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featuring...



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Dry bulk trade support easing

After restricted growth in global import demand for commodities in a number of countries last year there is anxiety about how the pace will evolve through the next twelve months. Increased world seaborne dry bulk trade still seems a likely outcome, but expectations for additional volumes are fairly modest.

The latest forecast for economic activity published by the International Monetary Fund at the end of January pointed to a slowing trend with greater downside risks. World gross domestic product growth, which edged downwards by 0.1 percentage points to 3.7% in 2018, is estimated to lose more momentum in 2019, to 3.5%. Slackening output expansion in the USA, Europe and China is expected.

GRAIN & SOYA

Within the global grain (wheat, corn and other coarse grains) trade segment, changes envisaged among importers during the current 2018/19 crop year ending June are mostly quite limited. As a result, according to updated International Grains Council calculations revealed last month, total world trade is still shown as remaining unchanged compared with the previous crop year, at 368mt (million tonnes).

One positive element which has just been revised upwards is grain imports into the European Union. IGC analysts now expect these imports to increase to almost 28mt in 2018/19, a 12% rise.

This advance to the highest level in a decade follows a reduced domestic harvest in the EU last summer/autumn, and reflects additional corn purchases by livestock feed manufacturers recently.

IRON ORE

Attention in the iron ore trades focuses on China because of the huge proportion of the global iron ore sector, over 70%, which these volumes represent. Data for 2018 shows that imports into China (including some land movements) were down slightly by 1%, at 1,065mt, and prospects for any revival this year seem constrained.

A full statistical picture of world steel production in 2018 has been published by the World Steel Association. Among individual countries and areas which are key importers of raw materials, most changes in crude steel production last year were not large. In the European Union and Japan, steel output was flat at 168mt and 104mt respectively. South Korea achieved a 2% rise to 72mt, but China's performance was stronger, growing by 7% to 928mt.

COAL

Some coal trade forecasters estimate that the world total may have grown by as much as 4% in the past year, while others suggest a rise of about half this percentage is more likely. Predictions for 2019 vary considerably as well, given uncertainties surrounding several major importers including China, India

and EU.

In the coking coal trade segment, much of which comprises movements to large importers in Asia, as shown by table 1, prospects for the year ahead are mixed. These buyers appear to have imported about 238mt last year, a small 1% rise. In the next twelve months, the main positive influence probably will be India's imports, amid strongly expanding steel production, greatly dependent on foreign coking coal because of the limited domestic supplies of high-quality material available.

MINOR BULKS

Estimates of steel products (coil, plate, sheet and other items) trade suggest that the world total may have been fairly stable in 2018, although individual components changed. One major part, China's exports, diminished last year when the volume fell by 8% to 69mt. Imports into China apparently were 1% higher at 13mt.

BULK CARRIER FLEET

Deliveries of new bulk carriers from shipbuilders declined greatly by 10 million deadweight tonnes or about a quarter in 2018, to 28m dwt, as shown by table 2. But a similar decrease in scrapping resulted in the world bulk carrier fleet's growth remaining steady at 3%. In the year ahead both newbuilding deliveries and scrapping seem quite likely to rise.

TABLE 1: KEY ASIAN SEABORNE COKING COAL IMPORTERS (MILLION TONNES)

	2013	2014	2015	2016	2017	2018*
Japan	77.0	74.1	70.6	74.0	71.9	72.0
South Korea	26.4	29.9	32.5	32.0	32.2	32.0
Taiwan	10.9	10.9	10.8	10.5	11.1	11.5
China	75.4	62.3	48.0	59.3	69.9	66.0
India	39.0	47.1	50.6	51.4	50.1	57.0
Total of above	228.7	224.3	212.5	227.2	235.2	238.5

source: various & BSA 2018 estimates

* estimate

TABLE 2: BULK CARRIER NEWBUILDING DELIVERIES (MILLION DEADWEIGHT TONNES)

	2013	2014	2015	2016	2017	2018*
Handysize (10-39,999dwt)	6.3	5.4	6.5	4.6	3.4	2.9
Handymax (40-64,999dwt)	14.7	11.4	15.9	13.2	10.8	5.5
Panamax (65-99,999dwt)	19.9	12.8	9.9	9.4	8.9	5.6
Capesize (100,000dwt and over)	22.0	18.7	16.9	20.0	15.3	14.5
Total	62.9	48.3	49.2	47.2	38.4	28.5
% change from previous year		-23.2	1.9	-4.1	-18.6	-25.8

source: Clarksons Research & BSA estimates for 2018

* estimate

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Canadian grain farmers worried that plans to transport crude oil by rail mean agricultural shipments will not get priority



Farmers in Alberta, Canada, have expressed concerns by governmental plans to ship crude oil by rail.

They believe that this could overtax the rail system — one which they say is already at capacity — with the result that grain shipments will be affected.

Rail companies Canadian National (CN) and Canadian Pacific (CP) have promised that agricultural shipments will not be negatively affected, but farmers have lost billions of dollars from two major backlogs in the past five years, and remain anxious that history will repeat itself.

The premier of Alberta, Rachel Notley, announced that the government has signed

contracts to lease 4,400 railcars to deliver oil sands crude to market. The \$3.7 billion plan includes contracts with Canadian National and Canadian Pacific railways to move up to 120,000 barrels per day by 2020.

Tom Steve, general manager of the Alberta wheat and barley commissions, explained: “We have some strong reservations about putting additional oil cars onto the system and potentially putting grain at risk.”

According to Steve, railways struggle to cope with the demand from grain producers, and when grain producers can't deliver to the elevators, they don't get paid.

“It's a huge risk and it also affects our international reputation with our customers,” Steve said. “The risk is we lose sales and we lose reputation, and ultimately all those costs are borne by the farmers.”

Notley said CN and CP have assured the government that the crude-by-rail plan would not hurt other industry, including agriculture. “We made it very clear that we were not going to do anything that would compromise or jeopardize the shipping capacity of our agricultural producers or other producers,” Notley insisted. “They're fundamentally important parts of our economy in the past, now and well into the future.”

Trump set to lift Canadian steel and aluminium tariffs?

US President Donald Trump's steel and aluminum tariffs imposed on Canada are expected to be lifted “in the next few weeks,” according to David MacNaughton, Canada's ambassador to the US.

The 25% tariff on steel and the 10% tariff on aluminum were immediately met by Canadian counter-tariffs on a wide range of goods from coffee to toilet paper.

MacNaughton previously said that the Canadian government was doing what it could to ensure the tariffs were lifted. Since a new trade deal was signed in October last year, to replace NAFTA, Canada's official position is: “that is all the more reason why these tariffs ought to be lifted.”



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Key role of coal for a responsible energy transition

The Paris Agreement, signed in December 2015, focused on combating climate change and setting the path for a low carbon future, aiming at limiting the global temperature increase to 1.5°C, writes Anne-Claire Howard, Executive Director, Bettercoal, UK. The urgency of this was brought to the forefront again with the 2018 Intergovernmental Panel on Climate Change Report. Policy efforts have been focused on how best to reduce carbon emissions, specially seeking an end to the use of coal for electricity generation. But coal production and usage have not shown signs of shrinking globally:

- ❖ 2017 saw net additional capacity of 28GW installed globally and there are over 700GW of coal-fired power plants in development or under construction;
- ❖ global coal demand grew by 1% in 2017 to 7,585mt (million tonnes). Coal still accounted for 37% of the world's power generation;
- ❖ the *BP Statistical Review of World Energy 2018* reported growth in coal consumption in parallel with growth in renewable energy in several regions;
- ❖ 74% of steel manufactured uses coal; and
- ❖ it takes approximately 200kg of coal to produce one tonne of cement, and about 300–400 kg of cement is needed to produce 1m³ of concrete.

As the world transitions towards more sustainable sources of energy, coal still has a significant role to play. Increasing global urbanization implies that people will need access to affordable energy and buildings

made of steel and concrete will have to be built; none of that can happen without coal.

Over 50% of global emissions are produced by 24 countries, which identified a role for low emission coal in their climate pledges as a way of working towards their Paris Agreement targets. In these countries, coal is an abundant, reliable and affordable fuel that fosters economic development. To reach near to zero emission plants in these countries requires financial capital. However, under fire from well-minded organizations, much of the financial community has chosen to remove access to capital for coal projects, which might lead to the use of less efficient technology and an increase in emissions instead of a responsible use of the resource. For instance, many financing agreements (especially backed by development finance institutions such as the International Finance Corporation) require the operator to demonstrate they meet environmental and social performance standards. But without the financial support, this scrutiny has dwindled.

At the same time, coal mining is potentially damaging to the reputation of large mining operators who are under increasing pressure from their shareholders to divest their coal assets and focus on other commodities. When this happens, they are often replaced by smaller operators who do not have the knowledge or financial capacity to invest in strong systems to manage their environmental and social performance.

Therefore, the stigma currently born by

the coal industry is dangerous for three main reasons. Firstly, it means that there is insufficient investment in technology to reduce the carbon emissions coming from coal for power generation. Secondly, it has led to a decrease in scrutiny on the performance of coal mining operators increasing the risk in its value chain. And thirdly, it has led to a fragmentation of the industry.

It is imperative to acknowledge the existence and relevance of coal in current and near future systems. Coal for power may be significantly reducing in Europe, but it remains key in the energy mix in parts of the world including Eastern Europe. And, even though the cement and steel industries are making strides to reduce their carbon footprint, coal is still very much part of the equation.

This is why engagement, scrutiny, transparency and dialogue are so important for the coal industry to ensure that whilst it exists, it is being produced responsibly. Bettercoal is in a unique position as the only supply chain initiative which looks at coal mining. The organization ensures that coal production meets ESG principles embodied by the Bettercoal Code.

It also ensures that buyers of coal increasingly purchase from mines which have undergone a Bettercoal Assessment. By doing this, Bettercoal aims to improve the coal supply chain globally working together with both buyers and suppliers, encouraging new members to join the organization and create greater positive impact in the coal industry.



Major hike noted in Indian coal imports

Between April and November 2018, India's coal imports increased by 9.7% to 156mt (million tonnes), compared with the 142mt reported for the corresponding period in the previous year.

In November alone, coal imports grew 10.1% to 19.47mt. Imports of non-coking coal in the same month amounted to 14.24mt compared with the 15.23mt imported in October 2018.

Local analysts believe that the significant correction

in thermal coal prices in November prompted buyers to take a wait and see approach. However, the met coal market remained effectively stable and this could be seen in purchases.

Imported coking coal in November amounted to 3.93mt and 3.94mt in October.

Barry Cross



Coal being unloaded at Krishnapatnam Port in India.



Working towards a global responsible coal supply chain.

Expanding coal trade defies negative overtones



Richard Scott, Bulk Shipping Analysis

An upwards trend in global coal trade persists, despite justifiable worries among commodity and freight market observers about longer term prospects. Solid growth unfolded last year and there seems to be a possibility of further enlargement in 2019. Yet the threat from environmental pressures and the shift towards alternative, cleaner energy sources remains prominent.

Estimates for world seaborne coal trade in 2018 are still provisional. Available firm data plus best guesses about other elements suggests that there was a large increase from the preceding year, perhaps approaching 50mt (million tonnes). Several major and minor importers increased purchases. Higher volumes recorded in the past two years have reversed what had appeared to be a downwards trend evolving in the previous two years.

Despite this positive performance and

indications of rising future import demand, during the next twelve months at least, great uncertainty surrounds some aspects. While expectations of more growth ahead seem realistic, it is also possible that the outcome could be a flat or decreased overall volume this year. Unpredictable (in terms of precise timing and impact) political influences could restrain the advance, suggesting that on a longer view a robust upwards trend is unlikely.

ECONOMIC FOUNDATIONS WOBBLING

Global economic output growth — as expressed by gross domestic product (GDP) — decelerated slightly over the past twelve months and looks set to continue slowing through 2019. Although this broad indicator does not have a fixed relationship with energy commodity use or more specifically coal import demand, it provides

clues to the background for energy consumption.

During 2018 only the USA among the principal economies saw an improved performance. In the European Union and Japan slackening growth was clearly visible, while China's expansion was restricted. The pattern evolving is widely expected to persist in the next twelve months when the USA also may join the list of slowing countries. International trade tensions are a contributory adverse influence.

At the beginning of last year there was fairly general optimism about a continuation of the economic upswing then under way. But circumstances deteriorated and, according to the latest International Monetary Fund update, world GDP growth was 3.7% in 2018, below the previous year's 3.8%. Further slackening to 3.5% is forecast for this year with a proviso that

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WORLD COAL TRADE – PRINCIPAL IMPORTERS (MILLION TONNES)

	2016	2017	2018*	2019*	2019 % change**
China	255	271	273	257	-6
Japan	189	187	189	187	-1
India	214	208	229	235	+3
South Korea	135	149	151	147	-3
Other importers	566	584	581	590	+2
Total	1,359	1,399	1,423	1,416	0

* forecast ** 2019 forecast compared with previous year

source: Australian Government Dept of Industry, Innovation and Science, December 2018, and BSA calculations

“risks to global growth tilt to the downside”.

Among major coal importing countries, it could be perceived in several that slowing economic growth was acting as a moderating factor on energy and coal consumption. In India, however, the economy continued to perform well, resulting in buoyant electricity generation, industrial activity and steel production, all reflected in additional support for the domestic coal market and imports.

The world economy's growth is seen as unlikely to strengthen this year, even if trade tensions — especially between the USA and China — are limited or eliminated. The activity cycle seems to have turned towards softening momentum in a wide range of countries. A more serious challenge for coal trade though is political rather than economic. An increasing intensity of government measures in numerous countries, designed to reduce carbon emissions and cut air pollution, appears set to remain at the forefront.

CONTINUING TRADE RECOVERY

Coal trade during 2018 extended the upturn seen in the previous year. The trend was remarkable because pessimism had emerged earlier. After a 6% reduction in global seaborne coal trade in 2015 followed by a flat period in 2016, there were signs that the feared long-term declining trend resulting from switching to other energy sources had begun and would continue. In the past two years that theory has so far proved incorrect, with annual volumes reviving.

Recent estimates of the scale of 2018 growth vary. Calculations by the Australian Government Department of Industry, Innovation and Science (AGDIIS), published in late December, which are summarized in the accompanying table, show a 2% rise. Global coal trade including land movements, but mostly consisting of seaborne shipments, is put at 1,423mt last year, 24mt above the preceding year's 1,399mt total.

Other reputable forecasters calculating specifically seaborne trade show a larger increase, based on provisional figures while awaiting more accurate or complete importer and exporter data. In mid-January the German coal importers association VDKI suggested that world seaborne coal trade grew by 3.7% in 2018, including a 3.6% rise in steam coal and a 4.4% rise in coking coal. Estimated expansion of around 4% for overall trade is corroborated by several analysts, based on available indications.

As highlighted above, both steam and coking coal trade sub-groups evidently saw higher volumes in the past twelve months. Coking coal trade, the smaller category comprising around one-fifth of all coal movements, benefited from stable or higher steel production in raw materials importing countries. Within the dominant category comprising the remaining four-fifths of movements, steam coal trade, volumes were boosted by buoyant electricity generation as well as growing coal-fired power station capacity and output in newer, smaller Asian importing countries.

Higher imports into India and China last year provided a sizeable addition to the world total. The volume received by India may have been over 20mt above the preceding annual figure, at around 225mt. China's overall coal imports including low-grade lignite rose by 10mt or 4%, reaching 281mt (more than shown in the AGDIIS estimates calculated before year-end), although towards the end of the period weakness was prominent.

Another boost was derived from expanding purchases by a group of relatively small Asian importers — Malaysia, Pakistan, Philippines, Thailand and Vietnam. This group may have raised its steam coal imports by almost a fifth in 2018 to over 110mt, as new power stations began operating and power demand continued growing. By contrast, Europe's steam coal imports still appear to be on a declining trend amid tightening regulations affecting coal-fired power output.

The geographical pattern of global coal trade was also affected by changes among suppliers. Some of these changes are broadly visible but final figures are awaited. According to preliminary calculations which may be revised, larger volumes exported by Indonesia, Australia and the USA propelled the overall trade expansion, partly offset by lower quantities exported by several other major suppliers.

Coal exports from Indonesia, the world's largest supplier when low-grade lignite is included, appear to have increased in 2018 as a whole, following a 10% rise to 392mt in the first eleven months. Second largest supplier Australia apparently also raised its export total above the previous year's 370mt. One early annual statistic published showed that exports from Richard's Bay, comprising most of South Africa's volume, declined by 4% in 2018, at 74mt.

UPWARDS AND ONWARDS IN 2019?

Further expansion of global seaborne coal trade during 2019 seems quite likely. But the huge uncertainty surrounding imports by several major buyers points to the possibility of a different outcome, especially given the underlying negative influences affecting the market for this commodity. Unexpected changes in national policies, which perhaps can be labelled as the 'known unknowns', probably with mostly negative consequences for coal movements, could greatly alter the trend.

Among major importers, especially great uncertainty about how government policy decisions may impact on coal imports is evident in China. Other influences of a more commercial nature are prominent in China also. Yet changes in policy, which are only predictable as general possibilities with unclear timing and magnitude, often heavily determine short term trade flows. The effect of such a changed policy was seen towards the end of last year when abruptly China's imports were tightly restricted, resulting in a sudden steep downturn within the final month.

Elsewhere, in numerous countries, national energy and specifically coal policy changes have occurred in recent years, almost always with adverse effects on coal trade. Although many other commodities traded internationally are subject to changing government policies, coal is particularly vulnerable because of its large contribution to harmful carbon emissions and air pollution. The downwards trend seen in Europe's coal imports mainly reflects this factor.

Consequently predictions of significant growth in world seaborne coal trade in 2019, at a rate probably below last year's fairly brisk pace, are partly speculative, incorporating much guesswork. However, currently there are signs of positive or potentially positive influences which could strengthen import demand in a number of countries, enough to more than offset foreseeable adverse influences which are also visible.

A slightly more cautious view is illustrated by the AGDIIS forecasts table, showing an almost flat trade outcome this year. The 2019 total for world trade in steam and coking coal (including land movements but mostly seaborne, as already mentioned) is forecast at 1,416mt, which is just 7mt or under 1% below last year's estimated volume.

Imports into three major importing countries — China, Japan and South Korea, comprising over two-fifths of the world total — are expected to decline at rates in a 1% to 6% range, contrasting with a 3% rise in India. A breakdown of the voluminous 'other countries' category (also two-fifths of the total) is not provided: this element is expected to increase by 2%. In the 'others' sub-group is Europe, which is not forecast separately but presumably is expected to see a decline, implying that assumptions for the remaining countries chiefly in Asia are considered fairly bright.

Within this broad picture, a breakdown of world trade by coal type is also published by AGDIIS, although not shown in

the table. Negative changes foreseen are concentrated in the steam coal segment. Steam coal trade is forecast to decrease marginally in 2019 by 17mt or just over 1%, to 1082mt. Conversely, metallurgical coal trade (coking coal plus steam coal grades used in the steel industry) is predicted to expand by 10mt or 3%, reaching 334mt.

According to other statistical sources which show the European Union separately, seaborne imports of coal into the EU from external origins probably totalled around 130mt last year, a large decrease of about 10%. Another large reduction could follow in 2019. This part of world coal trade may be seen as the major component with the clearest negative trend. The weakness results from environmental policy mandating reduced coal use, accompanied by a progressive switch towards alternative energy emphasizing renewables, especially wind power generation.

Looking at positive aspects, rising imports into India and several smaller importers can be expected to support trade growth in the twelve months ahead. India's coal use is rising rapidly while increases in domestic production of coal, and growth in rail transport capacity, is straining to match the pace of consumption expansion. Also benefiting imports, high quality coking coal for expanding steel output is mostly based on foreign supplies. In the 'smaller Asian importers group' comprised of Malaysia, Pakistan, Philippines, Thailand and Vietnam, coal imports related to rising coal-fired power generation seem set to see further growth.

RESTRAINTS ON OPTIMISM

This analysis can be interpreted as pointing to another rise in global seaborne coal trade this year, and perhaps in the following twelve months as well, as a speculative outlook. Currently it seems realistic to envisage that a foreseeable 2019 increase probably will not be as strong as last year's estimated rise, suggesting that a slow 1–2%

growth rate is a more plausible expectation at present.

Nevertheless, it is clear that optimism about the longer trend of international coal trade is built on shaky foundations. In Europe particularly, and also in Japan, South Korea, India and China, together comprising almost three-quarters of total world imports, there are doubts about the strength of key drivers. Some influences eventually are more likely to turn negative than positive in the future, despite no clear signs of those changes occurring in the twelve months ahead.

One unfavourable background influence for 2019 is becoming more visible: the slowing world economy. This deceleration, although at present envisaged as being fairly modest, is likely to have a limiting effect on steel production in numerous countries, especially as weaker capital investment spending (usually steel-intensive) is evident. Adverse effects on steel output by blast furnace producers using imported coking coal are predictable. The direct implications of slowing economic growth for steam coal consumption are more difficult to assess, but negative effects can be foreseen.

A recent report by the International Energy Agency suggested that, in its 'new policies scenario' for the world as a whole, looking ahead over the next two decades, growth in coal consumption will be restrained by improvements in electricity supplies and renewable energy participation, and by efficiency gains. However, the report commented that "it is too soon to count coal out of the global power mix". The average age of coal-fired power plants in Asia is less than 15 years, compared with around 40 years in advanced economies. As a result, only limited potential exists in the near future for obsolescence and replacement with alternative energy sources.

These observations emphasize again the significance of Asia in future global coal usage, and the imports which comprise a large part and also form a dominant proportion of global seaborne trade in coal. In many Asian countries, coal-fired electricity generation remains the preferred option, providing reliable and relatively cheap power supplies to satisfy rapidly rising demand for energy amid economic development progress. But the positive view of international coal trade, which can be shaped by such arguments, is tempered by intensifying downwards pressure from environmental policy, suggesting that prospects for trade growth are severely constrained.

DCi



Optimarin says early order surge should make 2019 'best year ever'

In the quarter of a century since its formation in 1994, ballast water treatment (BWT) specialist Optimarin has never experienced a year quite like 2018.

The Norwegian headquartered firm revealed in late January that the previous 12 months saw it sell more than 100 systems and achieve record revenues. However, according to company CEO Tore Andersen, 2019 is already shaping up to set a new standard, with the orderbook currently five times the size it was at this point in 2018. Revenues, he says, are expected to double year-on-year.

LONG-TERM DEDICATION

"This is an overnight success that's been 25 years in the making," he says. "I've been asked how have we managed to suddenly boost sales in this way. But that 'sudden' surge is the result of many years of dedication, investment and total focus on BWT.

"We have patiently developed the market's most reliable, simple and effective

UV technology — a technology that is tried and tested like no other, with no major overhauls or iterations in the last ten years. That means we, and our customers, have complete trust in it, knowing the system inside out. It is easy to use, easy to operate and easy to rely on.

"Now that the industry is mandated to install BWT systems we see that it's becoming the easy choice."

AMBITIOUS GROWTH

With the most recent orders taken into account, Optimarin has now sold close to 700 of its Ballast Water Treatment Systems. Of these, more than 500 are installed and operational, of which approximately 250 are retrofits.

Stand out agreements in 2018 included signing a 36 system fleet deal with Ardmore, being selected for the USCG's newbuild Offshore Patrol Cutter programme, extending its relationship with Saga Shipholding, securing new installations with Royal Caribbean, and moving into the aquaculture segment with a contract for DESS Aquaculture newbuild wellboats.

The year 2019 has already seen a host of new contracts signed, encouraging Andersen to aim for a 100% year-on-year sales increase for 2019.

MEETING DEMAND

"There's no reason at all that ambitious target can't be achieved," he comments. "The ratification of the IMO Ballast

Water Management Convention, allied to the USCG's stringent requirements, fired a starting gun and, thanks to our established expertise, technology and the fact we were the first to achieve USCG compliance, we're in an excellent position to meet that demand."

"Two-thousand-and-eighteen was an excellent year; 2019 will be even better. We'd like to thank our customers, suppliers and all our stakeholders for helping us achieve that success."

STRONG AND STABLE

Optimarin, which installed the world's first commercial BWT system on the cruise ship *Regal Princess* in 2000, is now expanding its own business to meet demand. In the past few weeks the firm has taken on new staff across its procurement, technical and project management divisions.

"With the orderbook growing and the continued backing of our strong and stable investor base it's the perfect time to build our business for the opportunities we so clearly see on the horizon," concludes Andersen.

Alongside its full IMO and USCG compliance, Optimarin has certification from a comprehensive range of classification organizations, including ABS, BV, DNV-GL, LR & MLIT Japan. Current customers include Royal Caribbean International, Fednav, GulfMark, Hapag Lloyd, Matson Navigation, McDermott, the Danish Navy, MOL, Seatruck, Technip, and the Royal Netherlands Navy, amongst others.



Optimarin: tried, tested and market-established BWT systems.

Liberia confirmed as world's second-largest ship registry

Liberia is the second-largest ship registry in the world, according to leading shipping analyst Clarksons in its Clarksons World Fleet Monitor January 2019. This report confirms that, in gross tonnage terms, Liberia has overtaken and outgrown the Marshall Islands, which now languishes in third place.

Alfonso Castellero, CCO of the Liberian International Ship & Corporate Registry (LISCR), the US-based manager of the Liberian Registry, says, "This is about quality of service, not discounted rates.

"The Liberian fleet was the fastest growing major open flag in both the shipping and offshore sectors in 2018,

and currently has a growth rate of 8.0% — more than twice that of most other open flags. There are a number of reasons for this, not least a growing recognition on the part of major shipowners and managers that Liberia, more than any other flag state, is able to combine increased safety and efficiency with reduced costs.

"The quality of service offered, and the rapid response times achieved, are important factors behind the significant growth recorded by the Liberian Registry, whose clients are able to communicate with our highly qualified, motivated staff at any time of the day or night, thanks to the registry's global

network of offices staffed by experience professionals.

"Owners and managers have also been shifting their fleets to Liberia because of the huge cost savings available under the historic agreement on port dues with the People's Republic of China. This agreement, which was recently renewed, can result in savings to owners of millions of dollars."

Liberia is not only making shipping more cost-effective. It is also making it more efficient and safer through the strategic deployment of its expanding global services and international presence and its pioneering role in the application of cutting-edge technology.

GB Railfreight to continue successful partnership with Liberty British Aluminium

In early January this year, GB Railfreight announced that it will be continuing its successful partnership with Liberty British Aluminium, having agreed to extend their contract for another three years.

The contract will see GBRf class 66 locomotives hauling alumina from North Blyth to Fort William, on a service that will run six days a week. The service enables the delivery of critical supplies to an industry which is not only central to the West Highlands, but the Scottish economy as a whole.

John Smith, Managing Director of GB Railfreight, said: "We are delighted to see the extension of this historic relationship between GB Railfreight and Liberty British Aluminium. The move will ensure the continuation of rail freight on the West Highland line.

"Our ambition at GBRf is to see an increase in the amount of goods and materials transported via rail freight, taking trucks off the road and benefiting the environment.

"Ensuring the delivery of materials to a key Scottish industry also secures employment in the West Highlands, and we are proud of the role GBRf are playing in ensuring the economic prosperity of the area."



environment and communities of Lochaber."

ABOUT GB RAILFREIGHT

Founded in 1999 and headquartered in London, United Kingdom, GB Railfreight is the third-largest rail freight operator in the United Kingdom, with a turnover in excess of £120m. GB Railfreight is one of the fastest-growing companies in the railway sector and transports goods for a wide range of customers.

ABOUT LIBERTY BRITISH ALUMINIUM

Liberty British Aluminium said: "We at Liberty are incredibly proud to own and operate the only remaining UK aluminium smelter in Fort William. Our partnership with GB Railfreight is important in maintaining the operation of the smelter and our continued investment and growth; creating jobs in the West Highlands."

Bill Reeve, Transport Scotland's Director of Rail, said: "A competitive, sustainable rail freight sector supports our communities and our economy through a safe, green and efficient way of transporting products and materials.

"The Scottish Government welcomes the continued commitment of British Aluminium to rail freight to provide the raw materials for its production. This is another example of the importance of the West Highland Line to the economy,

Liberty British Aluminium is part of the GFG Alliance, a London-headquartered international group of businesses, founded and owned by the British Gupta Family, with annual revenue of over US\$15 billion and around 14,000 staff. It combines energy generation, metal manufacturing, engineering, natural resources and financial services, working together to deliver a common business strategy. The Alliance comprises Liberty, an integrated industrial and metals business; SIMEC, a resources and infrastructure group; Wyelands, a banking and financial services arm; JAHAMA Estates, a division that manages and develops the Alliance's global property holdings; and GFG Foundation which focuses on the retention and creation of engineering and industrial skills.

ClassNK releases new PrimeShip-HULL software

ClassNK has released the latest version of its design support software PrimeShip-HULL (HCSR) Ver.6.0.0, developed in response to the IACS Common Structural Rules for Bulk Carriers and Oil Tankers (CSR BC & OT). The new version incorporates the latest rule amendments to CSR BC & OT including amendments based on feedback from the industry.

In addition to the incorporation of the latest rule amendments, various functions were also added or improved in the PrimeShip-HULL (HCSR) prescriptive calculation software and direct strength assessment software.

The enhanced calculation report

function found in the prescriptive calculation software makes it possible to create reports for multiple sectional data all at once. The update also allows users to change output settings in detail, enabling the sorting of reports by section, evaluation item and more.

Additionally, the enhanced data linkage function with 2D CAD data enables users to load the sectional data of outside cargo parts. It is now possible to load the sectional data of all ship parts.

The direct strength assessment software now contains a 'Zooming Analysis' function. This can be used for design examination and strength

evaluation with partial models cut out from hold models.

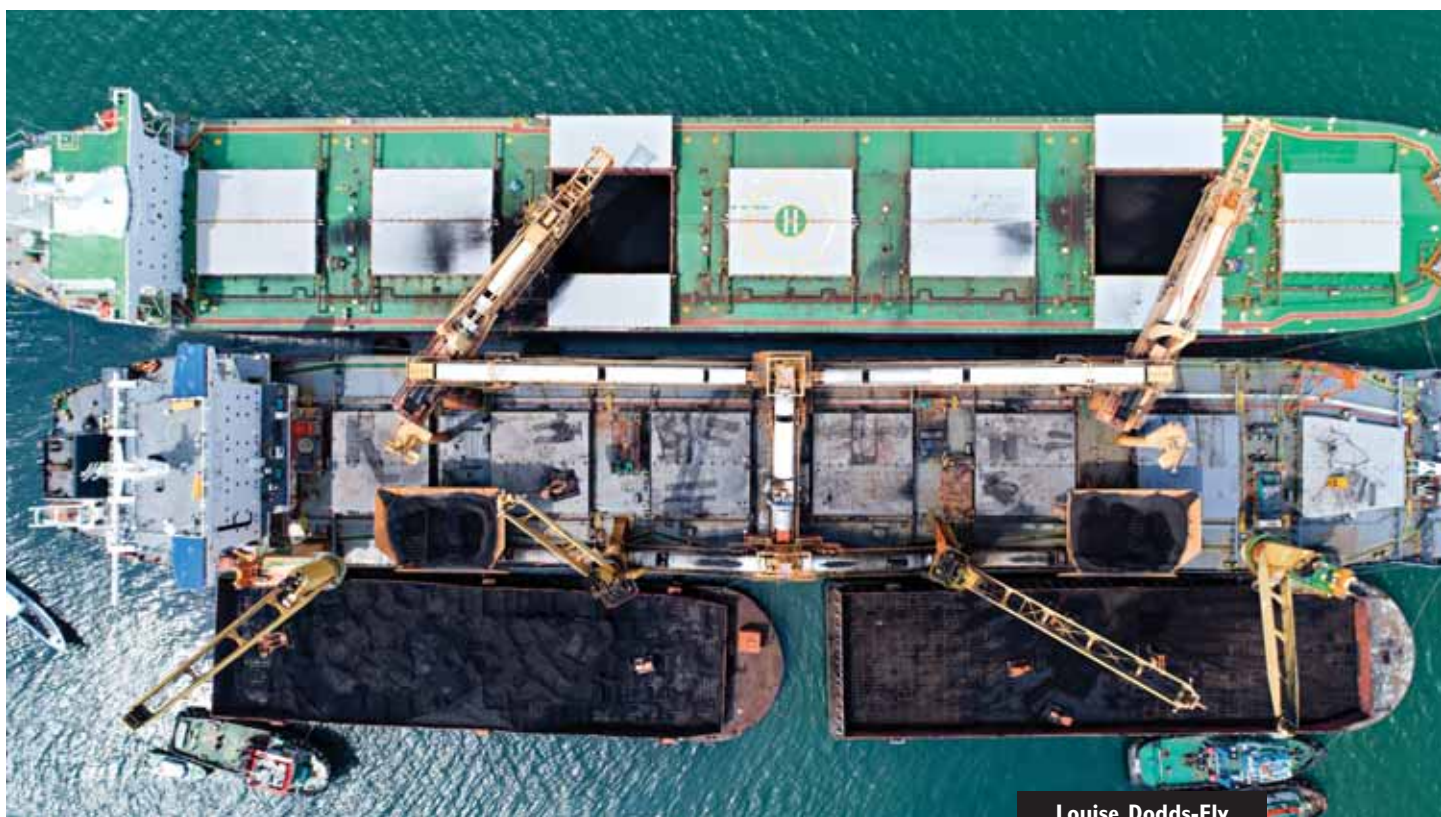
The mesh refinement function found in the direct strength assessment software has also improved to allow better mesh quality. Now it is possible to create higher quality meshes even for complex structures.

The enhancements and new functions are expected to greatly contribute to reductions in necessary man hours and shorter design lead times.

PrimeShip-HULL (HCSR) Ver.6.0.0 was developed by ClassNK to offer the industry an extremely high level of support in the design of safer ships compliant with CSR BC & OT.

Floating cranes, transshipment and self-unloaders

advanced bulk handling in the spotlight



Louise Dodds-Ely

Rocktree expands in newer geographies with new partners

SPECIALIST IN TRANSSHIPMENT SERVICES

Rocktree is a Singapore-based global dry bulk commodity handling company providing transshipment, storage and blending services to multiple customers including international traders, mining companies and end users.

Rocktree has established its reputation for excellence in South East Asia over the last ten years, providing customized logistics solutions, simplifying the supply chain and enabling cost efficiencies for its clients. It has handled more than 147mt (million tonnes) of coal since inception and has emerged as a preferred transshipment partner across the region.

In 2018, Rocktree completed the acquisition of 14 tugs and barges and two transshipment vessels with storage capacity, *RT Leo* and *RT Genova*, in anticipation of accelerated growth and

interest from other global regions. These assets allow Rocktree to offer integrated transportation services to clients, inclusive of barging and transshipment (jetty to

vessel), while also improving operational flexibility due to the increased visibility of the scheduling of barges for unloading. The floating storage help clients maximize barge

ROCKTREE FLEET: TRANSSHIPMENT VESSELS

	Zeus	Mara	Apollo	RT Leo	RT Genova
Handling capacity (million tonnes per annum)	8.5	12.0	8.5	14.4	14.4
Net loading rate (tonnes per day)	40,000	60,000	40,000	72,000	72,000
Blending & metal detection	Yes	Yes	Yes	Yes	Yes
Buffer storage (tonnes)	6,600	60,000	3,000	55,000	55,000

TUGS AND BARGES

	300ft barges	270ft barges	Tugs
Number	10	4	14
Capacity/horsepower	7,500 tonnes	5,000 tonnes	2,000–2,060HP

utilization leading to significant cost savings.

Building on its pre-eminent position in the market, Rocktree is exploring opportunities to extend this growth into new markets and enhance its diversification from coal into other commodities. Rocktree is experiencing increased interest from importing countries with current infrastructure challenges such as Vietnam, Bangladesh, Thailand and Myanmar. Meanwhile, exporting countries like Australia, Africa and South America are also seeking partners with high quality standards, eco-friendly and innovative solutions.

EXPERTISE YOU CAN RELY ON

Rocktree constantly strives to be ahead of curve in understanding client requirements and in response, its OFTs (offshore floating terminals) are equipped with:

- ❖ metal detectors;
- ❖ metal separator systems;
- ❖ moisture and temperature analysers;
- ❖ certified cross-belt sampling systems; and
- ❖ tailor-made procedures to minimize risks to people, environment and assets.

Metal separator systems remove metal contamination allowing the clients to ensure the quality of their product. The moisture and temperature analyser installed on each Rocktree OFT utilizes near-infrared beam technology to continuously analyse the moisture percentage and temperature of coal on the conveyor system. This is supported by 24/7 CCTV monitoring of the vessels.

Rocktree's constant interaction with

clients has enabled it to understand the market's shift towards the use of geared vessels resulting in an additional shiploader upgrade in 2019.

A RELENTLESS FOCUS ON QUALITY AND TECHNOLOGY

Rocktree focuses on continuous improvement and process mapping to automate and streamline processes, thereby reducing the need for human intervention. The company utilizes a combination of internally developed and market-based IT tools to monitor operations, improve efficiency, increase transparency and address logistical challenges.

The company has developed a proprietary Cargo Scheduling Application (CSA) to consolidate information under one platform. The CSA provides relevant operating information to management on a real-time basis in a secure environment.

This allows Rocktree to recognize early operational bottlenecks and to adjust quickly to improve the overall scheduling process of the vessels.

Further, Rocktree endeavours to reduce risks related to the safety of its operations. The standards that Rocktree sets for its operations internally are consistently beyond the regulations of the locale in which it operates. By raising its own standards for health and safety, environment and quality, Rocktree aims to



RT Genova.



RT Leo.



Tugs and barges.

set new standards and drive increasing customer expectations of safety and quality for the benefit of the market as a whole. The company is compliant with leading industry standards: ISM Code 2010, SOLAS'74, ISO 9001 2015, ISO 14001 2015 and ISO 18001 2007/OHSAS (DNV-GL).

ONE-STOP-SHOP SOLUTION

With a proven track record of providing customized logistics solution, Rocktree has now established a subsidiary company, Rocktree Consulting, a shipping and logistics consultancy headquartered in Italy. Rocktree Consulting provides comprehensive consulting and advisory services across the whole supply chain with specific expertise in port, shipping, shipyards, barging and transshipment fields.

Rocktree Consulting specializes in conducting feasibility studies for the implementation of tailored practical and reliable logistics solutions. These solutions help overcome infrastructure challenges associated with ports with draft or other restrictions, frequently found in emerging markets.

With sustainable economic development and continued demand growth for coal in South and South East Asia, Rocktree Consulting will provide advice on coal supply chains for upcoming power plants in the region.

In addition to coal, Rocktree Consulting also provides optimized supply chain solutions for the import or export of other dry bulk commodities, such as grains, iron ore, bauxite, woodchips, reclamation sands and cement or breakbulk cargo such as

FACTS & FIGURES (JAN 2019)

No. of transshipment vessels	5
No. of tug & barge sets	14
Volume handled (million tonnes)	147
Vessels loaded	2,069
Barges unloaded	19,916

steel products, forest products and containers.

Mr. (Capt) Mario Terenzio, recently joined as Managing Director of Rocktree Consulting. Terenzio, a Master Mariner, is a shipping and logistics expert, with over 30 years' industry experience. He led logistics business development activities at Coeclerici, focusing on customized floating terminals and self-unloading vessels and founded Logmarin Advisors. He has global

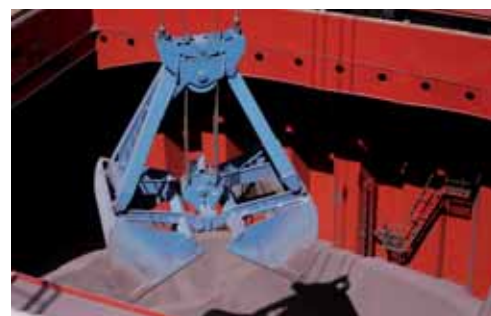
expertise in waterborne logistics with projects developed in 26 countries all over the world.

Thanks to the significant resources in terms of expertise, technology, network and know-how, Rocktree Consulting will enable the parent company Rocktree to provide a wider range of solutions building deeper and more strategic relationships with its customers by becoming involved earlier in projects, thereby adding strong expertise and greater value to the end-to-end provision of logistics solutions.

With the additional consultancy and engineering capabilities, Rocktree now offers a full suite of services: from conceptual study aimed to identify the client's most efficient solution, to actual project implementation and operation, thereby offering a one-stop-shop solution.



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Konecranes wins order for two floating cranes for open-sea operation from China

In the fourth quarter of 2018, Jingjiang Port Shipbuilding & Engineering Co., Ltd. ordered two Konecranes Gottwald Model 8 floating cranes. To be operated by Cosco Shipping Bulk Co., Ltd. (Cosco), the cranes will handle bulk off the coast of Guinea, Africa as of the end of 2019.

Cosco Shipping Bulk Co., Ltd. (Cosco) is a subsidiary of one of the world's leading shipping companies, China Cosco Shipping Corporation Limited, and a new customer for Konecranes Gottwald floating cranes. The cranes for Cosco will transship bauxite for the production of aluminium from river barges onto ocean-going Panamax vessels on the open sea. With these two cranes, the number of Konecranes Gottwald floating cranes in operation on the western coast of Africa totals ten.

Zhijun Fan, General Manager of Technical Division of Cosco, said: "We will operate the two floating cranes within the framework of our co-operation with China Aluminum group, an important step in the implementation of China's 'One Belt, One Road' initiative. The aim is to transport bauxite from Guinea to the aluminium plants in China. As transshipping raw materials at sea quickly and safely plays a key role in the supply chain, we opted for Konecranes Gottwald Floating Cranes. These cranes have proved themselves in Africa and beyond as particularly productive and reliable in rough open sea environments."

Giuseppe Di Lisa, Sales and Marketing Director of Konecranes' Business Unit Mobile Harbor Cranes: "We are proud that a global market leader like Cosco has opted for our technology for their bauxite transshipping operations in western Africa. The rapidly growing number of Konecranes Gottwald floating cranes around the globe confirms our leading position in this segment once again. Based on mobile harbour crane technology and launched in

Konecranes Gottwald Model 8 floating cranes are in high demand for transshipping off the coast of Guinea. Two more cranes will begin work as of the end of 2019.



2004, our floating cranes expanded their capabilities quickly from transshipping mid-stream to operation on the open sea."

Built for use on the open sea, the two Model 8 floating cranes for Cosco are designed in accordance with Lloyd's Register Code for Lifting Appliances in a Marine Environment, which allows them to be operated at wind speeds up to 24m/s and maximum wave heights of 2.5m. Both cranes offer a maximum outreach of 43m and a powerful 63-tonne grab curve for continuous-duty bulk handling.

ABOUT KONECRANES

Konecranes is a world-renowned group of Lifting Businesses™, serving a broad range of customers, including manufacturing and process industries, shipyards, ports and terminals.

Konecranes provides a range of productivity enhancing lifting solutions as well as services for lifting equipment of all makes. The Group has over 16,000 employees at 600 locations in 50 countries. Konecranes shares are listed on the Nasdaq Helsinki.

Shi.E.L.D. Services srl marks first anniversary

Shi.E.L.D. Services srl, provider of technical management and consultancy services for the shipping and industry markets and for the on-shore and off-shore logistics of dry bulk materials, celebrates the first year of operation as it started its business activities in January 2018 by managing several transshipment vessels, mainly based in Indonesia.

Even though it is a new player in the market, Shi.E.L.D. Services srl is built on the decades of experience and knowledge in the maritime logistics and shipping sectors of its team members, as they have worked many years for Coeclerici Logistics, one of the world's leading players in the offshore logistics.

After Coeclerici exited the maritime logistics business, the team gathered together under Shi.E.L.D. Services to continue working in the logistics and shipping markets applying the great experience and the valuable know-how acquired over the years.

Corrado Cuccurullo, former General Manager Operations of Coeclerici Logistics, is the Chief Executive Officer of Shi.E.L.D. Services srl. "Thanks to our long experience in the logistics industry we are

committed to provide our clients with tailor-made solutions and high quality management services to ensure that their assets always comply with all applicable rules and regulations, respect the environment, run in a safe and cost-efficient manner and are maintained so as to preserve their value", says Cuccurullo.

"Our mission is to bring added value to our clients because we believe that our experience and know-how can make the difference between average and excellent performances," he adds.

Shi.E.L.D. Services srl provides a whole range of services in particular for the offshore logistics of dry bulk materials, including engineering design of ships, transshippers and cargo handling equipment, project management, new building supervision, vessel conversion, vessel maintenance, technical, operational and crew management of ships and transshippers.

Through research and development, Shi.E.L.D. Services creates customized solutions designed to satisfy the most complex integrated handling requirements.

In this respect, Shi.E.L.D. Services promotes the use of 'floating terminals', or



Shi.E.L.D. Services is managed by Corrado Cuccurullo, former General Manager Operations of Coeclerici Logistics.

'transshippers', that carries out the same functions as a port terminal, but requires considerably less investment, boasts lower management costs and has less environmental impact. They are cost-effective alternatives to fixed port infrastructures, useful for solving logistical bottlenecks including port restrictions, draught limitations or lack of port facilities,

Shi.E.L.D. Services
technical management and consulting

Ships
Energy
Logistics
Design

Photo by courtesy of Coeclerici

- Technical Management
- Vessel Conversion

- Crew Management
- Project Management

- New Building Supervision
- Engineering Design

www.shieldservices.it

Shi.E.L.D. Services srl
viale Monza 270
20128 Milan – ITALY

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info@shieldservices.it

and improving the flow of raw materials to clients.

INVALUABLE EXPERIENCE

During their time in Coeclerici, the members of the Shi.E.L.D. Services team have successfully managed many extremely complex logistics projects and handled a full range of dry bulk materials, literally everywhere in the world. The following ones are the most representative because of the complexity and the performances obtained:

- ❖ **in South America:** transshipping coal with a specially designed transshipper permanently anchored in the Maracaibo lake in Venezuela for a Venezuelan state-owned mine company; the vessel had a storage capacity of 50,000 tonnes and was equipped with four cranes and a conveyor system with three shiploaders, which allowed a coal transshipment rate from barges of more than 50,000tpd (tonnes per day);
- ❖ **in Africa:** with one of the most complex offshore logistics & shipping projects in the world, consisting of two 54,000dwt tailor-made Supramax vessels — *Bulk Zambesi* and *Bulk Limpopo* equipped with — five heavy duty 40-tonne cranes and a cargo handling system with a capacity of 5,500tph (tonnes per hour); the vessels used to be loaded at the port with coal and sail to an offshore location 25nm off the coast where they would

transship the cargo into the anchored ocean going vessels at a rate of more than 60,000tpd;

- ❖ **in Indonesia:** with five floating terminals transshipping coal;
- ❖ **in Italy:** lightering iron ore from oceangoing vessels (OGVs) for the biggest Italian steel mill; and
- ❖ **in Russia:** first of a kind in the world, transshipping sulphur in the Black Sea.

Over the past 15 years, members of the Shi.E.L.D. Services team have designed, built and managed more than 20 transshipment vessels which have handled overall more than 200mt (million tonnes) of dry bulk cargoes.

MAIN ACHIEVEMENTS

Among the working experiences of Shi.E.L.D. Services in 2018, it is worth citing the following:

- ❖ Technical, crew and operational management of the two transshippers *Bulk Zambesi* and *Bulk Limpopo*, owned by Vale, one of the world's largest mining companies.
- ❖ Technical, crew and operational management of four transshipment facilities of 11,500dwt with two heavy duty cranes and a conveyor system with two shiploaders, owned by the Indonesian shipping companies PT Asian Bulk Logistics;
- ❖ Technical and operational management

of one transshipment facility of 5,500dwt with two heavy duty cranes and a conveyor system with two shiploaders, owned by the Indonesian shipping companies PT Transcoal Pacific, used for loading coal for major Indonesian mining companies.

- ❖ Engineering consultancy for Interger SpA, part of the German group Deutz, for Oil & Gas plants.

As for the current projects, Shi.E.L.D. Services continues the partnership with the Indonesian transport and logistic company PT Transcoal Pacific as Technical Manager of the 5,500dwt transshipment facility *TCP PIONEER* based in East Kalimantan, Indonesia.

The vessel is equipped with two heavy duty 2-tonne cranes and a 1,800tph conveyor system with two shiploaders, used for transshipping coal from barges into ocean going vessels at a rate of 40,000tpd for Kaltim Prima Coal, the major thermal coal producer in Indonesia.

Shi.E.L.D. Services is also Technical Consultant for PT Asian Bulk Logistics, Indonesian ship owner and operator, for the management of four floating transfer stations. Three of these are sister vessels of 11,500dwt, designed to discharge barges and load OGVs, equipped with two heavy duty 30-tonne Liebherr cranes and a 2,200tph Sammi conveyor system with two shiploaders.



The transshipper TCP Pioneer, owned by PT Transcoal Pacific, managed by Shi.E.L.D. Services (photo by courtesy of Coeclerici).

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Bulk Wayuù is one of the Coeclerici transshippers which used to be managed by the current Shi.E.L.D. Services team (photo by courtesy of Coeclerici).

The fourth transshipper of 10,500dwt is propelled with two azimuth thrusters and equipped with two heavy duty 30-tonne TTS cranes and a 2,200tph Bedeschi conveyor system with one telescopic shiploader.

These vessels can reach a transshipment rate in excess of 50,000tpd, and are used by PT ABL to handle coal for Berau Coal, one the major Indonesian mining companies.

Shi.E.L.D. Services is currently discussing other possible opportunities with major Indian and Indonesian companies for the technical, operational and crew management of their floating terminals operating in Indonesia.

In the first year of operation Shi.E.L.D. Services has managed seven transshipment vessels which handled in total more than 15mt of coal.

“One can tell from our recent history that Indonesia is the main playground for

our activities,” says Cuccurullo, “but we have seen an increased interest and development in other areas of the world as far as offshore logistics is concerned. West Africa is the first that comes to mind, with many projects concerning export of bauxite where offshore transshipment operations are required. We think that our expertise could play an important role in these challenging projects.”

In this regard, speaking about transshipment projects in West Africa, Shi.E.L.D. Services is proud to see the strengthening of the co-operation with LDPL, a subsidiary of Louis Dreyfus Armateurs, a major global player in transport and logistics. After the technical feasibility study for a transshipment project carried out last year, Shi.E.L.D. Services has been appointed by LDPL as technical consultant for the engineering design of the

conversion of a 57,000dwt Supramax into a transshipment vessel. The conversion works include the installation of four heavy duty 50-tonne cranes and a 4,000tph conveyor system with one shiploader, in order to grant the vessel a transshipment capacity of more than 10mt per year of bauxite. The transshipment vessel will be employed by a joint venture between LDPL and Abu Dhabi Port, in one of the most important logistic projects in Guinea of the last decades for Emirates Global Aluminium, the world’s largest ‘premium aluminium’ producer.

“The year 2018 has been a positive one for Shi.E.L.D. Services, with a turnover of US\$2.5 million and the outlook for the dry bulk market remains positive for 2019. Therefore we see a good potential to add more clients and orders to our portfolio,” concludes Cuccurullo.



The transshipper Bulk Celebes, owned by PT Asian Bulk Logistics, which was managed by Shi.E.L.D. Services last year (photo by courtesy of Coeclerici.)



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Damen Shipyards includes offshore and transshipment in its service portfolio

Damen Shipyards Group is a company with as many as 35 shipyards around the world, supported by its own engineering companies, comprehensive research and Development departments and a big network of trusted suppliers. The group's portfolio consists of tugs, workboats, offshore vessels, dredgers, pontoons and barges, high speed craft and defence and security vessels. Damen has delivered over 6,000 vessels to more than 100 countries with an annual average of 160 deliveries, many of them being returning clients. Damen also offers a network of 16 repair and conversion yards around the world with dry docks up to 405 x 90 metres, successfully handling an average of 1,500 projects annually.

Everywhere there's water, you'll find Damen.

OFFSHORE AND COASTAL TRANSSHIPMENT

As a builder of workboats, Damen also has a range of solutions for the dry bulk transshipment market. A team of industry experts with backgrounds in naval architecture and mechanical engineering designs new standardized concepts and tailor-made designs. In particular, for special transshipment solutions, Damen's experience proves to be valuable in every phase of a project.

A typical transshipment project starts with finding the best location for transshipment, with minimal influence of swell, sufficient (natural) depth and not too far from the importing/exporting location on shore.

To assess the operability for the intended transshipment location, Damen's R&D department is available to analyse wind and wave conditions. Sea conditions might seem calm at times, but swell is what causes moored vessels to move and can limit the operation. Specialized software



*Transshipment barges
from Damen.*

developed by Marin allows Damen to predict the motions of a vessel occurring at certain sea states for any specific location.

OPERABILITY AND CAPACITY STUDIES

Doing all the research and engineering in-house enables Damen to immediately process mitigating design actions in case the conditions deem challenging. Data represents actual weather situations and knowing how to obtain and use that data is what shapes a solid foundation for any project. These studies serve two goals; it is a question of design optimization and 'de-risking' the project. Since every project is different, Damen is able to support at every stage.

The focus is always to design a low-cost, safe, efficient and easy to operate transshipment solution. Not only is the cost price very friendly because of the optimized design, the costs of ownership are as well. Robust design ensures a long

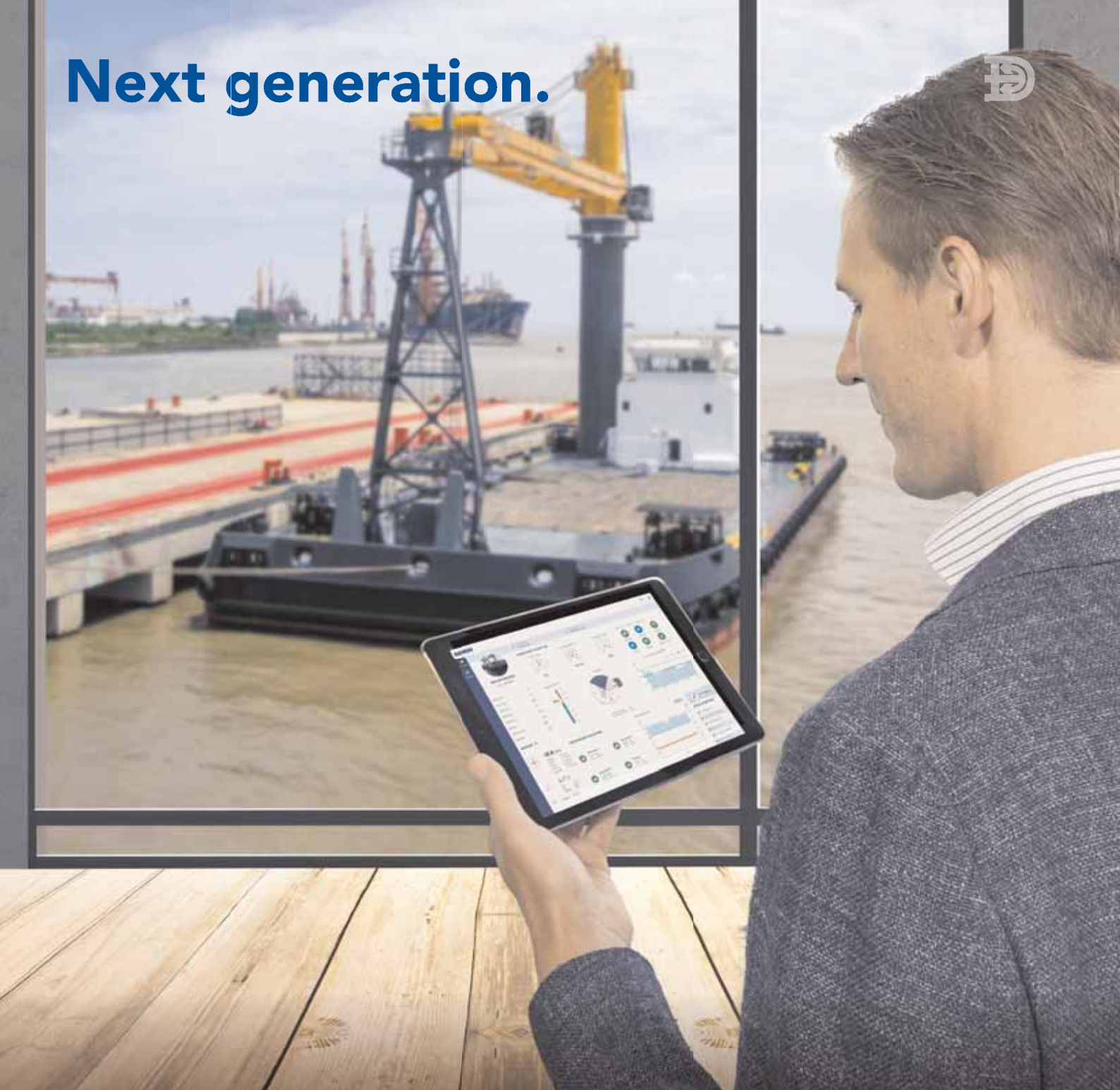
lifetime of the hull by having a solid mainframe and highly protective fender system with steel welded pipes and tyre fenders at the full length of the barge. Another important aspect is the maritime design of components including the most important ones: the crane and generator sets. Marine equipment is designed for harsh conditions and increases the lifetime of components being used in a marine environment.

TRANSSHIPMENT SOLUTIONS

Typically new transshipment projects consist of various stages of design and development. Damen's aim is to build the best solution for the job in terms of quality, efficiency and operational excellence. Damen can offer conceptual designs substantiated by seakeeping/operability studies to analyse initial transshipment locations. Based on the project requirements, a concept design is made considering the local conditions, crane capacity and ships to be handled by the transshipment barge. Damen can act as single point of contact for support in the various project phases or co-operate with a preferred consultant. There's years of experience in the market with Damen-built floating cranes, tugs, crew suppliers, shuttle barges and cargo vessels. The repair and conversion yards have a long history with larger bulk carriers and with yards in Western Europe, the Carib, the Black Sea region and UAE, so there is always one nearby to service clients' vessels or convert vessels into a transshipment solution.



Next generation.



CRANE BARGE 6324

It's not just a barge, it's a Damen Barge. More than that, it's a Damen Barge with remote monitoring capabilities. With our next generation transshipment barge we've taken a digital leap, incorporating a dashboard that displays all data such as overall performance and fuel use. And, with this new technology applied to proven, innovative designs, this barge will transship up to 1,000 tonnes per hour.



in stock

America welcomes the world's two largest AmClyde bulk cranes



The world's two largest AmClyde bulk cranes, *Mr. Ervin* and *Hulk*, have been upgraded and refurbished, and for the first time are working in the United States of America. As a result of acquiring these two colossal cranes, Cooper Consolidated LLC, the cranes' new owner and the state of Louisiana's premier bulk stevedoring service provider, has added an additional 30 million tonnes of annual coal-loading capacity to its customer offering.

"The addition of these two new cranes, some of our industry's largest, strongest, and fastest, will further ensure that our team is always offering our customers the world's best bulk stevedoring experience," said Erik Cooper, Executive Director for Cooper Consolidated, LLC. "Over the past seven years we've invested in a state-of-the-art, highly efficient crane fleet, and the addition of these two cranes is the capstone to that work."

Clyde MSB 16, christened *Hulk*, and Clyde model 37, christened *Mr. Ervin*,

were built in Pascagoula, Mississippi by AmClyde and put into service in Santa Marta, Colombia in 2000 and 2004, respectively.

Operating in Colombia until 2015, the cranes were acquired by Cooper Consolidated in November 2017 from Drummond Coal. Since that time, the cranes have undergone transformative upgrades and refurbishment in Darrow, Louisiana.

"The decision to bring America's largest AmClyde bulk cranes to the Mississippi River was one that was easily made knowing that as a result of the new cranes, our Cooper Consolidated team would be able to offer a high level of value for our customers that our market has never seen before," said Billy Fitzpatrick, Managing Director Sales & Logistics for Cooper Consolidated LLC.

The crane barges are 200-feet long and 75-feet wide. The bucket capacity is an astonishing 132,280 pounds.

"Our team's goal is to consistently provide customers with the premiere

stevedoring services in the world," said Wendell Landry, Managing Director Stevedoring Operations for Cooper Consolidated.

"Being the best in the world means offering the highest quality of service and the most efficient and safest cargo handling. To meet our high standards we had to develop the best crane fleet in the world. *Mr. Ervin* and *Hulk*, the world's largest AmClyde bulk cranes, are the latest additions to our state-of-the-art crane fleet," he added.

Cooper Consolidated is the largest asset-backed stevedoring, barge, marine, and logistics company operating in the ports of New Orleans, Baton Rouge, South Louisiana, and Plaquemines. With offerings that span the entire reach of the Lower Mississippi River between Southwest Pass and Baton Rouge, Cooper Consolidated's services are provided and directed by its own assets and employees, thereby providing customers with an extremely reliable and flexible service.

Algoma Central Corporation: major player in the domestic and oceangoing self-unloader market continues to extend its reach



The Honorable Henry Jackman, ocean self-unloader, in Boston.

Algoma owns and operates the largest fleet of dry and liquid bulk carriers operating on the Great Lakes–St. Lawrence Waterway, including self-unloading dry bulk carriers, gearless dry bulk carriers and product tankers. Algoma also owns ocean self-unloading dry bulk vessels operating in international markets and has a 50% interest in NovaAlgoma, which includes a diversified portfolio of dry bulk fleets operating internationally.

DOMESTIC SELF-UNLOADER FLEET

Algoma's self-unloader fleet provides flexibility for shippers who require their

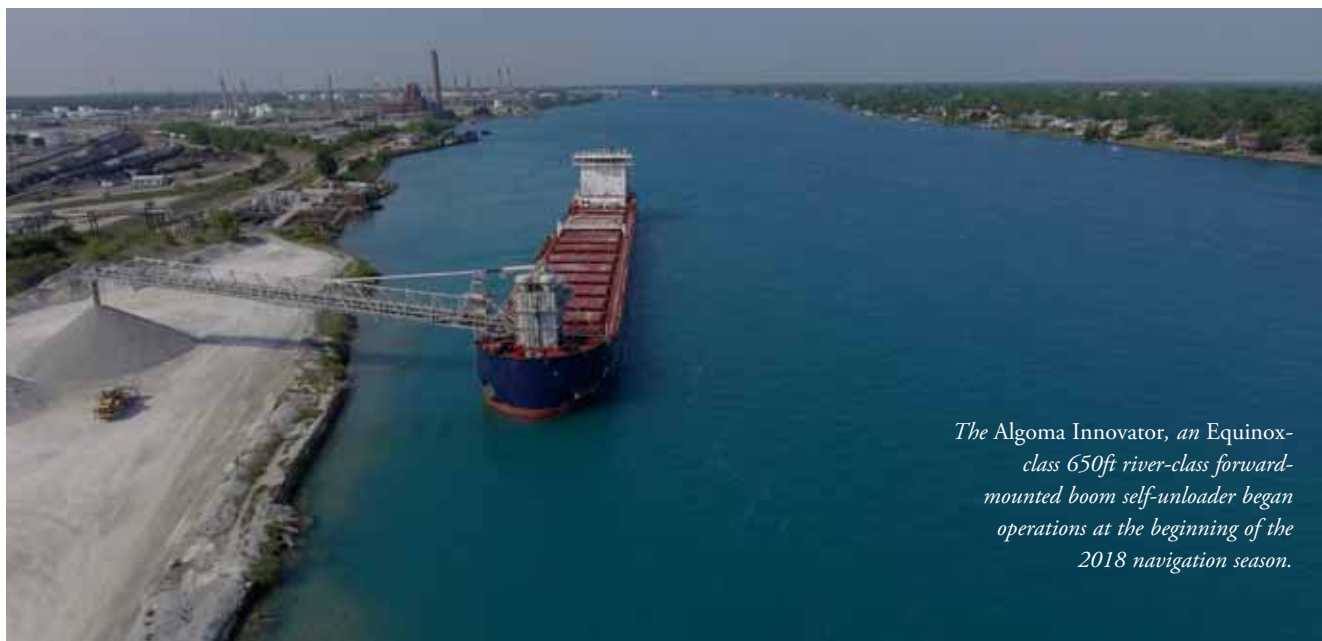
cargo to be delivered to customers that do not have the capabilities to load/unload cargo at their facilities. Self-unloading bulk carriers discharge their cargo using onboard equipment. Cargo flows from the cargo hold through gates to conveyors located below the hold. The cargo is carried through the ship and then elevated to an unloading boom at deck level. These booms are 75–80 metres long and can rotate out to 90° from each side of the vessel. Self-unloaders discharge cargo to either stockpiles or directly into receiving storage facilities.

❖ Algoma owns and operates ten self-

unloaders within its domestic dry bulk fleet with one additional self-unloader, the *Algoma Conveyor*, to be delivered at the beginning of the 2019 navigation season. These 11 vessels have a total deadweight of approximately 296,000dwt.

- ❖ The length of these vessels range from 630ft to Seaway maximum size of 740ft.
- ❖ Typical cargoes include salt for road safety, iron ore products, aggregates and construction materials.

Four of the 11 self-unloaders are equipped with closed-loop exhaust gas scrubbers.



The Algoma Innovator, an Equinox-class 650ft river-class forward-mounted boom self-unloader began operations at the beginning of the 2018 navigation season.



The Algoma Mariner in the Welland Canal.

Closed-loop scrubbers remove sulphur emissions generated from fuel combustion. Emissions testing has confirmed a reduction in sulphur oxide emissions of over 98% and also demonstrated a reduction in particulate matter of approximately 43%. Algoma was the first on the Great Lakes, perhaps even globally,

to make a long-term commitment to installing closed-loop scrubbers as part of its *Equinox*-class fleet renewal programme that began in 2010. The first scrubber was certified by Lloyds and installed on the *Algoma Equinox*, which began operations in 2013. To date, there is a total of nine vessels equipped with scrubbers within the

Algoma fleet, and the decision has been made to retrofit scrubbers on the next two youngest vessels within the domestic dry bulk fleet.

The *Algoma Innovator*, an *Equinox*-class 650ft river-class forward-mounted boom self-unloader began operations at the beginning of the 2018 navigation season.

The Bahama Spirit, ocean self-unloader.





2nd engineer performing daily rounds.

The vessel is the first new forward-mounted boom ship to be built for the Great Lakes in 45 years. Its forward-mounted boom provides greater flexibility to customers who require access to ports with vessel length restrictions. The forward-mounted boom allows the vessel to unload cargo into niche spaces.

The domestic business customer base is stable and customer demand is strong. Algoma has contracts with major customers such as ArcelorMittal, Lafarge and Compass Minerals and many North American agricultural commodity companies. Algoma strives to always provide customers with flexible, reliable and innovative service and is taking steps to improve these service relationships:

- ❖ *Equinox*-class vessels are equipped with automated cargo handling which has reduced the number of crew needed to operate the vessels from approximately 26 to 18. Although the need for qualified seafarers will be around for many generations to come, the crew reductions have eased the impact from the current industry-wide recruitment shortage.
- ❖ During this year's winter lay-up, Algoma is applying new modern and technologically advanced hull and cargo coatings on several vessels in order to improve fuel efficiency, increase cargo flow, withstand more impact from cargo and preserve the ships' steel.
- ❖ Algoma, often an early adopter of promising technologies, has installed AutoMate software developed by Buffalo Automation on one vessel to date with plans to install a second unit in the near future. The software uses sensors, HD thermal cameras,

broadband radars and AIS (Automatic Identification System) to identify stationary objects, swimmers, recreational and large vessels. This technology could eventually enable vessels to navigate by sensor input and follow manoeuvres that comply with COLREGs (International Regulations for Preventing Collisions at Sea). While these units are currently in the testing stage, they could be installed on more vessels in the fleet, if successful.

OCEAN SELF-UNLOADERS

Algoma is a significant participant in the world's largest pool of ocean self-unloaders, the CSL International Pool (Pool) which consists of 18 vessels operating in international markets. In 1998 Algoma made its first investment into the ocean markets when it acquired a 50% interest in Marbulk Canada Inc. from Upper Lakes Group. Over the years, Algoma has established its own presence in this market and now independently owns five vessels, sizes range from Handymax to Panamax, all of which participate in the Pool. In a recent press release, Algoma announced that it has purchased three additional ocean self-unloaders from Oldendorff Carriers GMBH & Co. All three vessels take part in the Pool, increasing Algoma's interest to approximately 40%. The deal is expected to close in the second quarter of 2019.

Algoma's ability to provide and develop self-unloading solutions internationally as well as for the Canadian market makes it a tough competitor in this sector.

PNEUMATIC CEMENT CARRIERS: SELF-UNLOADING TECHNOLOGY

In 2016, NovaAlgoma Cement Carriers

(NACC) was established and has since grown to be the largest pneumatic cement carrier fleet in the world.

The fleet currently consists of 16 pneumatic cement carriers, which are predominantly operating in international markets, with two vessels operating on the Great Lakes–St. Lawrence Seaway. NACC also has a 25% interest in seven smaller specialized cement carriers operating in Northern Europe.

Pneumatic cement carriers are a specialized form of self-unloader designed to carry cement powder and fly ash.

- ❖ Pneumatic cement carriers have the capacity to both load and unload cargo using onboard equipment. A compressor and pump system loads and unloads cement powder via a large-diameter hose. This operation is very clean, with essentially no discharge to the atmosphere.
- ❖ NACC vessels are highly specialized and can load and unload cargo directly into on-shore facilities, including directly into cement trucks. With additional equipment, these vessels also have the capacity to bag cement should the need arise.

The future is looking good for Algoma Central Corporation and it seems the company is continually looking for new opportunities on the horizon. With its range of vessels and service locations, it is able to satisfy the needs of its current and future customers.

Self-unloading technology is not new technology but it is something that is improving, becoming more efficient and technically sophisticated and Algoma is a front-runner in driving this innovation.

LD Ports & Logistics reports on major bauxite-handling contract

LDPL-ADP AWARDED A 15-YEAR CONTRACT FOR BARGING AND TRANSSHIPMENT OPERATIONS FOR EMIRATES GLOBAL ALUMINIUM (EGA) BAUXITE MINE IN GUINEA (CONAKRY):

In April 2018, LD Ports & Logistics (LDPL and Abu Dhabi Ports [ADP]) was awarded a 15-year contract to provide barging and transshipment services for EGA's operations in Guinea (Conakry).

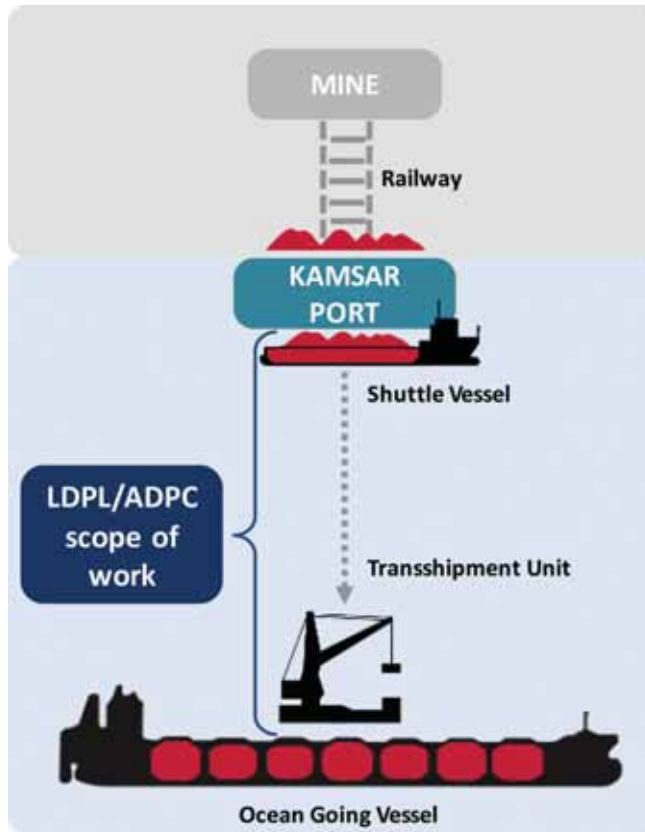
EGA is investing in the development of a bauxite mine, infrastructure and export facilities in the Boke region of north-west Guinea. The investment is one of the largest greenfield investment in Guinea for over 40 years. Guinea holds one of the world's largest and highest-quality reserves of bauxite, the raw material used in the production of aluminium.

The mine is scheduled to begin production in 2019, with a ramp-up production up to 13mtpa (million metric tonnes per annum). Together with additional 5mtpa from third-party mines, LDPL will totally transship 18mtpa.

The bauxite will be transported by rail to Kamsar, using the existing 75km railway lines, where it will be loaded in shuttle vessels through both the existing port and EGA's private export pier and unloading yard.

LDPL's scope of work will include loading the bauxite in both facilities at Kamsar port, transporting the cargo a distance of approximately 20nm to anchorage, where it will be transhipped into Capesize vessels.

LDPL, according to its strategy, has developed a tailored solution based on the specific requirements of the client, and in keeping with LDPL's extensive experience



in handling operations in challenging environments like Guinea, which can present numerous difficulties. In practical terms, this means that during the design, construction and operational phase, there will be a careful selection of equipment and handling processes (grabs, conveyors, or a combination of both), critical to ensure a reliable supply, even in remote environments where maintenance of offshore transshipment vessels can be a challenge.

The transshipment solution will consist in:

- ❖ four 13,000dwt Deck Cargo Ships (DCS) specifically designed to ensure high manoeuvrability as well as smooth mooring and unmooring operations at EGA river barge terminal. The DCS will

be equipped with two 1,600kW engines for propulsion, flap rudders and bow thruster;

- ❖ one 57,000dwt Supramax vessel duly converted to a transshipment unit (TSV – Transshipment Storage Vessel). The TSV will be equipped with four 50-tonne SWL (safe working load) heavy duty cranes, side-mounted, and a travelling conveyor system able to load Capesize vessels minimizing shifting. All equipment will be provided by McGregor;

- ❖ one transshipment unit (TU) with no storage, equipped with two 36-tonne SWL E-Crane and a conveyor system from McGregor able to load up to Capesize;

- ❖ one 32-tonne SWL Floating Crane Transshipper Units (FCTUs), LDPL design;

- and
- ❖ two tug boats for transshipment operation assistance.

In addition to its own transshipment fleet, LDPL will provide a Panamax vessel which will be dedicated to do shuttling from Kamsar Port's existing facility to anchorage. The existing berth, in Kamsar Port, is not fitted for small size vessels, so in order to optimize loading cycle, LDPL made the decision to bring in an additional vessel.

The combination of the fleet will be able to transship bauxite at daily rate exceeding 60,000 metric tonnes per day.

ABU DHABI PORT JOINT VENTURE

The EGA project also represented the

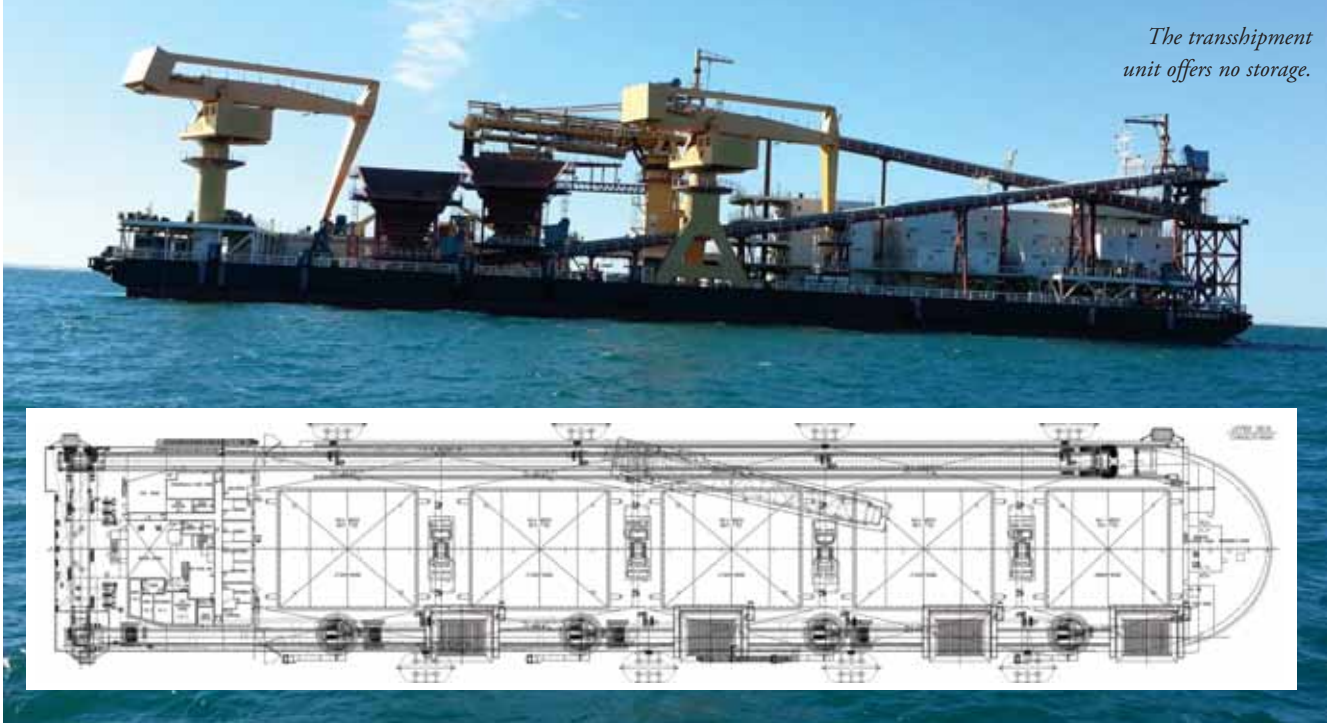


Deck Cargo Ships (DCS) are specifically designed to ensure high manoeuvrability as well as smooth mooring and unmooring operations.

Technical Specs:

LOA	129.3 m
BREADTH	26.0 m
DRAUGHT	5.7 m
DWT	13,000 MT
PROPULSION	2 x 1600 kW
MAX SPEED	13 knots
ENDURANCE	30 days

The transshipment unit offers no storage.



opportunity for LDPL to initiate a strategic collaboration framework with Abu Dhabi Port, the state-owned flagship entity playing a pivotal role in the development of the port and logistics industry in UAE. Abu Dhabi Ports owns, manages and operates eleven ports and terminals in the UAE and Guinea.

CLEAN COAL POWER PLANT PROJECT, DUBAI – FLEET DELIVERY

Following the award in 2015 of a contract to manage the coal handling and transshipment facilities at new Clean Coal power plant project in Dubai, LDPL has started the mobilization of its fleet, which is expected to start operation in 2020.

The fleet composition will be two 48-tonne SWL FCTUs and four highly manoeuvrable shallow draught deck cargo

ships (FAZEL) that have been specifically designed to meet the environment and natural requirements of Hassyan project. FCTUs and FAZELs will be used to unload Capesize vessels.

FAZEL DELIVERY

On 10 January, the LDPL team successfully completed the delivery of the four FAZEL units.

The LDPL team organized the transport in dry towing, by means of a 26,000dwt heavy loader semi submersible vessel, able to carry two FAZELs at a time.

FAZEL DECK CARGO SHIPS

FAZELs are 5,800dwt deck cargo ships, which are self-propelled by means of four 780kW azimuth thrusters. The FAZELs are

characterized by shallow draught, only 3.8m, and ultra-high manoeuvrability in order to reduce dredging area in channel and in port. In fact, being double ended, they need much-reduced infrastructure for berthing or manoeuvring, with no need for a turning basin in port. In addition, they are able to keep and hold their position as vessels equipped with dynamic positioning systems.

FLOATING CRANE TRANSHIPPER UNIT 'FCTU' — TECHNOLOGICALLY ADVANCED TRANSHIPMENT VESSEL

The second generation of FCTUs is the result of over 20 years of transshipment operations and recognized engineering skills. Designed by an in-house LDPL team, the FCTUs are self-propelled



The 5,800dwt deck cargo ship FAZELs at delivery.



Floating Crane Transshipper Unit 'FCTU' — technologically advanced transshipment vessels are equipped with 48-tonne SWL crane, with a designed free digging rate of 1,600tph (tonnes per hour) at 40m outreach.

transshipment units equipped with 48-tonne SWL crane, with a designed free digging rate of 1,600tph (tonnes per hour) at 40m outreach. The lattice boom structure ensures maximum weight reduction, optimizes dynamic performance reducing stress on the slewing bearing. Its fully redundant power system grants true performance unimpeded by any waves conditions. On this second generation, the addition of a 100m³ hopper, conveyor belt and loading are system, makes the FCTUs a perfect tool to unload vessels up to Capesize into barges with loading rate in excess of 36,000 tonnes per day.

BATOS — 'IMPROVING THE EFFICIENCY OF TRANSSHIPMENT OPERATIONS THROUGH INTELLIGENT SCHEDULING AND CONTROL'

LDPL has developed powerful calculation software, BATOS (Barging and Transshipment Optimization Software) able to determine in a few seconds the best loading schedule complying with an extensive list of operational inputs (OGV balance draught survey, hold completion, wheel loader transfer, barge initial and final survey etc.) enabling a very high degree of realism in the modelling.

The solving process is a multi-level optimization which combines a linear solving system (simplex) with an enhanced genetic algorithm. This complex solving method enables to find solution to difficult optimization issues, like operating globally a transshipment terminal, from shore facilities to final loading of the oceangoing vessel at anchorage.

The software tests every possible combination and keeps the most efficient one, thereby minimizing operation costs (despatch and demurrage, fuel consumption) and improving the



Louis Dreyfus Armateurs CEO – Gildas Maire while during signing ceremony together with Mohamed Juma Al Shamisi (CEO of Abu Dhabi Port) and Abdulla Jassem bin Kalban (CEO of EGA).

performance through and intelligent scheduling and control. BATOS creates value to the end-user, allowing significant savings on freight and demurrage. With optimized barges cycles and floating cranes movements, the software has demonstrated that floating terminal loading rate can be increase by +20% compared to a non-optimized case.

BATOS also includes a Monte-Carlo application (mathematical method to account for risk in quantitative analysis) to run simulations on the laycan schedule and shipping plan over thousands of scenarios. This application is used to evaluate all the possible ships arrival outcomes and their impact on the transshipment terminal.

Leading efficient transshipment

operations is neither intuitive nor simple, especially on a large scale floating terminal involving several oceangoing vessels and many floating cranes at the same time. Being more than a simple simulation software, BATOS has become an unrivalled tool to compare different transshipment solutions and improve significantly operational efficiency.

The software allows designing a fit-for-purpose solution to cope with the requirements and specification of each transshipment project (providing export solution to a mining company or supply a coal-fired power plant). "Performance is not only a target it has to be an achievement," recalls Capt. Emmanuel Dür, Managing Director of LDPL.

COMPANY PROFILE

LD Ports & Logistics (LDPL) is part of Louis Dreyfus Armateurs group, a French family business founded in 1851 which has continuously been at the forefront of maritime bulk transportation and logistics.

LDPL is the specialized subsidiary focusing on mining sector and energy industry, proposing a wide range of integrated services in floating terminals and transportations, forging long-term partnerships with leading industrial groups around the world.

LDPL has acquired also an extensive experience in development of shallow water solutions in order to 'feed' its floating terminals.

LDPL is a Singapore based company, operating worldwide from South America to South East Asia, passing by Africa and India. With the development of the two new businesses in Dubai and Guinea, LDPL has successfully opened new offices in UAE and Guinea.

Purpose-built bulk handling cranes from REEL-NKM Noell

Floating bulk handling cranes operate in a specific niche. The competitive environment of this niche and the continuous and harsh operations these cranes are put through, supports the idea of building cranes that are especially designed for purpose.

REEL-NKM Noell delivers purpose-designed bulk handling cranes for inshore and offshore operations.

Floating cranes have always played an important role in the direct transshipment of dry bulk, and still do to this day. Since the beginning of the 20th century, a significant amount of the bulk directly transhipped between sea going vessels and barges has been handled by floating cranes. Also at bulk terminals with quay facilities, floating cranes are often used at peak times and even as primary loading capacity for handling the bulk cargoes that are directly transhipped.

Floating cranes are very flexible, mobile and able to handle many different types of bulk requiring different types of grabs. One or two floating cranes can, for instance, be positioned between vessel and quay, making it possible to handle relatively large vessels at relatively shallow quays. It is on the back of this highly competitive environment that REEL-NKM Noell has been challenged and driven to develop and continuously improve its floating bulk handling crane knowledge. And NKM Noell floating cranes have been developed for inshore and offshore operation.

What sets bulk handling cranes apart from any other type of crane is the high utilization requirement resulting in high requirements for uptime, efficiency and specifically energy consumption. REEL-NKM Noell believes that bulk handling

The REEL-NKM Noell single boom crane is specifically designed for continuous duty, high uptime and efficiency, and low energy consumption.



operations in this demanding environment cannot be fulfilled by standard cranes, but require purpose-designed and -built cranes.

DESIGNED FOR A LIFETIME

The result is a crane portfolio of high capacity — high efficiency lemniscate and single-boom cranes for continuous duty inshore and offshore operations. The lemniscate — with its ingenious balanced level luffing system to keep the crane tip low and thus reduce the pendulum length — is at the top of the range. The REEL-NKM Noell single-boom crane offers comparable capabilities at a lower cost. Both crane lines feature high uptime due to build in redundancy and robust design for longevity. Examples include the design lifetime of the slewing bearing of 30 years while the slewing and luffing movement is performed by four motors each.

KEEPING UP PRODUCTION RATES

The efficiency of the cranes is enhanced on both the automation part and the operator part. The hoisting speed has been made load-dependent. The actual measured load of the grab is input for the hoisting speed settings of the crane. But regardless of the automation, the operator still has an important role in the overall efficiency of bulk

handling cranes. Creating the best possible position and environment for the operator to do his work is therefore taken very seriously. The REEL-NKM Noell cranes feature full and direct operator visibility on the complete ship's hold and the entire path of the grab, allowing for safe and fast operation. A comfortable and ergonomic workplace for the operator is created, and the working conditions are optimized using dynamic cabin suspension. This will enhance operator performance, reduce fatigue and stress, and thus lead to increased efficiency and enable him to continuously keep up the required production rate.

20% ENERGY & CO₂ REDUCTION

Energy consumption is more detrimental to bulk handling OPEX than in any other operation. REEL-NKM Noell started to address this with optimizing the geometry for balance, but the biggest gains have been achieved by complete electrification as it takes out the conversion of electric into hydraulic power. Power of lowering movements is accumulated and stored in supercaps or flywheels, providing an even load on the generators, increasing their efficiency and lifetime and lowering fuel consumption, maintenance costs and soot emissions. All in all, this has resulted in a 20% saving in energy consumption and thus CO₂ emissions. In addition to energy savings, taking out the hydraulics has the advantage that it is much cleaner in the dusty bulk handling environment. And taking out the risk of possible oil-spills adds to the green image of the REEL-NKM Noell bulk handling cranes.

The lemniscate with its ingenious balanced level luffing system to keep the crane tip low and thus reduce the pendulum length



Oldendorff's eco newbuildings delivering simultaneously



In line with Oldendorff's continuous effort to upgrade its fleet, 2019 started with the delivery of five new eco-ships delivered to Oldendorff Carriers, four of which were delivered on the same day. Oldendorff is always trying to reduce its environmental impact and these new (fuel-efficient) vessels will reduce fuel consumption for transporting cargo and consequently

reduce the company's carbon footprint.

The *JAN OLDENDORFF*, *JOHN OLDENDORFF* and *JULIUS OLDENDORFF* were delivered from the building yard Nantong Cosco KHI Ship Engineering Co., Ltd in Nantong, PRC. The three Ultramax vessels are 61,400dwt on 13.03 metres draught with four 30-tonne SWL (safe working load) Mitsubishi cranes, an LOA

(length over all) of 199.90 metres and a beam of 32.24 metres. The vessels are fitted with a fuel-efficient MAN-B&W 6S50ME-B9.2 main engine of 10,000kW and fuel saving devices: semi-duct system with contra-fins and rudder bulb system with fins.

The *JOHN OLDENDORFF* and *JULIUS OLDENDORFF*, upon delivery from the





shipyard, entered in to long-term time charters with clients. The *JAN OLDENDORFF* will service contracts of affreightment and spot market cargoes.

CHRISTIANE OLDENDORFF (former *Midland Trader*) was delivered from the Samjin Shipyard in Weihai, PRC. This Handysize vessel is 35,762dwt on 10.21 metres draught with four 35-tonne SWL Mitsubishi Masada-licence cranes with 12m³ grabs, an LOA of 180 metres and a beam of 30 metres, and features a strong tank top. She has a fuel-efficient Wartsila 5RT-flex 50-D of 6,100kW main engine and is fitted with a 'Mewis' energy-saving duct by Becker, Germany. The *Midland Trader* was delivered for long-term employment with a major international trading house after delivery.

KAI OLDENDORFF was delivered from the Hantong shipyard in Hantong, PRC. This Kamsarmax vessel is 81,242dwt on 14.51 metres draught. She has an LOA of 229 metres and a beam of 32.26 metres; the vessel has a fuel-efficient Hyundai-MAN B&W 6S60ME-C8.5 main engine and Yanmar auxiliaries. Next year, she will be retrofitted with an exhaust gas cleaning system (scrubber) to comply with IMO 2020 regulations.

Having sold most of its older vessels, the Oldendorff Carriers owned and bareboat chartered fleet of 111 vessels now has an average age of just 4.78 years. With its remaining order book of 38 newbuildings — including, 21 owned, 13 time-chartered and four bareboat chartered — Oldendorff Carriers will maintain a young and fuel efficient fleet of bulk carriers going forward. Most of its additional roughly 600 operated vessels are also young and fuel-efficient and closely mirror its owned fleet.



Need to protect
your hull
from barnacle
invasion?

Ask your coatings
supplier about
Selektope®.

selektope®

Royal Bodewes builds three low-fuel-consumption self-unloaders for cement



Major shipbuilder Royal Bodewes builds vessels in the 1,500–12,500dwt range. As well as dry cargo vessels, tankers and customized ships, it also manufactures ‘special’ vessels including hybrids, offshore

vessels, ro/ro and lo/ro and cement carriers.

The company is currently building three self-discharging cement carriers at two locations in Holland. The pictures show the

first of these carriers.

The capacity of all three vessels will be 4,200dwt, and a major incentive is low fuel consumption during sea voyages. The plan is to deliver all three ships this year.



The Transmax™: revolutionary bulk carrier that will open up shallow ports globally

National Ports, in partnership with thyssenkrupp Industrial Solutions, has developed the Transmax™; a self-unloading super shallow draught bulk carrier that will redefine transshipping operations in shallow water ports globally. National Ports is an Australian-headquartered developer and operator of large-scale floating port, transshipment and shallow-draught port solutions.

Economic growth linked to global port capacity is restricted by shallow water access. Estimates show:

- ❖ 96% Pacific Ocean Ports have less than 16m depth;
- ❖ 86% Atlantic Ocean Ports have less than 16m depth; and
- ❖ 86% Indian Ocean ports have less than 16m depth.

The Industrial Solutions business area of thyssenkrupp is a renowned partner for the engineering, construction and service of industrial plants and systems. The mining technologies business unit supplies a full range of machinery, systems, equipment and services for the extraction, processing, storage and transportation of raw materials. All material handling on board the Transmax™ including the shiploader are designed, built and commissioned by thyssenkrupp Industrial Solutions. In collaboration with its customers in the mining and minerals sectors throughout the world, the company develops custom,

forward-looking solutions that enhance productivity and allow natural resources to be used responsibly and efficiently.

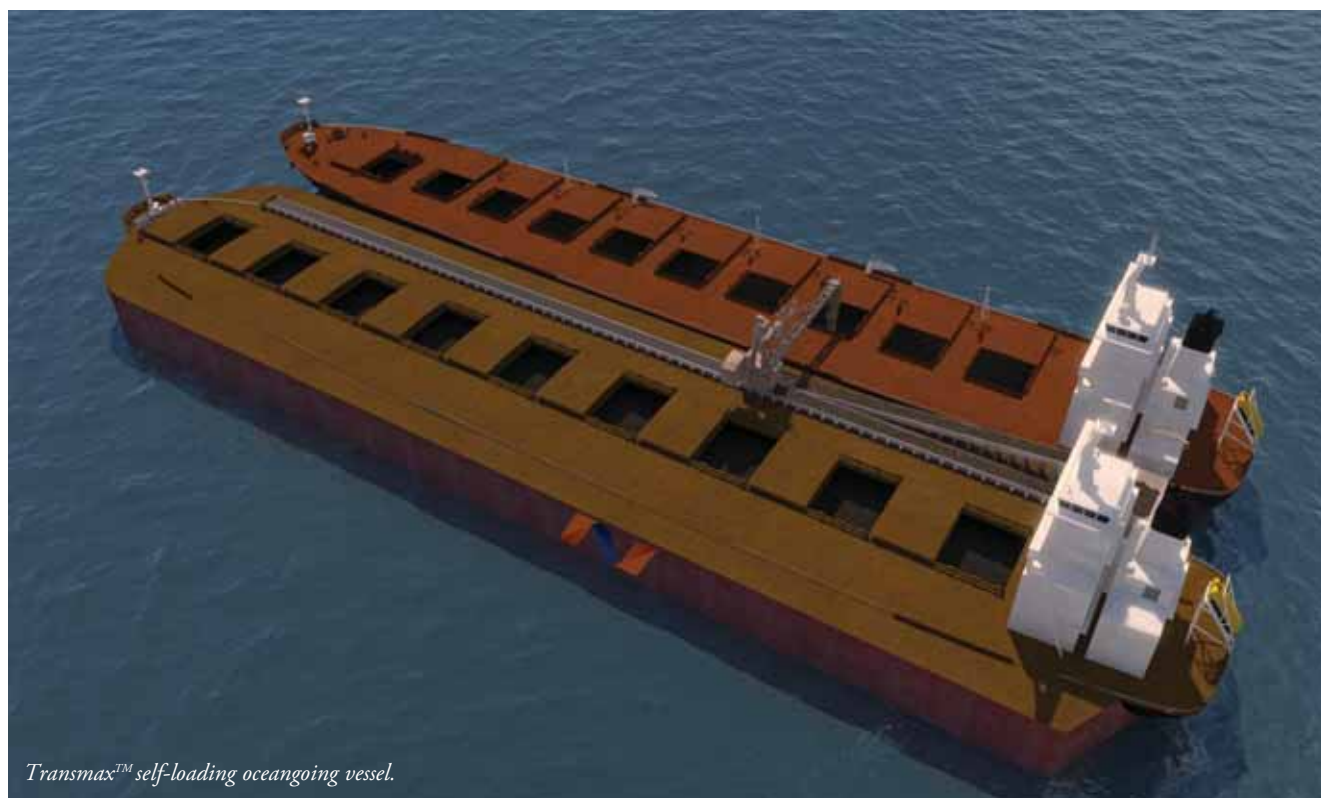
Dr Franz-Maria Wolpers, Senior Executive in the Mining Technologies business unit of thyssenkrupp Industrial Solutions, says: “We are delighted to be helping our clients solve one of the most complex challenges they face when operating in shallow, restricted and remote ports. In addition to opening up access to those ports, the new system dramatically increases self-unloading rates into any type of bulk carrier to the port of destination through a thyssenkrupp materials handling system. In co-operation with National Ports, we are thus offering mining companies and port operators’ worldwide significant efficiency improvements including faster materials handling at lower cost and reduced environmental risk”.

The Transmax™ is a large-scale self-loading and unloading transshipment vessel of 190,000dwt on 14-metre draught for shallow draught ports; currently the existing capacity on the same draught is 120,000dwt. The majority of global import and export ports for bulk material are geographically remote and not sufficiently dredged to handle modern bulk carriers. Such bulk carriers with deadweight of 190,000 tonnes usually require a draught of about 19m, including clearance under the keel. Each self-propelled Transmax™ can be custom designed to the water depth

available at each port; for example, a 60,000dwt Transmax™ can transit a port with water depths of only 6.5m, a substantial improvement on existing services.

The Transmax™ is equipped with innovative cargo handling systems designed and built by thyssenkrupp Industrial Solutions, each capable of self-unloading its cargo into any size oceangoing vessel. The Transmax™ can be loaded at existing berths using existing shiploaders, or can be loaded directly from a shore conveyor, removing the capital cost for the construction of a conventional marine berth and travelling shiploaders. This represents a substantial saving in capital expenditure.

The Transmax™ is equipped with bow and stern thrusters, making the vessel highly manoeuvrable and vacuum or magnetic mooring system for fast mooring and unmooring. The Transmax™ can load 190,000 tonnes directly from a shore conveyor at the rate of up to 20,000tph (tonnes per hour) and self-unloading into any size bulk carrier including the Valemax at up to 13,000tph. When compared with prevailing technologies that have a maximum unloading rate of 3,000–5,000tph, the Transmax™ outperforms by delivering a 260% improvement on current unloading rates and 200% for current loading rates. No capital cost is required for the construction of a conventional wharf, rail



Transmax™ self-loading oceangoing vessel.

tracks and travelling shiploader.

draught limitations constrain export and imports

IN DEPTH CASE STUDY: CHINA, AUSTRALIA, BRAZIL, INDONESIA AND INDIA

China:

- ❖ The enormous distances from Brazil to the markets of China is a challenge and in an effort to reduce the freight costs, Chinese ship owners operate a fleet of very large bulk carriers (400,000dwt — 'Valemax').
- ❖ Only three ports in China can accommodate these 400,000dwt vessels.
- ❖ By positioning the self-propelled transshipment Transmax™ in deep water near the Chinese port of destination, Chinese ship owners could deliver bulk commodities with a supersized Valemax directly to any port in China.

Australia (Port Hedland):

- ❖ A fit for purpose Transmax™ can double the current throughput per year at the restricted port of Port Hedland. This represents a significant increase in revenue for the Pilbara Ports Authority and a substantially increase in Royalty payable to the State Government of Western Australia.
- ❖ Port Hedland's inner harbour and channel have a draught of 14.3m at low tide. Laden Capesize ships can only depart the inner harbour at high tide. The average vessel loading iron ore at Port Hedland has deadweight of 180,000 tonnes on 18.2m draught.
- ❖ The window of transit time for laden Capesize vessels at Port Hedland is restricted by the tide and the shallow channel, along with a number of miners competing for a few slots on the tide.
- ❖ The average operating time available for laden Capesize vessels to traverse the inner harbour and the channel is limited to about three hours every 12 hours.
- ❖ As a result of tide limitations, large oceangoing bulk carriers often must depart the berth short loaded.
- ❖ Port Hedland ranks as the largest port in the world by tonnage. The Transmax™ could traverse the inner harbour fully laden 24/7 unrestricted by tide limitations.

Brazil:

- ❖ The Transmax™ is the solution for the transportation and transshipment of agricultural products through the rivers



Transmax™ loading from a shore conveyor.

system in Brazil. Most river ports in Brazil have a draught of 11m or less, a fit for purpose Transmax™ could transship 109,000dwt, an extraordinary improvement on barges.

- ❖ The Brazil market is restricted to mostly barges that must navigate some 2,000km from the fluvial ports to a deep water port. The current system is slow and inefficient for agricultural products that are transported by barge or trucks, stockpiled and reloaded onto a larger ocean going vessel.
- ❖ The Transmax™ could load at the fluvial port, navigate the 2,000km and unload directly into an oceangoing bulk carrier at anchor in deep water. This will remove the cost of stockpile for the agricultural products, and reduce the number of cargo handling incidences.
- ❖ A transshipment Transmax™ could self-load the iron ore from the river barges at Nueva Palmira, navigate the Martin Garcia Channel with its purpose-built bow and stern thrusters and self-unload its cargo (at the delta) directly into any size ocean going vessel, including the Valemax at the rate of up to 13,000tph.

Indonesia:

- ❖ The majority of river ports in Indonesia have water depth limitations of 6m. The largest barge in operations has a capacity of 7,500dwt on 5.5m.
- ❖ A custom Transmax™ of 38,000dwt on 5.5m draught, could transship between the loading berth and any size ocean going vessel moored in deep water; or from the loading berth directly to the port of destination of neighbouring countries.

India:

- ❖ In India none of the 12 ports owned by the Indian Government can handle Capesize vessels at their berths; the water depth averages 13m and is too shallow for a standard 150,000dwt vessel.
- ❖ Capesize vessels currently anchor 31 nautical miles off shore and are serviced

by 2,000dwt barges, a slow and arduous process.

- ❖ The Transmax™ is an ideal solution for opening up shallow water ports of India.

Additional benefits:

- ❖ no dredging;
- ❖ no capital expenditure (for existing operations);
- ❖ no change to material handling process or equipment;
- ❖ zero dead freight cost;
- ❖ blending, the Transmax™ can load and discharge different grades of material;
- ❖ increasing exports and/or imports;
- ❖ negligible dust, all transshipment operations take place undercover;
- ❖ exports and imports no longer constrained by tide;
- ❖ the total system is an operating cost not a capital cost;
- ❖ no shifting of the vessel during loading or unloading operations;
- ❖ self-discharging cargo into any size oceangoing vessel at the rate of up to 13,000tph;
- ❖ it is possible operate in conditions of up to 2.5m swell
- ❖ highly manoeuvrable with bow and stern thrusters;
- ❖ self-loading cargo from any size bulk carrier; and
- ❖ the Transmax™ can be leased

The Transmax™ is an ideal solution for draught-restricted ports globally; it delivers high volume transshipment that is fast and efficient, up to 94% throughput uplift for clients attainable. Marco Lucido, Managing Director at National Ports, says: "Our new solution will open up access to shallow loading and destination ports worldwide including those affected by large tides. The system will not only be able to significantly increase cargo throughput for existing mining companies with limited draught, it can also help to make new mining companies economically viable". The Transmax™ is a game-changer in the transshipment industry worldwide and for the logistics handling of raw materials. DC

The urgency of agency

ship agents remain as important as ever



Jay Venter

Istop Spamat Stevedoring Company, serving the Ports of Bari, Molfetta and more

Founded in 1977, Spamat celebrated its first 40 years of activity in the Italian Port of Bari in February 2017.

Initially Spamat was located in the small Port of Molfetta, but in the 1980s, thanks to the national liberalization of port jobs, the company and its General Manager, Captain Vito Totorizzo, took the immediate opportunity to provide the Port of Molfetta with its own investments in the form of new cranes, forklifts and other accessories such as grabs, hoppers and hydraulic hooks, in order to speed up port operations: Istop Spamat Stevedoring Company was born.

A few years later, the activities were extended to the Port of Bari where the company currently has nine cranes, with capacities ranging from 20 to 154 tonnes (Liebherr and Fantuzzi) managing a container terminal, and approximately two

million tonnes of cargo moved yearly, with a total of 50 employees. Ship agency is one of Istop's major activities.

Today Spamat covers the following activities:

- ❖ shipping and forwarding agents in the

port of Bari and Molfetta;

- ❖ stevedoring company in same port;
- ❖ brokerage; and
- ❖ port container terminal for MSC Lines in the Port of Bari.

All the activities are covered 24/7 all year long.



Organization of the work starts the day before, with a joint meeting between all the branches, such as agency, forwarding agent and stevedoring, which ensures that the next day experiences no delays and achieves maximum efficiency. Furthermore, arrangements are made for the necessary cranes and personnel, according to the expected commitments.

During 2018, the same trend of the previous years was reconfirmed, with a notable increase in container traffic for Istop terminal, which reached approximately 45,000 TEUs and bulk cargoes such as wheat, cereals in general, fertilizers and palletized cargoes. Also, Istop started handling project cargoes and heavy lifts in earnest.

New business started in 2018 in the form of iron coils imported from China, which the Spamat Company moves into the port warehouse for onward delivery at the request of final clients. The export of scrap iron from Bari terminal will also start



shortly. During 2018, there were developments for the company in the ports of Brindisi and Vasto, where its own mobile cranes and future services developments were announced for 2019. In fact, a new Spamat Branch will be established in the well-known Port of Barletta, approximately

50km north of Bari. In 2019 a solid increase in cruise traffic is expected, that should reach the considerable designation of approximately 100 calls from MSC Cruises.

Finally new port investments will start in Albania and Montenegro.

Inchcape Shipping Services: aligning for future growth

In September 2018, Inchcape Shipping Services announced the successful completion of a strategic divestment of its freight forwarding business, following its sale to Investment Corporation of Dubai. This follows a strategy review where it was concluded that due to limited synergies, the marine and freight forwarding businesses should operate separately.

Inchcape Shipping Services remains under the ownership of Istithmar World PJSC.

The completion of this transaction now allows Inchcape Shipping Services to focus solely on the marine services and port agency business.



THE INCHCAPE 360°

Capitalizing on a unique global network combined with cutting-edge digital solutions, the 'Inchcape 360' offering connects the shipping world to a

smoother, smarter ocean, generating transparency and service excellence.

Frank Olsen, CEO of Inchcape Shipping Services, comments: "With our renewed focus on our core marine business, a unique network and the best people in the business, we are very confident about our ability to provide service excellence to our customers. Combined with our digitalization and business transformation initiatives, we will drive positive changes in our industry".

PORT AGENCY

Port by port and ship by ship, Inchcape provides full port agency services through its unique network and selected partners.

Its services are designed exclusively around the needs of its customers and include full cargo agency, crew logistics, husbandry, transits, dry docking, bunker calls, protective agency, financial management and fully outsourced solutions managed through the company's service centre hubs.

MARINE SERVICES

Inchcape provides critical support services to the marine industry through established specialists:

MACHINERY SERVICES

Specializing in the supply of genuine spare parts, equipment and technical services to the global, marine and industrial segments.

MARINE SURVEY AND INSPECTION

Providing complete survey and inspection services for vessels and cargo from strategically located centres.

ISS PALUMBO

Providing project logistics and freight forwarding solutions to customers in the growing offshore oil and gas energy sector

SMART SIGHT

The company utilizes the right information at the right time:

MARKET INTELLIGENCE

Dynamic operation and market updates, direct from its network of eyes and ears on the ground in the world's ports.

PORT INTELLIGENCE

Detailed information for all the world's ports, integrated seamlessly into ERPs (enterprise resource planning), or available as a standalone subscription.

OPERATIONAL PERFORMANCE

Keep in control with real time operational data, available instantly through your dashboard or ERP on any screen anywhere.

SMART PAY

Inchcape provides simple and effective payment solutions, using technology to ensure full visibility and total transparency.

World Marine Corporation – 2019

World Marine, headquartered in Glyfada, Athens, Greece, headed by Alexios Arnokouros, has been servicing the shipping industry consistently since 1985 with its ship agency and representation services in Egyptian Ports-Suez Canal, P.R. China and S.A.R Hong Kong.

WORLD MARINE EGYPT:

- ❖ maintains its own offices in Port Said, Suez and in Cairo;
- ❖ has been awarded with ISO 9001 offering services at competitive cost;
- ❖ specialized in the Suez Canal Tolls Reduction Scheme, in case of alternative route;
- ❖ services security teams embarkation/disembarkation service at competitive cost; and
- ❖ offers round-the-clock ship agency solutions for vessels calling at Egypt, transiting Suez Canal, loading or discharging, attending husbandry matters in all ports of Egypt.

WORLD MARINE CHINA:

- ❖ with representative offices in the heart of operations at Shanghai, Shenzhen and Dalian, provides customized services in all Chinese ports in central, south and north China as well in Hong Kong;
- ❖ World Marine's personnel is always standing by the principal's locally attending superintendents and facilitating their requirements round the clock; and
- ❖ services vessels calling at China or Hong Kong, that are in need of ship agency solutions for cargo operations, dry dock, repairs, delivery (S&P), husbandry matters, new building supervision and scrubbers fitting follow up.

ROLE OF THE SHIP AGENT

A ship agent, like World Marine Corp., represents a vital part in shipping

operations, usually servicing charterers, ship owners, and operators when the ship is at port. The main duty and role of a ship agent is to be the principal's office extension by being a reliable party in front of local authorities wherever the ship calls.

As it is not feasible for any party to be represented globally, with its own office in every port, a ship owner/charterer (or other party interested in a ship's prospective port call) chooses, during a port call, a local ship agent, who is the most suitable to physically attend his vessel, ensuring its smooth operation at port.

A ship agent's role includes accomplishment of all ship formalities and settlements with local authorities before, during and after the ship's port call.

The agent must provide up-to-date detailed information on port restrictions, conditions and tariffs, taxation, environmental (ballast policy, law on sulphur), as well cargo-specific information, export documents, receipts, OBL — issuance for loading operation-availability-copies, receiver's arrangements for receiving cargo-discharging operations.

Additional duties include dealing with crew changes, cash to master – CTM, spares clearance/collection/delivery, repairs, provisions, water, bunkers, medical, underwater inspection, and ship's delivery.

All activities require an experienced agent's coordination for a professional and timely attendance, as every process involves several parties interaction with local and international interests.

WORLD MARINE CORP. IS REPRESENTED

- ❖ **in Egypt:** all ports of Egypt and with own offices in Port Said, Suez, Cairo; and
- ❖ **in PR China:** all ports all over China and with own basis in Shanghai, Shenzhen, and Dalian.

World Marine's main competitors in Egypt and China are all major public and private

owned shipping agency companies.

According to the World Marine Department Heads of Egypt and China operations desk, where the company offers Agency services, its businesses relates:

- ❖ Egypt 60% in total and China 40% in total operations.
- ❖ In Egyptian ports 60% to dry bulk and 40% to tankers (transits).
- ❖ In Chinese ports 20% dry docks services and 80% owner's matters handling.

MAIN CHALLENGES OF WORLD MARINE ARE:

- ❖ keeping its clientèle satisfied and working exclusively with the company;
- ❖ increasing its clientèle with new introductions as owners, charterers, operators, as well cargo owners-shippers and receivers in both countries, as well as within countries exporting to Egypt and China;
- ❖ adapting to steadily changing environmental, legal and operational requirements of global shipping (IMO, etc); and
- ❖ being open to possible joint ventures, synergies and strategic alliances with local and global shipping services providers.

SUEZ CANAL AUTHORITY TOLL REBATES

The Suez Canal Authority (SCA) offers Rebate on tolls whenever there is an alternative route (via Cape of Good Hope or Panama) in order to attract ships to pass via Suez Canal. SCA policy is not fixed, as it studies each case individually; taking into consideration various factors, i.e. present freight market, bunkers cost, vessels consumption and speed, duration of voyage, etc.

World Marine is well experienced with the Suez Canal Authority (SCA) rebates policy, with \$8,000,000 in returns to its clients for 2018, with over 600 successful applications.

As rebates offered by SCA are calculated by various factors, the best way to know is to submit an application through World Marine and wait for the reply of Suez Canal Authority. All details about information needed to proceed are available by communicating with the company's staff.

At the end of December 2018, World Marine Corp. successfully supervised one of the hardest passages ever for the Suez Canal, namely of a reared towed Offshore Support Vessel: FIRENZE FPSO with US\$2.5 million of transit tolls.



World Marine is well experience with the Suez Canal Authority (SCA) rebates policy, with \$8,000,000 in returns to its clients for 2018,

Morska Agencja Gdynia: past, present and future

One of the oldest enterprises operating in the Polish maritime sectors, Morska Agencja Gdynia (MAG), is Poland's major private agency offering services in all Polish ports, dealing in all aspects of international traffic.

MAG is a member of:

- ❖ The Baltic and International Maritime Council (BIMCO)
- ❖ The Ship Agents and Brokers' Association at Gdynia, and is
- ❖ ISO certified

HISTORY

MAG's wide range of activities is a culmination of over 65 years of experience and development. The company, which was established in the mid-20th century (a state-owned enterprise called Morska Agencja in Gdynia), was founded in 1951. At that time, MAG represented foreign shipping lines, shipowners and insurance clubs (P&I) in Poland. In Polish ports, the enterprise was providing agency services for Polish vessels and foreign flags. Over time, the

company extended its range of activity to include chartering ships, port shipments as well as an employment agency for Polish mariners on ships under foreign flags.

ABOUT MORSKA AGENCJA GDYNIA

Thanks to its long experience and creativity of its staff, Morska Agencja Gdynia is a brand which cooperates with shipowners, exporters and importers from all over the globe, shipping lines, freight forwarders, ports, maritime offices, customs and border offices, banks and financial institutions as well as insurance companies.

With political and economic changes in Poland at the beginning of the 1990s, the company turned into an employee-owned company operating under the name: Morska Agencja Gdynia Sp. z o.o. It was the first privatization in the sector of marine services in Poland. The changes became a stimulus for further development. With its experience of operating in free-market conditions, the company became additionally involved in



Gdansk Lighthouse at the entrance to the Port of Gdansk.

services including rail and air forwarding, storage, distribution and customs handling.

Over time, the company extended its range of activity to include chartering ships, port shipments as well as an employment agency for Polish mariners on ships under foreign flags.

SHIPS AGENCY

Day or night, MAG's experienced team in the agency is at the disposal of shipowners and ship crews calling at all Polish ports.

MAG'S SERVICES INCLUDE:

- ❖ assistance when vessels enter the port and when they set sail;
- ❖ supervision over port operations;
- ❖ organization of all repairs;
- ❖ inspections and controls;
- ❖ keeping of ship documentation; and
- ❖ change of crew.

The company also ensures efficient assistance in emergencies requiring medical care.

In 2018 MAG served 1,250 vessels, of which over 25% transported bulk cargoes such as aggregates, fertilizers, wood logs, wood chips, grain, coke, coal, chemical products, wheat pellets and many others.

MAG believes that by constantly doing its best to ensure the highest possible quality of services it gains the confidence of shipowners and customers. This enables the company to build long-term business relationships.

"We are often willing to take up new challenges and ready to fulfil all individual requirements" says Michał Smigielski president of MAG.



Bulk vessels under agency services of MAG.



New century mine re-opening / Inchcape Australia awarded agency

In September last year, Inchcape Shipping Services Australia was awarded as the port agency for New Century Resources (NCR), a new Zinc concentrates miner in Queensland's north.

The mine at Lawn Hill is connected to the port of Karumba, 300 kilometers to the North East, via a slurry pipeline where the zinc concentrate will be dried, loaded on a self-discharging barge and then transhipped at anchorage to vessels that will carry the cargo to zinc smelters throughout Australia, Asia and Europe.


The Century mine actually began open-pit production in 1999, however previous owners MMG ceased processing operations in early 2016 following the depletion of the Century ore reserves. During its 16 years of operation, Century was one of the largest zinc mines in the world, producing and processing an average of 475,00tpa (tonnes per annum) zinc concentrate and 50,000tpa lead concentrates at Lawn Hill. The cessation of processing operations presented an opportunity for a focused junior minor to



monetize valuable remaining mineral assets. These include over 2,200,000 tonnes of JORC-compliant zinc metal equivalent resources located within mineralized tailings, and over 1,000,000 tonnes of JORC-compliant zinc and lead resources in the Silver King, South Block and East Fault Block base metal deposits. In addition, Century hosts several substantial phosphate deposits which are

yet to be developed.

Tony Brazenor, Queensland Regional Manager, was fortunate enough to be invited along by the NCR marketing team recently to the grand re-opening of the mine at Lawn Hill. Around 80 guests were invited to the mine site including local government officials, as well as state and federal members of parliament. Tony said "It was very much an honour to be invited

along to the mine opening and get the opportunity to meet with the NCR team, in particular the marketing team that we will be working very closely with, as well as brokers and buyers of the zinc concentrate, most parts of the supply chain were represented. It is a mining operation that is the first of its kind in Australia, the ultimate recycling story, a new approach to dealing with mine sites that have concluded their original intended purpose, extracting zinc concentrate for export from 15 million tonnes of tailings waste per annum." 



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New Port of Ayr agribulk warehouse to be built

The Scottish Port of Ayr, which forms part of Associated British Ports (ABP), is to have a new £2.2 million agribulk warehouse. This state-of-the-art facility aims at improving the port's customer offering.

Construction of the 4,000m² warehouse started last year. When it opens, it will provide much-needed support for South West Scotland's expanding agricultural sector. It will be located on the west side of Griffin Dock.

Local contractor 3b Construction is undertaking the work, reflecting a 'buy local' strategy adopted by ABP to support local businesses.

Andrew Harston, ABP Short Sea Ports Director, notes, "As the UK's leading company in our sector, we are committed to an extensive investment plan focusing on the Ports of Ayr and Troon and we would actively encourage Scottish businesses in need of first class port facilities in the West of Scotland to come and talk to us."

Stuart Cresswell, ABP's Port Manager at Ayr and Troon, said that other recent investments had also been made, not only in warehousing, but also in cranes and in a new pilot boat, so he sees the development of another major agribulk terminal in Ayr as a huge vote of confidence in the port.



"I strongly believe that the facilities we are developing at Ayr and Troon offer a beacon of hope for the many Scottish voices calling for a renaissance of maritime-related industry and shipping on the Clyde," he said. *Barry Cross*

The Port of Riga announces enhanced co-operation with Belarusian forestry industry

Representatives of the Belarusian Ministry of Forestry have visited the Port of Riga to discuss ways of enhancing the export of the country's timber through the Baltic port. They believe improved co-operation could unlock significant traffic potential, which officials at the Port of Riga are extremely interested in targeting.

The timber trade in the port is already rapidly growing. Turnover grew by 34.5% last year to reach 5.5 million tonnes. It is now the second most important commodity in the port behind coal exports.

Around 7% of existing flows of timber are sourced from Belarus, although this percentage is growing annually and is far from reaching a ceiling.

"Our co-operation has a great potential. We have many ways to boost our volumes and seek different kinds of cooperation," said Belarusian Deputy Minister of Forestry Vladimir Krech.

The Belarusian timber industry is exploring the optimum routes for its products to access markets in Scandinavia and Western Europe.

One of the suggestions put forward by the Belarusians is that of taking a potential equity stake in existing port operators. This would allow them to partially control tariffs and eliminate intermediaries in the logistics chain. In compensation, incumbent Latvian investors would get guaranteed cargo volumes.

"This model ... is already working in a number of ports. If a model works and brings good results, it's a good idea to take it as a basis to use elsewhere, stated Krech.

Ansis Zeltiņš, CEO of the Freeport of Riga Authority, says that this proposal is definitely worth discussing.

"There are many companies in the Freeport of Riga working with timber. These are both terminals transferring timber cargoes and companies involved in timber processing, packaging, sorting and loading into containers. I think that this model of co-operation can be promising and mutually beneficial and will boost our cargo flow," he said. *Barry Cross*



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Port of Trois-Rivières sets out its development plans

The Port of Trois-Rivières is part of Canada's network of national ports. It handles approximately 3mt (million metric tonnes) annually, 85% of which is solid bulk. This includes cereals, zinc, copper and nickel ore concentrate, spodumene, coal, gypsum, raw sugar, alumina and calcined coke. It has the particularity of offering services adapted to a wide range of products, sometimes transported in limited quantities.



THE PORT OF TROIS-RIVIERES SETS A COURSE FOR 2030

The Trois-Rivières Port Authority recently unveiled its new development plan that sets On Course for 2030. In addition to continuing investments in port infrastructure, this plan aims to fully deploy the potential of the port's urban character. Based on the principles of sustainable development, the vision that will guide actions in the coming years reads as follows: "To be an innovative urban port, growth-generating, at the heart of a competitive supply chain."

IMPROVING THE COMPETITIVENESS OF THE SUPPLY CHAIN

The competitive position of the Port of Trois-Rivières is based not only on the quality of its infrastructure, the productivity of its handling activities and its environmental record, but also to a large extent on the competitiveness of the logistics chain in which it operates. To support growth, the port and its partners will have to play an active role in improving the competitiveness of the elements that make up the chain, particularly maritime, rail and road transport services. On Course for 2030 includes several measures to achieve this objective and thus make the port more competitive and the region even more attractive to investors.

BUSINESS GROWTH

Initiatives to consolidate the supply chain will allow Trois-Rivières to better position itself on the international scene since this is where the growth opportunities for the port and the region lie. Development opportunities, when they arise, must be seized quickly. The port is therefore preparing for this and plans to build new storage spaces, as well as new wharves

west of its facilities. These projects will add approximately 175,000m² to the port's terminals and will require investments of \$85 million.

In addition, thanks to a partnership between the City, the Port and Innovation and Développement Économique-Trois-Rivières, which supports and coordinates all economic development in the Trois-Rivières region, the efforts invested in collaboration with the Government of Québec for the development of the Industrial-Port Zone (IP-Zone) will continue. This area encompasses both the port and surrounding properties, including industrial parks, and is used to attract companies that need a nearby port or others that want to process goods that are already using the port. One of the three development areas selected concerns the handling and processing of solid bulk.

To support this growth, it is essential to maintain and even improve the productivity of port facilities. The first rule is to maximize the use of space already available. To this end, the port and its users, with the help of governments, have made massive investments, amounting to more than \$130 million to upgrade infrastructure and equipment, as part of the previous development plan, On Course for 2020.

The use of each square metre of the port has been optimized and must now be kept in good condition. Annually, the port will devote on average \$2 million to maintain infrastructure and it estimates that its users will invest an amount of \$1 million, mainly in equipment, for a total of about \$40 million by 2030.

CREATION OF TWO FUNDS

In order to encourage innovation and the deployment of environmental projects, the port is creating two funds whose investment will amount to \$2.5 million over

five years. Accessible to the port's users and clients, the Innovation Fund will support the implementation of innovative solutions to increase the port's competitiveness and the Environment Fund will be used to complete the financial package of projects aimed at improving its

environmental performance. By combining the efforts of the port, users and partners, it will be possible to multiply the investments made, which should total \$10 million. When combined, the amounts planned for the maintenance of infrastructure and equipment, for the Environment and Innovation Funds, as well as those for the construction of new terminals and wharves, investments are estimated at \$135 million.

DEVELOPMENT OF THE RIPARIAN ZONE

Like many ports around the world, the Port is seeking to reallocate some of its facilities for recreational, residential and commercial tourism, and is therefore currently working with Transport Canada to obtain this authority. This would allow it to develop, in collaboration with the City and institutional and private partners, its properties near the Port Park, in harmony with the surrounding environment. Investments estimated at \$100 million, mostly from the private sector, could result from such projects.

Thus, overall, Cap sur 2030's investments will total approximately \$ 235 million.

HIGHLIGHTS

- ❖ 85% of the tonnage transiting the Port of Trois-Rivières is solid bulk, or 2.5mt annually.
- ❖ The same installations are used for about thirty different products.
- ❖ After completing On Course for 2020 three years ahead of schedule, which required investments of \$132 million, the Port of Trois-Rivières is now launching On Course for 2030, which plans investments of \$ 235 million and will make the port even more competitive, particularly in the solid bulk sector.

Two mobile harbour cranes for Quetzal

In Guatemala, Quetzal Port has put into operation two mobile harbour cranes (MHCs). The MHCs, which were built by Liebherr, are the company's LHM 600 multipurpose models. These can handle loads of up to 600 tonnes. They each

cost around \$6 million.

The cranes form part of an order for six MHCs, which will be divided between two operators at the port

According to the government, the equipment contract was made as part of

an Indirect Management Regime whereby a stevedoring company undertakes operation of the cranes and the port company, EPQ handles behind the scenes paperwork, for which it charges a percentage. *Barry Cross*

Sea Commercial Port Yuzhny increases cargo turnover to 12.3mt in 2018

According to its results, in 2018 the state company Sea Commercial Port Yuzhny increased cargo turnover to 12.3mt (million tonnes). The company handled 730,000 tonnes (+6.3%) of cargo more than in 2017. Seventy per cent of the total volume was exports of iron ore, metal products, grain cargoes and products related to their processing. Twenty per cent was represented by the import of coke and thermal coal, and 10% was transit cargo and cabotage. The port accommodated 212 vessels, a quarter of which were large-capacity vessels with deadweight tonnage of over 175,000dwt.

The growth of cargo turnover in comparison with 2017 is due to the increase (+4%) in the handling of export cargo — more than 8.6mt, the increase by 22% of the import coke coal (2mt), and transit cargo and cabotage went up by a factor of 3.8 (1.2mt). In 2018, the staff at

the port handled 1.45mt of pig iron. This figure is almost three times more than last year. The handling of grain cargoes and products of their processing rose by 52,000 tonnes.

In 2018, the state company accommodated 212 vessels (+22 compared to 2017) of different capacity. Half of these were bulk carriers Capesize (26%) and Panamax (24%). The bulker *NETADOLA* was the largest vessel. It was loaded with a record volume of iron ore — 206,450 tonnes.

"I am grateful to the employees for their work and I am sure that 2019 will not disappoint us. We are under way to modernize handling operations in order to increase speed and quality of the cargo handling. We plan to purchase new handling equipment and machines, to introduce modern cargo handling technologies in certain areas, to boost the production capacity and to expand storage

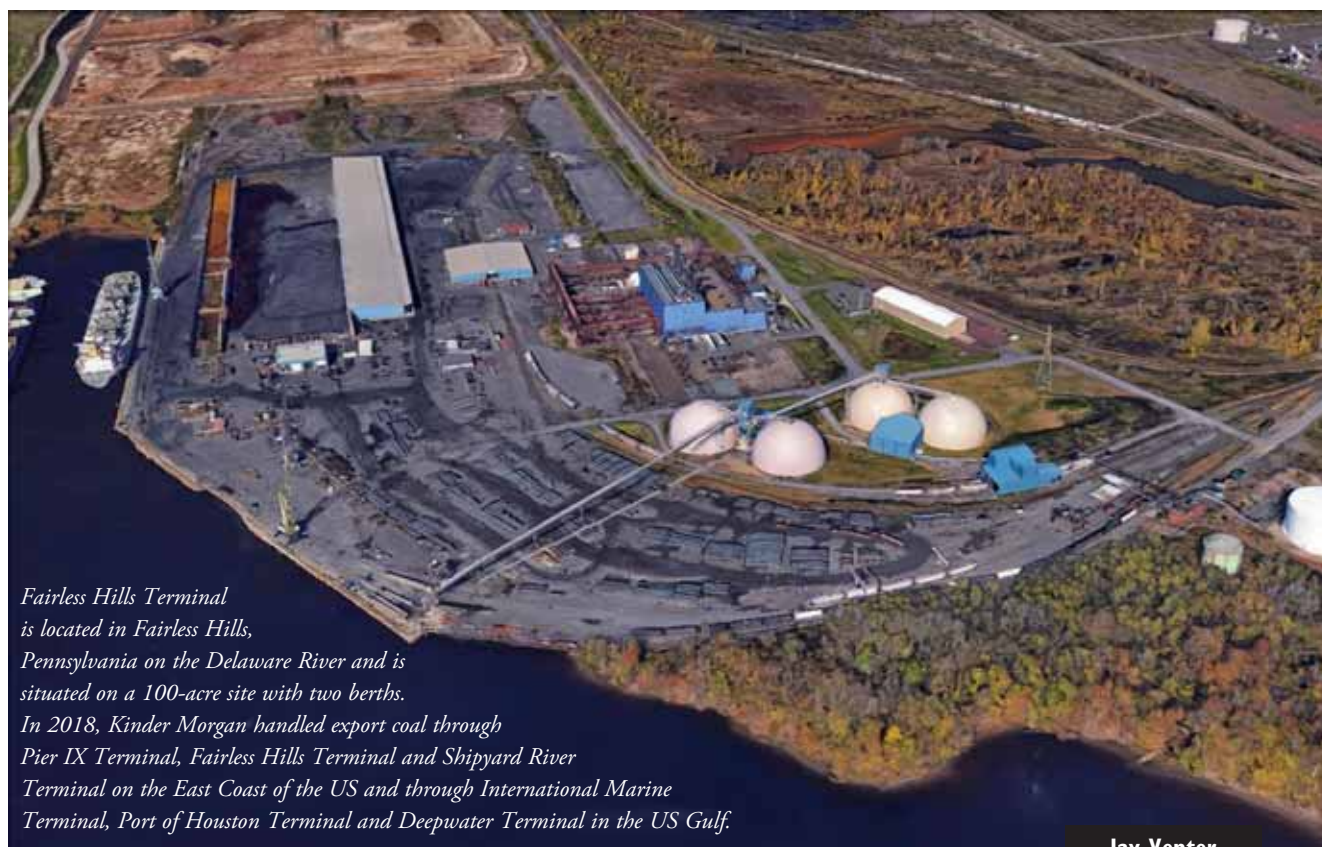
areas. We are about to go on increasing cargo turnover and providing our clients with high-quality and competitive services," said Anatoliy Yablunivskiy, acting director of Sea Commercial Port Yuzhny.

Sea Commercial Port Yuzhny is located on the north-west coast of the Black Sea in the non-freezing Adzhalytsky estuary and it is the deepest port in Ukraine. The company provides a wide range of loading and unloading services, storage and related works; it handles bulk, general and breakbulk cargoes. Scheduled cargo delivery and cargo handling are effectively performed due to the convenient location of the railroad station Beregova, developed infrastructure of the road and railways. The company operates five deep-water berths, two of which are dedicated to the handling of Capesize vessel up to permissible dwt. Annual cargo turnover of the company is 15.07mt.



Coal ports and terminals

worldwide developments



Fairless Hills Terminal is located in Fairless Hills,

Pennsylvania on the Delaware River and is situated on a 100-acre site with two berths.

In 2018, Kinder Morgan handled export coal through Pier IX Terminal, Fairless Hills Terminal and Shipyard River Terminal on the East Coast of the US and through International Marine Terminal, Port of Houston Terminal and Deepwater Terminal in the US Gulf.

Jay Venter

Kinder Morgan, providing export terminal capacity throughout its coal terminals network

Recent international demand for both metallurgical and thermal coals has re-established the importance of US coals in global target markets. While domestic natural gas in the US continues to provide low-cost power options to US utilities, higher volumes of thermal coal have now shifted from the domestic utility market to the international thermal market.

Kinder Morgan continues to work closely with a variety of US coal producers, trading companies and international end-users to provide export terminal capacity across multiple regions throughout its terminal network. In 2018, Kinder Morgan handled export coal through Pier IX Terminal, Fairless Hills Terminal and Shipyard River Terminal on the East Coast of the US and through International Marine Terminal, Houston Bulk Terminal and Deepwater Terminal in the US Gulf.

PIER IX TERMINAL

Served by the CSX railroad, Pier IX Terminal is located in Newport News, Virginia on the James River and has approximately 1.4mt (million metric tonnes) of ground storage and 17mt of total throughput capacity. Pier IX Terminal handles both metallurgical and thermal coals supplied from Central Appalachia,



Pier IX Terminal is located in Newport News, Virginia on the James River.

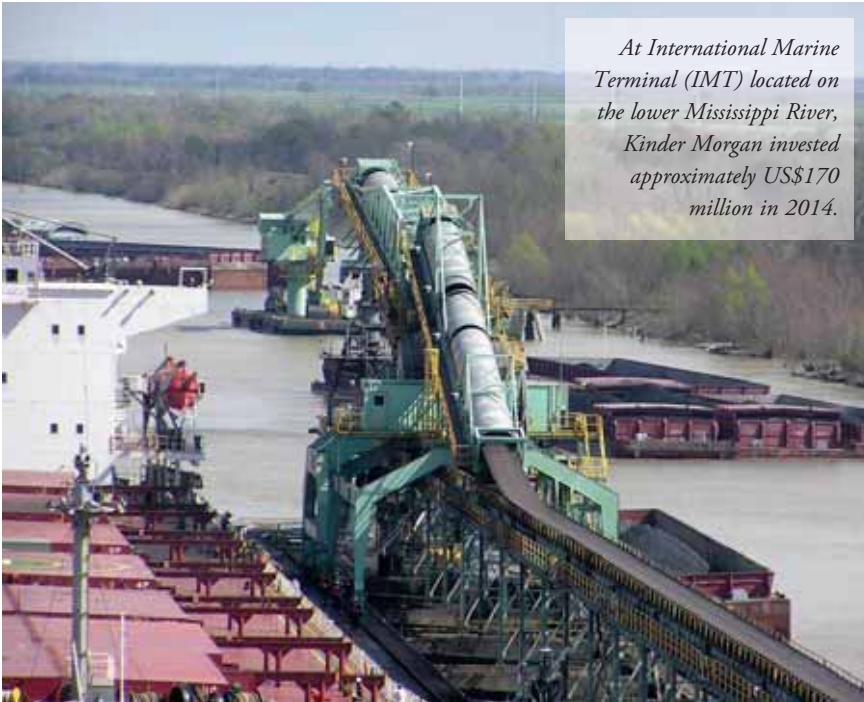
Northern Appalachia, and the Illinois Basin.

FAIRLESS HILLS TERMINAL

Fairless Hills Terminal is located in Fairless Hills, Pennsylvania on the Delaware River and is situated on a 100-acre site with two berths. In addition to coal, FHT handles a variety of other commodities including steel slabs, steel coils, rebar, pipe, beams, fertilizer, sugar, slag, sand and liquid UAN fertilizer. Due to its close proximity to the anthracite coal fields, Fairless Hills Terminal is perfectly positioned to ship anthracite coal to the international markets.

SHIPYARD RIVER TERMINAL

Shipyard River Terminal is located on the Cooper River in Charleston, South Carolina and is dual served by the CSX and Norfolk Southern railroads. It is a 270-acre terminal with three berths that handle a



At International Marine Terminal (IMT) located on the lower Mississippi River, Kinder Morgan invested approximately US\$170 million in 2014.



Shipyard River Terminal is located on the Cooper River in Charleston, South Carolina.



Kinder Morgan's Port of Houston Terminal is ideally situated on the Houston Ship Channel with direct access to Western railroads.

variety of import commodities including coal, cement, salt, aggregates, fertilizer, gypsum and pumice as well as liquid bulk products such as petroleum and chemicals.

INTERNATIONAL MARINE TERMINAL (IMT)

At International Marine Terminal (IMT) located on the lower Mississippi River, Kinder Morgan invested approximately US\$170 million in 2014 to increase the terminal's coal export capacity. The IMT terminal improvements included a new ship loader with an extended boom capable of efficiently loading cape-size vessels. The improvements also included a second continuous barge unloader, improved reclaim and distribution systems and a dedicated dock for loading ocean going Gulf barges, enabling export coal and petcoke to be handled at a completely independent berth from the domestic coal movements. IMT has an export capacity of approximately 15mt.

PORT OF HOUSTON TERMINAL AND HOUSTON DEEPWATER TERMINAL

Kinder Morgan's Port of Houston Terminal and Deepwater Terminal are ideally situated on the Houston Ship Channel with direct access to Western railroads. These terminals provide export coal capacity primarily for western producers who can rail their coal directly to the US Gulf without having to rail coal to the Mississippi River, transfer the product to a barge and then barge the coal to secondary export terminals located on the lower river. Kinder Morgan deployed significant capital for new infrastructure improvements at its existing petcoke export terminals, allowing producers to efficiently and economically export western coal through those facilities.

Improvements at the Port of Houston Terminal which were completed several years ago included new coal receiving, storage and reclaim systems. The Port of Houston Terminal can store up to 300 railcars at a time at the terminal. Kinder Morgan also upgraded the existing shipping system, increasing both the terminal's coal and petcoke export capacity and ocean vessel loading rates.

Just down the Houston Ship Channel from the Port of Houston Terminal, Kinder Morgan similarly invested in significant improvements to its Deepwater Terminal which included a new shiploader capable of loading baby cape-size vessels at rates approaching 5,000 tonnes per hour, new rail loop tracks capable of simultaneously holding three, 135-car unit trains, a new

railcar rotary dumper and segregated distribution and dual reclaim systems on each storage pad. The Deepwater Terminal has an export coal throughput capacity of approximately 9mt of coal per year.

COMMITMENT TO SAFETY AND EXCELLENCE

All of Kinder Morgan's terminals are designed, constructed, and operated to meet or exceed industry safety and environmental standards. Kinder Morgan is committed to being a good corporate citizen and conducting itself in an ethical and responsible manner. The company invests significant dollars each year on integrity management and maintenance programs to operate its assets safely and to protect the public, its employees, contractors and the environment. Operationally, Kinder Morgan continues to perform better than its industry peers relative to environmental, health and safety measures.



Kinder Morgan's Deepwater Terminal on the Houston Ship Channel has direct access to Western railroads.

KINDER MORGAN
TERMINALS

Kinder Morgan Terminals Handles:

- In excess of 65 million tons of bulk products per year with the capacity to handle over 100,000,000 tons
- 15 million tons of coal
- 14 million tons of petroleum coke
- 18 million tons of raw materials
- Soda ash, salt, aggregates, cement, fertilizers and breakbulk

Kinder Morgan Terminals Operates:

- Over 30 dry cargo handling facilities in the US and Western Canada serving all coasts and the inland river system

Kinder Morgan Terminals Offers:

- An expanding line of product services, including bagging, full inland and ocean logistics as well as in-plant operations support
- Terminal construction management and financing
- Open and covered bulk and breakbulk material storage and warehousing
- General stevedoring services



Shipyard River Terminal



International Marine Terminal



Port of Houston Terminal



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Fairway adjustment will simplify Elbe traffic control by summer 2021



Photo copyright: HHM / Michael Lindner.

Germany's largest universal port contains over 75 terminals, handling over 18,000 ocean-going and inland waterway ships every year. For the Elbe and port pilots, the 65% increase in the number of calls by what are known as extraordinarily large vessels — German: AGFs — represents a challenge.

Whereas in 2008 not quite 600 ships in

this class berthed in Hamburg, now more than 1,000 do so. AGFs are vessels with a length of over 330 metres and a beam of over 45 metres. These are subject to numerous restrictions along the 120-kilometre stretch of the River Elbe between the estuary and the boundary of the Port of Hamburg, which must be exactly observed.

Advantages also arise for bulk carriers: The Port of Hamburg is also the strongest German seaport in the bulk cargo sector (2017: 44.7mt [million tonnes]). Dry bulk accounts for 69.4% and thus the majority. Between 2008 and 2017, dry bulk volumes in Hamburg increased by around 16% to 31.01mt. After 2015 (31.5mt), this is the second-largest volume ever handled in

Photo copyright: HHM / Michael Lindner.



Hamburg. Growth drivers in this segment have been coal imports in particular since 2012 (record in 2017 with 7.9mt) but also grain and animal feed (together around 6mt in 2015: record).

In the course of the next year, as part of the fairway adjustment of the Lower and Outer Elbe, widening of the fairway by 20 metres between Störbogen and Wedel will already create extra capacity for ultra-large vessels and a simplification for traffic control of traffic arriving and departing at Germany's largest universal port. Seven kilometres in length and 385 metres wide, once it is completed at the end of 2019, a passing box between Wedel and Wittenbergen will bring to an end the 'one-way traffic' for ships with a combined width of more than 90 metres. Arithmetic suggests that 2,800 ultra-large ships could then reach the Port of Hamburg — or more than twice as many as at present. Business in the Port of Hamburg anticipates completion of the fairway adjustment in summer 2021.

Since 2015, the HVCC, or Hamburg Vessel Coordination Center, has looked after optimized passage planning for ultra-large ships in the AGF class, which along with containerships also includes bulk carriers and cruise ships. Founded by terminal operators EUROGATE and HHLA, as Nautische Terminal Koordination (NTK) the company undertakes not only the operational co-ordination of arrival and departure planning for mega-ships, but also — as the Feeder Logistics Centre (FLZ) — rotation planning, arrival control and stowage planning for feederships and inland waterway craft in the Port of Hamburg. Following arrival at a previous port, e.g. Southampton, via the HVCC data platform, for example, all partner shipowners receive inbound passage plans. Precise time planning enables the ship's speed for the Elbe and arrival time at the terminal in Hamburg can be optimally determined. Reduction of vessel speed from 18 to 14 knots on the voyage section Rotterdam — Hamburg of 220 nautical miles yields a 22-tonne saving in bunkers and leads to a 66-tonne reduction in CO₂ emissions. The data made available by the HVCC also include outbound passage plans for optimized transit from Hamburg to the next port.

In 2017, HVCC served more than 3,000 vessels arriving and departing at the Port of Hamburg. Other ports, the terminals in Hamburg and the shipping companies that cooperate, are all involved. Further expansion of co-operation between those responsible for traffic control in the Federal Waterways and Shipping Administration, Hamburg Port Authority (HPA), the port and Elbe pilots, and the HVCC, should in future involve incorporation of ships and pilot stations in the German Bight in mobile data traffic.

Ingo Egloff and Axel Mattern, Joint CEOs of Port of Hamburg Marketing, welcome the willingness of all those institutions and companies involved in traffic control to further expand their mutual exchange of data and information. "It is essential that

the fairway adjustment is now speedily implemented, also that for shipping and port customers rapidly noticeable simplifications in the accessibility of the Port of Hamburg are achieved," says Mattern. The deepening by around one metre will, once in effect, also be a great gain for the port. Containerships will in future be able to bring and take away around 1,800 TEU more cargo. "Our customers all over the world are waiting for that," adds fellow CEO Egloff. For these two port experts, with the long expected start on fairway adjustment a positive change in mood is apparent among the port's customers in Germany and elsewhere. Those publicizing the Port of Hamburg are keen to carry this on into the New Year.

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January coal exports from Australia's Gladstone jump 37% on year

A total of 6.45mt (million metric tonnes) of coal was exported from the Port of Gladstone in Queensland, Australia, in January, up 37% year on year and 4% month on month, as volumes to Japan surged and shipments to India eased off, data from the Gladstone Ports Corporation (GPC) showed.

After surging in 2018, Gladstone's coal exports to India started the new year on a slightly lower note at 1.42mt, down from 1.43mt in January last year and a drop of 12% from December.

While it is the first time in five months that exports from Gladstone to India have fallen below the 1.6mt mark after expansions in the Indian steel sector lifted volumes to as high as 1.95mt in May last year and 17.75mt in 2018 as a whole with a 48% year-on-year jump, the country's metallurgical coal imports are expected to continue rising again.

"India is forecast to overtake China as the world's largest importer of metallurgical coal in 2020, with India's imports forecast to grow steadily over the next two years, to reach 71mt in 2020," Australia's Department of Industry, Innovation and Science said in late December. That compares to an expected



67mt for China in 2020.

China-bound shipments remained depressed in January after a 23% year-on-year slide in 2018 to 9.94mt. The January total was 689,000 tonnes, which is up 62% year on year and down 42% month on month. The January volume is below the 2018 monthly average of 825,000 tonnes and well below the 1.08mt/month average in 2017, the data showed.

There is expected to be a slight softening in China's metallurgical coal imports over the next couple of years due to a moderation in the country's steel production as its economic growth slows.

Gladstone's exports are made up of

approximately 70% metallurgical coal and 30% thermal, GPC says. Japan-bound coal shipments from Gladstone rose to an eight-month high in January with 2.06mt, showing a 20% rise year on year and 44% increase from December, GPC said.

Volumes to South Korea were also firm at 1.18mt — the highest in three months, up 70% year on year and 17% month on month, it said. Although its volumes are small compared to Gladstone's other key export destinations, Taiwan saw a 17-month high with 331,000 tonnes in January, up 86% year on year and more than four times as much as the 80,000 tonnes shipped in December, the data showed.

Russian coal ports need to embrace state-of-the-art technology

In Russia, Aleksandr Grigoryev, Deputy General Director of the Institute of Natural Monopolies Research (IPEM), believes that coal ports need to seek out the world's best available technologies and not just rely on domestically manufactured solutions. However, all new technology must comply with environmental standards.

Nevertheless, he recognized that a large number of domestic ports have already gone down this road or have conditions in place to adopt it. However, he observes that other ports are lagging behind. "[They should] 'either catch up or start handling other cargoes,'" he says.

The Report on Economic and Environmental Problems of Russian Coal

Terminals, which was issued on 1 October 2018, said that the country's four most advanced dedicated coal terminals are AO Vostochny Port, AO Daltransugol, AO Rosterminalugol and AO Trade Port Posiet. In all cases, the key limiting factor for coal exports from Russia remains inadequate transport infrastructure. *Barry Cross*

Turkey's 2018 thermal coal imports down 4.5% to 31.5 million metric tonnes

Turkey's thermal coal imports in 2018 fell 4.55mt (million metric tonnes) to 31.5mt, according to data from the Turkish Statistical Institute.

That was after imports in December of 2.77mt — little changed month on month but there was a 23% fall, year on year.

Colombia grew its share of Turkish imports, with volume up 7% to of 18.2mt.

In December alone, Colombia shipped 1.67mt, unchanged from November but down 16% year on year.

Colombia's gains were felt by Russia, which exports to Turkey fell 16% to 11.2mt. Russia exported 921,896 tonnes in December, up 32% month on month, but down 22% year on year.

South Africa also reduced its export

volume to Turkey in 2018, by 28% to 1.6mt. The December volume from South Africa was down 50% on the month and the year to 175,706 tonnes.

The average S&P Global Platts CIF (cost, insurance, freight) Turkey 6,000 kcal/kg NAR (net as received), 90-day price in 2018 was \$98.50/mt, a rise of \$8.40/mt on 2017.

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Hitachi enhances durability and safety of ZW180-6 and ZW220-6 wheel loaders for special applications



To answer the needs of its European customers, Hitachi has introduced a waste handling package for its versatile ZW180-6 and ZW220-6 wheel loaders. This comprises a range of additional features that provide extra protection for the operator and key components, enhancing the safety and durability of the machine, and reducing unscheduled downtime and maintenance costs. In addition to waste handling, the new package is advantageous for demolition and forestry applications.

For added protection from falling debris, the medium wheel loaders are fitted with durable guards for headlights and taillights. Seal guards for the wheels prevent material from wrapping around the axles. Steel spiral hose guards protect the hydraulic hoses of the boom and lift arm cylinder.

A lift arm cylinder protector prevents damage of the lift arm cylinders, hoses and tubes, when material is trapped between the cylinders and the front frame. An articulation area guard protects critical components, such as the transmission and parking break, from damage due to fallen debris.

To enhance the reliable performance of the machine in waste handling and dusty

environments, a dust protection screen with fine mesh and automatic reversible cooling fan prevent the radiator from clogging. The rotation of the fan changes every 30 minutes automatically — and a manual option is also available for flexibility.

The waste handling package includes an

engine pre-cleaner to eliminate dust and dirt, which will also extend the lifetime of the air filter. For added durability and safety, owners can choose from a range of optional guards for the front windshield, bucket cylinder, and the driveshaft and powertrain.



For contrast, the non-modified ZW180-6 in bulk handling mode.

SPECIFICATIONS

Model code:	ZWI80-6
Engine rated power (kW/HP):	129/173 (ISO14396)
Operating weight (kg):	14,880–15,250
Bucket capacity ISO heaped (m ³):	2.4–2.8m ³
Breakout force (kN):	107–126
Static tipping load, straight (SLA) (kg):	12,660–13,000
Static tipping load, straight (HLA) (kg):	9,900–10,140

Model code:	ZW220-6
Engine rated power (kW/HP):	149/200 (ISO14396)
Operating weight (kg):	17,950–18,360
Bucket capacity ISO heaped (m ³):	2.4–3.3m ³
Breakout force (kN):	134–185
Static tipping load, straight (SLA) (kg):	14,840–15,230
Static tipping load, straight (HLA) (kg):	11,750–12,000

EXCEPTIONAL EFFICIENCY

The medium wheel loaders offer exceptional levels of performance without compromising on efficiency, thanks to low levels of fuel consumption. The EU Stage IV-compliant engine does not require a diesel particulate filter, which reduces maintenance costs.

The selective catalytic reduction (SCR) system, also designed to comply with EU Stage IV emission regulations, lessens the wheel loader's impact on the environment. The SCR system injects urea into exhaust gas to reduce nitrogen oxide from emissions. As waste handling companies occasionally deal with flammable material, the maximum temperature level of exhaust gases is lower on this SCR system. This enables it to meet the high safety standards required in this industry.

The quick power switch increases engine output when more power is instantly required, or for driving uphill. The simultaneous movement of the bucket and lift arm ensures an efficient digging operation. The five-speed transmission ensures increased productivity and fuel efficiency while travelling.

SAFEST IN ITS CLASS

The ZWI80-6 and ZW220-6 are among the safest machines in their class. They offer the best all-round visibility with a 360° panoramic view from the spacious cab and the rear-view camera. The repositioning of the muffler and air filter, and wide-view mirrors, have also enhanced the rear-view visibility.

Operators will notice extremely low noise levels inside the cab, thanks to improved sound insulation. To ensure a smooth driving experience on all kinds of terrain, the ride control feature minimizes pitching via the movement of the lift arm cylinders.

A smooth operation and exceptional control are ensured by the optional Joystick Steering System (for the ZW220-6), which enables operators to reach high levels of productivity with effortless steering. In the cab, the multifunctional LCD monitor with built-in rear-view display also makes life easier, showing vital information at a glance.

Hitachi Construction Machinery (Europe) NV Wheel Loader Product Manager Vasilis Drougkas says, "We have introduced this package for the ZWI80-6 and ZW220-6 models to meet the specific needs of any application in which there is a high risk of falling debris. It enhances the durability of the standard models for dusty environments, and prevents damage to components. As a result, it ensures a reliable performance, reduced downtime and lower maintenance costs."

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Energy consumption and environmental impact have become key words when it comes to investments in new port equipment. In other words: the environmental impact of a port crane needs to be minimized. On the other hand, the cost associated with handling one tonne of bulk material also has great importance, as this shows the economic feasibility.

When handling difficult dry bulk materials as well as steel scrap, hydraulic material handlers have become the standard as being the most suitable solution for the job. Traditional rope cranes are being replaced by hydraulic units that are faster and more versatile, wherever you look.

ENERGY COST

Over the last few years, the tendency towards more energy efficiency can also be noticed on modern hydraulic material handlers. Several manufacturers now supply machines with hybrid systems where the energy that is released during the boom down function is stored into accumulators. When the boom is lifted again, the stored energy is utilized to support this movement. Usually an additional cylinder is required in combination with an energy storage system. Suppliers claim to save 30–35% on the energy bills.

E-Crane has not gone down the same track, as its basic design already results in

an extremely energy-efficient hydraulic crane. Utilizing the principle of equilibrium, where the stick is mechanically connected to the rotating counterweight by means of a connecting rod, the load can be moved from point A to B at a fraction of the energy usually required. The energy savings accomplished using hybrid systems on a material handler all of a sudden become insignificant. The E-Crane philosophy is simple: rather start from an energy-efficient design than adapt a fundamentally inefficient one.

On any E-Crane, the centre of gravity of the machine always stays within the slewing ring, as the movement of counterweight and stick are synchronized. As a result of this a balance situation is maintained and



guaranteed at all times. When working with lighter loads, the movable counterweight makes the arms go up almost spontaneously as it pulls the boom up. When working with heavier loads the movable counterweight assures that smooth lifting is possible at low hydraulic working pressures.

ELECTRIC POWER

At the same time, E-Crane has also noticed a tendency towards electrically powered machines, instead of the traditional diesel-powered material handlers, even on mobile machines. For material handlers, this is considered to be a product innovation.

On the other hand, electrically powered machines are nothing new the Belgian manufacturer of bulk handling cranes. All machines are equipped with an electrical motor as the main power source, and have been so since the late nineties. When no shore power is available, the machines can be equipped with a diesel generator set. Switching between shore power and diesel is possible in all circumstances. What others see as an important innovation has been common practice for decades at E-Crane. The optional use of a VFD (Variable Frequency Drive) can further reduce the size of a diesel genset, if this is required.

NOISE REDUCTION

Another major issue in modern ports is the general noise level. As more and more terminals are close to urban areas, there can be strict rules as to the maximum



sound level for new equipment. It is therefore more often a requirement that an extra effort is made to reduce any noises from the port cranes in the best way possible.

Thanks to the electro-hydraulic powertrain working at relatively low hydraulic pressures, the E-Crane is already one of the most silent cranes on the market. However, as an option, E-Crane can install an additional sound dampening package to meet even the strictest demands.

THE ADVANTAGES OF THE EQUILIBRIUM PRINCIPLE

The equilibrium principle, perfected and implemented successfully in well over 200 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 to any other hydraulic material handling machines;
- ❖ very low wear costs as the crane operates with low pressures and the balance is ensuring an equal load spread on components;
- ❖ smooth, harmonic crane movements;
- ❖ high operator comfort, supporting high productivity and excellent ergonomics;
- ❖ extremely silent inside and outside;
- ❖ unique, adjustable floating point (automatic boom float), which helps ensure grab filling in difficult conditions and prevents damage to ships and tools; and
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The E-Crane design provides the highest quality fabrication of all load carrying steel constructions, high-class corrosion protection and reliable hydraulic components from renowned suppliers, such as Rexroth and Caterpillar. Design classification meets the highest possible standards in FEM or DIN, with the longest design life. Electronic controls include remote diagnostics and the possibility of semi-automatic crane operation.

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

AFTER-SALES SERVICE

E-Crane prides itself on not only supplying equipment, but rather long-term solutions for bulk material handling challenges. After delivery and installation, E-Crane personnel remains present on site to carry out operator and maintenance staff training, as

this is a practice both client and supplier will benefit from. Additional training can also be organized at the E-Crane Academy in the E-Crane HQ in Belgium when it comes to in depth training courses for operators, maintenance personnel as well as terminal managers.

Optionally E-Crane can also carry out all maintenance activities for its client. All-in maintenance contracts are in place for an increasing number of E-Crane users around the world, so that the crane owners can focus on their core business. Regular site visits by a certified E-Crane field service technician are made to support the client in the best possible way and to carry out preventative maintenance tasks. E-Crane further assists in optimizing the unloading process by continued operator training, bottleneck identification, process evaluation and by making recommendations on how the terminal operations can be optimized as a whole.

Furthermore, E-Crane is on standby 24/7 in case of emergencies and also guarantees the availability of replacement parts, should they be required, as part of the all-in maintenance contracts.

All of the above illustrates E-Crane's strong commitment to being a long-term

partner, rather than just a crane supplier.

CONCLUSION

Where others claim to offer green alternatives E-Crane really delivers, even more so when looking at machines that reach a life of 60,000 hours and more. E-Cranes provide longer outreach ranges than typical material handlers, starting from 25 metres, all the way to 50 metres. This outreach allows for unloading any type of barge or ship with minimum clean-up. E-Crane duty cycle capacity ranges from five to well over 60 metric tonnes. Although E-Cranes are compatible with any type of hydraulic grab, E-Crane's clamshell buckets are designed with a powerful closing force affording 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.

DCi

HIGH QUALITY EQUIPMENT FOR DRY BULK CONVEYING

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Standing out on the scrap heap

SENNEBOGEN handlers at work

The flexible 840 crawler gantry solution ensures work can continue uninterrupted while trucks deliver scrap to the steelworks.



Six units in a year: steelworks service provider relies completely on SENNEBOGEN electric material handlers

The SENNEBOGEN E-Series machines really stand out among the huge scrap heaps. They have been a permanent fixture at mill service specialists Steelage since the beginning of 2018. Steelage has been operating at Ostrava, the largest steelworks in the Czech Republic, for some five years. Inside the works, which employs around 7,000 people and has been at the heart of the third-largest Czech town since the 1950s, Steelage is indispensable as an internal scrap logistics expert, handling on average 120,000 tonnes a month, and doing so, from the start, exclusively with SENNEBOGEN material handlers.

Innovation, safety and a reliable partner — that is what is important to owner of Steelage, Jörgen Sassen. “We have been working with SENNEBOGEN for a few years now, we were looking for the perfect balance in terms of price and performance that just did not seem to be on offer in the market.” They finally found the ideal service and support partner in dealer Merimex, who guarantee reliable, customer-focused support.

Those in charge of the project faced an interesting challenge thanks to the difficult space restrictions. The central scrapyards is surrounded by narrow pathways and two

sets of railroad tracks, across which the scrap has to be transported. At the same time, they need to be able to easily load transport wagons and unload delivery trucks.

By working closely with dealer Merimex, a unique, customized solution was configured from the modular SENNEBOGEN range. A flexible 840 crawler gantry excavator powered via a spiral winding engine line drum is used, meaning that trucks can drive under the material handlers without interrupting their workflow. With a reach of up to 23 metres, a strengthened special attachment



is in operation. This has to stand up to the enormous continuous load of, on average, 6,000 operating hours a year.

In the centre of the front section of the 20,000m² yard, there is currently another stationary 825 electric solution that feeds a compactor and is soon to be replaced by the next largest machine, the 830. Three further 840 crawler excavators, with

electric drive and 2m pylon extension, drive between the wagons and the storage area. The extension guarantees the driver the best possible view of the scrap heap and for loading wagons.

“As we are involved in recycling the steelworks’ old scrap, it was clear that, for cost reasons, we could only operate electric machines. Also, we are aware of

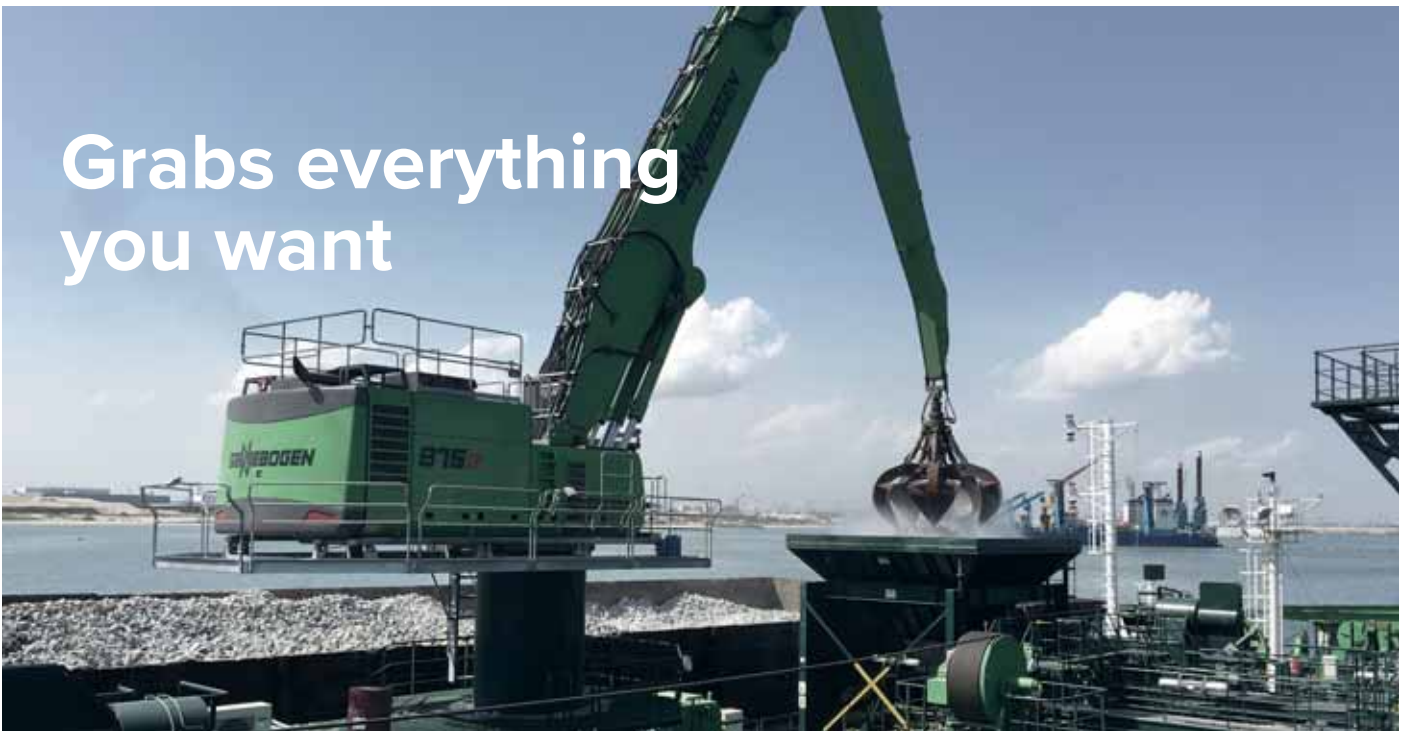
our growing responsibility towards our employees and the environment and going forward we want to reduce our fine dust and noise pollution,” says Sassen about the investment at the 70-person site. Steelage sees this as an advantage over larger competitors in the market where diesel machines are still seen as the undisputed standard.

DCi



Happy customers and project supervisor, from left to right: Daniel Hrbac (Steelage, managing director), Jan Beníšek (Merimex), Jörgen Sassen (Steelage, owner), Kerstin Wabner and Uwe Hammer (SENNEBOGEN).

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Innovative vibrator mounting solution

eliminates need for welding or bolting



Step three in the installation process: after applying the base to the vessel, the adhesive is mixed and injected.

Martin Vibration Systems, a global provider of industrial vibration equipment has introduced a versatile mounting solution for bins, hoppers and chutes — with no welding, drilling or tapping required — speeding up vibrator installation and eliminating the usual system downtime. Designed to soundly adhere to circumferences of less than 24in/610mm (including high arcs, odd angles or limited spaces), the purpose-built Martin® Stick & Shake™ Adhesive Mounting System now allows operators to quickly and easily attach compact vibrators directly to process vessels. The result is more effective material flow at choke points, higher efficiency and reduced maintenance time.

Available for the company's NTK 8AL HA, NTS 80 and NTP 18 vibrators, the

Stick and Shake Mounting System provides all necessary components, including stainless steel face plate, mounting studs, lock washers and hex nuts, two-component adhesive cartridge, mixing nozzle, double sided adhesive strips and a convenient applicator gun. Compatible with virtually any clean surface, the glue adheres to nearly every common industrial structural material, including painted metals, polycarbonate, acrylics and ABS plastics. The low-noise, pneumatic, piston-driven Bantam series units can be mounted in any position, even when in constant use.

“Handlers of pellets, grain, powder or viscous liquids often have small hoppers, specialized vessels or cramped spaces where traditional vibration brackets won't fit,” explained Michael Holland, Product Group Leader at Martin Vibration Systems.

“In response to customer requests, we devised a revolutionary solution that can conform tightly to a curved vessel wall, but still offer a flush and sturdy mount to attach our Bantam™ series of powerful compact vibrators.”

Previously, narrow system bottlenecks that were prone to clogging required a vibrator to be mounted on a flat surface or support structure. To properly agitate the hopper and maintain constant material flow, the vibrator needed to be powerful enough to shake the entire apparatus, rather than just the vessel itself. Beyond the increased energy usage of larger vibrators, over time, perpetual shaking degrades the stability of support structures and potentially reduces the life of mechanical parts, increasing the cost of operation.



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By adhering directly to the wall of a hopper, bin or chute, operators are better able to apply focused energy directly to the blockage site, improving material flow with less force. Shaking only the vessel wall instead of the entire apparatus, the vibration creates separation between fragments, dislodging buildup and promoting flow, drastically reducing downtime and maintenance associated with material accumulation.

“This as a game-changer for small applications,” said Mike Lindbeck, Vice President of Sales and Marketing for Martin Vibration Systems. “As processors seek to improve speed and efficiency, they need vibration for consistent material flow. Now, they finally have a solution for these



The first step: adhesive strips are first applied on the perimeter of the mounting base.



Step two: the Stick and Shake features dual mounting studs.

the unit running or remedy the clog with a manual switch, improving throughput and reducing operating costs to deliver an excellent return on investment.”

Martin® Vibration Systems Solutions is a respected innovator and supplier of industrial vibrators, compaction tables, feeders, hoppers and other material handling products for a wide range of industries, including chemicals, food, pharmaceuticals and foundries. The firm supplies both electric and pneumatic models. MVS has built its reputation on quiet, energy-efficient designs, engineered and built to deliver precise energy

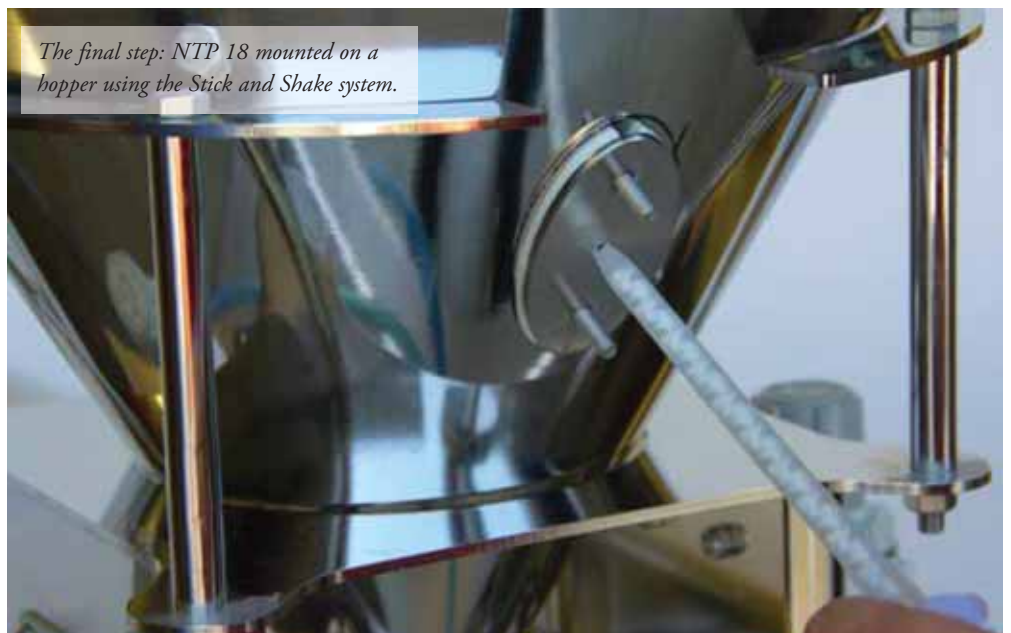
difficult applications.”

A single worker can install the new mounting system in just a few minutes. Needing just 24 hours for full cure of the adhesive, the vibrator can be mounted, installed and working the same business day. To operate, the units require a three-way normally closed valve and 5-micron filter regulator. All of the designs can be outfitted with timers to regulate operation and conserve power.

“Customers have told me that the ability to mount a small, energy-efficient vibrator in exactly the right spot has significantly improved their process,” Holland concluded. “Workers no longer need to monitor systems as closely or

take the time to manually dislodge accumulation. Now, they either just leave

transmission, long service life and low maintenance.



The final step: NTP 18 mounted on a hopper using the Stick and Shake system.

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Coal control

getting the best equipment is the key to success

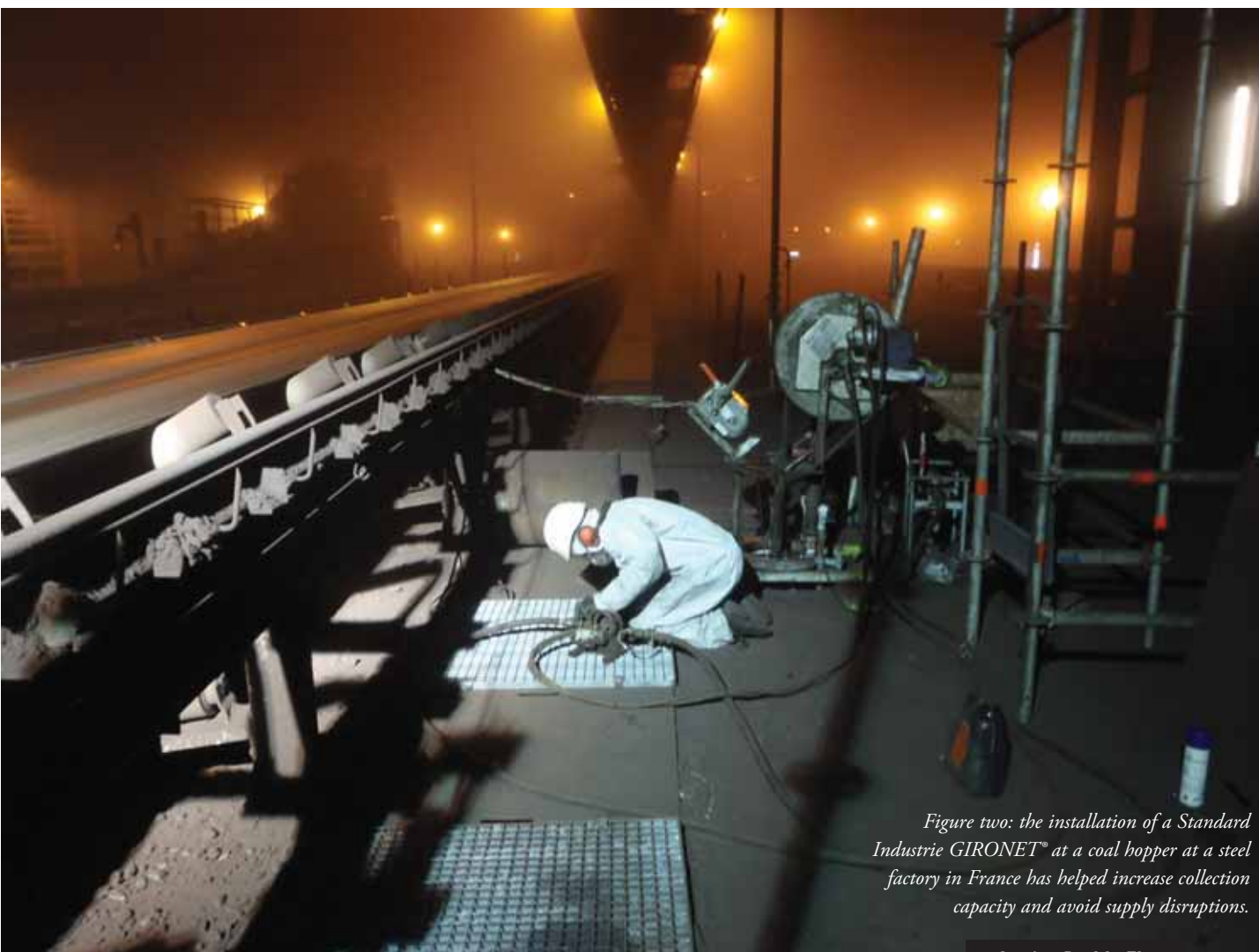


Figure two: the installation of a Standard Industrie GIRONET® at a coal hopper at a steel factory in France has helped increase collection capacity and avoid supply disruptions.

Louise Dodds-Ely

Standard Industrie: solutions to ensure smooth handling of coal

For 40 years, Standard Industrie International has been a specialist in the design and manufacture of solutions to facilitate the handling of bulk products by combining safety and respect for the environment — especially in factories using coal.

MATERIAL BUILD-UPS IN THE COAL PRODUCTION PROCESS

Material build-ups in the coal production process often lead to reduced plant productivity and higher cleaning costs, as well as increased safety risks for

maintenance staff. Such issues can be avoided by undertaking measures including:

- ❖ blockage and build-up removal; and
- ❖ silo and hopper cleaning.

Having developed expertise in both these areas over the past 40 years, Standard Industrie has helped a number of plants across the world improve productivity, reduce cleaning costs and lower safety risks.

As an example, Standard Industrie installed three of its AIRCHOC® air cannons on a hopper in the coal tower of

a steel plant in Belgium :

The customer has eight extraction points finished by chutes. Some of these extraction points regularly became blocked due to wet coal clogged on the inclined walls of the coal hopper resulting in loss of material and loss of time.

SOLUTION

The technical solution recommended by Standard Industrie International and chosen by the customer was the installation of three AIRCHOC® air cannons AC510, in standard versions, with

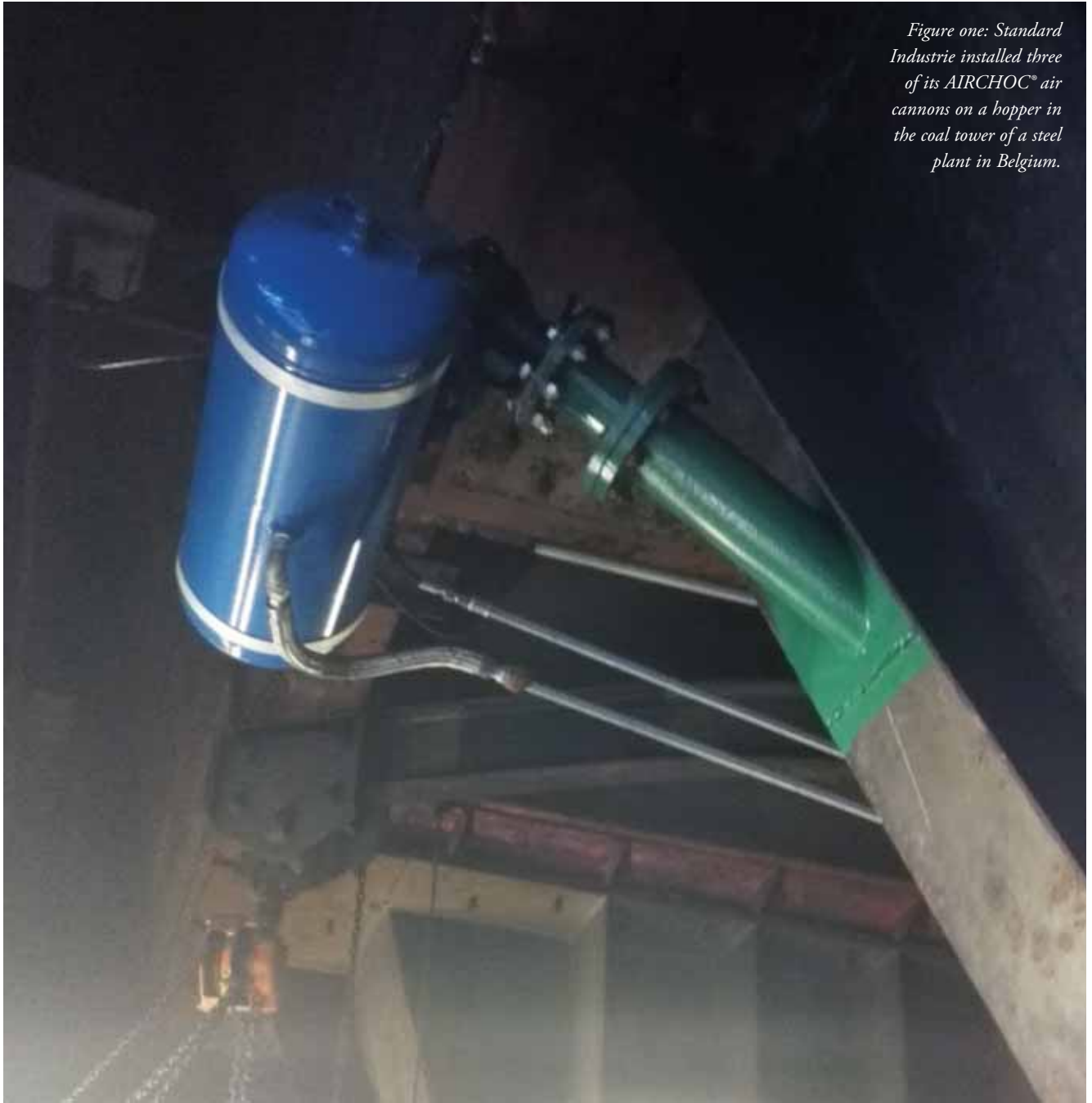


Figure one: Standard Industrie installed three of its AIRCHOC® air cannons on a hopper in the coal tower of a steel plant in Belgium.

a control panel to automatically control the air cannons (see figure one above).

Standard Industrie also recently intervened at a steel factory in France to clean the coal hopper.

The customer had a low recovery collection capacity. In this case, the use of the pneumatic GIRONET® is the solution for the cleaning of silos and the reduction of their stock. The GIRONET intervention will enable to increase the capacity of collection in order to avoid supply disruptions (see Figure 2 on p63).

DUST CONTROL IN THE COAL PRODUCTION PROCESS

Optimizing the production tools means reduction of atmospheric emissions, improved visibility, staff safety, reduced maintenance costs ... here are a very few

advantages of Standard Industrie's solutions regarding the dust control in coal production :

LIFTUBE®: CONVEYOR BELT OPTIMIZATION

The LIFTUBE® is a solution that optimizes the sealing of any conveyor belt (smooth or cleats, rubber or PVC, vulcanized hot or cold). It comes as a replacement for stations equipped with three rollers on the conventional conveyors. These are standard one-metre modules that are scalable and easy to install on all or parts of a new or existing conveyor while keeping the belt, chassis and motorization of origin. It is installed between the point of loading and unloading. Available in widths from 500 to 1,400mm, in high temperature, explosive, food or self-extinguishing versions, the LIFTUBE® avoids any

contamination of the product transported with the outside environment. This seal-proof system enables easy tilting of the glide boards and the central roller for easy and minimal maintenance. Thanks to its pinch points protections the LIFTUBE® significantly improves the working conditions of the operators.

This customer, a thermal coal power station in Germany asked Standard Industrie to install six metres of LIFTUBE®.

CUSTOMER'S PROBLEM

The energy sources required for the production of electricity may be many (coal, natural gas, oil...). In this power plant, 630 to 850 tonnes of raw coal are conveyed every hour by fluvial way, stored on site and then transported by conveyor belts to the crusher.

At this transfer point, significant losses of material and dust emissions occur and require cleaning operations two times per week.

CUSTOMER'S REQUIREMENT

- ❖ **Safety:** reduce the risk of explosion due to dust emissions.
- ❖ **Economic:** reduce the cleaning costs carried out by a contractor.
- ❖ **Environment and health:** reduce exposure to the coal for the operators.

SOLUTION

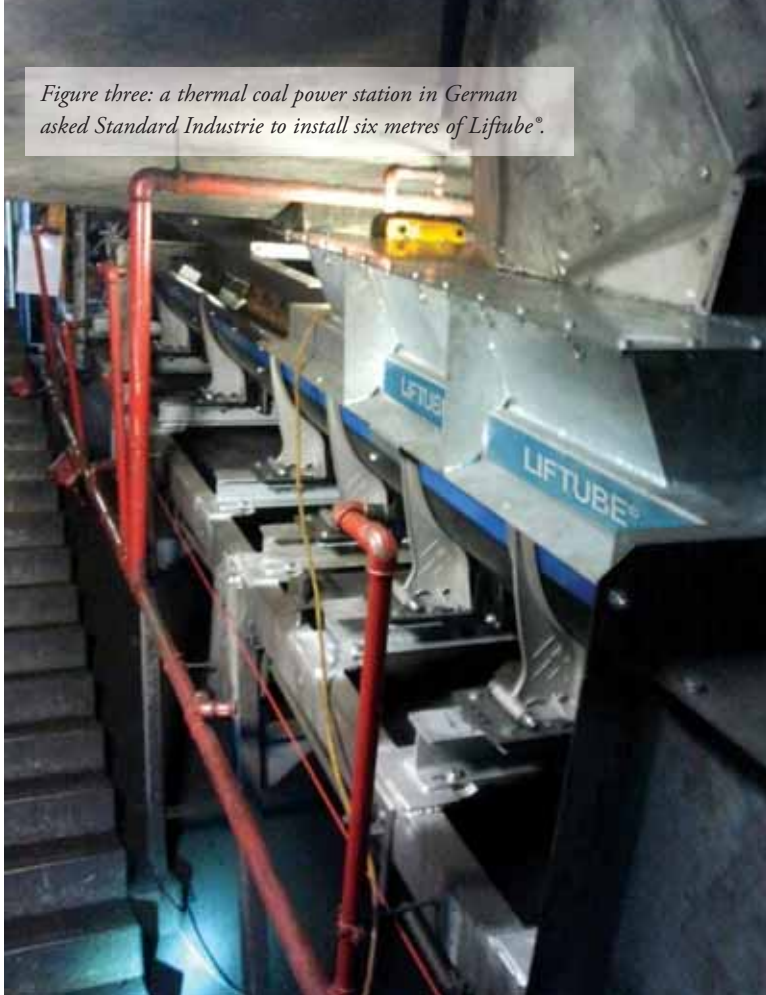
After several site visits, 6m of 1,200mm-wide LIFTUBE® were installed at the beginning of the conveyor and more precisely at the hopper level. Indeed, it was decided to equip only the beginning of the conveyor where emissions and material losses are the greatest.

Given the explosive nature of the product, LIFTUBE® was supplied in ATEX version to ensure optimum safety. It was also recommended to equip the tail pulley of the conveyor with a V-plough (figure three).

Formerly, there had been no protection, but it was necessary to avoid the projection of coals with belt return.

RESULT

Figure four: the GAD high-power vacuum allows for the cleaning of a very large surface.



The goal of the customer has been met:

- ❖ **At the economic level:** cost reduction generated by cleaning.
- ❖ **At the safety level:** strong decrease in the risk of explosion (ATEX22 area).
- ❖ **At the environment and health level:** less exposure to coal for the users.

VACUUM CLEANING MACHINES

To meet its clients' industrial cleaning, pumping and vacuuming requirements, Standard Industrie offers a complete range of equipment and vehicles that combine safety and performance.

From vacuum vehicles to mobile vacuum units, Standard Industrie has a solution for every industrial vacuuming problem.

CASE STUDY: COAL FIRED POWER STATION IN BOSNIA-HERZEGOVINA

CUSTOMER'S PROBLEM

New standards in Bosnia-Herzegovina in terms of safety and environment are close to those of the European Union.

As the power station is partly public, it must conform to them. A centralized vacuum unit is then necessary.

SOLUTION

The GAD high-power vacuum allows the cleaning of a very large surface. Connected to a centralized vacuum network, it reaches nearly 40 metres high on four floors and does the cleaning of five boilers.

Coal handling with iSAM's advanced terminal automation solutions

Coal mines as well as export and import terminals typically have extreme levels of equipment utilization. At most locations, the equipment is utilized 24/7 and waiting times create a considerable impact on the profit margin. To ensure the best interaction of the available machinery, perfect timing and a high level of co-ordination has to be realized.

To fulfill these requirements, iSAM has developed and implemented technology packages for fully automated operation of either individual equipment or — as a combination of individual systems — of entire coal handling facilities.

AUTONOMOUS GRAB SHIP-UNLOADERS, SHIP AND BARGE LOADERS

iSAM's sensor and evaluation package for autonomous grab ship-unloaders and ship and barge loaders is based on an advanced collision protection system, a solution using latest 3D LiDAR and GPS technology. This system enables a control system to obtain complete information about its own position and of all other objects in the vicinity. For the first time, this ensures the effective protection of a ship-unloader boom as well as of the boom and telescopic chute of a shiploader. It also creates the foundation for remote and even fully autonomous operation by enabling the system to 'see' its environment and to make its own, situation-specific decisions as an operator would do. For grab ship-unloaders, the same technology is also utilized for tracking the load in real-time to allow for a safe and collision-free unloading. Smart algorithms decide for the best loading and unloading strategy focusing on an optimized material distribution to keep the ship balanced at all times.

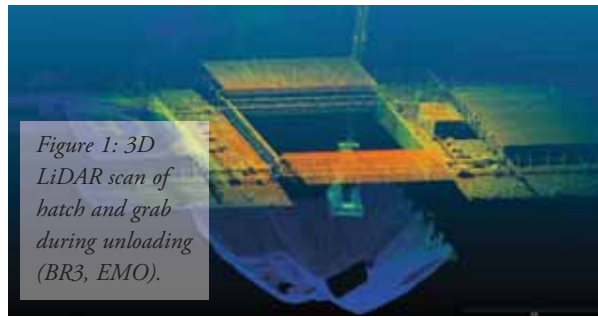


Figure 1: 3D LiDAR scan of hatch and grab during unloading (BR3, EMO).

As an example, figure 1 shows a 3D LiDAR scan taken during ship unloading.

NEW DEVELOPMENT

One of iSAM's new developments is the fully autonomous coal shiploader including the use of spoon and final trim phase. The system allows for a virtual loading test, including real-world 3D LiDAR scans of the vessel to be loaded and the original machine PLC. Due to the simulated loading process, the commissioning is very efficient and therefore the loss of production is minimized.

SCALABLE ADVANCED CONVEYOR LOAD CONTROLLER (ACLC)

The scalable advanced conveyor load controller offers an optimized equipment utilization and a maximum of comfort to the operator when tracking and controlling complex blending orders in today's busy bulk export and import terminals. The ACLC also has a hatch and train loading module to pause the material flow automatically according to the loading plan allowing the ship loader to change hatches or the train loadout to receive the next train. In fully automated mode, the individual machines will first be set to pause and then continue the material feed automatically without any operator action required. For non-automated machines, the ACLC provides the necessary information feedback to the machine operator. It represents the perfect link between individual automation solutions of the iSAM coal handling automation portfolio like the fully automated train loadout or ship loading. It helps reduce human interaction to the process to a bare minimum and hence makes it not only possible to control the entire loading process

from a remote location but also to provide an unprecedented level of automation, enabling one operator to feed several ship or train loaders from multiple, blending-capable sources easily from a central control room.

AUTONOMOUS OPERATION IN PORTS — REFERENCES

To date, iSAM has equipped seven grab ship-unloaders, six shiploaders and more than 40 stacker/reclaimers with these technology packages. Four autonomous grab ship-unloader systems are fully operational at the Port of Hamburg (Hansaport) and three systems at the Port of Rotterdam (EMO). At EMO, the automation of the grab ship-unloaders BR3/BR4 with 90-tonne coal grabs (60-tonne net capacity) has just been completed.

Two autonomous shiploader systems are fully operational, one at EMO (ship/barge loader ZB1, EMO) and one at Hansaport. iSAM has also equipped the shiploader SL3 at DBCT, Dalrymple Bay, QLD, Australia, with a 3D ship model and a full envelope collision protection. BMA Hay Point, QLD, Australia and BHP Billiton Iron Ore, Port Hedland, Australia, have the same technology package operational at shiploaders SL1 and SL3, and SL1, respectively.

Currently iSAM is implementing the automation of stacker/reclaimer SR47 at Westshore, Roberts Bank, BC, Canada's largest coal export terminal, as well as a 3D ship model and a full envelope collision protection for the shiploader SL2 at DBCT, Australia.

The operational and safety procedures are approved by public authorities.

ABOUT THE COMPANY

iSAM AG, Gesellschaft fuer angewandte Kybernetik, located in Muelheim an der Ruhr, Germany, develops and implements automation solutions that enable industry, commerce and service suppliers to increase their performance. iSAM's team includes specialists from the engineering, computer science and physics sectors as well as from business economics, focusing on increasing customer value. The company's customers can be found all over the world and in almost every industry, such as mining, bulk materials handling, transport and logistics, steel and metal manufacturing and processing, tube welding and pipeline construction, mechanical engineering and plant building, electronics and aerospace.

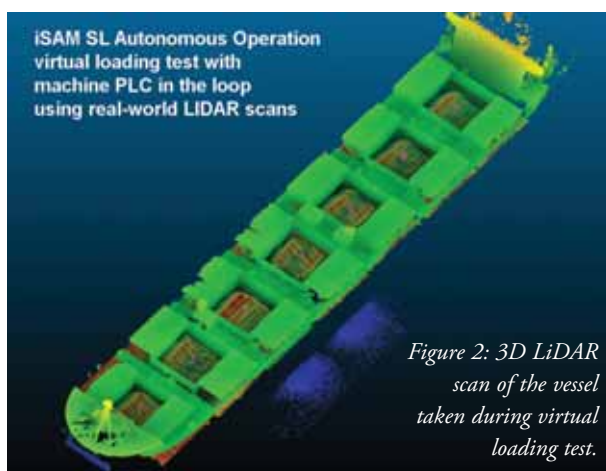


Figure 2: 3D LiDAR scan of the vessel taken during virtual loading test.



NEGRINI
since 1967 S.R.L.



Negrini company, established in 1967, specializes in engineering and manufacturing a comprehensive range of grabs and buckets for rope machines and crawler mounted cranes; they are employed to do many jobs. Negrini buckets and grabs are very well-known for quality as well as for the very accurate and skilful engineering work; in fact Negrini supports their clients by analyzing the job to be done and, if needed, by adjusting the standard design of grabs and buckets to enhance their performance once in operation.

VIA TORRICELLI 4 · CASTELFRANCO E. (MO) ITALY

www.negrini.org

New dust controls for all weathers with solutions from WeatherSolve

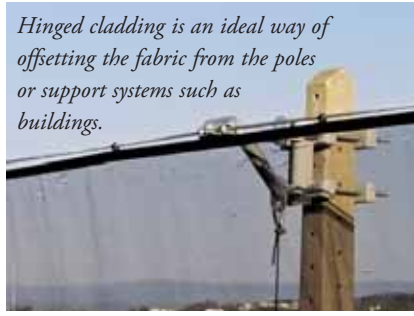
WeatherSolve, a prominent global supplier of wind fence technology, has three new dust control systems under way that each offer interesting advantages to companies looking to economically and effectively control stockpile dust. These systems are ideal for use with coal stockpiles, and drastically reduce the dust emissions into the atmosphere. They are:

1. HINGED CLADDING FOR LOWER COST

The hinged cladding system is a way of offsetting the fabric from the poles or support systems such as buildings.

The details can be seen in the photos from a WSS wind fence in Egypt and another on a concrete pole in Portugal. Each connection is held about 16" away from the pole with a bracket that can hinge slightly from side to side, while still remaining parallel to the general line of the

Hinged cladding is an ideal way of offsetting the fabric from the poles or support systems such as buildings.



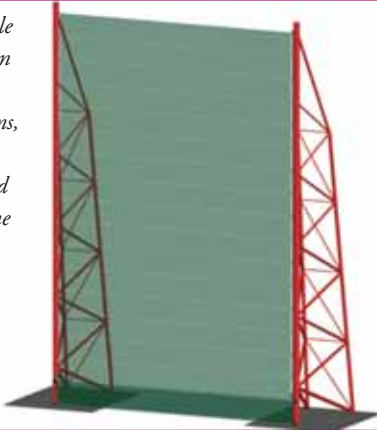
fence. The advantages are two-fold.

Firstly the system virtually eliminates side loading on the poles. The side loading comes when gusts of wind hit a fence harder in one spot than a neighbouring spot. Poles typically require extra strength to handle the side load, so the removal of that load saves money on the pole. This can be particularly helpful when designing a wall-cladding system to go on an existing

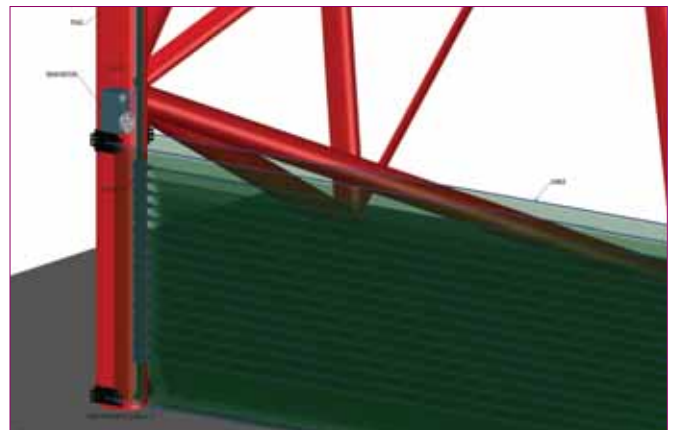
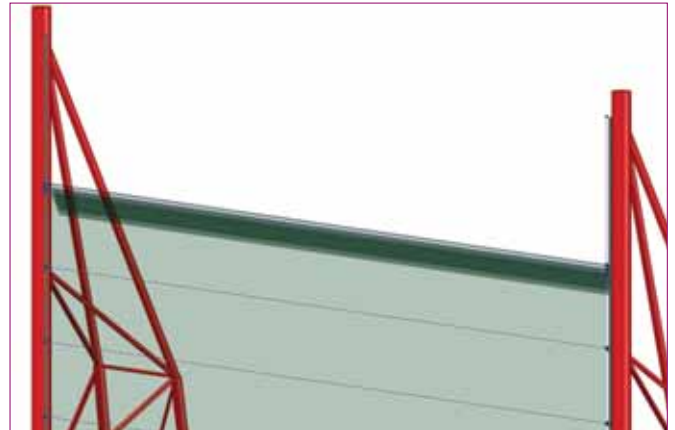
building where the support columns are already close to being fully loaded. It also reduces fatigue loading on the pole.

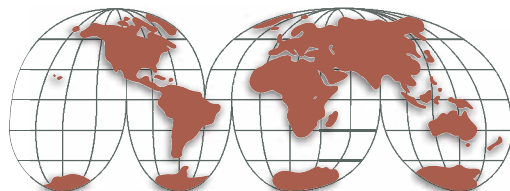
The second benefit is that with fewer attachment points, the system is available at a lower cost and it is quicker to install. This is particularly so for concrete poles.

The retractable wind fence can withstand 'normal' storms, but can be easily retracted when a cyclone is forecast.



Retractable hail canopy under construction in Calgary. Note the retraction unit integrated with the support truss.





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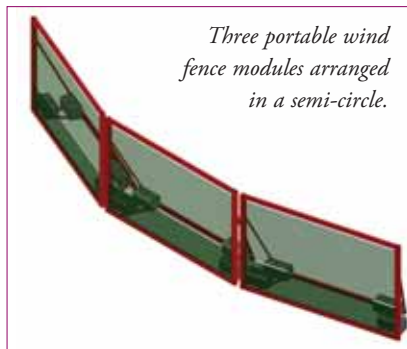
www.tmsa.com.br

Brazil: Porto Alegre RS | Belo Horizonte MG | São Paulo SP
Argentina: Buenos Aires

The trade-off is that it generally suits poles or columns up to 50ft (15m) spacings rather than the 100ft (30m) spacings available with the standard WSS wind fences. Each design is individually considered so deciding the best option for a given situation is part of the WSS design process.

2. REFINED DESIGNS FOR PORTABLE FENCES

Portable fences are a way of retaining flexibility for dust control fences. The newest designs have truncated ends to enable them to be positioned in a circle from either side as shown in the drawing below.



They are also set so there are only four concrete blocks required to hold them upright in storm conditions.

Together this makes them even easier to relocate as required.

Typically they are used in operations such as crushing plants

where equipment and stockpile locations are rearranged from time to time. The most effective pattern for stockpiles is then a half circle to protect it from the wind. For the crushing plant and conveyor, a straight line is generally more effective.

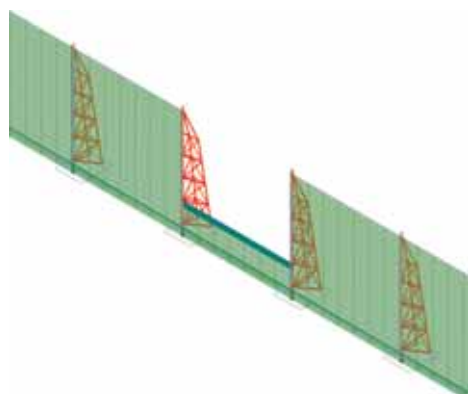
The option drawn is 20ft (6m) high and 32ft (10m) long. The base is 8ft wide so that it can easily be put on a truck if needed. That means they can readily be relocated to a new plant as well as be relocated around the operations yard when pile and equipment locations change.

3. RETRACTABLE WIND FENCES FOR EXTREME STORMS OR FOR EASY ACCESS

WeatherSolve Structures' (WSS) wind fences can be designed for any storm level — even hurricanes and cyclones. In places such as coastal western Australia, this can make them expensive as the design wind speed reflects the frequency of cyclones. Design wind speeds of say 180mph (280kph) create forces that are about four times the loads that are designed for in less extreme wind climates such as California.

The alternative is a system that can withstand 'normal' storms of 60 or 70mph but be easily retracted when a cyclone is forecast. This brings the costs back to prices that make economic as well as environmental sense.

The system to do this is an adaptation of the WSS retractable hail canopy system in use in hail-prone areas like Calgary, Canada. The system



uses electric motors and a very unique cable drive arrangement that enables acres of hail canopy (or wind fence) to be retracted without needing to climb poles or use special equipment. The retracting fabric moves down the pole and stows in a protected trough at the base of the fence.

Operators with stockpiles that need to be accessed from outside the sheltered area such as shiploaders will immediately see the benefit. The system makes it possible to have a wind fence along most of the pile and with the touch of a button, just open up one bay at a time as required for access.

The graphics on p68 show the details of the hail canopy retraction and the illustrative drawing below shows the retraction system on a wind fence.

For all these systems and other WeatherSolve wind fence dust control systems inquiries are welcome. Every wind fence is individually engineered to match the local weather extremes, fit with the site operational requirements, and create the desired environment. To that end, the list of possibilities WSS can offer has now grown by three. The design process starts with a no-obligation ball-park proposal for a range of possibilities. Following that a detailed design is created together with a detailed costing and installation programme using WeatherSolve's storm tested systems and world-wide network of agents.



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Dust suppression in the coal-unloading process with Burnley® Baffles

For any business dealing with coal minimizing coal dust is a high priority.

Coal is brittle in nature, and dust can be easily created during mining, mechanical handling or by transportation. Coal dust is therefore hard and sharp. Fine coal dust is light enough to be carried by air.

This type of dust is particularly dangerous, as long-term exposure can lead to pulmonary illnesses in people who inhale excessive quantities of it. Coal worker's pneumoconiosis, or 'black lung' disease, is caused by inhaling coal dust, typically dust produced in coal mining. Government agencies in the United States have set exposure limit guidelines for coal dust inhalation.

Even though levels of dust during coal unloading are not as high as those during mining, it is still a risk to workers' health. A gust of wind can create swirling black clouds of dust as coal shipments are loaded and unloaded. It can contribute to hazardous work environment for staff and present a problem for neighbouring business and homeowners. The suppliers and operators of coal handling equipment are under pressure to provide technologies and develop best practices to reduce the levels of fugitive coal dust.

A wide range of techniques can be used to manage and minimize coal dust emissions during transportation and unloading. Mideco, an Australian company with over 60 years of experience in the



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dust control industry, has developed one of the most effective ways to suppress dust released during coal unloading.

Its internationally patented dust suppression system, Burnley® Baffles, is specifically designed to reduce the escape of dust from dump hoppers and chutes handling dry granular bulk raw materials. When applied to a hopper alone Burnley® Baffles can eliminate up to 80% of dust. With an additional dust collector applied directly to a hopper, 100% of dust can be eliminated.



The system consists of a set of modules that fill the open inlet face of a hopper. Each module contains a set of blades that pivot to allow the material flow into the hopper. The baffles strip the air moving into the hopper off the pieces of ore or grain because the air pressure on all sides of baffles is all but constant. As the air is not heavy enough to open the blades, only the product enters the hopper while the dust is kept below the blades. The design of the system is unique and uses the principles of air movement; therefore no complicated installation or maintenance is required.

An example of Burnley® Baffles at work during coal unloading is a dust suppression solution designed and supplied to one of Mideco's client in Australia.

Mideco was approached by the company Australian Char which required a dust control solution for its new blending plant in Morwell, Victoria. The new plant fed the existing BBQ fuel production plant and the coal unloading generated a significant amount of dust.

The process involved mineral char (from brown coal) with pieces up to 25mm in size being dropped into hoppers from front end loader positioned at the height of 500mm. The material loading quoted was 2,000kg to 3,000kg per bucket and the dust suppression system was required for two hoppers 5,500mm long x 2,500mm wide each.

Burnley® Baffles can be customized to a hopper of any size and are available in various sizes to suit different types of dry granular bulk raw material. For this particular project with char application Mideco recommended Burnley® Baffles, Model 3. The baffles had to be constructed from the heavy-duty mild steel with 5mm plate. Two grids with 13.75m² area per grid

were built and supplied. The dust suppression system dramatically reduced

the coal dust released during coal unloading. The problem was solved.

This is just one example of Mideco's Burnley® Baffles at work. It's a well-established dust suppression system with hundreds of installations in Australia and around the world. They are currently installed at facilities in the US, Canada, Ukraine, New Zealand, China, UK and Ireland amongst others.

The high level of customization, simplicity of design and high effectiveness

makes Burnley® Baffles an ideal dust control solution for coal unloading.



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Now we don't have a ground man. We haven't shoveled the tail wheel or cleared anything out from under the conveyor since we installed these cleaners. I'm amazed by CleanScrape®, it's been on for a year now and I haven't touched it. This material is sloppy, it's just muck that we're running. And then you look at the return side of the belt and the proof is right there. Absolutely phenomenal. Try it out for yourself, it's amazing.

– Trey Poulson | Fairplay Gold Mine, Colorado, USA

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Container Rotation Systems: a strong decade of development and innovation



The Eurospec 38 is ideal for carrying coal and other light materials such as woodchip and grains.

In 2009, Container Rotation Systems (CRS) introduced its Rotainer® (H.D.) to the global market. It was commissioned for D.P. World, Port Adelaide, Australia, in 2010. Initially its primary role was loading parcels of approximately 70,000 tonnes of DSO iron ore for IMX Resources.

Automated Lid Lifting followed not long after with the introduction of CRS's sealed system for copper concentrate handling. This was delivered to Oz Minerals in 2011 and operated by Flinders Ports, South Australia.

In the ten years since its inception, CRS has progressed to handling a range of other commodities, which now includes coal cargoes. The company's Rotainer Eurospec 38 is of particular interest to the coal handling market.

CRS ROTAINER EUROSPEC 38: IDEAL FOR COAL CARGOES

CRS has developed a special, 2,900mm heavy-duty container system for coal and other light materials such as woodchip and grains whereby higher-than-normal volumes need to be transported and loaded.

This system is well suited for

applications where the product is moved from a shore based stockpile to the shiploading facility via an internal road network.

This innovative and patented container design is best suited to the newly developed Rotainer Eurospec 38 which allows for larger lifting capacities whilst

keeping the simple design criteria.

TEN YEARS OF INNOVATION

Other innovations that have taken place over the years include:

- ❖ **the Rotainer Eurospec 32**, which offers innovative single beam technology. This range has been specifically designed for

The Rotainer RS (reachstacker), introduced in 2013, is the world's first three-in-one container rotation system.





Introducing the:

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- 2,900mm heavy-duty container system
- Well suited for shore-to-ship applications

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We offer a standard range of container rotation solutions or fully customised installations from conception to completion.

CRS: leading the way in container rotation technology



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the European and North American regions. Fully certified for cold climate applications, the Eurospect system will allow clients to extend their ability to operate during difficult conditions. 100% fully sealed components guarantee clean, environmentally safe operating conditions. Combined with CRS's unique 'Rotorcon' container design, the clean progressing discharge eliminates dust dispersion. Diesel/hydraulic or electric/hydraulic drive and available with remote control or hard wired. The modulated design allows for easily delivery anywhere in the world by a single 40ft container. Both 30ft and 40ft variations are available. 32,000kg WWL (working load limit) as standard with options up to 50,000kg.

❖ **the Rotainer Eurospect 32 HH** (half height), the world's first container rotator specifically designed for 'generic' half height 1450 containers, where automated lid lifting is required.

❖ **the Tiltainer.** New innovative technology allows for a full 90° tipping angle. Centre of gravity is electronically controlled. It takes ±15 seconds to empty a container. Electric/hydraulic — diesel hydraulic. Has a light tare weight of approximately 6,000kg. Standard lift capacity is 32 tonnes, 40-tonne option lift capacity is available. The Tiltainer easily fits: reachstackers, ship-to-shore cranes and ships' cranes. Disconnect from inverted container. Patent is pending. The Tiltainer can be containerized for global delivery.

❖ **the Rotainer HD:** CRS's signature machine. Best suited to ship to shore cranes or larger mobile harbour cranes where high productivity is required. Rated to 38,400kgs WLL with a rotational speed of 15 seconds for the 360° rotation, arguably makes the Rotainer HD one of the most productive units on the global market. Fully electronically managed and designed for low maintenance, guaranteeing a cost-effective, highly productive container rotator system.

❖ **the Rotainer RS (reachstacker),** was introduced in 2013, another industry first. It was also the world's first three-in-one container rotation system. It easily fits: reachstackers, ships' cranes and mobile harbour cranes. Can be easily connected to ship-to-shore, mobile and large hydraulic cranes and reachstackers. WLL is 38,400kg with 180° rotation achieved by CRS's specially designed & patented hydraulic crank system. Powered by a small diesel engine with remote control enables this unit to be a 'quick release' attachment to value add any container handling facilities where medium volumes of bulk commodities are handled.

❖ **the Lidlifter:** automated lid lifting system, first introduced to the global market in 2010. It has proven to be fast, reliable and efficient, raising and lowering the lid in less that ten seconds per cycle with the option to unlock the lids from the container. CRS systems now guarantee a completely sealed bulk ore transport system that meets world's best practice for environmentally





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- ❖ **Rotorcon® containers:** CRS has also specially designed the Rotorcon® series of bulk ore containers, specifically for the container rotation industry. The unique design of the Rotorcon eliminates the need for internal 'X' bracing or external supports from the tippler frame and also eliminates the need for dust management. Fully certified and heavy duty, Rotorcon containers come with a variety of lids that meet all international shipping standards. All of CRS's containers are CSC-rated and BK2-compliant. Rotorcon containers are available from 1,600mm to 2,900mm in height and all are rated to 35,000kg load capacity as standard, with option 42,000kg gross, the Rotorcon is strongest and lightest tare per tonne carrying capacity open top container in the market.

ADAPTING TO DIFFERENT CARGOES

During CRS's initial container design, it was highlighted that no two bulk products have the same angle of repose, especially when it comes to concentrates.

Product hang-up and carry back is an industry problem, especially where traditional 'half height' containers where square corners or slightly angled side walls are used.



To allow customers to 'future proof' their container investment, CRS took a different approach in design. It used its vast mining equipment experience to come up with a new approach to bulk ore container design.

With its multi angled internal wall system and high centre of mass, the Rotorcon container can be rotated with minimal input energy which in-turn reduces CPR (cost per rotation).

A smooth and controlled pour (not a tip) reduces impact on receival bins or in ships' holds and further reduces wear on the internal coatings.

Another plus is CRS's maintenance-free

lid sealing systems. No rubber seals or gaskets means no maintenance.

Rotorcon containers comply with statutory regulations in regards to sealing and moisture ingress.

EXPERIENCE AND EXPERTISE

The CRS team has many decades of experience in the mining and shipping industry. This skill set allows the CRS team to offer its clients a complete 'Pit to Ship' solution from the one supplier.

CRS designs, manufactures and proof-tests all of its products in its state-of-the-art manufacturing premises in Sydney, Australia.





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All around the world, Gambarotta Gschwendt's equipment is in use in countless plants and operations, and its successful operation is testament to the company's winning working philosophy, which has been an integral part of its approach since it started business in 1919.

The company's extensive and specific expertise results in highly reliable machines which meet every requirement and fully comply with the strictest international standards. It is able to rely on: excellent design departments; statutory procedures; continuous exchanges between the internal divisions of the company and the customers on-site; and the rapid prototyping of new devices. Gambarotta Gschwendt uses the best quality materials and components available on the market, which are able to withstand high levels of wear, which





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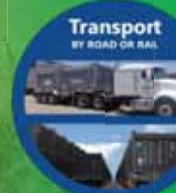
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has a favourable impact on maintenance costs and timing.

In many areas of industry, there has been a recent return to using coal as primary energy source — this is partly for economic reasons and partly because of the security of supply that coal can guarantee.

In certain specific situations, however, the handling and transportation of coal can pose a danger of explosion. This depends on various factors: the type of coal involved, its granulometry, the humidity and the presence of certain volatile substances.

In order to be in the position to offer transport systems which really are secure, Gambarotta Gschwendt Srl has drawn up a series of internal recommendations which deal specifically with the danger of explosion in the lifting and transport of coal.

Its recommendations were prepared on

the basis of detailed research and with consultants who have considerable experience in this field.

The recommendations take into consideration the particular conditions a machine is operating in, vibration, friction, turbulence, complex internal geometry, etc.

Gambarotta Gschwendt is thus in a position to supply reliable equipment, that is completely tested against the risk of explosion.

Among the products offered for the handling of coal are:

- ❖ heavy duty apron feeders/apron weigh feeders;
- ❖ high-capacity bucket elevators up to 3,000 tonnes per hour;
- ❖ bucket elevators for large size material;
- ❖ drag chain conveyors/armoured chain feeders;
- ❖ screw conveyors/mass flow screw

feeders; and

- ❖ self cleaning cell feeders.

GAMBAROTTA GSCHWENDT SERVICES INCLUDE:

- ❖ spare parts supply for its conveyors and those of other brands;
- ❖ upgrade/refurbishment of its conveyors and of conveyors of other brands, keeping existing structure/casings and replacing internal parts such as chains, sprockets etc.;
- ❖ measurements of existing site dimensions/layout (civil and steel works), 3D creation and proposal of customized new conveyors/feeders;
- ❖ periodic inspection of conveyors with reporting and evaluation of each component's life expectancy; and
- ❖ maintenance supervision and assistance when replacing spare parts.



Keeping dust in check with Golden West Industries

Golden West Industries (GWI) is a US based dust mitigation company specializing in mining, shipping and handling of all types of material globally. GWI works closely with the ocean going vessels as well as land-based loading/unloading companies to ensure proper dust abatement satisfying clients in the US, South America, the Pacific Rim/Asia and anywhere shipping occurs.

GWI's speciality products are used with self-unloaders as well as non-self-unloaders across the world with extremely satisfying results.

The products are manufactured in the US and distributed via multiple containers including bulk, ISO containers and totes. This allows the vessels to load the product, or be used at ports/ports of loading. The equipment is also in house and is provided to the end user or fleets with an additional cost(s). Professional technical services directors are part of the equation and are available for installations and 24/7 questions and port of call — maintenance or servicing in all regions of the world.

GWI's dust reductions with coal, gypsum, iron ore, copper (even food grade products), are guaranteed to reduce fugitive dust to 80% reduction levels — however, its standard operating levels are at 90–95% reduction level on average.

Regardless of the size of shipment/cargo intentions/vessel dynamics, Golden West Industries is prepared to handle any and all situations. Its highly trained members of staff are available for any situation and dedicated to the company's clients.

Generally speaking, GWI's products are liquid in nature and reduce water consumption by up to 80% with highly favourable results. The equipment is small and easy to operate, install and function for years to come — even in salt water conditions.

GWI has been treating material on ocean going vessels since 1999, and on land facilities since 1991.



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Nuestro mundo es el mundo

TTS (Latvia) meets another challenge head-on

TTS (Transportation Technology Systems) design and manufactures non-standard technological equipment, conveyor and hoisting systems, metal structures of varying degrees of complexity to handle a wide range of cargoes, including coal. TTS was tasked with a major project in Riga, Latvia, the details of which are below..

LOCATION: RIGA COAL TERMINAL, RIGA, LATVIA

TASK: COAL UNLOADING, MAGNETIC CLEANING, CRUSHING AND STACKING.

TTS designers have extensive knowledge and experience dealing with coal applications, so the challenge was accepted with great enthusiasm. As long as cargo flow is not continual, the customer didn't want to invest in stationary equipment. Also, there was no option to build any



Receiving hoppers with chain feeders.



Crushing unit with magnetic separator.

delivered to the 14m-long radial stockpile stacker;

- ❖ coal — stacked by front loaders — is moved to two mobile 40m-long radial stackers, which create stacks of up to 17m high; and
- ❖ the cycle is completed by harbour bucket cranes, which load coal from the stacks to the cargo vessel.

All the equipment was designed, manufactured, delivered, assembled and commissioned by TTS, following the six-month schedule and, at present, is operating at full capacity.

TTS is a versatile company, capable of delivering tailor-made material handling solutions according to the specific requirements of the customer to meet all manner of complex tasks. Regardless of the bulk material that customers want to handle, TTS is ready to take the job. Its conveyors transport aggregates, fertilizers, grain and of course coal. Upon receipt of a technical brief, TTS can develop any project with subsequent possibility of production, delivery, installation and commissioning.

foundations on the jetty, as the terminal authorities want to stay flexible, operating different cargoes. With these restrictions in mind, a mobile approach was recommended to the customer. TTS's solution was agreed and green-lit very quickly. The scheme of the terminal is as follows:

- ❖ coal is delivered by railroad and unloaded from railcars by two mobile harbour bucket cranes at a speed of 1,000tph (tonnes per hour);
- ❖ cranes discharge coal into the two receiving hoppers, both of which have a capacity of 90 tonnes;
- ❖ each hopper is equipped with a chain feeder, making it possible to adjust productivity, delivering material to the

- collecting belt conveyor;
- ❖ stationary collecting conveyor, equipped with magnetic separator, transfers material to the crushing unit and removes metal contamination;
- ❖ crushed coal, via belt conveyor, is



40m-long mobile stacker.

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Coal production in the US has dropped by more than 50%, making efficiency extremely critical to maintaining profitability and eliminating waste from processes. When markets shrink, it is important to look internally into our business and review how we handle the changing market. To increase profitability, we need to understand how our processes work intimately and efficiently.

Lean thinking and continuous improvement are important elements in all aspects of business, and if customers want to be profitable, vibration equipment and application of vibration should be a critical element in coal processing. It's an area where improvements can easily, and economically, be made.

VIBCO knows from experience that vibration plays a critical role in moving coal. It has been helping people in the industry solve these critical flow issues and material hangs ups since 1962. The last thing anyone needs in the chain of coal handling is downtime. Downtime situations cost revenue and produce nothing. VIBCO can decrease these downtime situations and keep a clear, predictable and reliable process moving in a regular fashion every day, and it knows that in doing so, it is increasing revenue earned.

COAL ON THE MOVE

Flow issues for coal are in the 'top five reasons for downtimes' at processing



facilities. Vibrators are an essential part of material flow wherever the coal is going: into trucks, hoppers, clarifiers, or crushers, and for whatever the process entails. Applied vibration is the solution to make coal move faster, and at even flow rates, while avoiding 'downtime – a real revenue loser!' During the whole spectrum of handling coal, there are so many opportunities for minor glitches to wreak havoc. It is important to know how to apply vibration correctly to minimize problems.

It is difficult to find enough labour in the market today to do the required work. Critical people cannot go out and clear hoppers and conveyors when they are doing the job that they were hired to do — they simply don't have the time. Whenever there is a wait for employees to clear hang-ups, resulting in downtime, money is lost.

Wherever consistent flow and continuous processing is imperative to improve efficiencies, there are vibration products that solve the material flow problems which coal processors and bulk handlers typically encounter.

Mass flow of bulk material generally doesn't work on its own — vibrators are needed to handle materials that may get wet, damp, and sticky. There are sometimes heavy or coarse products that are exposed to climatic conditions like snow and rain, or heat and cold. It is important to have a vibrator that works in all scenarios and in different parts of the world where conditions are ever changing. It's a global economy now for coal, coal may come from one country, it might come from several countries, or it might be sourced from a domestic supplier. All these coal types have different characteristics and the way they

How to select the right vibrator in three easy steps

1. Determine needed vibrator force for the application.
2. Find available vibrator models.
3. Select electric, pneumatic or hydraulic operation.

DETERMINE NEEDED VIBRATOR CENTRIFUGAL FORCE (IMPACT) FOR THE APPLICATION

FOR BIN, HOPPERS

To move the material in a bin or hopper, the friction between the material and the bin skin has to be broken. Once this is done the material cannot cling to the bin sides and it will flow out through the discharge. The vibrator force needed to accomplish this, is for 80% of all applications, very simply calculated as follows:

Calculate the weight of the material

in the transition or sloping part of the bin. Normally this is the only place where the friction between the material and the bin sides has to be broken. Do not calculate the total weight, only what is in the transition part.

For conical bins, calculate as follows:
 $.26 l \times \text{dia.}^2 \times \text{height} \times \text{material density}$ in lbs/cu. ft.

For rectangular bins, length x width x height x 1/3 x material density.

When the weight has been calculated, divide by 10. This figure is the force or impact needed on your vibrator, in pounds.

For example: the conical part of a 25-tonne bin contains 7,000 lbs. Divide 7,000 by 10, so you need a vibrator with 700 lbs. of centrifugal force or impact.

Note: additional considerations when

sizing vibrator to bins.

1. If bin side angle is below 30°, select next larger vibrator.
2. If bin thickness is extra heavy, select next larger vibrator.
3. On really sticky and hard to move materials, it is better to use two small vibrators instead of a large one (find the smaller one by figuring half the material weight).

VIBCO offers a bin worksheet to help determine proper placement, and it also offers its Virtual Reality, VVV, Virtual Van Visit. This is a quick and easy way for customers to send VIBCO a cell phone photo or video of the application, which allows engineers to see the unique situation and to recommend proper placement of the correct model.

flow can be dramatically different: vibration force, frequency, sizing, and placement of the vibrator are critical to assist the flow.

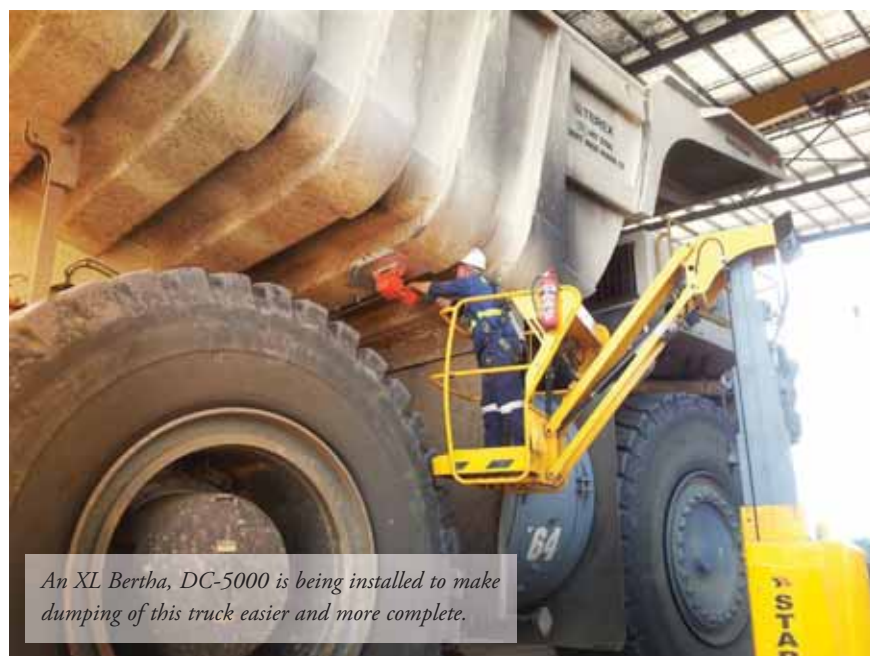
On a larger scale, the worldwide coal market is on the move and it is possible to play a profitable part in the industry or be left on the sidelines. Coal is the second-largest commodity transported globally.

LET'S START AT THE BEGINNING — TRANSPORTATION

Coal is moved in the mine and transported to the processing plants via trucks, hoppers, conveyor systems, railcars, roadways, depending on the system of extracting coal from the earth. The coal eventually ends up in stockpiles and after being conveyed underground or moved with bulldozers, trucks and reclaimers, the coal gets replaced onto trucks, ships, trains,



A Big Bertha, DC-3500 is used to assist complete dumping which speeds the dumping process and allows the truck to get back into service.



An XL Bertha, DC-5000 is being installed to make dumping of this truck easier and more complete.

and more.

Now, there is the potential for wet, damp, cold and frozen product.

TRUCKS — AN OPPORTUNITY FOR VIBRATORS

A dump truck vibrator like the 12V or 24V Big Bertha DC-3500 or XLBertha DC-5000 really helps to clear loaded coal. The dump body can be cleared at a lower angle with a vibrator reducing the risk of roll over and increasing employee safety on the job. Most importantly, a vibrator on a dump truck, speeds truck unloading so more loads can be carried — up to three more loads per day.

It also prevents material hanging-up inside the truck body. Just 5% of the load remaining in the truck adds up to lost profit opportunities over time. In a typical day,

what is being lost when the full load is not dumped?

- ❖ one truck x ten trips x 5% stuck in truck = 50% or 0.5 of a load lost
- ❖ ten trucks x ten trips x 5% stuck in truck = 500% or five loads lost

Railroad hopper cars and ropeway hoppers work the same way. The faster the transport mechanism is able to return to service, and the more completely it is cleared, will directly translate into profits. The best news is, truck vibrators, railroad car vibrators, and hopper vibrators generally cost less than a truck tyre.

AT THE COAL PROCESSING PLANT

Vibration has to be strategically placed using correct forces and frequencies. Vibration application is an engineered

solution and, without talking to people that understand how to apply it and where to place it, it is impossible to get the full efficiency and potential of the vibrator to keep materials flowing.

One of VIBCO's customers insisted that every truck which dumped into its graded pit had to use a vibrator. If they didn't, they left a mess of dumped coal around the pit that had to be cleaned up costing time and money. When the driver pulled away from the dump site, he would leave coal residue when he purposely slammed his tailgate against the body of the truck (rather than using a vibrator to cleanly clear the truck during dumping). The people at the this power plant understood that each time a truck sat longer at the dump site than planned due to coal sticking in the body, it cost money. They made it a mandate that people have vibrators on their trucks because they didn't want that 'dwell time'. They calculated down to the exact yardage and tonnage in the truck that they should be able to dump within seconds rather than sitting there for extra minutes and then making a mess. That is efficiency.

Once the raw material from the mines is transported to the coal handling plant it is cleaned, crushed, and sorted into graded sized chunks, preparing it for transport to market. The coal is fed onto a conveyor belt which moves it into the coal handling plant. Once on the conveyor, vibration units can keep material flowing at a constant rate as the vibrator works to settle and evenly distribute the coal moving into the plant. This simple vibration process minimizes overflow and spillage. This may seem like a minor nuisance, but there are many accidents involving



Shiploaders



**Tilting
Spreaders**



**Bulk Handling
Plants**



**Large-scale
Assembly**



**Weigh
Hoppers**



*One of VIBCO's
2P-4500 vibrators
keeps this coal
chute working
smoothly.*

conveyor belts each year. (According to the US Department of Labor, approximately 35% of work-related injuries from 2008 to 2012 were because of conveyor belts, and \$218 million was spent on workers' compensation claims for those accidents.) Working closely to a moving conveyor to clean up dropped coal presents an additional danger to workers and should be avoided.

Clearing coal out of bunkers and hoppers can be handled with a cheap hammer or a sledgehammer but these primitive methods can be dangerous to employees. Also, hopper sides will be destroyed, and denting and distorting a smooth slope sheet will create more material hangups. Equipment is expensive today and broken equipment is downtime. The old-school methodology was just to throw a hammer, throw a person at it — not a good strategy in a competitive market. Many times VIBCO engineers go into facilities that say they're 'state-of-the-art' — they have internal processes to watch flow — and find hammers there, or see hoppers that are broken or have hammer rash and many patches welded on them. There is also the potential injury to somebody's arms or hands as they're swinging.

Some companies haven't replaced equipment in decades. They generally put in a bin liner, they use Hardox abrasive-resistant plates, they use UHMW materials and sometimes they're ill-placed or ill-fastened. These materials are fine to have inside bins because coal is abrasive and will wear things out. It is important to be more critical in how and where a vibrator is placed, because it is necessary to transfer the vibration through two layers of material.

VIBCO sees people using the vibrator in the wrong orientation of the direction of flow and not following basic engineering principles. If these engineering principles are not followed, it is possible to rip apart a brand new piece of equipment or an existing piece of equipment. It's really important to talk to a company that has fundamental basic engineering principles to handle questions and give the correct answers.

Applied vibration is a strategy — a small investment compared to the cost of total equipment.

Whether on the receiving end, whether a power plant or whether in the steel industry using coal, vibrators are a small fraction of operating costs. It is vital to have an engineer or a company that understands the fundamentals of vibration application to work through all the scenarios on how to properly mount and properly size the vibrator for the system and supply engineered mounting solutions able to handle the forces and frequencies of the application. VIBCO uses its Virtual Van Visit (VVV) Program to reach customers it can't visit in person. Real-time, live, it can see what its customers see and have a better insight for better results. All it requires is a photo of the

BULK HANDLING EQUIPMENT

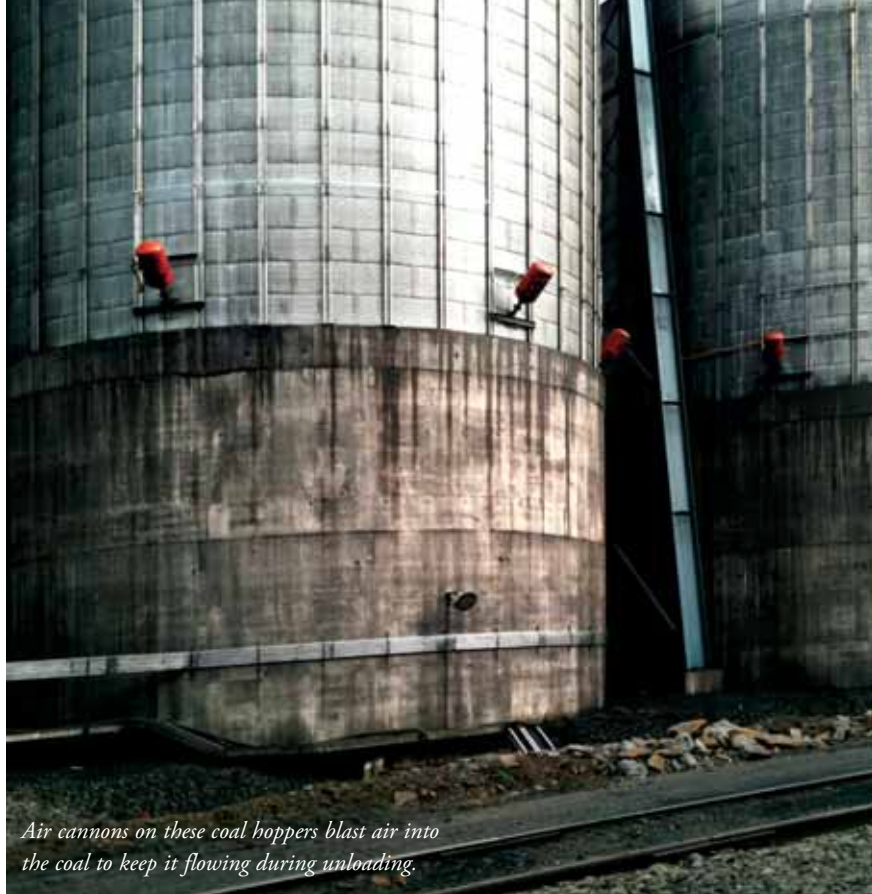
RAILROAD CARS

Applied vibration is used on filling railcars as well. When a car is loaded, a peak is formed which needs to be settled. A car which is not vibrated will often arrive at its final destination being only two-thirds full (it's contents having been settled by the rail transportation). Imagine the waste of shipping air! A vibrator used before shipping would have allowed for more product to be shipped and maximize on money spent to transport product not air.

When the coal is ready to be delivered to its final destination, coal may be moved using many methods. The most important, accounting for nearly 70% of coal movement (in the US) is railroad. Depending on usage, railroad car vibrators generally pay for themselves within the first month of operation.

Unloading rail cars is a dangerous, dirty and slow job —VIBCO's new RailBoss RB-6500 makes it safer, easier, faster and cost effective. The Carshaker's wedge slides easily into the dovetail (female) wedge bracket on the railroad hopper car. With vibration, the railroad car will be cleared quickly and made ready for its next load. More importantly, the full load will be delivered with no coal left behind in the railcar.

There are many different types of railcar vibrators. A company like VIBCO has suction cup type vibrators, clamp on, electric vibrators, hydraulic, single phase electric, three phase, pneumatic vibrators, and more. Some vibrators need lubrication and some don't need lubrication. In VIBCO's experience, if there is pneumatic air at the site and there is a female railcar pocket, that is the best scenario. It is less heavy than the electrics, easier to transport and extremely efficient for unloaders at an



Air cannons on these coal hoppers blast air into the coal to keep it flowing during unloading.

application and problem areas and VIBCO will super-impose the correct product with simple instructions for proper placement and installation.

VIBRATION HELPS FLOW THROUGHOUT THE PLANT

After screening and cleaning, the coal is then crushed to meet the size specifications of thermal power stations. This process involves screens with vibrators. Depending on the density of the typical load, VIBCO engineers will recommend the proper vibrator with just the right amount of force and frequency to keep the plant moving efficiently. Stockpiles of coal at various stages of screening and crushing are usually near the coal processing plant and also become a large part of the bulk handling process. Bulldozers, dump trucks and conveyor booms are used for smaller stockpiles, but larger, more controlled ones use mechanical stackers which are fed by conveyors.

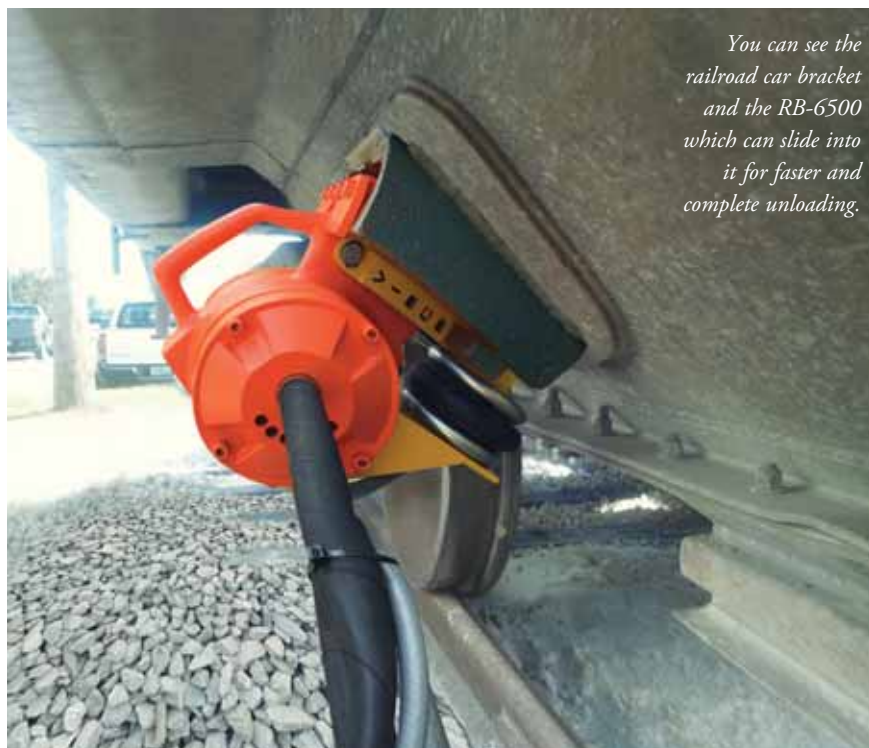
Once again, vibration can play a key role in keeping the material flow running smoothly. Think about the wear and tear of stopping and starting belts that were supposed to run continuously.

Generally the operator is a long distance away from the belt, so when that conveyor goes down, it's always going to be a costly fix in man-hours. That time is money and every time people are moved around into other areas, it increases risk of injury. Operators should avoid opening up

their processes to risk — these can be mitigated by using vibrators.

MOVING COAL TO MARKET

Several methods can be used to move the stockpiled coal to market. Tunnel conveyors under the pile can be fed by a slot (reclaim) hopper. In this case a vibrator is used to keep the coal from 'bridging' or sticking on the sides of the hopper, so the material feed is continuous. In some cases, the bin or hopper requires a blast of air to aerate the product and keep it flowing. In this scenario, air cannons are used. Air cannons with long, well oriented pipes may be used through the pile to discharge near the hopper.



You can see the railroad car bracket and the RB-6500 which can slide into it for faster and complete unloading.

operating site.

Noise is also an issue when speaking of vibration. It is important to work with a company that understands ergonomic safe green environments for workers and noise that can be mitigated with the proper product. Some vibrators need lubrication and some don't need lubrication. There is a choice between taking atomized oil and spewing that into the environment (exposing workers to that harmful mix), or buying a vibrator that's quiet and needs no lubrication.



A large hopper at the Port of Tampa (the largest port in the state of Florida) holds bulk materials for loading onto ships.



A VIBCO CCF-5000 keeps these power plant hoppers supplying coal.

The next stop on the coal's journey could very well be a port where giant hoppers hold the product for loading onto ships like this one in Tampa, Florida, USA. Once again, vibration will help the product flow out of the hopper and onto a conveyor (which is also improved by vibration) eventually ending up in a barge, ship, railroad car, or truck.

The ultimate ending for a coal shipment could well be a power plant which is supplied by large hoppers like those shown in the photo. When the power plant has finished with the coal, vibration will be used to help carry away the remaining ash and assist clearing dust collectors.

IN CLOSING

Any time a process stops, operators should do a root cause analysis and generally when handling coal, it will have something to do with material flow. The wrong size vibrator may be the issue, it may be in the wrong place or there might not even be a vibrator at all. It is important to find a company that has a depth in engineering and long-term understanding of vibration capabilities to give a correct engineered solution to flow problems. Anything less than that and operators are wasting their time and

money. It's critical that to look at all the points where coal is either transported, stored, moved, stockpiled or placed, and to walk the stream of the coal processing, and really see all the areas. Operators should speak with a company that understands the applied vibration, understands the power sources that are available and really understands how to become compliant with noise, mist oil in the air, confined spaces, and explosion proof environments. It is vital to have somebody that really understands those conditions and that can help work through these models and apply the right force, the right frequency in the right amount, in the right place, while meeting MESA regulations to keep workers safe.

A proper vibration system can eliminate some of the eight wastes of lean manufacturing. These are:

- 1. **Defects.**
- 2. **Excess processing:** this leads to excess handling of the product

which cuts into profits.

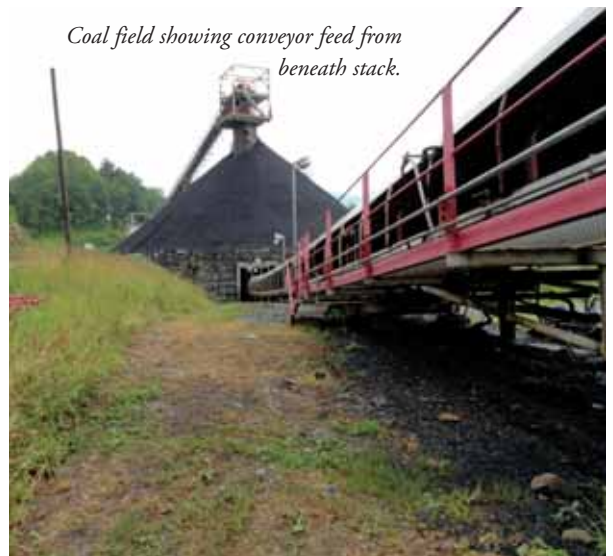
- 3. **Overproduction:** maintaining stacks which require extra handling.
- 4. **Waiting:** waiting for loading and unloading, downtime of parts/conveyors.
- 5. **Inventory:** additional motion and transportation wastes.
- 6. **Moving:** resources are required to move without generating value.
- 7. **Motion:** human resources whose effort and time are being wasted doing unnecessary tasks.
- 8. **Non-utilized talent:** make sure employees perform value-added activities.

From beginning to end, there is a vibration solution that will help keep product moving smoothly and profitably!

VIBCO has been making vibrators since 1962. It has a complete line of pneumatic, hydraulic and electrically operated vibrators, vibrating tables, air cannons, plate and roller vibrators — over 1,800 products — in its vibration arsenal.

NB: as a USA-based manufacturer, several of VIBCO's statistics are US based. The specifications and governmental requirements for manufacturing, mining and constructions industries depends on which country/region they are in.

Coal field showing conveyor feed from beneath stack.



#MovingToMobile technology revolutionizing port operations in Russia

Ust-Luga Port is the largest and deepest port on the Baltic Sea and is seamlessly integrated into the northwest transport network and European transport infrastructure. Constructed at a cost of \$2.1 billion, this important coal and fertilizer terminal is an attractive source of supply of Russian export products due to its proximity to the European Union and Central Russia.

The 'Multipurpose Reloading Complex' LLC (MRC) is a cargo terminal at the port of Ust-Luga in the Leningrad region, specializing in receiving, storing and shipping general and bulk cargoes (cargo turnover in 2017 was 5.5 million tonnes of mainly power generating coal). With the terminal handling all types of vessels with capacities ranging from 3,000dwt to 75,000dwt, MRC looked to future proof its business whilst maximizing on its Capex investment. After much research by the purchasing company, the ultimate solution was found in the introduction of the TB58 All Wheel Travel Radial Telescopic Shiploader.

The company already had experience of Telestack equipment having previously introduced three Telestack units into its fleet. In 2009 the company installed a mobile TSI542 radial telescopic stacker that currently has over 60,000 hours on the clock. It added a TCL431 in 2014 (currently @ 16,000 hours) and in 2017 it purchased a TCL1031 (7,000 hours). The purchasing company's experience with the Telestack equipment meant that it had confidence in the brand to spec the customized equipment specific to its commodities, quayside conditions and the changing needs of its operation.

'Mining Technologies' approached Ust Luga Port and presented the benefits that direct shiploading would bring to its operation — in terms of both speed and efficiency. Ust Luga Port selected Telestack to provide a TB58 All Wheel Travel Radial Telescopic Shiploader to load coal onto a Panamax vessel.

In addition, the same unit would be used in another part of the quayside or stockyard for use in other parts of the shiploading/unloading or stacking process when not shiploading.

The all-wheel travel feature offered MRC mobility and flexibility incomparable to any piece of equipment in its operation. With the ability to literally turn 360° with ease, speed and accuracy, the all-wheel travel function has enhanced the Ust Luga operation considerably. With the added



benefit of no civil or planning requirements, the all-wheel travel system is a quick and easy solution suitable for any single or multiple cargo berths.

Incorporating a telescopic boom on an all-wheel travel double bogie system, the 58m telescopic boom is rated at 1,200*

tonnes per hour (*coal) and can cater for vessels which have a freeboard height of up to 16 metres and a beam of 43 metres. At this maximum freeboard, the unit has a reach of 25 metres into the hold of the vessel. Couple this with the range of steering modes available (including in-line,



carousel, radial, parallel and crab mode), the radial and telescopic ability also gives the operator full control allowing him/her to easily and quickly trim the hatch and adapt the load in accordance with the differing vessel sizes, application or quayside conditions. With the ability to change hatches in as little as two minutes, the operator can maximize production rates and minimize labour on site.

The sophisticated hydraulic system enables variable speed when travelling in parallel mode during hatch change, radial mode when trimming the vessel and steering mode when in transport position. The process is further enhanced with the user-friendly radio remote control that permits full and accurate control, particularly whilst working in restrictive quayside conditions. The 1.2-metre-diameter wheels also gives a high ground clearance and have been designed to cater for adverse ground conditions.

Russia experiences extreme

temperatures ranging from -30° to $+30^{\circ}$ and for this reason the Telestack engineering department incorporated many features that enabled the unit to function in either extreme. An operator control cabin was mounted on the conveyor for full control and operation which included hydraulic levelling, air conditioning and seating. Some further custom features on the unit included anti-condensation heating to drive the motors, LED emergency light within the panel, control panel heaters and several motor and gearbox upgrades.

Russia, like much of the industry sector, is facing the pressures to implement environmentally friendly systems to its everyday processes. Another key factor for the Telestack purchase was its ability to offer many dust containment and extraction solutions. Fitted with fully galvanized dust covers on the full length of the outer conveyor, side wind plates on the inner conveyor, a retractable canvas

telescopic dust cover on the inner conveyor, a fully enclosed hood at transfer point, dust extraction system on the feed-in and transfer points and an integrated compressor for dust extraction in the under-carriage, the entire shiploading process is now virtually dust free and simple to operate using the radio remote control.

Having over three decades of experience in the ports industry, Telestack boasts one of the most impressive installment portfolios in the industry across a wide range of commodities. Its range of port equipment encompasses radial telescopic shiploaders, shiploading direct from trucks, direct feed shiploaders, rail-mounted shiploaders, cambered boom shiploaders and dockside unloading hoppers and the range is further enhanced with the ability to incorporate the all wheel travel feature on most models thus allowing many operators to truly benefit from the #MovingToMobile concept.





Telestack[®]
Mobile Bulk Material Handling



#MOVINGTOMOBILE



#TRUCKTOSHIP

Fully mobile 'All Wheel Travel' Shiploading system comprising of a **TB60 All Wheel Travel Shiploader** & **Titan dual-feed All Wheel Travel 800-6 Bulk Reception Feeder** discharging 2 x trucks simultaneously loading to Handymax, Panamax / Post Panamax vessels.

The equipment is designed to load cement clinker and gypsum at average rates from 1,200tph to 1,500 tph.



www.telestack.com
sales@telestack.com



Analysing coal with equipment from Scantech International

Scantech International Pty Ltd designs, manufactures and supplies analysers for measurement of conveyed coal utilizing various technologies depending on the parameter to be measured. The COALSCAN range of ash, moisture and elemental analysers has been on the market for over 35 years and continues to expand. Initially, the company was focussed on commercializing dual-energy transmission technology for ash measurement in the early 1980s. With hundreds of installations this was, and still is, a very robust design with some units installed in the 1980s still operating. The COALSCAN 2100 ash analyser typically achieves accuracies of better than 1% ash. Main applications are measuring raw coal feed to wash plants and washed coal quality. The COALSCAN 1500 uses natural gamma sensing to calculate the ash content of coal without the use of radioactive sources as in the COALSCAN 2100.

Moisture analysis is commonly used in conjunction with ash analysis to enable calculation of heating value of coal. TBM systems utilize microwave transmission technology to detect free moisture by measuring the attenuation and group delay of microwaves passing through the

conveyed coal. A signal from a belt weigher is used for the total mass flow and the TBM determines the moisture content to accuracies better than 0.5% moisture. Moisture measurement can be used to monitor TML, assist with optimal filter or dryer operation, and for dust management.

In some cases more detailed information on coal quality, such as sulphur content and other ash components is also needed, particularly for thermal coal where power stations may require coal with strict composition requirements. The COALSCAN 9500X has been used to provide accurate elemental analysis on full flows rather than sample streams which may not be representative. A chute-based version has also been supplied where opportunities to measure have been limited by high chlorine content in conveyor belts or space has been limited on existing belts. Measurement accuracy is typically close to 0.5% ash.

The latest models use a common interface and include remote access capability. All models measure through the full bed depth continuously and provide results second by second or minute by minute. Scantech analysers are considered a premium product due to high

specification, robust design and comprehensive shielding particularly for the PGNAA-based COALSCAN 9500X which requires no additional isolation area around the unit.

Recent comparisons to other products on the market by a customer indicated the COALSCAN 9500X had one quarter the radiation levels of a newer competitor product claiming to be the latest and most advanced system in the market with a smaller source, but evidently also much less shielding.

No two products in the market are the same so a thorough due diligence process involving reference checks should be considered in all purchasing decisions.

Scantech's latest addition to its range is the SizeScan PSD (particle size distribution) analyser developed by COREM in Canada and commercialized by Scantech. It is a next-generation PSD system using a 3D infrared camera and advanced algorithms that overcome known problems in particle recognition using segmentation software. The 3D IR camera is unaffected by dust and lighting controls required for traditional 2D digital camera systems which add significantly to installation and operating cost and maintenance of those systems. SizeScan has the added advantage of reporting every five seconds the conveyed volume and belt speed with the PSD data. Where bulk density is consistent the SizeScan becomes a reliable mass flow measurement device comparable to a nucleonic weigh scale in performance. SizeScan does not require ongoing calibration or support, unlike other measurement systems.

Scantech offers various installation services. Installation manuals are available to clients wishing to install equipment themselves. Installation supervision, engineering, fabrication, or full turnkey options are also available. This limits risk of cost or schedule blowouts and ensures analysers are installed correctly the first time, every time. Clients have analysers operating sooner and providing benefits in the shortest possible timeframe after purchase.

Ongoing service and support for analysers is handled by qualified service engineers based near concentrations of analyser installations in Europe, Africa, Asia, Australia, North America and Latin America. A central pool of engineers provides support as needed for commissioning and calibrating analysers as well as R&D.



Scantech's new SizeScan on-belt analyser for particle size, volume and belt speed measurement.

Calim Grabs: popular worldwide for handling coal and other commodities

Calim Grab Industry (Calim Kepce) Lifting Technologies manufactures of grabs and other lifting equipment which can be used to handle, among others, coal cargoes. The range of products includes bulk cargo handling as well as special hoists.

Key areas of operation are ports, ships, manufacturers of cranes and construction machinery, steel mills, waste-to-energy plants and recycling/scrap handling industries.

Calim's main customers are: crane manufacturers; stevedoring companies; dredging companies; shipping companies; fertilizer companies; cement companies; mining companies; alumina producers; steel manufacturers; and electrical power plants. Calim Grabs has gained great expertise in handling all types of cargo, including: fertilizer; coal; gypsum; grain; soybeans; sand; scrap steel; rock; clinger; cement; iron; ore; salt; petcoke; wood; chipboard and many more.

Calim Grabs can be found everywhere where materials are handled, moved or positioned, and is a respected global brand for the loading and unloading of bulk carriers. The success story of the Calim Grabs began in 1970, with the building of the first grab — a mechanical 800-litre single-rope grab. Today, Calim Grabs offers a complete product range: mechanical two- and four-rope grabs, electro-hydraulic motor grabs, radio-controlled single-rope grabs, touch down single rope grabs, hydraulic grabs, as well as a wide range of special lifting accessories.

Calim Grabs' products are world-class, and the company proudly owns a modern machine park that is can adapt very fast to technological developments in the world.

Calim Grabs specializes in the manufacture and repair of grabs which are used to handle a wide range of materials, including coal. Its well-trained and experienced staff work to develop highly



efficient and cost-effective grabs. It offers great expertise in engineering and customer-focused developments.

The company's domestic and international market activity has been growing since the end of 2011. One source of satisfaction for Calim Grabs is the recent sale of 30 units to Latin America. Over the last few years, the products have been in operation in the largest ports in the world. Port activity is one of its key sectors and it is very conscious of the market's new demands concerning product efficiency and evolution.

Its last project was for a Algeria Annaba Port and AlcelorMittal steel mills. Calim's products can be seen in many ports, cement and steel factories and on ships worldwide. They are especially popular in Latin America, North Africa, Venezuela, the UK, Romania, India, Pakistan, Singapore, Ireland, Bangladesh, Cyprus, Ghana, Madagascar, Ukraine, Sudan and more. The company also ships spare parts with any purchased product which may be needed in, say, six months, at no cost.

The TR 1600 and TR 1100 are efficient tools for handling coal and other commodities including grains, fertilizers, other ores, clinker, bauxite and other bulk material. The TR 1600 has 3–50m³ capacity, it has two-line opening and two-line closing functions. The mechanical structure for opening and closing is efficient and original. No

maintenance is required except greasing. The grab is easy to use and can work under any circumstances. The grab is mainly used on gantries, ships or port cranes to load and unload bulk cargo, including coal.

TECHNICAL FEATURES:

- ❖ used to transport loads with densities of 0.5–3 tonne/m³ density; four-rope system; capacity of 3–50m³; painted twice to protect against corrosion. bucket jaws are made of special Hardox 500 steel material; cast steel pulleys are used.
- ❖ TR1100 electro-hydraulic orange peel grabs for coal bulk. The number of tines varies between five and eight, according to the capacity of the grab, which varies from 0.5–25m³. It has a electro-hydraulic system that works with electricity. Its motor force is increased related to grab force. It is used by a control panel. The mechanical structure for opening and closing is succinct and original. No maintenance is required except greasing. It is easy to use and can work under any circumstances.
- ❖ It is used to transport loads which have 0.5–2.5 tonne/m³ density. It is turned on and off by a remote panel which works with 380–440 volt. Products have capacity between 0.5m³ and 20m³. It is double-coated against corrosion. It is used by attaching to ship and port crane hooks. Grab tines are made of steel 52-3 or hardox 400-500 steel

Calim Grabs will continue to be a reliable name in the grab and lifting industry.



Stacker and reclaimer for coal stockyard – seismic analysis & structural verification

Two Bedeschi machines have been assembled for a new outdoor coal stockyard, that will feed the thermoelectric power plant in the Antofagasta region in Chile, writes *Matteo Schivo, Project Engineer at Bedeschi S.p.A.* All activities relating to engineering, design and supply have been developed by Bedeschi S.p.A. of Limena (Padua) on behalf of Dimisa, a Mexican firm that was awarded the supply of conveyors and machines in the coal stockyard.

The storage area has a capacity of about 200,000 tonnes; pile size is 266×63m and a height of 12m. The two machines supplied by Bedeschi are: a rotating stacker, capacity 3,600tph (tonnes per hour), total weight approximately 450 tonnes, electric power installed approximately 400kW; a portal reclaimer, capacity 1,700tph, total weight approximately 530 tonnes, electric power installed approximately 700kW. In addition to the huge size of the machines, the engineering and design had to consider a particularly severe seismic specifications, since the machines are installed in a zone with frequent earthquakes. By means of Straus7 software, static verifications were carried out for the main load conditions (own weight, operating loads, wind) as well as seismic calculations with modal analysis and response spectrum.

INTRODUCTION

Bedeschi S.p.A. is an industrial design and manufacturing company located in Padua; it was founded in 1908 and is operating globally for several decades now. In addition to its brick business unit, which started many years ago, Bedeschi can now supply machinery and complete plants for bulk handling, marine, gas cleaning and container logistics.

In bulk handling and marine logistics, there is a progressive increase in the size of the machines required by the market. This means increased attention towards structural aspects and cost containment related to the weight of structures, and therefore optimization in the use of materials. In addition, there is a growing demand for expediting the process of design, testing and commissioning of new machines, but ensuring at the same time the required standards of reliability and robustness required for such type of machines.

In Bedeschi S.p.A. 2D and 3D drawing tools, FEM (finite element modelling) tools and other calculating tools for material trajectories and containment surfaces (DEM — discrete element modelling) have

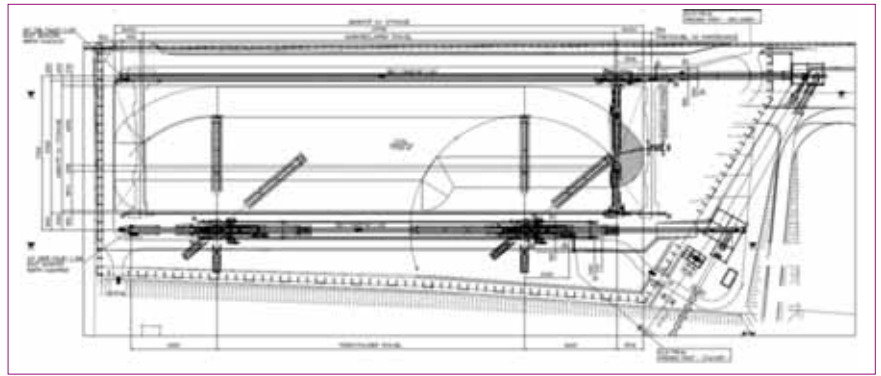


Figure 1: plant view of the stockyard with overall dimensions.

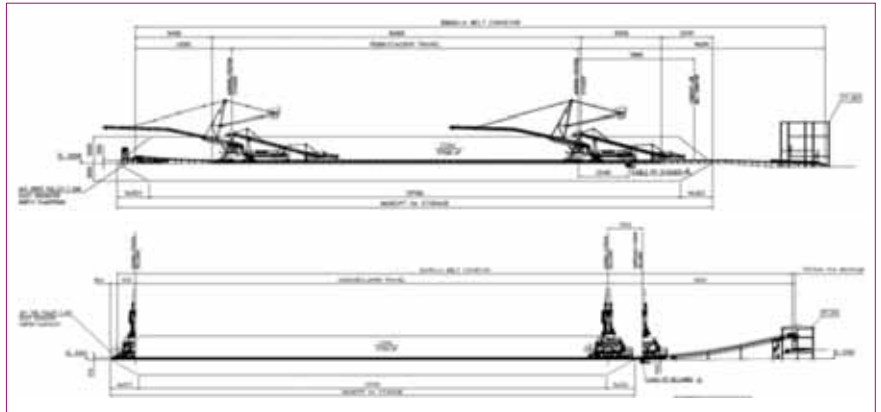


Figure 2: side views of the stockyard with overall dimensions.

been used practically since their first appearance to improve the design process.

BLUE DOLPHIN PROJECT

One of the latest Bedeschi projects, called 'Blue Dolphin Project', involved the design and supply of two machines — a stacker and a reclaimer — for an outdoor coal stockyard to feed a thermoelectric power plant in the Antofagasta region of Chile. The stockyard can hold about 200,000 tonnes of coal and the pile footprint is 266 × 63m. Dimisa, a Mexican company specialized in conveyors, was awarded the contract to supply the conveyors and machines in the stockyard by the end user E-CL, the largest electric company in Chile which specializes in production and transport of electric power. The two Bedeschi machines were assembled in 2017. Erection lasted for a few months, and the machines are now in successful operation.

In addition to the challenges posed by the huge size of the machines, during the engineering and design process it was necessary to factor in particularly severe seismic specifications, since the machines are installed in a zone with frequent earthquakes. By means of Straus7 software, static verifications were carried out for the main load conditions (own weight, operating loads, wind) as well as seismic calculations with modal analysis and response spectrum. Applying requirements

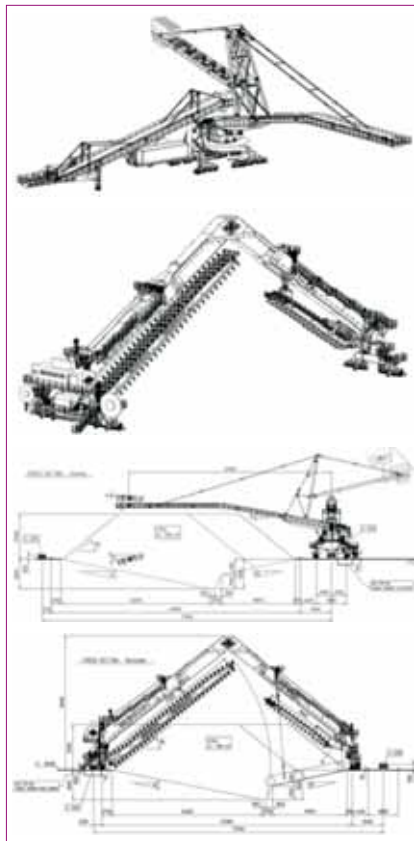


Figure 3: stacker and reclaimer 3D models and side views.

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written in seismic specifications, usually for buildings and not for machine structures, is not always easy and in some cases is not possible, or not 'correctly' and fully possible... This paper, therefore, does not describe correct methods for seismic analysis, but reports only a case study of using Straus7 for dimensioning calculations of the machine's structures, general bearing loads and seismic loads.

STACKER

The rotating stacker has a capacity of 3,600tph, the total weight is approximately 450 tonnes, and the installed power is approximately 400kW. The length of the boom is 55m and the width of the conveyor belt is 1,830mm (72"). Coal arrives on a conveyor belt after being unloaded from vessels. The conveyor belt goes up the tripper structure in order to reach the required height to be transferred to the stacker belt conveyor and to be stored on the ground. The stacker tows the tripper and can move along the rails throughout the stockyard. The stacker boom, 55m long, can rotate covering an angle of ±135°, can tilt covering an angle of about 20°, in order to stake the coal at the bottom of the park and then rise during the formation of the pile, limiting the drop height of the material and the consequent formation of dust.

RECLAIMER

The portal reclaimer has a capacity of 1,700tph, the total weight is approximately 530 tonnes, the installed power is approximately 700kW. The main structure is a 67m span portal frame, that crosses the

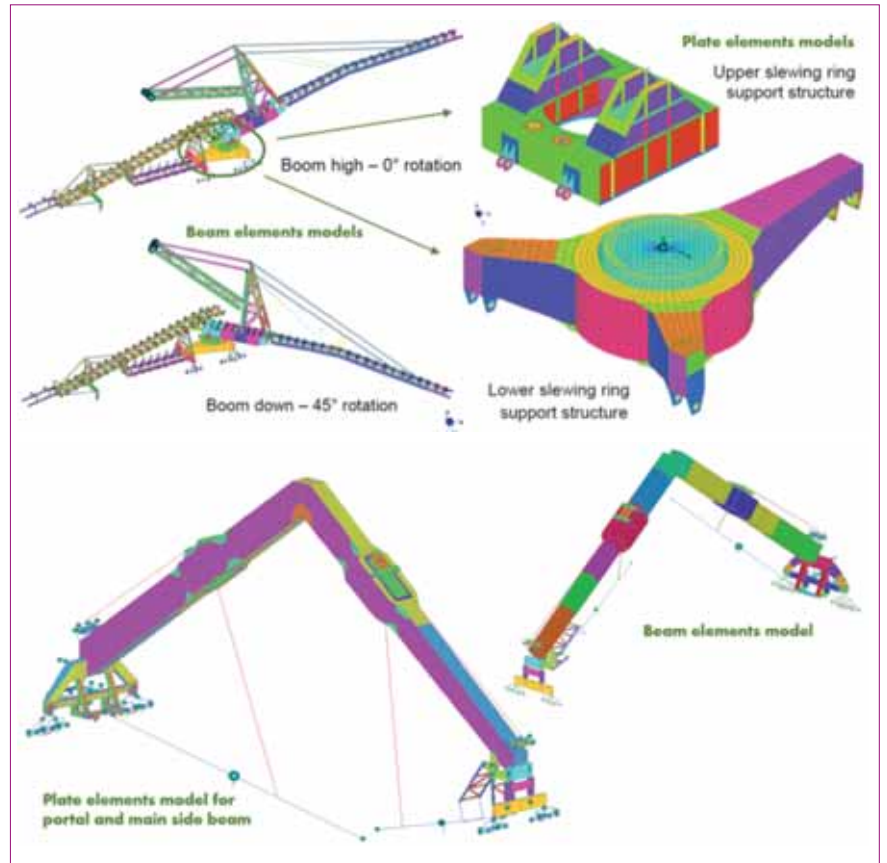


Figure 4: stacker and reclaimer Straus7 models.

coal pile and supports the two booms, the main boom (reclaiming side) and auxiliary boom (feeding side), by means of two lifting winches. The purpose is to continuously dig the coal with reclaim blades (2,600mm wide for the feeding boom and 3,500mm for the main boom) and convey it to the conveyor belt on the side of the stockyard, which then transports it to the power plant. The blades of the feeding boom push

the coal towards the main boom, whose blades instead drag the coal into a hopper feeding the reclaim conveyor.

FEM MODELS WITH STRAUS7

The main structures of the two machines have been modelled with Straus7. The beam elements models have been considered for global and seismic analysis; plate elements models have been considered to analyse stress concentrations and detail design. In particular, stress concentrations (hot spots) in these types of machines are subject to vibrations and could generate premature weld cracks.

Some components, such as the booms, are well-known, as they have been already put in service for other similar machines. So the beam models have been simplified as simple rigid elements, with only mass properties.

LOADS

GENERAL LOADS

The following general loads have been considered: dead loads, operation loads (coal on the conveyor belt for the stacker, digging loads for the reclaimer, taken from FEM II e ISO 5049, "Mobile equipment for continuous handling of bulk materials"), loads on walkways (live loads), operation wind (for this project and normally 20m/s =

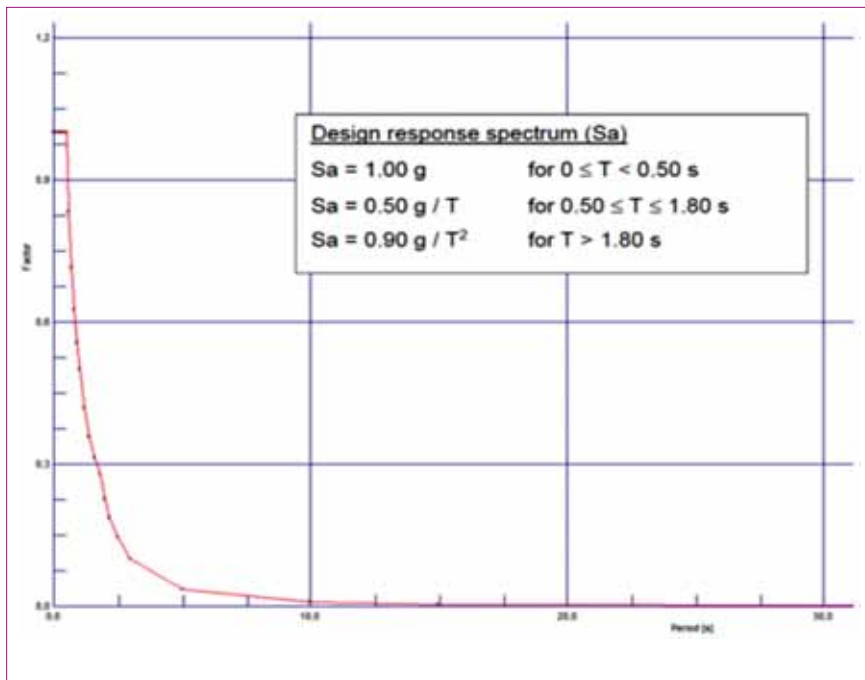


Figure 5: elastic response spectrum for modal analysis.

NATURAL FREQUENCIES

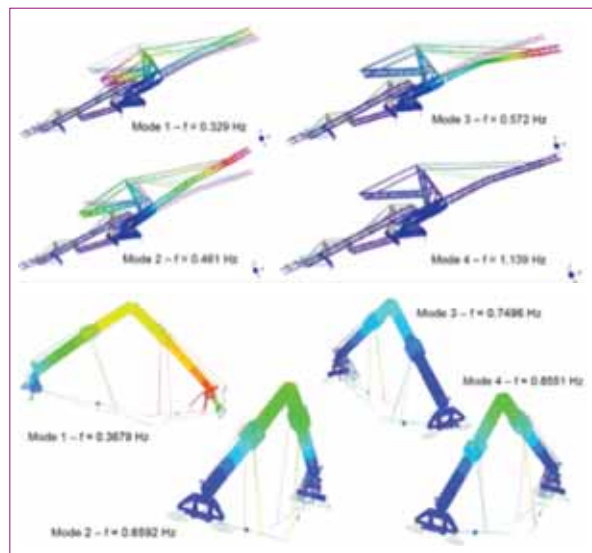


Figure 6: first four modes and natural frequencies for stacker and reclaimer.

STRESSES

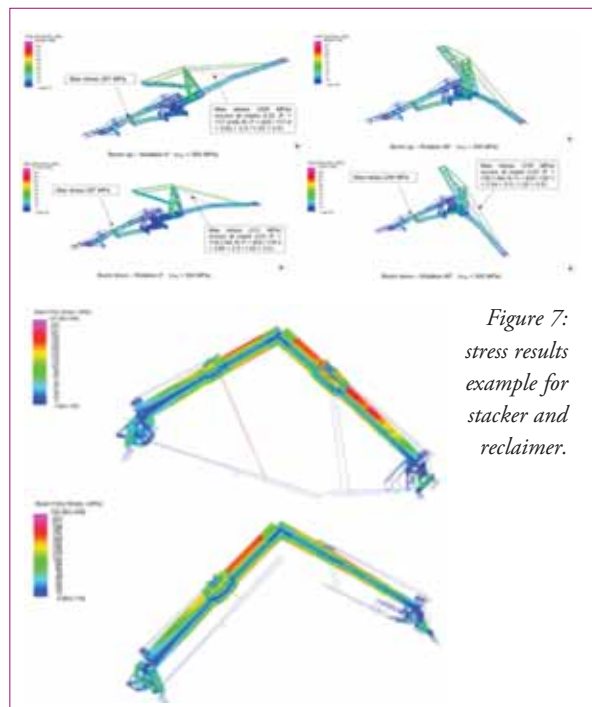


Figure 7: stress results example for stacker and reclaimer.

72km/h), out of service wind (33.3m/s = 120km/h, as required from Chilean local standard Nch432-2010, “Diseño estructural – Cargas de Viento”).

EARTHQUAKE LOADS

The seismic loads have been evaluated considering customer specification (PIEM-02000-C-DC-SKH-45-002, “Seismic design basis”). Main data are: design spectral accelerations $SDS = 1.00\text{ g}$ / $SDI = 0.50\text{ g}$, importance factor = 1.25, reduction factor $R = 3.0$, overstrength factor $\Omega_0 = 2.0$ (used in joints calculations) and $C_d = 2.5$ (used in displacements assessment). Participating mass of 95% is required for modal analysis.

DISPLACEMENTS

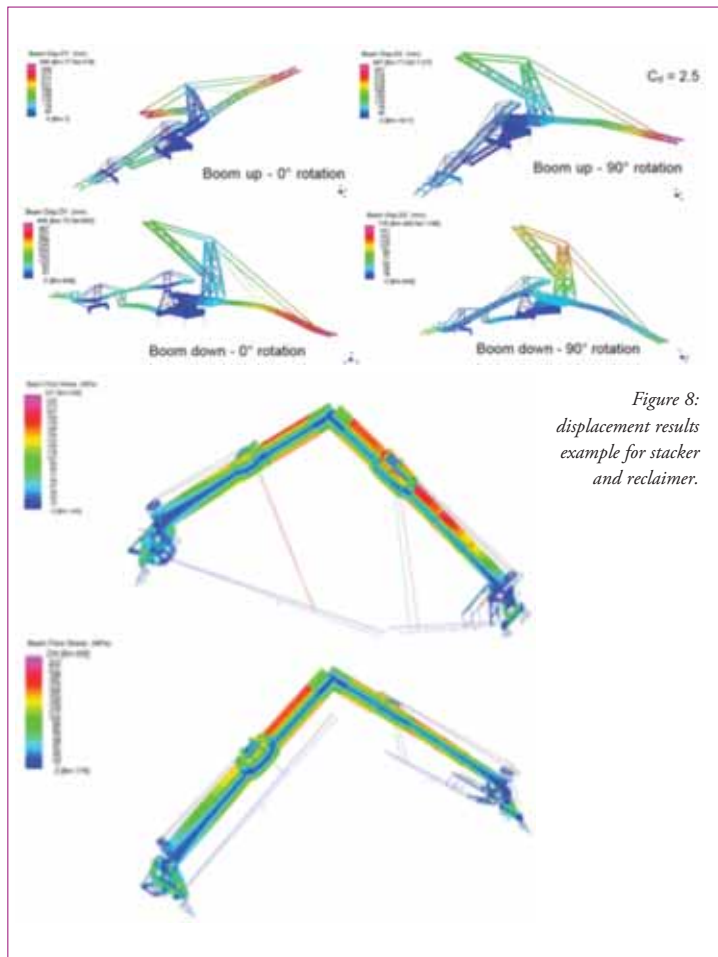


Figure 8: displacement results example for stacker and reclaimer.

SEISMIC LOAD CASES COMBINATIONS

The seismic loads combinations have been evaluated according to the above specification, which refers also to American Standard ASCE 7-10. Several combinations have been considered for seismic cases, in particular two sets: one for structural resistance and one for overall stability of machine verifications.

For the structural resistance, the allowable stress design method (ASD) has been considered, with reference to FEM II e ISO 5049, that define standards for these type of machinery.

Combinations for structural resistance are:
 $1.0\text{ D} + 1.0\text{ L} \pm 0.7\text{ Ex} \pm 0.21\text{ Ez} \pm 0.7\text{ Ev}$
 $1.0\text{ D} + 1.0\text{ L} \pm 0.21\text{ Ex} \pm 0.7\text{ Ez} \pm 0.7\text{ Ev}$
 Combinations for overall stability are:
 $0.6\text{ D} + 0.6\text{ L} \pm 0.7\text{ Ex} \pm 0.21\text{ Ez} \pm 0.7\text{ Ev}$
 $0.6\text{ D} + 0.6\text{ L} \pm 0.21\text{ Ex} \pm 0.7\text{ Ez} \pm 0.7\text{ Ev}$
 where: D = dead loads, L = material loads, E = seismic loads. The seismic loads derived from modal analysis have been combined with CQC method (Complete Quadratic Combination).

RESULTS

The first step to perform seismic assessment was to obtain natural frequencies and vibrating modes (about 400, in order to reach 95% of participating mass) for the two machines. Then stresses and displacements have been calculated and analysed. Some examples of the obtained results are illustrated.

OVERALL STABILITY VERIFICATIONS

In order to ensure global stability of the machines, safety coefficients were provided from the Customer seismic specification, see previous paragraph “Seismic load cases combinations”. For the reclaimer structure, for both geometrical configurations analysed (booms up and booms down), no problem for overall stability was found, because all minimum wheel corner loads were positive (always compression on wheels).

For the stacker anti-lifting devices (clamps) have been considered, see figure 10, because negative values for wheel corner loads were found. Clamps are attached to the machine’s bogies, during the machine travelling they do not work; instead, in case of wheel lifting, they act on the rail and permit the transfer to the foundation traction loads by means of the

connection between rail and foundation. Rail is connected to the foundation by means of welded clips, with a regulation bolt. A simple beam element model has been used to determine the maximum load on the clip, due to clamp action taking into account the rail stiffness contribution (see figure 9). Then a brick FEM model of the clip has been considered to verify it in the condition of maximum tensile load. Non-linear analysis, representing the curve stress-elongation for the spheroidal cast iron, has been considered.

RESULTS ON PLATE FEM MODELS

The design of the machine structures has been completed in detail using the results of the plate FEM models, see figure 10. In particular, for the stacker the most important load cases have been extrapolated from the global model in terms of loads applied to cylinders and slewing ring, then re-applied to the plate models. The full structure of the portal reclaimer has been modelled for weight



Picture from site of the portal reclaimer.

optimization and buckling verifications. The static scheme of the portal is basically a reverse V-structure, hinged at one side and simply supported at the other, therefore the whole structure is affected by high horizontal deflection due to its own weight. One very important design parameter is

the value of horizontal displacement due to its own weight, in order to manufacture the portal structure with a shorter span (camber). Once the portal will be erected, it will reach the correct span .

stacker and reclaimer, for an outdoor coal stockyard for feeding a thermoelectric power plant in the Antofagasta region of Chile. In addition to the challenges posed by the huge size of the machines, during the engineering and design process it was necessary to factor in particularly severe seismic specifications, since the machines are installed in a zone with frequent earthquakes.

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- [1] PIEM-21200-C-CA-BED-45-001 C07401.W004.M07887 Verification report of structural strength and deflection of main stacker structures
- [2] PIEM-21200-C-CA-BED-45-002 C07401.W003.M07888 Verification report of structural strength and deflection of main portal structure
- [3] C07401.W005 Elasto-plastic analysis of rail clip.

CONCLUSIONS

One of the latest Bedeschi projects, called ‘Blue Dolphin Project’, involved the design and supply of two machines: a,

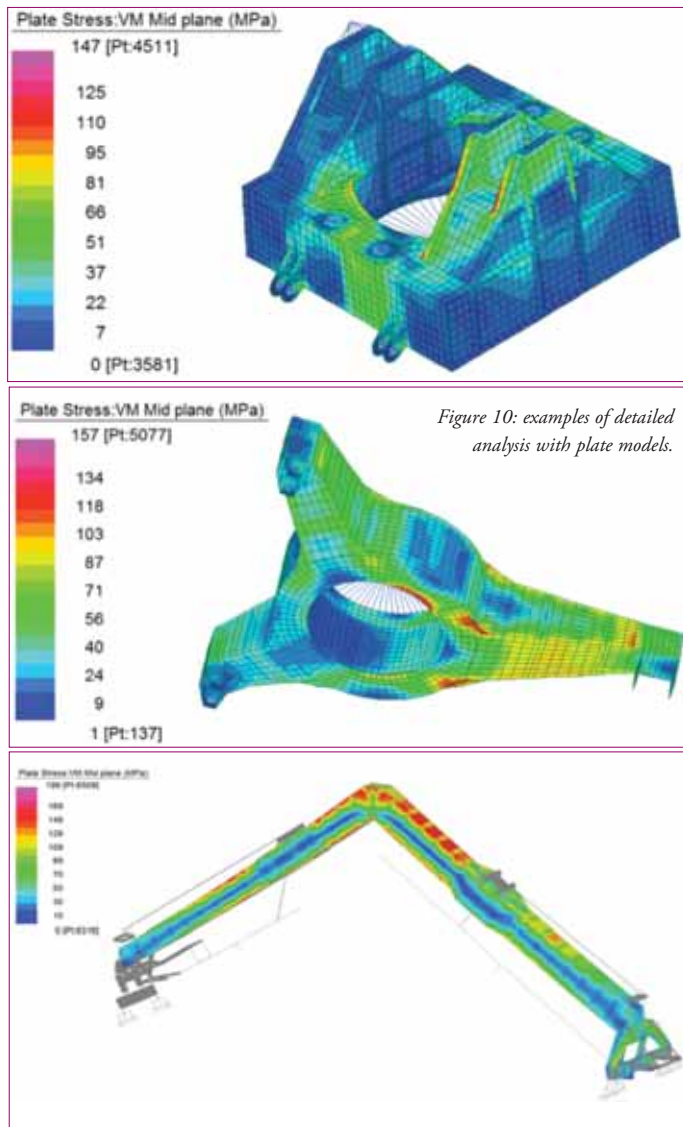


Figure 10: examples of detailed analysis with plate models.

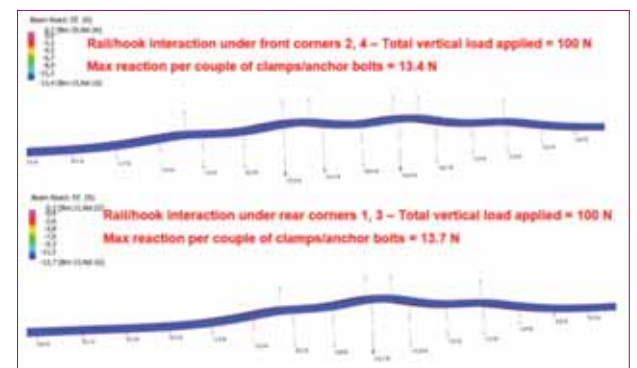


Figure 9: determination of maximum load on the clip (percentage on a total load of 100 N).

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Wuvio enables a dust-free environment and keeps facilities clean, safe and efficient. Companies globally realize more than ever that dust is an environmental issue that has to be dealt with. Traditionally this is done with water (...and lots of it), large enclosure or fences.

Wuvio’s approach is simple: each dust problem is unique. Its team of experts is there to help, they analyse dust problems onsite together with the clients and work towards an optimized and sustainable solution both from economical and operational perspective.

Wuvio’s products and solutions are used worldwide by companies active in dry bulk transshipment and handling, recycling, mining,

infrastructure/civil works, logistics, energy production, food and feed industry and biomass. Its products are ideal for coal handling applications.

Wuvio has a range of major clients all over the world and in different industrial areas, from recycling companies to port and terminals, steel mills and energy



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companies. Companies like Oxbow Energy Solutions, Engie, ArcelorMittal, Salzgitter, Renewi are companies have been using its products for years.

Wuvio produces products and solutions which are 100% biodegradable and harmless to the aquatic environment and therefore 100% safe for people and environment. These solutions reduce the dust by 90% and it is possible to can save more than 80% on water (costs and treatment expenses).

Dry bulk shipping and global trade is vital to many industries; the estimated 500 billion tonnes of dry bulk material support everything from steelmaking to the beer you crack open at the end of the week.

Loading and discharging bulk cargo or dry bulk from vessels is a specialized task often done by stevedoring companies and designated terminals.

Most dry bulk materials are dusty and therefore likely sources of wind-borne dust emissions. When large volumes of material are being discharged from vessels and allowed to freefall in open air conditions, even at a distance of 75cm or less, the increase of speed of the material will displace air and create air turbulence. Causing dust particles to become airborne, therefore dust nuisance can occur even

during calm weather conditions.

When the material travels on site, either manually or via the conveyor belts from the hopper/feeder to the stacker and ultimately when building the stockpiles, it becomes vulnerable to mass loss by wind; especially during long term storage.

Wuvio offers solutions to reduce dust nuisance and the loss of material during all stages of dry bulk handling, storage and transshipment:

- ❖ **Crust forming:** binding and adhesive additives that help form a top layer crust that prevents dust. Wuvio's stockpile sealers create a long-lasting layer with white, green or transparent colour that reduces mass loss, dusting and improved economics.
- ❖ **moistening:** additives that lower surface tension and reduce dust during handling. Wuvio's wetting agent allows for hopper loading to be done with up to 75% less water and with reduced dust emissions, allowing lower moisture levels.
- ❖ **Foaming:** an additive that forms tiny bubbles that capture fine dust particles.. Foaming is a technique used on conveyor belts or transition point treatment with increased active duration up to 30 days, which allows for minimized water usage and moisture

levels.

- ❖ **Agglomerating:** binding and adhesive additives that bind dust particles with larger particles. Freko-Bind is an agglomeration solution that binds fine dust particles and can be used for treatment at a single application point.
- ❖ **Road dust solution:** stabilizes dust on the surface of the road and absorbs new dust particles.

Wuvio's 'eco crust' crusting agent was awarded an eco-innovation prize (Dutch government) and recently the company received the Bulk Handling Safety Award from the *IBJ (International Bulk Journal)*.

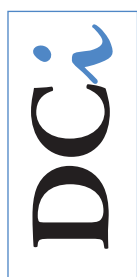
Wuvio also provides the machinery to apply its products and solutions. Its technical experts will define and design the best possible equipment for optimal use. This goes from stand-alone and mobile units right up to fully integrated installations. Wuvio is able to provide turnkey solutions.

Wuvio invests a lot in R&D, not only developing new products based upon the demands of the market, but also making its existent portfolio bio-based.

Wuvio takes care of dust-related problems. It has a solution for every step in the logistic and processing chain. DCi

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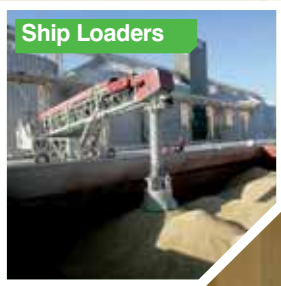
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