could be transformed.

The port has enjoyed record volumes in the past five years, with particular growth in the transshipment of bulk products, including liquid bulk, coal and agri products and scrap. There were some useful questions and discussions around city port relationships generally and the issue of having terminals close to urban centres.

Brenninkmeijer explained that while the emphasis had previously been on raising volumes, now there is much more focus on the impact of operations on the city itself.

Will Frey's bullish market predictions in his opening presentation "Prospects for the Dry Bulk Market in 2020 and Beyond" were encouraging for our industry. Similarly, *Bulk Terminals International* regular contributor Basil Karatzas saw strong demand by financiers for ports and terminals infrastructure projects.

THE ABTO TEAM

SIGNING THE MOU ARE SIMON GUTTERIDGE AND RICHARD BROUGH OF ICHCA

The upbeat note continued with Garry O'Malley from Redcar Bulk Terminal. O'Malley described the ongoing transformation of a former pure bulk import terminal for iron ore and coal into a multi-user, multi-products bulk import and export port facility, together with the complex challenges faced during this journey. The first day continued with a series of presentations focusing on achieving those all important operational efficiencies.

At the end of day one, we all set off for a highly enjoyable tour of Amsterdam's Canals and the Conference Reception on board the historic Friesland barge *Anna Maria*.

Operators face additional costs addressing the pressing safety, sustainability and environmental improvements bulk terminals need to make. These challenges and the solutions to them were fully aired on day two.

ABTO is committed to being in the vanguard of efforts to address these issues. In this, we will be assisted by the MoU that I signed at the conference on behalf of ABTO with Captain Richard Brough OBE, head of ICHCA International. Brough is a valued contributor to our conferences and was joined in Amsterdam by Javier Quintero Saveedra, chairman of the ICHCA Dry Bulk Cargoes Working Group, who presented in the Biosecurity session.

New in Amsterdam this year was a workshop on Marketing and Branding Bulk Terminals, run by Ian Mills and Paul Sowden, assisting our members in developing their competitive edge and a theme we will return to.

My thanks to our all our other speakers, especially the support we continue to receive from Professor Mike Bradley, director of the The Wolfson Centre for Bulk Solids Handling Technology. He will be the course leader for the upcoming Port and Terminal Operations for Bulk Cargoes, a two-day short course and optional practical workshop taking place 10-12 March 2020. ABTO is delighted to be partnering with The Wolfson Centre (part of the University of Greenwich School of Engineering) to deliver this course, hosted at its Chatham Medway Campus.

The course will examine the issues surrounding the safe handling and storage of bulk materials in ports and on the sea. It is designed to be interactive so delegates are given the chance to discuss real life issues and to determine best practice for future developments. Our first course earlier this year included a visit to The Wolfson Centre's pilot plant. Interest was such that next year we will be offering an optional Practical Workshop, to be held at its on-site industrial-scale pilot plant.

Thanks also to our *Bulk Terminals 2019* sponsors: igis, Buttimer Engineering and BRUKS Siwertell, who make it possible to run our annual Bulk Terminals conference.

One consequence of the MoU ABTO signed with ICHCA International in Amsterdam was the invitation extended to me by Captain Brough to attend its November conference in Malta, with the theme of 20/20 Cargo Vision.

Sessions were held on subjects such as "Health and Safety in Port and Maritime Operations" and "Sustainability Along Container and Bulk Cargo Chain" — very much areas of joint interest to both ICHCA International and ABTO.

The conference was followed by a meeting of ICHCA's Technical Panel, a global volunteer group of industry professionals dedicated to fostering best industry safety practice. With ICHCA's strength in the container side of cargo movements and ours in bulk operations, we look forward to supporting it with joint industry initiatives on safety and sustainability.

After Basil Karatzas' presentation at *Bulk Terminals 2019* covering in part ports and terminals infrastructure projects, I was very interested in the Cargo Market Focus session led by Steve Cameron, managing director, CMR and technical panel member ICHCA International, looking at prospects in the Mediterranean, Africa and One Belt One Road.

I look forward to working closely with ICHCA International on safety and sustainability issues of joint concern to our industry.

BARGE TRIP ROUND AMSTERDAM DURING THE CONFERENCE

DR MARTIN JONAS OF BROOKES BELL

WORLD NEWS ROUND-UP

It has been something of an up and down year for shipping, with confidence in the industry dropping slightly in the latest survey from shipping advisers and accountants BDO

Confidence in the shipping industry fell in the latest three-month survey to its lowest level for two-and-a-half years, although owners, charterers and managers were more confident than they were at the time of the previous survey in May 2019.

The average confidence level recorded by the survey in the three months to end-August 2019 was 5.8 out of a possible maximum of 10. This compares to the figure of 6.1 recorded for the quarter ended May 2019.

Confidence was highest in the chartering sector, while the increased ratings for owners and managers were from 6.3 to 6.4 and from 5.8 to 5.9, respectively. The rating for brokers, however, was down from 5.7 to 5.1.

Confidence was up in Asia from 6.0 to 6.8 — the highest figure for this region since the survey was launched in May 2008, with an overall rating for all respondents in all geographical areas of 6.8 out of 10. The rating for Europe, however, was down, from 6.1 to 5.7.

In the freight markets, the number of respondents expecting higher tanker rates over the coming year was down by 12 percentage points to 43%, with the rating for charterers tumbling from 75% to just 25%. In the dry bulk sector, expectations of rate increases were down from 48% to 39%, with charterers again recording the most marked decrease, from 80% to 25%. Net rate sentiment was positive in the tanker and dry bulk sectors, but negative in the container ship market.

Responding to a stand-alone survey question, 26% of respondents said they expected the price differential between high-sulphur fuel oil and IMO-compliant low-sulphur fuel oil at 1 January 2020 to be between $175 and $249 per metric tonne. This compares to the 23% who thought likewise in November 2018. 24% put the figure at between $100 and $174, compared to 12% previously, while 17% estimated the cost at between $250 and $324 compared to 24% last time.

Richard Greiner, Partner, Shipping & Transport at BDO, says: "Geopolitical uncertainty contributed significantly to the decline in confidence recorded in our latest survey, with a number of respondents expressing concern about burgeoning trade wars and political tension in various parts of the world. Ongoing indecision surrounding Brexit was also a salient factor."

It was not all bad news, says Greiner. "Indications from the freight markets were less encouraging, with a fall in expectations of higher rates in all three main tonnage categories. Indeed, net rate sentiment was negative in the container ship sector for the first time in almost four years. But shipping confidence must be weighed against the highly cyclical nature of the industry. Not every reversal in fortunes is a portent of significant decline.

"Major challenges lie ahead, some of which will be beyond the control of the industry itself. But there will always be a role for the shipping industry, and particularly for one that is technically inventive and environmentally compliant and thereby attractive to investors."

INVESTMENT CHALLENGES

Basil Karatzas of Karatzas Marine Advisors told delegates at ABTO's recent conference in Amsterdam that one of the challenges for investors was with hundreds of millions of dollars under management, waking up every morning and finding something in which to invest. One aspect has been the volatility of the dry bulk index over the years since 2010, which has had impacts on investment.

"The industry is highly capital intensive. It is a diverse market and from an investment point of view you can pick

and choose which segment to invest in. While the industry has been affected by geo-politics, the dry bulk market has been a bit isolated from the trade wars."

The model is different for port finance, he told delegates, as there may be substantial upfront costs, but then investors can collect revenues over a period of many years. The cash flow model appeals to yield investors, who want to a cash flow yield, year on year, which is relatively low risk. Other models include public private partnerships: investment in port terms could be from pension funds interested in the yield model. Different commodities could attract different investments, such as cement terminals.

Interest rates have been historically low, and for many companies there is negative yield, he said, so investment in terminals may be attractive in view of this. There is interest in dry bulk cargoes, cruise ships and container operations. Partnerships may develop with operators in terminals with an emphasis on port efficiencies.

There is lot of money looking for a place to go and now is a good time to source capital for ports, Karatzas said. There is interest in expanding existing facilities as well as a need for big investments in new technology and long-term projects.

FUEL QUALITY CONCERNS

LuminUltra, the microbial monitoring specialist, has highlighted important concerns over the quality of some compliant fuels as the shipping industry gears up towards meeting the International Maritime Organization's sulphur cap, which comes into force in January.

Commenting on the blending of biodiesel with HSFO and distillates, which go towards reducing the amount of SOx emitted during the combustion process, Patrick Taylor, LuminUltra's director of global business development, says: "The addition of biodiesel will reduce the sulphur content, but ship operators do need to be aware this can result in increased microbial influenced corrosion (MIC). Less sulphur means more bugs."

Taylor points out that the high sulphur content of residual fuel has been an "excellent inhibitor", preventing the build-up of microbial growth and, consequently, the microbial induced corrosion of fuel tanks and systems.

"There is an increased biodiesel content in Marine Gas Oil (MGO) and we are seeing HSFO now being blended with recovered distillates to reduce the sulphur level. As biodiesel has a high water content, these new fuels can be nutrient-rich breeding grounds for microbiological growth. There are real risks, real safety concerns," he says.

"If compliant fuels are not regularly monitored for their microbiological content, then at the very least biofilm will form and clog up the fuel filters. In the worst case, if microbial growth goes unchecked, then we are likely to see an increase in rapid microbiological induced corrosion of even the most well-maintained fuel tanks and pipework."

MALAYSIAN BLOW

Members of the Clean Shipping Alliance 2020 have expressed disappointment in Malaysia's decision to prohibit the use of open-loop exhaust gas cleaning systems in its coastal waters.

The Malaysia Shipping Notice, published in November, states that ships calling to Malaysian Ports are advised to change over to compliant fuel oil or change over to closed-loop/hybrid systems before entering Malaysian waters and ports.

"We are disappointed in this announcement," says CSA 2020 chairman Captain Mike Kaczmarek. "The decision will impact not only our member shipping companies, but over 200 other international shipping companies that have announced their intent to install scrubbers as an accepted means of compliance under MARPOL Annex VI.

"We will, of course, comply with these national rules. However, we do not understand the reasoning or timing, with the global sulphur cap deadline just weeks away and with the IMO already embarked on a comprehensive evaluation of the environmental impact of exhaust gas cleaning systems in ports.

"We don't know what's behind this decision by the Malaysian Marine Department, but it was not likely science-based, as there is no evidence that would clearly support it. There also were no collaborative discussions with their global shipping partners, many of whom are very experienced with these systems."

In a CSA2020 Technical Conference held recently in Brussels, Elizabeth Lindstad, chief scientist at SINTEF Ocean, confirmed that the use of HFO+EGCS not only has better air emissions quality than ships operating on compliant fuel, but also a greater positive effect on global emissions reduction, including greenhouse gases.

Ian Adams, executive director of CSA 2020, says: "There are multiple credible studies just released during the past year that confirm the quality of washwater from exhaust gas cleaning systems, and clearly demonstrate that they have negligible environmental impact on the ocean or port environments.

"What makes this announcement so surprising is that the scientific evidence is there, and it is clear that the positive net environmental benefit from ships operating open loop in Malaysian waters would play an important role in Malaysian maritime sustainability plans."

BENTINCK BOOST

ABP has recently re-opened its Bentinck silo at the Port of King's Lynn, following a £400,000 refurbishment to enhance storage capacity.

Following significant expansion, the silo now offers ABP's customers in King's Lynn an additional 6,000 metric tonnes of grain storage. This represents an expansion in silo storage capacity of almost 25%, to 32,000mt in total, across 40 individual bins. The silo is also an ideal location for blending and storing smaller commodity volumes, providing customers with even greater flexibility.

Customers using the silo will also be able to benefit from the excellent weighbridge facilities as well as an additional grain processing lab located at the port, which provides quality-testing equipment.

FOLLOWING PROTOCOL

Trans-boundary export of carbon dioxide (CO_2) for the purpose of carbon capture and storage (or "sequestration") can now be provisionally allowed under certain circumstances, parties to the London Protocol have agreed.

The London Protocol provides the basis in international environmental law for governments to allow carbon capture and storage (CCS) under the seabed — which is recognised as one tool in climate change mitigation, while ensuring protection of the marine environment.

London Protocol Parties, meeting in London, October adopted a resolution to allow provisional application of an amendment to article 6 of the Protocol to allow sub-seabed geological formations for sequestration projects to be shared across national boundaries.

"The adoption of the resolution will remove a barrier for countries that wish to make use of carbon capture and storage, but which do not have ready access to offshore storage sites within their national boundaries," says Fredrik Haag, head of the Office for the London Convention and Protocol and Ocean Affairs at IMO.

SUSTAINABLE SOLUTION

More of the world's international shipping fleet will soon be able to power their engines using 100% sustainable biofuel. Biomass technology group BTG is setting up a new high-tech technology company that can convert crude pyrolysis oil into diesel fuel suitable for the shipping sector. It will be the first refinery in the world for an advanced marine biofuel based on pyrolysis oil.

The facility will be operated by a new company named BTG-neXt. In the first phase, BTG-neXt will focus on building a pilot refinery for converting pyrolysis oil into 100% sustainable marine biodiesel for ships, in order to demonstrate that continuous production is feasible.

Pyrolysis oil is made from biomass-based residues such as sawdust and roadside grass cuttings and is a sustainable alternative for replacing fossil fuels. Crucially, the new fuels will not make any concessions in terms of the sustainability of feedstocks.

The new demonstration facility has a planned production capacity of a modest 1,000 tonnes of advanced marine fuel per year, with plans, if deemed successful, to scale up, in order to support the industry in meeting International Maritime Organization target of a 50% reduction in Greenhouse Gas emissions by 2050, equivalent to an 85% reduction per vessel.

René Venendaal, chief executive of BTG, comments: "This initial capacity is sufficient to demonstrate that the technology works and will serve as a basis for further scaling up our operations."

According to Venendaal, the pilot will require a six-figure investment: "We are now working on a more precise estimate of that figure."

The goal is to use the pre-commercial facility as a reference for rolling out commercial refineries with a capacity of possibly hundreds of thousands of tons per year of an advanced sustainable marine biofuel for ships.

STORAGE SERVICE

Growing demand for high standard storage and distribution services has prompted GAC Malaysia to open its newest warehouse at the Port of Tanjung Pelepas in Johor state.

Catering to the needs of the Fast Moving Consumer Goods sector, the 117,000ft^2, 9,000-pallet position ambient racked facility is in a Free Zone area to take advantage of exemption on customs and excise duties for imports and exports, subject to approval from the relevant authorities.

It is located within the port to facilitate the most efficient and cost-effective movement of goods, as well as simplified customs procedures.

The warehouse features a selective pallet racking system, hydraulic loading bays and 24-hour monitored security and fire protection.

FLOATING FACILITY

Rocktree Consulting, a division of Singapore-based transshipment and logistics group Rocktree, has completed the front-end engineering and design (FEED) for a new floating terminal for the Bauxite Hills Mine, operated by Australia's Metro Mining Limited.

Bauxite ore is the world's primary source of aluminum. Australia, Guinea and Brazil are the largest suppliers of bauxite to the seaborne market, while China is the main buyer.

The FEED work forms part of an updated Definitive Feasibility Study (DFS) for the Stage 2 expansion of the Bauxite Hills Mine, located approximately 95km north of Weipa, Queensland, Australia. Metro Mining aims to increase bauxite exports from about 3.5m tonnes to 6m tonnes per year by 2021.

Fundamental to the expansion is the optimisation of an on-water transshipment facility capable of loading bauxite on to larger vessels, increasing transshipment volumes and loading rates.

Currently, bauxite from the mine is exported by way of smaller, geared self-loading bulk carriers.

Rocktree Consulting, under the leadership of managing director Mario Terenzio, was appointed in February 2019 to carry out a feasibility study aimed to identify the most cost-effective floating terminal solution capable of increasing Bauxite Hills' competitiveness by reducing transportation costs with the use of large bulk carriers up to capesize.

COMPLIANCE CONFIRMATION

To support improved industry management of risk and safety ahead of the implementation of the 2020 Sulphur Cap, RightShip is asking the operators of vessels over 8,000 DWT to confirm their compliant fuel choices and ship implementation plans in a new compliance assessment,.

Information gathered will be displayed on a per-vessel basis in RightShip's vetting platform, Qi, with the aim of improving the accessibility of compliance pathway data for owners and charterers and helping the industry to manage new safety risks arising from the Sulphur Cap, the company says.

After 1 January 2020, any serious incidents, detentions or non-compliance related to the regulation will also be highlighted on the platform. This follows the current RightShip practice whereby the vessel's Risk Rating will be downgraded until the root cause analysis is completed or the manager can prove compliance. Repeat incidents or non-compliance will be flagged during the vetting process.

RightShip users will be able to see the vessel's method for IMO 2020 compliance as declared by the ISM operator. Vetting customers will have the option to screen this data as part of their vetting criteria. The vessel's Risk Rating or GHG Rating will not be influenced by the vessel's IMO 2020 compliance method.

During the vetting process, if the manager has indicated that a vessel does not have a valid method of compliance, the vet requestor is informed accordingly of the risk of non-compliance or incidents.

Regardless of the compliance option chosen by the vessel owner, the decision to accept the ship or not ultimately remains with the vetting customer.

Martin Crawford-Brunt, RightShip's CEO, RightShip, says: "Complying with IMO 2020 brings a host of technical and operational risks that all of the industry needs to be aware of. It is therefore vital that all parties – ranging from ship owners, managers and charterers – have a full understanding of how compliance is being managed across a fleet.

"This temperature check will provide a means for vessel owners and managers to communicate their transition plan and their chosen compliance pathway. RightShip remains impartial to the compliance option selected and we will continue to support industry safety standards."

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FROM STRENGTH TO STRENGTH

COMPANY NEWS

Redcar Bulk Terminal (RBT) operates a deep-water terminal on the south bank of the River Tees, capable of handling capesize vessels with drafts up to 17m. The quay is equipped with two gantry cranes, with both bulk and hook capability, offering bulk discharge rates in excess of 40,000 tonnes per day.

The adjacent 130 hectare terminal, which is HMRC approved, offers both short- and long-term storage for bulk and conventional cargoes. The terminal has separate rail handling facilities for rapid loading and off-loading of rail freight traffic and enjoys direct access to the UK rail and road networks, with road links to the A66, A19 and A1(M). Given its location, the terminal is ideally placed to handle large off-shore wind projects in the North Sea. The terminal offers 24/7 working, which is provided by its own flexible and highly motivated staff.

RBT is the only UK east coast port to meet the full criteria for staging plus two, as stated in the Strategic review of UK east coast ports staging and construction facilities carried out in 2016. To date, RBT has hosted a number of offshore wind projects, including "Walney Extension", "Hornsea 1", "Borssele 1+2".

Following the closure of the Redcar steelworks in 2015, RBT moved away from traditional coal and iron ore imports and has successfully made the transition to a multi-user bulk handling facility handling a variety of bulk products, including: coal, coke, pet-coke, granulated blast furnace slag, aggregates and road salt, and has recently added scrap exports to the list of products handled. Continued investment in port equipment and rail infrastructure has seen terminal throughput continue to grow and the business pipeline is extremely strong.

For more information, please contact:
Redcar Bulk Terminal
Lackenby Main Office
Lackenby Works
Middlesbrough
TS6 7RP
Tel : +44 (0) 1462 406444
Mobile +44 (0) 7912 568890
E-mail: garry.omalley@redcarbulkterminal.com
Website: redcarbulkterminal.co.uk

THE NEXT GENERATION

COMPANY NEWS

Performance, reliability, acquisition costs, maintenance costs, operating costs, energy costs and environmental impact — all are key factors when deciding whether to invest in new equipment.

At E-Crane, we take great care to learn all about our clients' operational requirements and goals. This attention to detail ensures that all of these factors are addressed when building a solution to meet clients' material handling needs.

E-Cranes around the world routinely operate in "mission critical" roles where meeting the needs of downstream processing equipment is essential to the overall success of the operation.

While maximum performance and reliability are key to all operations, the ability to minimise material handling costs per ton is of great importance. E-Crane's balanced design brings it all together with longer outreach, higher capacities and fast duty cycles, which not only maximises throughput, but often results in a reduction in the number of conventional material handlers needed to move the same amount of material from point A to point B.

This balanced design allows for lower installed power, which in turn results in significantly lower energy consumption and costs. This balanced design also results in less wear and tear of components, reducing maintenance and repair costs. Additionally, in today's environmentally conscious workplace where CO_2 emissions and a smaller carbon footprint have taken on a new level of priority, E-Crane's electrically powered cranes will save thousands of tons of CO_2 emissions compared with the traditional CO_2-emitting diesel fuelled material handlers.

ENERGY EFFICIENCY

Over the past few years, there has been a concerted movement towards greater energy efficiency, which can be seen on some of today's modern hydraulic material handlers. Several manufacturers now supply machines with hybrid systems and proudly claim this approach can save 30-35% on the energy bills

E-Crane has not gone down the same track, as our basic and proven balance design already results in the most energy-efficient hydraulic crane available on the market. Utilising the principle of equilibrium, balance is achieved by a connecting rod that mechanically connects the stick to a moveable counterweight. This mechanical connection guarantees an "always in balance condition", allowing the load to be moved at a fraction of the energy that would be required using typical material handlers. Because the movement of the counterweight and stick are mechanically synchronised, the E-Crane's centre of gravity is always maintained and guaranteed to remain within the diameter of the slewing ring. The movable counterweight assures smooth lifting at low hydraulic working pressures.

ELECTRIC POWER

There is a market tendency to seek lower energy costs and the environmentally friendly benefits offered by electrically powered machines, versus the high-energy-consuming, CO_2-emitting, diesel-powered material handlers that are so commonplace today. To address this market, several conventional material handlers are now offering an electric power option as major product innovation.

However, what others promote as "innovation", such electrically powered, environmentally friendly machines have been standard practice and perfected by E-Crane since its beginnings. All E-Cranes are equipped with an electric motor as the main power source — and have been for decades. Where no fixed electric power source is available or there is a need for the machine to be mobile, the E-Crane can be equipped with a diesel generator set to power the main electric motor. The ability to switch between a fixed power supply and diesel generator is always possible on all diesel generator set-equipped

machines. The use of an optional variable frequency drive can reduce the start-up demand of a fixed power source or reduce the size of a diesel genset on a mobile machine.

E-CRANE ADVANTAGES

The equilibrium principle, perfected and implemented successfully in hundreds of cranes by E-Crane, provides a nearly perfect balance between the movable counterweight and the weight of the crane boom and the stick, plus half of the payload, at all radii.

Outstanding benefits are:

- Very low energy consumption compared with any other hydraulic material-handling machine
- Very low wear costs as the crane operates with low pressures and the balance ensures an equal load spread on components
- Maintenance-friendly access to all serviceable components.
- Smooth, harmonic crane movements
- High operator comfort with excellent ergonomics and a superb view of the work area needed to enhance safety and facilitate high productivity
- Extremely quiet inside and outside of the cabin
- Unique, adjustable floating point (automatic boom float), which helps to ensure grab filling in difficult conditions.
- Lowest operating cost in the industry.

The E-Crane design provides the highest quality fabrication of all load-carrying steel constructions, high-class corrosion protection and reliable, non-proprietary, hydraulic components from renowned suppliers, such as Rexroth and Caterpillar. Design classification meets the highest possible standards in FEM or DIN, ensuring the highest-quality build and longest service life available in any material handler today.

All crucial spare parts, including slewing bearings, pumps and cylinders are in stock in one of the regional distribution centres around the world and available on very short notice even in the most remote locations. This reduces the client's need for spare parts to only those needed for regular maintenance, plus a limited selection of items that would be convenient to have on hand.

TRAINING AND ADVICE

After delivery and installation, E-Crane technicians will always remain on site until the machine is performing properly, and the client is comfortable taking over operations of the Crane. This is a standard practice that benefits both the client and E-Crane. A follow-up visit by the technician is always included with every E-Crane to answer any operational or maintenance questions that the client may have.

When it comes to in-depth training courses for operators, maintenance personnel and terminal managers, additional training can also be arranged at the E-Crane Academy at the company's headquarters in Belgium or US Operations headquarters in Galion, Ohio.

AFTER-SALES MAINTENANCE

At E-Crane, it is not just about selling a piece of equipment —it's about developing a solution to lower our client's material handling costs and developing a long-term relationship with them. As part of this effort, E-Crane offers maintenance contracts of varying degrees, ranging from periodic visits by our service technicians to All-In Maintenance Contracts to carry out all maintenance activities. All-In Maintenance Contracts are now in place for an increasing number of E-Crane users around the world, allowing E-Crane owners to focus on their core business. All-In Maintenance includes regular site visits by a certified E-Crane field service technician to support the client in the best possible way to remain proactive in preventative maintenance, ensuring maximum uptime. As part of the All-In Maintenance Contract, E-Crane guarantees the availability of replacement parts. This illustrates E-Crane's strong commitment to be a long-term partner, rather than just a crane supplier.

CONCLUSION

Where others may claim to offer energy-efficient, green alternatives, E-Crane really delivers — even more so when looking at machines that regularly reach a life of 60,000 hours and more.

E-Cranes provide longer, useable outreach ranges than typical material handlers, starting from 25m, all the way to 50m, with duty cycle capacity ranges from 5 tonnes to more than 60 tonnes. The combined long outreach and high-duty cycle capacities maximises the use of existing real estate, can reduce the number of conventional material handlers needed and allows for unloading any type of barge or ship with minimum clean-up.

Although E-Cranes are compatible with any manufacturer's hydraulic grab, its clamshell buckets and scrap grabs are designed with a powerful closing force, ensuring maximum fill and eliminating spills and carry-back. The E-Crane operator's cabs are equipped with a state-of-the-art control system for easy machine operation which builds operator confidence, reduces cycle times and maximizes productivity.

All in all, the E-Crane design makes the machines ideally suitable for high-volume industrial and mission critical applications in the most demanding working conditions — something that has been proven many times over on all continents around the world.

For more information, please visit: e-crane.com

PUTTING SAFETY FIRST

Damage caused by crane collapses and injuries to operators are common and now three industry bodies have produced revisions on safety features for quay cranes

Experts from international freight transport insurers, TT Club, together with cargo handling industry experts ICHCA and PEMA have recommended minimum standard safety features to promote safety.

The "Recommended Minimum Safety Features for Quay Container Cranes'" document has been updated and Revision 1 is now available. The recommendations update the original document published in 2011. Born out of TT Club's claims experience, the research has drawn together a formidable group of operational and engineering experience from around the globe to recommend solutions to common safety issues.

The publication calls for a new approach to the crane procurement process in order to recognise safety as an integral part of operational decisions that will minimise exposure to injury, damage and disruption costs over the life cycle of the equipment.

The recommended minimum safety features directly address the causes of accidents and failures identified by TT Club from its claims records. Some of these include:

» **Damage caused by high winds**
TT Club's publication *WindStorm II - Practical risk management guidance for marine & inland terminals*, emphasises that design features play an important part in minimising exposure. Non-technical people would be surprised at the "sail effect" inherent in the Meccano-like structures. There are innumerable instances of cranes being blown along the rails, colliding with neighbouring cranes, or being dislodged from the rails, often leading to structural collapse. While extreme conditions cannot be entirely avoided, the recommended baseline requirements include details for driven braking system and anemometer design and operational controls with an appropriate shutdown function. Further losses can be prevented through the installation of storm pins on both waterside and landside, as well as crane tie-downs on each corner of the crane — with appropriately positioned and engineered anchor points in the terminal apron.

» **Damage caused by collision**
Accident statistics clearly demonstrate that collisions are a surprisingly recurrent problem. Most commonly, it is the boom of the crane that impacts

a ship's superstructure, resulting in substantial repair costs and consequent downtime. TT Club has for a number of years recommended the installation of radar or laser electronic sensors. This proven technology, integrated appropriately into the operational systems, allows the crane to come to a "normal" stop prior to impact.

» **Risk of fire**
The incidence of fires in quay gantry cranes is low, certainly compared with mobile terminal equipment. However, the position of control machinery high up on the crane structure presents a considerable challenge to most port fire response services. Thus, it is important to install temperature and smoke detection systems and provide alarms for all relevant operational staff. Fully automatic fire suppression is also recommended.

The intention of the recommendations is to urge suppliers to include as standard, not optional, the baseline safety features on this list in all their quotations for container quay cranes. Terminals and buyers are also recommended to incorporate such requirements in their tender specifications. In many instances, the safety features identified can be retrofitted to existing equipment.

The publication aims to contribute to protecting the substantial asset investment and minimising costs and injuries associated with any type of accident.

The "Recommended Minimum Safety Features for Quay Container Cranes" document Revision 1 is now available free from the websites of TT Club, PEMA and ICHCA.

REACHING NEW HEIGHTS

Improving cranes lifting capability is key to improving performance and Liebherr has set about improving this across its LTM 1750-9.1 mobile crane range. The LTM 1750-9.1 is becoming an 800-tonner, with the type designation LTM 1750-9.1 being retained. Liebherr has compiled a new luffing jib configuration using existing lattice sections to provide additional capacity increases for wind power applications. Cranes already in use on the market can be retrofitted with the new system.

The increase in load capacity of the LTM 1750-9.1 for wind power applications is more than 10 tonnes.

The wide-ranging experience that the design engineers and structural engineers have with thin-walled boom profiles has enabled the popular calculation models and approaches of the Finite Element method to be further refined, Liebherr explains. Supported by high-performance computers, the real load-bearing structure of the crane is simulated even better in the static calculation model.

The result is that the lifting capacities of the 750-tonner are now higher than originally calculated across the vast majority of working ranges.

Liebherr recently handed over the 100th Liebherr mobile harbour crane, a new LHM 600, to the Spanish customer Maritima del Principado in Gijón. Spain is now the third country in the world, alongside Russia and India, with a fleet of 100 or more Liebherr mobile harbour cranes.

AWARD-WINNING DESIGN

The 370 EC-B 12 Fibre, representative for the whole EC-B series, has been awarded another design prize — the "Focus Open 2019 Gold".

"Here, the little scope left for the design of such highly functional machines was used very effectively. In particular the cabin, which is often only a purchased part, was specifically redesigned: Inside it provides a humanised workplace and the exterior design sends out clear brand signals. Even the ballast elements are formally integrated," said the jury.

Other innovative solutions pioneered by Liebherr this year include the Liebherr LR 11000 crawler crane featuring the innovative, highly flexible "V-frame" ballasting system.

The 1000-tonne crane operated by Swiss crane logistics contractor Emil Egger AG used this hydraulically adjustable folding frame for the suspended ballast to complete a spectacular bridge hoist near Lausanne and also removed an old fire ship from the River Rhine in Basel. If the V-frame had not been used, these two crane jobs would only have been possible at significantly higher cost.

The demanding requirements on site therefore created perfect conditions for a stiff practical test for the first use of the new V-frame on the LR 11000 operated by Emil Egger. "Without the hydraulically adjustable ballast radius, hoisting the bridge would have been significantly more expensive," says managing director Michael Egger.

"It would have required much more expensive work on the embankment to get closer to the abutments with a crawler crane. And then we would also have required a much longer crane track to complete the bridge immediately in front of the abutment."

The adjustable ballast system was used for this job because there were buildings and obstacles in the way of the derrick ballast during the slewing process.

In addition to the LR 11000, Liebherr also supplies the V-frame for the LR 1800-1.0, the newest crawler crane development from Ehingen.

MACHINE, REPAIR & SERVICES

COMPANY NEWS

Established in 1977, MRS Greifer GmbH is a leading engineering company providing design, manufacture, supply and after sales services for grab buckets up to 30 m³ capacity. Our commitment to continuous research and development ensures our grabs are world leaders in terms of technology, quality and performance.

With five decades of experience in the design, manufacture, research and development of grabs, plus an extensive after-sales service backed by our team of highly skilled engineers, MRS Grabs has clients from every corner of the world.

We design grabs to fully meet the needs of our clients and the parameters within which they work, producing equipment capable of unloading all kinds of bulk cargo. Our machines include the latest features and are of optimal weight, ensuring an exemplary performance for a longer period of time. When it comes to hydraulics and other outsourced parts, we only use trusted brands so the highest quality is ensured.

Each grab is manufactured under the industry's strict quality controls, according to the QAP approved by our experts. We are only too aware that delays in shipping can result in exorbitant costs so we keep a full stock of spare parts, and our committed after-sales service team is available to see to all our customers' needs in the quickest possible time.

With grabs to handle bulk, logs, scrap, underwater dredging and more, please don't hesitate to contact us to talk through your needs.

MRS GREIFER

MRS Greifer GmbH
Talweg 15 - 17
74921 Helmstadt
www.mrs-greifer.de
export@mrs-greifer.de
Phone: +49 7263 9129-15
Fax: +49 7263 9129-12

DUSTING DOWN

Preventing dust build-up during materials handling is a key challenge for port operations, but a number of initiatives are providing new solutions

What kind of machinery is used in port to handle material will have a considerable effect on cargo and its potential degradation, Professor Mike Bradley of the Wolfson Centre for Bulk Solids Handling Technology told delegates at the recent ABTO conference in Amsterdam.

In terms of unloading, the aim is to reduce degradation, and with cargoes such as biomass the question is whether a grab or an unloader is more appropriate, he said. "A continual ship unloader [CSU] will often give more partial degradation than a grab."

As a rule, he told delegates, grab handling was a more gentle process. The transfer point design of the equipment has a huge impact on the degradation issue, with a move towards head and spoon design in the past few years, which stops material bouncing from side to side.

Another point to consider, he told delegates, is what an acceptable level of degradation is: partial degradation leads to dust emission, poorer handling, caking or dust explosion.

In addition, Bradley said, "contractual agreement of cargo degradation is a minefield". Working out loss may be very difficult because sampling is tricky: "How do you know how much dust was in the cargo to start with?"

In considering whether to buy a grab or a CSU, efficiency will have a part to play. CSUs are better in terms of efficiency and offer high rates of unloading, he said, although they are generally designed around a specific cargo. They are also less dependent on an operator's skill.

Pneumatics, meanwhile, are available on much shorter lead times and have lower weight on the quayside. Energy consumption is high, however, Bradley said.

Different materials have different issues to contend with during handling. These include caking of the material or moisture migration due to temperature change. Mass flow as opposed to core flow also needs to be taken into account, as core flow product is more likely to cake than mass flow, according to Bradley. Core flow silos must be drawn down to empty occasionally, he explained. "The key thing is to understand the material and review the handling system."

DUST-BEATING DESIGNS

High concentrations of dust from processed wood can cause problems if left unchecked. Aside from its environmental impact, sawdust can build up on the surface of machinery, especially on oiled parts, and interfere with equipment function. It can also potentially increase fire risk or the spread of fires in particularly hot and dry environments, according to Bruks Siwertell. The company advocates the use of bulk trusts as "one of the fastest, most efficient ways to distribute and discharge the huge volumes of processed wood chips required by the bioenergy market and pulp and particle board industries".

Bruks Siwertell has developed many ways to mitigate the dust emissions that invariably occur from this form of material discharge. "The basic design of the truck dumper has been optimised to reduce dust emissions," says Christopher Duffy, area sales manager at the company.

"Primarily, dust is controlled by our low-profile end-pivot design, which ensures that the truck unloads its cargo at a low elevation, approximately 2.5m above the ground, and directly into the back end of the hopper.

"This keeps the impact of the material very low and results in minimal dust emissions, particularly when handling very dry materials such as wood shavings or wood pellets."

In most cases, the low-profile design and the covered hopper is sufficient protection against dust emissions. However, in some cases where facilities are located close to other industries or populated areas, the truck dumper can be covered with a fixed or rotating hood.

Both versions mitigate dust emissions by bridging the gap between the truck dump end and the covered hopper. The

fixed version is fitted on to the end of the hydraulic lifting platform. The rotating hood is fitted both to the platform and the hopper and articulates when the platform is raised and lowered.

"These additions to the system can provide assurances and help to develop good relationships with neighbours by settling any concerns about dust emissions from a new wood products facility being developed in the area," notes Duffy.

Where no dust emissions are permitted, a dust collector can also be specified. Dust collectors can be mounted directly over the covered hopper, or ducted to a central baghouse so that the customer can make better use of it.

ROBOT RESPONSE

Konecranes, meanwhile, has recently introduced a new lift robot for its industry-leading Agilon automated materials management system, which it says will significantly enhance customers' warehouse efficiency and open new opportunities for companies at larger storage premises.

The Agilon robot's ability to move diagonally as well as horizontally and vertically offers greater versatility versus previous models, and it is equipped with Konecranes' latest software. This means accelerated transfers of items at customer sites, a more comprehensive reach in terms of warehouse size and greater efficiency and insight for customers, the company says.

Most of the existing Agilon systems can be updated with the new lift robot. The first users of the updated systems include Agronic Oy in Finland, Smartmile parcel service, in Finland and Germany, and selected parcel terminals in the US.

"Our customers asked us to increase the performance of Konecranes Agilon so it can be used in larger locations, too," says Tapani Tilus, vice president, Konecranes Agilon. "Our new robot solution, which also brings the latest innovations from our software, shows we can meet this demand and underlines our commitment to give customers unparalleled and unbeatable service."

SMART MOVES

STEMM has developed a new range of state-of-the-art grabs that automatically adapt themselves to the product specific characteristics during each handling process, with no direct manual intervention from the worker required.

Should the product be heavy or compacted, of big granulation or sometimes mixed with light products or plastic packages, the grab works at a lower or higher speed, regulating the penetration force required and with the adequate dragging of the material. It changes the speed and regulates the pressure according to the material characteristics in each moment, the company says.

The working mode of the machine can be pre-programmed according to the products and materials that are going to be handled. This programming is done remotely, either from the crane cabin or via a remote control from a tablet, PC or smartphone.

The grab's operating regime can therefore be controlled remotely, with data gathered on the number of fast and slow manoeuvres that are carried out during the homogenisation and preparation phase, saving a considerable amount of time.

Stemm's Smart Grabs feature external lamps running on fast or slow flashes frequency, with colours depending on the condition or working regime at each moment.

Handling with Stemm's latest generation grabs provides significant added value, the company says. They have been put into operation in the port sector where port cranes are equipped with different grabs for handling various types of bulk cargo of differing densities. As the most suitable equipment for each bulk product is not always available, equipment with grabs that cover the maximum or higher density range is needed. The grab's penetration force and speed may need to be adapted according to the product.

When the bulk carried in the hold is lighter, manoeuvre times are automatically adapted with the appropriate penetration force and speed, resulting in great time savings while unloading vessels, which has a positive economic impact on the port.

Stemm has also developed remote control service Grab Connect, which allows continuous remote monitoring, assessment and control of the grab. It can also be programmed and adjusted in real time. This new tool helps to optimise preventive maintenance and make production processes more efficient.

The grabs incorporate an automaton that enable the user to see in real time the operating pressure, oil temperature and level, opening and closing commands and times, the number of manoeuvres and the hours of work, among other parameters.

In addition, notification is sent by email and text message each time an event occurs, any incident, stoppage or anomaly is detected, or a change of components or spares parts is foreseen.

COST-EFFECTIVE CONVEYANCING

COMPANY NEWS

Drawing on more than 80 years of experience, BEUMER Group develops and implements system solutions to provide greater efficiency in the bulk industry. Controlled growth, a global presence and a wide product range in conveying and loading, palletising and packaging technology has ensured the long-term success of the company. Based in Beckum, Germany, and with branches across the globe, BEUMER Group employs some 4,500 people and achieved an annual turnover of around €900m in 2018.

BEUMER Group produces curved belt conveyors as open troughed or pipe conveyors, which are capable of transporting large quantities of bulk material from the quarry to the works or port cost effectively. They overcome long distances, steep gradients and tight curves, and can be individually matched to the particular task and topography. The pipe conveyors avoid any contact of the product with the environment and vice versa.

BEUMER also provides mechanical vertical conveyors, such as belt and central chain bucket elevators for vertical transport. For safe and economic transport for floury and small-sized bulk materials, for example raw meal, cement, grits, sand and concentrated ores, the company offers apron conveyors with a belt or chain as the traction element.

To ensure efficient loading, BEUMER Group also supplies ship loaders. These consist of a fixed boom with an extendable telescopic belt conveyor, which allows ships to be filled efficiently. These systems are also equipped with a de-dusting unit that keeps the process emission-free.

BEUMER Group also manufactures loading heads for fast and dust-free loading of bulk materials into silo vehicles. Their double-walled design separates the de-dusting system from the material inlet. In addition, BEUMER Group has developed mobile loading units that can be adapted to the length of the vehicle. It also offers various telescopic systems for loading open vehicles without generating dust.

BEUMER Group's strength lies in its ability to efficiently combine individual installations and systems in the packing plant with intelligent automation — from filling to the packaged stack.

Its rotating filling machine BEUMER fillpac® R, for example, can be incorporated flexibly into existing packaging lines. The system is equipped with a calibratable weighing unit. The weighing electronics ensure that the BEUMER fillpac® R always achieves accurate degrees of filling. Special software, meanwhile, enables the weigher to communicate continuously with the filling spouts and get the best out of the packaging line, as it is not necessary to reject bags with incorrect weights from the process.

The BEUMER paletpac® high-performance layer palletiser stacks bags of paper, PE, and PP on different sized pallets flexibly, accurately, stably and more efficiently. Users benefit from improved accessibility, shorter installation time, greater flexibility and therefore, above all, lower costs.

BEUMER Group's product range also includes the BEUMER stretch hood®, a high-performance packaging machine that stretches a snug-fitting hood over the palletised goods, minimising film consumption and protecting the product from external influences.

In addition, BEUMER Group offers comprehensive support to ensure high levels of availability for its customers' machines and systems. It comprises intensive customer service and flexible service agreements, individual modernisations, efficient spare parts supply, extensive training for users and residential service.

For more information, visit:
beumergroup.com

HOT TOPIC

Safety is a key component when transporting product like cement clinker, which can reach extremely high temperatures and therefore requires a robust handling system, as Beumer explains in this case study

CEMENT FACTORY IN ACTION

Cement clinker can reach temperatures of 500 to 800°C, which can make transportation of the material difficcult. One system on offer is Beumer's belt apron conveyor, which uses a belt instead of a chain as the traction element, allowing higher speeds and a slimmer design while still delivering the same level of performance. The GSZF is particularly suitable for modernisations, as can be seen with the Turkish cement manufacturer Göltas Cemento.

So why are apron conveyors particularly efficient for the transport of clinker? According to André Tissen of Beumer: "The cement plant operators are still not able to ensure with 100% certainty that the material does not leave the clinker cooler than temperatures of 500 to 800°C."

Tissen is a sales manager for customer support at Beumer and is familiar with the demands of customers. In general, the clinker should cool down to the ambient temperature plus 80°, but during the process, a so-called raw meal flash can occur in the shell section of the pre-heater tower, caused by breaks in the kiln outlet sealing. "It doesn't happen often, but it does happen. It can't be completely avoided," he explains. Within a few seconds, several tons of raw

meal or clinker run through the cooler. The material cannot cool down and arrives on the conveyor at extremely high temperatures.

Beumer 's apron conveyors provide robust and reliable solutions that are completely heat resistant. The specific design of the cells allows safe, low-friction transportation of any hot material. Sealed and overlapping side walls and bottom plates in the cells prevent the clinker from exiting and minimise the escape of dust. Operators have the Beumer apron conveyors SZF and GSZF with cell width gradations from 500 to 2,000mm, centre distances of more than 250m and conveying capacities of over 1,300m^2 per hour.

The angles of inclination on the SZFs and GSZFs depend on the height of the silo and the conveying distance. The systems come in three different designs. "We have an open cell design where the bulk material is transported at an angle of up to 30 degrees without rolling back," explains Tissen. The cells on the second design are equipped with baffle plates. Inclinations of up to 45° are possible. The design as steel box conveyor allows extreme inclinations of up to 60°. "This design is perfect for steep inclinations and small curves, but also for smaller inclinations when transporting clinker with a high content of fine particles," he describes.

And this is becoming more and more important for operators. Instead of using fossil fuels such as coal and gas, they are opting for alternative fuels in order to reduce greenhouse gas emissions and production costs. Besides liquid materials such as waste oil or solvents, the majority of the solid alternative fuels are composed of municipal and industrial waste, such as plastic, paper, composite material and textile mixes. This also changes the chemical process.

"Clinker grains are spherical with a diameter of 10-30mm and the content of fine particles is less than 5% when using fossil fuels. This content increases, however, to 30% when using alternative fuels," explains Tissen. "In order to handle this safely, the boxes need to be completely enclosed."

The traction element in the conveyor is usually a single or double strand sprocket chain, designed as steel-bushed roller chain with a pitch of 315mm. Finely regraded versions for breaking forces ranging between 250 and 2,700 kilo newton ensure optimum adaptation to the required parameters. The maximum conveying speed is 0.3m per second.

"Instead of a chain, we also offer apron conveyors with our tried and tested Beumer steel wire belt coming from the bucket elevator technology," says Tissen. Here the cells are attached to the low-wear, long-lasting and steel-wire reinforced belt in a way so that the heat of the clinker in the steel cells is not transferred on to the belt. A special profile between the steel cells and the belt prevents this. Partition plates are attached in the material feeding area below the cooler and can be easily removed for maintenance, protecting the belt against hot clinker in case of a kiln flash.

One decisive advantage of the belt apron conveyor: with 0.6m per second, it can reach double the conveying speed compared to apron conveyors with a chain. "This makes it perfect for retrofitting and modernisations," says Tissen. If the operator wants to increase the kiln capacity for example, he can replace an existing apron conveyor with an belt version of the same size. It means double the capacity without having to change anything on the steel structure or the conveyor bridge.

The operator also benefits from a new construction application: the thinner, lighter design of the GSZF reduces costs for the steel structure and freight. Furthermore, the decreased net weight lowers the static and dynamic loads that affect the clinker silo and the foundations, for example. "A new construction project can be designed for a smaller load and is therefore more cost-effective to build," explains Tissen. "The lightweight design also lowers operational costs."

As the entire belt lies with its surface on the drive and return pulley, the unwanted polygon effect on the chain is avoided. The particularly smooth running of the machine also reduces noise emission considerably. The noise is less than half as loud as conventional SZFs with chains. This is good for employees, the environment and the surrounding area.

The use of the durable Beumer steel wire belt instead of a chain lowers maintenance costs and extends maintenance intervals. Chains can also break, if preventive maintenance is not performed properly, which will lead to the conveyor collapsing. "The belt with the steel wires only ages and the rubber becomes brittle, but it would never completely break," Tissen explains.

Lubrication is also not required for the belt, whereas it is used frequently on a chain, if for no other reason than to reduce noise levels. Grease and oil are not only a cost factor, but also detrimental to the environment and the conveyor: clinker dust gets stuck on it and settles in the chain links, which accelerates the wear and tear.

Beumer belt apron conveyors are in operation for nearly 150 companies. One of them is the Turkish cement manufacturer Göltas Cemento, located close to Isparta, approximately 130km north of Antalya. In the wake of a building boom in Turkey and the growing demand for cement, the cement manufacturer opted to modernise its kiln and increase the performance. An increase from 250 to 400 tons per hour of the conveying technology capacity was required, for a chain apron conveyor that transports the clinker from the kiln cooling system to the silo.

And for an economical production, Göltas Cemento has been increasingly opting for alternative fuels over the past few years, which meant that the content of fine particles also increased continuously. The existing conveyor already transported high quantities of material, and the process had become extremely dirty. Personnel were constantly needed to perform cleaning work.

To find an efficient solution and a suitable partner on its side, Göltas

Cement turned to the Beumer Group. The two companies have been working together since 1996. The system provider has supplied two clinker transport systems and four belt bucket elevators over the course of their partnership. So, the cement manufacturer was already familiar with the advantages of Beumer's steel belt technology.

The project phase began mid-2015 and the contract was awarded in the beginning of 2016, followed by the installation and commissioning in the autumn of that year.

"For a more powerful chain apron conveyor, we would have needed to take down the entire system including the building structures and the concrete tunnel," says Tissen, who was responsible for this project with his team.

"This wasn't necessary when opting for the belt version. It reaches double the conveying speed, so that the Beumer Group engineers could design the system for an increased capacity while keeping the same width. The conveyor bridge and the self-supporting steel structure, as well as the concrete foundations remained. Göltas Cement was able to considerably reduce costs, and put the system quickly into operation."

The silo is 50m high. In order to overcome an inclination of 40°, we installed a steel box conveyor," explains the expert. It releases almost no material to the environment, despite the higher content in fine particles, creating a cleaner work environment.

For the installation work, Beumer Group provided the supervisor and the assembly was carried out by the client personnel.

"Our collaboration was great," says Tissen. "The assembly was a little trickier in the very narrow concrete tunnel, where the conveyor is located. But the installation was well-prepared. So we were still able to stick to the set schedule."

Göltas Cemento and Beumer Group are already discussing future modernisation projects.

BEUMER GROUP SUPPLIES BELT APRON CONVEYOR TO THE TURKISH CEMENT MANUFACTURER GÖLTAS CEMENTO.


THE NARROW AND WEIGHT-REDUCED DESIGN OF THE GSZF REDUCES THE COSTS FOR STEEL STRUCTURE AND FREIGHT. THE OPERATOR WAS ABLE TO SAVE CONSIDERABLY ON COSTS


EMPLOYEES OF THE CEMENT MANUFACTURER IN CHARGE OF THE INSTALLATION WORK, WITH THE SUPPORT OF BEUMER GROUP.


THE BELT APRON CONVEYOR REACHES AN INCLINATION OF 40°.


THE SPECIFIC DESIGN OF THE SYSTEM'S CELL STRAND FACILITATES THE CLEAN TRANSPORTATION OF THE CLINKER. NO CLINKER CAN RUN OUT.

A FLEXIBLE APPROACH

COMPANY NEWS

SIG is one of Europe's most important, producers of rubber conveyors and elevator belts.

With more than 50 years of manufacturing experience, SIG supplies high-quality rubber belts with synthetic and steel cord carcasses worldwide, in all industrial fields where the handling of bulk solid materials is required. Rubber covers are available to safely and efficiently handle critical bulk materials such as hot clinker, flammable coal, oily waste and fertilisers, highly abrasive bauxite and iron ore.

Highly specialised technicians are also available to provide assistance when installing belts and elevators, with the full supply of all the products required, such as splicing materials and clamping devices for elevator belts.

SIG also produces special technical products, including, in particular, tracks for snow mobile machines.

Since the end of the 1960s, production has been exclusively located in Gorla Minore (Varese) in northern Italy, close to Malpensa Airport and Milan city centre. The 1,2000m^2 site incorporates all the company's key areas, such as management, sales, purchasing, accounts and R&D. The company organisation allows for a truly flexible approach to the business, making the decision process and reaction to customers' needs fast and easy.

SIG's technicians are in daily contact with customers to analyse any problems and find the most cost-effective solutions.

The flexibility of the company's organisation extends to the production process: with a capacity of 350km and 5000t per years, SIG produces conveyor belts of all sizes, up to 2200mm width and 25t of weight per single roll, length and type, covering all industrial fields, such as cement and iron factories, power stations, ports and terminals, quarries and mines and chemical industries.

To optimise customer requirements, reduce freight costs and save time for belt installation SIG is also able to deliver rolls in an oval shape.

RUBBER BELT CATAGORIES

- **TEXTER®** with EP textile insertions
- **SIDERFLEX®** with steel cord carcass

- **ARABELT®**
- **PIPEX/PIFLEX®**
- **SLIDEM®**
- **RIPSAVE®**
- **TEXBIND®** with special carcass

- **SPINATEX®**
- **FLEXOBORD®**for high inclines

RUBBER COVERS FOR CONVEYOR BELTS

- Abrasion resistant
- For materials with temperatures up to 200°C
- Oil, fat and chemical resistant
- Self-extinguishing and anti-static as per ISO 340 & ISO 284

RUBBER BELTS FOR BUCKET ELEVATOR

- **ELEMET®** with steel carcass
- **ELETEX®** with textile carcass
- Elevator belts can be punched according to customers instructions
- Special rubber compounds for high temperatures, up to 200°C.
- All rubber covers are antistatic as per ISO 284.

The supply chain comprises qualified European converters of rubber compounds, synthetic fabric and steel carcasses to assure the highest levels of quality with the fastest and most flexible delivery time. Product quality is managed according to codified quality control programmes throughout the whole production process, from raw material acceptance to delivery of final product.

SIG has also developed its own technological laboratory, equipped with the most advanced and reliable equipment. SIG's laboratory is also available for customers' requirements.

Together with strict quality control, SIG pays special attention to the environmental and health properties of the raw materials involved. Since 2012, following European directives for tyre products, all rubber compounds used by SIG are free from hazardous chemicals — in particular PolyAromatic Hydrocarbons — giving a limited and lower impact to the environment and also to the health of operators than imported products of unknown origin.

RELIABLE RESULTS

COMPANY NEWS

Since its establishment some 50 years ago, Vigan Engineering has sold more than 1,350 machines in around 100 countries across the globe, including 270 high-capacity pieces of equipment. Its recognised international experience, reliability and specialised knowledge has made it a leader in the agribulk handling industry.

Designing and manufacturing ship loaders and unloaders for dry agribulk cargo, Vigan has the solution for all your bulk handling needs.

Our equipment is customised to meet any specific requirement and is suitable for a range of applications, depending on the cargo, size of vessel, points of discharge and destination of cargo, working conditions and so on.

Portable grain pumps

Available in suck only, suck and blow or blow only mode, their capacity range is 100-250 tons/hour. A wide range of accessories allow many different applications: vessel to truck, silo to train, vessel to vessel and so on.

Pneumatic continuous barge and ship unloaders (NIV)

Designed for a capacity range of 160-800 tons/hour for all sizes of vessels, these are fixed, on tyres or rails, with an electrical or diesel engine, adapted boom length and many other options. They are able to handle many kinds of free-flowing products (cereals, grains, meals, wood pellets), as well as more fragile ones (malt, cocoa beans).

Mechanical continuous ship unloaders — "simporter"

These can discharge up to 1,500 tons/hour from larger vessels (Panamax, Cape) thanks to their twin-belt technology.

Ship loaders

These are designed according to the loading capacity required, up to 2,000 tons/hour (adapted to conveyor speed and length, type of cargo, and so on). Like unloaders, many parameters are optional, such as fixed/on tyres/on rails, height and width, boom length, loading spout type, dust control system, control cabin, static/rotating thrower and so on.

Thanks to our strong relationships with business partners specialising in complementary equipment, Vigan is able to manage complete turnkey projects, such as grain terminals providing pneumatic and/or mechanical ship unloaders, cranes, conveyors, weighing and bagging stations, storage silos and portable machines, as well as supervising engineering and civil work. For instance, we have carried out installations in Pakistan (handling capacity of 1,600 tons/hour, storage of 75,000 tons) and in Djibouti (handling capacity of 1,200 tons/hour, storage of 60,000 tons).

Our high-level sales team and international network of sales agents and representatives enable the engineering and adaptation of any project to the customer's exact requirements. We are focused on efficiency, in order to reduce energy consumption and operational costs. We also provide our customers with long-term reliability and a strong after-sales service, working with them from start to finish, from the first drawings to the manufacturing and erection of its machines. Once in place, our NIV pneumatic unloaders are reliable for more than 50 years and customers can be assured of a continuous after-sales service. There is no better reward than receiving a new order from an existing customer, to increase capacity or equip another site.

Located at the heart of European Union, just 30km south of Brussels and one hour's drive from the international port of Antwerp, all our activities take place on the same 12,000 m^2 site. This enables easy communication between all departments, including sales, engineering, manufacturing, quality control and after-sales technical assistance, all contributing to provide the very best for our customers.

vigan.com

VIGAN NIV-TYPE SHIP UNLOADER OF 600 T/H INSTALLED IN TAIWAN IN 2018 AND IN THE BACKGROUND IS THE VIGAN NIV 600 T/H INSTALLED IN 2014

GRAINS OF TRUTH

Derek Langston, head of research at SSY Consultancy & Research, examines the world grain trade outlook

This year is on track to see record seaborne grain trade, with SSY estimating a combined coarse grain, soya (bean and meal) and wheat trade total of 533 metric tonnes, representing a gain of around 20 metric tonnes on last year. Although grain makes up just 11% of this year's estimated global seaborne dry bulk trade total, projected grain cargo growth in 2019 accounts for more than 25% of SSY's expected dry bulk trade expansion, with iron ore trade falling in the aftermath of the Brazilian dam disaster in January.

These levels have been achieved despite widespread outbreaks of African swine fever across China and other Asian countries, which have dampened import demand for soya used in animal feed. Official figures reported from China suggest culling led to a near 40% reduction in the country's pig herd in the year to August. Indeed, the US Department of Agriculture's Chinese soyabean import estimate for 2018/19 of 83 metric tonnes compares with an expectation of 103 metric tonnes back in June 2018.

South America has made a massive contribution to grain exports this year, not only as the leading supplier of soya to the world's largest consumer, China, but also in terms of corn exports. With retaliatory import tariffs imposed by China on US soyabeans from last year in an escalation of the trade war, soyabean exports from Brazil have dominated Chinese market share, accounting for 70% of total Chinese imports in January-September 2019.

However, there is the scope for increased competition from US supplies in the event of a breakthrough in trade negotiations with China (where there has already been news of increased purchases of US soyabeans).

Combined exports of corn from Argentina and Brazil more than doubled to 31.6 metric tonnes in the 3q19 from 14.2 metric tonnes in the same quarter last year, playing a vital role in creating a record quarter for world seaborne grain trade, judging by confirmed trade data. The South American corn cargo flow was encouraged by extensive crop damage across the US corn belt earlier in the year.

Gaining market share at the expense of US suppliers has involved significant expansion in long haul trades. For example, destination data from the International Grains Council (IGC) showed combined corn trades from Argentina and Brazil to all Asian destinations leaping from 8.3 metric tonnes in the 3q18 to 17.2 metric tonnes in the 3q19.

Drought-impacted Australian wheat supply created opportunities for shipments into the import markets of Asia-Pacific from Argentina. The election of a new president in Argentina, bringing export tax changes, does, however, represent a source of uncertainty for the country's agricultural sector.

Strong export performances from Russian wheat and Ukrainian corn exports boosted Black Sea shipments beyond traditional markets in North Africa and the Middle East into South East Asia.

Underlying strength in world import demand, regardless of the US-China tariff war and outbreaks of African swine fever, have added to our conviction that seaborne trade will continue to trend higher and become a consistent generator of incremental dry bulk carrier demand growth.

GOLFETTO SANGATI
GRAIN MILLING AND HANDLING

Mechanical and Pneumatic grain handling terminals

Designed, engineered and built in italy with 90 years of experience and evolution

Golfetto Sangati, part of GEA Group, designs, builds and installs turnkey equipment for grain handling and milling. The company fulfills the market demand in a competitive way and with state-of-the art technologies based on research, experience and in-depth technical knowledge. The company designed and built more than 50 port systems all over the world and plays a primary role in technological advancement from the first pneumatic ship unloader to the more advanced mechanical loaders and unloaders. The company supplies a large range of handling, processing and storage, loading and unloading systems on tires or rail with a capacity of 50 to 2,000 tons per hour implementing the best technical principles.

GEA engineering for a better world

golfettosangati.com
gea.com

TAKING CONTROL

Working closely with Martin Engineering Brazil, T-Grão Cargo – located at Latin America's busiest port, Santos in São Paulo, Brazil – saw its dust control efforts improve exponentially

Although fugitive dust particles from virtually any dry cargo can lead to respiratory issues, grain dust emissions possess allergenic properties over and above the common air quality concerns, increasing the number of people who experience negative effects. To prevent this having an impact on the local community and adjacent docks with dust caused by the transfer of agricultural commodities, T-Grão Cargo – located at the Port of Santos in São Paulo, Brazil – decided to seek professional help to mitigate the issue.

"We have a complicated geographic position, because we are between a passenger terminal to the north and the Brazilian Navy to the south, and across the street from the port authority," explains Vinicius Pina, operations director for T-Grão.

PORT AND TERMINAL

The Port of Santos is the busiest port in Latin America, spanning approximately 8km^2. With nearly 1,500 people working in the port on a daily basis and 1.1m passengers boarding and disembarking ships annually, the area is always bustling, so authorities monitor air quality closely to ensure safety.

Operating since 1998 at Terminal 26 on the Northern end of the quay

closest to the passenger terminal, T-Grão manages the import and export of over 4m st/y (3.6m mt/y) of malt, wheat, soy and maize. The company maintains 42 concrete silos and eight massive metal silos, totalling 126,000st (114,000mt) of storage capacity.

Spanning 14,000m^2 of dock space, the company is considered one of the smallest grain terminals in Brazil, but processes more grain per square metre than larger competitors, making it the most efficient operation of its kind in the country. Offering customs clearance, cargo delivery and reception, logistics and warehousing services, T-Grão serves a variety of customers from international importers to farmers across the State of São Paulo.

"As our production has increased over the years, so have fugitive dust emissions," says Pina. "We've worked closely with regulators and neighbours to address air quality issues."

PARTICLES AND PEOPLE

Transfer points at T-Grão range between 10-15m in height. As material was dropped from one belt to the next, the impact created turbulent air pressure that forced dust out of openings in the chute. The fugitive emissions significantly lowered air quality and visibility in the immediate work areas, forcing workers to wear protective masks when working around any part of the conveyor system. The dust often travelled beyond the site line.

The Santos Estuary — the waterway that serves the port — is partially protected from high winds off the Atlantic by a wind shadow created by high-rise buildings and hilly terrain along the coast. The placement of Terminal 26 in the northern part of the port, however, leaves it exposed to wind travelling up the estuary. Depending on the direction and force of the wind, dust created at the transfer points had the potential to travel long distances.

"Complaints were fairly common, and our proximity to the port authority allowed an immediate response from inspectors," Pina says. "When we received a complaint, we acted to address the issue right away, but we needed a long-term solution."

BATTLING DUST

Utilising a cleaning crew of 45 workers for 24 hours per month, the inner and outer areas were thoroughly cleaned on a regular basis. "The investment for

cleaning equipment just to control dust build-up was high," Pina explains. "Along with using brooms and other basic equipment, we purchased an expensive Italian-made sweeper. Overall, the cleaning took personnel away from other operations, spanned large areas of the dock and warehouse, and actually ended up mobilising the dust particles while it was being done."

Operators first sought an answer to the dust by bringing in an equipment manufacturer that installed a new transfer chute. This was intended to contain dust from the discharge flow as it fell on to the belt. What it did not do was control emissions at the loading zone where the impact would cause plumes of dust to escape. The dust filtration system attached to the settling zone chute was inadequate, due to the volume of emissions and the chute design.

"At one point, a breakdown caught us unprepared at a critical moment and resulted in costly unscheduled downtime," says Pina.

RETHINKING THE TRANSFER

With complaints still periodically coming in from neighbours and ongoing internal air quality issues, T-Grão turned to Martin Engineering Brazil and two other suppliers, asking all three to propose solutions within their budget. Martin technicians discovered that, due to the height of the transfer chute, dust created by the impact of material was most turbulent at the loading zone. When it hit the belt, pressure within the loading chute increased, pushing particulates at a high velocity out of any gap that was not sealed. Moreover, because of inadequate cleaning of the belt's surface at the discharge zone, fines clung to the belt causing carryback on the return side, which led to spillage and dust along the entire conveyor path.

The result was large amounts of fugitive dust in the area, reducing air quality and visibility, settling on all surfaces and fouling rolling components. Seizing idlers contributed to belt mistracking and spillage, further increasing operating costs for cleaning, maintenance and downtime.

After preparing a detailed report and proposal, Martin Engineering was chosen to install a series of components that together created a total transfer point solution. Beginning with a tail sealing box, the approach also included a skirt board cover, dust bags, impact cradle, slider cradles, track-mount idlers and a belt tracker, completed by a heavy-duty belt cleaner.

"We found that Martin offered the most effective and easily maintained solution within our budget," Pina says.

CONTROLLING AIRFLOW

Uncontrolled airflow and improper sealing through the loading and settling zone is the main culprit in the creation of dust and spillage in the transfer area, and it starts with the tail pulley. Protecting the tail pulley is important because fouling of the pulley's surface can lead to belt slippage and drift as the belt is entering the loading zone. Uneven loading worsens mistracking and breaks down the belt seal on the skirt board, causing spillage and dust emissions. Installed on the rear of the chute work, the tail sealing box effectively stops dust emissions from the rear of the chute, protecting the pulley.

A vital component of the design was containing, lengthening and increasing the interior space of the settling zone. Along the entire length of the chute is Martin's unique apron seal, designed to mitigate dust emissions and spillage

due to turbulence and cargo shifting. A skirtboard cover is used to contain even fine dust particles and further reduce debris "shedding". The structure controls airflow so fine particulates are directed toward two new dust bags installed above the chute, while heavier airborne dust is given space to settle without leaving the chute environment.

To control the turbulent pressure build-up from material dropping on to the belt, a heavy-duty impact cradle features a top layer of low-friction UHMW polymer moulded to a base of impact-absorbing SBR rubber, all reinforced with a steel support structure able to withstand as much as 17,000 pounds (53.4 to 75.6 kN) of force. The cradle protects against impact and friction wear on the belt as it glides over the bars, with no rolling components to break down, which reduces maintenance and prolongs operational life.

Extending from the impact cradle down the length of the settling zone are slider cradles that retain a tight belt seal and a smooth path through the settling zone to mitigate dust creation. Using a smooth UHMW polymer "box bar" engineered to prevent heat build-up, the unique design provides dual-wear surfaces for extended equipment life.

By supporting the edges of the belt to eliminate sag, the cradles prevent spillage, stabilising the belt's path and helping the skirting retain a tight seal. To offer further belt support, Martin's track-mounted idlers are placed in the tight spaces between cradles to retain a straight belt profile, preventing "pinch points" that can damage the belt over time and sag points that allow spillage. Designed with sliding frames on a stationary base, rolling components are easily installed and serviced.

After the belt leaves the settling zone, a belt tracker minimises the belt wander that can be caused by uneven cargo loading. Precise alignment keeps the belt from contacting the conveyor structure and causing edge damage and spillage, ensuring that the material enters the discharge zone properly centred for optimal flow, transfer and belt cleaning.

To conclude the total system solution, Martin Engineering technicians installed a primary belt cleaning blade and spring tensioner system designed to keep a tight seal across the blade profile with minimal wear on the belt or splice. Utilising the Constant Angle Radial Pressure ("CARP") curved blade, the system maintains the most efficient cleaning angle through the life of the blade. Mounted with a minimal footprint on the head chute, the cleaner improves discharge of fine material, reducing carryback, spillage and dust emissions along the return path.

As a compliance measure, technicians also installed safety guards to prevent reach-in hazards. To inspect and monitor the system operations, sealed access hatches allow safe observation and maintenance of components.

RESULTS

When the conveyor was activated, operators immediately observed significant results. As material moved through the system, particulates remained within the enclosure and either collected in the dust bags or settled back into the cargo flow.

Along with less carryback on the return side of the belt, dust was drastically reduced in the immediate area around the conveyor system at both the loading and discharge zones.

"It was a substantial improvement over the previous design," Pina says. "The staff no longer need to wear protective gear just to enter the area and visibility is improved."

After a lengthy observation period, operators report that there has been less downtime for clean-up and maintenance, as well as improved workplace safety. In addition, managers have enjoyed a reduction in complaints from neighbours and less scrutiny from authorities inspecting the port for air quality.

"Our dust control efforts have set an example that is now being considered by terminals up and down the port," Pina concludes. "We are now planning to install a similar design on several of our other transfer points."

YOUR TRUSTED PARTNER

COMPANY NEWS

Golfetto Sangati has more than 90 years of experience in the grain handling industry

Part of the Pavan Group since 2010, Golfetto Sangati develops, builds and installs turnkey plants for durum wheat, maize and rice mills, as well as ship loading and unloading systems, and storage for raw materials and finished products.

It has more than 90 years of experience in grain handling, developing advanced systems for the handling, cleaning, calibration, selection and storage of seeds and other commodities, such as wheat, corn, barley, soybean, sunflower seeds, rapeseed, coffee, rice and fertilizers.

Clients can be certain that our extensive knowledge in the design and engineering of integrated technology systems for grains and grain-based food will ensure the best solution for them.

At the end of November 2017, Düsseldorf engineering group GEA – one of the largest suppliers for the food processing industry — purchased the Pavan Group.

This acquisition creates a truly global group, with design and engineering know-how marrying up with an extensive sales and servicing network, offering all sides growth opportunities and new markets.

SHIPLOADING

A mechanical shiploader, TRANSLOAD can be stationary or mobile on rails or wheels.

GRAIN TERMINALS

Golfetto Sangati is one of the few companies able to design, manufacture and install full grain terminals, from intake, to storage and cleaning/treating equipments, up to loading.

RECENT PROJECTS

Yuzhnyi Port project (Ukraine): design, manufacture and delivery of one mobile TRANSLOAD shiploader, rated at 2,000 tph with KIKO system.

SHIP UNLOADING

TRANSMEC continuous mechanical unloader

Barcelona Port project (Spain): supply of one TRANSMEC ship unloader (600 tph) for soya beans, including a shiploading boom for soya meal (200 tph).

Cocoa beans project in Toronto (Canada): design, manufacture and delivery of handling system for cocoa beans. Intake, cleaning and bulk load out for raw material to chocolate manufacturers.

Further more information, please visit:
www.golfettosangati.com
www.pavan.com
www.gea.com/grainhandling

For business enquiries:
Golfetto Sangati
Pietro Barbujani, Product Manager
Via Fratelli Bandiera, 3, 31055 – Quinto di Treviso (TV) - Italy
Phone +39 366577 9423
Pietro.Barbujani@gea.com

MAKING THE CHANGE

Key bulk products require not only safe handling, but a decision on whether they should be handled at all, as delegates at the recent ABTO conference in Amsterdam discovered

Femke Brenninkneijer, director of energy, cargo and offshore at the Port of Amsterdam, gave delegates at the recent ABTO conference in Amsterdam a rundown of the current state of play at the port following the announcement that it was banning coal handling in the next few years.

The port has had record volumes in the past five years, with particular growth in the transshipment of bulk products, including liquid bulk, coal and agri products and scrap. It has decided to phase out coal — a difficult decision to make, Brenninkneijer said, because it was major bulk stream in the port.

The port covers an area about one sixth of the size of the city, totalling 1,600 hectares. There is a lot of investment in the port, with the expansion of existing companies and new companies investing, so space is at a premium.

Once the decision on coal was made, the port worked very closely with dry-bulk-handling terminal Overslagbedrijf Amsterdam (OBA) to work out what changes needed to be made and how its business could be transformed, as well as that of the port.

With coal power plants already closing this year, OBA is turning its focus on developing business in minerals,

scrap, biomass and agri bulk. For example, it is handling scrap collected locally from Germany, which it exports to Turkey and supplies to Tata.

The terminal has made great strides in showing stakeholders how issues are being tackled and business is being developed, Brenninkneijer explained. "As a port, we have to explain to stakeholders that it is not just bulk, but part of a bigger picture," she said.

When it came to the issue of having terminals close to urban centres, Brenninkneijer said that it was a question of how to position bulk in the bigger supply chain and that logistics would always have a big part to play.

"Four years ago, the port was concentrating on raising volumes and less on the city, but this has now changed," said Brenninkneijer. "We have a lot of work to do to make the city part of the beautiful world of the port."

ICE CHALLENGE

Thyssenkrupp Industrial Solutions, meanwhile, is developing and building a new materials handling system for one of the most remote and challenging locations in the world: an iron ore port on Baffin Island in northern Canada.

Baffinland Iron Ore Mines Corporation's Mary River mine is one of the world's richest iron ore deposits, with iron content at more than 65%. At the same time, the port on Baffin Island is one of the most demanding locations in the world as it is only free of ice and accessible to shipping between the end of July and the beginning of October.

With Thyssenkrupp's new material handling system, Baffinland aims to triple its material handling capacity to 12m tons of iron ore per year.

According to Christof Brewka, head of materials handling at Thyssenkrupp Industrial Solutions: "Ambitious projects like this require a deep understanding of local conditions, close collaboration with the client and efficient global project management.

"One of our strengths is that we can bring together our experts at different locations around the world. Teams from Germany, Canada and the US have pooled their know-how to develop the best solution for Baffinland. At the same time, our proven technologies will guarantee the highest productivity even under extreme climatic conditions."

THYSSENKRUPP SHIPPED THE FIRST PLANTS FOR A NEW MATERIAL HANDLING SYSTEM COMPLETELY PRE-ASSEMBLED FROM BREMERHAVEN

Thyssenkrupp supplies a complete system for the processing, storage and transport of iron ore. This includes a complete railcar unloading station, a crushing and screening plant, a stockpile system including a combined stacker/reclaimer, a ship loader as well a conveyor plant connecting all components.

Due to the difficult logistical and climatic conditions on site, the plants are pre-assembled at a total of four locations in Europe, Canada and the Middle East.

The first delivery included a crusher, a screening system and a railcar unloading station, which was shipped from Bremerhaven to Canada in July this year. While the railcar unloading station was preassembled in Stettin and transported to Bremerhaven, the crushing and screening system was assembled in Bremerhaven. The crusher building is 23.5m wide, 33m high and weighs 1,470 tons. The screen building is 30m wide, 34m high and weighs almost 1,800 tons.

When it goes into operation in 2021, the system will crush, screen and store the ore produced in the Mary River Mine all year round and load it onto panamax or capesize ships during the ice-free season. The system can fully load a capesize ship in just one day.

The ore is transported from the mine to Milne Inlet port on the northern coast around 100km away. As part of the overall project, this transportation will be converted from road to rail.

Thyssenkrupp has also recently supplied a new coal handling system to the State Transport Leasing Company (STLC) in Russia. The system will be the centrepiece of a new terminal for coal exports in the port of Lavna near Murmansk, on the western shore of Kola Bay. With a planned capacity of 18m tons of coal per year, the terminal will significantly increase the coal handling capacities of the region. It is expected to be fully operational in 2021.

Torsten Gerlach, chief executive of the mining technologies business unit at Thyssenkrupp Industrial Solutions

comments: "Together with our partner LNK Industries, we will equip one of the largest ports in Russia with a state-of-the-art port handling facility. We are pleased to contribute our extensive experience in the planning of such systems. As one of the few full-range suppliers, we can provide our customers with fully integrated solutions that ensure high performance and resource-efficient operation."

The terminal project will be completed in two phases: first out-shipments are expected to take place in 2020. In that same year a total of nine million tons of coal will be handled on site. In 2021, the volume increases to 18m tons.

The project will augment regional coal exports and release pressure on existing terminals in the Baltic Sea. It is closely connected with the development of the Murmansk Transport Hub, one of the biggest ongoing infrastructure projects in the Russian north.

Thyssenkrupp will supply two ship loaders, stackers, reclaimers and car dumpers, as well as one combined stacker-reclaimer, several belt conveyors and auxiliary equipment. The contract includes engineering and procurement, as well as services for site erection and commissioning.

Within the project, Thyssenkrupp's partner, the Latvian construction company LNK Industries, is responsible for the design and construction of the conveyor system.

In order to keep dust emissions from the handling site at a minimum, all coal transfer points, wagon unloading stations as well as ship loaders will be outfitted with dust suppression equipment.

DUST DOMINATION

Ensuring that product is safely loaded without generating dust is a key part of ports' activities these days. Vortex recently displayed its dustless retractable loading spout, along with products from the Vortex Quantum Series, including the Vortex Orifice Gate™, Vortex Roller Gate™, Vortex Quick Clean Gate™, Vortex Wye Line Diverter™, and Vortex® Iris Valve at PPMA 2019, in Birmingham.

Vortex's loading spouts are used for loading dry/bulk solid materials into open and/or enclosed vessels like trucks, railcars and barges. The four-cable lifting design provides maximum stability and the unique machined pulley features chamfered edges and precision cable grooves to significantly reduce cable wear and back lashing as the loading spout extends and retracts.

Vortex offers a 10-year warranty on the spout cables if they should break due to friction from the pulley.

Dust control is also an important feature of the Port of Rosyth's new eco hopper equipment. The Samson hopper is the first of its kind in the UK and will be a key component of the port's new agri-bulk hub facility for Cefetra.

Forth Ports owns and manages eight commercial ports across the UK including the Port of Rosyth which is strategically located for road and rail and provides an important connection with mainland Europe and the UK. The Port of Rosyth is currently undergoing a multimillion pound investment to provide a dedicated agri-bulk facility for Cefetra. The new terminal and improved storage facilities will deliver increased annual throughput and storage capacity positioning Rosyth as the main agri-hub for Scotland.

In developing this new agri-hub the safety of staff and protection of the environment is paramount. Forth Ports chose a SamsonN Eco Hopper to receive dry bulk materials as it offers a high and reliable import capacity whilst minimising the escape of dust and it is equipped with a host of safety measures to ensure effective and safe performance.

The new Samson Eco Hopper will be used for dry bulk materials such as grain and aggregates.

Operation of the Samson Eco Hopper is straightforward. As dry bulk materials such as grain arrive by sea, they are offloaded into the hoppers using mobile harbour cranes. At a little over 18m in height and made of reinforced steel the Eco Hopper provides a sturdy and solid reception unit.

The Eco Hopper is topped by a tapered inlet shroud that minimises any dust generation caused by cross winds. As the crane grab discharges the load, dust filter units situated on three sides of the hopper will keep any fugitive dust from spreading.

The grain then falls through the "Flex-Flap" dust seal system, which contains any further dust. Material is discharged from the hopper via a dual outlet fitted with two telescopic cascade discharge chutes. This allows a single truck to be loaded by two chutes simultaneously, thus increasing the average loading speed.

Material passes through the Samson Eco Hopper at a peak rate of 1,200 tons per hour. The unit is wheel mounted, which allows it to be positioned across the port in different locations as required and to be moved clear to allow other port operations to continue when not in use.

The Samson Eco Hopper benefits from a variety of safety measures: a storm anchor system (comprising of chains, shackles and attachments to secure the equipment during high winds), ready-to-load traffic lights and sounders, working lighting and safety overload protection.

The operators' cabin is climate controlled and provides a 360 degree view of the operation while accessing all controls. There is also a hand-held pendant operator remote control unit.

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NEUERO Industrietechnik

TAKING A PRACTICAL APPROACH

Moving products efficiently and quickly is essential in the cement industry, where a number of innovative approaches are having a dramatic effect

The cement industry requires smart solutions to ensure speedy, efficient production. One recent contract saw Chinese firm Anhui Conch Cement ordering a series of laboratory automation systems from Thyssenkrupp Industrial Solutions.

China alone accounted for around 2.2bn tons, or about 56%, of total world cement production in 2018. Anhui Conch Cement operates more than 120 cement lines worldwide and its order was for the supply of four new polab laboratory automation systems, including for the world's two largest cement plants in Wuhu and Tongling in eastern China.

Pablo Hofelich, CEO of the Cement Technologies business unit of Thyssenkrupp Industrial Solutions, says: "More and more cement manufacturers are showing interest in our smart factory and digitisation solutions. Our automation systems make cement plants fit for the future. This order with our longstanding client is an outstanding reference in the industry, underlying the global trend for efficiency improvements. "

The polab laboratory automation system uses industrial robots to ensure consistently high product quality at minimum production cost. The system enables cement producers to respond to growing quality and environmental requirements, according to Hofelich.

"The increasing use of substitute fuels and raw materials in cement production makes it necessary to record and monitor quality data promptly and intervene in the production process as necessary. The high degree of automation ensures excellent reproducibility and avoids errors," he says.

"With polab, Thyssenkrupp provides customers with a high-end system for controlling and optimising their processes and supports them during installation, commissioning and operation," Hofelich concludes.

KEEPING MOVING: A CASE STUDY

Efficient material movement via conveyor is critical for efficient cement throughput — a particularly acute issue when running wet raw material at the quarry. At Ash Grove Cement's facility in Louisville, Nebraska, operations personnel noted accumulation in specific locations that threatened to slow material movement — particularly at transfer points — which required manual intervention on a near-constant basis.

THE ASH GROVE CEMENT PLANT IN LOUISVILLE, NE

"Basically, a plant utility person would have to be stationed at the transfer point at all times, operating an air lance to prevent material from plugging the chutes," explains Ash Grove Quarry Superintendent Quentin Vandal. "The approach required a staff member to poke and prod the accumulation for an entire shift to maintain the flow of raw material and keep pace with our production needs."

Vandal recognised that air lancing was not a sustainable solution and that the temporary fix was affecting overall efficiency, raising costs and taking a valuable employee away from more productive tasks.

The plant had used air cannons from Martin Engineering in other locations at the facility to maintain material flow and prevent blockages. But the situation on Conveyor 102 was unique, in that no power was readily available to run the devices. Vandal turned to conveyor experts at Martin to review the issues and come up with a solution.

The first step was installing Martin's air cannon designs at key locations throughout the transfer point. One was located at the head of the conveyor, with two others at the tail.

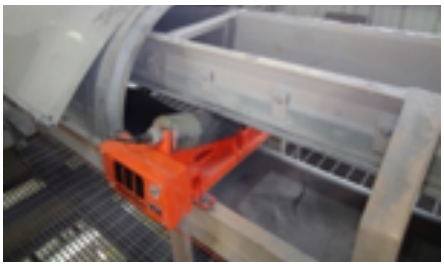
"The cannons did a good job of breaking loose the accumulation, but because they were connected to the plant's air supply without electrical power, the units had to be fired manually," explains Martin Territory Manager Cory Goldbeck.

"So when plant personnel noticed a reduction in material flow, they would walk to the conveyor and trigger the cannons. This wasn't a permanent solution, because at times the firing was a little too late and that would require another round of air lancing."

ONE CANNON WAS LOCATED AT THE HEAD OF THE CONVEYOR, WITH TWO OTHERS AT THE TAIL.

To address the lack of readily available power, Martin technicians installed the company's Roll Generator System, which uses the energy of the moving conveyor to generate electricity. "A conveyor is driven by a multi-kilowatt motor, and this power is readily available system-wide in the form of the moving belt," Goldbeck continues.

"The motors driving the belts are typically sized with a considerable power safety factor to account for parasitic loads, such as rolls with damaged bearings, tracking devices, sealing systems, belt cleaners and material changes due to different moisture levels and variable loads."



THE OD OF THE GENERATOR MATCHES THAT OF THE ROLL, BUT PLACES THE UNIT OUTSIDE THE MATERIAL PATH

Currently available only in the US, Martin's product engineers developed the patented design that uses a magnetic coupling attached to the end of an existing roller. The outside diameter of the generator matches the diameter of the roll, but places the generator outside the material path to avoid the heavy loads and fugitive material that tended to damage previous design attempts.

The system easily generates enough energy to power the air cannons, allowing operations personnel to schedule automatic firing and prevent the accumulation that had been creating flow problems. Together, the components created a turnkey solution that requires no human intervention.

THE LOAD IS CARRIED BY THE GENERATOR'S LARGE SUPPORT SHAFT

The generator forms a lightweight unit that does not affect the existing roll in any way, except to be magnetically engaged and draw a small amount of mechanical power in order to generate the electrical energy. It is sealed from fugitive material and forms an integral unit independent of the conveyor roller. All components to "condition" the power to a steady 24VDC are enclosed in a protective cabinet.

A TECHNICIAN WIRES THE PANEL TO CONTROL THE ROLL GEN SYSTEM.

The Martin air cannons are a positive-acting, internal valve design, developed specifically to deliver the most direct air path and maximum force output, with minimal air consumption.

By producing more power from less air than most existing designs, it can employ a smaller reservoir, giving it a reduced footprint and allowing it to fit into tighter spaces.

During the firing sequence, a solenoid valve sends a signal to the exhaust valve, causing it to actuate and release the pressure holding the piston. The piston is instantly forced back by the air pressure stored in the tank, and the blast of air is then directed through the nozzle and into the target area.

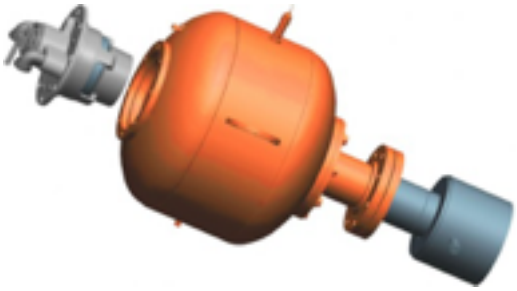
Refill time in this application is less than 30 seconds and the current schedule has the cannons firing once every two minutes.

Engineered to fire only when the belt is running and loaded, the system eliminates wasted air from firing when there's no cargo on the belt or when the conveyor is idle.

The specially-designed valve allows the control solenoid to be positioned as far as 200ft (60m) from the tank, keeping critical components away from harsh service environments.

Locating the tanks in a safe, easily accessible area means that workers can inspect the equipment more often and perform service on a single cannon without downtime.

The design was developed for simplified maintenance, as the complete valve assembly can be removed by a single worker in one easy step, working from one side of the tank. The units are designed for a minimum of 200,000 firings.



THE MARTIN AIR CANNONS EMPLOY A UNIQUE VALVE DESIGN THAT CAN BE SERVICED QUICKLY AND SAFELY

So what have been the results of the new approach? "The process experiences less downtime associated with wet material plugging the chutes, feeders and storage bins," Vandal explains.

"Operators are able to stay on task performing inspections instead of investing labour in time-intensive air lancing during operations.

"The ability to generate the necessary power right at the point where it was needed was a key element in the solution," he says.

Vandal estimates that the payback period is between one to one-and-a-half years, adding: "The solution is worth its weight in gold."

SURFACE INDUSTRY

Hull coatings have an important role to play in not only ensuring vessels meet environmental standards, but also in improving performance — and therefore saving money

A number of new products have been coming on the market recently as paint and coating suppliers up their game on the environmental front, with new regulations entering into force in the coming months.

PPG announced in November results from a study that concluded vessels using its fouling release and antifouling coatings show improved speed and power performance.

PPG conducted the study in collaboration with classification society DNV GL, using the hull performance analysis methodology developed by DNV GL to analyse the performance of various major vessel types.

"This study provides additional confirmation that PPG fouling control products contribute to improved vessel performance," says Tom Molenda, PPG global platform director, marine coatings.

Commenting on the current market issues, Molenda says: "The shipping industry has responded to demands for improved environmental performance with a number of voluntary initiatives to speed up the development of more efficient ways of operating their vessels, and coatings have their part to play in this process. Over the past 10 years, the improvements in overall fleet efficiency and reduced environmental impact have been noteworthy accomplishments.

"Going forward, shipping will continue to focus on both operational efficiency and a holistic improvement of environmental performance. A combination of voluntary actions, global regulations and market instruments will result in owners progressively reducing their environmental footprint as a function of their everyday business.

"The data that will drive the new regulations is already being collected and although the IMO 2030 and 2050 targets are not law yet, shipowners are already taking many positive steps.

"Shipowners will increasingly supplement their efforts to increase the efficiency of their vessel operations for commercial reasons with a co-ordinated process of reducing fuel consumption across their fleets," Molenda continues.

"PPG anticipated the trends of increased efficiency and growing environmental awareness and in response engineered its most advanced pure silicone fouling release system, PPG SIGMAGLIDE® 1290. This coating is formulated to help owners increase performance and at the same time greatly enhance the environmental aspects — while delivering a coating that is free from biocides.

"PPG SIGMAGLIDE 1290 is a fourth-generation, silicone fouling release coating and is completely biocide-free. As such it is unaffected by legislation such as the Biocidal Products Directive and it is tailored to comply with future environmental compliance programmes.

"Its low environmental impact means that it can be applied on to the hull of a vessel trading in the most ecologically-sensitive environments. Superior performance is achieved

THE STUDY USED THE HULL PERFORMANCE ANALYSIS METHODOLOGY DEVELOPED BY DNV GL TO ANALYSE THE PERFORMANCE OF VARIOUS MAJOR VESSEL TYPES, INCLUDING LNG CARRIERS, BULK CARRIERS, CRUDE OIL TANKERS AND CRUISE VESSELS

through a combination of film-forming properties and a very low average hull roughness, which result in market-leading performance."

PPG SIGMAGLIDE 1290 utilises dynamic surface regeneration technology to eliminate slime problems and significantly increase performance, when compared with existing fouling release products.

These properties allow water to act as a catalyst to lower the surface energy of the coating back to its original state and thus restart its beneficial surface configuration properties.

Additionally, PPG has also found good market acceptance for PPG SIGMA SAILADVANCE™, a range of high performance, antifoulings suitable for a variety of operating conditions.

The range includes SAILADVANCE RX and GX, two formulations based on PPG's own patented technologies. These antifoulings are based on self-release binder technology using Controlled Surface active Polymers (CSPs) which provide a self-lubrication and self-release mechanism to the coating."

CSP acts on the coating/water interface as a lubricant, which supports laminar flow, thereby lowering the hull friction when the ship is sailing. In addition, CSPs create a slippery surface that increases the resistance to fouling when the ship is not sailing, allowing for longer idle times.

The PPG SIGMA SAILADVANCE range is designed for container vessel types and operating conditions and is also effective for slower steaming because of the engineered CSP composition. The antifoulings also benefit from high-volume solids for efficient application and evolve in a pattern of linear polishing, with consistent biocide release for predictable performance for up to 90 months.

Similar to other leading industries, the maritime industry is quickly moving forward with processes to incorporate more data analytics into decision-making processes. For example, such analysis can provide better insights into vessel/hull conditions and appropriate action steps, Molenda says.

PPG selected DNV GL to partner in the study due to the accuracy of the company's vessel performance analysis methodology, which is more rigorous than the ISO 19030 standard for measuring changes in hull and propeller performance. DNV GL's testing procedures introduce advanced filtering and normalisation methods that increase the usability of data and yield more accurate results.

The results demonstrate noteworthy hull performance, with less than 1.5% average speed loss across the variety of ship types and operational conditions. In addition, vessels using PPG SIGMAGLIDE® 1290 fouling release coating demonstrated notable speed and power improvement over the baseline sea trial conditions.

This study provides additional confirmation that PPG fouling control products contribute to improved vessel performance.

PROVIDING A PAYBACK

Nippon Paint Marine has announced that it will now apply its low friction hydrogel technology across its standard range of antifouling products as a means of assisting the reduction of fuel consumption.

Hydrogel, which is already used in the company's LF-Sea 150 HyB and A-LF-Sea range of hull coatings, has now been incorporated into its Ecoloflex SPC 200 range.

Ecoloflex SPC 200 LF has been specifically developed to provide the wider commercial shipping sector with a low-cost, low-friction hull coating with the aim of reducing hull friction and extend service intervals by up to 90 months, according to the company.

Niko Yamanoue, deputy managing director of Nippon Paint Marine (Europe), says "The new low-friction version of Ecoloflex has been developed with the coming global sulphur cap in mind. With the anticipated hike in fuel costs set to impact operations from next year, commercial shipowners will need an economical hull coating capable of helping towards reducing the fuel bill.

"By adding hydrogel technology to our established antifouling, shipowners can expect to achieve substantial fuel savings compared to regular SPC coatings."

Nippon Paint Marine developed the novel coating technology following extensive research into the skin structure of tuna fish, which was found to contain a mechanism that repels water. The research led to the incorporation of hydrogel, a component that traps a microscopic layer of water on the coating's surface, smoothing the water flow around the hull.

The company claims that since the market introduction of hydrogel-containing coatings, ships using NPM's premium A-LF Sea product have achieved fuel savings of up to 10%, while the 3,000-plus ships that have applied LF-Sea 150 HyB have benefitted from about a 4% reduction in fuel consumption, compared with traditional SPC-type coatings.

"We have amassed more than 10 years of data from vessels operating hydrogel-based coatings to verify the fuel savings and extended service intervals use of these coatings can achieve," says Yamanoue. "Hull performance monitoring has shown that our low-friction technology is providing a real payback for customers compared to other systems."

The company hopes that the new coatings will prove popular with the bulker and tanker segment. John Drew, director, Nippon Paint Marine (Europe), says: "For most tankers and bulk carriers, these systems with advanced technology incorporated into a competitive, high-solid (62% SVR) SPC antifouling system will prove a highly effective, commercially-viable way of reducing operational costs and the environmental footprint."

IMPROVING PROTECTION

Coatings manufacturer Hempel's new generation fire-protection coating, Hempafire Optima 500, is specifically designed to improve the productivity of passive fire protection (PFP) coating applications. It achieves this by reducing the number of coats required and the process time required to apply them, saving time and costs.

Hempafire Optima 500 helps to maintain the stability of steel structures

in large infrastructure buildings by delivering up to 180 minutes protection against cellulosic fires, being optimised for 120 minutes.

It is a one component waterborne acrylic intumescent coating with zero volatile organic compounds (VOC) and can be used for both open or closed steel sections.

Last year, Hempel opened a new facility in Spain focusing on research and development of coating products within the field of passive fire protection and the company is committed to increasing its product portfolio of PFP coatings.

KNUTSEN PICKS AKZONOBEL

Knutsen OAS Shipping has chosen AkzoNobel and its high-performance Intershield 300 and Intersleek ® foul release technologies for its latest LNG vessels built in Korea's Hyundai Heavy Industries shipyard.

"Knutsen has used Intershield 300 on our vessels for a long time," says Oliver Smith, project manager of Knutsen OAS Shipping. "The reason Knutsen applied Intershield 300 on our new LNGs is because we knew that in the long term, we would be able to benefit from the lower maintenance cost.

"When we have inspected the ballast tanks every five years for our vessels in service having Intershield 300, the number of repairs has been very minimal" he says.

The fuel consumption after five years as compared to year one (initial application of Intersleek) is maintained, Smith explains. "Intersleek is ranked as one of the highest performing coatings as compared to other types of coatings in our fleet. This high performance also keeps future dry-docking costs down.

"After five years in service, the vessel had to only have one full finish coat applied instead of having to apply a full scheme.

"Knutsen has experienced the formation of green slime due to short lay-up and waiting periods. However, after sailing to the next port of call, the green slime was completely released, saving on any hull cleaning services at the port."

EMISSIONS CUT

Jotun has announced a memorandum of understanding with Hyundai Heavy Industries for a new type of marine paint that it claims reduces solvent emissions by up to 90%.

Jotun focuses heavily on research and development of environmentally friendly paints, and the corrosion-protective primer reduces total solvent release by 80-90% and has worked on developing the new type of marine paint for 13 years. It reduces solvent (VOC) emissions into the air from approximately 250 grams per litre to nine grams per litre.

"We have conducted research in Korea and in Norway while developing this paint," says Erik Risberg, one of the scientists behind the new paint.

"The product has better corrosion protection than previous systems, which helps extend the life of the vessels and reduces the need for maintenance, making it a very attractive option for shipowners," Risberg adds.

The company also recently signed an agreement with Wallenius Wilhelmsen to provide its Hull Performance Solutions (HPS) antifouling coating system across 42 vessels in the leading shipowner's advanced RoRo fleet.

Fouling is a key contributor to the spread of invasive species across marine ecosystems and a major cause of hull inefficiency, leading to increased fuel consumption and emissions.

RIAS BAIXAS KNUTSEN. CREDIT: KNUTSEN OAS SHIPPING

Studies have suggested that the fuel consumption of the world fleet could be reduced by up to 20% if all vessels were kept fouling free, according to Jotun.

HPS combines premium SeaQuantum X200 antifouling with technical and digital solutions to accurately measure hull performance. The antifouling works to increase vessel efficiency, cut fuel costs and reduce CO^2 emissions.

"As a company, we are focused on enhancing sustainability and reducing the environmental impact of our operations — maintaining clean hulls is a key enabler for that," explains Geir Fagerheim, senior vice president of marine operations at Wallenius Wilhelmsen.

"With HPS we can not only achieve this objective, but we also open a digital window on to how hull condition affects fleet-wide performance, efficiency and emissions, creating a culture of transparency and accountability."

AWARD-WINNING SYSTEM

HullWiper's Remotely Operated Vehicle (ROV) hull cleaning system has won this year's Environmental Award at the 2019 DCN Shipping & Maritime Industry Awards.

The company's underwater diverless and brush-free cleaning technology uses adjustable natural seawater jets to dislodge and remove biofouling without the abrasive scrubbing or harsh chemicals employed by traditional methods.

The ROV collects marine fouling removed from hulls, rather than releasing it into port waters and risking the spread of invasive marine species.

Captured residues are pumped into an onboard filter unit and deposited into dedicated drums onshore, which are collected by a locally-approved environmental waste disposal company, protecting both the marine environment and the customer from potential fines or penalties.

As a bonus, as no divers are involved, the ROV also saves costs and reduces the risk to human life.

REDUCING THE RISKS

Ports have to take a large number of factors into consideration when it comes to safety and cargo damage, with hazard limitation is at the forefront of ports' efforts to improve their systems and practices

As Captain Richard Brough, head of ICHCA International put it, the port industry "is still not safe and people have to understand the limitations of equipment". More than 100 people were killed in port accidents in 2018 and over 55 this year at the time of his presentation on safety issues at ABTO's recent conference in Amsterdam.

The drive towards control of emissions in ports will also mean that there will be moves towards electrification of port equipment such as forklifts and reach stackers. In addition, the International Maritime Organization is taking an increasing interest in what happens shoreside, he said: "It will come ashore if we don't get our act together as an industry."

The arrival of the smart port means that communication is increasingly important. This may be on a wider scale through port to port communication or in monitoring port practices and using predictive maintenance to prevent accidents and malfunctions before they happen, he said, through to drone inspections that will hopefully cut down on the number of accidents involving personnel working in dangerous environments.

Dealing with emissions when

handling bulk commodities is another issue that port operators have to address. With ever-increasing pressure on ports to deliver greener bulk cargo handling, dust and emission suppression is essential during bulk unloading.

As Fintan Lawney of Buttimer Engineering Group explained at the conference, ports in urban areas in particular need to reduce their emissions and tackle dust issues. There is increasing pressure for cleaner operations and "zero tolerance of airborne dust", he said. Cross contamination of bulk products is also an issue and "nobody wants spillage".

Another point requiring attention is ensuring that bulk cargoes do not become waterlogged. This obviously can lead to the liquefaction of a cargo at sea with disastrous consequences, as Dr Martin Jonas of Brookes Bell pointed out. Cargoes at risk are listed in the IMSBC Code and ports need to ensure that they have adequate procedures in place to ensure that cargoes are not exposed to the environment.

They also need to know the chain of command and who is responsible for making sure that wet parts of stockpiles do not get loaded, Jonas said.

Bulk products such as wood pellets pose particular challenges, as Professor Mike Bradley, director of the Wolfson Centre for Bulk Solids Handling Technology pointed out at the conference. Dust on the floor is clearly a serious hazard, leading to mechanical failures, which could lead to fires. Keeping spaces clean is vital. "If you can write your name in dust you have a catastrophe waiting to happen," he warned.

A lot of bulk solids handling equipment is custom made and the final design might not be the same as the generic design, he said. "If you are buying ATEX rated equipment, look at hazard assessments — it is your right to do so," he said. Reliance on the supplier is not good enough, he warned.

When handling cargoes, some will warm or self-heat after a period, so consideration of how long a pile can actually be left will need to be made. "The bigger the pile, the shorter the storage time" was a general rule of thumb. With products such as biomass "it is not a question of if you have a fire, it is a question of when," Bradley told delegates. Training of personnel is essential and, he said, "if you do nothing else, keep the floor clean".

CARGO INFESTATION

Cargoes can also become infected with insects that can affect the quality and viability of a product. As Jonas pointed out, in the case of grain cargoes, insects can affect them in different ways, some lay eggs and damage kernels, while some feed on dust and there is no change in the grain quality.

Getting rid of insects in a cargo may be handled in different ways, he said. The usual response is fumigation to kill the insect, which can be done on the vessel before discharge. However this will depend on the amount of time necessary to eliminate the problem, as there is a danger of opening the hold too quickly. In addition, the vessel may not be gas tight and certain fumigants used in tablet form may become a fire risk if they become wet, he said.

One common fumigant is phosphine, but phosphine-resistant insects are becoming more common, so the product may not continue to work for very much longer, Jonas said. Phosphine also presents hazards because it is toxic for people and leaks could prove fatal. Gas tests need to be done before stevedores unload vessels that have been fumigated, he warned.

Javier Quintero Saavedra, chairman of ICHCA's dry bulk cargoes working group, outlined some of the other hazards relating to fumigation of cargoes in discharging ports. Maize, for example, is hygroscopic and subject to mould and insect infestation. There are moisture content standards for maize that need to be adhered to. While in storage, both temperature and moisture contents need to be monitored, he said. The grain is a living organism that continues to perform its functions during storage, he stressed, and this needed to be taken into account.

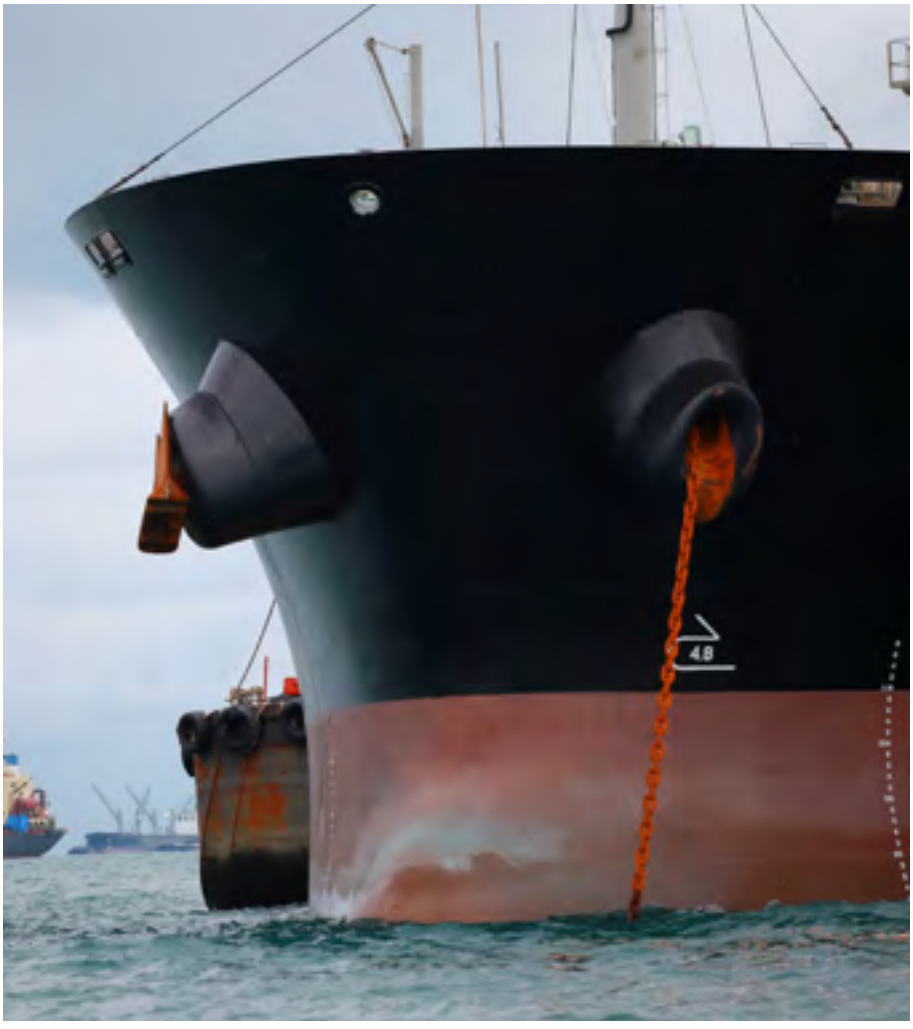
Also, he warned that fumigants could provide a protective effect and result in protective narcosis, so the pest could survive. Temperature could also affect the effectiveness of fumigation.

Saavedra also warned of the dangers of personnel handling cargoes that had been fumigated. "Fumigant can be trapped inside the bulk material and can be trapped between the kernels," he said.

He also warned against the dangers of cross contamination and, once again, ensuring premises were completely empty of product was essential.

GOING GREENER

With a new raft of environmental regulations for newbuilds at the forefront of shipbuilders' minds, whether or not to fit scrubber technology on vessels has been a key decision for owners over recent times, while designers are also looking at alternative fuel propulsion for ships of the future



Ultramax 2030 is one example of co-operation in the industry to produce the most eco-friendly ship designs.

In response to the International Maritime Organization's (IMO) strategy to reduce greenhouse gas (GHG) emissions, Oshima Shipbuilding and classification society DNV GL have signed a long-term strategic co-operation agreement to conduct research and development together on new bulk carrier designs. The first design, the Oshima Ultramax 2030, reduces the energy efficiency design index (EEDI) by 50%. Developed together with technology group Wärtsilä, it was introduced at Nor-Shipping 2019 in Oslo.

With 2008 as a baseline, the IMO strategy aims to reduce total GHG emissions from shipping by at least 50% by 2050 and to reduce the average carbon intensity, or CO^2 per tonne-mile, by at least 40% by 2030, while aiming for a 70% reduction by 2050. Beyond 2050, IMO's ultimate vision is to phase out GHG emissions as soon as possible within this century.

"To help the industry meet the ambitious GHG reduction targets set by the IMO, the industry needs to come together to advance ship design. This design halves the EEDI of comparable

vessels and sets a new standard for low-emission bulk carriers," said Trond Hodne, director of sales & marketing at DNV GL.

The strategic co-operation between Oshima and DNV GL will continue through 2030, working towards the IMO zero-emissions scenario with annual joint industry projects, where other partners will be invited to join.

The Ultramax 2030 design maximizes operational performance while minimizing emissions by utilising LNG as fuel, with an optimized hull shape and a hard sail to generate extra propulsion. In addition, the design uses solar panels and batteries to cover the hotel load during waiting and port operations. The array of options introduced in the new design includes a shaft generator with a battery pack and two different main engine alternatives. The first engine option is a high-pressure, two-stroke dual-fuel engine, while the second option is a four-stroke dual-fuel engine.

According to input from major shipowners, fleet profile research and automatic identification system (AIS) analysis of trade, ports, bunkering and cargoes, 40% of major ultramax ports already provide access to LNG terminals, with more in the planning and building stages. Worldwide operation is the ultimate requirement for deep-sea ships using LNG propulsio, and current availability allows for bunkering of a 2,000m^3 LNG tank with the Oshima Ultramax 2030 design, giving a range of 13,600 nautical miles. This is enough to cover the main global trading pattern of a round trip from Singapore to South Africa.

A typical ultramax spends just over 50% of its time in sailing mode, while the remainder is spent either waiting or loading/unloading. The level of available shore power has only been estimated for 2% of major ultramax ports.

With this in mind, particular attention was paid to reducing emissions while waiting and in port, in order to shrink the overall environmental footprint, not just while sailing.

Solar panels on the Ultramax 2030 design are installed on top of the hatch covers and will generate up to 88kWh during sunlight hours, with the remaining 42kWh supplied by battery. This covers the expected consumption of the highly optimised hotel load of only 130kWe in "eco mode" during waiting times.

Total solar panel area is about 1,500m^2, including all hatch cover surfaces. The 88kW/d output during daytime will provide annual savings of an estimated US$67,000, including fuel and maintenance of gensets. The payback period for the solar panels and batteries is expected to be around 10 years.

At night, battery power can be used for three hours before the battery is discharged. Whenever charging is required, diesel fuel gensets will run at optimum engine load to charge the batteries and cover the hotel load. About one hour is required to fully charge the battery.

The glass fibre reinforced plastic hard sail generates additional thrust to supplement propulsion power. The sail automatically rotates to the optimal angle of attack to maximise thrust in response to changing wind conditions. The hard sail system is being developed jointly by Oshima Shipbuilding and Mitsui OSK Lines.

Sail height is 60m, and the design satisfies Safety of Life at Sea (SOLAS) visibility requirements. The sail will be folded in unfavourable wind conditions and during loading and unloading. Oshima carried out computational fluid dynamics (CFD) analysis together with the University of Tokyo, using selected weather data for one year in the North Pacific. Expected fuel savings from sail use is up to 10%. Yearly fuel savings based on the current operational profile is estimated at US$130,000.

An additional aim of the Ultramax 2030 project has been to create a new standard that maximises the return on investment for the owner. One key objective was to minimise greenhouse gas emissions through the application of currently available technologies.

"Our smart marine initiative emphasizes collaboration between the various stakeholders and this project is a prime example of how effective such collaboration can be," says Stein Thorsager, director, merchant and gas carriers, Wärtsilä Marine.

"The design is based on actual operating profile data from ultramax bulk carriers, and incorporates an LNG-fuelled Wärtsilä 31DF dual-fuel main engine as one of the two engine options, connected to a power take out shaft generator and controllable pitch propeller.

The result outperforms all existing designs in terms of efficiency and sustainability, he says.

"Greater efficiency and better environmental performance have been made possible with the collaboration and initiative of Wärtsilä and DNV GL," says Eiichi Hiraga, President at Oshima Shipbuilding.

"Oshima alone could not have come up with this new innovative design, which includes optimised propulsion, energy storage and solar panels. It represents a future-proof solution that will enable bulk carrier owners to comply with legislation while also lowering operating costs."

EFFICIENT APPROACH

K Line has signed a contract with Japan Marine United Corporations for a 210,000dwt bulk carrier due to be completed in 2021 and set thereafter to be engaged in the iron ore and coal trades.

The main features of this vessel will comply with NOx emission regulations (Tier III) and be equipped with a SOx scrubber that removes SOx from the exhaust gas for complying with SOx emission regulations that will be enforced worldwide from January 2020.

The vessel is also an energy-saving type that achieves both increased cargo weight and reduced fuel consumption compared to conventional ships. In addition, the state-of-the-art vessel meets the Energy Efficiency Design Index, which is a GHG emission regulation, taking into consideration the Phase 2 level applied to contracted vessels after 2020.

ZERO TOLERANCE

Hydrogen-powered vessels have been another possibility for ships of the future and Ulstein's first hydrogen-powered ship design is now ready for marketing and offers a zero emissions performance.

The first complete hydrogen-fuelled prospect has been put together by Ulstein Design & Solutions and Nedstack fuel cell technology . The SX190 Zero Emission DP2 construction support vessel is Ulstein's first hydrogen-powered offshore vessel, featuring a Nedstack fuel cell power system.

This design uses proven and available technology, enabling clean shipping operations to reduce the environmental footprint of offshore projects. CO^2, NOx and particle emissions are eliminated when using hydrogen fuel cells.

"The maritime industry needs to align and be ambitious in bringing green solutions forward for a sustainable future. With this hydrogen-fuelled vessel, we aim for future zero-emission operations of long endurance," says Tore Ulstein, deputy chief executive of Ulstein Group. Sea trials of a newbuild ULSTEIN SX190 Zero Emission could happen as soon as 2022.

With today's technology, the ULSTEIN SX190 design is already capable to operate for four days in zero-emission mode, the company says. However, with the rapid developments in hydrogen storage and fuel cell technologies, a future zero-emission endurance of up to two weeks is targeted. For extended missions and capabilities, the vessel can fall back on its more conventional diesel-electric system using low sulphur marine diesel oil.

The zero emission design is based on Ulstein's existing SX190 vessel platform and has a total installed power of 7.5MW, of which 2MW is generated by a fuel cell power system, typically Nedstack Proton Exchange Membrane (PEM) fuel cells, which are located in a separate, second engine room.

PEM fuel cells convert hydrogen and air into electric power, heat and water and produce no harmful emissions in the process. Nedstack fuel cell systems have already been built and proven in the multi-megawatt power ranges and have now been adapted to meet the requirements of the marine industry, including class requirements and supply chains.

"Ulstein is constantly looking to improve marine operations and to reduce the environmental footprint of the vessels we deliver to the market", says Ko Stroo, product manager at Ulstein Design & Solutions. "Implementing fuel cell technology in a workhorse like the SX190 CSV design is one of the steps we take to move the marine industry into a more sustainable future, in addition to our X-BOW® hull shape, ULSTEIN ZED™ "get-in-and-leave-no-trace solution" and plug-in hybrid solutions."

The PEM fuel cells used in the SX190 Zero Emission design are fuelled by hydrogen from containerised pressure vessels, a well proven and readily available technology. These hydrogen storage containers can be loaded and unloaded by normal container handling operations and equipment, hence eliminating the need for expensive bunkering infrastructure and providing worldwide operational flexibility.

The hydrogen containers can be refilled at hydrogen production sites, either from industry by-product hydrogen or green hydrogen from electrolysis, making the vessel globally employable.

Another new Ulstein project is OHT's new heavy installation crane vessel Alfa Lift, which is currently under construction at China Merchants Heavy Industry in China.

The Alfa Lift vessel will be the largest and most innovative custom-built offshore wind foundation installation vessel in the world, Ulstein claims. The next major milestone will be the launching ceremony in 2020, with the vessel due to be delivered 2021.

OHT specialises in transporting oversized heavy cargoes for various markets including oil & gas, offshore wind and large infrastructure projects. Its newbuild vessel will be the first vessel built specifically for the offshore wind market.

ULSTEIN SX190 DESIGN

ON THE MOVE

Cutting down waiting times and costs have become key strategies for technologically savvy ports

Increasing the efficiency of operations in ports continues to be a key component of ensuring port viability, and there have been a number of innovations aimed at — among other things — reducing the amount of time ships spend idling in ports.

As Jeppe Skovbakke Juhl, manager of maritime technology and regulation at BIMCO pointed out at ABTO's recent conference in Amsterdam, one focus has been on new regulations to assist the ship clearance procedures that were introduced in April this year, with a two-year implementation period. The aim is to reduce the administrative burden for both ships and ports.

The use of the "just in time" approach to reduce idle time in ports requires "good early communications in ports," he told delegates.

Port congestion means a reduction in the capacity of ships, with substantial costs occurring due to delays, according to an UNCTAD report. However, communicating swiftly when a berth is likely to become available means that an approaching ship could reduce its speed to be able to go almost directly on to the berth as it arrives, Juhl said. .

"Planes are not allowed to leave before a place becomes available at the other end. Can we do something like that for shipping," he asked? This would require greater communication between owners, charterers and ports to ensure ships could go directly into ports.

This could mean that ships could adjust their speed much earlier before arriving at a port and port terminals could improve their "just in time" provision as a result. Slow steaming might be a controversial topic this days, but, said Juhl, the issue is "not slow steaming, but smart steaming".

"The low hanging fruit is ships' reducing share of emissions and collaborating closer with ports," said Juhl. Neutral, unbiased contacts between all parties were necessary to make this approach a success.

Operational issues aside, the optimisation of bulk terminal operations is clearly about use of the most efficient terminal operating software, according to David Trueman, managing director of TBA Doncaster. Using such systems can reduce complexity and administrative costs, as well as improving operational efficiency with the use of methods such as electronic data interchange (EDI), auto upload, customer data entry, and so on.

The dry bulk terminal environment is not just about large, single mode mineral terminals, said. There are many diverse, opportunistic small terminals trying to win business, but at low margins on short-term contracts handling and processing multiple commodities.

Some 36 terminals are using TBA terminals systems in the UK alone, but Trueman told delegates at the ABTO conference that selling software on its own brings little value. "Once you have delivered software you have to stay with it and make sure you sweat the asset," he explained. There are systems in the market that were built by vendors with no process knowledge or by small suppliers that disappeared, leaving the buyer in limbo, he added.

It is not just a question of operating the system, but operating in a real time environment, and measuring and weighing areas are critical with decisions needing to be made on where active tasks are performed.

Managing stock is also a key area, Trueman told delegates, with technology being used to optimise the movement of goods using, for example, online booking systems to alleviate congestion and optimise the supply chain. The principal business case is one of reducing operating expenditure, and understanding that unloading is a process and as a process can be optimised is important. "People aren't digging into how they can save time unloading," Trueman said.

Headcount is also an issue, as is using operatives in an optimal way.

Optimising space organisation is also a means of increasing cargo handling. "If you can provide better information than competitors, you win out".

Meanwhile, cross contamination of cargoes is an issue in ports that can lead to hefty claims and reputational damage, he warned. "Using information properly shows where the sticking points are," he said. For customers with multi-terminal operations, having a cloud-based system can help with centralised planning, he advised.

As Ekke Oosterhuis of Royal HaskoningDHV pointed out to delegates, much in terminal design is about performance in terms of a vessel's total time in port. Using simulation at the design stage helps to predict the performance of terminals. However, simulation is about input and the development of tools to harvest big data helps to define and benchmark various factors that contribute to the total time in port, including weather, downtime and waiting time.

Today's global port and terminal networks face a multitude of challenges, he said, from the ongoing pressure to reduce running costs to ensuring appropriate security measures; from facing the pressure to "go green" and mitigating against climate change, to utilising the immense amount of data they generate daily.

In answer to these challenges, Royal HaskoningDHV's Smart Ports offering combines digital innovation and tools with operator intelligence, enabling ports to work more efficiently and streamline operational costs.

Whether that's increasing the longevity of operations by using sensors to forecast maintenance requirements or finding new ways to optimise the use of their land, there are many ways in which new technologies can help ports to become smarter.

Through Smart Ports, the company provides digital port solutions consultancy for new and existing ports in three distinct areas — smart asset management, port operations and technology and terminal automation.

IMO RELEASES ONLINE TOOL

Streamlining the many administrative procedures necessary when ships enter or leave port is an important element of the International Maritime Organization's (IMO) work. Now an important tool used by software developers to create systems for exchanging the relevant data electronically has been made available by the IMO online and free of charge.

The IMO Compendium is a reference manual containing data sets and the structure and relationships between them, which will enable the IMO member states to fulfil a mandatory obligation (in place since April 2019) for the reporting formalities for ships, cargo and people on board international shipping to be carried out electronically and in a harmonised way.

Overall, this helps make cross-border trade simpler and the logistics chain more efficient, for the more than 10bn tons of goods which are traded by sea annually across the globe.

IMO is not the only organisation dealing with electronic data exchange in maritime transport, but others, notably the World Customs Organization, the United Nations Economic Commission for Europe and the International Standards Organization, have aligned their own data structures with the IMO Compendium to promote harmonisation.

ABP IT INITIATIVE

Associated British Ports (ABP) has announced it will establish a new "IT hub" at the Port of Cardiff to provide information technology services for its business and customers.

The significant investment by ABP is expected to create a number of new jobs in service and infrastructure support, project management, developers and analysts, and build on its existing IT team based in the region.

The new initiative will create a range of career opportunities for IT professionals to support a number of existing systems, including SAP ERP, as well as looking at how technology can improve the service offered to ABP's customers and business.

Commenting on the initiative, ABP's CEO Henrik Pedersen, says: "Investing in technology is an important part of our future as a business. We are delighted to be investing in Wales and the vibrant city of Cardiff to create our new IT hub, which will use the latest technology to improve our business in a wide range of areas, from stock management to customer service."

ABP's Cardiff technology hub will be part of a wider IT solutions network the company is rolling out, with other locations including London, Hull and Southampton all opening this year.

ABP has been partnering with the Knowledge Transfer Network (KTN), to run the EnSiX Challenge Competition, which invited UK businesses to provide innovative solutions to help boost efficiency and sustainability.

KTN is the network partner for Innovate UK, part of UK Research and Innovation, a non-departmental public body funded by a grant-in-aid from the UK government.

The competition addressed three main areas: reducing emissions from heavy lifting equipment at ports; systems and processes that can enhance equipment operator training and provide assisted inspection tools and novel alternative approaches to vessel propulsion systems.

As the industry strives to be zero carbon by 2050, ABP is looking to partner with UK businesses to provide energy saving, emissions reduction and efficiency boosting measures which can improve the sustainability of port operations.

The winning businesses will be given a commercial opportunity to then work with ABP to develop and roll out new technology across its network of 21 ports across England, Scotland and Wales.

MAKING A CLEAN BREAK

Shore-powered solutions to provide cleaner air in port cities have become a hot topic, with several regions and Germany has been taking positive steps in this direction

CLEANER AIR AND A REDUCTION OF CO_2

The German government recently announced new measures aimed at making the country's ports cleaner.

If using shore-based power, one of the key issues is whether the shore-side power source is greener than that of the vessel. The aim with the German initiative is to use renewable shore-based energy as opposed to burning fossil fuels.

Government representatives of several regions in Germany met in Kiel in October this year and signed a memorandum of understanding outlining the conditions for the use of shore-generated power to provide cleaner air in port cities.

"With these measures, we are making a significant contribution towards cleaner air and a reduction of CO_2 and noise in port cities along the North Sea and Baltic coasts. We are also giving ports and shipowners planning certainty for expanding facilities and refitting ships," Peter Altmeier, federal minister for economic affairs and energy, commented at the time.

"Shore-based power supply as an alternative to operating shipboard diesels represents a tangible contribution towards cleaner air and protecting the climate. That applies to

the port in Kiel and all other port cities on the North Sea and Baltic," Daniel Günther, minister-president for Land Schleswig-Holstein, added.

"The memorandum is an initial, important step towards improving the commercial viability of shore-based power. The paper includes the reduction of the EU levy to 20% favoured by Schleswig-Holstein. By mid-2020, we should have initiated the essential legal steps. I am expecting rapid implementation of what we have agreed."

The German authorities suggest that while using shore-side power can reduce emissions from ships in port, costs have been putting off shipowners, when compared to conventional sources. In addition, plugging in shoreside can present technical challenges and to be eco-friendly, the shore-side power supply must be green, which in many ports it is not.

German initiatives include reducing levies for ships and introducing subsidies totalling €140m from next year to help with costs relating to port infrastructure.

The German Shipowners' Association VDR has welcomed plans to provide ships with onshore power while on berth in German ports. "We are united in our goal to further improve the climate and the air quality in the ports," said chief executive Ralf Nagel. "Promoting the use of onshore power is a solid step in the right direction."

The VDR takes the view that the supply of electricity from land-based sources in ports will in future become an increasingly important component among the various measures taken by shipping to make the transport of goods and people by sea even more environmentally and climate-friendly than it has been in the past.

"When it comes to climate and environmental protection, shipping is on a more ambitious course than any other global industry," said Nagel. For the German Shipowners' Association, three aspects are important in the planned implementation of the onshore power plans in German ports to ensure that the projects are as successful and sustainable as possible. First, there is a need for sound infrastructure and clear regulations. While onshore power is suitable for ships operating regular shuttle or scheduled services — such as ferries, which routinely use the same berths — container ships and bulk carriers, on the other hand, frequently moor at different berths in the same port or need to be moved during loading and unloading.

VDR believes providing them all with flexible onshore-side power facilities is likely to exceed the capabilities of the ports, as well as of many of the ships. In addition, many technical and legal questions remain unresolved, such as the issue of different voltages used by the on-board and land-based networks, and the long-term financial viability of the facilities in the event of a low uptake by the ships. ·

There is a need for a truly sustainable concept: connecting to onshore power only makes sense in relation to a reduction of CO^2 emissions from ships if the power comes from renewable energy sources, according to the association.

Onshore power plants are currently competing against alternative fuels with similar or even better pollutant and CO^2 emission balances — and this competition will become fiercer in the future. What matters in the end is the overall ecological footprint. In addition, onshore power supply connections need to support very high capacities: during peak times, large container vessels and cruise ships will consume up to eight to 11 megawatts of electricity, respectively — as much as a small city.

Hooking up to onshore power must become more economically attractive VDR believes. To date, the availability of onshore power has been the exception rather than the rule, with only just over 20 ports worldwide offering onshore power facilities. To use onshore power, most shipping companies would first need to retrofit their ships, which would require some effort as well as millions in investment.

So far, onshore power in German ports has cost shipping companies two to three times as much as the use of on-board auxiliary diesel engines. The planned reduction of the Renewable Energies Act (EEG) levy on onshore power in Germany by 80% is therefore a sound and important measure.

"There is a need to provide financial incentives to shipping companies, as many of them, especially in this country, are engaged in fierce competition on a global scale," explained Nagel. He said the association offered to assist in the upcoming implementation of the onshore power projects in Germany.

"The German maritime shipping industry will be pleased to support the implementation of the projects in an ecologically and economically sound manner."

KIEL POWERS UP

The port of Kiel has invested in an onshore power plant as part of the process. The Siemens on-shore power plant at the Norwegenkai is specifically tailored to the needs of shipping companies and the port. It has a maximum connection capacity of 4.5MW at 10KV and a mains frequency of 50 Hz.

Port managing director Dirk Claus says: "Because of its considerable capacity and regular daily operation, a high level of environmental utilisation will be achieved. The new plant will deliver the largest amount of shore-based electric power (for ships) in the whole of Germany."

French manufacturer NG3 supplied the ship-to-shore plug interface, which is equipped with a programmed logic control unit (PLC) which communicates with the land station's switching gear. All the necessary switching commands passed on by the ship via the system's interface are carried out automatically.

Before power is transferred from shore to ship, however, the system first checks for correct plug and cable connections. Once this has taken place, the connection to shore is switched on and the ship synchronises itself with the shore plant, which then handles supply.

BOOST TO RAIL LINKS

Kiel has also been investing in rail links at the port to reduce road handling of goods. The structure and technics at Kiel's shunting station in Meimersdorf have been enhanced in such a way that freight trains with an effective length of 740 metres can enter and exit the station.

The rail/port interface is increasingly important for Kiel and the port expects a growth rate of 25% in combined traffic in 2020.

In addition to the existing connections of the Kombiverkehr KG company, which link Kiel to the national and European rail network, there will be a 690m long direct train of CFL Cargo to Bettembourg.

Kiel-Meimersdorf is one of 17 railway projects in Germany that form part of Sea-port Hinterland Transport II . According to Lord Mayor Dr Ulf Kämpfer: "Kiel is committed to climate protection and road traffic reduction. We are at a turnaround point regarding our mobility and it comes with it that goods will be transported to the hinterland by rail whenever possible."

RUSSIAN EXPANSION

Russian contacts with the port of Hamburg are set to grow with recent meetings to discuss the expansion of ports and shipping along the Northern Sea Route (NSR).

At a recent meeting in the city, members of a delegation from the Russian company Rosatom briefed interested business and shipping representatives extensively on planning for the expansion of the NSR and opening up the Arctic region. In initial test runs, the shorter sea route between Europe and Asia along Russia's Arctic coast has already been used as an alternative to the conventional sea route via the Mediterranean, Suez Canal and Indian Ocean.

The route through the Northeast Passage is navigable for ships in transit with the assistance of four nuclear-powered Rosatom icebreakers. Changes in the ice situation will enable shipping to use the NSR throughout the year. Last year, 27 ships in transit went through the passage along Russia's North coast.

Rosatom plans a fourfold increase in the quantity of freight so far transported on the NSR by 2024. There is a investment project under development that aims to expand transit freight services between Northern Europe and East Asia. Rosatom is also considering the construction of its own fleet of special vessels for transit shipping. "This is a major project. We wish to gain international partners and co-investors for implementing it," says Alexander Neklyudov, chief executive of Rosatom Cargo.

According to Ingo Egloff, joint CEO of Port of Hamburg Marketing, the future Northeast Passage is also of great importance for Hamburg, which is well equipped as a universal hub for handling cargoes of all types and is favourably located as the central hub port for the NSR.

Deposits of raw materials in Russia's Arctic region offer tremendous opportunities for investors. Compared to the route around South Asia, past India and through the Suez Canal, the Northern route would be 5,200km shorter for freight transport between Asia and Europe and could consequently also gain in importance in future.

GOING FOR GROWTH

The region is enjoying something of a boom and has been boosting its use of capesize vessels in a number of recent ventures

Emirates Global Aluminium recently announced the arrival of the first fully-laden capesize vessel to call at any GCC port at its quay at Khalifa Port in Abu Dhabi, commencing the import of bauxite for EGA's new Al Taweelah alumina refinery using capesize tonnage.

EGA is importing bauxite ore from Guinea to supply Al Taweelah alumina refinery, and using capesize vessels reduces shipping costs per tonne.

Abu Dhabi Ports has modified the approaches to Khalifa Port to accommodate capesize vessels bound for EGA, making it the first port in the Gulf able to accommodate these fully-loaded ships. The approaches have been deepened from 16.5m to 18.5m draft and widened from 250m to 280m.

With a draft of 18.2m fully-laden, capesize vessels are among the largest bulk cargo ships in the world.

Abdulla Kalban, managing director and CEO of EGA, says: "The arrival of Cape Taweelah is a landmark moment for EGA, but these huge ships will become a familiar sight at Khalifa Port over the years ahead. We are glad Abu Dhabi Ports addressed our need to bring capesize vessels to our quay and decided to further develop

the capabilities of Khalifa Port, also benefitting trade in Abu Dhabi and the UAE more broadly."

Captain Mohamed Juma Al Shamisi, CEO of Abu Dhabi Ports, says: "Welcoming this Capesize ship at EGA marks another first for Abu Dhabi's maritime and trade industry, and demonstrates our commitment to ongoing innovation and expansion in response to market and tenant demands.

"Our investment in deepening and widening the channel has created better business opportunities for all partners, including CSP Abu Dhabi, which recently received one of the largest container vessels at Khalifa Port with a capacity of 21,000 TEU."

EGA's Al Taweelah alumina refinery is the first in the UAE and only the second in the Middle East. The plant converts bauxite ore into alumina, the feedstock for aluminium smelters, and is expected to meet 40% of EGA's alumina needs once fully ramped-up. EGA invested some $3.3bn to build Al Taweelah alumina refinery, which began production in April.

BAM SIGNS OFF SAQR PORT

BAM International, the operating company of Royal BAM Group active outside Europe, has successfully completed Phase 1 and 2 of the Saqr Port Expansion.

The combined project value was approximately €75m. BAM International delivered the project to its client, Saqr Port, in spring 2019.

Saqr Port is the largest bulk-handling port in the Middle East, processing in excess of 70m tonnes a year and located in Ras Al Khaimah (RAK), one of the seven emirates of the United Arab Emirates (UAE), situated in the northern part of the region.

The main scope of BAM's work on this "construct only" project comprised dredging work and construction of a 720m quay wall, as well as stripping an existing breakwater. Reclamation works, topsides furniture, paving, drainage and lighting were also included.

CHINESE COLLABORATION

RAK Ports, the key maritime gateway for import and export activities in the northern emirates of the UAE recently signed a memorandum of understanding with Guangzhou Port to establish formal links between the two organisations.

Guangzhou Port is one of the largest ports in China and the 7th largest worldwide. Its 2018 cargo volumes were 615m tonnes. RAK Ports is the largest bulk handling port in the Middle East and North Africa region and is immediately adjacent to one of the largest limestone quarries in the world. Furthermore, RAK Ports and Guangzhou Port are both multi-purpose ports that share many operational similarities.

Moving forward, RAK Ports and Guangzhou Port will discuss future business collaboration with the aim of increasing trade links between Ras Al Khaimah and China.

Roger Clasquin, chief commercial officer RAK Ports, says: "We are extremely pleased to enter into this strategic partnership with Guangzhou Ports. We view this collaboration as the start of a long term relationship between Ras Al Khaimah and Guangzhou. We have already started discussion on various business proposals and we look forward to moving these forward whilst leveraging Guangzhou Port's existing network of contacts."

RAK Ports recently welcomed a delegation from China Aggregates Association. The China Aggregates Association is established under the approval of the Ministry of Civil Affairs in China, with the objective of promoting innovative development of the aggregates industry and enhancing the relationship between Chinese and international companies within the industry. The Chinese delegation's visit aimed to identify potential business opportunities within Ras al Khaimah and RAK Ports, specifically Stevin Rock — one of the largest limestone quarry operations in the world.

RAK Ports' new capesize berths at Saqr Port aim to expand bulk logistics. Bulk clients such as Stevin Rock can use the berths to connect to markets in the Far East and Australia.

The two 780m bulk berths were completed earlier this year and the port has indicated a wish to expand its market coverage, making use of the capesize segment to do so.

Two Cape 180 class vessels can be handled simultaneously and can load up to 180,000 tons of cargo.

In addition, Saqr ordered three Model 8 mobile harbour cranes from Konecranes Gottwald last year, which were delivered earlier in the year.

Situated in Ras Al Khaimah, Saqr Port is the major bulk terminal in the Middle East and an essential pillar of the Emirate's economy. The two new eco-efficient diesel-electric cranes, additions to the existing fleet of 11 Konecranes Gottwald mobile harbour cranes, will handle inbound and outbound bulk material including coal, limestone and clinker.

According to David Owen, port engineering manager at Saqr Port: "Ras Al Khaimah is one of the most rapidly growing emirates. Our port not only plays a key role in the long-term strategy of our emirate, but also as a logistic backbone of the entire Arabian Peninsula.

"To fulfill this dual role, we have operated mobile harbour cranes from Konecranes for many years, which have proven themselves to be very efficient. The new Model 8 cranes form both the next step in our partnership with Konecranes and our terminal's performance. These large cranes will help us to sustainably boost productivity in Saqr Port."

The three Model 8 mobile harbour cranes for Saqr Port are four-rope G HMK 8410 B cranes with a powerful 63-t grab curve in combination with the highest operating speed on the market, resulting in the highest handling rates.

For particularly eco-efficient use, the cranes will be prepared to be hooked up to the terminal's grid.

A POSITION OF POWER

China's demand for bulk cargoes will continue to dominate the dry bulk market and, by extension, the ports that serve them

AFRICAN SWINE FEVER VIRUS

How the US/China trade war will affect the dry bulk sector is still the question on everyone's lips, although dry bulk may have escaped some of the impacts felt by the container segment.

Will Fray, dry bulk analyst at Maritime Strategies International (MSI), ran through some of the issues that have rocked the dry bulk markets this year at ABTO's recent conference in Amsterdam. Some disruptions are temporary but others will have ramifications for the types of cargoes traded and ships required in the future, he said. Dry bulk is isolated from the direct effects of US/China trade war, he said, with the only single trade impacted directly by the tariffs from the US to China being soya bean. The container sector, however, is definitely having problems.

Another issue, he said, was the Brazilian Bumandinho dam collapse affecting trade rates following the disaster — although trade has returned much more quickly than expected. Other problems include swine fever in China and China's coal import regulations, which almost halted imports to try and help local producers.

"These topical policy risks have become more and more prevalent in the dry bulk markets," Fray said. Another

example is the IMO Sulphur 2020 regulations, he says. "The net result will be that freight rates will increase next year," he said. The increase could be quite sharp, perhaps around 25% because of the change on the fuel.

In addition, the Chinese One Belt One Road policy "is still a major feature of China's engagement with the world", with the plan to build partnerships across the region and into Europe, which will drive steel demand.

The final issue affecting the dry bulk sector is Indonesia's plan to ban mineral ore trade, which has been brought forward from 2022 to next year.

Trade growth is already slowing and Fray says his organisation expects it to slow further. In the years 2020 to 2025 the rate of growth is expected to be the slowest since before 1980. A lot of the impact is from China as its import growth — which has driven dry bulk trade — is slowing and has dropped below that of the rest of the world in the past two years. "This hints at a major change in the dry bulk market for the next few years," said Fray. China currently accounts for about 40% of global dry bulk imports — almost double the figure of 10 years ago, he said.

China joined the World Trade Organization in 2001, when iron ore imports began to grow. In 2009, at the time of the credit crisis, China stepped in and purchased all available iron ore. "This indicates that iron ore is actually a supply-led market, so essentially all the iron ore that can be produced, we expect China to import," said Fray. "That has been the case for many years. China's policy has been to prefer imported iron ore."

In 2018, there was a change as China's iron ore imports dropped, due to it using existing stockpiles. The assumption is now that iron ore imports will increase once more.

One major point to notice, Fray claimed, is that even if China's steel production continues to grow there will no longer be the leverage impact of changing sourcing of iron to trend. In future, the rate of growth in iron ore imports will be much more closely related to the rate of growth in steel production, he said. That is a negative driver for iron ore trade, he added.

There has also been increasing use of scrap steel in China's steel production. These drivers suggest weaker imports into China. Added to that has been talk about steel peaking in China. The view that China is reaching peak steel has been shared by many analysts, he explained. Fray said he believes the peak will be a "fairly long drawn-out process".

The government does step in to give support for infrastructure growth, which is very steel–intensive, he said. Even if the Chinese economy weakens "we can see periods where steel production is suddenly strongly supported". This happened in 2018, for example. On the other side of the equation the government is also trying to control pollution with the closure of inefficient steel production plants. .

As far as the coming year is concerned, there is talk of more stimulus in 2020, but there have been very high stockpiles. In balance, said Fray, MSI believes steel output next year will be flat, although this does not necessarily mean that iron ore trade will grow because there is potential for local iron ore production to increase. While iron ore stockpiles in Chinese ports were sold off when the price rose following the dam collapse, there is an expectation that stockpiles will be built up again in 2020.

A large chunk of iron ore is expected to come from Australia and Brazil, but, according to MSI, after that there will be an iron ore trade decline because of factors such as the Chinese use of scrap steel, which will result in a "whole new outlook to iron ore trade with China".

All this leads to what capesize vessels will do when iron ore production to China slows. Iron ore miners are continuing to order new tonnage to ensure freight supply, but there may be a large displacement of capesize vessels around the world, he said.

With regards to coal, the future is uncertain because of the significant issues worldwide relating to emissions. Even given the attitude to coal usage from the environmental point of view, Fray says he believes the trade in coal will increase. There are transformations taking place to improve energy usage and governments and companies are seeking to limit their consumption, but there is also a huge power requirement in countries such as India and coal remains the cheapest source of power. Investments in coal-fired power are still going ahead.

In Indonesia, for example, there are plans for 52 gigawatts of coal-fired power over the next decade that will require 200m tonnes of coal. In consequence, MSI believes coal trade will continue to grow, albeit somewhat more slowly than it has in the past. There are clear risks, though, because of much more traction from governments to pull back from coal-fired power capacity — even at the expense of populations, he said.

China, which produces and consumes over half of the world's coal output annually, imports around 5-10% of requirements. This can fluctuate hugely according to government policy. The country has clear goals to maintain energy security so it only imports a limited amount, which is expected to decline over the next few years, he said.

In contrast, India produces a huge amount of coal, but cannot produce it as quickly as it consumes it. Electric power stations are being built on the country's coastline, though, as well as it investing in coal capacity in Indonesia and Australia, with a commitment to imports. Vietnam is also expected to be another source for imports. In the longer term, coal transport is flat which is bad news for capesize tonnage.

Grain, however, has a more positive outlook, Fray said, albeit from a much lower base. Grain trade will continue to expand because of increases in the population, as well as the increased use of grains in diets and in industry, for example as biofuel. Increasing investment in farming in South America will provide product for the increased demand in Asia, providing a positive long-haul trade for dry cargo operators, particularly in the panamax segment, .

There has been a dramatic change in soy bean exports from the US and there seems to be unlikely to be a change in this situation before the US elections, which means a loss of the huge spikes in long-haul trade to China, he said. This has impacted on the use of panamax bulkers.

Minor bulks are a major potential source of growth, Fray suggested, and account for about 32% of total dry bulk trade. There are positive developments across the board for minor bulks, Fray said.

These include scrap, cement and minerals, aggregates, fertilisers, and so on, where there are positive signs of trade increases going forward. Some of this trade will be intra-Asia, so not involving long-haul routes, but handymax, supermax and handysize vessels have good prospects for dry bulk growth.

Minor ores, Fray told delegates are showing potential going forward, including bauxite, manganese ore and, potentially, nickel ore.

Bauxite is a good example of a segment in which there is a changing requirement. In China, there is a much greater need for aluminium, partly for energy efficiency and partly for construction. There is now potential for a mini boom in bauxite trade, which is coming from Guinea, West Africe, and Winning Shipping is involved in transshipment into capesize vessels off the port of Kamsar. This is interesting in view of the fact that there may be an over-supply of capesize tonnage in the future, and this initiative shows there is potential for capes in the carriage of minor bulks.

The capesize segment is the one with the largest orderbook at 16%, said Fray, and it is also a relatively young fleet, so even if there is a lot of scrapping there will still be a large number of vessels.

"In the longer term both the supply-side and the demand-side dynamics are not looking favourable for capesize," said Fray. "With more contracting by miners to carry their own cargoes, independent capesize owners are going to be looking for new routes."

STEEL PRODUCTION DOWN

Research by BIMCO, meanwhile, points to Chinese steel production dropping by one million tonnes in October 2019, a decline of 1.2%, compared to the previous year.

China produced 81m tonnes of crude steel in October 2019. This is the first decline in steel production year-on-year since December 2017.

"The story unfolds quite differently when looking at the accumulated volumes of crude steel production. In total, China has produced 829m tonnes of crude steel through the first 10 months of 2019, an increase of 6% when compared to the same period last year," BIMCO research suggests.

In fact, total steel production, in accumulated volumes, has been growing consistently since 2014, whereby steel production in 2019 is set to follow along the same trajectory with increased output year on year.

Chinese steel production tends to taper off towards the end of the year, whereby production in the final quarter is consistently lower than in the third quarter. October's decreased steel production might indicate that a similar slowdown could be expected in the fourth quarter of this year.

In the past, increasing Chinese steel production drove up iron ore imports, in turn, contributing to demand for dry bulk shipping.

However, as BIMCO has previously reported, the Chinese steel mills are increasingly substituting iron ore with domestic scrap steel, negatively impacting the demand for capesize transportation.

While the Chinese steel mills are producing record-breaking amounts of crude steel, the growth rates for iron ore imports have remained in negative territory for the past 20 months.

China has imported 877m tonnes of iron ore through the first 10 months of 2019, an impressive amount, but still down 1.6% in accumulated volumes year on year. A slowdown of Chinese iron ore imports will surely negatively affect the capesize segment, BIMCO says.

The capesize freight rates have remained profitable in the past two quarters on the back of increased Brazilian iron ore exports. However, in November 2019, the freight rates dipped towards US$20,000 per day and have since hovered around this level.

Lower iron ore imports in November and December might put the freight rates under even greater pressure, the report concluded.

STRONG PORT DEVELOPMENT

China's government departments have been looking at how to strengthen the port structure, with new guidelines being produced.

The aims of the moves is to make progress in environmental, safety and technology areas during the coming years to 2025, with longer term aims of positioning Chinese ports as world leaders going forward, as well as developing a number of world-class port clusters by the middle of the century.

On the agenda are issues such improving port management systems and port service capacity, as well as speeding up the development of intelligent ports and safe port construction.

TERMINAL TALES

SAFETY HELMET

Here's a great initiative from maritime technology and risk prevention organisation Prevention at Sea, which has put together a committee of 15 maritime safety "heavyweights" to examine its Human Element Maritime Enhancement Tool (HELMET). The tool takes a triangular proactive approach, with its risk assessment methodology designed to take a human-centric approach and support shipping companies to achieve safety excellence and continuously improve in this area. In recent meetings in Cyprus, the committee took an in-depth look at how a human-centred risk assessment methodology can boost the safe business culture for shipping. Judging by the number of accidents that continue to occur, such initiatives are only to be applauded. As the organisation recently pointed out, major maritime incidents not only impact human life and the environment, but also lead to off-hires, fines and detentions. "It is widely recognised that the majority of these incidents are directly or indirectly caused by human error," the organisation says.

HELMET introduces Key Risk Indicators – a new and unique approach of risk detection based on expert experience and input, best practices and analysis of past data that complement the industry's well known KPIs. Let us hope that the initiative improves safety still further.

KNOCK ON WOOD

The Port of Ipswich has reached another milestone in its hook-up with Finnish timber company Metsä Wood UK, as the port handled its first shipment of 2,000cbm of timber. The Finnish firm recently announced the opening of its newest UK terminal in Ipswich, which will specialise in receiving, storing and distributing a range of wood products. ABP already has a long-standing relationship with Metsä at King's Lynn and also provides services to the wider Metsä Group in the ports of Hull and Swansea.

FIGHTING TALK

There was a great turnout for ABTO's latest conference in Amsterdam, with plenty of good chances for networking – even when a tour of the city's canal system involved ducking every time our craft went under a bridge.

There were also plenty of safety warnings from speakers at the conference: Captain Richard Brough, head of the International Cargo Handling Co-ordination Association, warned those present that the port industry was still not safe and that people were still failing to understand the limitations of equipment, among other failings. The point was driven home by the number of fatalities that continue to occur in ports – the latest of which had occurred the night before he made his remarks.

There was also a warning that unless the industry got its act together, the International Maritime Organization would be "coming ashore" to clean up. You have been warned!

OFF TO MARKET

The conference offered plenty of words of advice about how to successfully market your business, with Ian Mills of Lawrence Mills Consulting and Paul Sowden of marketing firm Sowden & Sowden talking about how to successfully brand bulk terminals. Good marketing, they explained, meant you could get more out of your sales team by giving them good leads.

New technology offers many opportunities for technologically savvy ports to find out who is accessing their website, which then means you can target your customers more accurately.

Embrace the customer was their message – after all, if you don't have any customers, you don't actually have any business.

WHAT'S ON

The not-to-be-missed events for all those in the industry

23-24 JANUARY 2020
COALTANS USA 2020
MIAMI
www.coaltrans.com/events

17-19 FEBRUARY 2020
COALTRANS INDIA 2020
GOA
www.coaltrans.com/events

19 FEBRUARY 2020
DUST CONTROL FOR PROCESSES
LONDON
www.gre.ac.uk/engsci/research/groups/wolfsoncentre/coupro/sc

8-11 MARCH 2020
GLOBAL GRAIN ASIA
SINGAPORE
www.globalgrainevents.com/event-calendar.html

10-12 MARCH 2020
PORT AND TERMINAL OPERATIONS FOR BULK CARGOES
LONDON
www.gre.ac.uk/engsci/research/groups/wolfsoncentre/coupro/sc

17-19 MARCH 2020
WORLD PORTS CONFERENCE 2020
ANTWERP
www.worldportsconference.com

17-20 MARCH 2020
COALTRANS SCHOOL OF COAL
SINGAPORE

https://www.coaltrans.com/events

18-20 MARCH 2020
ASIA PACIFIC MARITIME
SINGAPORE
https://10times.com/asia-pacific-maritime

24-25 MARCH 2020
COALTRANS MENA 2020
CAIRO
www.coaltrans.com/events

31-32 APRIL 2020
CMA SHIPPING
CONNETICUT
https://globalmaritimehub.com/event/cma-shipping-2020

20-22 APRIL 2020
COALTRANS CHINA 2020

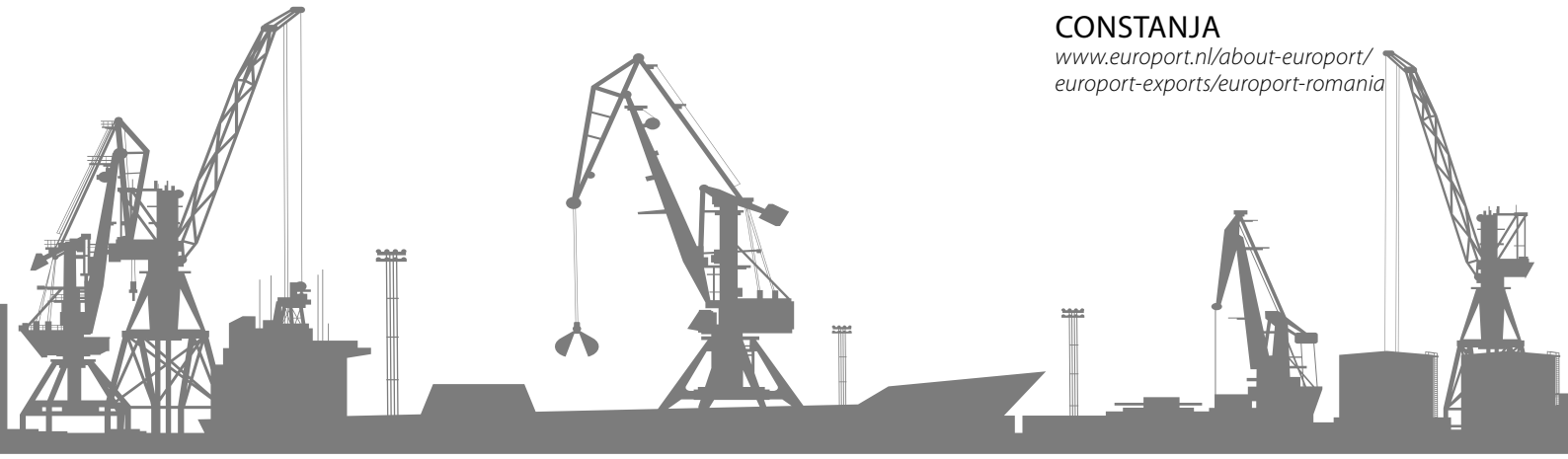
Shanghai
www.coaltrans.com/events

20-22 APRIL 2020
ARGUS BIOMASS CONFERENCE
LONDON
www.argusmedia.com/en/conferences-events-listing/biomass

28-30 APRIL 2020
PNEUMATIC CONVEYING OF BULK MATERIALS
LONDON
www.gre.ac.uk/engsci/research/groups/wolfsoncentre/coupro/sc

12-13 MAY 2020
COMMISSIONING AND TROUBLESHOOTING 'HANDS-ON' PNEUMATIC CONVEYING SYSTEMS LONDON
www.gre.ac.uk/engsci/research/groups/wolfsoncentre/coupro/sc

12-14 MAY 2020
EUROPORT ROMANIA
CONSTANJA
www.europort.nl/about-europort/europort-exports/europort-romania



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Liebherr Fixed Cargo Cranes

Fixed cargo cranes (FCC) are space-saving handling solutions for harbours and quaysides and suitable for vessels up to post-Panamax class. The slewing cranes installed on fixed foundation pedestals comprise both cylinder luffing as well as wire luffing slewing or double girder cranes. They provide the optimum balance between restricted space and cost effective turnover.

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