DCi
DRY CARGO international
ISSUE NO. 205 AUGUST 2017

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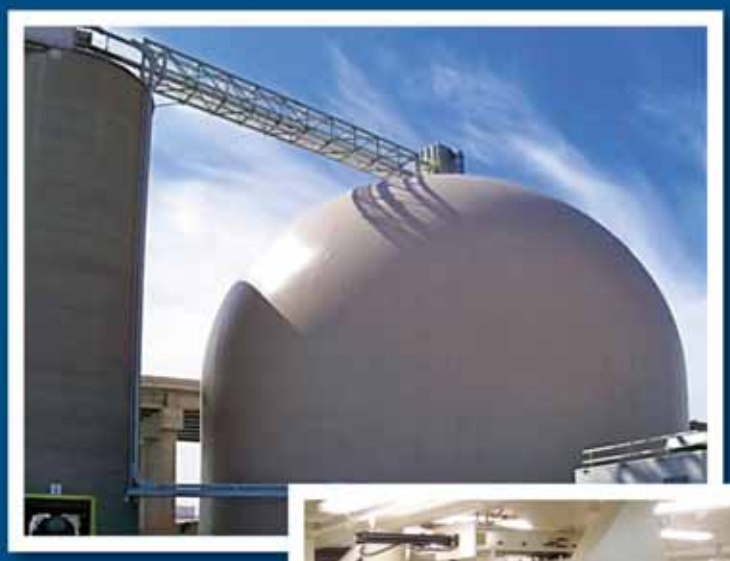

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Sennebogenstraße 10
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T: +49 9421 540-0
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W: www.sennebogen.com

PUBLISHERS
Jason Chinnock
jason@dc-int.com
Andrew Hucker-Brown
andrew@dc-int.com

EDITORIAL
Louise Dodds-Ely Editor
louise@dc-int.com
Jay Venter Deputy Editor
editorial@dc-int.com
Samantha Smith Directories
directories@dc-int.com
Stephanie Hodgkins Office Manager
accounts@dc-int.com

SALES
Matthew Currin Senior Sales Executive
sales2@dc-int.com
Gregg Franz Advertisement Sales Executive
sales@dc-int.com

CORRESPONDENTS
Brazil **Patrick Knight**
India **Kunal Bose**
Asia **David Hayes**
Europe **Barry Cross**
Malaysia **Wira Sulaiman**
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South Africa **Iain McIntosh**
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USA **Colby Haines**
USA **Walter Mitchell**

ADMINISTRATIVE OFFICE
Business Publishing International
Corporate Park, 11 Sinembe Crescent
La Lucia Ridge, South Africa, 4051
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Trade Publishing International Limited
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Colchester, Essex CO2 7UX, UK
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ISSN 1466-3643

AUGUST 2017 issue

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Coal trade looking more sturdy

Additional signs, appearing over the past few months, confirmed expectations of a pickup in commodity import demand in many countries. Reflecting these indications, it now seems likely that global seaborne dry bulk trade growth during 2017 will be much stronger than the minimal expansion seen in the past two years.

The strengthening trade trend is aided by an improving world economic performance. According to the latest (July) IMF update, an anticipated acceleration is still on track. World GDP is forecast to grow by 3.5% this year, following last year's 3.2% increase. Despite reduced optimism about the USA, several other key economies — China, Japan and Europe — are performing more strongly than expected.

Coal

Contributing to a more positive dry bulk trade picture is the revival of coal movements, although there remain doubts about whether recent strength will be fully maintained in the months ahead. One large element, China's coal imports, rose by 25mt (million tonnes) or 23% in the 2017 first half, reaching 133mt. But policy changes and other factors suggest that this growth rate may not be sustained.

In the coking coal category, several Asian countries are predicted to increase imports during the current year, as shown by table 1. However, a recently revised Australian government estimate for global trade in this sector was not optimistic, suggesting that the 2017 total could be 9mt (3%) below last year's volume, at 306mt. Weakness was expected to occur mainly in relatively small importing countries.

Iron ore

Figures for steel production in the past six months confirm a more robust backdrop for raw materials importing countries. World Steel Association data shows first half 2017 crude steel production rising by 5% in China, compared with the same period of last year, reaching 419.7mt. That expansion was a key influence affecting the big rise in Chinese buyers' iron ore purchases.

Among other iron ore importers, an increase in European Union crude steel output also was notable, boosting production by 4% to 86.1mt in the January–June period this year. In the same period, South Korea saw a similar rise of about 4% to 34.7mt, while in Japan there was a marginal uptick of under 1% to 52.3mt. In India, which is mainly self sufficient in iron ore but not in coking coal, steel output rose by 5% to 49.5mt.

Grain

The outlook for grain trade during the next twelve months depends heavily on the outcome of domestic harvests approaching or already under way in northern hemisphere importing countries. Production from summer harvests, stretching over the weeks ahead, will be affected by any unforeseen changes in weather.

Import demand in Europe, North Africa, the Middle East and China reflects variations in domestic grain output as well as other factors. Mid-2017 harvests in many of these areas are expected to be similar to, or above last year's volumes, although in China signs of a possible slight reduction have emerged. An absence of obvious large shortfalls partly explains why global wheat and coarse grains trade in 2017/18, now starting, could be almost flat at 365mt, based on US Dept of Agriculture estimates.

Minor bulks

Aluminium industry raw materials are a major part of seaborne minor bulks trade. In 2016 world trade in bauxite, and the processed form alumina declined to about 115mt, amid a sharp reduction in China's imports which totalled 55mt, down by 9%. Some reports point to a limited global revival this year, possibly resulting in 2-3% growth.

Bulk carrier fleet

A lower volume of newbuilding bulk carriers entering the world fleet this year is widely foreseen (table 2). Lower deliveries are estimated in all the main vessel size groups. Although this expected outcome acts to restrain fleet enlargement, much lower scrapping may result in fleet growth picking up again after several years of slowing.

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

	2012	2013	2014	2015	2016	2017*
Japan	70.5	77.0	74.1	70.6	74.0	73.0
South Korea	25.7	26.4	29.9	32.5	32.0	33.0
Taiwan	10.5	10.9	10.9	10.8	10.5	10.5
China	53.6	75.4	62.3	48.0	59.3	65.0
India	35.5	39.0	47.9	50.0	49.6	50.0
total of above	**195.8**	**228.7**	**225.1**	**211.9**	**225.4**	**231.5**

source: various & BSA 2017 estimates * estimate*

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

	2012	2013	2014	2015	2016	2017*
Handysize (10-39,999dwt)	10.5	6.3	5.4	6.6	4.6	4.0
Handymax (40-64,999dwt)	20.9	14.7	11.4	16.0	13.2	11.0
Panamax (65-99,999dwt)	27.0	19.9	12.8	9.9	9.5	9.0
Capesize (100,000dwt and over)	41.9	22.0	18.5	16.9	20.0	15.0
Total	**100.3**	**62.9**	**48.1**	**49.4**	**47.3**	**39.0**
% change from previous year		-37.3	-23.5	2.7	-4.3	-17.5

source: Clarksons Research & BSA estimates for 2017 * estimate*

by Richard Scott, Bulk Shipping Analysis, Tel: +44 (0)12 7722 5784; Fax: +44 (0)12 7722 5784; e-mail: bulkshipan@aol.com

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Iron ore trades

changes are afoot in the industry

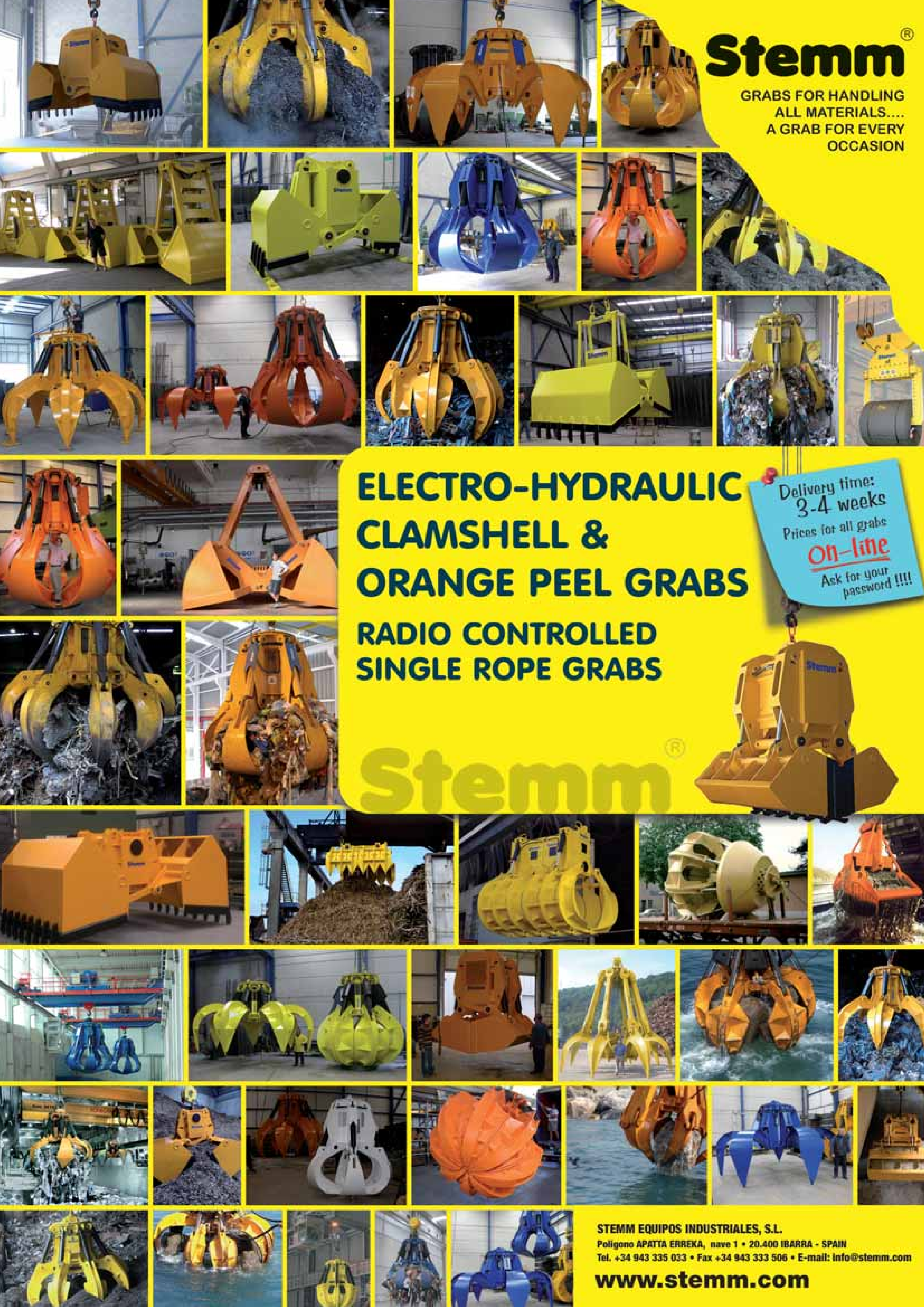
Indian steelmakers frustrated by local refusal to match global price cuts

Indian steelmakers without captive mines are distraught that local iron ore extractors, including the state-owned NMDC and Odisha Mining Corporation (OMC) — which sell the very major part of their production in the domestic market — have remained stubborn in refusing to take a price cue from the global market, *writes Kunal Bose*.

NMDC, the country's largest producer of the steelmaking ingredient, has not felt the compulsion to revise the ex-mine price of the 64% iron (Fe) content ore since March in disregard of steep falls from the 30-month February peak in the price of the globally benchmarked 62% Fe rich variety. At the same time, local buyers had in a way registered their protest against ore disposal policy of OMC when in the last round of e-auctions of lumps and fines they did not bid for the major portion of the mineral on offer because of high base rates. Private sector ore producers arrive at ore prices through negotiations with buyers where also the former dictate terms. No wonder then that the Indian steel ministry wants all iron ore to be sold in auctions, separately for steelmakers and traders.

Reacting to the disposition of mining groups, a steel industry official says the refusal to bring domestic prices in alignment with what obtain in the world market at a given point stems from the belief of ore producers that since only the shore-based steel, direct reduced iron (DRI) and pellet manufacturers could profitably support a portion of their capacity utilization by using ore imported mostly from Australia, they will in any case have a big domestic market at their disposal. This, more than anything, will explain why in spite of around 150mt (million tonnes) of ore lying at mine heads, miners are found unrelenting when it comes to fixing prices.

It will be recalled that, in the wake of Supreme Court-ordered ban on mining in Karnataka and Goa since replaced by caps on extractions and restrictions that obtained in Odisha and Jharkhand, the country became a net buyer of foreign-origin iron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ore in 2014/15 with imports amounting to 12.09mt against exports of 6.12mt. In the following year too, the trade pattern remained identical with imports at 7.09mt being ahead of imports by 2.59mt. Imports were done mostly by converters on the western coast. The available infrastructure and logistics cost are not supportive of steel plants located far away from ports using imported ore. Indian private sector ore producers continue to take full advantage of the situation.

As Indian iron ore production is returning to normal, with the mining industry putting its house in order under the watchful eye of state authorities, exports climbed to 28mt in 2016/17 when imports were down to less than 5mt. Production did climb to 180mt. In the meantime, the Supreme Court is being petitioned by Karnataka and Goa governments to allow the two states to progressively raise production of iron ore without causing disturbances to the environment. With the onset of monsoon, Goan production will remain suspended until September.

Explaining why in the first place the import price of benchmark 62% ore at China's Tianjin port rose from the lowest on record on 24 November 2015 since the SteelIndex began tracking the spot price in 2008 to $94.86 in February, a 30-month peak, the official quoted earlier says global investors then put their bet on Beijing's stimulus for infrastructure and construction development and rising steel production in the country in the face of edict to shut inefficient and polluting capacity. No doubt, China, much to the surprise of the rest of the world, has kept to the schedule of scrapping environment-degrading steelmaking capacity in the past two years. But there is the caveat that whatever capacity was finally shed was already non-working. For record, China, which owns around 1.2bn tonnes of steel capacity scrapped 65mt in 2016, running ahead of 45mt target by more than 40%.

What is even more encouraging for the world steel industry to learn is that China, which left itself with wiggle room to eliminate capacity between 100 and 150mt by 2020, is now aiming at near the top of the range with a target of 140mt. Anything that has got to do with improving the prospects for steel prices will have positive fallout for iron ore and other steel making ingredients. While that may be the case, iron ore or metallurgical coal has its own dynamics working in moving prices. The Beijing-inspired merger of Baosteel Group and Wuhan Iron and Steel into Baowu Steel Group has too given a shot to scrapping of ageing low-productivity machines. Expect further consolidation in the Chinese steel industry which alone accounts for half the global surplus capacity of over 600mt.

Since China accounts for about half the world production of steel, it is only natural that long-term business strategies of leading global producers of iron ore will be influenced in a major way by their perceptions of how Beijing strikes a balance between maintaining stable economic growth and defusing debt risks and pushes through reforms of the steel industry. Commitments of billions of dollars of new investments in opening of new mines and expanding the ones in operation by Vale, Rio Tinto, BHP Billiton and Fortescue earlier this decade were based on perceptions that China would be the destination of all incremental production. It was also believed that economic consideration will lead to rapid closure of very high-cost mines in China. In the last four years of tumult in the world steel industry marked by low demand and low prices, major miners have slashed capital expenditure in a major way. This has left investors in shares of Rio and BHP somewhat confused.

Because of large fresh investments in mines development, particularly in Western Australia but also elsewhere, the industry now has to contend with a global glut in iron ore. This was worsened due to fresh supplies coming from newly developed properties such as Roy Hill's 55mt-capacity operation in Pilbara in Australia, Anglo American's Minas Rio and the biggest of them all Vale's S11D in Brazil. On top of all this, will come the investment by Anglo-Australian Rio to develop its Koodaideri iron ore deposit in Western Australia. The prefeasibility study has established the project's potential to dig out 70mt of ore a year and a 170km rail link to the main line. Actual project implementation to start in 2019 is intended to replace the ageing relatively high cost mines.

In a statement Rio Tinto iron ore CEO Chris Salisbury says: "We remain firmly focused on our value over volume strategy and maximizing returns through enhanced productivity. We are examining the Koodaideri project as an option to help us maintain our low cost competitive position and assist in maintaining the Pilbara blend product quality." Not only is the market to embrace in iron ore supply deluge, the big producers are steadily lowering the cost of mining. They are credited with production cash cost at well below $20 a tonne. These two will then be considered the principal risk factors that may tug iron ore prices lower at any point even when the outlook for steel remains good.

Those in the business of iron ore price forecasting find themselves on a treacherous ground. Who could have thought that the bear market in the commodity would be over in three months. A smart rally began coinciding with the start of the year's second half. This happened as steel mills in China re-entered the market to replenish ore inventories with better grades of ore. The pickup in physical tenders suggests a real tightness. Two factors played out strongly in the rally that took the benchmark 62% fines from one-year low of $53.36 to $65 a tonne in July first week. First, the mills well anchored in profit zone wanted to be adequately stocked up with high quality ore. Second, the country's official manufacturing purchasing managers index going up to 51.7 in June from 51.2 in May is an indication of the economy's strength. This is against Reuters poll forecast for 51. The steel industry's index eased to 54.1. But that is still above the cut off point of 50 that signals expansion.

Port inventories of iron ore in China at any point are fairly well collated. But mill inventories can only be guessed. In recent weeks, inventories at 33 major Chinese ports fluctuated between an unusually high 136mt on 19 May, making a bearish impact on the market and 120mt now. Chinese steel production in the first five months up to May rising by 4.4% to 347mt will explain why iron ore imports in the corresponding period were at an elevated level of 444.52m tonnes. Last year the country, which has a share of over three quarters of global seaborne trade in iron ore, raised imports by 7.5% to 1.024bn tonnes. What is not to be lost sight of is that some imports by China are speculation based and iron ore is also used as collateral for bank loans.

Some analysts believe that even if Chinese steel production grows at 4% for the rest of the year that will not be found enough to take care of the additional ore coming out of the newly developed mine properties. Goldman Sachs says in a recent report that supply abundance will exert enough pressure to bring the average ore price realization to $47 a tonne in 2018. On identical consideration, Citigroup sees a likelihood of prices caving in to $40s next year.

What further lends credence to medium and long-term bearish outlook was the unaccounted India factor. Recall the fact that the country with the world's fourth largest resource at close to 32bn tonnes produced 218.55m tonnes and exported 117.37mt in 2009-10. But then a series of government actions discouraging exports, which rightly invited accusations of 'resource nationalism' and court interventions derailing production made India's presence in the world market insignificant in subsequent years.

A steep fall in production and exports led to the derailment of the iron ore industry, including major unemployment and fall in government revenue and foreign exchange earnings from exports. In virtual admission of mistakes, the government in the budget for 2016/17 scrapped export duty on ore fines and lumps with iron content below 58%. But further concessions in export duty are needed if India is to find a place of honour in the world ore trade.

Diversification key to success, says new Vale chief executive

The new chief executive of Vale, the world's largest exporter of iron ore, Fabio Schwartsman, says the company needs to diversify, as prospects get more complex, *writes Patrick Knight.*

Comments by Schwartsman, until recently chief executive of the Klabin pulp and paper company, who has just taken over as chief executive of Vale, Brazil's giant ore producer, illustrate very well many of the problems facing iron ore both worldwide as well as in Brazil.

The price of ore has fluctuated between a high of close to $100 per tonne, to a low of about $40 this year and the price is predicted to continue to be volatile for the forseeable future. This is largely because of the uncertainty as to what economic policies the Chinese government will adopt. Worries about the sustainability of the model which has served that country well for many years, have caused concerns to rise.

The fact that Vale is now almost exclusively dependent on its revenues from the sale of ore, rather than from a wide range of activities, as it was in the past, is a matter of great concern, says Schwartsman. In recent years, about half the ore exported by Vale, and more than that for some other the other miners in Brazil as well, has been destined for China. As output at the latest workings at Vale's super-efficient and low-cost Carajas mine increases, together with improvements to railways and at ports allow Vale's exports to grow, it is anticipated that the share of Vale's ore going to China will increase as well.

During the last century, of course, Vale did not only produce iron ore, as well as some nickel and gold, it was a leading player in all aspects of Brazil's aluminium industry. It used some of the profits of these to plant hundreds of thousands of hectares of mainly eucalyptus forest, mainly for use by the pulp and paper industry, as well as for the pig iron industry, and it owned shares in several pulp mills. It was also a leading producer of fertilizer. Vale owned and operated a large fleet of ships, ran not only the state-of-the-art railways linking its mines in Minas Gerais state as well as Carajas to ports which it owned and operated, it also bought shares in other railways when they were privatized.

Virtually all these assets — apart from the lines which carry ore — have been sold off in the past few years, when ore prices have often been low, but when spending on expansion at the Carajas mine was at its peak, as have assets in other countries, such as coal reserves in Mozambique. This concentration has led Schwartsman to worry that too many of Vale's eggs are now all in one basket. He has not yet given any indication as to which areas Vale might expand into. But because Vale's financial situation has improved greatly in the past couple of years, decisions can be expected soon. At the back of Schwartsman's mind, must be the fact that the supply and demand situation for ore is now very different from what it has been in the decades since the 1940's, a period when large new markets appeared regularly to replace ones in decline. In the first period, demand from Europe was particularly strong, as numerous countries there set about re-building their shattered steel industries.

Japan emerged as the leading market at this time as well, and the 'Asian tigers' also became important customers for Vale. For several years, Japan was the leading market for Brazilian ore, and this resulted in Vale accumulating great expertise in logistics. This included rail and handling at ports in Brazil, and long-distance bulk shipping, including developing and building the largest possible ore carriers. This efficiency enabled Vale, whose ore — particularly that from Carajas — is of the highest quality so commands a premium, to compete with that with the large companies with mines in Australia, which are much closer to Japan than Brazil's.

The fast and steady growth of China, which in the past 20 years has concentrated on building basic infrastructure — notably a network of long distance, high speed railways — as

well as modernizing numerous large cities, which have become attractive to millions of migrants from the countryside, has explained the boom in ore exports of the past few years. But there is now no other underdeveloped country the size of China to emerge, and take China's place as the leading market for ore, as China did with Japan. In fact, there are many reasons why the world market for ore is more likely to shrink than grow, and at the best to remain stagnant, while output of ore continues to increase. It is unclear at the moment whether enough high cost mines in China and elsewhere will shut down, leaving more space for the three to four low-cost giants, all of which have invested in new capacity in the past few years. It had been expected that mine closures would happen, but strong local political interests have often prevented this. It was also expected that the growth in China's steel-making capacity would slow, but this has not happened either. Many analysts suggest this increases the risk of a major crash in the fairly near future, as indebtedness, and overspending of banks, are at dangerous levels.

The question as to whether the Chinese government will be able to take the sometimes tough measures which are called for, but which will force the economy to slow to a point that it becomes sustainable, rather than be forced to take emergency measures, is not yet clear. Because of the fear of unrest which might follow a severe downturn, when tough measures were introduced, might soon have to be reversed, pushing the problem into the future. In any case, growth of close to 10% a year, is unlikely to be seen again.

It also seems likely that a growing number of countries, will follow the example of the United States, and switch from relying on large blast furnaces, to using scrap as the raw material for making steel, rather than ore, to make steel. As the economy of a country develops, and large quantities of obsolete consumer goods start to accumulate, very large quantities of scrap start to build up as well. Other factors will involve changes in the pattern of energy use. As efforts to reduce pollution, and the risk of climate change become more of a priority, it seems virtually certain that vehicles powered by electric motors, rather than heavy internal combustion engines made largely of steel, will increasingly come to be used. An electric motor is much lighter than an internal combustion one, so far less steel will be needed to make it. The bodywork of future vehicles, will also be lighter as well. So the future of steel and iron ore by the motor industry, now a leading market, will be very different than it has been for the past 100 years.

Schwartsman, who was the first non-family member to head the Klabin pulp and paper company, and who had considerable success in raising the company's profitability by giving greater importance to market pulp, rather than paper, also says he plans major changes to Vale's organizational structure. At the moment, many different directors are housed in different buildings, so rarely interact with their colleagues. The new CEO wants them all to share the same building, which he believes will make the exchange of ideas easier.

Independent of what Schwartsman is planning, a lot is happening both at Vale, and elsewhere in the Brazilian ore industry. The new workings at Carajas started up 18 months ago, and this allowed 150mt (million tonnes), of the total 350mt Vale produced in 2016, to come from Carajas. The availability of so much top-quality ore, is allowing Vale to blend some of this with lower-grade ore from mines in Minas Gerais state, at the Tubarao terminal. Blended ore is embarked from there, or else at the terminals Vale now operates in Asia, so can be sold for a variety of prices. The workings at Carajas, will only attain full capacity in 2020, by which time Vale expects to be producing 400–450mt.

Anglo American is gradually raising output at its mine in Minas Gerais state, and hopes to produce about 17mt there this year. If all goes according to plan, Anglo's output will leap to 26.5mt in the 12 months ending in December next year. The CSN steel company produced 37mt in 2016, 44% more than it did the previous year.

The increase in output by Vale, Anglo and CSN means that the 25mt of pellets previously produced from ore mined by Samarco, jointly owned by Vale and BHP, but where production was halted in November 2015 following the bursting of a dam, is hardly missed. The date at which the Samarco mine will be re-opened, keeps being pushed back, and there are reports that BHP would like to leave Brazil, but problems of unpaid taxes are interfering.

It appears that after a long delay in allowing companies which have been awarded concessions to open workings, but have not yet done so, may soon come to an end. A total of 8,000 requests for concessions are being considered by the National Minerals Production Department, and it anticipated that 100 new concessions will be given the go-ahead this year.

Petroleum coke market volatility driven by many factors

Ben Ziesmer & Jesus Cabello, Jacobs Consultancy

Many factors have buffeted the seaborne fuel-grade petroleum coke market during the last 18 months, causing substantial price volatility. These factors include changing government regulations, severe weather, and unexpected production problems. Beyond recent short-term events, new marine fuel environmental regulations and the Keystone XL pipeline will affect the petroleum coke market longer term.

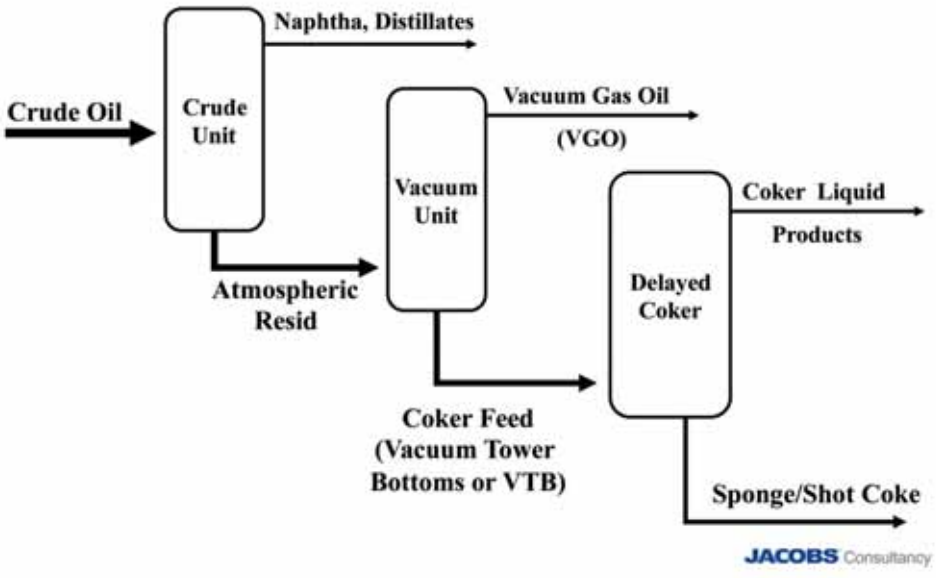
Before discussing various factors affecting the petroleum coke market, it is important to provide some background information.

Background

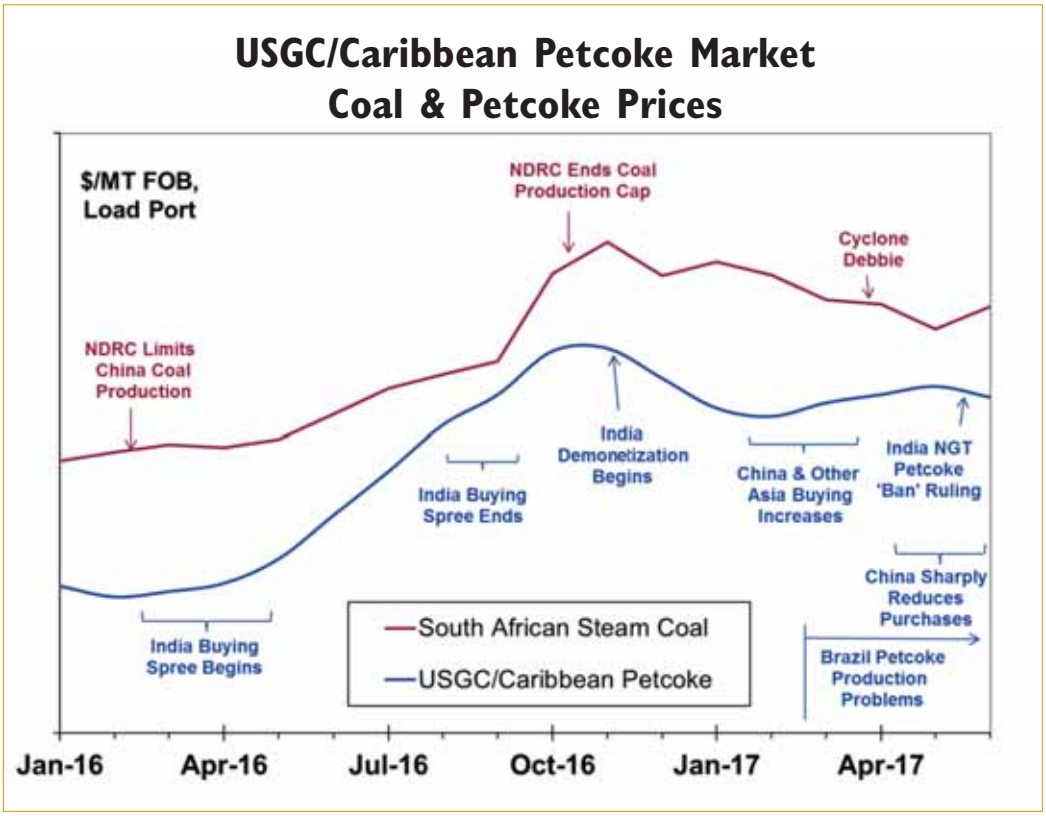
Petroleum coke (a.k.a. petcoke) is produced as a by-product in many — though not a majority — of oil refineries. Crude oil is first processed in an atmospheric distillation unit, followed by a vacuum distillation unit. The heavy residuum exiting the bottom of the vacuum tower (i.e., vacuum tower bottoms, or VTB) can be used to make asphalt, blended with some light products such as diesel to produce residual fuel oil (RFO), or used as coker feed (see Simplified Coking Refinery Flow Diagram).

Traditionally, cokers are installed in oil refineries to convert vacuum tower bottoms (VBT) and other heavy residual oils into higher-value light transportation products (e.g., gasoline, jet fuel, and diesel fuel). Until recently, a coker almost invariably

Simplified Coking Refinery Flow



increased refinery profitability because the yield of high-value transportation fuels is maximized and production of low-value residual fuel oil (RFO) is minimized. While the coking process has been in use since the 1930s, petcoke production has seen its largest growth following 1990 because worldwide light transportation petroleum product demand has grown faster than RFO demand. Cokers have been, and continue to be, the preferred refining technology that allows the refining industry to reduce its production of RFO per barrel of crude oil processed, and bridge the gap between light product and RFO demand growth.



During the last two decades, two additional factors have driven the construction of cokers:

- Provide assured outlet for heavy crude oil: coking units allow a refinery to process lower-cost, heavy, sour crude oils. This was the driving force for the nine new or expanded cokers installed on the U.S. Gulf Coast from 1996–2004 when more heavy crude oil entered the market, and heavy crude oil producers signed long-term crude supply agreements to induce refiners to install additional coking capacity.
- Ultra-heavy crude oil production: cokers are used in upgraders that produce various grades of synthetic crude oil (SCO) from bitumen or ultra-heavy crude oils. This type of upgrader exists in Venezuela where ultra-heavy Orinoco Belt crude oil is upgraded and exported as lighter crude oils, and in Canada where upgraders are used to produce SCO from the bitumen derived from Alberta oil sands.

There are two general applications for petcoke: as a carbon source and as a heat source. The former requires better quality (e.g., low sulphur and metals) and commands higher prices. Green[1] petcoke is usually upgraded by calcination (a process which removes moisture and volatile matter and improves critical physical properties) when it is used as a carbon source. Petcoke that has been calcined is referred to as calcined petcoke (CPC). The largest market for CPC is in the production of anodes for aluminium smelting; other uses for CPC are in the production of carbon electrodes for electric arc furnaces, titanium dioxide (TiO_2) production, and as a recarburizer in the steel industry. Almost 30% of the petcoke produced is sold into these higher value-added markets for higher-quality petcoke; the remainder of the petcoke is sold into the fuel market, where it almost always competes with coal.

1. Technically, all petroleum coke that has not been calcined is green petroleum coke (GPC). However, within the petcoke industry, the term GPC is usually only used for petroleum coke that is being used as calciner feedstock.

Petcoke exports from the U.S. Gulf Coast (USGC) and the Caribbean (primarily Colombia and Venezuela) provide approximately 65% of the seaborne fuel-grade petcoke trade. The sulphur content of fuel-grade petcoke in this market varies from 4.0% -7+%. Some USGC refineries produce much lower sulphur petroleum coke, but this petcoke is used by calciners to produce calcined petroleum coke (CPC). Petcoke sulphur content is determined by the sulphur content of the crude oil being refined. Refiners primarily running Venezuela and U.S. domestic crude oil tend to produce 4.0–5.0% sulphur petcoke whereas refiners running Canadian, Mexican, or Middle Eastern crude oils tend to produce ≥6.0% sulphur petroleum coke. It used to be that the clearing market for USGC/Caribbean petroleum coke was Europe, Middle East/North Africa (MENA), and Latin America. However, since early 2009, the clearing market for ≥6.0% sulphur USGC petroleum coke has been Asia (primarily China and/or India).

Looking back at 2016 and this year, it is clear that, while there may be some correlation between steam coal and petroleum coke prices, petcoke prices are not closely correlated with coal prices (see USGC/Caribbean Petcoke Market – Coal & Petcoke Prices chart, above). For example, from February through May 2017 petroleum coke prices increased while coal prices decreased. This is because petroleum coke prices are determined by petcoke supply demand (i.e. Econ 101), operating within a solid fuel pricing environment determined by coal. The seaborne steam (thermal) coal trade volume is 20+ times larger than petroleum coke seaborne trade volume, so petcoke cannot meaningfully affect the seaborne coal market.

Many factors drove USGC/Caribbean petroleum coke prices during 2016 and 2017. The decision in February 2016 by China's National Reform and Development Commission (NRDC) to restrict coal mines to 276 operating days/year was a significant factor that drove coal prices higher as 2016 proceeded. Initially, the coal market did not react to this decision because there were excess inventories throughout China. However, inventories levels reduced as 2017 proceeded, and China's coal

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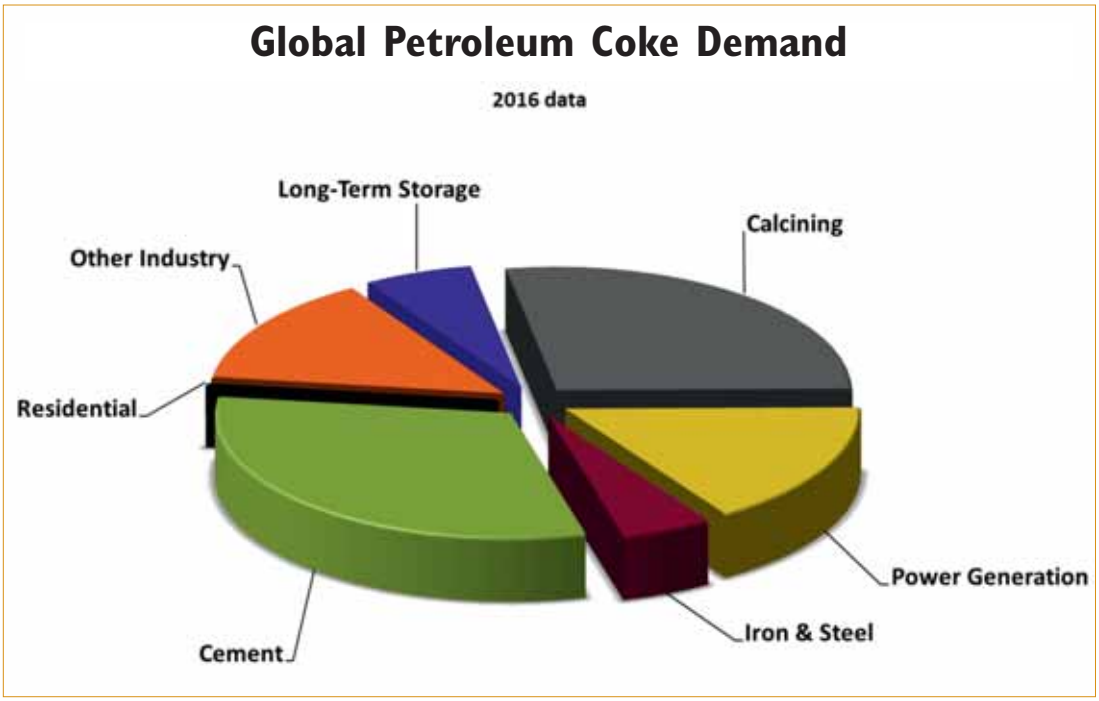
import volumes increased substantially. These increased import volumes drove international steam (thermal) coal prices higher. Eventually, rapidly escalating coal prices drove China's electricity prices higher, hurting the competitiveness of industry, and the NRDC was forced to rescind its coal mining production limits.



USGC/Caribbean petcoke prices had been depressed in late 2015 due to concerns that China was going to ban imports of petroleum coke >3.0% sulphur. Depressed petroleum coke prices compared to coal prices offered strong economic incentives to use petcoke instead of coal, and Indian buyers leapt into the petroleum coke market. Petroleum coke prices more than doubled from February to August 2016 while coal prices only increased by about 25%, and the economic advantage of using petcoke shrunk. Consequently, Indian petroleum coke purchasing reduced. However, petroleum coke prices continued to increase, partly due to market momentum and partly due to continued coal price increases.

On 8 November 2016, the Government of India suddenly announced the demonetization of all INR500 and INR1,000 bank notes. The government claimed that the action would curtail the shadow economy and crack down on the use of illicit and counterfeit cash to fund illegal activity and terrorism. The sudden nature of the announcement and the associated cash

shortages that followed as the economy transitioned to credit based transactions caused cement demand to drop by ~30%. Consequently, Indian demand for petroleum coke weakened further.

Buying interest by China and South Korea increased as 2017 began. Then, Brazilian buyers of domestically produced petroleum coke were suddenly informed that shipments would be curtailed due to petcoke production problems, and they were forced to quickly look for prompt cargoes. These two events put a 'bottom' in the market and started a price rally. Increased petroleum coke purchases by Indian buyers also supported prices as the country acclimated to demonetization, and cement demand began to recover.

Recently, two factors weakened the petroleum coke market. First, Chinese interest in petroleum coke suddenly came to almost a complete halt. Second, on Tuesday 16 May, India's National Green Tribunal (NGT) called for a nationwide end to petcoke use by industries that do not have permission to use petroleum coke as a fuel. The NGT directed the Ministry of Environment and Forests (MoEF) and all state governments to decide within two months if petcoke was "an approved fuel" or a hazardous waste. Even though the NGT does not have direct regulatory power, it can heavily influence regulatory policies.

Subsequently, the Rajasthan state government decided that petroleum coke, which is widely used as fuel in the lime industry, is an approved fuel. This appears to have been a bellwether decision as several other state governments have decided to follow Rajasthan's lead. Thus, the worst fears of the petcoke market have not been realized, but there remain concerns as to how much of India's petroleum coke demand will be lost due to environmental regulation.

U.S. and Canada West Coast Petcoke Market Developments

This market consists primarily (85%) of U.S. West Coast plus Canadian West Coast petroleum coke exports. This is a more complicated market than the USGC/Caribbean petcoke market because:

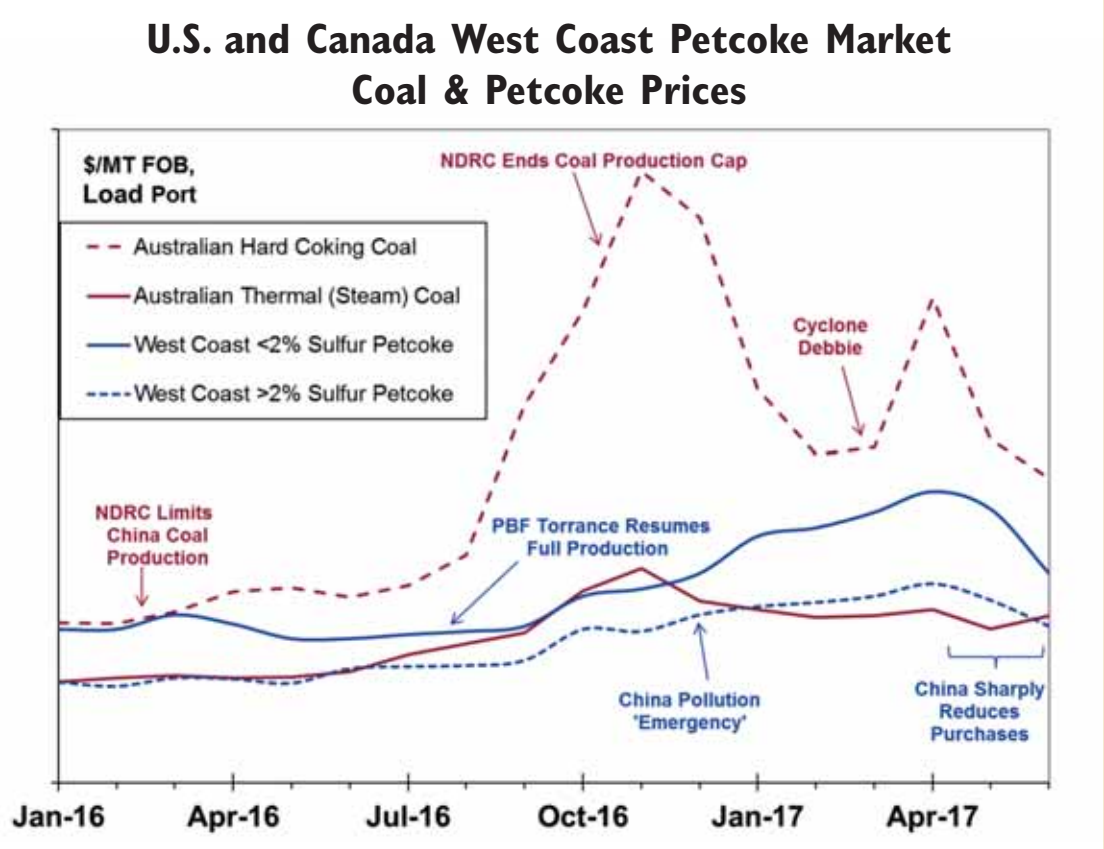
- Petroleum coke sulphur content is much lower (i.e. 1.5-5.0), which makes much of this petroleum coke potentially attractive to the steel industry. Thus, coking coal as well as thermal (steam) coal prices influence petcoke prices.
- It is much smaller (~15% of seaborne trade) than the USGC/Caribbean petcoke market, so the actions of individual refineries or large customers can have meaningful impacts;
- It is much more concentrated geographically with close to 80% of the petroleum coke exported to two countries — China and Japan.
- Niche applications are much more important due to the combination of the petroleum coke having lower sulphur content and much smaller market size.
- California requires covered storage of petroleum coke, so there are much fewer days of inventory storage available to absorb short-term market perturbations due to the cost of covered storage facilities.
- Fort McMurray, Alberta, Canada area oil sands upgraders are located approximately 2,000km (1,200 miles) from the most commercially viable port (Prince Rupert, British Columbia), and it is practical to return petroleum coke into the open cast (strip) bitumen (oil sands) mines supplying the upgraders. Thus, this petroleum coke only enters the seaborne market when petroleum coke prices are high enough to cover the substantial logistics costs to move this petcoke to a port.

These complex interactions are illustrated by the U.S. & Canada West Coast Petcoke Market –Coal & Petcoke Prices Chart. During the second half of 2016, West Coast petroleum coke prices, especially <2% sulphur prices, had a limited response to rapidly escalating coking coal prices. One the factors that contributed to this muted response may have been the return of PBF Energy's (formerly Exxon Mobil's) Torrance refinery to full petroleum coke production. The Torrance refinery is the largest producer of <2% sulphur petcoke in this market.

In December 2016 Beijing and other Chinese cities experienced severe air pollution. The 'red alerts' caused the Chinese government to pursue emissions enforcement with new vigour. Consequently, various petroleum coke consumers, especially glass producers, were forced to reduce the sulphur content of the petcoke they were using. This increased buying interest pressured West Coast, especially <2% sulphur, petcoke prices higher. Sharply higher coking coal prices as result of Cyclone Debbie, which severely damaged Australia's Queensland coal mining logistics infrastructure, also helped support higher prices.

Then, during the second quarter of 2017, Chinese traders became very concerned with rising petcoke inventories and dramatically reduced petcoke purchases, pressuring prices lower. Sharply falling coking coal prices as a result of Queensland's faster than expected recovery from Cyclone Debbie also contributed to downward pressure on petroleum

coke prices.



MARPOL VI 0.5% Sulphur Bunker Fuel Regulation

In October 2016, the International Maritime Organization (IMO) committee set a deadline of 1 January 2020 for the global implementation of regulations that limit the sulphur content of marine fuels used outside of sulphur emission control areas (SECA). This regulation, which is part of MARPOL[2] Annex VI[3], will require ships to use marine fuel with ≤0.5% sulphur or install exhaust gas clean-up equipment (i.e. SOX scrubbers). The dominant exhaust gas clean-up system technology utilizes seawater, which is alkaline, in a scrubber to capture sulphur oxides (SO_2 & SO_3) in the exhaust stream. The seawater, with the captured sulphates, is then returned to the sea. The choices of lower sulphur fuels range from utilizing low sulphur residual fuel oil (LS RFO), which requires virtually no vessel modifications, to using liquefied natural gas (LNG), which requires very substantial ship modifications. The IMO estimates that there are 50,000+ vessels of 5,000dwt or larger that will be subject to this regulation. Analysts estimate the additional costs for the container shipping sector alone could reach US$35–40 billion.

The shipping industry consumes more than three million barrels per day (~170 million tonnes/year) of high sulphur residual fuel oil (HS RFO), and this market is very important to many refineries. It will be a challenging task for the refining industry to replace this fuel with much lower sulphur distillate fuel and find new outlets for HS RFO.

In the short to medium term, there is insufficient time for the shipping and refining industries to retrofit or install new equipment. For example, it typically takes five years for a refiner to install a new coker. Moreover, the response of the shipping and refining industries to this new regulation has been muted. We understand there have been many inquiries for SO_X scrubbers by ship owners but limited commitments to install scrubbing equipment. The refining industry response has been even more restrained with only a few studies commissioned in response to the 0.5% sulphur bunker rule.

Therefore, the dominant fuel solution for the 0.5% sulphur bunker rule compliance in the short to medium term is likely to be marine gasoil (MGO)/marine diesel (MDO) and low-sulphur fuel oil (LSFO) rather than ships installing exhaust gas scrubbing or converting to LNG. If the shipping industry entirely relied on MGO/MDO for compliance, global MGO/MDO demand would increase by ~11%. However, some oil refineries that currently produce HS RFO will be able to shift to sufficiently low sulphur crude oil to produce compliant LSFO, so incremental MGO/MDO demand will be less than 11%. Nonetheless, MGO/MDO prices will be pressured higher. Refiners that currently produce HS RFO for the bunker market will have strong incentive to purchase lower sulphur crude oils so they can produce 0.5% sulphur compliant LSFO. Conversely, refineries that have coking capacity will have increased incentive to process heavy, sour crude oil and maximize production of MGO/MDO. Thus, as 2020 approaches, we expect that petroleum coke production at existing cokers will increase and petcoke quality will decrease (e.g. higher sulphur content).

Longer term, it is expected that the shipping industry will move towards exhaust gas scrubbing or LNG and away from MGO/MDO. Since there are large economies of scale to SO_X scrubbing, the most likely evolution for the shipping industry will be some combination of SO_X scrubbing on newer, larger vessels, and the use of ≤0.5% sulphur marine fuel for the remainder of the vessels.

It is unlikely that the shipping industry will exclusively utilize seawater scrubbing technology to achieve compliance with the 0.5% sulphur marine fuel rule. Thus, the refining industry will make some investments to reduce its production of HS RFO. While it is possible to remove the sulphur from high sulphur residuum directly, given the complex nature of these

2. MARPOL - International Convention for the Prevention of Pollution from Ships established in 1973, this code has been updated several times. Currently more than 180 countries are signatories.

3.MARPOL Annex VI – or colloquially MARPOL VI – Regulations for the Prevention of Air Pollution from Ships – was first enacted in 1997. Many people conflate MARPOL VI and the global 0.5% sulphur cap on bunker fuel even though MARPOL VI contains other regulations besides the global 0.5% S cap on bunker fuel.

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hydrocarbons, residuum desulphurization is a costly process, both in terms of capital and operating costs. An alternative path for the displaced high sulphur residuum is processing via delayed coking followed by distillate desulphurization. As was discussed earlier in this article, coking converts heavy residuum into light products (e.g., distillate fuel, similar to MGO, meeting the required sulphur limit of 0.5% maximum) and petroleum coke.

RFO typically contains 70% vacuum tower bottoms (residuum) and 30% diluent (e.g. kerosene), so currently approximately 2.1 million bbl/day (120 million tonne/year) vacuum tower bottoms (i.e. potential coker feedstock) is consumed by the maritime industry. If the refining industry selects coking to accommodate 50% of the residuum currently consumed as bunker fuel, then approximately 1.0 million bbl/day (~60 million tonne/year) of coking capacity will need to be installed. This new coking capacity will produce about 20 million tonne/year of petroleum coke; currently approximately 45 million tonnes/year of petroleum coke is traded in seaborne markets.

Keystone XL Heavy Canadian Crude Pipeline

One of the first actions of Donald Trump after he became U.S. President was to approve the 830,000 bbl/day Keystone XL pipeline. This 1,179-mile (1,897km) pipeline, which runs from Hardisty, Alberta, Canada to Steele City, Nebraska, is the final link between heavy Alberta oil sands crude oil production and U.S. Gulf Coast refineries.

It is not a foregone conclusion that Keystone XL will be built as TransCanada, the pipeline developer, has just begun soliciting firm transportation commitments, and the economics of Alberta crude oil production are less attractive now than when TransCanada began developing the pipeline. TransCanada has said it will proceed if it gets firm commitments to transport 225,000 bbl/day through the Keystone XL pipeline.

If the Keystone XL pipeline operated at full capacity and exclusively displaced light, sweet crude oils at U.S. Gulf Coast (USGC) refineries, then USGC petroleum coke production could increase by 20%. On the other hand, Keystone XL would have no meaningful impact on USGC petcoke production if Alberta crude oil exclusively displaced heavy Mexican or Venezuelan crude oils as the yield of petroleum coke per barrel from these crude oils is virtually identical to Alberta crude oil petcoke yield. The reality is that the Keystone XL pipeline will probably cause some increased USGC petcoke production but not a 20% increase.

In conclusion, the seaborne petroleum coke market has been significantly affected by factors often outside of its control, and outside factors will likely continue to significantly impact the seaborne petroleum coke market. DCi

About the Authors

Ben Ziesmer (Group Manager)

Contributing editor to Jacobs Consultancy's *Pace Petroleum Coke Quarterly*©. He has an in-depth background in the power sector, including experience in procurement, operations, environmental compliance, and engineering. He leads Jacobs Consultancy's fuel-grade petcoke practices and has been the project manager for numerous studies involving the fuel-grade petcoke market, environmental issues, and power generation.

Jesus Cabello (Group Manager)

Jesus is a contributing editor to Jacobs Consultancy's *Pace Petroleum Coke Quarterly*©. He has more than 36 years of experience in petroleum product marketing, refinery planning, operations, and technical support. He has conducted a number of configuration studies for heavy oil upgraders, refining and petrochemical facilities, optimization and debottlenecking of existing facilities, technology screening studies, and due diligence for investors, and has strong experience developing operations best practices. Prior to joining Jacobs Consultancy, Jesus held a variety of technical and management positions a: PDVSA, CITGO, Shell, Lummus Technology, KBR, and Foster Wheeler.

Jacobs Consultancy Inc. has published the *Pace Petroleum Coke Quarterly*© since 1983. The report has been published monthly since 1984 and is considered the worldwide authoritative source for petroleum coke market information.

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Hydrex mobdock reduces Singapore sterntube spill

Environmental considerations frequently demand that damaged sterntube seals are repaired as they happen and in the shortest possible time frame.

It is estimated that damaged ship sterntubes leak some 57 million tonnes of lubricating oil in to the oceans every year, but by replacing these seals when the damage is first discovered, Hydrex *in-situ* repairs not only help towards reducing the environmental impact but can also save shipowners time and money.

Using its flexible mobdock technology, damaged aft sterntube seals can be quickly replaced underwater during a vessels port-stay, negating the need for costly drydocking. Even complicated stern tube configurations and liners can be repaired this way.

"Environmental considerations frequently demand that damaged sterntube seals are repaired as they happen and in the shortest possible time frame," said Hydrex Production Executive Dave Bleyenberg. "Every Hydrex office is equipped with the mobdock technology and sophisticated equipment that can be deployed at a moment's notice to effect repairs in any location around the world."

A recent sterntube seal replacement Hydrex engineers completed in Singapore underscores the commercial and environmental benefits of using the *in-situ* repair method.

When a 138m-long vessel began leaking oil from a damaged sterntube seal during the vessel's port of call, an expedient repair was required to avert any delay to its schedule and prevent further pollution.

"Such incidents not only result in off-hire costs and charges, but also pollution related fines," said Bleyenberg.

Hydrex's local mobdock team was deployed while the company's technical department in Antwerp, Belgium, put forward a detailed repair plan which, once approved, allowed the mobdock team to make all necessary vessel preparations. Within a matter of days diver/technicians were on-site carrying out the seal replacement work.

Working in concert with the original equipment manufacturer, the Hydrex team removed and replaced three damaged seals with new ones. The entire operation was carried out underwater, without the need to drydock the vessel and without disruption to the vessel's schedule.

"From the start to finish, the project took just a few days, preventing any further oil leaks and keeping the vessel operational without incurring significant costs," said Bleyenberg.

Hydrex

Antwerp-headquartered Hydrex is renowned for bringing drydock-like conditions to ships and offshore units. This helps owners to extend their vessels' drydock interval and eliminates the loss of time and production brought about by drydocking.

Using its patented mobdock concept (mobile mini drydock), Hydrex diver/technicians can perform permanent repairs to all parts of the underwater ship propulsion system, as well as steel work or crack repairs in drydock-like conditions.

Because of the nature of repair work, it is often necessary for solutions to difficult problems to be worked out in a short time period, sometimes even after an operation has already started. Through a worldwide network of offices and service stations, Hydrex can provide start-to-finish solutions economically at any location.

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Subsea Industries welcomes TAU research into hull biofouling

"The industry has to consider taking a different approach to hull protection."

A study into the extent to which biofouling on ships' hulls is contributing to the spread of invasive aquatic species in the Mediterranean Sea — a phenomenon commonly associated with ship ballasting operations — has been welcomed by Belgium-based marine coatings supplier Subsea Industries.

According to recent research published by Tel Aviv University's School of Zoology, half the ships passing along the Mediterranean coast of Israel are carrying invasive ascidians, presenting a global threat to ecosystems around the world.

TAU's Dr. Noa Shenkar, who led the research, said: "These organisms are passing through the Suez Canal, latching onto ropes and the bottom of the ship. They're filter feeders, so they cover and clog every surface they latch onto, creating a lot of drag for the ship and damaging marine biodiversity in their new environments. They're a major threat to our coasts and are very costly to shipowners."

Among the wide occurrence of non-indigenous ascidians (NIA), TAU researchers also discovered a Caribbean species new to the region. The findings, state the authors of the report, "strongly support the hypothesis that marine vessels constitute a substantial vector for the introduction and dispersal of NIAs".

Subsea Industries' founder and chairman Boud Van Rompay, said: "The NIA threat is increasing because the antifouling systems in use since the TBT ban have been less effective in eliminating hull fouling. There is currently no miracle cure that will, on its own, prevent the spread of NIAs. The only known way of removing the threat is to clean the fouling organisms off mechanically, which is only possible with a hard-type coating. This ensures the underlying protective coating is not damaged. The industry has to consider taking a different approach to hull protection."

This is a view supported by the research findings. *The Monitoring the Magnitude of Marine Vessel Infestation by Non-Indigenous Ascidians in the Mediterranean* paper states that "self-polishing hull coatings are ineffective" in controlling biofouling in "hidden and protected" areas.

The research also finds: "The method of rapid high-pressure fresh-water wash fails to provide adequate treatment for removal of invertebrates inhabiting internal hidden areas; especially ascidians, that can survive the dry-docked time outside the water. Of greater concern is that it allows vessels to continue their regular operations and at maximal speed for longer periods; conducting a thorough maintenance procedure every 3–4 years rather than every 1–2 years."

Commenting on the findings, Van Rompay said: "This research substantiates what we said in January this year; that the entry into force of the Ballast Water Convention will not alone prevent the transfer of invasive aquatic species. There has to be mandatory legislation in place to prevent biofouling on ships' hulls. Hopefully this research will generate greater awareness of the problem and result in appropriate action."

Subsea Industries

Antwerp-headquartered Subsea Industries, established in 1983, is a pioneer in the development of hard hull coating systems and hull and propeller cleaning systems.

In 2002, after three years' extensive research and development, the company introduced Ecospeed as an environmentally safe underwater hull coating system, capable of improving ship performance, providing long-term fouling protection and reducing the impact of ship operations on the environment. Widely considered as an asset rather than a consumable — since one-coat lasts the vessel's life time and is deemed part of a vessel's structure, Ecospeed now has more than 700 marine references.

Ecospeed is type approved by Lloyd's Register as an abrasion resistance coating for ice-class ships and has DNV GL approval for use as a coating in ballast water tanks.

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GB Railfreight announces new appointments

GB Railfreight (GBRf) has announced that Bob Tiller has been promoted to Engineering Director and Ian Langton will take over as Production Director. Both will sit as members of GBRf's board.

In his new role, Tiller will oversee the relationships with GBRf's leasing and maintenance partners, ensuring value for money is realized by all parties to deliver long-term, sustainable results for the company. Tiller joined GBRf eight years ago as Fleet Engineer and has worked on the railways for over four decades, starting as an apprentice with British Rail at Old Oak Common. In that time, he has worked in various technical roles, including as Depot Production Manager, Fleet Engineer and on various locomotive refurbishment projects. He was also Project Manager for the repowering of First Great Western's high-speed train power cars.

Ian Langton will be responsible for the day-to-day delivery of GBRf's services, as well as the leadership of those carrying out this work. Langton joined GBRf in April 2012 and has over 27 years' experience in the rail freight sector. Prior to joining GBRf he spent 22 years working with DB Schenker and its various predecessors, EWS, Transrail, and British Rail. In the final two years of this period he was Operations Manager in the Netherlands.

GBRf is one of the rail freight industry's great success stories, having grown rapidly in recent years. The company has particularly focused its efforts on innovating and on delivering outstanding customer service. GBRf has pioneered the development of alternative core commodity markets such as intermodal and aggregates, as well as growing new markets in biomass. The company also introduced the 'Train Manager' concept, a title that reflects the enhanced responsibility and status of its drivers in delivering a top-class service for its customers.

John Smith, Managing Director, said: "It is a real pleasure to welcome both Bob and Ian to the GBRf board, where I know they will be able to make significant contributions. They both have proven track records of providing leadership and direction to their teams, as well as the ability to successfully lead and implement business strategies.

"In promoting Bob and Ian, I want to demonstrate that GBRf rewards loyalty and hard work, and is committed to creating more opportunities for others within the company. Maintaining the culture and work ethic within GBRf is paramount for me. I intend to work closely with all of the board to ensure this is maintained, developed, and improved upon."

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.

Port Autonome de Papeete orders a Damen ASD Tug 2810 for Tahiti

Damen Shipyards has won an open tender for the supply of a tug to Port Autonome de Papeete on the Pacific island of Tahiti. Tahiti is part of French Polynesia, an overseas territory of the French Republic. The tug will be Damen's popular ASD 2810 model, a rugged, versatile vessel capable of delivering 60 tonnes of bollard pull. Pape'ete is the capital of French Polynesia and the economic hub of the archipelago.


Contract signing.

Port Autonome de Papeete serves a wide range of vessels including local ferries, cargo ships, naval vessels, cruise ships and oil tankers and having a modern towage capability is vital for both the port and Tahiti given its remoteness and reliance on trade. With the current primary tug becoming increasingly outdated the decision was taken to acquire a new, more powerful vessel capable of handling the larger cargo, oil tankers and cruise ships expected in the coming years.

Following the award of the tender, Damen received 'L'ordre de Service' in early May. With an ASD 2810 in stock at Damen Song Cam Shipyard in Vietnam the process began immediately of finishing and commissioning her in accordance with French regulations, in time for delivery in early October this year. Additional equipment being fitted includes an extra aft winch and a Fi-Fi (firefighting) installation.

With French Polynesia being one of the remotest inhabited areas on Earth, an important part of the contract is ensuring that the tug will be properly supported and maintained. To meet this requirement, Damen has established a partnership with a local marine engineering company in Papeete that will operate in cooperation with the Damen Service Hub in Brisbane, Australia, 3,220 nautical miles to the west. As well as keeping the ASD 2810 in good working order, this arrangement will result in a welcome transfer of skills and technology to the Tahitian maritime sector.

Vincent Maes, Sales Manager Asia Pacific for Damen, commented; "Fortunately as a group we have long experience of working on projects in France and its overseas territories. The Asia-Pacific and French sales teams worked closely on the tender to ensure that all the requirements were met and we are delighted to have been selected. We look forward to establishing a lasting relationship with the Port Autonome de Pape'ete in the years ahead, and to contributing to the local maritime economy via training and knowledge transfer."

Georges Puchon, Port of Papeete General Manager, added "Damen was awarded the tender thanks to the good technical arguments, professional experiences and insuring after sales organization and services in Tahiti. We hope that our collaboration will last for the best of each of us."

With regard to other French projects, Damen Shipyards Antalya is currently building two 55-metre Fast RoPax 5510 ferries for the Collectivité de Saint Pierre et Miquelon, another French overseas territory, situated in the north western Atlantic Ocean near the Newfoundland and Labrador province of Canada. Delivery is scheduled for the end of this year.

Damen Shipyards Group

Damen Shipyards Group operates 33 shipbuilding and repair yards, employing 9,000 people worldwide. Damen has delivered more than 6,000 vessels in more than 100 countries and delivers some 180 vessels annually to customers worldwide. Based on its unique, standardized ship-design concept, Damen is able to guarantee consistent quality.

Damen's focus on standardization, modular construction and keeping vessels in stock leads to short delivery times, low total cost of ownership, high resale values and reliable performance. Furthermore, Damen vessels are based on thorough R&D and proven technology.

Damen offers a wide range of products, including tugs, workboats, naval and patrol vessels, high speed craft, cargo vessels, dredgers, vessels for the offshore industry, ferries, pontoons and superyachts.

For nearly all vessel types Damen offers a broad range of services, including maintenance, spare parts delivery, training and the transfer of (shipbuilding) know-how. Damen also offers a variety of marine components, such as nozzles, rudders, anchors, anchor chains and steel works.

In addition to ship design and shipbuilding, Damen Shiprepair & Conversion (DSC) has a worldwide network of 17 repair and conversion yards with dry docks ranging up to 420 x 80 metres. Conversion projects range from adapting vessels to today's requirements and regulations to the complete conversion of large offshore structures. DSC completes around 1,350 repair and maintenance jobs annually.

Damen TSHK 650 sails to Gippsland Ports

First Damen dredger for Australia sails on own keel to final destination

A Damen Trailing Suction Hopper Dredger (TSHD) 650 has successfully completed sea trials in Shanghai and has now sailed to new owner, Gippsland Ports in Australia on her own keel. The TSHD, named *Tommy Norton*, is the first Damen dredger built for Australia.

Having left Shanghai on 14 July, a Damen team sailed *Tommy Norton* approximately 5,000 nautical miles over a period of around 30 days to reach Australia. Along the way, the vessel stopped off in Guam for bunkering and to enable the crew to take on supplies of fresh water and food.

Damen's team made extensive preparations for the voyage, as Captain Martin van Krieken explains: "Before embarking on such a trip, there is a lot to do. We have to make sure we have enough supplies on board for our safe manning of seven crew — and to ensure that everyone is familiar with the vessel. Then there's voyage planning, draught and stability calculations, weather routing, establishing of a maintenance schedule and checking all on board equipment to take into account."

Van Krieken highlights that safety is given the highest priority during these preparations. "One of the key points of focus is the setting up of both an International Safety Management (ISM) and an International Ship and Port Security (ISPS) system, both of which are certified by Bureau Veritas prior to departure. This includes rollout of a number of drills — including abandon ship, man overboard, fire, emergency steering, collision, oil spills, grounding and piracy. Nothing is left to chance."

Additionally, the team had on board a comprehensive set of medical equipment and medicines in case of injury or sickness. As Captain, Van Krieken is trained to administer treatment for most common medical situations. He can also count of the assistance of the Netherlands' 24-hour doctor support service for Dutch Captains. In case of a medical situation occurring, these qualified professionals judge if treatment is necessary and what form it should take.

After arriving in Australia, the *Tommy Norton* embarked upon dredging trials.

Tropical Shipping selects Thordon seawater-lubricated propeller shaft package

Thordon's award-winning COMPAC water lubricated propeller shaft bearing system.

Thordon Bearings' Jacksonville-based distributor Coppedge Marine has secured an order with Tropical Shipping for the award-winning COMPAC seawater lubricated propeller shaft bearing system.

The COMPAC systems destined for two 300TEU environmentally-compliant box ships under construction in China, at the Guangzhou Huangpu Wenchong Shipyard, will represent a first reference for COMPAC with this shipowner. The shaft package is equally suitable for use in dry bulk carriers.

"Tropical Shipping is a long-standing customer to whom we have supplied various Thordon equipment over the years," said Ed Coppedge, Vice-President, Coppedge Marine. "We have often discussed the benefits of seawater lubricated propeller shaft systems with the shipowner so are delighted that we can now add the COMPAC system to our scope of supply.

"A key factor in us winning the order was being able to offer a proven, reliable system capable of meeting the US EPA's Vessel General Permit Rules. When these new reefer containerships join Tropical's fleet in June 2018, they will operate in US waters between Florida, the Bahamas and the Caribbean."

Erwin Holder, General Manager Vessel Construction, Tropical Shipping said: "We have an established relationship with Coppedge, which has supplied Thordon rudder bearings to a number of vessels in the Tropical fleet. Our experience with these bearings and the confidence we have in Thordon systems, in general, meant COMPAC was a no brainer for us. These new 300TEU vessels will have a raft of equipment designed to protect the environment, so COMPAC fits well with our environmental sustainability goals. A seawater lubricated propeller shaft bearing installation means there will be zero risk of these vessels leaking oil into the sea."

In addition to the COMPAC polymer bearings, the Tropical Shipping package includes Thordon's Inconel®-equivalent shaft liners, Thor-Shield shaft coating systems, Thordon Water Quality Packages and a wear down poker gauge assembly.

"We were very involved in the specification to ensure that we were able to offer Thordon's 15-year bearing wear life guarantee, which was an important requirement for the owner," said Coppedge. "To offer this Thordon has to take the lead on the shaft installation to ensure it is properly protected and that the water flowing to the bearings is of sufficient quality."

In concert with Coppedge, Thordon's Chinese distributor CY Engineering will work with the shipyard to ensure the system is installed correctly and optimize the plant to meet Thordon's 15-year wear life guarantee requirements.

Sam Williams, Thordon Bearings' Regional Manager, Eastern Asia, said: "Orders such as this require close cooperation between our representative looking after the shipowner and our distributor working with the shipbuilder. When we receive new orders, we approach both parties and work to achieve a preference on the part of the owner, and a commercial/technical agreement with the yard. This can be a process which goes through many iterations, depending on the owner's involvement and on the preferences of the shipyard.

"In this case, CY Engineering will be responsible for all detailed technical/engineering work with the shipyard and supervise the installation and commissioning processes. CY is also the contract partner for Thordon and will supply all Thordon deliverables for the project in July."

The Guangzhou Huangpu Wenchong Shipyard will also build four 1,100TEU containerships, each of which will be powered by a MAN B&W 6S60ME-C8.5 main engine driving a five-bladed VBS1550-5 Mk5 CP propeller in a COMPAC seawater lubricated shaft bearing arrangement.

Tropical Shipping's new vessels will form part of a wider fleet expansion programme designed to improve service levels between West Palm Beach, FL., Halifax, Canada and the Bahamas and Caribbean.

About Thordon Bearings

A global leader in seawater lubricated propeller shaft bearing systems, with over 35 years' experience in this technology, Thordon Bearings is renowned for supplying high performance, oil and grease-free bearing systems to the global marine, clean energy, pump and offshore markets. Thordon Bearings is the only manufacturer of propeller shaft bearings to guarantee its award-winning COMPAC system for a 15-year wear-life. Thordon systems and bearings are available worldwide through over 85 agents and distributors.

ABS joins industry partners to advance autonomous shipping

ALLIANCE BRINGS TOGETHER KEY INDUSTRY STAKEHOLDERS TO FORGE A PATH FOR THE UNMANNED CARGO SHIP.

ABS, a major provider of classification and technical services to the offshore and marine industries, joined the Unmanned Cargo Ship Development Alliance to work with industry partners, including class organizations, shipyards, equipment manufacturers and designers to advance autonomous shipping. The design will integrate features of independent decision-making, autonomous navigation, environmental perception and remote control.

"Increased digitization, advanced technologies and new levels of connectivity are changing the way the maritime industry operates," says ABS Greater China Division President Eric Kleess. "In the coming years, we will see significant changes in the way ships are designed and built, with a strong drive to develop autonomous vessels especially in China. As a key member of this alliance, ABS is aligned closely with industry to support safer and more sustainable maritime operations."

The Unmanned Cargo Ship Development Alliance, chaired by HNA Technology Group Co, Ltd., was formed with nine members, including ABS, CCS, China Ship Research & Development Institute, Shanghai Marine Diesel Engine Research Institute, Ltd, Hudong-Zhonghua Shipbuilding (Group) Co., Ltd, Marine Design Research Institute of China (MARIC), Rolls-Royce, and Wartsila. The alliance officially launched at the end of June and expects to deliver the unmanned cargo ship by October 2021.

"Through this collaborative effort, we will apply the latest technologies to develop a new autonomous ship concept," says HNA Technology Group Vice Chairman Li Weijian. "The newly formed alliance is advancing new innovations in ship design and operations, and also working to promote the safe adoption of these assets in the market."

ABOUT ABS

Founded in 1862, ABS is a major international classification organization devoted to promoting the security of life and property and preserving the natural environment through the development and verification of standards for the design, construction and operational maintenance of marine and offshore assets.

ABS updates Advisory ahead of impending 2020 global sulphur cap

ABS SCRUBBER ADVISORY OFFERS COMPREHENSIVE GUIDANCE ON THE LATEST AVAILABLE EXHAUST GAS ABATEMENT TECHNOLOGIES.

ABS has updated the *ABS Advisory on Exhaust Gas Scrubber Systems (Scrubber Advisory)* to help industry prepare for IMO's 2020 global sulphur cap.

"As I meet with owners and operators around the globe, there is a common focus on how best to comply with the upcoming global sulphur cap," says ABS Executive Vice President for Global Marine Dr. Kirsi Tikka. "This Advisory provides in-depth guidance on scrubber technology selection and comes just as the marine industry is weighing the right compliance options for their fleets."

Central to the impending 2020 global sulphur cap are requirements to reduce the sulphur oxide (SO_x) emissions from ships. Installation of exhaust gas cleaning systems (EGCS), commonly referred to as scrubbers, is a potential solution for owners looking to comply with the upcoming requirements. This updated Advisory includes background on air emission regulations and explores the different types of available scrubber technologies along with the associated installation and operational challenges for each.

"As we close in on 2020, scrubbers are under increasing consideration as a solution for many vessels," says ABS Director of Environmental Performance Thomas Kirk. "By utilizing this Advisory to understand the unique characteristics of the available scrubber technologies, the marine industry will be able to make smarter decisions on the future of their fleets."

ABS has led the way in helping industry prepare for upcoming air emission requirements. ABS introduced the world's first scrubber-ready notation, providing guidance for owners who are planning to retrofit their vessel with an SO_x scrubber at a future date. By looking ahead during the design phase and accounting for possible retrofits in the future, owners are better prepared for future regulatory requirements and able to more cost-effectively retrofit their vessels.

ABS also published the ABS Guide for Exhaust Emission Abatement which applies to vessels fitted with an exhaust emission abatement system, including SOx scrubbers, selective catalytic reduction systems and exhaust gas recirculation for nitrous oxide (NO_x) emission control. ABS can provide further support by completing a techno-economic analysis of the arrangements. Such studies consider the impact of capital and operating expenses to determine the life cycle cost of the installation, providing critical information to support vessel owners and operators in the decision-making process.

More investment projects at the Port of Gdansk

Under an agreement signed on 26 June this year, works focusing on bank reinforcements of the final section 12f–14 of the Szczecinskie Quay will be carried out this year. This is yet another investment by the Port of Gdansk implemented with the improvement of safety in mind.

The works, which are to begin this month (July) will involve the reconstruction of the existing bank reinforcement, and the quay's above-water part will be pulled down and modernized, along with the slope reinforcement to the same standard as the neighbouring sections meet. The execution of this contract, amounting to PLN 1,369,499.99 (US$370,000), will take up to 33 weeks. All the works will be carried out in the immediate vicinity of an open fairway.

The investment constitutes another stage of the thorough modernization of the entire port infrastructure as part of the strategic plan to be implemented until 2027, as well as an important element of the visual enhancement of the port premises. All of the undertakings, amounting to a total of PLN 700 million (US$188,000), are aimed at improving the port's safety and competitiveness.

Major feedstuffs delivery arrives at Fredericia

27,500 TONNES OF FEEDSTUFFS ARRIVE BY SHIP FROM URUGUAY TO THE PORT OF FREDERICIA.

A ship with 27,500 tonnes of feedstuffs arrived early July 2017 at the Port of Fredericia in Denmark. Even though the Port of Fredericia often receives large ships, it is always a fine sight when a ship 190 metres long and 32 metres wide docks in the harbour. With a central location, 15 metres of water depth and a large crane capacity, the Port of Fredericia has the right preconditions to handle very large ships.

Its optimal location makes the Port of Fredericia a link between Denmark and the rest of the world. In the hub, where the harbour meets the motorway and railway, ADP handles containers, mixed cargo, project loads and dry bulk from the whole world.

"We are experienced in handling the big ships with both corn and feedstuff at the Port of Fredericia. We have the facilities in the form of warehouses, hinterland areas, manpower and not least optimal logistical conditions so that the goods can be quickly transported on to their next destination," says Ole Haugsted Jørgensen, Strategic Sales Manager at ADP A/S.

SHIP-TO-SHIP OPERATION

Working with shipping companies, ADP regularly handles cargo transfers or 'ship-to-ship' operations, which means part of the load from a large ship being directly transferred by crane to a smaller ship.

A ship-to-ship operation can be demanding, since the arm of the crane has to reach from the edge of the quay and lift the goods from one ship to the other. But at the Port of Fredericia, there is the necessary crane capacity to handle major transshipments. In the specific case of a ship 32 metres wide, the crane needs to reach 40 metres out from the quay," says Johnny Nielsen, Head of Department at Fredericia Shipping.

The ship arrived from Uruguay with 27,500 tonnes of feedstuffs and was emptied in four days, using two cranes from early morning until the early evening.

"Our crane operators have many years' experience in the effective handling of goods from big ships, and that is precisely one of our sales arguments that customers appreciate," says Ole Haugsted Jørgensen.

From the cargo total, 2,500 tonnes of feedstuff were directly transferred to a smaller ship, which then sailed to Nørresundby. The remaining 25,000 tonnes were distributed onto 750 trucks, which then transported the feedstuffs further to production companies or for storage elsewhere, according to Nielsen.

Port of Rotterdam throughput up by 3.9%

With an increase in throughput of 3.9%, the port of Rotterdam can look back on a good first half year. There was growth in eight of the ten market segments. The only falls were in the volumes of mineral oil products and other liquid bulk. In particular, the volume of containers handled (9.3% in TEU, 10.4% in tonnes) was the determining factor for the overall growth in throughput. Dry bulk increased (5.2%), liquid bulk decreased slightly (–1.0%) and breakbulk was very much on the rise (10.8%). A total of 238mt (million tonnes) of goods was handled in the first half of the year. The market share of Rotterdam by comparison with the other ports in the Hamburg-Le Havre range increased from 29.0% (Q1 2016) to 30.9% (Q1 2017) in the container sector.

Several companies announced major investments this half year, indicating business confidence in the Rotterdam port and industrial complex. Those investments consolidate the importance of the complex for the Dutch economy.

Sea port dues decreased by 0.4% (€0.6 million) to €146.0 million, while throughput increased by 3.9% because of a fall in some market segments of the average price per tonne due to the prevailing price structure. Income from contracts rose by 1.3% (€2.2 million) to €173.8 million. 'Other operating income' increased as a result of an accounting change and so revenue as a whole went up by €8.3 million to €342.3 million. To meet the corporation tax requirement effective from the beginning of the year, 25% (€31.4 million) of the result has been earmarked, and profit after taxation is therefore €97.8 million. This is comparable with the result over the same period last year, when the interest rate swap was partially bought off for €32.0 million. The result is in line with expectations.

Ports in neighbouring countries receive considerably more support on a structural basis from their national governments than their Dutch counterparts. For example, there are now plans in Germany to halve the tariffs for rail transport. Dutch ports are the only ports that the European Commissioner requires to pay corporation tax, and the European limit for state aid has been raised to €150 million. In view of the importance of the port of Rotterdam and the challenges facing the port and industrial complex, support is needed that is comparable to neighbouring countries.

Multi-user dock generates local spinoffs

The Port of Sept-Îles has announced that Societe ferroviaire et portuaire de Pointe-Noire (SFPPN) has retained local contractor Groupe G7 to build the conveyor that will link the multi-user dock to SFPPN storage facilities.

This local contract, a $15 million investment on the part of SFPPN, is in keeping with the agreements stipulating that users of the multi-user dock are responsible for linking it to their storage facilities.

This new regional infrastructure project follows on the December strategic agreements between SFPPN and the Port of Sept-Îles setting out the terms and conditions for priority construction of the conveyor.

As the instigator of the multi-user approach and partner with SFPPN from day one, the port will cooperate in every way possible to ensure the project is delivered on time so that loading operations can start at the multi-user dock before the end of the year.

"We'd like to acknowledge the Quebec government's leadership in helping ensure that the contract benefits the region by going to a local company. Government investments at Pointe-Noire in recent years show that Quebec is attentive to the region's needs and realizes the importance of supporting the iron mining industry," said Pierre Gagnon, CEO of the Port of Sept-Îles.

About the Port of Sept-Îles

Boasting diverse, state-of-the-art facilities, the Port of Sept-Îles is one of North America's largest ore-handling ports, with an annual volume of close to 25 million tonnes. The port facilities at Sept-Îles play a vital and strategic role in the economy of Eastern Canada. Annual economic impacts are estimated at nearly $1 billion and almost 4,000 direct and indirect jobs.

Grain exports via Rosario increase significantly

In Argentina, the Rosario metropolitan area has seen a 41% increase in exports of grain, derivatives and vegetable oils when comparing 2006 and 2017. Going back to 2000, the difference is a significantly larger 96%.

According to the Economic Department of the local Chamber of Commerce, in 2016, grain was moved by 1.96 million HGVs, 210,000 railway wagons, 3,000 barges and 2,420 deepsea vessels. Two of the Chamber's economists, Julio Calzada and Alfredo Sesé, note that this was 300,000 HGVs and 250 vessels more than the ports in the Metropolitan area had reported in 2015.

The city and its surrounding area are also home to various processing plants, while road traffic into the ports is on the rise. The ports have drawn in around 2,400 vessels, loading or discharging fertilizer, containers and minerals.

It has been calculated that, in 2016, some 65mt (million tonnes) of Argentinian grain passed through Rosario, with transport being in rail wagons, HGVs and barges, as well as deepsea vessels.

The ports also handled 1,735,546 tonnes of flour and 726,216 tonnes of oil from Paraguay and Bolivia for export, as well as 852,000 tonnes of imported grain.

The Paraná-Paraguay waterway is used extensively by barges serving Rosario's ports, with overall export port traffic up 11% in 2016 compared to 2015. In that year, export volumes amounted to 67mt out of a total for the ports of 86mt. Both road and rail benefitted from this extra traffic, but not barges.

Significantly, neither the capacity nor the quality of either road or rail links have been improved in recent years.

The report's author's therefore conclude, "It is highly necessary and very urgent to quickly implement road and rail infrastructure works that the area needs and which have been continually put back over quite some time." *Barry Cross*

Maravilha Consortium's Rio grain terminal bid approved

Brazil's Ministry of Transport has approved the concession agreement for the wheat terminal at the Port of Rio de Janeiro, which was awarded by the National Waterway Transport Agency (Antaq) in April.

The winning bid of $372,886 was received from the Maravilha Consortium, which had been put together by Bunge and M. Dias Branco. No other bids were received.

The winning consortium estimates that it will have to make investment in infrastructure and equipment in the region of $30 million.

The concession will run for 25 years. *BC*

Vostochny completes Phase 3 expansion

Russia's largest coal stevedore Vostochny Port JSC, which is part of the holding run by Port Management Company LLC, reports that delivery of all the major specialized equipment for Phase 3 of Vostochny Port's coal terminal is now complete.

Among the equipment delivered is two coal stackers, four reclaimers, two tandem wagon dumpers and two shiploaders, all of which will serve Berth No 51.

"Deliveries of equipment for Phase 3 of the coal terminal began last year," notes Anatoly Lazarev, Managing Director of Vostochny Port JSC. "Stackers and reclaimers were assembled here, on the construction site. Shiploaders were delivered by sea in an assembled condition".

The assembly and installation of wagon dumpers will begin as soon as underground bunker construction has been completed.

Vostochny Port JSC, which is situated in Primorsky Territory, remains Russia's largest publicly available terminal equipped with wagon dumpers, conveyor systems, ship loading equipment and what is a unique multilevel system of magnetic separation.

The terminal exports coal from various producers. In 2016, it exported 23.5 million tonnes of coal, equivalent to 20% of all Russian port coal exports, as well as 30% of coal transshipment through Russia's Far East Basin ports.

The new terminal facilities will be put into operation in 2017, boosting overall capacity at the port to 39 million tonnes. *BC*

Port of Kiel right on target for growth

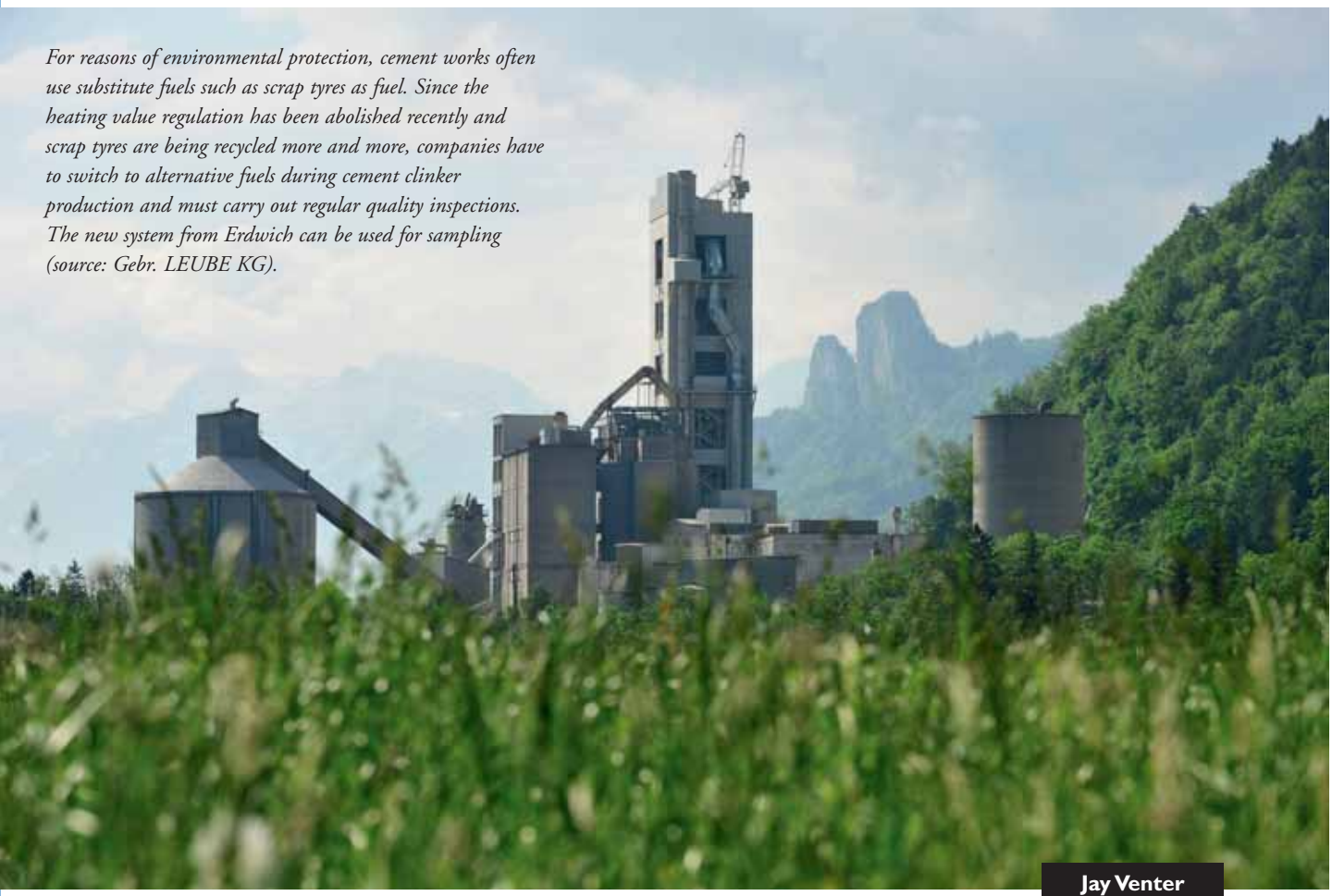
The Port of Kiel in Germany is very much on target for growth and has posted its best half-year results to date. In the first six months of 2017 the port's varied facilities handled 3.7 million tonnes of goods, topping the total in the same period of the previous year by 20%. Dr Dirk Claus, Managing Director of the Port of Kiel (SEEHAFEN KIEL GmbH & Co. KG) said: "the taking into service of the SCA Logistics Centre in Kiel's Ostuferhafen has already shown it is having a lasting impact on growth and providing the planned impetus which justifies our investment." Some 400,000 tonnes of high-value timber products were handled and stored for new customers Svenska Cellulosa Aktiebolaget (SCA) and Iggesund Paperboard in the first half of the year. "This very good result is all the more significant because Kiel was also able to post increases in its other handling sectors — ferry traffic and bulk goods," said Claus. Even without taking the SCA traffic into consideration, Kiel's handling performance still rose by a remarkable 7.6%.

In the first half year of 2017 bulk goods handling rose by a gratifying 18.7% to well over 550,000 tonnes. Alongside fuels like coal and oils, significant increases were also posted in the handling of building materials, grain and scrap metals. In the ferry sector, the Stena Line in particular upped turnover — by 12.8% — and is ranked number two on the list of Kiel's most important freight customers after DFDS. Surprisingly, trade with Russia, which has been severely disrupted in the past few years by trade restrictions, also showed a slight revival. "We are now creating additional warehousing capacities in the Ostuferhafen, in order to stabilize the positive development in trade with Russia," said Claus. Currently taking shape in the immediate vicinity of the berth used by ships on the St Petersburg route, is the 5,000m² Shed 12, planned as a warehouse for sawn timber. In container business, which is of only minor significance in Kiel, 13,400 TEUs were handled – an increase of 19.3%.

Intermodal rail/ship handling continued to expand in the first six months of the year with the inauguration of a weekly direct train shuttle between Kiel and Trieste and the introduction of an additional departure to Verona. For the first time ever, the rail facilities at the Schwedenkai Terminal and in the Ostuferhafen loaded more than 16,000 consignments onto rail wagons — an increase of 10%. Claus said: "We are already working to further increase performance at the Schwedenkai Terminal by adding another rail track. That will mean that we are able to handle the biggest part of the growth in sea port hinterland transport on the railways."

In the passenger sector, 913,000 travellers were handled – an increase of 3.1% over the same period last year. The biggest increases were recorded by the Stena Line on its route to Gothenburg in Sweden, followed by the route to Klaipeda in Lithuania. Most passengers travelled with the ships of Color Line from Kiel to Oslo. In the cruise shipping sector, 65 cruise ship calls were made up to 30 June and well over 200,000 passengers registered.

Inspection & sampling under scrutiny



For reasons of environmental protection, cement works often use substitute fuels such as scrap tyres as fuel. Since the heating value regulation has been abolished recently and scrap tyres are being recycled more and more, companies have to switch to alternative fuels during cement clinker production and must carry out regular quality inspections. The new system from Erdwich can be used for sampling (source: Gebr. LEUBE KG).

Jay Venter

Cement industry moves away from using tyres for energy

Abolition of the heating value regulation in the laws of life-cycle management

❖ **ENERGETIC USE OF SCRAP TYRES HAS BEEN RESTRICTED: CEMENT MANUFACTURERS HAVE TO SWITCH TO OTHER SUBSTITUTE FUELS**

Automatic sampling system facilitates fuel quality testing

The use of substitute fuels (SF) had previously been regulated in § 8 (3) of the laws of life-cycle management (Kreislaufwirtschaftsgesetz-KrWG) and facilitated above all industrial companies with a high energy requirement to use SF such as scrap tyres in the production of their products. But the so-called heating value regulation was now abolished on 1 June 2017. This means, among other things, for cement plants that the scrap tyres, which are often used because of their high heating value, are now increasingly recycled rather than energetically used; In the future, companies will also have to pay particular attention to the high quality of the waste and have it checked regularly in the laboratory. In order to meet these requirements, Erdwich Zerkleinerungssysteme GmbH offers plants that automatically take representative samples of the fuel material and process them for laboratory use.

On 1 June 2017, the heating value regulation was abolished in the German laws of life-cycle management at the instigation of the EU. "This paragraph had made it possible for industrial companies, such as cement manufacturers, to use SF to operate the heating furnaces. Primarily, plastics from commercial waste were used, for example films and scrap tyres. The prerequisite for this was that the heating value of the waste was at least 11,000KJ/kg," Jürgen Graf, sales manager at Erdwich Zerkleinerungssysteme GmbH, explains. According to the German Federal Environment Agency, 3.14mt (million tonnes) of energy were recovered from the 5.92mt of plastic waste in Germany in 2015, with 1.09mt being used as a substitute fuel in industries. The abolition could now have a significant impact on different waste streams. It is expected that around 80,000 tonnes of used tyres are to be recycled per year, which have previously been used as a substitute fuel. This poses a challenge for companies to look for another, high-quality substitute fuel that exceeds the heating value of 11,000KJ/kg. However, it is not yet clear which criteria must be met to burn the waste rather than to recycle it. Nevertheless, it is advisable for the cement

manufacturers to check the quality of the material and its heating value even more regularly in the laboratory. This is also relevant with regard to the product quality of the fired cement clinker, which depends inter alia on the burned materials.

Automated sampling system prepares material for laboratory analysis

In many companies, however, sampling is still done manually and very irregularly and at different times. "In this way, the material is not representative and very inhomogeneous. This makes it very difficult to draw conclusions about the quality of the entire substitute fuel," Graf says. Therefore, it should be in the company's own interest, to replace the manual sampling by an automated system.

On the basis of the tried-and-tested single-shaft shredders, the shredding expert company Erdwich has designed a system which automatically takes several individual samples from a total volume of 200 to 250 litres from the substitute fuel. These are comminuted from about 150mm to a suitable grain size of about 5 to 8mm and are, thus, suitable for further processing by laboratory shredders. "In order for the sample material to be as representative as possible, it is subsequently mixed again and, depending on the requirements, a sample of about 0.5 to one litre is taken as the final dispatch for the delivery to the laboratory," Graf explains. The rest of the material is automatically returned to the fuel stream.

The samples taken are crushed, mixed and, thus, optimally prepared for laboratory analysis. If necessary, Erdwich also adapts the comminution plant to special space conditions within the company (source: Erdwich Zerkleinerungssysteme GmbH).

Sampling system can be adapted to operational requirements

The Erdwich company offers two different solutions. On the one hand, the comminutor can be used as a stand-alone machine. Depending on the sample size, the compact models M400 for up to 30 litres as well as the M600 for up to 240 litres are intended for use. The feed to the plant as well as the separation after crushing are carried out manually. On the other hand, comminution with a graduated separation is possible. Here, the original sample with about 200 litres is removed manually from the furnace, transported to the plant and crushed there. Subsequently, the sample separation is performed.

If necessary, the system can also be equipped with a magnetic separator to protect the subsequent laboratory mills. SF consist mainly of plastics, but contaminants such as wood, metals, mineral fractions or glass can also be present in the commercial waste. These circumstances as well as the possibly occurring high residual moisture of the material strongly strain the knives of the shredders. This is why they are designed for a particularly high wear resistance and are equipped with a special geometry.

Since the origin of the substitute fuel is commercial waste, the waste consists of different materials that can strain the blades. This is counteracted by Erdwich with robust materials and special geometries (source: Erdwich Zerkleinerungssysteme GmbH).

Special solutions for special operating conditions are possible

The company, based in Igling, also offers special solutions on request, which can be adapted for example to particularly narrow space conditions in the enterprise. "The sampling system makes it possible to avoid human error sources and to prevent manipulation by means of the extensive process automation," Graf explains the advantages. "In addition, the samples are reproducible due to the consistently high extraction rate and are understandable at any time as documentation is created with each extraction. As a result, the substitute fuel suppliers can also continuously check how the analysis results have been achieved, "the sales manager continued.

In addition, Erdwich is developing a special version which can be opened up and which is to be subjected to a practical test in the in-house pilot plant. Cleaning and changes of screens should be considerably simplified.

Professional sampling and inspection by Alex Stewart International, -Agriculture

Alex Stewart International offers independent, worldwide coverage offering a full range of supervision, inspection, weighing, sampling, moisture determination, quality sample preparation and analysis services for metals, minerals, ores, concentrates, minor and precious metals (including jewellery), ferro alloys, recycled scrap metal, metallurgically complex materials and coal at all major ports and refineries.

Alex Stewart Agriculture, part of the Alex Stewart International Group, specializes in food and agriculture and offers a diverse range of inspection/sampling and analysis throughout the world, from grains/animal feeds to wood pellets, fruits, sugars, vegetable oils and pet foods. Alex Stewart Agriculture is a member of GAFTA, FOSFA, IFIA, GTAS, ANEC, SENASA and SAL.

"Our inspection team ensures that you can be confident that the quality, weighing and sampling of your product will be supervised and verified with professional care and attention, from the load port to the final destination, whether by draught survey, weighbridge, monitoring or truck reconciliation," says Glenn Forbes, Agricultural Manager, Alex Stewart Agriculture Ltd.

Alex Stewart Agriculture's client base consists of worldwide internationally renowned, local traders, pet food manufacturers, ports and food manufacturing plants. "To increase this market we are striving to participate in as many industry specific conferences, shows, trade fairs to meet and talk with companies in the industry and potential new clients." explains Forbes. He continues "We also look for the next new era of products coming to the market place. As temperatures rise and population increases this is an area we have to keep a close eye on and be ready as a company to offer our services wherever required."

On the metals side of things, Alex Stewart International's clients "...come from a wide variety of different sectors of the Metals and Minerals industry, ranging from miners, metal traders, smelters, refiners and various manufactures of metals products," says Graham Stewart, Managing Director, Alex Stewart International.

"Our competition within the markets and industries we service is fierce, however we continue to differentiate ourselves through our expertise, personal and professional service worldwide," Stewart continues.

With current economic climate being difficult at the moment and with an unstable Europe and worldwide trade difficult, Alex Stewart Agriculture as a company tries to diversify to new markets coming round, without forgetting the markets it is already working in. It does this by offering not only a professional service, but also the personal service that can be lost with some large companies.

The Minerals and Metals sectors are experiencing reasonable growth at the moment and Alex Stewart International is continuing to expand its business. "It is very important to differentiate our service and offer the highest standard of service to ensure we continue to receive repeat business from our clients," says Stewart.

Adherence to strict standards

Supervision, inspection and sampling strictly adhere to standard operating procedures and are all carried out according to contracts and their standards. Inspectors and cargo surveyors are present for the entire duration of supervision. By following correct sampling methods thoroughly and methodically, they assure that the quality of the samples is homogenous and representative of the cargo as a whole.

Talking about the importance of collecting homogenous samples Forbes and Stewart explain "Without homogeneous samples, the analysis could never be accurate. We obtain homogeneous samples, which is vitally important in order to represent the cargo, by strictly adhering to industry standards that are clearly marked out and keep our good in-house training to a very high standard. Our inspectors are well trained and work to strict international standards."

To ensure a constant qualified and skilled staff, Alex Stewart trains its Agri- and Metals- Inspectors at its in-house training programme. Additionally inspectors are also enrolled and sent out to industry specific courses.

Since Agri clients are exporting out of Europe, it is essential for Alex Stewart Agriculture to be converse with the latest EU directives and adhere to these standards.

Alex Stewart International works to international standards to ensure all work is performed in line with current legislation.

Tools of the trade

As the requirement for inspection services is continuing to grow, Alex Stewart's Agri- and Metal- sampling, analysis and

Your Global Network of Inspection & Analytical Laboratory Services

ASA Operations
Argentina
Australia
Bolivia
Brazil
Bulgaria
Chile
China
Ecuador
Egypt
Estonia
Finland
Gabon
India
Indonesia
Iran
Iraq
Japan
Kazakhstan
Korea
Latvia
Macedonia
Malaysia
Norway
Peru
Philippines
Portugal
Romania
Rwanda
Singapore
Spain
Syria
Taiwan
Thailand
Turkey
United Kingdom
Ukraine
United Arab Emirates
United States
Zambia

Alex Stewart Agriculture provides world-class FOSFA and GAFTA approved independent inspection and laboratory services. Supported by the A. Norman Tate and Huson & Hardwick Laboratories, our analytical, inspection and certification services facilitate the international trading of soft commodities, including sugar, oils & fats, bio-diesel, cereals, fertilisers and other food products.

Today, the network of regional Alex Stewart companies spans over 40 countries and delivers fast, flexible and comprehensive inspection, analytical and laboratory services to the agricultural industry, with coverage at all major ports and receivers. By maintaining a dedicated, friendly and trustworthy business relationship with clients, ASA provides unparalleled technical support.

Our mission is to provide professional inspection and analytical services that conform to internationally accepted standards – and, by meeting all contractual specifications, to protect clients from unnecessary financial claims. Our inspectors are conversant with all accepted sampling and weighing procedures.

A Name To Trust In Business
Inspection and analytical services combining a unique competence – ASA employs qualified, experienced chemists and inspectors to deliver precise and prompt quantity and quality reports and certificates. Our professional and knowledgeable team provides a dedicated, high-quality service that meets the specified requirements and demands of the agricultural sector including traders, producers, governments, banks and financial institutions and the general public.

Alex Stewart (Agriculture) Ltd

21 Sefton Business Park, Netherton, Liverpool
Merseyside L30 1RD United Kingdom
T: +44 (0) 151 525 1488 **F:** +44 (0) 151 530 1563
E: glenn.forbes@alexstewartagriculture.com
www.alexstewartagriculture.com

Alex Stewart Agriculture bases its activities on the principles of responsibility, impartiality, professionalism and confidentiality.

Main Activities
- Inspection services
- Laboratory and Analytical Services
- Weighing, sampling and sample preparation
- Quantity & Quality reports
- Certification
- Technical consultancy services
- Training

Inspection Services
- Pre-shipment inspection
- Proof on arrival inspection
- Vessel condition surveys
- Supervision of bulk cargoes – load/discharge
- Weighing, sampling and sample preparation
- Stockpile sampling
- CMA, goods release and warehouse control
- Radioactivity testing

Laboratory Services
- Commercial analysis
- Production analysis
- Oilseed analysis
- Sample preparation
- Traditional wet chemistry
- ICP/AA
- HPLC
- GC-MS

inspection services are needed on a continuous basis to ensure accuracy for its clients.

As such Alex Stewart's inspection team comes on-site prepared with a broad range of equipment and instruments:

For Agriculture: The field equipment for Alex Stewart inspectors ranges from sampling spears i.e. bulk spears, bag spears, truck spears a full range of sieves, mobile moisture meters, hectolitre weight, thermal imaging cameras, infrared thermometers, full range and size of industry standard self sealing bags, numbered seals and sample labels.

Metals: Likewise, the experienced inspectors attend with a wide range of professional equipment such as sampling spears, sampling shovels, sample preparation equipment to ensure representative samples are drawn according to international standards.

Laboratories and physical presence

Alex Stewart Agriculture's, GAFTA and FOSFA approved laboratories are strategically located in the UK, China, Brazil, Chile, India, Peru, Thailand and Ukraine. Alex Stewart Agriculture's UKAS 4352 accredited laboratory provides analytical testing for animal feed, oilseeds and food at its testing laboratories located in Liverpool, England. These laboratories are purpose-built and equipped with traditional and modern instrumentation, to provide a fast, reliable and accurate determinations for GAFTA and FOSFA contracts, nutritional values, calorific values, trace metals, spoilage organisms for animal feeds, regardless of whether the sample is for standard reference or part of a shipment.

Alex Stewart International's global laboratory network is fully equipped with traditional and modern instrumentation to deliver fast, reliable and accurate results for commercial transactions. The company also has accredited laboratories in Argentina, Chile, India, Rwanda, Spain, UAE, UK and Zambia.

Alex Stewart Agriculture has presence in many of the major ports around the world. From fully functional offices to small portacabins to allow it, not just be able to perform its job, but have that all-important Office-Lab that allows its clients to have confidence in its approach to their important business.

Alex Stewart International has inspectors based in many of the world's most important ports in order to provide 24/7 around the clock inspection services.

Arbitration and umpire services

When it comes to the transportation of cargo, problems are bound to arise. End-users might be dissatisfied with the product or the original sender might be unhappy with how a product was handled during shipping.

As margins are getting tighter more traders are looking to companies like Alex Stewart Agriculture, which has a very good reputation and a proven track record in dealing with difficult situations and issues during transportation.

"Alex Stewart International are often called upon to perform Inspection services for arbitration and to act as Umpire in commercial disputes," says Stephen Russell, Alex Stewart International's Commercial Executive.

Inspection Risk Management

Inspection Risk Management (IRM) is a value added GAFTA regulated inspection service that helps to control the inherent risks associated with the bulk shipment of cargoes between major ports.

Alex Stewart Agriculture's IRM service can guarantee customers a total line of quality management inspection, supervision and analysis throughout the shipment process — in other words, from the initial classification of crops to the final delivery report.

Alex Stewart's inspectors will be present throughout both loading and discharge to supervise operations, detect inferior quality cargo and ensure that correct procedures are being adopted to prevent your consignment from discrepancies, contamination or damage. Letters of Protest can be issued upon request. Digital photographs can also be taken on demand to provide visual evidence of the material's quality and cargo operations. A detailed report can be produced and sent to the customer by fax or email as soon as the work has been completed.

Inspection services

- pre-shipment inspections;
- storage & stowage inspections;
- transportable moisture determination;
- hatch hose testing;
- establishing source of water ingress;
- ullaging of ships tanks & quantity calculations;
- hold suitability for nominated cargo;
- tank cleanliness inspection;
- temperature determination;
- supervision of discharge/loading;
- recording of cargo distribution;
- control of cargo movement;
- monitoring cargo handling;
- letters of protest;
- finished product inspection;
- store intervention;
- damage cargo inspections;
- quality control;
- loss control;
- weight control — quay/weighbridge;
- tallying & stockpile control;
- calibration of weighing equipment;
- weighing supervision;
- sampling & quality sample preparation;
- moisture determination;
- size determination;
- granulometry testing;
- viscosity;
- CMS; and
- crop monitoring.

Bureau Veritas & Schutter Group introduce rapid aflatoxin testing services

Bureau Veritas and Schutter Group, global agri-commodities testing and inspection group, have introduced a rapid aflatoxin pre-shipment inspection and quality control process designed to protect producers, shippers, global buyers and feed processors by mitigating the risk of toxin exposure through on-site quick detection tests. Aflatoxin is a naturally occurring mycotoxin produced by two types of mould: aspergillus flavus and aspergillus parasiticus. Aspergillus flavus is common and widespread in nature and is most often found when certain grains are grown under stressful conditions such as drought or excessive precipitation levels. Exposure to aflatoxins can cause liver damage and cancer if not immediately identified and addressed. Animals fed contaminated food can pass aflatoxin transformation products into eggs, milk products, and meat.

For example, in 2016 Brazilian corn crops were heavily impacted by aflatoxin problems, mainly due to the drought in Mato Grosso, Mato Grosso do Sul and Minas Gerais. Brazil is about to experience one of the largest corn harvests in recent years. Therefore, close monitoring and testing of the country's 2017 corn crop is required to alleviate product contamination, food safety concerns and even global cargo rejection resulting in economic losses.

Schutter Group, a Bureau Veritas company, offers aflatoxin control services during the vessel pre-loading process through the implementation of a rapid and minimally-disruptive testing process. Grains and by-products are taken as samples during discharge of inbound delivery trucks or even directly on a shipping vessel's load conveyor belt. Product testing is then performed using quantitative strip tests that quantify total aflatoxin content within only seven to ten minutes.

"Bureau Veritas and Schutter Group are well equipped to perform aflatoxin quality control and detection for the upcoming agriculture export season," said Alan Shirley, Vice-President Marketing & Sales, Bureau Veritas Agri-Commodities. "We have invested in equipment and test kits to address on-site aflatoxin testing needs in high-demand ports and have five laboratories approved by both FOSFA and GAFTA to perform in-house analysis."

"The service is an essential element of our grain quality control process and fundamental to our inspection service adding value for customers in the global agricultural industry," Shirley continued.

Mitra S K South Africa inspecting bulk manganese ore for South 32

Various samples being taken.

Mitra S K South Africa Pty ltd has been awarded first vessel of bulk manganese ore by South 32 for the purpose of inspection and assay services at Saldanha Bay Port Terminal. Vessel *Atalanti SB* started loading Manganese ore fines at Saldanha Bay port and samples were drawn round the clock until completion of vessel on 15 June 2017. Mitra S K South Africa is looking forward to continued patronage of mining powerhouse South 32 in the field of assay and inspection services for various other commodities in future.

Mitra S K South Africa (Pty) Ltd operates in Richard's Bay, Johannesburg and Northern Cape region where the company serves the ferro alloys industry, chrome mining and manganese mining belt apart from coal exports from RBCT and Durban. MSK in SA was established in 2008 in Richard's Bay and now operates 2 laboratories in that port city.

Laboratory

The laboratories in Richards Bay and Postmasburg are equipped with highly sophisticated instruments: GCV calorimeter, carbon sulphur analyser, XRF, AAS, pelletizers, fluxers and other related instruments that enable the company to provide test results accurately and promptly within 48 hours, but also detect elemental composition in trace levels.

Service

MSK South Africa's core strength is derived from the highly skilled, experienced and professional manpower who are very customer focused. The team comprises 60 experienced personnel, experienced in diverse minerals.

The MSK SA team is well networked in terms of mobile communications and internet facilities to carry out around-the-clock sampling & supervision during vessel/container loading and also during sample collection from rakes and trucks. Additionally MSK SA uses the online vessel tracking, monitoring and reporting system that enables it to generate reports in real time.

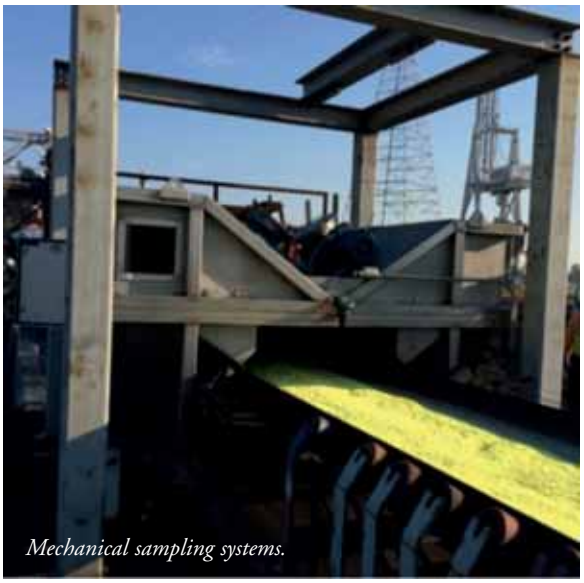
Within South Africa, MSK operates out of the following ports:

- Port of Richards Bay;
- Port of Durban;
- Port of Port Elizabeth;
- Port of Cape Town; and
- Port of Saldhana.

The team also caters to clients from rest of South Africa for sampling and inspection jobs for exports. Outside South Africa and in the rest of South Africa, Mitra SK South Africa Pty Limited operates out of the following ports:

- Port of Maputo in Mozambique;
- Port of Beira in Mozambique;
- Port of Mombasa in Kenya;
- Port of Dar-es-salaam in Tanzania;
- Port of Lagos in Nigeria; and
- any other accessible from South Africa.

Unbiased, independent sampling and analysis from A J Edmond



Mechanical sampling systems.

Solid fuels are a very important part of the global energy supply chain. From the Stone Age to the 21st century, mankind has used fossil and renewable fuels at every stage of development. Today, various energy commodities are competing in the marketplace with fuel value, storage, shipping, handling and environmental impact being major factors in fuel selection. Independent service providers, with respect to quality certification, and the resultant impact on commodity pricing have been the focus of greater attention in this market. Independent service providers possessing high integrity and technical capabilities are thus highly desired by fuel producers, traders/resellers and buyers.

A J Edmond Company (AJE) is one of the most recognized independent sampling, surveying, analytical and consulting companies involved in assessing the quality of solid fuels over the last 50 years. Unbiased, independent sampling and analysis is a small portion of the overall supply chain, but it can be as important as logistics, storage and handling of any commodity. AJE is well known in the USA and Europe for its contribution in modernizing sampling practices and analysis of solid fuels. Biomass is one of most heterogeneous fuel commodities, making collecting representative samples very difficult. Conventional manual sampling (using a scoop or shovel) from a conveyor belt results in biased samples, which does not provide true quality of the products. Thus, AJE and its associates have installed over 15 mechanical sampling systems at various ports and manufacturing plants in the US, South America & Europe.

AJE and its associates operate at all major export terminals at the US West Coast and US Gulf Coast. The laboratories at both coasts are ISO 17025 accredited and fully capable of analysing solid fuel including biomass pellets. US West Coast exports supply primarily wood chips to Asia. But the West Coast produces the largest quantity of agricultural biomass waste in the US. This agricultural biomass waste is burned at biomass power plants located mainly in California, Oregon and Washington. California is the second-largest state that uses biomass waste to generate over 400MW of electricity. AJE's Long Beach laboratory certifies the quality of agricultural and industrial biomass waste used in producing over 200MW of electricity in California. This laboratory is fully equipped to characterize wood chips, wood pellets, petroleum coke, coal and other solid bulk commodities using ISO, ASTM, CEN/TS and other test methods. AJE is working on becoming the first PFI-accredited laboratory for biomass pellets on the US West Coast.

AJE is also well respected for conducting inventories of stationary stockpiles using a variety of survey methods to best accommodate the solid bulk handling facilities. The company offers total station reflectorless laser survey of bulk stockpiles of products such as coal, petroleum coke, gypsum, sulphur, bauxite, woodchips, biomass pellets, etc. With advancements in technology, the company will soon offer drone high-resolution aerial photography technology in combination with traditional techniques for accurate measurement of inventory.

The company's President Jeffrey Rolle, who is the son of the founder of the company A. J. Rolle, is a chemical engineer with a strong background of chemistry and engineering. He is always interested in adopting advanced technologies that benefit the industry. Rolle's philosophy is "Do it right first time and every time." Under his leadership, the company is currently certifying over 10mt (million metric tonnes) of solid fuels exported from the US West Coast and, together with its associate companies, the group is certifying over 30mt of solid fuels exported from the US Gulf Coast.

Inventory surveys.

Amendments to IMSBC Code – International Cargo Regulations: Group A Cargoes

Photograph of uncovered bauxite stockpiles adjacent to port.

The International Maritime Solid Bulk Cargoes (IMSBC) Code regulates the safe transportation of solid bulk cargoes including the provision of guidance on the laboratory analysis and reporting required for compliance with internationally and nationally accepted standard procedures, *writes Dr Aime Harrison, Geotechnical Civil Engineer at London Offshore Consultants*.

Yet despite the safety provisions in the Code, there are many occasions where incomplete and/or inaccurate cargo certificates are submitted to the Master. This can cause confusion resulting in dangerous cargoes being shipped with catastrophic consequences.

Who is amending the International Maritime Solid Bulk Cargoes (IMSBC) Code?

The Sub-committee (of the IMO Maritime Safety Committee) on the Carriage of Cargoes and Containers regularly meets at the International Maritime Organization (IMO) to review the latest proposed amendments to the IMSBC Code based on research undertaken to resolve shipping cargo claims and casualties. Liquefaction is a common cargo risk, whereby a flow point is initiated in a bulk cargo. The result is a sudden loss of shear strength. The solid cargo may take on the flow properties of a liquid in the same way that earthquake forces may initiate natural soils to 'flow' like a liquid. Cargo flow is to be avoided at all costs as it can adversely affect the stability of a ship. The IMSBC Code defines Group A cargoes as "likely to liquefy" and Group C cargoes as "not likely to liquefy". The flow behaviour displayed by Group A cargoes is primarily governed by the moisture content. Accurate determination of the moisture content and of the flow properties is required. The values are to be compared with acceptability criteria provided in the Code and reported before loading.

How can the IMSBC Code be used to determine whether a cargo is safe for loading?

Section 4 of the IMSBC Code describes the assessment of consignments for safe shipment. The "provision of information" (Section 4.2 of the Code) states the cargo must be tested and certified by a Competent Authority in order to demonstrate its Group to the ship's master at the loading port. Section 4.5 describes the allowable time interval between sampling/testing and loading. The certification of the transportable moisture limit (TML) and moisture content (MC) for cargoes that can liquefy is only valid for a relatively short time. The cargo testing is generally carried out before transportation and/or temporary storage of the cargo such that there is the potential for changes in material characteristics to take place. It is often the case that cargoes are stored at the port quayside waiting to be loaded, in all weather conditions and without adequate protection from the elements (see photograph). In these cases, it is likely that the moisture content will increase due to rainfall, precipitation, snow, etc which will then render the test certificates invalid.

Section 7 of the Code describes the risks associated with liquefaction and the precautions to be taken to minimize this risk. When a Group A cargo has a moisture content greater than the certified transportable moisture limit, the cargo is not suitable for transport by sea. Historically many Group A cargoes have been wrongly declared; either by the shipping documents wrongly declaring the cargo as Group C in the absence of proper test certification, or by improper testing procedures leading to invalid certificates. The laboratory test procedures for Group A cargoes are described in Appendix 2 of the Code. Group A cargoes require the presentation of both MC and TML test certificates to the master to verify that the moisture content is less than the transportable moisture limit. The master must then use his/her discretion to ascertain whether the certificates accurately describe the cargo to be loaded.

Why is the IMSBC Code regularly updated?

Many misunderstandings regarding the IMSBC Code regulations continue today, despite the on-going efforts at the IMO on a regular basis to update and amend the provisions for each subsequent edition. There are frequent incidents where the general description of the cargo on the shipping documentation, or the veracity of the shipping documents, is questioned. Research on the mechanical properties of cargoes with liquefaction potential continues and London Offshore Consultants have been involved with the IMO for the past five years to provide expert advice on both the mechanical behaviour of cargoes, and on the operational aspects

that can influence the cargo behaviour.

What amendments have been accepted for the next edition of the IMSBC Code?

In the forthcoming edition of the IMSBC Code, there will be amendments to Section 4.5 (the allowable time interval between sampling/testing and loading) for two important cases which were proposed by Dr Harrison of London Offshore Consultants.

(1) Where the composition or characteristics of the cargo appear to be variable for any reason, a TML test is to be repeated after it is reasonably assumed that such variation has taken place.

(2) If the cargo has been exposed to significant rain or snow between the time of testing and the date of completion of loading, the shipper shall be responsible for ensuring that the moisture content of the cargo is still less than its TML value.

These amendments will be included in the next edition of the IMSBC Code to clarify when further testing may be required. They will define responsibility for the validity of the shipping documents.

Since the inclusion in the Code of a new schedule and test method for iron ore fines, other cargoes comprised of a high proportions of fines have been investigated for their TML properties. The Appendix 2 tests have been modified and new schedules have been produced for cargoes shipped as fines (such as coal fines, nickel ore fines, and bauxite fines). All new schedules and test methods for Group A cargoes have undergone rigorous laboratory testing by a variety of geotechnical engineering methods. The aim is to ensure that an accurate test for liquefaction potential is provided for cargoes originating from any mine in any part of the world. Testing Group A cargoes requires laboratory technicians who understand the importance of the cargo properties and the analysis results. Shipping Group A cargoes requires experienced operators who understand the importance of employing the utmost care to identify and prevent changes in cargo quality and characteristics for safe transport by sea.

Only high quality analysis which satisfies the current IMSBC Code requirements will result in test certificates from Competent Authorities that masters, shippers and receivers can trust. Cargoes will remain potentially dangerous. Shippers and owners alike must demand that testing, storage and handling procedures are employed from mine to port in accordance with the IMSBC Code.

Dr Aime Harrison, Geotechnical Civil Engineer at London Offshore Consultants, has been a Technical Expert on the subject of mineral ore cargo liquefaction working at IMO on the amendments to the IMSBC Code since 2011.

Inspectorate opens state-of-the-art laboratory in Ghent for coal, coke, petcoke & biomass testing

Inspectorate, part of the Bureau Veritas Group, announced in mid-May 2017 the opening of its new testing facility in Belgium for coal, coke, petcoke and biomass. Strategically positioned in Ghent, the new facility is fully accredited to ISO 17025 and is an integral part of our growing network of flagship laboratories.

As a leading provider of inspection and testing services on biomass materials, the new laboratory is capable of providing bespoke services and fast turnaround times, made possible by a dedicated team of highly trained chemists. The facility will utilize up-to-date LIMS software to ensure data integrity and complete traceability at all stages of the sample testing process.

This facility has testing capabilities for:

- solid fuels including; coal, coke, petcoke;
- biomass including; wood pellets, wood chips, dust and briquettes; and
- physical and analytical testing laboratory services.

Inspection and testing throughout the coal supply chain

The movement of bulk cargo can be associated with a number of risks, including loss of material through poor handling and quality variations from contamination or transport damage. These risks can result in significant financial loss for the commercial parties involved.

Bureau Veritas' independent inspection, weighing, sampling and testing services are available worldwide to monitor the supply chain and minimize or eliminate these risks. The company has an array of expertise that covers the full range of solid fuels, including energy and coking coals, coke, petcoke and biomass.

Bureau Veritas also designs, installs and operates mechanical sampling systems and its laboratories cover the full range of solid fuels testing from standard coal tests to specialist tests such as coke reactivity, petrography and many others.

Inspection Services

- load and discharge supervision and inspection;
- sampling and sample preparation supervision services;
- stock control and monitoring;
- warehouse inspections and storage facility due diligence; and
- weight determination by draught surveys and barge gauging.

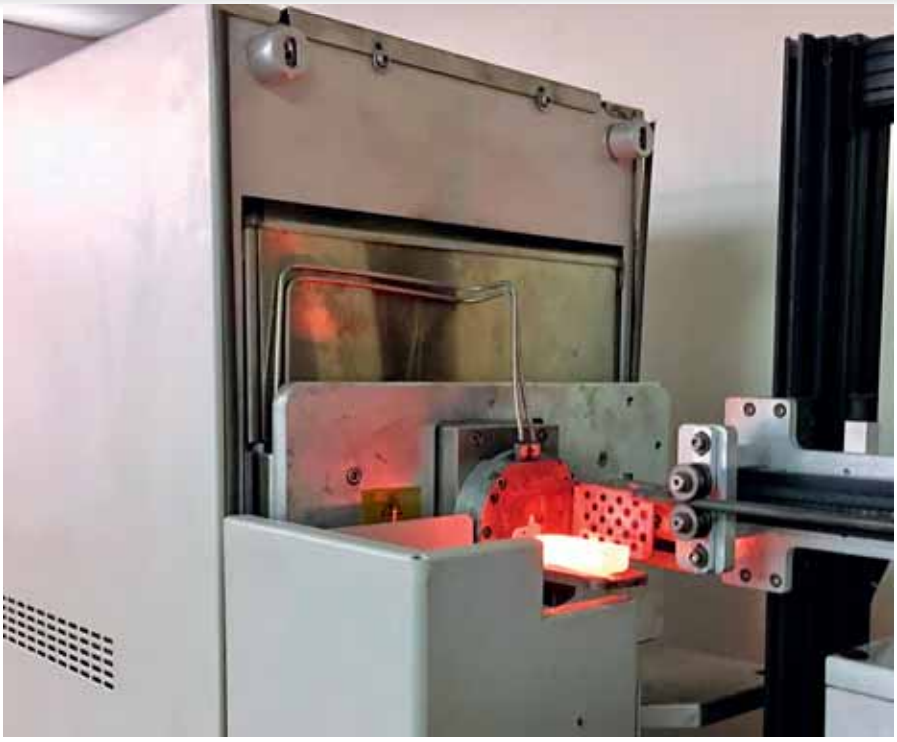
Key benefits of Bureau Veritas's coal, coke and biomass services

- extensive global network offers rapid turnaround time from sampling to certification;
- umpire or arbitration assaying to support commercial settlement;
- ISO 17025 accredited laboratories in key exporting and importing countries; and
- overcoming sampling and quality problems with training and consultancy services.

CITA Logistics LLC – a partner in quality assurance

Laboratory technician performing ash elemental analysis. Photo credit: Cita Logistics

CITA Logistics LLC, established in 2004 and registered in the State of Delaware, specializes in bulk logistics services provision, including bulk ore sampling & analysis, shipping agency, freight forwarding, logistics management, statistical data and market intelligence. Its offices are located a short distance from ports on the East Coast of the USA (Norfolk, Virginia) and the East Coast of Australia. (Mackay, Queensland).



Leco sulphur machine. Photo credit: Cita Logistics

Laboratory

CITA Energy Services, a division of CITA Logistics LLC, has served the global coal industry in the sampling and analysis of bulk ore for over five decades; power plants, steel mills and other industries using solid fuels.

CITA Energy Services' Laboratory was one of the first in the USA to be accredited under ISO 17025:2005 in 2009. This ISO accreditation provides a framework of technical guidelines ensuring traceability of results, participation in proficiency testing and regular internal and external auditing of all processes. In the years since, the laboratory has continued to maintain a high standard and retains its accreditation by being audited twice a year.

CITA Energy Laboratory receives samples from rail cars, stockpiles and/or from conveyor belts at the time of vessel loading, some of which are blends which are then analysed at the Lab. Upon request, its inspectors are on site at the point of loading to ensure that the right coal or coal blend is loaded and that the agreed loading sequence is adhered to. A chain of custody for the sample is maintained from the point of collection right through to the issuing of results. Each test result is traceable within the lab to the equipment, reagents, technical


Photo credit: Norfolk Southern Corp.

and calibration standards used to produce the test result.

Increasingly, buyers of coal and other raw materials need accurate and timely analysis results. CITA Energy Services is well placed to provide these. Thanks to ongoing in-house maintenance, sound calibration of all equipment and highly experienced technical staff, impartial results are produced on time, always. **CITA Energy Services invests heavily in the maintenance and renewal of laboratory equipment to improve precision and repeatability.**

The laboratory's performance is monitored through extensive participation in round robin proficiency tests. Proficiency testing involves comparing CITA Energy Services' lab results with those from a wide range of laboratories. This allows CITA Energy Services to validate its measurement methods, technical training of its staff, the traceability of standards and uncertainty budgets.

Clients are encouraged to request the proficiency testing report, reflecting the objective of CITA's management to provide peace of mind for clients through a high level of transparency and a policy of continuous improvement.

The laboratory offers a wide range of analyses for coal, coke and other carbon-based products. Its client base includes buyers and sellers in the power generation and steel sectors.

Two comprehensive audits are carried out each year. The accrediting body, ANAB (American National Accreditation Board), sends an assessor to perform a complete review of the laboratory, technical and managerial practices and ensures compliance in these three areas. Management also performs an annual internal audit whose findings and solutions are ultimately reviewed and discussed with an ANAB assessor.

Shipping agency

CITA Logistics has its own shipping agency in the USA which handles all types of vessels calling at all terminals within the port of Hampton Roads: liquid, bulk, container and general cargo vessels. In addition to full agency appointments, its team in Norfolk provides ship husbandry, protective agency services and freight forwarding. It can also serve the ports of Baltimore and Mobile through its network of subcontractors.


Cita agent on board a coal vessel. (Photo: Cita Logistics)

Agency staff are experienced and committed to providing a superior service to principals and vessels. They communicate promptly and clearly with Masters and liaise with all the various parties to ensure that vessels comply with all requirements in order that the port call proceeds as smoothly and efficiently as possible. Every assistance and advice is provided to vessels before arrival and whilst in port for cargo operations and non-cargo matters. Communication with principals is also a priority; staff are available at all times to respond to queries and report as necessary.

Logistics management

CITA Logistics offers extensive logistics management and back office services from its Australian and USA offices whose proximity to the load ports facilitates close and expert monitoring of shipments.

CITA co-ordinates the loading of over 20 million tonnes annually out of the USA and Australia. CITA works closely with charterers to effectively implement shipping schedules. Every aspect of individual shipments is closely monitored:from the mine load out facility through to the load port, including liaising with rail/barge providers and port authorities.

This bespoke approach to cargo management can also include 24/7 surveillance of rail receival to ensure coal specifications are as per sales contract, including complex blends. When required, CITA Logistics carries out witnessing of hold inspections, draught survey and loading operations, ensuring consistency and on time reporting.

CITA has developed considerable expertise in the treatment of laytime calculations. Its teams prepare statements on behalf of clients or verify a counterparty's laytime statements.

CITA's in depth knowledge of port practices and interpretation of contractual loading terms enables efficient and accurate despatch and demurrage checking. Its teams in the USA and Australia assess hundreds of laytime calculations each year and their combined experience spans many decades. CITA can also advise on how to best optimize contractual loading terms.

Clients can therefore access a range of services under one umbrella: logistics management, shipping agency and sampling/analysis can all be delivered on the same shipment by CITA Logistics LLC.

Samson® Material Feeders for Yorkshire Water

SAMSON Materials Handling Ltd., under the umbrella of the worldwide operating AUMUND Group of companies, has received an order from Black & Veatch, a global leader in engineering, procurement and construction (EPC) services for energy and water, for two Samson® Material Feeders type 450 Super Series to operate as sludge cake reception units for Yorkshire Water, UK. These units are designed to receive material at a variable rate up to 120m³/h and discharge material at a variable rate down to 30m³/h. There is a holding capacity of 30m³. These units will be commissioned at the end of 2017.

Bulk sludge cake will be delivered directly from 30m³ tipping trucks. Roller shutter doors will open at the push of a button, enabling the vehicle to reverse into discharge position. When the truck is in position the belt on the Samson® Feeder will start up. The Samson® Feeder will discharge onto a screw conveyor.

About the AUMUND Group

The AUMUND Group is active worldwide. The conveying and storage specialist has special expertise at its disposal when dealing with bulk materials. With their high degree of individuality, both its technically sophisticated as well as innovative products have contributed to the AUMUND Group today being a market leader in many areas of conveying and storage technology. The manufacturing companies AUMUND Fördertechnik GmbH (Rheinberg, Germany), SCHADE Lagertechnik GmbH (Gelsenkirchen, Germany), SAMSON Materials Handling Ltd. (Ely, England), as well as AUMUND Group Field Service GmbH and AUMUND Logistic GmbH (Rheinberg, Germany) are consolidated under the umbrella of the AUMUND Group. In conjunction with the headquarters of the manufacturing companies, the global conveying and storage technology business is spearheaded through a total of ten locations in Asia, Europe, North and South America and a total of five warehouses in Germany, USA, Brazil, Hong Kong and Saudi Arabia.

Minchinhampton company accepts ISO accreditation

In mid-July, RDS Technology announced that it had been awarded the ISO 9001: 2015 certification for the design, development, test and manufacture of electronic instrumentation for agricultural and industrial equipment following an evaluation process by the British Standards Institution. The ISO 9001:2015 is a globally recognized international benchmark for quality within an organization.

"Achieving this certification ensures suppliers and customers can have confidence in knowing that RDS Technology consistently meets the high standards that have been set out by the International Organization for Standardization," said Mike Ballard, RDS Technology quality manager. "It was a fantastic result for RDS. The award is reflective of the hard work that was put in by everyone. It is truly a company achievement."

RDS Technology, established in the late 1960s, was a pioneer in the use of electronics for agriculture with the introduction of the Grain Loss Monitor for combine harvesters.

The company expanded its activities into other sectors of mobile machinery and is now a market leader in on-board machinery electronics, serving the industrial, agricultural, quarrying and shipping machinery sectors.

About RDS

RDS Technology, a Topcon Positioning Group company, designs and manufactures a wide range of instrumentation for the mobile machinery industry. Areas of expertise include on-board weighing, seed-drill, baler and wrapper controls. RDS supplies over 100 original equipment manufacturers worldwide with custom solutions, as well as supplying standard 'retro-fit' products (and after-sales service) through a network of specialist independent distributors in over 30 countries. Headquartered in Minchinhampton in the United Kingdom, RDS pioneered the use of electronics for agriculture and continues to lead in other sectors of mobile machinery.

New Eriez compact suspended overband magnet to make its debut at industry expo

Eriez Europe will be showcasing the latest solutions in metal detection and removal for the mining and quarry industries at the Steinexpo show in Homberg, Germany from 30 August to 2 September. The expo is taking place in Europe's biggest basalt quarry, and visitors to Eriez's stand will have the first exclusive look at the new compact suspended permanent magnet.

Eriez has focused recent developments on producing higher gradient multi-pole magnet blocks coupled with more compact, lighter weight and streamlined self-cleaning arrangements.

The newly-designed magnet is lighter than a standard Eriez suspended magnet, yet offers comparable performance in achieving the highest levels of metal separation. The slimline, compact design features an internal frame simplifying the belt change process and is ideal for mobile crushers, shredders or screeners.

Eriez offers a comprehensive range of magnetic separators and metal detectors to remove both ferrous and non-ferrous metals to protect downstream processing equipment and reduce costly damage and downtime

For the removal of tramp iron in conveyed material or chutes, Eriez suspended electromagnets have been designed especially for the quarry and mining industries and are most effective when a deeper magnetic field is required. At Steinexpo, a self-cleaning model will be on display for the continuous, automatic removal of tramp iron. They are recommended where a large amount of tramp iron is expected or where there may be limited access to the magnet for cleaning purposes.

Completing the product line-up at the show is the MetAlarm QM3500 bridge coil metal detector, suitable for use with steel-corded conveyor belts. The dual sensor coil model is ideal for higher material burdens and higher belt speeds. It is able to detect tramp metal above the customer critical metal size only, ignoring smaller pieces and preventing unnecessary stoppages of conveyors.

Gareth Meese, Sales Director at Eriez Europe, explains: "There have been many developments with the ferrous and non-ferrous metal recovery solutions that we offer in the last few years. Eriez continues to focus on research and product development to ensure that the equipment we offer develops with ever-changing customer and market demands. The equipment on display at Steinexpo this year is testimony to this."

About Eriez Europe

Eriez Magnetics is recognized as a world authority in separation technologies. The company's magnetic lift and separation, metal detection, materials feeding, screening, conveying and controlling equipment have application in the process, metalworking, packaging, plastics, rubber, recycling, mining, aggregate and textile industries. Eriez manufactures and markets these products through 12 international facilities located on six continents. Eriez Europe Ltd. has its head office in Caerphilly, South Wales, UK.

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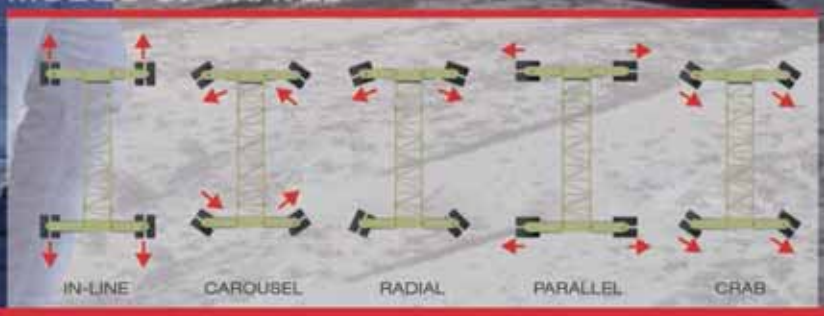

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Hycontrol's SHIELD brings a new level of protection

Compact, budget-conscious new system is a game-changer for the field of silo pressure safety

On 17 July, after months of development and testing, silo protection expert Hycontrol Ltd. announced the launch of the SHIELD Silo Protection System. The compact, all-in-one system comes after years of developing innovative technology to protect powder storage silos from pressure during tanker-fed deliveries.

Utilizing purpose-designed, state-of-the-art pressure monitoring and control equipment, SHIELD meets and exceeds best engineering practice and current guidance from the Mineral Products Association. The new SHIELD system has been re-designed from the ground up to offer customers the same comprehensive protection as Hycontrol's original, award-winning SPS, but with a raft of new and enhanced performance features and at a significantly more competitive price.

Powder storage silos are commonplace in many industries but are at risk of over-pressurization during tanker deliveries, which can happen when the filter unit gets blocked or if the pressure blowing in during the fill is uncontrolled. Air pressure from as little as 1psi or 2psi can easily rupture a silo or blow its filter unit off the top. This poses a serious health and safety risk, which is why a comprehensive safety and alarm system is vital. SHIELD incorporates the essential high-accuracy silo safety components into a modular design that can be adjusted to suit site requirements. Maintenance has been made easier and the long-term cost of ownership is significantly lowered. Along with many new features, SHIELD incorporates Hycontrol's pioneering Ground Level Test technology enabling a one-button full-function test, and inbuilt system diagnostics aid preventative maintenance.

"Drawing on our years of industry experience, it is clear that there is still a widespread requirement for comprehensive silo safety systems," said Hycontrol Managing Director, Nigel Allen. "From now on, cost is no longer a valid excuse for ignoring safety. Hycontrol has led the silo protection field for over a decade through both innovation and product performance. We have added new features and improvements to the SHIELD system, whilst lowering the cost to meet the needs of the competitive end of the market, particularly in ready-mix and concrete."

He adds: "With this exciting new product, we are confident that we are now making truly comprehensive silo protection systems available to, and affordable for, all sites and businesses. Safety for staff, contractors and drivers is, quite rightly, the number one priority. With SHIELD, Hycontrol is making complete silo safety achievable and affordable for all sites, however restrictive their maintenance budget."

About Hycontrol: Hycontrol has been at the forefront of level control and silo protection technology for over thirty-five years. Hycontrol is acknowledged as a global knowledge leader in silo pressure safety. The company creates systems that are safer by design, in order to reduce risk, create a safer working environment and provide the best-engineered solution — without compromise.

FLSmidth set to acquire part of Sandvik Mining Systems

FLSmidth has reached an agreement to acquire a part of Sandvik Mining Systems. This includes continuous surface mining and minerals handling technologies and competences that will strengthen the Group's core minerals business.

The pending acquisition enables FLSmidth to improve productivity for its customers by closing a gap and cover a wider range of the full mining value chain — from the primary crushing point in the mining pit and the transport from mine to plant all the way through the minerals processing plant to the tailings handling — 'Pit to Plant'. By obtaining direct access to all key processes and equipment, the acquisition will allow FLSmidth to digitalize the full value chain and enables a better utilization of existing leading technologies.

Facts about the pending acquisition

The part of Sandvik Mining Systems that is closest to the mine. This includes all products for continuous surface mining and minerals handling technologies and related intellectual property, including drawings and reference lists.

Employees with strong experience, competences and customer insights will be transferred. FLSmidth will provide project management and aftermarket services to Sandvik on the majority of ongoing projects to be delivered during 2017–2019. The agreement is subject to certain conditions, including regulatory authority clearance, and closing is expected by the end of 2017.

FLSmidth

FLSmidth is a market-leading supplier of productivity to the global mining and cement industries. Headquartered in Copenhagen, Denmark, and with offices in more than 50 countries, FLSmidth delivers engineering, equipment and service solutions to customers worldwide. Productivity, sustainability, and quality are focus areas for FLSmidth and its 12,000 employees. The company generated revenue of DKK 18 billion in 2016.

Liebherr strengthens maritime business out of Australia

Liebherr Maritime is about to establish full service, spares and sales activities in Australia, New Zealand and the Oceania region. This expansion guarantees better support for maritime customers using factory-trained and locally recruited engineers. Morrow Equipment Australia will focus on the purchase and rental of tower cranes in the future.

Liebherr has been present in Australia since the early 1970s, leasing their first premises in Kilkenny in 1983. Over the years, Liebherr has invested hugely in the Australian subsidiary, and the maritime division entered the Sydney offices with its offshore, duty cycle, heavy-lift, and foundation equipment in 2015.

With 40 ship-to-shore cranes and straddle carriers from its Killarney sister company, 35 MHCs, and in excess of ten offshore cranes in the Oceania region, Liebherr has now decided to take the maritime business unit to the next level. Therefore, it will directly establish full service, spares and sales activities in the region. This will lead to better support for our customers using factory trained locally recruited engineers. It also means that new products can be introduced, such as the new Liebherr Reachstacker or new mobile harbour crane types and offshore cranes.

Morrow Australia

Morrow Australia has represented Liebherr's mobile harbour cranes business in Australia for the last 27 years, using its excellent connections to assist in sales from first the Nenzing factory in Austria, and now the maritime headquarters in Rostock, Germany. The main business of Morrow is the purchase and rental of tower cranes, and this will become its focus, while at the same time continuing its links to Liebherr through this business. After a relationship of so many years, Liebherr will offer the company every support.

With the Morrow target now being tower cranes, on the service side Liebherr will recruit Kalman Kis, the Morrow MHC engineer, assuring a seamless transition. He started with the company on 13 June.

People on the move

With effect from 1 September this year, Gordon Clark will cease his function as Sales Director for Offshore Cranes in Liebherr-MCCtec Rostock GmbH. Subsequently he will transfer to Liebherr-Australia Pty. Ltd. in Sydney in order to manage the development of the maritime sales division in the regions Australia, New Zealand and Oceania. Clark has already been internationally active for the Liebherr Group in various sales positions since 1991. Following his start with Liebherr-Great Britain Ltd, his career led him via Liebherr-Africa (PTY) Ltd. and Liebherr Middle East, FZE. in Dubai to Liebherr's factory in Rostock.

The maritime sales division in the regions Australia, New Zealand and Oceania will be developed out of the Sydney office.

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'Tuning and Tweaking' — a live case study on a pneumatic ship-unloader

In this live case study, Lion Bulk Handling has visited a customer in South Europe which acquired a pneumatic ship-unloader more than ten years ago and requested a tuning and tweaking visit by one of its field engineers. During its lifetime operation, the equipment undergone normal wear and tear and lost performance over time. The goal was to determine how much performance could be gained back. By following the steps below, performance was increased by 11%.

The visit was executed in multiple stages:

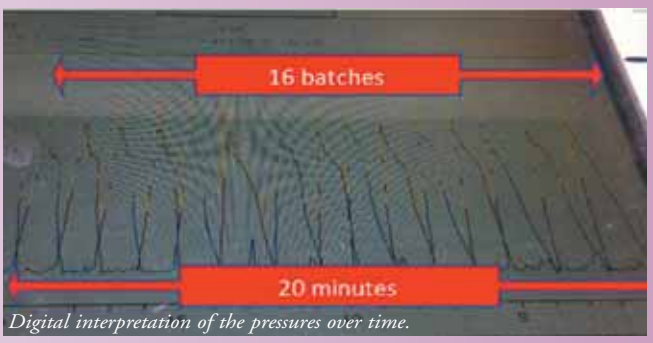
- general walkaround on the unloader making sure that there are no visual leakages like oil and water, no abnormal noises/vibrations, instrumentation/electrical cables still in place;
- read-out and clear the PLC internal alarm history;
- manually operate each individual valve for making sure that the valves operate and confirms back to the PLC its current/correct position;
- as the unloader is based on an operation via a vacuum and compression, the system has been pressure tested to find any internal leakages;
- commence unloading operations
- taking data like: suction pressure, filling times, pressurization times, discharge pressure and convey times per cycle over a couple of batched for gaining an average of each;
- based on the data out of step 6, determine if the filling and discharge cycles are within balance or one of them need/can be adjusted to gain overall better performance
- in this case the filling (suction) was not ideal as the unloader was conveying 16 batches in 20 minutes, which equals 48 batches per hour;
- by tuning the hardware and optimizing the unloader operator skills it was able to increase performance into 18 batches per 20 minutes, equals 54 batches per hour (increase of 11%).

Summary

By executing this service visit, the complete turnaround of unloading the vessel was for this customer now 11% faster, which equals six hours less of operational costs like:

- fuel;
- labour;
- running hours of equipment;
- maintenance intervals;
- downtime of the vessel;
- etc.

By regularly performing the correct inspections or tuning and tweaking visits, such equipment can be maintained in good condition, which results in a very fast return on investment and reduces overall operational costs.



Digital interpretation of the pressures over time.

Dust collection company AAF now ATEX-certified

According to reports, many dust explosions are started by mechanical sparks. Wet dust collection is seen as a solution to eliminate some of the factors that contribute to dust explosions. Once the dust has been saturated, the level of explosiveness is dramatically reduced. The transfer of the dust from the air into the water removes it from an oxygen rich environment. Without oxygen, combustion cannot occur. The use of water eliminates any potential source of combustion. Since the dust has been eliminated from the air and is now in a dampened state, there is no mechanism by which a dispersed dust cloud can form.

AAF's line of wet and dry collectors are fully certified and available for use in potentially explosive atmospheres in accordance with the new ATEX Directive 2014/34/EU.

AAF's products include:

- **RotoClone® W:** a highly cost effective and efficient wet dust collector. Combining a dust collector with a centrifugal fan, saving space and enhancing its suitable for a wide variety of different applications. The distinguishing feature of the RotoClone® W is the addition of a fine water film on the impeller blades to capture even the smallest of dust particles.
- **RotoClone® N:** combines high efficiency, low maintenance costs, simplicity, flexibility and low water usage to maximize performance. The RotoClone® N is a flexible design for a wide range of operating conditions with minimal servicing requirements. The RotoClone® N is an optimal solution for chemical, industrial processes, metal grinding, and metalworking environments.
- **RotoClone® LVN wet collector:** was patterned after the standard RotoClone® N collector, which has been installed in thousands of applications since its introduction in the 1940s. It is efficient, compact and economical and is designed for volumetric flow rates of 2,500 CFM or less.

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Flexible containerized bulk attachment works

Containerized bulk handling (CBH) is increasing in popularity, thanks to an innovative system from RAM Spreaders. A new design from RAM allows the revolver to interchange between MHC, Ships crane bridge crane and Reachstacker. This allows loading at quay with MHC on Monday and discharging bulk to warehouse on Tuesday which gives multi purpose ports great flexibility

Traditional bulk loading requires large amount of investment in engineering, design and construction, implementation and maintenance. Some bulk terminals cost more than $100 million to set up. The Revolver system from RAM Spreaders means that it is possible to transport bulk product easily from a container terminal.

The system works by loading bulk directly to a hopper by grab, and loading the cargo to a container, which is then sealed. The container can then be transported and stored, with no need for undercover storage facilities. The Revolver spreader is used to discharge the container — whether into a hopper, or vessel hold, or other.

The Revolver has been designed for flexibility to interchange with either a reachstacker or a bridge crane. RAM Spreaders developed this solution for MMG Las Bambas mine, and many other companies are now taking it up

One notable customer is CODELCO, the largest copper producing company in the world. The copper concentrate is loaded and sealed into special ISO twenty foot containers at the mine; it is then transported to the port's yard, stored like any other

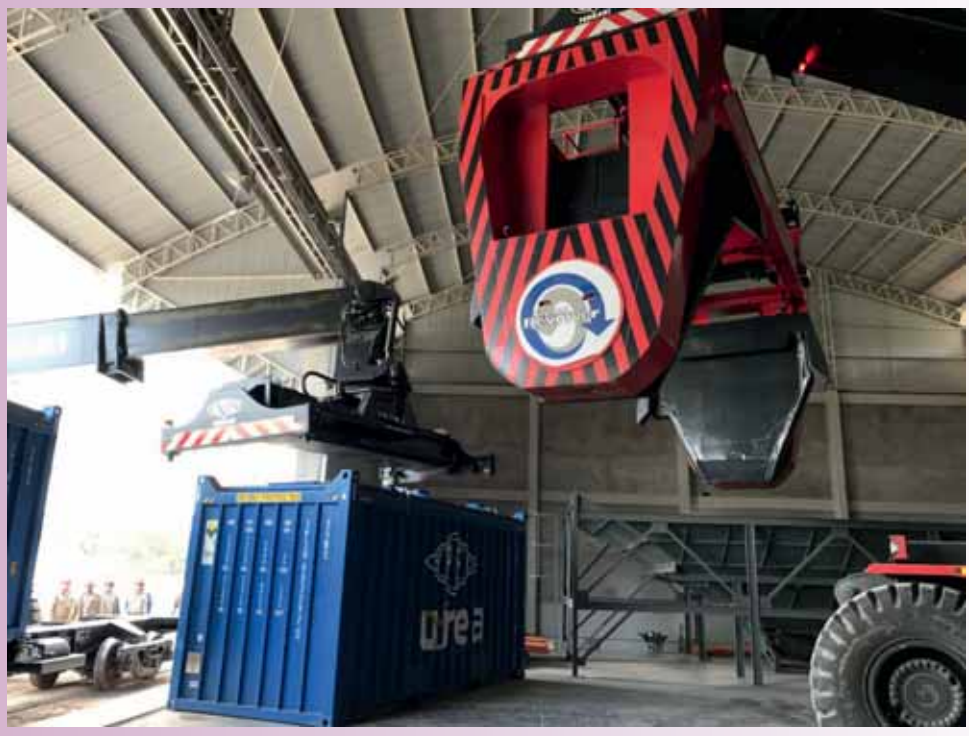
with multiple lifting equipment

container and then loaded right into the vessel's hatch with existing terminal equipment. The only new equipment is the purpose-designed revolver from RAM Spreaders.

The CBH process is simple and effective, efficient and most of all, clean and friendly to the environment at a very low cost. The copper is not exposed to the environment, even when it is released at the bottom of the vessel's hatch by the revolver spreader.

Other ongoing projects for RAM Spreaders include:

- urea import from port to factory in South America;
- truck offload of copper conns in Mexico; and
- pyrite offload at processing factory in Russia.



Flexible, fast and low capital cost

Most of the equipment required to successfully implement a containerized bulk handling system already exist at the mine site and port. This includes forklifts, reach stackers and cranes. For ports that do not have their own mobile or ship-to-shore cranes, the Revolver spreader also comes in a lightweight version, so it can be used on ship cranes.

The whole solution can be up and running within six to nine months from the time a decision is made. The system has also seen fast load rates with other projects using the revolver spreader for iron ore, loading at 2,000tph (tonnes per hour) per revolver. It is very cost effective indeed.

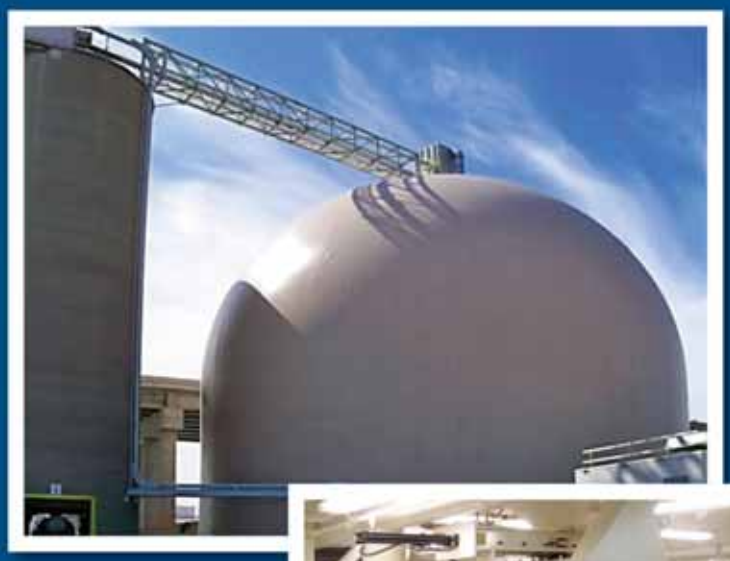
Other benefits of containerized bulk handling

The Revolver spreader makes it possible to blend cargoes right in the hold of the vessel.

The system is also fully mobile. The port operator or the mine company can move the operation (revolver spreaders and containers) to any other site within or outside its borders. Investment is therefore not lost when operations end, it is enhanced and protected. Along the same lines, this process may creatively add significant new cargo traffic and revenues to the port.

In summary, containerized bulk handling system is a low capital investment, with a faster time to market and virtually no dust from the lid and misting system, and it caters for most types of bulk products.

One Source



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Growing market share for AUMUND in Chinese power industry

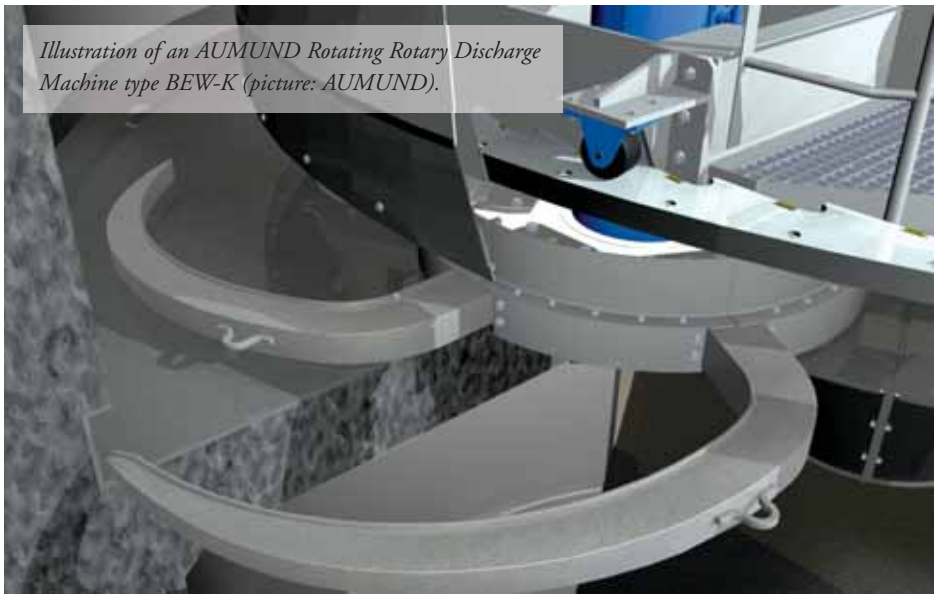

Illustration of an AUMUND Rotating Rotary Discharge Machine type BEW-K (picture: AUMUND).

Despite the declining number of new construction projects in the power sector, the AUMUND Group has secured an increased market share in the Chinese power industry over the past two years. The combined efforts of the AUMUND subsidiary in Beijing and the AUMUND power technology team in Germany has resulted in orders for several power stations belonging to the Shenhua Power Group, as well as from Shanneng and Guodian.

Tightening of environmental protection regulations has led to an increased volume of enquiries for flue gas purification systems from power plant operators in China, who are now opting for silos rather than stockpiles for their gypsum storage. AUMUND has noted increased interest in flue gas desulphurization and silo discharge with AUMUND Rotating Rotary Discharge Machines type BEW-K. The rotating rotary discharge machine was specially developed for large extraction openings and silos of 6 to 14m diameter. A typical application is the extraction of FGD gypsum in coal-fired power stations. These machines work on the first-in, first-out principle, are designed for mass flow and can feed and extract the material at the same time.

AUMUND received orders from the Shenhua Group for the supply of two rotating rotary discharge machines to each of four power plants, in Luzhai, Jiujiang, Ningdong and Ezhou. The eight machines were installed, over a period of about two years, for the discharge of FGD gypsum from the respective silos into trucks.

Following this success, AUMUND received another order, from the Shanneng Group for its power plant in Zhaoshipan. In this case a rotating rotary discharge machine with a diameter of 10m and a capacity of 150tph (tonnes per hour) was ordered. China Shenhua Energy Company Limited was incorporated in 2004 in Beijing and is a subsidiary of Shenhua Group Corporation Limited. The company has extensive coal reserves in the People's Republic and is a leading energy provider. Its main business includes production and sales of coal-derived power and coal-related products, as well as transportation of these products using its own integrated network of railway and shipping routes.

Samson® Material Feeder type 1600 for the power plant in Fengcheng

The sales success of AUMUND Beijing was enhanced by the order to supply a Samson® Material Feeder type 1600 for coal handling in the Guodian power plant in Fengcheng. Mobile conveyors of this type are installed in applications all over the world, predominantly to receive correctives, additives and alternative fuels.

The Samson® has already proved its flexibility in being able to handle such a diverse range of conveying properties displayed by materials like sewage sludge, manufacturing by-products, biomass and industrial or domestic refuse. The machine is now underlining its flexibility in the Asian power industry.

Unlike on conventional tipping yards, the Samson® Feeder does not just deposit the material but actively extracts it from the truck. In this way, a regulated material flow is achieved, irrespective of whether the materials are wet, sticky, heavy or abrasive. Furthermore, the machine is installed above ground, with no need for preparatory construction, and no expensive civil works for deep pits or underground hoppers. Being mobile, it can easily be repositioned for use in different locations and even provides temporary buffer storage capacity. The wide-apron belt design eliminates bridging or spillage, giving a reliable conveying solution whatever the material.

About the AUMUND Group

The AUMUND Group is active worldwide. The conveying and storage specialist has special expertise at its disposal when dealing with bulk materials. With their high degree of individuality, both its technically sophisticated as well as innovative products have contributed to the AUMUND Group today being a market leader in many areas of conveying and storage technology. The manufacturing companies AUMUND Fördertechnik GmbH (Rheinberg, Germany), SCHADE Lagertechnik GmbH (Gelsenkirchen, Germany), SAMSON Materials Handling Ltd. (Ely, England), as well as AUMUND Group Field Service GmbH and AUMUND Logistic GmbH (Rheinberg, Germany) are consolidated under the umbrella of the AUMUND Group. In conjunction with the headquarters of the manufacturing companies, the global conveying and storage technology business is spearheaded through a total of ten locations in Asia, Europe, North and South America and a total of five warehouses in Germany, USA, Brazil, Hong Kong and Saudi Arabia.

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Taking a load off

digging deep into bulk ship unloading

Golfetto Sangati's Transmec unloader can unload vessels of up to 120,000dwt.

Louise Dodds-Ely

Golfetto Sangati's grain handling systems benefit from 90+ years of experience

Golfetto Sangati is an Italian company designing, building and installing turnkey plants for grain handling and milling. It is a reference point for the design and construction of complete port systems for storage, loading and unloading ships with free-flowing or not free-flowing materials such as wheat, corn, barley, soybean, sunflower seeds, rapeseed, coffee, sugar, rice, soya meal and others.

The company designed and built more than 50 port installations and tens of other handling systems all over the world.

TRANSMEC MECHANICAL SHIP-UNLOADER

The Transmec is a mechanical ship-unloader designed and manufactured in the Italian offices and factories of Golfetto Sangati, each equipment is customized in partnership with the Client in order to comply with technical, operational requirements and specific site characteristics.

Transmec can unload vessels up to 120,000dwt and can be stationary or mobile on rails or wheels.

The handling capacity ranges from 200tph (tonnes per hour) to 2,000tph handling cereals and a wide range of free-flowing

materials as well as meals.

The in-house designed Digger system allows for the efficient unloading of non-free-flowing products. The Digger is a circular cage system with interchangeable toothed blades driven by epicyclical-geared motors and gears (see picture below).

The full control system installed in each shiploader includes:

- automation system equipped with PLC board, main control unit, I/O card, network interface and control panel;
- control cabin with ergonomic chair equipped with commands and controls;
- remote radio control (emitter and receiver);
- CCTV and audio control;
- smoke and fire detection; and
- connection with main operational station via fibre-optic and/or wireless connection.

In addition, an anti-collision system specifically designed by Golfetto Sangati prevents any risk of collision during the movements. This is really helpful during low visibility situations due to weather conditions or blind spots, preventing accidents due to human error. This system is mainly comprised of:

- travelling collision detection;
- collision detection of the horizontal boom;
- collision detection of the vertical boom; and
- product hatch automatic detection.

Golfetto Sangati's Digger is a circular cage system with interchangeable toothed blades driven by epicyclical-geared motors and gears.

Particularly notable elements of the Transmec include:

- very low energy consumption in operation (0.37kWh/tonnes, according to measurements taken), which is 50% lower than a pneumatic unloader: this is one of the main reasons that Golfetto Sangati decided to focus on mechanical unloaders;
- peak capacity 10% to 15% higher than rated capacity;
- the efficiency across vessel unloading is higher than 70% of the rated capacity (tph);
- the ship-unloader is extremely versatile during operations thanks to the wide range of movements allowed, and to the equipment installed onboard.

The most recent Transload projects installed include:

- **Shanghai Liangyou Group Project:** this provides for design, manufacture, delivery and start-up of two ship-unloaders on rails in the Port of Shanghai (China). Each Transmec-type ship-unloader has a capacity of 1,000tph;
- the **project in the Port of Livorno** (Italy) including design, manufacture, deliver and start-up of storage plant, the wagon and truck intake and the material cleaning section before milling plant and a ship-unloader on rails for the company Grandi Molini Italiani. The Transmec-type ship-unloader has a capacity of 600tph; and
- the **project in the Port of Gdynia** (Poland) including design, manufacture, deliver and start-up of a combined ship-unloader/shiploader on tyres and a storage plant for the Baltic Grain Terminal. The unloading capacity is 400tph.

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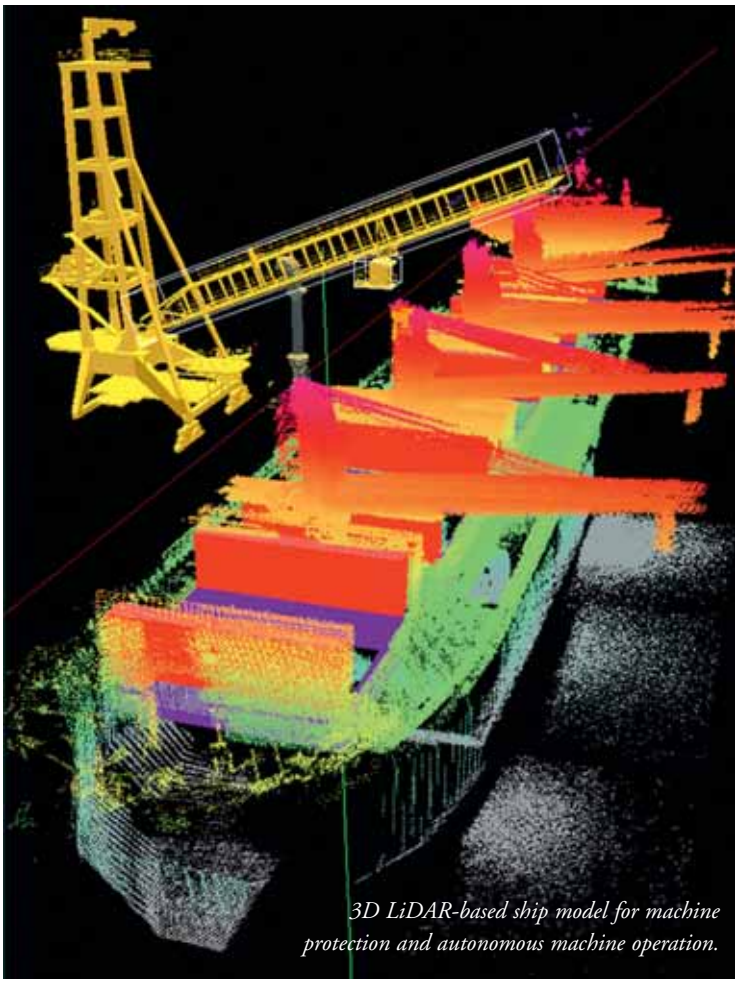
iSAM: ship-unloader automation brings countless benefits

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 business economics, focusing on increasing customer value. The company's customers can be found 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. iSAM's customers are spread all over the world and its business and turn-key solutions are available all over the globe.



3D LiDAR-based ship model for machine protection and autonomous machine operation.

Autonomous mechanical ship-unloading with iSAM technologies

Current mechanical ship unloaders have to be manned by an operator all the time and only teach-in procedures are available to support the operator. The first part of the unloading process has to be performed entirely manually and the collision protection is sometimes difficult, because the operator can see neither the unloading area nor the complete machine in all positions.

iSAM has developed and implemented two main technologies to improve production, safety and economy on grab ship-unloaders and shiploaders. The same technology can also be applied to mechanical ship-unloaders.

The task of operating a grab unloader driverlessly and autonomously was a great challenge, if not a mission impossible. With a combination of the latest 3D LiDAR technology, originating in self-driving cars, the leading-edge control technology and RTK-GPS systems for machine positioning, iSAM has succeeded in solving the problem.

The solution consists of an advanced collision protection system, a sensor and an evaluation system which 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 allows the effective protection of the ship-unloader boom. It also creates the foundation for remote and even fully autonomous operation by enabling the system to 'see' its environment and make its own, situation specific decisions as an operator would do.

The key advantages of the system are:

- automatic identification of all collision hazards;
- timely warning to the machine control system to stop critical movements before a collision occurs;
- prevention of downtime and damage to valuable assets;
- lower wear and tear because mechanical performance limits are respected in automated mode;
- reliable and safe operation even during obstructive weather and environmental conditions such as rain, wind, dust, fog or snow;
- real-time determination of the grab and the cargo position;
- autonomous unloading, even under the hatch coaming;
- real autonomous operation (i.e. not a remote control);
- possibility of manual intervention from the central control station;
- 'freeing; from an extraordinary situation (for instance a buried grab due to collapsed material walls);
- very uniform unloading performances;
- fulfillment of operational guidelines and safety rules;
- improved working conditions; and
- situational awareness for operators based on 3D environmental model with overlaid 3D CAD model of machine.

Additionally, the use of fully automated grab ship-unloaders means a significant reduction of personnel expenses. One operator in the central control station can easily handle four ship-unloaders with minimum stress thanks to a maximum degree of automation.

The iSAM technology for grab ship unloaders is compatible with the mechanical ship-unloader requirements and provides among others the following functions:

3D laser scanning for

- measurement of hatch position;
- measurement of actual cargo distribution;
- reliable detection of collision hazards;

GNSS (GPS, GLONASS etc.)

- exact positioning of machine gantry;
- exact positioning of elevator inside the hatch; and
- high reliability of position data.

Hatch manager

- automatic determination of best path (no teach-in); and
- adaptation to new unloading situations.

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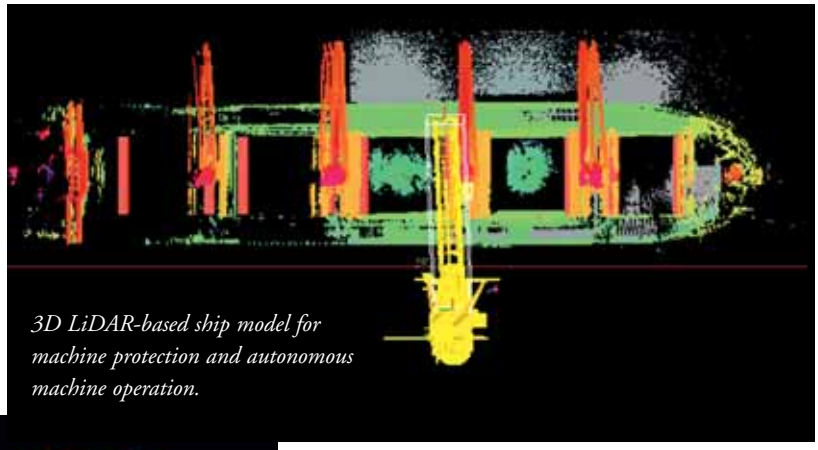
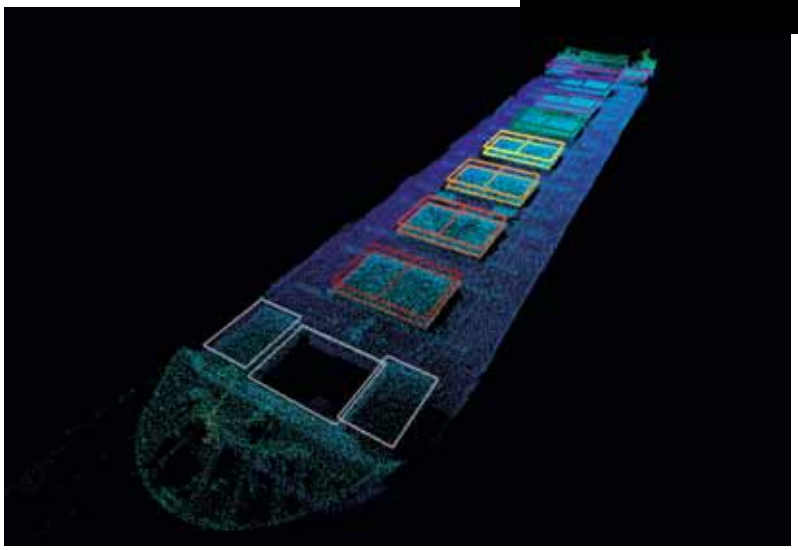
The continuous unloading performance is ultimately independent of the actual operator and the advanced collision protection based on current, real-time 3D scan data provides reliable obstruction information with <10cm accuracy.

A 'true' autonomous operation without operator intervention and an automated unloading right from the beginning including the initial 'levelling' of the material surface are enabled by iSAM technology.



3D LiDAR-based ship model for machine protection and autonomous machine operation.



Autonomous operation in ports — references

To date, iSAM has equipped five grab ship-unloaders, two shiploaders, five train loaders and more than 40 stacker/reclaimers with this technology.

Four autonomous grab ship-unloader systems are fully operational at the Port of Hamburg and one system at the Port of Rotterdam. The operational and safety procedures are approved by public authorities.

iSAM AG is well prepared for future challenges and iSAM-experts are constantly developing, upgrading and adapting their technology to other applications and markets, finding unique solutions for each customer request.

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New possibilities for data and power supply to ship-unloaders

In general, motorized cable reels and a combination of winding and unwinding high voltage fibre-optic cables are used to transfer power and data to ship-unloaders. Conductix-Wampfler has long been a leading manufacturer of motorized cables reels and is able to customize its cable reels to fit almost all application scenarios.

However, what if a motorized cable reel can't be used due to special space or weight limitations on the ship-unloader, or if the needed conductor size is above 240–300mm² due to no available high-voltage power supply?

0813 conductor rail system including ProfiDAT data transmission profile and (inset) the ship-unloader that is using this system.

As a full liner for data and power transmission systems, Conductix-Wampfler is able to offer alternative solutions to meet special application and installation requirements.

A recent installation on a grain ship-unloader is using Conductix-Wampfler's conductor rail 0813 series for power transmission. This product is known for its high power capabilities and low voltage (<1,000V) transmission in seaport environments. For many years, it has been used in huge number of projects where diesel-driven RTGs are turned into electrified E-RTGs.

The 0813 conductor rail solution is capable of transmitting up to 1,250 Amps along the quayside. The current collectors can be installed on the crane in order to access the conductor rail directly or they can be mounted on a separate trolley running along the conductor rails being pulled by the crane.

A ProfiDAT profile during installation.

Conductix-Wampfler also offers a recently developed data transmission solution called ProfiDAT that provides a fast and reliable data transmission to cranes.

The ProfiDAT system is designed to achieve a reliable transfer of mixed data (video + audio + control signals) at very high data rates using slotted waveguide technology. Data is safely transferred at rates up to 100Mbit/s, with an average latency of 3ms.

The data transmission system is designed to be fully integrated into the 0813 conductor rail product, with no additional installation work or additional space needed. This is possible because the protective earth (PE) conductor rail profile has been re-engineered and contains the waveguide profile for the data communication channel.

At the above-mentioned grain ship-unloader, the ProfiDAT system transfers control signals (Modbus TCP-IP) from a Schneider PLC as well as video/audio data between the ship unloader and the port control room.

Modbus is a serial communication protocol, originally published by Modicon (belonging to Schneider Electric). Specifically, Modbus TCP-IP is a Modbus variant used for communications over TCP/IP networks. The Modbus TCP-IP protocol from Schneider Electric is fully compatible with the ProfiDAT transceivers; therefore, no additional signal conversion is needed and the system works like a plug-and-play solution.

In addition to the real time control signals, digital video signals from a camera installed at the crane itself are transmitted by the ProfiDAT system. The user interface of the ProfiDAT system is a mobile transceiver (client), mounted on the crane as well as the stationary transceiver (access point) on the landside installation of the conductor rail system. Connections between these transceivers and customers PLCs are done with an integrated Ethernet port to the Ethernet Modbus –TCP network via RJ45.

The ProfiDAT data transmission system is suitable for harsh environments as seen in sea ports and bulk handling facilities. It was specifically designed to fulfill the requirements of the container handling market and performs with the highest accuracy and reliability without having copper-wired or fibre-optic linked systems.

With this project, Conductix-Wampfler has again proven its capability of providing solutions to dedicated customer data and power transmission demands, even when conventional fitting solutions aren't applicable.

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IHI ship-unloaders in use all around the world

IHI Transport Machinery Co., Ltd, a major affiliate of IHI Corporation Group in Japan, is renowned for providing a wide range of cranes and bulk handling system, including ship-unloaders, to the global marketplace.

IHI's ship unloaders are in use worldwide in different industries such as bulk terminals, coal-fired power plants, steel mills and so on, and are used to handle coal, iron ore and other raw materials. From small-capacity double-link type ship unloaders to advanced bucket elevator type continuous ship unloaders (CSU), IHI offers ship-unloaders for all different site conditions.

To date, IHI has delivered its bulk handling systems — including ship-unloaders — to hundreds of customers, and its products and services have an excellent reputation.

Through IHI's long history, one particular experience from 2011 stands out. On 11 March 2011, an unexpected tsunami swept into the cities in the Tohoku area of Japan. The coal handling systems which had been delivered by IHI to the Haramachi thermal power station of the Tohoku Electric Power Co., Inc and Soma Kyodo Power Co., Ltd's Shinchi power station did not escape the devastation. After the tsunami, large scale recovery work was carried out as national top priority project by a lot of companies to make up for the decrease in the power supply caused by the stoppage of power plants, including those two mentioned above. IHI was expected to make its best efforts for recovery and repair construction of CSU and BC to ensure that restoration could take place in the shortest period possible. As a result, the Shinchi power station was able to resume power generation before the end of 2011, and the full restoration of coal handling system was completed in the end of August, 2012. Moreover, the Haramachi power station's coal handling system Through this unforgettable experience, IHI remained true to its company philosophy of "Contributing to the development of society through technology".

As the pioneer of bucket elevator type continuous ship unloader (CSU), IHI has been delivering CSUs since it completed its first model in the 1960s. Recent projects include one 2,700tph (tonnes per hour) CSU for a steel mill, one 700tph CSU for a coal-fired power plant, and one 1,900tph CSU for a bulk terminal. IHI's track record will soon exceed 80 units after the delivery of its on-going projects which include CSUs for power plant in Japan and Southeast Asian countries.

Having the plenty of experience, IHI has been developing the design of its CSUs, with various options in order to exactly meet the requirements of different customers. IHI's CSU covers a wide range of capacities, and its advanced design makes it possible to achieve high unloading efficiency from beginning to completion of unloading operations. In the last moment of operation, buckets can scoop material without impact on ship by activating 'dredging mode', which makes those buckets softly touch and clean the bottom of the holds of the ship being unloaded. With this function, the unloading efficiency of IHI's CSU is kept high even in the last moment of unloading, while the efficiency of normal unloaders tend to greatly drop without particular tools for dredging or bulldozer assistance.

IHI's CSU has advantages, especially in terms of operational cost. First, efficient unloading operation with the unique function minimizes loss-time during operation, so CSU users could save demurrage fees. Second, the optimal combination of simple motions saves power consumption during operation. Third, long-lasting spare parts and high maintainability reduce maintenance cost for long-term operation.

In addition, IHI's CSUs meet recent strict environmental requirements. Dust emission during operation is prevented by its enclosed structure and applying optimal environmental protection devices upon customer's request.

As the pioneer of the CSU and a renowned supplier with plenty of experience, IHI offers more reliable, more efficient and eco-friendly bulk unloading systems as one solution for bulk handling system the future. DCi





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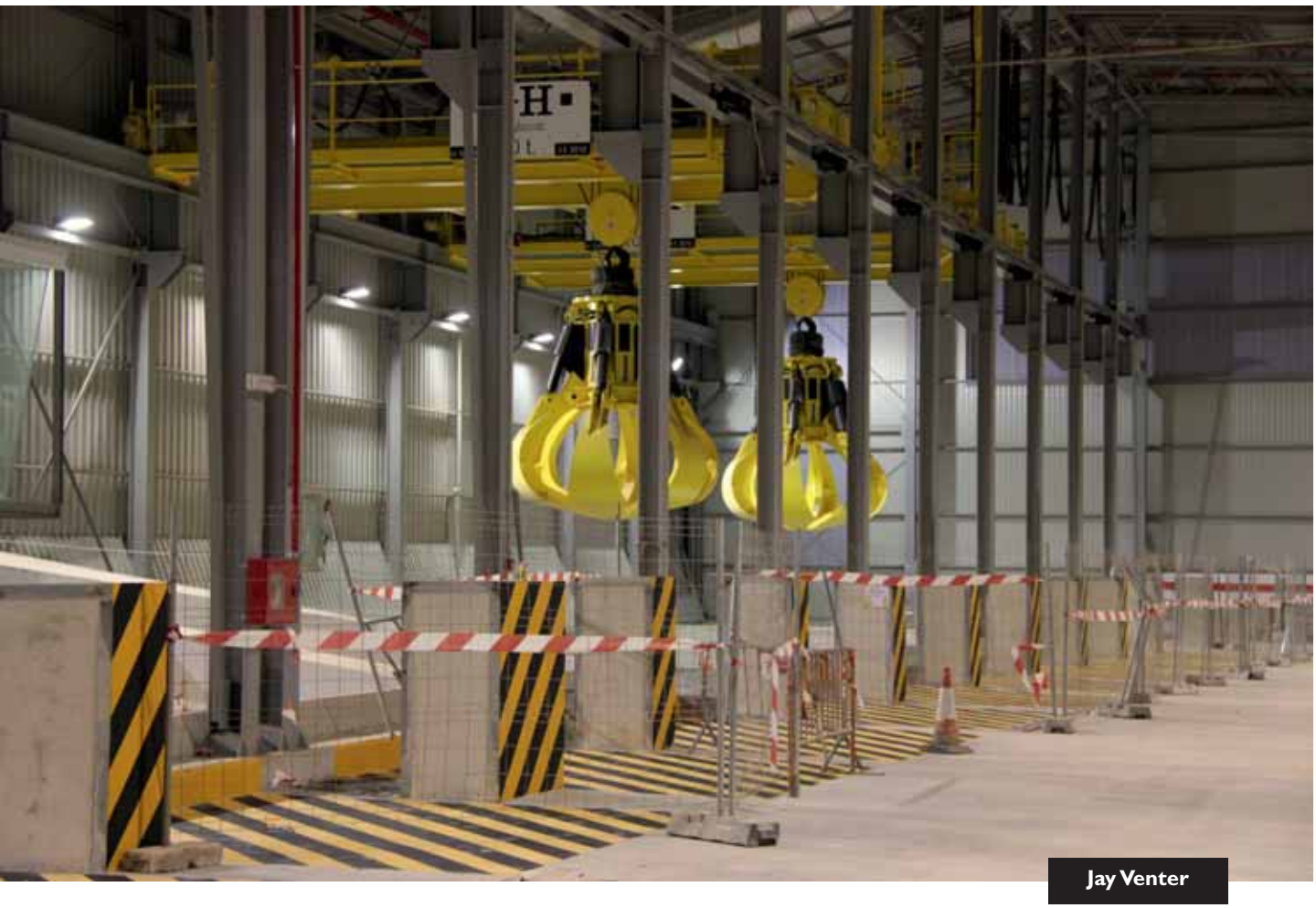

Jay Venter

Large, extensive programme of orange peel and clamshell grabs from STEMM

STEMM offers modern, updated and optimized equipment

In a constant commitment to innovation, STEMM develops advanced technological projects for various sectors, using new materials and devices applying the latest technologies.

STEMM offers a wide range of clamshell grabs and orange peel grabs based on a singular modular system for all components and parts. This innovative system allows STEMM to optimize designs, processes and purchases as well as to provide its grabs in many combinations.

The grabs feature structural robustness, electric and hydraulic power for proper penetration and dragging. The geometry and an appropriate shell kinematic with a progressive profile, in combination with a strong cylinder action, allow for an excellent filling coefficient, good load holding and maximum compaction.

STEMM grabs achieve high closing and opening speeds, which is great for production. The grabs have high pressure and variable speed pumps with a regeneration and energy-saving system. Pumps with splined shaft, low noise level and elastic couplings made of steel and nylon guarantee maximum transmission.

The speed is adjusted automatically depending on density, humidity and granulometry of the material to be handled. The hydraulic cylinders are specially reinforced with shock absorption systems and safety chambers.

Further features are excellent guidance of piston rods, high pressure joints from TRELLEBORG, double lip scrapers as well as tempered, rectified and chromed piston rods.

All cylinders are tested at 400 bar pressure and provided with MINIMESS pressure check points to take a quick pressure reading.

To ensure loading safety the grabs has omnidirectional working position. In case of power a failure, the grab cannot be opened, therefore the load does not fall. STEMM's grabs can work at inclinations of up 60°. Optionally, as an additional safety measure, the grabs are supplied with inclinometers.










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Liebherr's range of CBG cranes is extended with new model CBG 360

Liebherr's Ship Crane Department extended its range of CBG cranes with a new model.

Liebherr's new innovation, the CBG 360, is a robust four-rope grab crane designed for high speed bulk handling. Many years of experience from the operation of the preceding model, the CBG 350, have been put into the development of the new crane, which has a maximum capacity of 60 tonnes in hook operation and 48 tonnes in grab operation. Boom lengths between 26 and 36 metres are possible and the outreach of the crane can be extended by up to 12 metres through an additional ex-centre platform.

As in all cranes of the CBG series, the most important hydraulic and mechanical parts are positioned in a dustproof machine house making the CBG 360 particularly resistant against diverse weather conditions.

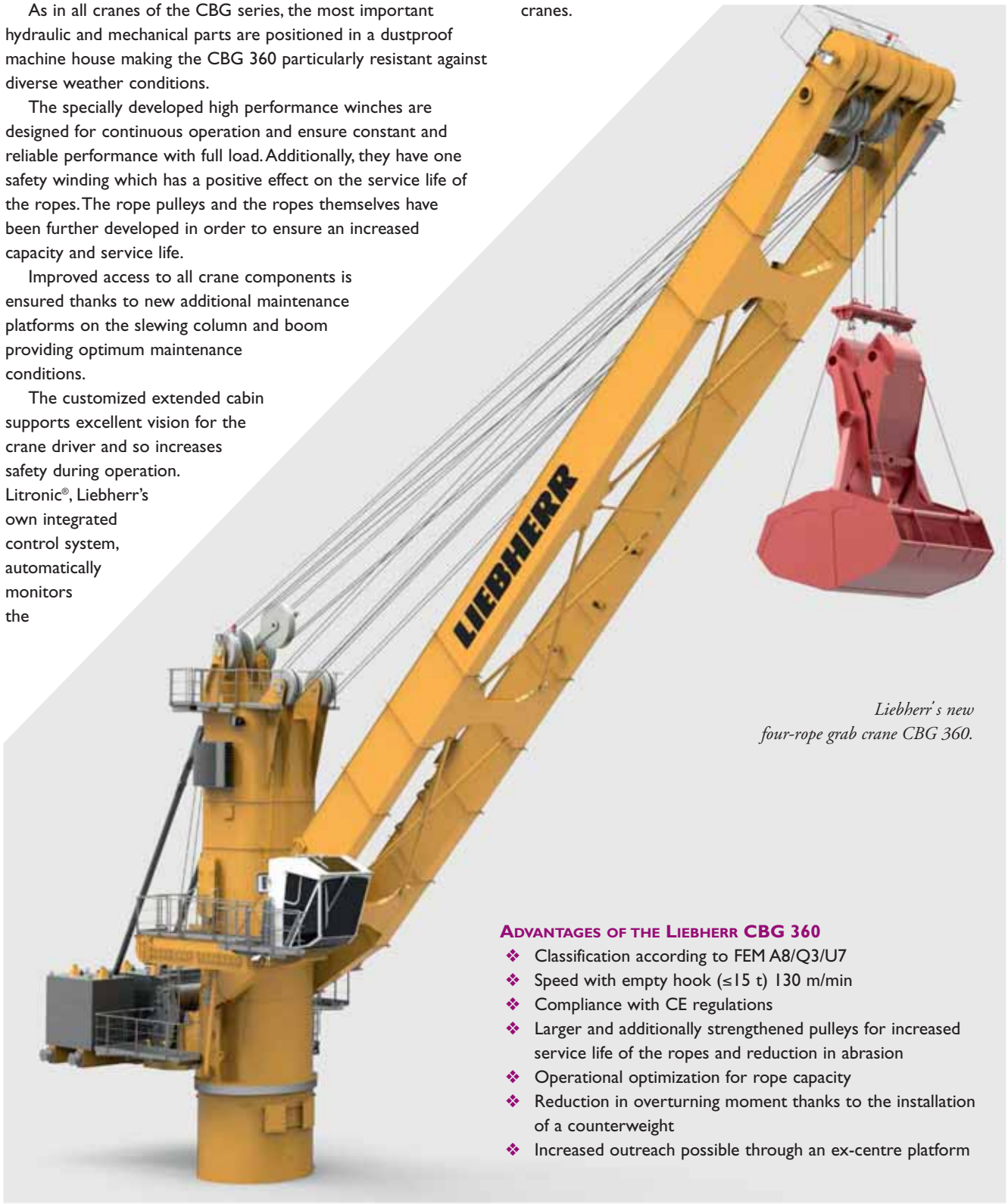
The specially developed high performance winches are designed for continuous operation and ensure constant and reliable performance with full load. Additionally, they have one safety winding which has a positive effect on the service life of the ropes. The rope pulleys and the ropes themselves have been further developed in order to ensure an increased capacity and service life.

Improved access to all crane components is ensured thanks to new additional maintenance platforms on the slewing column and boom providing optimum maintenance conditions.

The customized extended cabin supports excellent vision for the crane driver and so increases safety during operation. Litronic®, Liebherr's own integrated control system, automatically monitors the crane's heel and trim and responds with the appropriate emergency programme in critical situations. Therefore, the crane is not only suitable for operation in sheltered waters but also in open seas for servicing vessels up to Capesize.

The complete development of the CBG 360 was carried out in consideration of the European Parliament's directive 2006/42/EC and is therefore CE certified.

The CBG 360 has been developed by Liebherr to meet with the current market requirements is now available as part of Liebherr's range of maritime cranes.



Liebherr's new four-rope grab crane CBG 360.

Advantages of the Liebherr CBG 360

- Classification according to FEM A8/Q3/U7
- Speed with empty hook (≤15 t) 130 m/min
- Compliance with CE regulations
- Larger and additionally strengthened pulleys for increased service life of the ropes and reduction in abrasion
- Operational optimization for rope capacity
- Reduction in overturning moment thanks to the installation of a counterweight
- Increased outreach possible through an ex-centre platform

MacGregor, ESL Shipping develop and test autonomous discharging feature on bulk handling cranes

MacGregor, part of Cargotec, and ESL Shipping Oy, part of Aspo Plc, have agreed to jointly develop and test an autonomous discharging feature on MacGregor bulk handling cranes. It is designed to offer safety and efficiency advances. The cranes will be fitted on board ESL Shipping's two new liquefied natural gas-powered Handysize bulk carriers.

"Autonomous crane operation improves efficiency and safety," says Leif Byström, Senior Vice President, Cargo Handling at MacGregor. "Discharging operations can be monitored and controlled from the bridge and therefore eliminate the need for personnel in hazardous operational areas."

"We are very excited about collaborating with ESL on this development project," continues Byström. "By combining the expertise of a forward-thinking shipowner and operator with our expertise in intelligent cargo handling, we can reduce unnecessary waste in the value chain and therefore develop safer and more efficient solutions for unloading bulk cargoes."

The vessels are planned to enter service during the second quarter of 2018, when automation testing will commence.

As previously reported, LNG is becoming an increasingly popular fuel option in the marine shipping industry. For example, SEA\LNG, a multi-sector industry coalition, recently signed a memorandum of understanding with the Society for Gas as a Marine Fuel to break down the commercial barriers to the uptake of LNG as a marine fuel and to develop guidelines and best practices for safety, operational and technical aspects.

In addition, many companies are taking steps to support LNG fuelling infrastructure. ExxonMobil, Eagle LNG Partners LLC and Crowley recently signed a memorandum of understanding to establish the storage and technical support necessary to provide safe, reliable LNG delivery for vessel operators bunkering in North America.

Further, Shell Gas & Power Developments B.V. also recently signed a framework agreement with Qatar Petroleum's Wave LNG Solutions to develop LNG marine fuelling infrastructure at strategic shipping locations across the globe, as increasing numbers of ship owners and operators are responding to tighter sulphur and nitrogen oxide emissions regulations.

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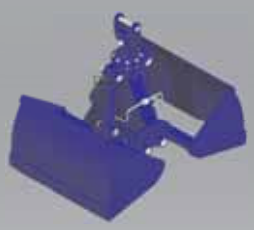

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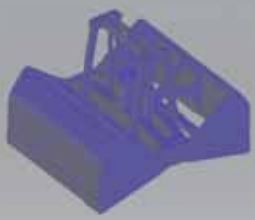
Mechanical clamshell bucket



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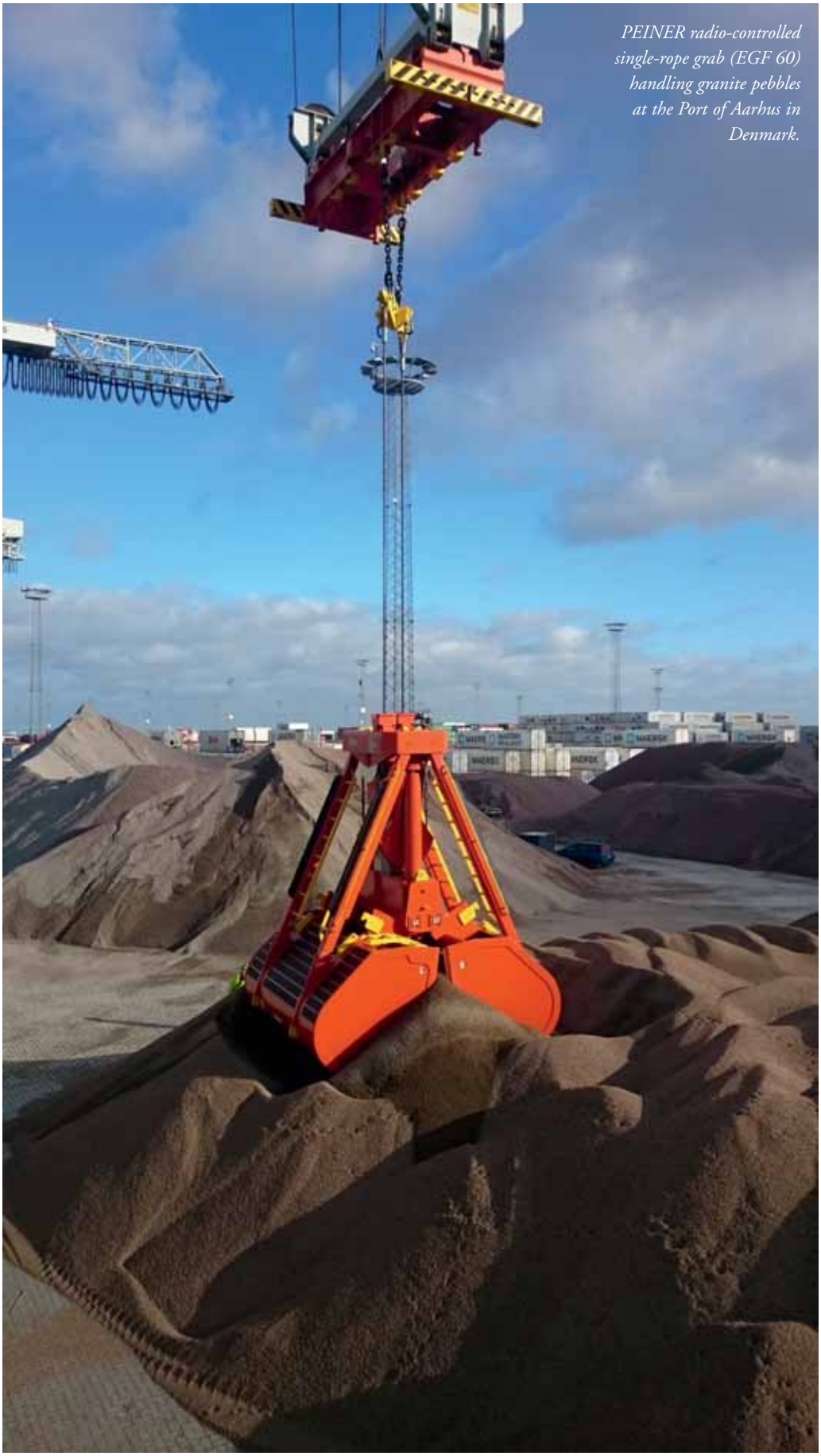
PEINER SMAG offers new bulk handling solution for container cranes

PEINER SMAG Lifting Technologies, Salzgitter, Germany, has introduced a high-volume radio controlled single-rope grab (EGF 60) for operation with a container crane at Port of Aarhus, the largest container port in Denmark.

At the beginning of 2015, PEINER SMAG Lifting Technologies GmbH (PSLT) was approached by its customer the Port of Aarhus with a request for a specific grab that can be operated with an existing container crane to handle bulk cargo. As most of the proven grabs could not be used to fulfill this requirement, the company felt encouraged to develop an efficient solution tailored for customer's needs.

This was a challenging technical task: since the crane is not equipped with the necessary hoisting gear/winches, mechanical two-rope and four-rope grabs are ineligible for operation with this type of crane. Hydraulic and electro-hydraulic motor grabs require a wide range of accessories to be installed on the crane and would go beyond the planned budget, hence also these grabs could not be taken into account. Another alternative is the use of diesel grabs; however they are known to have a negative impact on the industrial safety and, besides, they provide limited operational flexibility. For the required handling capacity of more than 30m³, the grab must have a powerful engine as well as an exhaust system to meet the permissible emission levels.



PEINER radio-controlled single-rope grab (EGF 60) handling granite pebbles at the Port of Aarhus in Denmark.

Finally, after all possibilities had been checked, PSLT decided on the only workable solution: the PEINER radio-controlled single-rope grab (EGF). This has already proved to be successful on board bulk carriers over the past 15 years; however, the grabs were primarily used for handling volumes from 12m³ to 15m³. The goal of the Aarhus project was to construct an EGF with a volume of 32m³ in order to use the

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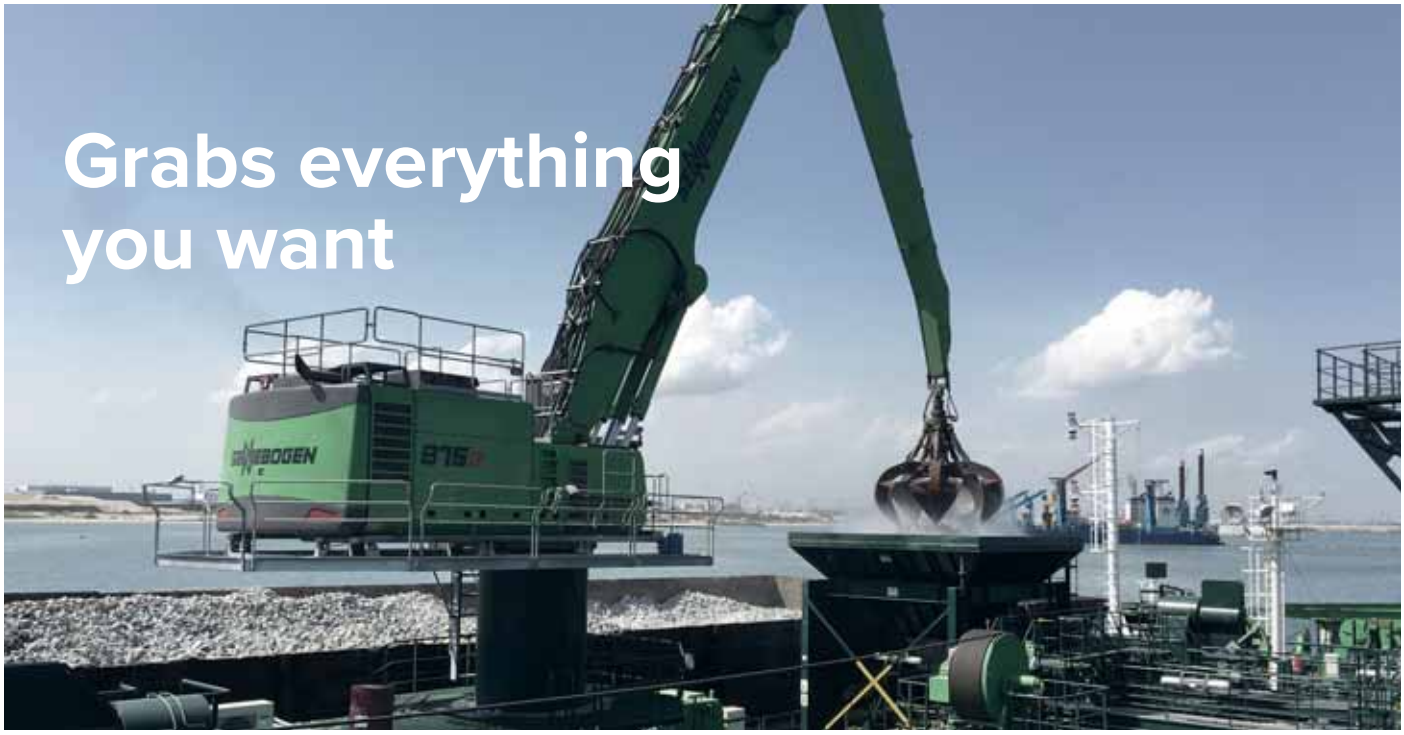

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These specific grabs for the handling of animal feed, wood pellets and wood chips at the port of Aarhus are the largest radio controlled single-rope grabs ever built by PSLT.

existing crane lifting capacity even during grab operation.

These specific grabs for the handling of animal feed, wood pellets and wood chips at the port of Aarhus are the largest radio controlled single-rope grabs ever built by PSLT.

In addition to a new design, engineering of the basic unit with special cylinders the grabs offer a sensor attachment transmitting actual operational states to the crane controls and crane driver by wireless communication. This innovative feature helps crane operators to work even faster and more effectively. The grabs are provided with a centralized shift of lubricating points and are therefore easy to maintain.

An intelligent climbing assistance system ensures the highest standards of job safety for the maintenance staff on the job site. The grabs are assembled with a universal suspension that enables

Variable grab height: transport of a wheel loader into the ship's hold.

the operation both lengthways and crosswise. PSLT's scope of supply also includes an adapter unit in the form of special load traverses to connect the grab with the crane headblock. The traverses feature a range of supplementary technics, e.g. proximity sensor, light and camera systems, control cabinets and electrical plugs.

Additionally, the EGF 60 is equipped with a unique locking system that considerably reduces the grab height. This feature particularly supports ship-to-ship bulk handling processes, for example during transportation of wheel loaders into the ship's hold, where high structures on deck often block the way. The grab shell can easily be fixed in position by hand without using any tools so that the grab height is reduced by half.

It is the first time that a PEINER radio-controlled single-rope grab of such a large size will be operated by a container crane. PSLT expects this pilot project to serve as a positive drive for further developments in this field and sincerely hopes that it could be a starting point for the realization of more projects with this innovative technology. Jens Hvidegaard Dissing, Project Manager at the Port of Aarhus, who accompanied the project from the idea stage to the first commissioning, is convinced about the new development. "Bulk material handling is essential to the success of ports. Our goal was to have an intelligent solution for our container cranes, with significantly better efficiency in terms of speed and handling volume. We had an idea, and we found the right product: a PEINER radio-controlled single-rope grab, that combines all the required features, together with additional benefits to meet today's material handling challenges in the Port of Aarhus."

About PEINER SMAG Lifting Technologies GmbH

PEINER SMAG Lifting Technologies GmbH (PSLT), a subsidiary of SMAG, is a major global manufacturer of grabs and other lifting accessories for cargo handling. Based in Salzgitter, Germany, PSLT runs manufacturing sites in Germany, China, India and Singapore. On the basis of the proven PEINER product design, the special-purpose machinery manufacturer develops, manufactures and services lifting accessories for various industries, e.g. ports, ships, steel mills, waste-to-energy plants and recycling/scrap handling businesses.

About Salzgitter Maschinenbau AG

Salzgitter Maschinenbau AG (SMAG) is the holding company of a German group of mechanical engineering companies with factories in Germany, China, India, Singapore and Slovakia. At these sites, grabs and spreaders for loading and unloading seagoing cargo vessels, fully equipped driver cabins, automated drilling technology for the open-pit and underground mining industry, special-purpose vehicles for the process industry as well as mechanic and hydraulic telescopic antenna masts are in-house-developed, manufactured and worldwide distributed.

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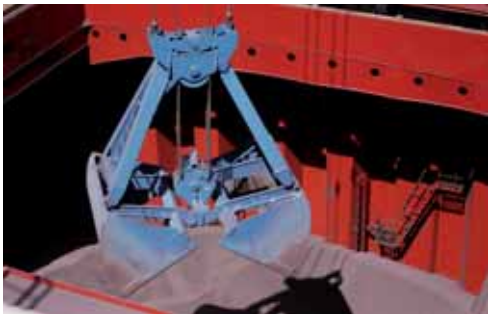

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KRÖGER grabs meet economic and ecological requirements

Bulk handling demands light and environmentally friendly grabs

KRÖGER grabs have been in operation in almost all German ports and harbour for a long time, both on the coast, e.g. in Hamburg, Brunsbüttel and Bremen, or in inland harbours such as Duisburg, Düsseldorf, Cologne, Andernach and Ludwigshafen and due to their technical benefits they are going to spread out now throughout Europe and worldwide as recent orders from Asia and South America show.

Above all, the weight-optimized configuration, which is achieved by means of special materials and an innovative design, provides an improved payload capacity of the grab in bulk handling, which enhances the productivity. Furthermore KRÖGER's grabs can be equipped with the KRÖGER ZERO-maintenance bearing system, what makes the time consuming and annoying lubrication procedures dispensable and thus additionally enhances the efficiency of the overall transshipment operation.

The legal requirements on port companies in terms of bulk goods handling are becoming increasingly important with regards to emissions. The fact that many handling companies are situated in the vicinity of residential areas makes it all the more imperative to avoid environmental impacts such as dust formation and ground water pollution.

With long time experience in loading and shipping practices grab expert Rainer Büssing, director Sales and Marketing at Kröger Greifertechnik provides an overview of the necessary requirements on future-oriented, ecologically responsible loading grabs.

"Open the grab jaws. Grab the bulk goods. Transship. Things are no longer as simple in harbours and ports," says Büssing. "Today it implies: Grab the bulk goods. Do not lose any of it. Protect the environment."

As a matter of fact, there are mainly three areas in a grab that need to work in an eco-friendly manner: The specifically raised grab jaws, the grab edges and the hinge bearings. Let us first consider the eco-friendly grab jaws. While open grabs were absolutely normal earlier, today increasingly closed loading grab types are found in port operation. Winds occurring on water and in the harbours compel handling companies to appropriately protect their conical piles. The grab jaws are raised above the angle of repose so that the often strong winds in harbours and ports are left with no chance to affect the conical piles and, consequently, the light, dust-forming bulk goods. This is an ideal solution to the problem of blowing-off of material dust.

Matters become more complicated during tight closing of the grab edges. This requires higher effort in terms of structure and design so that the grab jaws are able to operate tight even under extreme loads and continuous, long-term usage. In 90% of the handling goods, tight closing of grab jaws can be achieved by means of double Pantanax round-bar steels both on the bottom scrapers as well as the side blades. The jaws close tightly through the bedding in of both the linked round-bar steels until a watertight closure is reached.

Increasingly importance is also gaining the protection of the environment from oils, greases and lubricants, which could squeeze out of the hinge bearings and fall of to ground or water. This is totally avoided by the use of the above mentioned KRÖGER ZERO maintenance technology and therefore undesirable follow-up costs are eliminated.

"So," Büssing sums up, "KRÖGER shows that grabs can meet both, economic and ecological requirements in bulk handling operation".

Kröger Greifertechnik GmbH & Co. KG is a manufacturer of grabs based in Sonsbeck/Niederrhein in Germany. Its core products include rope, motor-hydraulics and hydraulic grabs. The target markets are, in particular, customers in the sectors of sand and gravel extraction, ports and general bulk handling as well as waste incinerator plants. End-users and distributors at home and abroad are among its customers. DCi

Kröger STLBG enclosed grab for dust-free bulk handling.

The Kröger STLB four rope grab is ideally suited for bulk handling.

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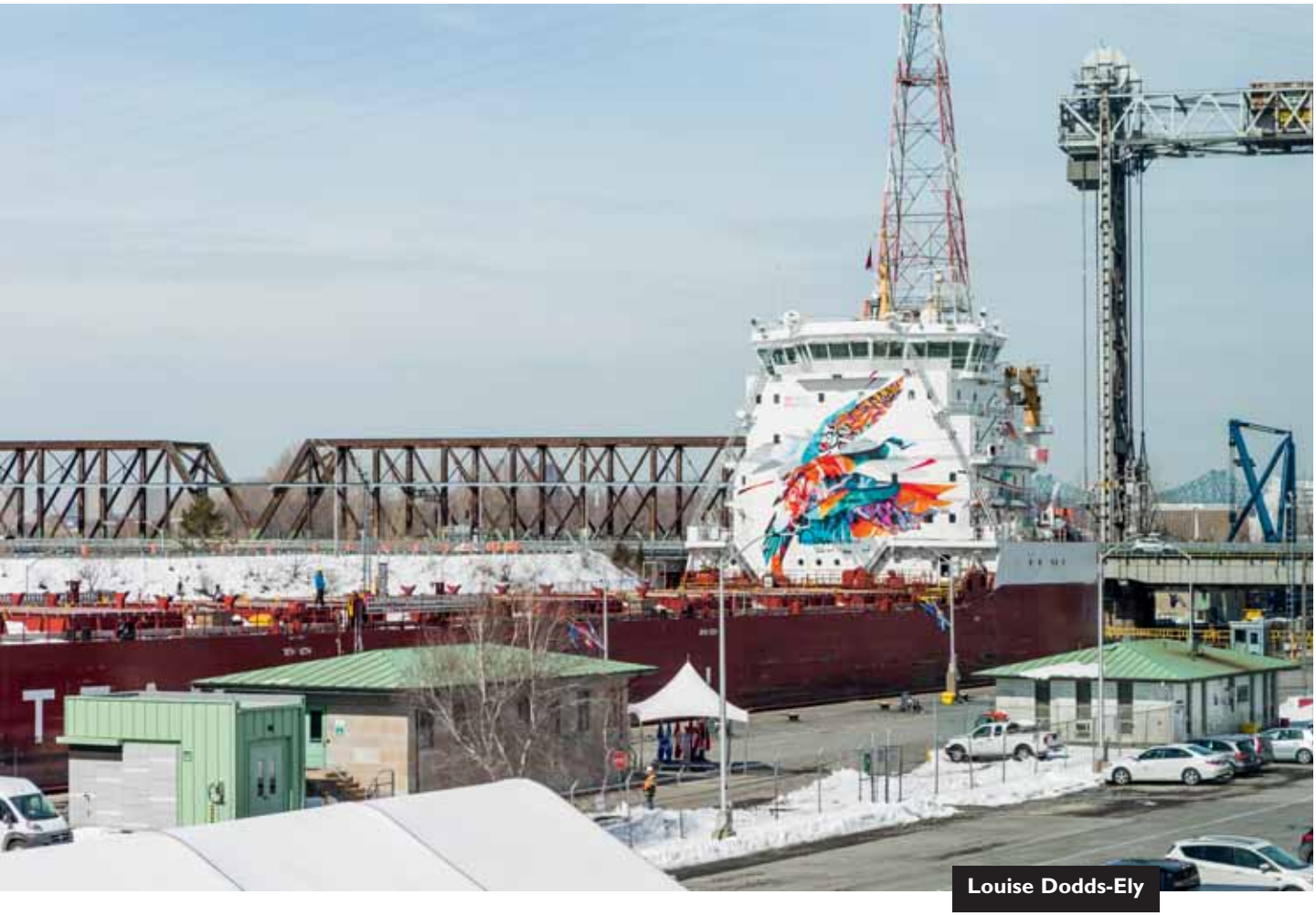


Louise Dodds-Ely

The Great Lakes St. Lawrence Seaway System is a deep draught waterway extending 3,700 km (2,340 miles) from the Atlantic Ocean to the head of the Great Lakes, in the heart of North America. The St. Lawrence Seaway portion of the System extends from Montreal to mid-Lake Erie. Ranked as one of the outstanding engineering feats of the twentieth century, the St. Lawrence Seaway includes 13 Canadian and 2 US locks.

The Great Lakes and St. Lawrence River have been major North American trade arteries since long before the US or Canada achieved nationhood. Today, this integrated navigation system serves miners, farmers, factory workers and commercial interests from the western prairies to the eastern seaboard.

Virtually every commodity imaginable moves on the Great Lakes Seaway System. Annual commerce on the System exceeds 200 million net tonnes (180 million metric tonnes), and there is still ample room for growth. Some commodities are dominant:

- iron ore for the steel industry;
- coal for power generation and steel production;
- limestone for construction and steel industries;
- grain for overseas markets;
- general cargo, such as iron and steel products and heavy machinery; and
- cement, salt and stone aggregates for agriculture and industry.

The primary carrier vessels fall into three main groups: the resident Great Lakes bulk carriers or 'lakers'; ocean ships or 'salties'; and tug-propelled barges. US and Canadian lakers move cargo among Great Lakes ports, with both nations' laws reserving domestic commerce to their own flag carriers. Salties flying the flags of other nations connect the Lakes with all parts of the world.

Opened to navigation in 1959, the St. Lawrence Seaway part of the system has moved more than 2.5 billion metric tonnes of cargo in 50 years, with an estimated value of more than $375 billion. Almost 25% of this cargo travels to and from overseas ports, especially Europe, South America, the Middle East, and Africa. From Great Lakes/Seaway ports, a multi-modal transportation network fans out across the continent. More than 40 provincial and interstate highways and nearly 30 rail lines link the 15 major ports of the system and 50 regional ports with consumers, products and industries all over North America.

St. Lawrence Seaway Management Corporation: bellwether of the economy

The Canadian St. Lawrence Seaway Management Corporation (SLSMC) is a not-for-profit corporation responsible for the safe and efficient movement of marine traffic through the Canadian Seaway facilities, which consist of 13 of the 15 locks between Montreal and Lake Erie. The Corporation plays a pivotal role in ensuring that the waterway remains a safe and well-managed system, which it shares with its American counterpart, the Saint Lawrence Seaway Development Corporation (SLSDC).

The Corporation's mandate promotes efficiency and responsiveness to the needs of shipping interests, ports, marine agencies, and provincial and state jurisdictions.

The two Seaway entities co-ordinate operational activities particularly with respect to rules and regulations, overall day-to-day operations, traffic management, navigation aids, safety, environmental programmes, operating dates, and trade development programmes. The unique bi-national nature of the

SEAWAY MONTHLY TRAFFIC RESULTS
July 2017

Traffic (in thousands of tonnes)	SLSMC - Combined Traffic			
	Year to Date		Change from 2016	
	2016	2017	Tonnes	%
Total Cargo	13 579	16 044	2 465	18.15%
All Grain	3 598	3 763	165	4.59%
Iron Ore	2 210	3 721	1 512	68.41%
Coal	1 077	929	-148	-13.75%
Dry Bulk	3 822	4 416	594	15.54%
Liquid Bulk	1 769	1 734	-35	-2.01%
General Cargo	1 084	1 467	383	35.37%

Vessel Transits	2016	2017	Transits	%
Total Transits	1 596	1 759	163	10.21%

The St. Lawrence Seaway Management Corporation

System requires 24-hour, year-round co-ordination between the two Seaway entities.

Commodity throughput

Bruce Hodgson, Director of Market Development at the SLSMC, spoke with *Dry Cargo International*, to give an update on progress in the first half of 2017. Hodgson reports that cargo flows through the St. Lawrence Seaway System have been very positive in the first six months of 2017, which is much as expected. Grain remains the most prominent commodity to be shipped through the System. Iron ore is notable too, as its numbers are higher than last year, due in great part to increased export cargoes. The SLSMC views this as a very positive development.

Seaway incentives

The SLSMC has a range of incentives in place, to attract new business to the System. These include the New Business Incentive; Service Incentive; and the Volume Incentive.

A new development, the Gateway Incentive, was put into place last year, and is proving particularly popular. Under this, shippers are encouraged to move their cargoes from other gateways. Shippers that can commit to certain levels of tonnage can benefit from deep discounts.

The results of all these incentives are overwhelmingly positive. Year to date, they have attracted $1.4m in terms of new business. This means that, over the last ten years, a total of $34.4m — or 20.6mt (million tonnes) — has been achieved.

The SLSMC's incentive programmes have been very well received by customers. The Gateway Incentive, in particular, has been very well received among users, and the SLSMC is strongly committed to promoting this within the marketplace, and expects positive results this year moving forward.

Highway H_2O

The Highway H_2O programme continues to do well. The marketplace has responded favourably to the ongoing marketing drive, with the new website in particular attracting a significant level of interest. The website has experienced greatly increased traffic. Its mobile-friendly format makes it easily accessible to web browsers on phones and tablets, and is one of the reasons behind the high levels of activity on the site. All in all, says Hodgson, the programme is very positive.

Safety first

The SLSMC enjoys a great record in terms of safety through the System. Safety has always a cornerstone of SLSMC policies, and remains a focal point of the company's culture. This emphasis is clearly demonstrated by the company's continued excellent safety record.

Modernization programme and asset renewal

The Corporation's modernization programme focuses on implementing technology to enhance the efficiency and safety of lock operations. This project is centred on implementing the world's first vacuum mooring system, known as Hands Free Mooring (HFM), for use at high-lift locks. In addition to HFM, the modernization programme includes remote operation of Seaway locks.

The HFM programme and remote operation system are progressing extremely well, and the work is near to completion. By the time the Seaway opens for business in 2018 — on time, and on schedule — both will be fully operational.

Feedback from customers has been very good; not only does the HFM improve productivity, but it greatly enhances the safety of crews.

Maintaining a safe, reliable and cost-effective transportation system is vital to the Seaway's competitive position. The Corporation has been using an Asset Management System since the mid 1990s to optimize value from its assets and provide long-term planning, ensuring that capital expenditures meet operational objectives and lead to consistently high levels of system availability.

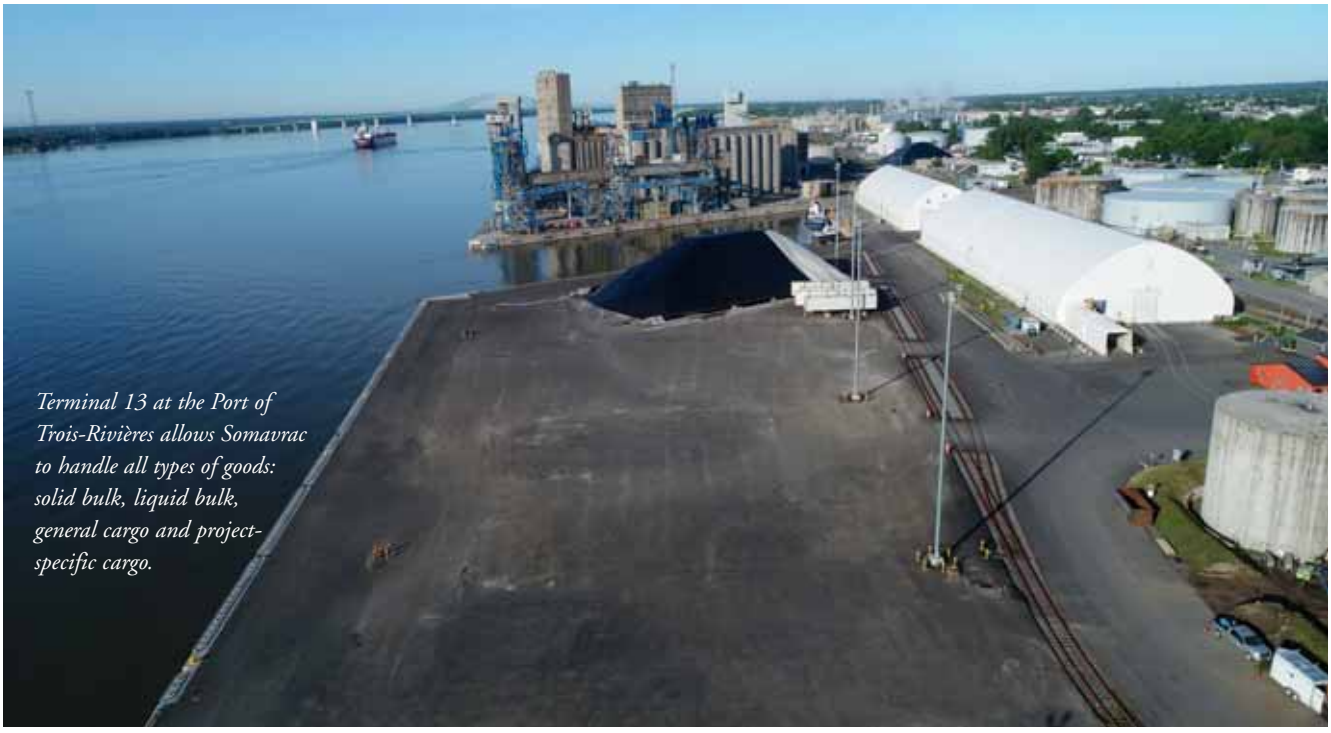
In 2016/17, the Corporation completed the major programme to replace 1.9km of approach walls/tie-up walls in the Welland Canal. Best-in-class planning skills and rigorous monitoring were key factors in ensuring that the project remained on budget and on schedule throughout its four-year execution plan.

Another significant asset renewal project is the Marine Security Program. At a cost of about $15 million, this two-year project was completed by July 2017, and will improve monitoring and intrusion detection, perimeter and access control, and virtual security.

On track for a bright future

Overall, says Hodgson, SLSMC's business is tracking well. He expects to see increasing throughput volumes in the upcoming years. The SLSMC is a bellwether of the economy — the economy is better in Europe, the US and Canada, and this will continue to be reflected throughout the Great Lakes/St Lawrence Seaway System.

Newest terminal on the St. Lawrence River to be operated by Groupe Somavrac



Terminal 13 at the Port of Trois-Rivières allows Somavrac to handle all types of goods: solid bulk, liquid bulk, general cargo and project-specific cargo.

On 3 July, the Trois-Rivières Port Authority (TRPA) and Groupe Somavrac announced the signing of a long-term agreement to operate Terminal 13 at the Port of Trois-Rivières. This terminal, with a surface area of 23,000m^2, as well as Pier 13, was restored in 2016 and has been in operation since January 2017.

This agreement allows Somavrac to expand its services. In addition to two vessel berths, Terminal 13 provides an outdoor storage area accommodating a wide variety of products. The terminal provides effective rail and road links along with a network of pipelines connected to reservoirs located further north. It also offers access to two solid bulk facilities located nearby. It has become a comprehensive multimodal storage platform.

Marc Paquin, President of Groupe Somavrac, explained that "Terminal 13 will enable Somavrac to better serve its customers. With its versatility and quality of maritime, road and rail access, it is well adapted to the complexity of our customers' supply chains. In addition to this infrastructure, Somavrac offers

Marc Paquin, President of Groupe Somavrac; and Gaétan Boivin, President and CEO of the Trois-Rivières Port Authority on Terminal 13, with an outdoor storage area of 23,000m².

advanced equipment and expertise recognized throughout the logistics industry. This agreement consolidates a well-established business relationship with the Port of Trois-Rivières since our company was founded in 1963, and we are very proud of this."

Gaétan Boivin, President and CEO of the TRPA, is very pleased with the agreement with Somavrac. As he explained, "it strengthens our partnership with a company recognized for its excellence, and the Port of Trois-Rivières has always been able to rely on their quality and competitive logistics services. This agreement allows the Port of Trois-Rivières to continue providing high quality services to its users. The stability of the workforce is also assured with the signing in February of a nine-year collective agreement between the Maritime Employers Association and the Longshoremen's Union".

About Somavrac

Somavrac offers specialized services in the multimodal handling of bulk goods. Through its various maritime, rail and road accesses, Somavrac has the necessary resources to fulfill customer's logistics activities in full or in part.

The company's services include stevedoring, warehousing, transportation, distribution, handling, bagging and transformation of goods.

The new Terminal 13 strongly demonstrates the resolve of the Port of Trois-Rivières to put its customers first. It is an unprecedented modernization on the St. Lawrence River. From a logistical point of view, a new berth has been added. It augments the traffic movement areas, making them even more fluid and thereby minimizing waiting times. Unlike other berths in this sector, there are no warehouses nearby, which optimizes the loading and unloading of vessels. The Terminal benefits from a new 23,000m² storage area served by two rails at the terminal.

"With our resolve to satisfy customer needs, the configuration of the terminal has been optimized to accommodate different types of products in both solid bulk and general merchandise. Everything has been considered, whether in terms of calculating the slopes as well as the positioning of the lighting fixtures. The port can thus offer customers different value-added services in a safe and sustainable environment," says David Berthelot, Business Development Coordinator at the Port of Trois-Rivières.

The Port of Trois-Rivières' primary objective is to be perceived as the ideal port solution for its users — including the cargo handlers and the shipping agents, the crews, the shippers and their freight forwarders. The port receives between 200 and 250 vessels a year, and is keen to provide a positive experience all round. The new terminal will allow it to accommodate more, but it knows too that it is important to receive vessels at the right docks, to optimize their passage through the port as it knows that this can have an impact throughout the handling chain. For the Port of Trois-Rivières, it is important that this impact be positive!

Investment in port infrastructure continues

In recent years, the port has paved the way in this area by adding infrastructures linked to port operations but also in terms of safety, security and the environment. Over $130m has been invested at the port in recent years. These investments have greatly benefited the solid bulk sector. Specifically, the railway infrastructure was completely redesigned, as was the railyard, thereby doubling its capacity. The acquisition of new storage areas and the addition of four new warehouses for various bulk type cargo demonstrate that the Port of Trois-Rivières has become the benchmark for a long sought-after multi-product customized approach.

The port's tenant Somavrac is recognized for offering new ways of operating to its customers in order to increase productivity including a new unloading platform in front of the new warehouses 24 and 25. The port is working closely with Somavrac, as well as with all its other customers, to identify innovative solutions to optimize productivity, whether through new infrastructures or processes, and also to reduce the environmental footprint of port activities.

About the Port of Trois-Rivières

The Port of Trois-Rivières handles over three million metric tonnes of traffic and generates close to 900 direct jobs. It accommodates 55,000 trucks, 11,000 railcars and more than 200 merchant and cruise ships annually originating from over 100 different ports in more than 40 countries around the world.

As part of the 18 Canadian Port Authorities and active since 1882, the Port of Trois-Rivières offers a wide range of facilities and services to the maritime industry throughout the year. It is an important player in regional, national and international economic development for major industrial sectors such as the construction industry, aluminium, mining and agri-food.

Metro Ports to operate bulk terminal at Port of Indiana

Country's oldest stevedore to open its only Great Lakes facility in Indiana

Left to right: Ken Kaczmarek, Chairman, Ports of Indiana Commission; Michael Ferguson, President, Metro Ports; Michael Giove, COO, Nautilus International Holding Company; Rich Cooper, CEO, Ports of Indiana; Jody Peacock, Vice President, Ports of Indiana; Ian Hirt, Port Director, Port of Indiana-Burns Harbor

On 20 June this year, the Ports of Indiana announced that the country's oldest stevedoring company — Metro Ports — will become the new bulk terminal operator at the Port of Indiana-Burns Harbor. Starting 1 July 2017, Metro Ports will manage the loading and unloading of shipments along the port's East Harbor for port tenants and outside companies shipping bulk cargoes, including products for the steelmaking, agricultural, manufacturing, energy and construction industries.

Metro Ports is the brand used to collectively identify stevedoring affiliates of Metropolitan Stevedore Co. and its parent company, Nautilus International Holding Corp., both based in Long Beach, California. The company's roots date back to 1852 when its original parent corporation, California Stevedore and Ballast Co., was established during the Gold Rush era, and it has maintained continuous family ownership for 165 years. Metro Ports operates at 27 US ports on the East, West and Gulf Coasts in the states of Washington, New York, Massachusetts, South Carolina, Texas, Florida, Louisiana, California, North Carolina and Georgia. This is the company's only Great Lakes facility.

"Having a 165-year-old company like Metro Ports select Indiana to launch its Great Lakes operations is a tribute to our state's business climate and our extremely successful port system," said Rich Cooper, CEO for the Ports of Indiana. "Indiana's robust maritime economy leverages shipping connections to domestic and international markets through the Great Lakes and the inland river systems to support 155,000 Hoosier jobs and generate $21.5 billion in annual economic activity. We're happy to see Metro Ports recognizes tremendous economic opportunity in establishing a port terminal at the 'Crossroads' and 'Cross-waterways' of America."

Metro Ports handles a wide range of bulk and breakbulk cargoes around the country, including aggregates, potash, coke, coal, cement, fertilizer, borax, bauxite, RoRo, military, steel, wind energy, yachts and project cargo.

"Metro Ports is recognized as a world-class stevedore and terminal operator for handling bulk commodities," Cooper said. "The corporation's global focus and proven track record reflect a long history of providing the management, operational resources and expertise to work in a competitive environment to meet demanding safety, environmental and quality standards. We're excited to partner with such a high-calibre team of professionals and are looking forward to working shoulder-to-shoulder with them to grow business at the port."

In 2016, the Port of Indiana-Burns Harbor handled nearly 2.6 million tonnes of cargo, completing the highest three-year total in the port's history. In addition, the Ports of Indiana invested nearly $2.5 million into port infrastructure, including dredging and stabilization of two ship berths to increase dock capacity for handling Seaway-draught vessels as well as replacement of 2,000 feet of rail track and rehabilitation of multiple rail turnouts. Additional investments are planned by the Ports of Indiana and Metro Ports to upgrade the bulk terminal to increase the port's throughput capacity.

"We're honoured to be selected as the bulk terminal operator at the Port of Indiana," said Michael Ferguson, president of Metro Ports. "We see tremendous potential here to leverage the port's connections to ocean ships, Great Lakes vessels, river barges and multiple rail carriers, as well as the region's powerful industrial base located within sight of downtown Chicago. Indiana was the obvious choice for us to expand our business into the Midwest and establish a Great Lakes presence. We could not have asked for a better business partner than the Ports of Indiana and are already working together with their team to develop new shipments that could significantly grow business in this region."

Maritime operations at the port generate nearly $4.9 billion per year in economic activity and support more than 39,000 total jobs. The port currently has 110 acres available for development and is home to 30 companies that provide a range of advanced manufacturing and logistics services.

About the Port of Indiana-Burns Harbor

The Port of Indiana-Burns Harbor opened in 1970 and is operated by Ports of Indiana, a statewide port authority operating three ports on the Ohio River and Lake Michigan. Established in 1961, the Ports of Indiana is a self-funded enterprise dedicated to growing Indiana's economy by developing and maintaining a world-class port system.

About Metro Ports: Metropolitan Stevedore Co. was established in 1923 in Southern California and with business roots dating back to the 1850s Gold Rush era through its original San Francisco parent corporation, California Stevedore and Ballast Co. Through the years, Metropolitan Stevedore Co. became known as Metro so in 2008 the decision was made to use Metro Ports as the new brand for the various key operating companies of Long Beach-based Nautilus International Holding Corp. Those key companies included Metropolitan Stevedore Co., Southeast Crescent Shipping Co., Suderman Contracting Stevedores, Inc., Southeast Maritime Services LLC (which holds the Savannah International Terminal), and Cape Fear Bulk LLC.

Nautilus International Holding Corp, headquartered in Long Beach, Calif., maintains oversight of various subsidiary companies concentrating in stevedoring, terminal operations, agency, logistics and risk management. The companies of Nautilus International Holding Corp. excel in providing outstanding services to various market segments. These subsidiaries include Metro Ports, a contract stevedoring and marine terminal operator specializing in dry and liquid bulk materials, breakbulk cargoes, forest products, wind energy, and a variety of other marine cargoes; Metro Cruise Services LLC and Metro Shore Services LLC, which jointly provide a full suite of services to the passenger cruise industry; and Metro Risk Management LLC, which specializes in claims administration and other risk management services.

Lakes limestone and iron ore trades up 15% in July

Limestone

Shipments of limestone on the Great Lakes totalled 3.9mt (million tonnes) in July, an increase of 15.4% compared to a year ago. July's loadings were also slightly ahead of the month's five-year average, according to a report from the Lake Carriers' Association.

Loadings from US quarries totalled 3.16mt, an increase of 22.3% compared to a year ago. Shipments from Canadian quarries totalled 700,000 tonnes, a decrease of 60,000 tonnes. Year-to-date the Lakes limestone trade stands at 12.6mt, a decrease of 9.6% compared to a year ago. Loadings from Michigan and Ohio quarries total 10.3mt, a decrease of 1.4%. Shipments from Ontario quarries total 2.35mt, a decrease of 13.4%.

Iron ore

Shipments of iron ore on the Great Lakes and St. Lawrence Seaway totalled 6.4mt in July, an increase of 14.7% compared to a year ago. However, shipments trailed the month's five-year average by 2.3%.

Shipments from U.S. Great Lakes ports totalled 6mt in July, an increase of 21.7% compared to a year ago. Loadings at Canadian terminals in the Seaway totalled 391,000 tonnes, a drop of nearly 40%.

Year-to-date the iron ore trade stands at 30.1mt, an increase of 12.4% compared to the same point in 2016. Year-over-year, loadings at US ports total 27.5mt, an increase of 14.3%. Shipments from Canadian ports in the St. Lawrence Seaway total 2.65mt, a decrease of 4%.

Lake Carriers' Association

Lake Carriers' Association represents 13 American companies that operate 49 US-flag vessels on the Great Lakes and carry the raw materials that drive the nation's economy: iron ore and fluxstone for the steel industry, aggregate and cement for the construction industry, coal for power generation, as well as sand, grain and other dry-bulk cargoes. Collectively, these vessels can transport more than 100mt of cargo per year.

Rand Logistics receives International Safety Management Code certification on eight Canadian vessels; and launches second 'Marine Miracle Month'

Rand Logistics wins ISM Code certifications

On 16 August, Rand Logistics, Inc. a major provider of bulk freight shipping services throughout the Great Lakes region, announced that the company has received five-year International Safety Management (ISM) Code certifications on eight of its Canadian vessels by the American Bureau of Shipping (ABS), the Company's third-party surveyors.

"Certification of our vessels to the ISM Code is a direct reflection of our commitment to our core values of safety, health, security and protection of the environment in which we operate. The teamwork and effort put forth by our shipboard and shoreside employees to achieve these certifications were admirable and correlate to the pride our employees have in operating in the Great Lakes region," stated Gerald Ray, Vice President of Operations for Lower Lakes Towing, Ltd., the Company's Canadian operations. "Each and every employee should be proud of these certifications, which align with our operational and safety excellence initiatives."

The first vessel in the Canadian fleet achieved ISM compliance in November 2016 and the eighth vessel obtained certification the week of July 17, 2017. It is expected that the ninth Canadian vessel will be certified after completion of its ISM audit in November, after returning to service to support the grain harvest.

The International Safety Management (ISM) Code is an international standard for the safe operation of ships and for pollution prevention. The ISM Code, to which participation is voluntary for vessels involved in inland waters trade such as the Canadian vessels of Lower Lakes Towing, Ltd., establishes safety-management objectives and requires a safety management system (SMS) to be established by the Company.

Company to donate $0.05 per tonne of cargo carried in August 2017 to benefit children's charities designated by its customers

In June, Rand Logistics, Inc., a major provider of bulk freight shipping services throughout the Great Lakes Region, announced the launch of its second annual Marine Miracle Month, a programme to benefit children's charities.

As the cornerstone of the 2017 Marine Miracle Month program, Rand will donate $0.05 for every tonne of cargo carried by its fleet during the month of August to non-profit organizations with a primary focus on the health and wellbeing of children. The company will provide its customers the opportunity to select the children's charity of their choice and will make the donations in each customer's honour. The donation amount will be based upon the total tonnes each customer ships during the programme month. Rand's goal is to exceed the total donations raised during the 2016 Marine Miracle Month programme.

"Marine Miracle Month creates a vehicle for Rand to give back to our communities and expand the reach of our Corporate Social Responsibility efforts, while strengthening partnerships with our valued customers," stated Ed Levy, Rand's President and CEO. "Last year's Marine Miracle Month was a great success, and we are pleased to make it an annual event for Rand, our customers and the organizations and children in the communities that it positively impacts."

"We were overwhelmed by the interest and positive response our customers, employees, suppliers and community partners showed towards the initiative in its inaugural year," stated Aaron Degodny, Rand's Chief Commercial Officer. "In 2016, more than $125,000 was raised for charities dedicated to the health and wellbeing of children, with more than 30 customers participating in the program and just as many charities benefiting. We are hoping to expand the programme this year and exceed last year's total contribution."

Customers will work with their Rand representatives to select a qualifying not-for-profit organization. Selected organizations must hold 501(c)(3) status in the U.S. or be a registered charity in Canada providing services and benefits to children.

About Rand Logistics

Rand Logistics, Inc. is a leading provider of bulk freight shipping services throughout the Great Lakes region. Through its subsidiaries, the company operates a fleet of three conventional bulk carriers and 12 self-unloading bulk carriers including three tug/barge units. The company is the only carrier able to offer significant domestic port-to-port services in both Canada and the US on the Great Lakes. The company's vessels operate under the US Jones Act – which reserves domestic waterborne commerce to vessels that are US-owned, built and crewed — and the Canada Coasting Trade Act — which reserves domestic waterborne commerce to Canadian registered and crewed vessels that operate between Canadian ports.

Salt storage at the Port of Belledune.

North America East Coast

moving bulk in this busy region

Port of Belledune: diversification is key to a bright future

The Port of Belledune on the east coast of Canada is a world class deep water facility with exceptional year round cargo handling capacity. It handles resource materials, energy, aggregate, and so forth.

The port was built in 1968 to facilitate the shipping needs of Noranda (Glencore) Smelter. It was originally operated by the Canada Ports Corporation in Ottawa. In 2000, the Port of Belledune became a local port authority.

The Belledune Port Authority (BPA) offers modern equipment and infrastructure which includes a barge terminal, a roll-on, roll-off terminal and Modular Component Fabrication Facility. It is a year-round, ice-free, deep-water port and offers efficient stevedoring always ensuring the integrity of its customers' cargo. The port has ample outdoor terminal storage space and several indoor storage facilities — a definite competitive advantage for bulk, breakbulk and general cargo handling.

The BPA offers diversity, innovation and has a reputation for excellence. To continue to achieve these sustainable results, it benefits from a dynamic and engaged board of directors and a professional and committed staff.

Safety is always the first priority at the Port of Belledune, which holds the 'Certificate of Compliance of a Marine Facility or a Port.' The EPA holds an A+ safety rating from Transport Canada. Transport Canada Marine Safety & Security has not identified any vulnerabilities during its past assessments.

Five growth sectors

As part of its diversification efforts, the BPA has adapted a new business development method with an increased focus on specific growth sectors. The objective behind this new strategic direction is to enhance the BPA's capabilities, create new opportunities and encourage new development at the Port of Belledune and in Northern New Brunswick.

COMMODITIES HANDLED BY SECTOR

Energy	Forestry	Mining & Minerals	Agriculture	Modular
Crude oil	Wood pellets	Aggregates	Potash	Generators
Natural gas	Wood chips	Lead	Fertilizer	Modular homes
Coal	Wood pulp	Zinc	Perlite	Trailers
Bioenergy	Lumber	Ores	Peat moss	

The majority of cargo handled by the Port of Belledune in 2016 fell under the energy sector in the amount of 1,620,187 metric tonnes.

The chart on p93 illustrates examples of various commodities handled at the port and the sectors they fall within.

With this focused approach to business development the BPA strives to be innovative, offer supply chain solutions and be a catalyst for growth in Northern New Brunswick.

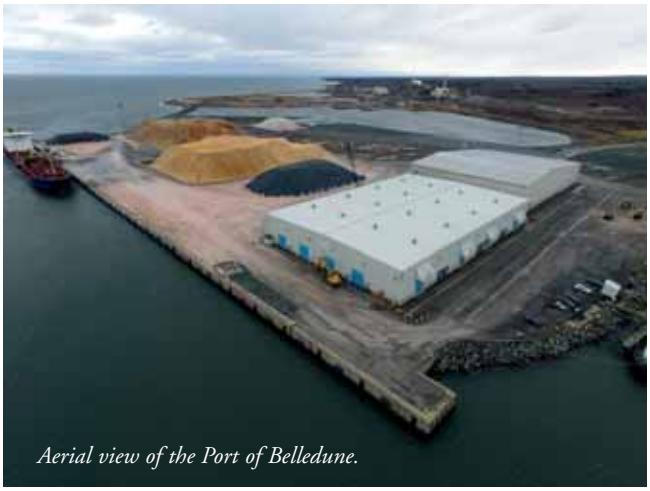
Six new commodities

The Port of Belledune welcomed six new commodities in 2016, including bauxite, urea, limestone, mill scale, silica sand and road salt.

While bauxite, limestone, mill scale, silica sand and road salt all fall within the Mining & Minerals sector, urea falls within the Agricultural sector, and is used predominantly as a fertilizer. The Port of Belledune received a shipment of urea in April, 2016 in the amount of 5,984 metric tonnes. The shipment came from

Handling woodchips.

Unloading perlite from a vessel hold.



Aerial view of the Port of Belledune.

Limestone.

Millstone.

Handling bauxite.

Gypsum cargoes.

Muuga, Estonia. Prior to 2016, the port received its last shipment of urea in 2006.

Over the course of the year, the port also welcomed 7,183 tonnes of bauxite from New Amsterdam, Guyana, 36,731 tonnes of limestone from Lower Cove, Newfoundland, 7,183 tonnes of mill scale from Nanticoke, Ontario and 9,428 tonnes of silica sand from Long Pond, NFLD. In addition, the port also received its first five shipments of salt, three of which came from Pugwash Nova Scotia, one shipment from Magdalen Island, Quebec and another from Casablanca, Morocco totalling 67,915 tonnes of salt in 2016.

The BPA is very pleased to have welcomed these new commodities to the port and it will continue its efforts to create new opportunities and encourage new development in an effort to sustain its success and enhance its capabilities.

Eastern Canada Stevedoring Inc.

Eastern Canada Stevedoring Inc. (ECS), a subsidiary of Quebec Stevedoring Company Limited (QSL), has been providing their clients with exceptional services tailored to their specific needs for many years. The company is very active at the Port of Belledune. Supported by a management team with a wealth of experience, skilled workers with extensive know-how and equipment at the cutting-edge of technology, ECS adheres to the most stringent quality standards of the stevedoring industry. ECS is the terminal operator for Terminal 3 and also provides stevedoring services for all other terminals at the Port of Belledune.

ECS works very closely with the management team at the Belledune Port Authority to develop innovative customer solutions and provide the most flexible port experience.

Kinder Morgan Terminals: providing logistical solutions to serve North America

Tampaplex Terminal.

Kinder Morgan, Inc. is one of the largest energy infrastructure companies in North America. It owns an interest in, or operates, approximately 84,000 miles of pipelines and 155 terminals. Kinder Morgan's pipelines transport natural gas, gasoline, crude oil, carbon dioxide (CO_2) and more. Kinder Morgan's terminals store and handle liquid bulk products, such as petroleum and chemicals, and dry bulk products such as coal, salt, cement, steel and fertilizer. Kinder Morgan has a combined liquids storage capacity of approximately 152 million barrels and handles about 60 million tonnes of dry bulk materials annually. Kinder Morgan also owns Jones Act product tankers that are engaged in the marine transportation of crude oil, condensate and refined products in the United States.

On the East Coast of the United States, Kinder Morgan owns and/or operates 17 major liquid bulk terminals and 11 major dry bulk terminals. Kinder Morgan also operates marine terminals inside several of Nucor Steel's Plant facilities in the US, with two on the East Coast in Hertford, North Carolina and Charleston, South Carolina.

The following are key specifics of a few of Kinder Morgan's larger dry bulk terminals on the East Coast of the United States:

Tampaplex Terminal

Tampaplex Terminal is located on the Port Sutton Channel in Tampa, Florida. It is a 114-acre terminal with two berths that handle many different commodities such as fertilizer, salt, aggregates, coal, and scrap metal.

The terminal has three warehouses and three silos for products that need indoor storage, and it has a direct unit train connection to CSX railroad, and the draught at the berth is 34 feet.

Expansion opportunities at Fairless Hills Terminal

This terminal is located on the Delaware River in Fairless Hills, Pennsylvania. It is situated on a 100-acre site within a 1,000-acre industrial park and has two berths that handle a variety of commodities such as steel slabs, steel coils and rebar, bulk sacks, pipes, beams, fertilizer, coal, sugar, slag, sand, and liquid UAN fertilizer. There is an Ashross railcar unloader on site and the terminal has direct unit train connection to CSX and NS railroads. The draught at the Terminals main berths is 38 feet and 6 inches.

Fairless Hills.

Export coal at Pier IX Terminal

Pier IX.

This terminal is located on the James River in Newport News, Virginia. It is a 66-acre terminal with two berths designed to handle export/import coal, petcoke, and imported cement. It has direct unit train connection to CSX railroad and has a double rotary railcar dump system capable of unloading 600 railcars per day. The export berth has a draught of 50 feet and a shiploader capable of loading 3,500 tonnes per hour.


Shipyard River Terminal.


Elizabeth River Terminal.

Dry bulk opportunities at Shipyard River Terminal

This terminal is located on the Cooper River in Charleston, South Carolina. It is a 270-acre terminal with three berths that handle a variety of commodities such as cement, salt, aggregates, coal, fertilizer, gypsum and pumice, as well as liquid bulk products such as petroleum and chemicals. It has direct unit train connection to both CSX and NS railroads and the draught at the berth ranges from 40 to 45 feet. With ample land for growth and rail advantages this terminal has several growth projects in the works.

Two Gottwalds added to Elizabeth River Terminal

This terminal recently added two large floating Gottwald Cranes with an unloading capacity of 25,000 tonnes per day. It is located on the Southern Branch of the Elizabeth River, in Chesapeake, Virginia. It is a 107-acre terminal with two berths designed to handle many different commodities such as fertilizer, salt, ores, minerals, aggregates, scrap steel. The terminal connects to both the CSX and NS railroads via a short line railroad, and the terminal has a draught at the main terminal berths of 35 feet. The terminal has 13 warehouses, five truck scales, and two rail scales.

Vessel to barge and inbound operations at Pier X

This pier has two Gottwald Cranes with 42 and 52 cubic yard buckets capable of unloading 25,000 tonnes per day. Two travelling hoppers feed a high speed conveyor that conveys to ground storage located within Pier IX terminal. The Pier X berth LOA is 825 feet, with a 50- foot draught, a 122 breadth limit, and a 100-foot airdraught limit. This pier is a key asset for inbound bulk handling and vessel to barge midstream operations.


Pier X.

Port Manatee Terminal

Port Manatee Terminal is located on the Port Sutton Channel in Palmetto, Florida. It is a six-acre terminal with one berth that handles many different commodities such as fertilizer, salt, and aggregates. The terminal has four warehouses that can store approximately 130,000 tonnes of products, a direct unit train connection to CSX railroad, and a draught at the berth of 40 feet.

Safety first

Safety, environmental excellence and compliance, and commitment to its customers are top priorities at Kinder Morgan Terminals. In 2016, Kinder Morgan Terminals recorded 73 terminals with 1,000 days or greater without a Recordable injury, and 110 terminals with 1,000 days or greater without a lost time injury which is considerably less than the industry average.


Port Manatee Terminal.

CONNECTING THE WORLD

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Host is proud to be the exclusive provider of marine terminal services at Tradepoint Atlantic, North America's 3,100-acre premier heavy industrial gateway and the largest maritime development in the United States.

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Host Offers East Coast a unique, multi-faceted solution at Tradepoint Atlantic

On 6 April this year, Tradepoint Atlantic, a 3,100-acre multimodal global logistics centre in Baltimore, Maryland — which features an unmatched combination of access to deepwater berths, railroads, highways, and storage space — announced an exclusive, ten-year agreement with Host Terminals to oversee the vast majority of marine cargo operations. The facility is designed to handle all dry bulk cargoes, as well as breakbulk and liquid bulk cargoes.

As part of the announcement, $30 million in combined investment toward infrastructure improvements will also be made to the site. This will further Tradepoint Atlantic's ability to generate a projected 17,000 direct and indirect permanent jobs

over the next decade as it enhances Baltimore's competitiveness as a key East Coast port for global trade.

"Since Host's founding in 1923, many of the fundamentals of moving bulk and breakbulk cargo haven't changed," says Host President and CEO Adam Anderson. "Tradepoint Atlantic offers a unique solution to create efficiencies in the supply chain by processing goods on-site and using rail to provide a lower delivered cost to our customers. Our goal is to add value, whether it's 50 acres for a factory on-site, a storage warehouse, or a tank. With Host's expertise and our partners at Tradepoint Atlantic, we can deliver those REAL solutions to the market place. It will not only

service the market in Baltimore, but will shift the transportation paradigm for bulk and breakbulk cargoes to the 21st century."

With eight berths, over 1,000 acres dedicated to marine storage space, and connections to both CSX and Norfolk Southern, Tradepoint Atlantic is the largest maritime development in the United States. The site offers immediate access to the interstate and regional road network, and it has the largest private rail yard on the East Coast with over 100 miles of shortline rail on-site. It will be the first place in the country to push bulk cargo operations inland.

Last year, the facility moved 1.6mt (million tonnes) of cargo, and aims to move 5mt annually within five years.

Cargo currently moving through TPA includes numerous commodities, such as granulated slag, coal, import organic grain, zinc calcine, and gypsum. DCi

Blue Water Shipping expands its horizons

Blue Water Shipping Company has opened a new office in Norfolk, Virginia. The new office, which was opened on 1 June this year, is staffed by three highly experienced local agents — Kevin Clapsaddle, Casey Porter and Chris Peele.

Blue Water's trusted, dedicated and highly experienced team of ASBA-certified Agents and Freight Forwarders have proudly served cargo interest and the bulk shipping industry since 1979.

Blue Water Shipping's new office in Norfolk, Virginia (photo: Matt Boucree).

Blue Water Shipping Company is a privately held US steamship agency specializing in co-ordinating port calls of oceangoing vessels and timely execution of import and export shipments of bulk, agri, fertilizers, coal, petroleum coke, ores, steel, minerals, biomass and oils.

Blue Water provides professional 24-hour agency services at all US ports, precision freight forwarding for bulk cargoes, AMS, eNoa/d (electronic notice of arrival/departure) services and much more.

With headquarters in Metairie, Louisiana and fully staffed offices in Houston, Texas; Mobile, Alabama; Portland, Oregon; Puget Sound, Washington; and, now, Norfolk, Virginia, Blue Water's team of professionals directly serves vessels calling the Mighty Mississippi River, Mobile, Pascagoula, all US Gulf ports, all Texas Ports, the Columbia River, Seattle, Tacoma, Gray's Harbor, Hampton Roads and Baltimore.

Conitex Sonoco launches BulkSak® On-Demand

Conitex Sonoco USA, Inc., a manufacturer and distributor of flexible intermediate bulk container (FIBC) bulk bags as well as other innovative packaging products, has launched BulkSak® On-Demand, a web-enabled inventory program that provides new and existing customers on-demand access to over 70 types of ready-to-ship FIBCs.

Conitex Sonoco created the BulkSak® On-Demand programme to address an industry need for quick access to domestically-available bulk bag inventory. Conitex Sonoco, with an FIBC manufacturing facility in Malvern, Arkansas, is one of only a handful of bulk bag suppliers with US-based manufacturing as well as US warehouse locations.

"With overseas manufacturing lead times ranging from 12–15 weeks or greater, an inventory shortage could be catastrophic to a bulk bag end-user," explains David Monteith, VP Flexible Products Division at Conitex Sonoco. "The BulkSak® On-Demand programme will supplement our existing domestic FIBC manufacturing and provide the opportunity for immediate shipments."

"We have spoken with many purchasing executives who have lamented over the ever-increasing pressure to drive costs down, including their internal labour resources," states Richard Brooks, Director of Sales and Marketing at Conitex Sonoco. "With an overtaxed workforce and rising or unpredictable demand for product, manufacturers have no way to forecast reliable production levels. This creates a recipe for disaster in a growth economy."

The BulkSak® On-Demand programme will provide fast access to various standard bulk bags, as well as select speciality bulk bags and a wide range of flood and erosion control bags. Most stocked inventory items ship the same day when ordered before 1:00 p.m. EST and are available in pallet quantities.

About Conitex Sonoco USA, Inc.

Conitex Sonoco USA, Inc. is the North American headquarters of Conitex Sonoco N.V., a joint venture of Texpack Group N.V. and Sonoco Products Company. Conitex Sonoco USA, Inc. is a manufacturer and distributor of a broad range of packaging products. The company is comprised of four major divisions which are Paper, Converting Products, Flexible Products and Adhesives. Conitex Sonoco's product offering includes coreboard, edge board, point of purchase (POP) displays, textile yarn cones and tubes, plastic and corrugated pallets, FIBC bulk bags and bulk bag pallets, a full range of flexible packaging products, and coreboard/paperboard adhesive. In addition, the company offers production labelling machines, labels and supplies. Conitex Sonoco's major brands include BulkSak® flexible packaging products and Loadrunner® corrugated pallets.

TPG-backed Flexituff International to spin off bulk container business

Flexituff International Ltd will spin off its flexible intermediate bulk container (FIBC) business into a wholly owned subsidiary.

Founded in 1993, public-listed Flexituff offers products such as form stable baffle bags, form fitted liner bags, glued liner bags, biaxially oriented polypropylene (BOPP) bags, geo-textile fabrics and polymer compounds, among others. FIBCs are used in industrial bulk packaging in pharmaceutical, fertilizer and food industries.

The repositioning of the FIBC business as a separate entity will help unlock value and raise growth capital, the company said in a statement.

The restructuring is expected to be completed within four months.

In 2016/17, the FIBC business contributed around 44% to the company's revenues which stood at Rs 1,335 crore.

Madhya Pradesh-based Flexituff counts World Bank's private investment arm International Finance Corporation and private equity firms TPG Capital and Clearwater Capital Partners as investors.

In April 2013, TPG Capital invested Rs135 crore ($25 million then) in Flexituff. The private equity major had previously invested Rs27 crore ($5 million then) in the bulk container manufacturer.

In 2007, Clearwater invested Rs46 crore in Flexituff, picking a 26.07% stake. The PE firm part-exited during the company's initial public offering in 2011.

About Flexituff International Ltd

Flexituff is a multi-product, multi-market, multi-location enterprise. Having evolved from a leading global FIBC major to a foremost Indian geosynthetics solution provider, Flexituff — through its niche products — now serves the domain needs of the retail, agro and infrastructure sectors. With four manufacturing plants across India, a wholly-owned distribution company in United Kingdom and a dedicated warehousing supply and a technical services network in all continents, exports to over 60 countries, employing over 7,000 global citizens, Flexituff is truly an Indian multi-national company that has come of age.

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NBE unveils container filling system

National Bulk Equipment, Inc. (NBE) has introduced a single-station, variable container filling system for bulk filling of drums, cartons, totes, gaylords, bulk bags and other bulk container types. The NBE variable container filling system advances beyond conventional rotating fillhead designs to provide dry bulk material processing operations container-specific filling, densification, and NTEP-certified weighing.

The NBE variable container filling system has a proprietary densification design integrating two densifying methods. This NBE design enables varied container types to be processed through the same fill station. The NBE design ensures precise fill volume and weigh accuracy, optimal line speed, reduced material waste, and eliminates material contamination resulting from operator hand levelling of material.

When in the multiple container mode, the NBE variable container filling system uses an automated, vibratory densifier pad to individually densify each drum on a pallet. The densifier arm and pad automatically extend from the unit to densify one drum at a time. When a drum fill/densification cycle is complete the pallet deck rotates to repeat the cycle with each drum on the pallet. This one-by-one densification eliminates the problems common with rotating fillhead designs that vibrate the entire base of the unit; these problems include drums bouncing out of the unit, and operators reaching into equipment during densification to stabilize drums.

When in the single container mode, the NBE variable container filling system uses a deck-only vibratory densifier for large, single containers such as gaylords, totes, and bulk bags. The NBE design isolates 3G of vibration force to the deck of the system rather than vibrating the entire base of the unit. This isolated vibration concentrates the vibratory

effect to the container enabling precise material fill volume and weigh accuracy. The isolated vibration also eliminates the damaging and annoying transfer of vibration to surrounding equipment and work areas common with conventional densifiers.

The NBE variable container filling system is designed with a completely integrated, NTEP-certified weigh system. A single, UL listed, menu-driven controller, designed and built by NBE, meters material feed rates based on container type, material type, densification cycles, and finished package weight. The NBE variable container filling system can weigh containers with capacities from 113 to 1,814kg to an accuracy of plus/minus .01%. The NBE NTEP-certified weigh system eliminates material waste common with manual designs. Operator interaction is limited to controller operation and container loading and unloading.

RFID-driven weighing and batching system from NBE

National Bulk Equipment, Inc. (NBE)'s fully integrated bulk material handling system uses RFID-driven process communications to automate simultaneous batching of multiple, and varied, chemical mixtures during a single processing operation. The process begins when an empty bulk tote is introduced to the system; RFID recognizes the tote and communicates to the system the specific batch recipe assigned to that tote. The primary ingredient is dispensed from one of four surge hoppers through a horizontal screw conveyor into the tote. As the first tote advances to its next batching location, a second tote enters the system and is recognized by RFID for processing. Each tote advances to one, or both, of two, subsequent batching stations where any one, or a combination of four secondary ingredients can be added based on the RFID recognition of the tote. Each secondary ingredient batching station consists of four bulk bag unloaders, each with integrated material conditioning to ensure consistent material supply is sent to a station-specific gravimetric feeder that provides accurate and repeatable secondary ingredient supply into the tote.

Complete NBE process engineering, from ensuring NBE equipment met process-specific GMPs and risk assessment requirements, to the integrated automation of controls, sensors, monitoring, and data reporting, combined to increase batching throughput by 80% and eliminate potentially harmful repetitive motion actions by operators.

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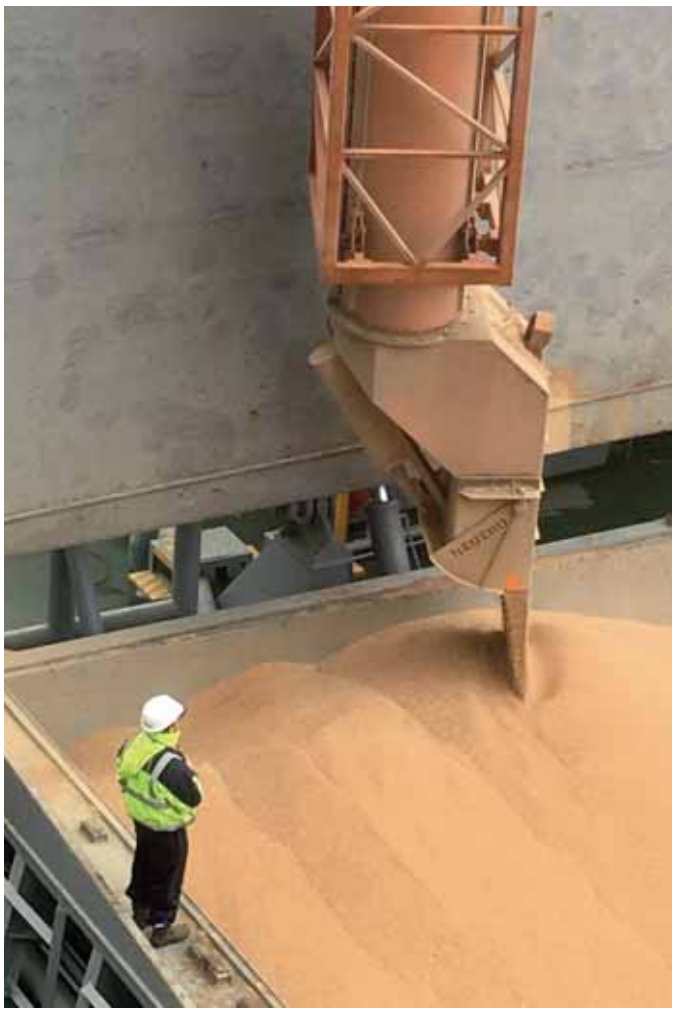





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