

DRY CARGO

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AUGUST 2016 issue

featuring...



TRADE & COMMODITIES

A narrowing coal trade vista	2
Iron ore trades: not quite smooth sailing?	3
CHANGING REGULATIONS ARE BUFFETING THE PETCOKE MARKET	13



SHIPPING & TRANSPORT

Drydocks World conforms to FPC under EU Regulation	21
IRClass leads EU certification of recycling yards in India	23
Energy efficiency is impacted by choices made	24
New Ecofix filler coat reduces the cost of rudder repairs	25



PORTS, TERMINALS & LOGISTICS

A greener future for the Port of Los Angeles	26
Dunkerque posts new grain record	33
INSPECTION, ANALYSIS AND SAMPLING: QUALITY CONTROL REMAINS VITAL	35



ENGINEERING & EQUIPMENT

Phoenix broadens its products to include conveyor belt lighting	47
Small components for more power: efficient electric motors	59
UNLOADING BULK CARGO: STREAMLINING OPERATIONS	75
GRABS ON LAND AND AT SEA: PORT-BASED AND SHIPBOARD	97



REGIONAL REPORT

Hwy H2O: A VITAL WATERWAY	109
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BREAKBULK & BAGGING

BRAZIL TIMBER EXPORTS BOOSTED	138
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A narrowing coal trade vista

During recent months, some large elements of global seaborne dry bulk commodity trade proved much stronger than expected earlier. Although signs of changes likely to weaken import demand in several countries are still highly visible, the pattern now unfolding suggests that 2016 growth may be better than previously predicted.

An update by the IMF published in mid-July emphasizes the limited support derived from economic trends, however. Global GDP growth was again downgraded slightly, to 3.1% in 2016, with only a very modest improvement to 3.4% next year envisaged. Confidence and investment, vital contributors to healthy progress, seem destined to experience adverse effects related to greater uncertainty.

COAL

Expectations for coal trade indicate the possibility of another overall global decrease this year, but the reduction may be much slower than seen in the preceding twelve months. One positive and unforeseen development is the 8% increase in China's coal imports (including lignite) during the first half of 2016 (compared with the same period a year earlier), to 108mt (million tonnes).

A contrasting view of the metallurgical coal trade portion was published a few weeks ago by the Australian Government Department of Industry, Innovation and Science. The world total (including land movements, but mostly seaborne) is expected to fall by 10mt (3%) this year, to 289mt. Lower imports of this coal type into China, down by 9% to 48mt, and declines in some other countries are foreseen.

IRON ORE

Steel production in raw materials importing countries was mostly weaker in the first six months of 2016. China and Japan saw marginal (1%) crude steel output declines, to 399.6mt and 52.0mt respectively. In South Korea there was a larger 3% reduction to 33.4mt, while the European Union experienced much greater weakness with a 6% fall to 82.7mt.

Despite an unfavourable background, iron ore trade

developments were not wholly negative. A pick up in China's iron ore imports, comprising over two-thirds of world trade in the sector, resulted in this country's January-June 2016 total expanding by 41mt or 9%, to reach 494mt. Consequently some forecasts of global ore trade for the entire year have been raised, showing additional growth.

GRAIN

Prospects for grain trade in the period ahead remain heavily dependent on northern hemisphere importing countries' domestic grain production. Harvesting of these summer crops is now under way, stretching through to September and estimates may change as a result of unforeseen weather conditions. Recent signs pointed to crop reductions in parts of Europe, North Africa and China, potentially affecting related import demand.

The clearest indications of higher imports of grain (wheat, plus corn and other coarse grains) in crop year 2016/17 ending June 2017 have been seen in several smaller importing countries including Morocco and Turkey. By contrast, downturns are likely in China (because of high stocks) and the EU as a whole, which seem set to more than offset additional volumes elsewhere, causing a possible 3% decrease in world trade.

MINOR BULKS

A key industrial commodity component of minor bulks is bauxite/alumina. Global trade evidently increased to over 120mt last year, boosted by a sharp rise in China's imports which comprise a large proportion of the total. Currently signs of further growth this year are limited.

BULK CARRIER FLEET

New bulk carrier capacity entering the world fleet in 2016 could be slightly higher than seen last year, as shown in table 2. In particular, higher Panamax and Capesize newbuilding deliveries are expected. However, greatly increased scrapping of old or uneconomic ships is likely to offset most of the new tonnage. The result could be very slow fleet growth, in the 1-2% range.

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

	2011	2012	2013	2014	2015	2016*
Japan	68.7	70.5	77.0	74.1	70.6	71.0
South Korea	25.9	25.7	26.4	29.9	32.5	31.5
Taiwan	10.7	10.5	10.9	10.9	10.8	10.0
China	44.7	53.6	75.4	62.3	48.0	51.0
India	33.0	35.5	39.0	47.9	50.0	53.0
Total of above	183.0	195.8	228.7	225.1	211.9	216.5

source: various & BSA 2016 estimates

* estimate

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

	2011	2012	2013	2014	2015	2016*
Handysize (10-39,999dwt)	10.2	10.5	6.3	5.4	6.5	5.0
Handymax (40-64,999dwt)	22.0	20.9	14.7	11.4	16.0	15.0
Panamax (65-99,999dwt)	22.2	27.0	19.9	12.8	9.9	11.0
Capesize (100,000dwt and over)	45.6	41.9	22.0	18.5	16.9	20.0
Total	100.0	100.3	62.9	48.1	49.3	51.0
% change from previous year		0.3	-37.3	-23.5	2.5	3.4

source: Clarksons Research & BSA estimates for 2016

* estimate

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Iron ore trades

not quite smooth sailing?



Slower than anticipated demand growth and excess supply – yes, the iron ore market looks a lot like the bulk carrier shipping business, writes Michael King.

Iron ore prices have recovered in recent months but the uplift came from historic lows. The value of the key steelmaking ingredient nudged the US\$70/tonne mark in mid-April due to a resurgence of construction activity and steel consumption in China which accounts for some two thirds of global iron ore imports by sea. But, as of early July, pricing was averaging just over \$51 per tonne for 2016 after hitting near-decade lows in December 2015 when the value fell below \$40 per tonne.

The recent pricing recovery could keep some smaller and medium-sized loss-making miners in business, but the outlook from Australia's Department of Industry, Innovation & Science (ADIIS) remains dire and the industry is likely to see a further round of cost cutting, even as its largest producers step up production.

ADIIS's latest quarterly report, released in the first week of July, predicted iron ore pricing drops due to uncertainty surrounding China's economic growth, the UK's 'Brexit' decision to leave the European Union, the upcoming US Presidential election, and the appreciation of the US dollar.

The government forecaster said 'free-on-board' Australia prices had fallen from over USD\$140 per tonne in March 2013 to some \$50 per tonne in the second quarter of 2016. The spot price is expected to hover at around the \$40–50 tonne mark for at least the next the year putting downward pressure on Australia's iron ore export earnings even though export volumes

are forecast to reach 852mt (million tonnes) in 2016/17, up from 748mt in 2014/15, as Australian producers seek market share in an environment of weak demand.

"Iron ore spot prices were highly variable in early 2016 led by speculative activity on the Dalian Commodities Exchange in China," said ADIIS. "The volume of iron ore futures traded on

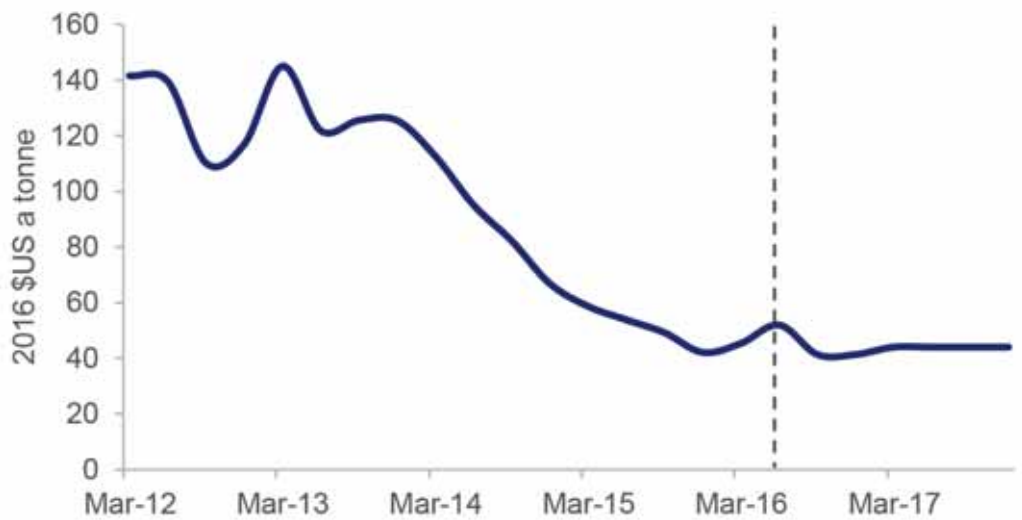


*Peter Sand, chief
shipping analyst at
Bimco.*

the Dalian Exchange grew rapidly in early 2016 — with daily traded contract volumes exceeding half a billion tonnes on 32 occasions between February and April.

“The spot price for a tonne of iron ore (FOB Australia) traded as low as US\$40 a tonne and as high as US\$66 a tonne over this three month period. The iron ore price averaged US\$48 a tonne in the first six months of 2016, down 13% year-on-year.”

Iron ore price, free on board Australia



Source: Bloomberg (2016) Metal Bulletin; Department of Industry, Innovation and Science (2016)

MARKET FUNDAMENTALS

The report concluded that despite the large movements in prices, market fundamentals were broadly unchanged—demand



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growth was slow and steelmakers remained well-supplied. "With the expectation of weak growth in consumption and stronger growth in supply, prices are forecast to moderate over the remainder of 2016," the report added. "For the year as a whole, the iron ore price is forecast to decline by 11% to average US\$45 a tonne."

Moreover, in 2017, iron ore prices are now expected to recover more slowly than previously forecast and to average around US\$45 per tonne, representing little change from 2016. "The revision is based on the assumption that loss making operations may continue to produce for longer than previously expected," said the report. "It also factors in increased supply from India and additional cost savings reported by iron ore producers."

TRADE RISES ON CHINA IMPORTS

However, despite the gloomy pricing outlook, ADIIS expects global trade in iron ore to reach close to 1.5bn tonnes this year, a marginal 0.9% increase on 2015 and the slowest rate of growth in more than a decade.

However, next year growth of 4% is predicted despite relatively



flat global consumption. "This is expected to be driven by the continued displacement of domestically produced iron ore in

China with imported iron ore," said the report.

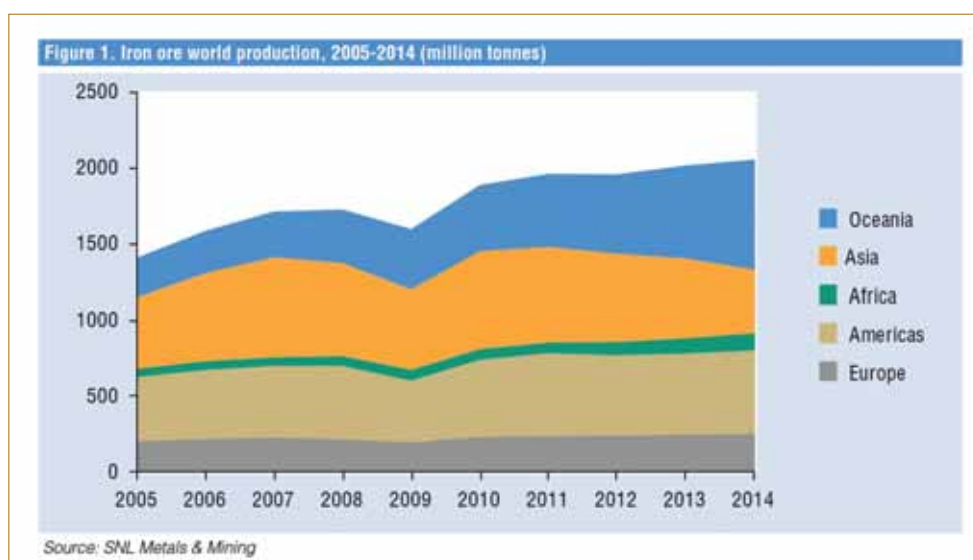
China's imports of iron ore are forecast to increase by 2.1% to 974mt in 2016 and by a further 0.7% to 981mt in 2017 because of falling domestic production. "Many of China's iron ore mines have declining ore grades and are uncompetitive against lower cost imported iron ore," said the report. "Run-of-mine production fell by 6% in the first four



months of 2016, relative to a year earlier. Quality-adjusted iron ore production is forecast to fall by 12% in 2016 and by a further 20% in 2017."

However, the report emphasized three key downside risks to the outlook for China's iron ore imports. Firstly, China's steel production has the potential to fall faster than anticipated. Secondly, domestic iron ore production could also decline more slowly than expected. The third risk is the potential for China to make more of its steel in electric arc furnaces which use scrap steel and require much less iron ore.

"China's scrap availability from old cars, machinery,



*The Vale Brasil VLOC
(very large ore carrier).*



household appliances and construction is expected to increase in the future, but is not anticipated to have a material effect on iron ore demand in the next eighteen months," added the report.

IRON ORE AND BDI

The drop in FOB (free on board) Australia iron ore prices in recent years echoes movements in bulk shipping markets generally. The West Australia–China iron ore route adds only around \$5 a tonne to the price of seaborne iron ore, while from Brazil shipping costs are now as low as \$10 a tonne. This reflects how the Baltic Dry Index (BDI) has collapsed from the stratospheric days of 2008 when it was pushing 12,000. Since then the most recent 'peak' was 2,330 in late 2013 and in January it fell to just 290, the lowest figure since the Index was launched in 1985.

The BDI has since rallied to nudge above 700 in July, but the general global decline in commodity demand, strong worldwide economic headwinds and excess vessel supply have seen optimism for a major recovery within the next year dissipate, unless that is owners start scrapping ever-younger vessels and at far faster rates.

"Chinese iron ore imports have surprised positively this year," Peter Sand, Bimco Chief shipping analyst, told *DCI*. "Volumes looked set not to impress in 2016 before the year started. However, steel prices, iron ore prices and steel exports have resulted in volumes being strong all year — so far. But what remains is the lack of a positive impact on freight rates from this positive development in imported iron ore volumes. Low coal imports, primarily to India, have deflated some of the buoyancy from Chinese iron ore imports, while grains have supported the markets as expected.

"[To better balance vessel supply and demand] the industry needs to break the trend of halting demolition activity as soon as the BDI improves marginally. We can only improve the fundamental market conditions if shipowners keep demolition

activity up consistently."

Taking a longer-term look at the link between freight and iron ore markets, UNCTAD's latest report on the iron ore industry concluded that the rapid decline in bulk freight rates in recent years was largely the result of demand growth from China for iron ore — and other commodities — slowing just as huge fleets of newbuilding bulkers entered service. This happened despite leading iron ore producers boosting output more quickly than expected. The upshot was a severe downturn in iron ore prices and the collapse of bulker freight rates, even though lower oil prices reduced operating costs. The report concluded that a large proportion of the world's iron ore industry was now operating at a loss, and "the outlook is for continued low freight rates for several years to come".

MAJORS SEEKING MARKET SHARE

The collapse of freight rates would traditionally have levelled the playing field for iron ore miners competing against Australian output from further flung sources, not least Brazil. However, while Vale's decision to build a fleet of Valemax vessels to reduce its tonne-mile disadvantage may have helped kill 'peak' bulk freight rates, the vessel type's high building and running costs have led many to presume that the Brazilian miner's fleet's capex costs are now more expensive than alternative options available on the spot market.

The Brazilian mining giant did, however, report a return to profit in the first quarter of 2016 on the back of low freight rates and improving iron ore prices. Net income was \$1.8bn, a major improvement on the \$8.6bn loss reported in the final quarter of 2015. Demand in the coming quarters was predicted to remain stronger due to Chinese economic stimulus.

"We acknowledge the recent improvement in iron ore prices but are cognizant of market volatility, thus remaining fully committed to strengthening our balance sheet through the reduction of our net debt as previously informed," said a Vale

statement. The company also predicted cash flow would exceed capital spending once work was finished on a major expansion project at its \$14bn S11D mine in Brazil's Amazon region due to be completed in the second half of this year. Indeed, Vale continues to boost output in a bid to retain its position as the world's leading iron ore supplier. Full-year 2015 output totalled 345.9mt, a new record.

CHASING MARKET SHARE

Vale's leading rivals such as BHP Billiton and Rio Tinto are also expanding production despite iron ore prices dropping some 75% over the last five years in the belief that their lower costs will push out smaller rivals and eventually stabilize prices even as demand slows in China.

BHP Billiton, for example, saw its main iron ore asset, WAI0 (Western Australia Iron Ore), produce a record 193mt in the nine months through Q1 2016 — despite poor weather and disruptive rail maintenance works — as its Jimblebar mining hub started operating at full capacity, although output from its Samarco production plant in Brazil fell by 50% in the period due a tailings dam failure on November 5, 2015.

Rio Tinto saw its iron ore production and shipments increase 13% and 11%, respectively, year-on-year in Q1 2016 due to the completion of brownfield developments and expanded infrastructure capacity in the Pilbara, although delays in installing its new automated rail system — AutoHaul — in Australia will cap total production at 330–340mt in 2017, down from an anticipated 350mt.

However, even as miners boost output from existing plants, some investment projects have been put on hold. Rio Tinto has now shelved its \$20bn development of a new iron ore mine —

the Simandou project in Guinea — due to low prices. “We’ve been very clear that it’s a very expensive project,” explained CEO Jean-Sebastien Jacques earlier this year. “We did deliver the BFS (bankable feasibility study) to the government as per the agreement a few weeks ago and we’ve been very clear that in the current market environment, we don’t see a way forward in relation to Simandou. It’s not the right time to develop this project from a Rio standpoint.”

LEADING SEABORNE SUPPLIERS

The leading iron ore source countries remain Australia and Brazil, the world's lowest cost producers. ADIIS predicted the two would increase their share of global seaborne trade in 2016 and 2017. “Australia is forecast to increase its market share from 54% in 2015 to 58% in 2017, while Brazil's share is forecast to increase from 26% in 2015 to 28% in 2017,” said the report.

India is set to become the world's third largest iron ore producer in 2017 after numerous mines reopened in the first half of 2016 after years of suspension. “Nonetheless, India's iron ore production is forecast to be 25% lower in 2017 than it was at its 2009 peak,” said ADIIS. “The Federation of Indian Mineral Industries (FIMI), the representative body of miners in India, estimates that India's iron ore production could increase further if the 80mt production cap in Odisha is removed. However, FIMI also noted that tax relief was required for India's iron ore industry to compete internationally. Indian iron ore mines are relatively high cost because of government levies and the relatively small size of operations.”

India is not, therefore, expected to become a net exporter of iron ore in the next 18 months, with net trade forecast to be broadly balanced.



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Ferrobamba and Tenova co-operate on Peruvian iron ore development project

FERROBAMBA AND TENOVA SIGN CO-OPERATION AGREEMENT FOR THE AYMARAE (PERU) IRON ORE DEVELOPMENT PROJECT

Ferrobamba has signed a cooperation agreement with Tenova to develop its iron ore mine in the Aymaraes region of Peru. The company has chosen Tenova HYL Micro Module technology in order to oversee the technological design and provide the equipment to develop and build a 500,000tpa (tonnes per annum) pelletization plant and a 250,000tph high carbon DRI (direct reduced iron) plant.

“The Tenova HYL Micro Module will allow our company to add significant value to our iron ore deposit in Aymaraes, producing high carbon DRI with the proven ZR (zero reformer) technology used since 2010 in the Emirate steel. The Micro Module uses the same ZR technology applied in Nucor’s Louisiana plant, but is one 10th of the size and allows junior mining companies like ours to enter the DRI production market with a limited capital investment,” stated Alfonso Navarro, CEO of Ferrobamba. “Our company will be in a position to produce a premium quality DRI that is not currently available in the region.” In fact, Ferrobamba’s Aymares Project is potentially one of the highest quality, lowest cost iron ore projects in the Americas with a significant resource upside potential of 3,400 million tonnes of iron ore.

Iron ores will be first crushed and pelletized and then processed to direct reduction (DR) grade pellets. These pellets are fed into a Tenova HYL ZR Micro Module DRI plant where they are reduced to metallic iron. The DRI produced is the highest quality available with high carbon content (around 4%) and can easily substitute pig iron or high

quality scrap for use in the electric steel making operation, to produce high grade steel.

“The Micro Module DR Plant is a proven technology that allow for high carbon DRI production with a simple and compact design providing several benefits, such as low maintenance costs, minimum manpower requirements, more affordable CAPEX, and low OPEX. Moreover, the Micro Module, as any other ENERGIRON DR Plant, complies with the strictest environmental regulations. It has been permitted twice already in the USA, as well in other regions of the world,” confirmed Angelo Manenti, VP of North America Business development for Tenova.

ABOUT FERROBAMBA

Ferrobamba is a private company engaged in exploration of iron in the south of Peru. The company is also developing Ferro Andes a project related to the beneficiation of the DSO (68%) iron ore part of the deposit. The low cost of gas and electricity in Peru allow for a vertically integrated operation, including a concentration plant, a pelletizing plant, a direct reduction plant. There a future possibility of installing an electric arc furnaces melt shop to produce high grade steel in the south of Peru.

ABOUT TENOVA

Tenova, a Techint Group company, is a worldwide supplier of advanced technologies, products, and services for the metals and mining industries providing innovative, integrated solutions for complete process areas.

Tenova Group employs around 3,500 staff in 24 countries on five continents.

New governmental levies put strain on iron ore industry

All natural resources from minerals under the earth to oil and gas lying onshore or offshore or in shale to spectrum are accepted to be community owned, writes Kunal Bose. Precisely for this reason, governments of all resource-owning countries are expected to be highly transparent in allocating resources to groups for use, ideally by holding auctions. Even after resources allocations on long-term leases, the host country governments will retain the right to charge new levies or revise the ones in operation for community benefit. But expect protests by mining groups every time a proposal to that effect is made by a government or a ruling coalition partner.

This is exactly what is happening in Western Australia where Brendon Grylls, leader of the Nationals Western Australia has proposed a tax increase of A\$7.2bn (US \$ 5.5bn) on iron ore operations in the region by the world’s two largest miners Rio Tinto and BHP Billiton. The proposal to raise production rental cost to A\$ 5 a tonne of iron ore from 25 cents straight in the wake of Grylls’ appointment as the leader of Nationals party, which is the junior partner of the ruling coalition in Western Australia where the senior partner is the Liberal Party whose

Colin Barnett happens to be the prime minister.

The new tax proposal is upsetting for Rio and BHP, which are engaged in iron ore mining in Western Australia in a big way and still building new capacity. Rio has said in a statement that “there are no grounds for a new mining tax in Western Australia and it should not be adopted as Nationals policy... An ill-conceived tax grab will place these local jobs and the growth of (the company’s) iron ore business at risk.” In an almost identical tone BHP says: “We don’t understand why a proposal that is so discriminatory and uneconomic would be targeted at the two companies... We are operating in an international market and we have to be able to compete or will lose market share.” Expectedly the Chamber of Commerce and Industry of Western Australia has instantly come to the defence of the miners saying the Nationals proposal does not have the “support of business and is unlikely to proceed given it would need the support of alliance partners.”

The worrying factor, however, is the claim by Grylls that ahead of announcing the tax proposals he had met and discussed it with the prime minister. He has left the miners disappointed

by saying: “The Nationals WA believe that the state and taxpayers have facilitated a huge expansion of the iron ore industry at great cost to our state budget and the big miners are not paying their fair share... These two miners (Rio and BHP) have made almost \$140bn since 2010 and Western Australia has facilitated that.” The state government had said in a May statement that falls in world iron ore prices would lead to an 8% fall in royalty income to around A\$3.8bn. Grylls proposal will, therefore, be seen as an attempt to compensate for any loss that the government may be incurring because of ore staying in the bear zone.

Mines royalty is a major source of revenue for the government figuring as it does next to taxes and federal government grants. The Nationals claim that revision of production rental cost estimated to net in A\$7.2bn will bring the state budget into surplus. In India too, the Mines and Minerals (Development and Regulation) Amendment Act passed by parliament last year introduced District Mineral Foundation (DMF) and National Mineral Exploration Trust (NMET). While DMF will work for the benefit of people affected by mining operation, NMET will address to exploration work. Both are to be funded by levies on miners over and above royalties they are already paying. RK Sharma, director general of Federation of Indian Mineral Industries, says: “You have socially responsible mining groups operating both in Australia, India and elsewhere taking care of the welfare of local communities in many ways. No one will contest the government right to levy taxes on miners. But what we want is moderation so that mining operations remain viable. That way all stakeholders the local community, mines groups and the government will benefit.”

The subject has global ramifications since Western Australia is the world’s largest iron ore producer, accounting for 37% of global production and nearly half of global seaborne trade in the mineral. The Pilbara region there alone had a share of 94% of the country’s ore production last year. China will be looking askance at any developments in Western Australian mining scene which may have cost implications for it. The world’s largest steel producer China happens to be the biggest export market for iron ore originating in Western Australia. In response to growth in Chinese steel capacity and production over the past decade, iron ore producers in the state’s Pilbara region invested heavily not only in opening new mines and expanding the ones in operation but associated infrastructure.

Earlier, as China was investing heavily to build infrastructure and turning itself into a factory for the world, its steel production was growing rapidly in step. In the process, Chinese mills were importing growing quantities of iron ore lifting its price from around US\$30 a tonne in 2002/03 to around US\$150 a tonne in 2011/12. Ore production rises in Western Australia led to shutting of high-cost production in China. This and also poor performance of steel subsequently led to iron ore prices falling by over 40% in 2014/15 and now quoting below \$60 a tonne. In fact, all commodities then met with a bear hug after riding out the super cycle. There were periods when ore prices sank to \$45 a tonne leading many agencies to forecast that prices could slip below \$30 a tonne, which mercifully the miners were spared. In any case, lower iron ore prices have reduced



revenues from ore and profitability of Western Australia’s producers and therefore, government royalty revenue. Profits fall notwithstanding, the iron ore industry in the region remains globally competitive with its holding of high quality reserves and low production costs. It is said, ore mined in Pilbara could be delivered to Chinese ports at less than \$25 a tonne leaving profits to miners. While China will remain the biggest market for Pilbara ore, it also meets with good demand from Japan, South Korea and Taiwan.

Both Rio and BHP have an excellent record in Western Australia in terms of mines and infrastructure development, corporate social responsibility work and revenue contribution to the Exchequer. Rio produced 310mt (million tonnes) of iron ore in Western Australia last year when it paid a total of US\$3.3bn in taxes and royalties. BHP’s production in the year ended June 2016 was 257mt. Both the companies are big employers in remote parts where other job opportunities are rare. But as Rio points out, the security of mining jobs depends on a “stable and competitive taxation environment.” Both the Western Australian government irrespective of whichever party or coalition of parties is in power and mining groups, big and small have a big stake in uninterrupted efficient functioning of mines. Hopefully, wise counsel on every constituent’s part will prevail in resolving the additional tax issue. Australia is the world’s largest iron ore exporter ahead of Brazil. In terms of raw ore production, however, China has a big lead over Australia. But to make it blast furnace grade, Chinese ore requires washing and that considerably shrinks local ore supply for the country as it adds to the cost. With annual production of around 700mt, Australia has the biggest share of China’s ore imports.

IRON ORE PRODUCTION OUTLOOK

The world’s leading ore producers are sticking to their output guidance for 2016. The Brazilian Vale, the biggest of them all in iron ore production finds the outlook for steel making ingredient encouraging for the rest of the year. It is pitching its hope on “steel demand improvement in China, supported by credit easing” that started in the second half of 2015.” Vale thinks such optimism is supported by rise in global steel production in the second quarter, naturally very largely supported by “Chinese steel output growing in that period.” The Brazilian group has maintained the guidance for the year forecasting ore production at the lower end of the 340–350mt tonne range. On its part Rio tells its shareholders of its remaining on target to meet production guidance for the full year. BHP, however, has to contend with Samarco dam disaster that shut down its Brazilian mine forcing it to miss its ore guidance narrowly.

Rain-proof anti-dust coatings for iron ores

Most dry bulk raw materials are stored for long periods in outside stockpiles at various stages of the handling process, from mining the material until it reaches its ultimate destination. These outdoor stockpiles are vulnerable to weather, and can get wet. Extra moisture in iron ore can cause a variety of problems during onward transshipment and in the final production processes. These problems include:

EXTRA COSTS

The moisture increases costs, due to shipping costs of greater mass. Also, when the cargo is in its final use in production, a higher level of energy consumption is required to remove the excess moisture.

LIQUEFACTION

The problems of cargo liquefaction are well-known in the



shipping industry, and iron ore cargoes with elevated moisture contents can undergo liquefaction easily. Cargo liquefaction occurs in dry bulk cargoes with high moisture contents — especially cargoes containing fine particles. When loaded into the holds of dry bulk carriers, liquefied cargoes can start to behave like liquids when the ship is moving. Such cargoes shift rapidly in the holds of a ship, resulting in a free surface effect. This can cause catastrophic loss of stability, especially in severe weather and heavy seas, and rapid capsizing of the ships in extreme cases.

C-FORCE® INDUSTRY

Benefits	Cost reduction
Excellence in binding dust	
Water repellent or water retaining (depending on application)	Saving on water use
Long-term performance	Lower material losses from wind and transport
Giving a flexible, non-brittle protection layer	Lower moisture content of raw materials
Universally applicable	Lower operating costs
Improved relations with the work force and surrounding community	

FLOWABILITY PROBLEMS

Crust formation and lumping of the iron ore because of impurities as traces of clay will make it harder to remove material from stockpiles. Furthermore, it will form vertical surfaces during retrieval for product loading that may collapse abruptly, thus creating dangerous situations. Additionally moist raw materials may cause problems during unloading of ships due to caking and lumping in corners and against the walls of ships.

LEACHING

Large amounts of rain may leach out smaller particles (production loss) and water-soluble components that may give rise to pollution of the soil and ground water.

Instral B.V. in Lelystad, the Netherlands, has developed C-Force® Industry, a wide range of solutions to regulate the moisture content and suppress dust of iron ore powder and pellets stored in open stockyards. The features of C-Force® Industry are detailed in the box above.

The C-Force® Industry products are non-hazardous and burn ash-less. Instral has developed a coating, specifically for pellets, that reduces the amount of moisture in bulk pellets by >20%. Moreover, the coating binds >95% of dust and makes the pellets more resistant to abrasion.

C-FORCE® INDUSTRY COATING COMPARED WITH CURRENTLY USED PRODUCTS

	C-Force Industry	Water	Latex	Paper pulp
Dust reduction	✓✓✓	✓	✓	✓
Long-term effect	✓✓✓		✓	✓
Environmentally friendly	✓✓	✓	✓	✓
Easily applied with conventional sprayer	✓✓	✓✓	✓	
Water repellent/retaining	✓✓✓			
Efficiency after rainfall	✓✓✓			

The combined output of the three leaders Vale, Rio and BHP constitute a good chunk of world iron ore output. Their ore production is set to grow because of their investing heavily in the past in capacity expansion in anticipation that China at some stage will make a billion tonnes of steel, which has now been proved wrong. Such capacity is steadily coming online. What, however, must not be lost sight of is that besides China, Australia and Brazil, as many as 40 other countries are engaged in iron ore production. At least two of these India and Russia produce well over 100mt each. Looking beyond the industry leaders based in Australia and Brazil, the iron ore output growth is slowing. The UK-based leading research and forecasting group BMI Research says from here ore production will grow “minimally” to 3.275bn tonnes by 2020 from 3.149bn tonnes in 2016 amounting to a growth rate of 0.1%. This compares poorly with 4.8 per cent production growth seen in the five years to 2015.

Notwithstanding progresses made by ore leaders, including the Australian upstart Fortescue, low prices will continue to force high cost producers, particularly in China to exit. BMI Research says: “On the one hand, supply growth will be primarily driven by Australia and Brazil on the back of expanding output by major miners, such as Rio, BHP, Vale and Fortescue Metals. On the other hand, miners in China, which operate on the higher end of iron ore cost curve, will be forced to cut output due to continued iron ore price weakness.” A decade ago when China made 356mt of steel, the local mines would supply about half the ore that the mills there needed. Chinese steel production last year was 803.83mt and in the first half of 2016 almost 400mt. Local ore now meets less than 20% requirements of Chinese steelmakers, though steel production in the

meantime has expanded in a big way.

For one unit of crude steel, 1.6 units of iron ore are needed. China imported 952mt of ore in 2015 and 493.7mt in the first half of this year meeting the major part of close to 1.3bn tonne requirements of the steel industry. So expect China ore imports growth rate to progressively slow down now onwards. One commentator has said and rightly so that imports could at the most capture a further 150mt of Chinese annual ore requirements. At the current world ore prices, some Chinese mines are breaking even. In any case, it is unlikely that with huge reserves of ore, albeit with low iron content China will exit iron ore extraction business altogether. For the big three in the global industry, the more they produce, the lower will be its unit output cost. In any case, all their investments in new capacity have started maturing. On top of all this, Chinese steel production is likely to stagnate at the current level, if not fall. Therefore, the world will stay oversupplied with iron ore and this will have a bearing on its prices.

Operators more often than not are befuddled by complexities of behaviour of iron ore prices. It is not easy to explain why the prices spiked in the first place from \$37 a tonne in December to \$70 in April to retreat to \$59 now. Closure of Samarco in Brazil no doubt helped as also restocking by China which now at well over 100mt are at the highest since December 2014. So going forward, Chinese ore import demand could only moderate. Even then, the market sentiment has improved. According to a survey report by Newport Consulting, of the 50 Australian mining executives interviewed, 43% was found “upbeat” about industry outlook. That’s a big rise from 17% respondents found positive about the prospects a year ago.

Brazil confident that its low costs will help it survive current low prices

As Vale prepares to start up its new mines at Carajas, amongst the world’s lowest cost, the ore price remains stuck at around \$50 a tonne, where many analysts suggest it will remain for a considerable time, writes *Patrick Knight*.

China, destination for 43% of the 350mt (million tonnes) or so of iron ore Brazil exports each year, and a much higher proportion than that of the total seaborne trade in ore, is clearly the key to what happens to the health of the iron ore industry worldwide. This also goes for the companies which mine it in Brazil and export it from there, notably Vale.

The ore price touched US\$79 a tonne for a while in April this year, 30% above its last year lows. This was apparently a response to the fact that stocks in China had fallen more than expected. But the price has since fallen back to around US\$50 a tonne, and it is at this level or less which most analysts anticipate the price will end 2016. Many think the price will not rise much above that figure for several years to come either.

Although the Chinese economy has not experienced the ‘hard landing’ many predicted, a large surplus of unsold housing hangs over the market, while steel production seems to be stagnating. The Chinese government aims to switch priority for growth away from investment in large infrastructure projects, to consumer spending. But there are fears that it will not be able to pull this off, at a time of renewed turbulence in the world economy.

Vale is set to start producing ore from its newly completed 90mt-capacity mines in the Carajas province later this year. This is one of a series of large new mines being opened by the world’s leading producers in recent times, as they attempt to

take advantage of the fact that their production costs are far lower than average.

Vale has seen its revenue fall following the sharp fall in the price of ore, although this has been partly compensated for by a collapse in the value of the Brazilian currency, which makes Brazil’s exports more competitive. Although Vale is still set for a profit this year, because about \$100 million has been cut from revenue, it will be smaller than that of 2015.

Vale has set about selling off non-core assets, and hopes to raise US \$13 billion by this means. Such assets include coal mining projects in Mozambique, its share in the M.R.N., Trombetas bauxite mine and some of the investments in energy it has made over the years. Vale has also halted production at several elderly and high-cost mines in Minas Gerais state, which between them produced and exported 30mt of ore last year.

The new mines at Carajas are as fully automated as possible to be. The huge trucks which will carry ore from workings to a complex of conveyor belts, located much closer to workings was than usual in the past, will not have drivers.

More automation reduces what is the leading cost at the Carajas mines, where very high wages have to be paid to operatives. Virtually all of these originate in other parts of Brazil, and are hard to recruit.

Vale claims that the new ore from Carajas can be mined and processed for an unbeatable US\$8 per tonne. Although the ore has to be carried 800km by train to the port of Itaqui, its low ex-mine cost gives Carajas ore a major advantage against all producers, apart from some equally low-cost mines in Australia. The costs achieved by the latest mines opened by the small

number of very large producers, demonstrates why these mining companies are confident they will survive a prolonged period when ore prices are low, much better than most producers in higher-cost producing countries such as China and India, where numerous mines have already closed.

Vale is also benefiting from the fact that the cost of transporting ore to markets in Asia, where in addition to China, countries such as Japan, South Korea and the Philippines, are important, has fallen sharply, due mainly to the fact that there is now a surplus of large bulk carriers. As the more traditional markets in Europe and north America stagnate, along with steel production and manufacturing industry there, the centre of gravity for ore has moved east. The cost of getting ore from Brazil to Asia has fallen to less than \$10 per tonne, compared with around £20 a tonne 18 months ago.

Amongst assets Vale is to sell are at least seven of its fleet of the massive Valemax ore carriers used in the Asian trade. Brazilian ore is also benefiting from the fact that the authorities in China are now permitting these giant ships, several of them built in China, to discharge at several ports there, rather than have to use the transshipment facilities Vale was forced to build in the Philippines.

Vale is co-owner with BHP-Billiton of the Samarco mine in Minas Gerais state, where operations have been halted since a dam holding back slurry and waste collapsed in late 2015. This collapse allowed millions of tonnes of toxic waste to flow downstream to the sea, which has resulted in claims for several billions of dollars in compensation. Vale and BHP have not yet been able to find a way whereby annual production of about 30mt of ore a year, all taken to the port of Uba along one of the world's longest slurry pipelines and where it was processed into pellets, can resume.

The company has proposed that until the dam can be rebuilt, or another permanent solution found, which is expected to take at least two years, the waste could be pumped into disused underground workings at Samarco's mines. But this solution has



not proved acceptable. There are reserves of some 30 billion tonnes of ore at Samarco, and the resulting pellets form a high proportion of the total world production of this type of high value ore.

Following the major consolidation of more than a decade ago, Vale now produces the lions share of the ore mined in Brazil. But all other companies, including Anglo-American, have been hit badly as well. Anglo's mine in Minas Gerais was started up two years ago, while the mines owned by several steel companies, which in recent years, have switched from buying most of the ore they need from Vale to producing it from their own mines, have also suffered. Anglo-American is reported to be seeking a buyer for its complex of mines, which cost far more to bring on stream than was anticipated when the workings were bought from local businessman, Eike Batista. But ore is not a very attractive business at the moment, and plans by other companies to build new mines in Bahia state, have been shelved.

All Brazil's steel companies, which for several years made as much money from their ore operations as they did from selling steel in Brazil or from exporting it, are experiencing severe financial difficulties. Most have ceased exporting ore and have reduced sales in Brazil. This is because output by local industry, notably the motor and consumer durables industries, as well as construction, the leading consumers of steel, have all contracted.

Mainly because Vale has to compete on equal terms with the other very large ore producing and exporting companies in other countries since it was privatized 20 years ago, the company has remained almost uniquely free of the political interference and corruption which has caused severe damage to other large companies in Brazil — notably to the state-controlled Petrobras oil company. But frustrated with the fact that Vale's current chief executive, Abel Ferreira, was nominated by Dilma Rousseff, who was forced to step down as president in May and is likely to lose her job permanently, pressure from politicians in Minas Gerais state for Ferreira to be replaced, have grown. Other leading shareholders in Vale include the pension funds of several state owned companies, as well as state-owned and private banks, and companies such as Mitsui, are resisting the pressure. But it remains to be seen what the outcome will be.



Changing regulations are buffeting the petcoke market



Ben Ziesmer & Frank Wilson, Jacobs Consultancy

Changing regulations are influencing the petroleum coke (petcoke) market today and are likely to have an even larger impact in the future. The most immediate impact is China's possible regulation of petcoke sulphur content. In the near term, India's probable application of a Clean Energy Tax to petcoke is keeping market participants on edge as they await the Indian government's decision. Longer term, implementation of the International Marine Organization's (IMO) global 0.5% sulphur limit for bunker fuel could have a substantial effect on petcoke.

Before explaining how each of these regulatory concerns evolved, we must first explain the production and purpose of petcoke.

BACKGROUND

Petcoke is produced as a byproduct 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 on p17).

Traditionally, cokers are installed in oil refineries to convert VTBs 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 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 outpaced 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.

Additionally, beginning in the late 1990s, two new factors have



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been driving 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 US 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 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



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production of carbon electrodes for electric arc furnaces, titanium dioxide (TiO₂) production, and as a recarburizer in the steel industry. About 25% 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.

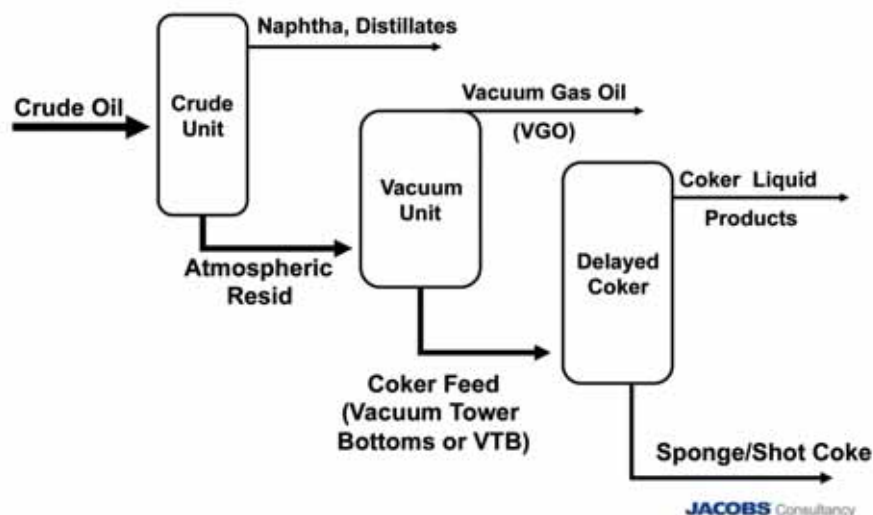
IMMEDIATE – CHINA'S PETCOKE REGULATION

On August 29, 2015, President Xi Jinping of China signed and issued Presidential Decree No. 31, which prohibits the sale, burning, or importing of 'unqualified' coal, petcoke, and other sources of air pollution, to take effect 1 January 2016. This is the latest version of the Law on the Prevention and Control of Atmospheric Pollution. The petcoke market response leading up to and months after the effective day was one of high uncertainty because no detailed regulations defining 'unqualified' petroleum coke were published.

The uncertainty is clearly depicted in Chinese petcoke import statistics as petcoke import volumes crashed Y/Y (e.g., January 2016 vs. January 2015). YTD through April, total imports were down 33% and 45% versus the same periods in 2015 and 2014, respectively.

Since China has historically segregated petcoke imports as either less than or greater than 3.0% sulphur, most petcoke importers assumed that petcoke with >3.0% sulphur content would be classified as 'unqualified.' Consequently, imports of <3.0% sulphur petcoke boomed while imports of >3.0% sulphur petcoke crashed (see China Petcoke Imports <3.0% Sulphur and China Petcoke Imports >3.0% Sulphur charts).

Simplified coking refinery flow diagram

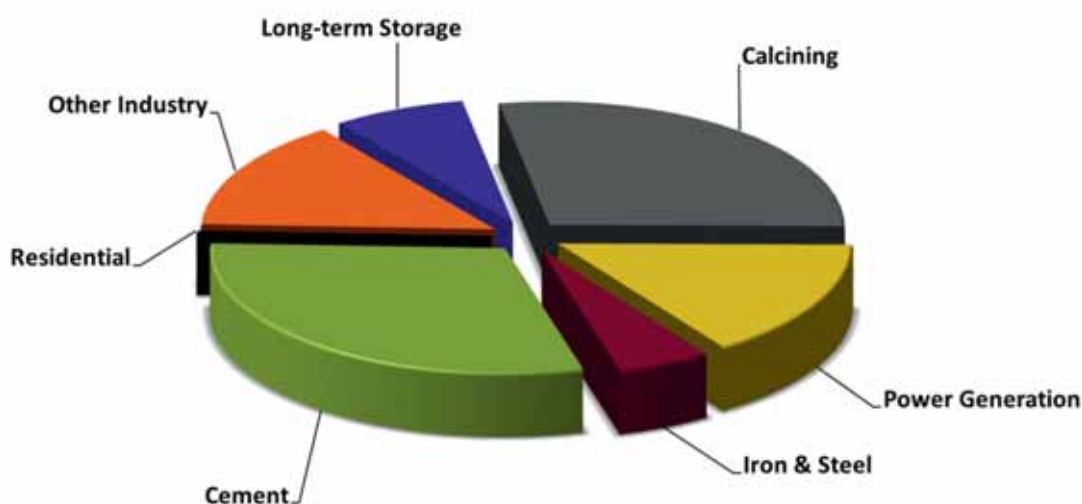


As time has passed since January 2016 without rules being published, more petcoke market participants made deals to import >3.0% sulphur petcoke, and the quantity of this material imported into China increased each month. It appears any vestiges of concern regarding impending petcoke regulations ended in May and imports of >3.0% sulphur petcoke boomed (see China Petcoke Imports >3.0% Sulphur chart).

It should be noted that increased imports of higher sulphur petroleum coke do not necessarily significantly increase sulphur dioxide (SO₂) emissions because the process in which petcoke is used can significantly affect emissions. For example, higher sulphur petroleum coke is often used in cement kilns or fluidized bed boilers, both of which inherently capture at least 90% of fuel sulphur content. On the other hand, lower sulphur petroleum coke is often used in industrial processes that do not inherently capture fuel sulphur and may not have SO₂ emission control equipment.

Global Petroleum Coke Demand

2015 data



SHORT TERM – INDIA CLEAN ENERGY TAX

Presently, the Indian government levies a 400 Indian rupee per tonne (about US\$ 6/tonne) Clean Energy Tax on coal. However, there is no Clean Energy Tax levied on petcoke use. Indian coal producers have put forward the argument that it is only fair that a Clean Energy Tax be imposed on petcoke.



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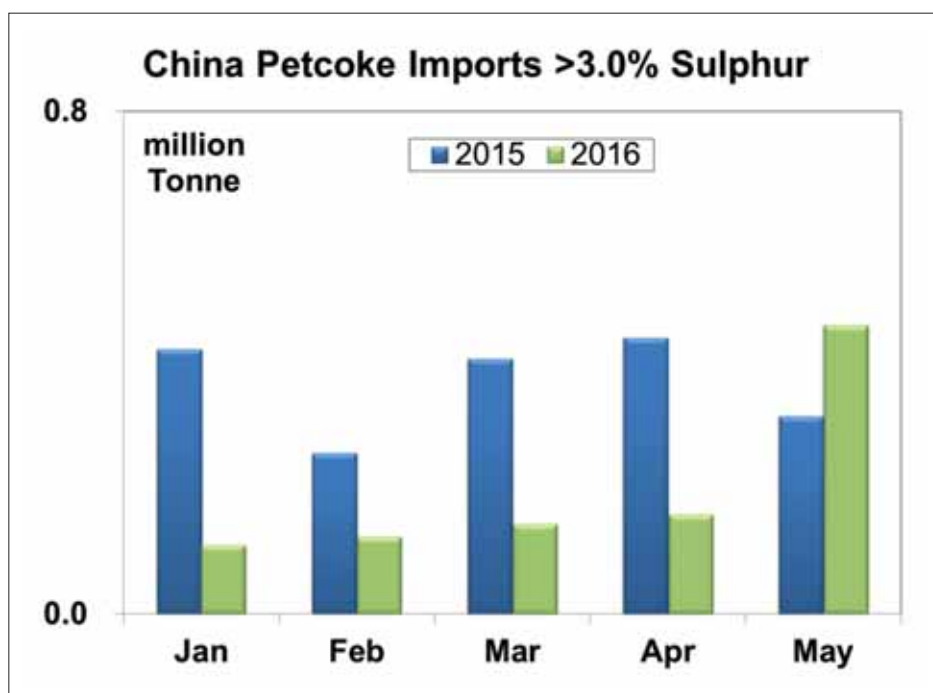
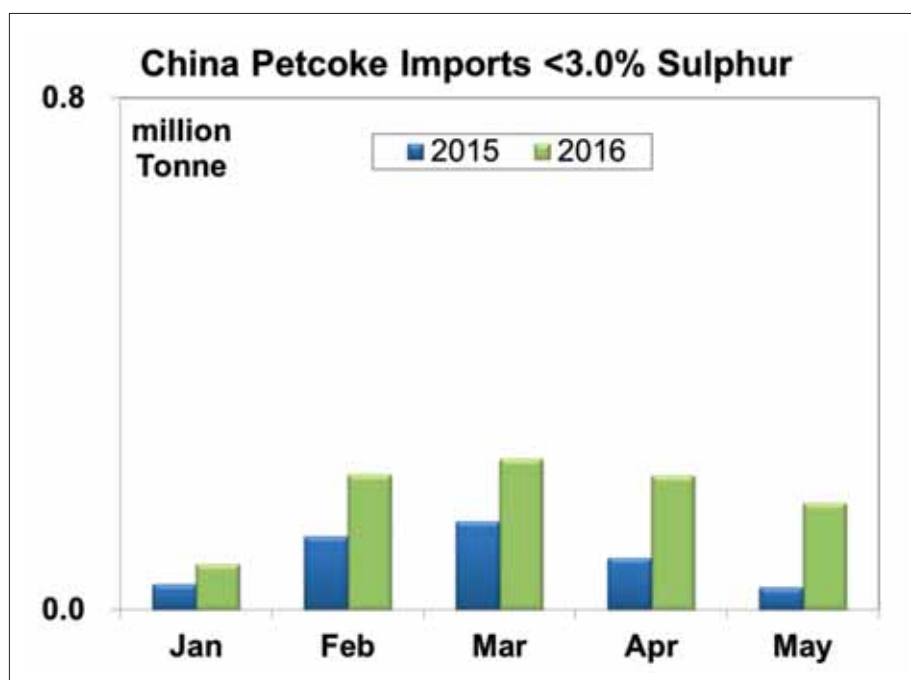
Moreover, they argue that the Clean Energy Tax on petroleum coke should be much higher than coal as petcoke has much higher sulphur content than coal. The Indian government has planned hearings to obtain input from all concerned parties.

When compared to coal, petcoke has greater heating value (e.g., 7,500kcal/kg vs. 6,000kcal/kg, NAR [net as received] basis) but typically contains higher levels of sulphur, is more difficult to pulverize, and is more difficult to combust completely. Thus, petcoke normally sells at a discount to coal (\$/million Btu basis).

The proposed Clean Energy Tax is important because India has become the clearing market for US Gulf Coast and Saudi Arabia petcoke. Imposition of a Clean Energy Tax on petcoke use will adversely impact the competitive position of petcoke in Indian markets.

LONG TERM – MARPOL VI 0.5% SULPHUR BUNKER FUEL REGULATION

The IMO's Marine Environment Protection Committee (MEPC) is scheduled to meet in October 2016 to review the implementation schedule of the global 0.5% sulphur cap on the bunker fuel portion of Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL VI). The MEPC will consider whether the regulation's compliance date 1) remains effective January 1, 2020,



as currently planned, or 2) will be deferred, possibly to as late as January 1, 2025.

MARPOL VI is intended to reduce sulphur emissions (principally sulphur dioxide) from marine vessels operating outside Sulphur Emission Control Areas (SECAs) via either Exhaust Gas Cleanup (EGC) equipment (SO₂ scrubbers) or limiting the vessel's fuel to a maximum of 0.5% sulphur. The MEPC commissioned a study to determine if there would be sufficient availability of low-sulphur fuel to support the 0.5% sulphur global cap in 2020. The MEPC is reviewing the fuel availability study prior to its October 2016 meeting; indications are that the study concluded that there will be sufficient low-sulphur fuel to support

maintaining the 2020 deadline. Its decision will have profound implications on the economics of international shipping and on the petroleum industry.

In January 2015, SECAs were established in the coastal waters off North America and Northwest Europe, requiring vessels operating in these areas to use fuel with a sulphur content of 0.1% or less. Additional SECAs are being implemented in Asia (2016 and 2017) and the Mediterranean (2020). Meeting the 0.1% sulphur limit in these areas has generally been accomplished by using a distillate fuel, such as marine gas oil (diesel), with the required sulphur limitation, or using liquefied natural gas (LNG). While the shift from RFO to marine gas oil (MGO) was accomplished with relatively little disruption to bunker supply channels or additional cost, it is important to note: 1) overall petroleum prices were falling dramatically during 2015, masking the cost differential, and 2) the quantity of RFO displaced and additional MGO demand was relatively small compared to the estimated 3+ million barrels per day (bpd/day) of high-sulphur RFO (HS RFO) currently being consumed as bunker fuel.

Residual Fuel Oil is the bunker fuel most ships currently use when sailing in international waters. RFO is a blend of refinery heavy oil streams (residuum) and less viscous/lower sulphur refined products (e.g., kerosene, light cycle oil) to meet bunker fuel specifications¹. This HS RFO contains approximately 2.1 million bbl/day (~127 mt/year) of high-sulphur heavy oil streams.

If the shipping industry does not install EGC on any vessels, the potential impact of MARPOL VI on the refining industry of displacing this much high-sulphur residuum (mostly vacuum tower bottoms) would be enormous. While it is possible to remove the sulphur from high-sulphur residuum directly, given the complex nature of these hydrocarbons, resid 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 discussed previously, coking converts heavy residuum into light products and petcoke. This path would produce a distillate fuel, similar to MGO, meeting the required sulphur limit of 0.5% maximum.

Coking is the dominant heavy conversion technology. If the refining industry selects coking to accommodate 80% of the displaced residuum, then approximately 1.6 million bbl/day (~97 mt/year) of coking capacity would have to be installed at a cost on the order of US\$40 billion. This new coking capacity would produce about 30mt/year (million tonnes a year) of petcoke. Currently approximately 45mt/year of petroleum coke is traded in seaborne markets. This calculation is illustrative of the magnitude of the issue facing the refining industry. Obviously, EGC will be installed on some vessels; the magnitude of market penetration by EGC will determine the magnitude of the problem of displaced HS residuum that the refining industry will face.

Another proposed alternative to burning a liquid fuel oil with less than 0.5% sulphur content would be using LNG as bunker fuel. While LNG fuel has been gaining market acceptance in coastal voyages, there remain considerable concerns regarding its use in longer Transatlantic or Transpacific voyages. Due to the much lower density, significantly larger capacity fuel tanks would be required. While these larger tanks might be viable for large, new build vessels, installation on smaller vessels or in

retrofitting existing vessels will be problematic. However, from a refining industry point-of-view, use of LNG still leaves the refining industry with no outlet for displaced high-sulphur residuum.

The outcome of the MEPC meeting in October 2016 will propel refiners and ship owners to evaluate a path forward to comply with the new sulphur content limitation. One of the key issues facing the refining industry is that installing new coking or resid desulphurization capacity requires about five years from initial planning to commercial operation, but there will be fewer than 39 months between the MEPC's October meeting and January 2020. While many questions remain unanswered, one thing is clear: MARPOL Annex VI is moving forward. Its impact on international shipping and the petroleum industry is forthcoming.

Whether China implements Decree No. 31, India imposes a tax on petcoke, or MARPOL Annex XI takes effect in 2020, the petcoke market and its participants are dealing in much uncertainty today. Understanding the complexity of the issues and their potential impacts on the petcoke market is our work.

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Jacobs Consultancy Inc. has published the *Pace Petroleum Coke Quarterly*[®] (PCQ) since 1983. The PCQ has been published monthly since 1984 and is considered the worldwide authoritative source for petroleum coke market information.

¹ These specifications typically include viscosity, gravity (specific density), flash point, vanadium content (ppm), sulphur content (%), etc.

Drydocks World conforms to FPC under EU Regulation



Drydocks World, an international service provider to the shipping, offshore, oil, gas and energy sectors has successfully been certified to European Standards EN 1090 – 1 and EN 1090-2. The certification programme is part of the European Union's Construction Products Regulation CPR 305/2011. Drydocks World's main yard activities undertaken in its facility are found to be complying with Factory Production Control (FPC) requirements by the auditing body.

The scope of the certification includes Corrosion Protected Load Bearing Steel Structures, which can be manufactured under Execution Class 3 (EXC 3). Drydocks World is authorized to apply CE Mark (European Conformity) on load bearing steel structures manufactured in-line with European standards that regulate the fabrication and assembly of steel structures. venture into the construction of Onshore Civil Steel Structures by meeting the European Union's CPR 305/2011 requirements. Drydocks World has already reinforced and aligned the welding processes in-line with EN ISO 3834-2.

DRYDOCKS WORLD COMPANY PROFILE

Over the past 33 years Drydocks World-Dubai has become a leading provider of marine and offshore services to the shipping, oil, gas and energy sectors. Conceived as an ambitious project under the guidance of H.H. Sheikh Rashid Bin Saeed Al Maktoum, the late Ruler of Dubai, the yard is strategically located in a rapidly developing region of the world.

Drydocks World maintains high HSEQ (health, safety, environment and quality) and operational excellence standards, utilizing the yards world-class infrastructure to exceed the expectations of clients. The dedicated workforce and state-of-the-art-facilities at Drydocks World on average complete over

300 projects per year, with a record of handling 42 refurbishment projects simultaneously.

The yard is spread over 200 hectares, four dry docks, with the largest dock capable of handling the world's largest ship, and over 3,700m of berth space. Innovative projects for key global players have been constructed in Drydocks World, breaking records for some of the largest new build offshore fabrication projects worldwide.

In recognition of its excellent services and world-first projects, Drydocks World has received numerous awards and accolades including consecutively winning the prestigious Mohammed Bin Rashid Al Maktoum Business Award 2015 in the manufacturing category, which is the highest level of national recognition for business performance excellence in the UAE. In addition, Drydocks World has been honoured with: the prestigious '5 Star' rating from the British Safety Council for the past 13 years; the BSC 'Sword of Honor' on ten occasions; the International Business Excellence Award – 2015 for innovative solutions; and the International Seatrade Awards- 2015 for Clean Shipping.

The yard has been recognized at the Shell Contractors Workshop Awards, winning best HSE initiative for chariot robotics blasting; further, Drydocks World received the Best Repair Yard award at the 7th ShipTek International Maritime Awards. Under the Corporate Social Responsibility category, Drydocks World has won at the Seatrade Awards 2016 and the Maritime Standard Awards 2015. Drydocks World has achieved significant recognition for the accomplishments of the organization, and looking forward the business aims to achieve further success for the UAE's maritime industry, positioning Drydocks World as an international yard of choice.

IRClass leads EU compliance certification of ship recycling yards in India

IRClass is amongst the first organizations in the world to certify ship recycling yards according to EU standards as an 'Independent Verifier'.

IRClass Systems and Solutions Pvt. Ltd. (ISSPL), an entity promoted by Indian Register of Shipping, has certified four leading ship recycling yards in Alang as an 'Independent Verifier' in accordance with the requirements of European Union Ship Recycling Regulation (EUSRR) 1257/2013.

The four yards which have met the standards set by the EU and the Hong Kong Convention are: Priya Blue Industries; Shree Ram Vessel Scrap; R.L. Kalathia Ship Breaking; and Leela Ship Recycling.

These recycling yards are India's first recycling yards to be certified based on EU standards and have submitted their applications for inclusion in the EU recognized yards list. The deadline for application submission was 30 June 2016 and the yard list is expected to be released by December.

India is home to one of the largest ship breaking facilities in the world with over 150 yards along its coast. On an average, close to 6.2 Million GT is scrapped in India every year, which accounts for 33% of the total scrapped tonnage in

the world. Recently, however, health and environmental concerns have led to adoption of new policy regimes at international level.

The policy on EUSRR mandates vessels under the EU flag to be scrapped in recognized ship breaking yards. In the past four years, approximately 310 EU flagged vessels were scrapped, out of which 107 were scrapped in India, amounting close to 4.3 million tonnes in deadweight. A recognition from EU will allow these Indian yards to become a preferred option over others in the area in coming years.

The ship breaking industry, being a highly price sensitive market, having to adopt health and environmental regulations may imply significant expenses in a competitive environment. It will be vital for Indian yards to select the right partners to work with to achieve compliance as per the Hong Kong Convention as well as EUSRR. While IRClass has emerged as a partner of choice for these yards, there are several other yards who have approached IRClass for the certification.

EU ship recycling regulation has entered into force at the end of 2013, and its requirements are phased-in between 31 December 2015 and 31 December 2020.



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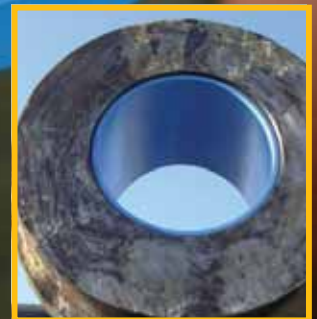
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Energy efficiency is impacted by choices made throughout a vessel's lifecycle

Investments in energy efficiency improvements offer vessel operators an opportunity to reduce operating costs and emissions while building a more sustainable brand image. The overall energy efficiency of a vessel is determined by the choices made throughout its lifecycle from new build to scrapping and recycling.

In the current market situation, investing in more energy efficient solutions is a good way to improve long-term competitiveness. Cruise shipping is currently one of the fastest growing sectors in tourism, with China offering big opportunities for growth. At the same time, the merchant shipping market is declining due to the economic downturn, despite the fluctuating crude oil prices.

Moreover, industry forerunners are focused on improving safety and energy efficiency and on minimizing their impact on the environment, which is an increasingly important factor for a growing number of cruise shipping customers. Tightening maritime regulation is creating pressure for enhanced energy efficiency for both existing and new fleet, as well.



APPLYING A HOLISTIC STRATEGY TO ENERGY EFFICIENCY

An operator wishing to optimize its fleet's energy efficiency should apply a holistic strategy by implementing comprehensive lifecycle solutions that take into consideration the vessel's entire journey from business planning to scrapping and recycling. Major improvements can also be achieved through assessing a specific area and applying a customized solution to it. Such solutions can be hull, propulsion and engine maintenance, machinery upgrades, or electrical and automation upgrades.

"The development of new ship design is constantly moving forward. Upgrading the existing fleet and optimizing its operations as well as maintenance, propulsion and machinery are also areas in which energy efficiency can be improved. For example, continuous performance monitoring can lead to substantial savings in energy consumption while optimized and smart maintenance planning makes maintenance costs more predictable," says Tomas Hakala, Vice President, 4-stroke Engine Services, Wärtsilä Services.

DIGITIZATION OFFERS OPPORTUNITIES TO INCREASE ENERGY EFFICIENCY

The use of data and analytics are providing enormous opportunities for energy efficiency improvements, too.

"Digital technologies make it possible for service providers to collect and analyse data from an installation and remotely monitor its performance. The technical knowledge of maintenance service providers is becoming critical to supplement the ship crew's competences," says Maarten van der Klip, General Manager, Project Sales & Development, Wärtsilä Services.

In 2015, Wärtsilä launched Wärtsilä Genius services, which use the benefits of real-time data and data analytics to improve the efficiency and predictability of operations. Wärtsilä Genius services can be used, for example, to optimize an installation's energy efficiency, or even the management of an entire fleet.

Earlier this year, Wärtsilä introduced the Wärtsilä Lifecycle solutions offering, which also covers Wärtsilä Genius services. Wärtsilä Lifecycle solutions consist of three concepts that combine digital innovations and advanced data analytics with a holistic approach. As an example, Guaranteed asset performance is a ground-breaking concept that provides guaranteed operational reliability, performance and uptime. This means that performance targets, for example related to energy efficiency, are determined based on measured data, and Wärtsilä can guarantee that these targets are reached and maintained.

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New Ecofix filler coat reduces the cost of rudder repairs

With an increasing trend for thruster and rudder manufacturers finishing their products with self-cleaning protective hard coatings, Antwerp headquartered Subsea Industries has introduced a filler coating for use with its award-winning Ecoshield hard coat system.

Ecofix, specifically formulated to provide ship repairers and Original Equipment Manufacturers with a cost-effective solution for the repair of corroded or pitted steel surfaces, returns the thruster or rudder to its original state prior to touching up the repaired area with Ecoshield.



Boud Van Rompay, Executive Director of Subsea Industries, said: “We are seeing an increasing number of propulsion and steering equipment suppliers apply tough hard coatings to their equipment for maximum protection against cavitation and abrasion damage, both of which can lead to widespread corrosion if conventional coatings fail.

“When a rudder or other piece of underwater gear has not been properly protected, the surface will become corroded. Cavitation damage can cause severe pitting and the steel needs to be restored to its original shape with a smooth surface prior to recoating.

“This is where Ecofix comes in. It has been developed to repair most pitting or corrosion damage on rudders, stabilizer fins, thrusters and other underwater gear. It’s as tough as the steel itself,” said Van Rompay.

With extraordinary bonding and hardness properties, Ecofix is an effective alternative to metal facing or very expensive fillers. And because it is part of the Ecospeed/Ecoshield family, it is non-toxic and extremely durable.

Since Ecofix uses the same basic resin as Ecoshield, the coating can be applied just one hour after applying the filler.

“Ecoshield is the only coating known to fully protect rudders and thrusters from all cavitation damage for the remainder of a vessel’s service life. Now with the launch of Ecofix, the repair work needed on the underlying steel can be done effectively and economically,” said Van Rompay.

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.

In 2013, after more than ten years of testing, Ecoshield, was launched for permanent protection against cavitation damage for rudders. This development was followed with the market introduction of Ecolock — an extremely tough and durable coating designed for FPSOs, drill ships and other offshore vessels — and then, in 2016, with the introduction of Ecofix, a restoration filler for use in combination with Ecoshield.

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.



A greener future for the Port of Los Angeles



Q&A WITH JEFF BURGIN, SENIOR VICE PRESIDENT, PASHA STEVEDORING & TERMINALS L.P.

Pasha Stevedoring & Terminals L.P. (Pasha), the Port of Los Angeles, and California Air Resources Board (CARB) are piloting a Green Omni Terminal, a \$27 million investment that will help North America's largest port become the first marine terminal to operate solely on renewable energy.

Q. How did this project get started?

A. For over a decade, Pasha and the Port of LA have discussed tangible ways we could tap into clean energy technologies to cut down on environmental pollution in our port communities and minimize dependence on the grid. The energy crisis 15 years ago really drove home the critical need to make this happen.

Our partners at the Port took the Green Omni Terminal initiative to Sacramento and were successful in gaining approval and support from CARB. We were up against other major container terminals, so we were ecstatic to be chosen as the first US marine terminal to spearhead a green terminal initiative. And now, four years later, here we are. It's very much a Wright Brothers moment for us, poised on the ledge, and, ultimately, standing as a model for how large industrial facilities can create a public/private partnership to develop and run a clean energy facility.

"When we work together, things get done," said Gene Seroka, Executive Director at the Port, and I echo that statement wholeheartedly.

Q. What is the Pasha Green Omni Terminal?

A. It's a game-changing environmental initiative that includes the creation of a solar-powered microgrid. It'll operate independently of the electric grid, along with zero and near-zero emissions equipment and clean transportation to move goods from ship to destination, greatly reducing harmful emissions in the local community. In the event of a disaster or power outage, our terminal would also be able to bring in emergency supplies and equipment, supply power to southern California and even serve as a base for the military.

The solar microgrid will include a 1.03MW photovoltaic rooftop array, a 2.6MWh battery storage system, bi-directional charging equipment, and an energy management control system. As part of the project, Pasha will also integrate a fleet of new and retrofitted zero-emission electric vehicles and cargo-handling equipment into its

terminal operations, and demonstrate the latest generation of advanced technology for capturing ship emissions from vessels unable to plug into shore power at berth.

Q. How long will it take the terminal to be fully operational?

A. We are working towards a mid-2017 timeline. Once complete, the project is expected to reduce more than 3,200 tons per year of greenhouse gases and nearly 28 tonnes annually of diesel particulate matter, nitrogen oxides and other harmful emissions from operations at the nation's busiest container port. This equates to taking 14,100 cars a day off the road in the South Coast Air Basin.

ABOUT THE PASHA GROUP

Serving customers since 1947, The Pasha Group is a family-owned diversified global logistics and transportation services company. The Pasha Group's Mission is to be a leader in providing customized, cost-effective and profitable value-added services to the automotive, maritime, and relocation industries through the integration of Pasha's network of global logistics entities and strategic partners. The company's continuing investment in its employees, technology, facilities and equipment enhances its productivity, leading to increased quality and profitability, for Pasha and for its customers, whose satisfaction is fundamental to its business.



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Pasha Stevedoring & Terminals L.P., the Port of Los Angeles, and California Air Resources Board are piloting a Green Omni Terminal to help North America's largest port become the first marine terminal to operate solely on renewable energy.

This environmental initiative includes the creation of a solar-powered microgrid that can operate independently of the electric grid, along with zero and near-zero emissions equipment and clean transportation to move goods from ship to destination.

Pasha Green Omni Terminal

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Electric Top Handler
Solar Powered Microgrid
Solar panels and battery storage
Electric On-Road Drayage Trucks

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Zero and near-zero emission technologies to improve air quality in our community

3,200 Tons Per Year Greenhouse Gases REDUCED	56,000 Pounds Per Year Diesel Particulate Matter, Nitrogen Oxides & Other Harmful Emissions ELIMINATED	14,100 Cars Off The Road Per Day Equivalent South Coast Air Basin CLEAN AIR GAINS
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Pecém acquires new ship-unloader

In Brazil, the port of Pecém has received a brand-new iron-ore ship unloader, which will be used by the Pecém Steel Company (CSP) and meets terms and conditions previously agreed between the government and the new port operator. The delivery of the crane to the port was undertaken in partnership with the manufacturer Tenova.

According to the Secretary of State for infrastructure, André Facó, "The port of Pecem has shown to be one of the best-prepared terminals in the country, having demonstrated an operational competence in receiving the unloader."

The new unloader, which weighs 2,000 tonnes and is almost 40 metres high, will be deployed at Berth 2 on Pier 1. There, it will unload ships directly onto a takeaway conveyor, with consignments transported some 9km to Sector 1 of the Pecém Port Industrial Complex (CIPP).

"This is a historic operation," said Facó. "We have never received any equivalent of this size before. The success of the operation confirms the competence of the team that operates the terminal at Pecém."

The port already has in place a continuous ship-unloader for coal, which uses conveyor screw technology. The new unloader is similar, although uses bucket lift technology, which helps to avoid spillage and the release of unwanted emissions. It will make use of quay rails and can discharge up to 2,400 tonnes of iron ore per hour. Once in operation, it is expected to handle around five million tonnes of iron ore annually.

Barry Cross

VLI continues Tiplam expansion

In Brazil, the Luiz Antonio Mesquita Port Terminal Integrator (Tiplam), part of the VLI logistics operations in the port of Santos, has opened its new sulphur warehouse, thereby doubling storage capacity. This has resulted in 84% of the expansion of Tiplam now being complete.

By the end of the year, the terminal plans to start handling agribulk, such as soya, corn, bran and sugar and, by the beginning of next year, it should also start handling fertilizer.

The terminal is located on the banks of the Piaçaguera Canal, next to the Usiminas quay.

In total, \$818 million is being spent on expanding Tiplam, with the project to be completed in July 2017.

The new sulphur warehouse can handle up to 66,000 tonnes of this product. It also has another warehouse capable of handling up to a further 60,000 tonnes.

With two new berths to be put into operation by the end of the year, one of which handle sugar and the other grain, throughput at Tiplam will increase from 2.5t (million tonnes) to 14.5mt per annum.

According to the director-president of VLI, Marcello

Spinelli, the terminal will be able to make extensive use of the 14km of rail sidings that the port of Santos has, thereby making the movement of dry bulk consignments much more efficient. In fact, movement by rail will replace around 1,400 trucks a day. There will be wagon discharge facilities at the terminal, which will allow up to six trains a day to be handled without there being any serious impact on the surrounding residential area.

The expansion project at Tiplam involves the creation of three new berths, of which two will handle sugar and grain, while the third will specialize in discharging consignments of fertilizer. This will give the terminal total of four berths. At present, the existing berth handles a combination of sulphur, phosphate rock, fertilizer and ammonia.

By December, a second berth will have entered operation, followed by the other two next year.

Storage capacity is also being expanded with four new warehouses: two for grain (each capable of storing 80,000 tonnes, and one for sugar, with 114,000 tonnes capacity. The fourth will be able to handle either cargo.

BC

Mundra sets steam coal discharge record

The Indian port of Mundra has set a new record for the handling of coal. This was established by Adani Ports and Special Economic Zone Ltd (APSEZ), which is India's largest port developer and operator. The record involve discharging 164,914 tonnes of steam coal in a 24-hour period, the consignment having been brought to the port by the *Marijeannie*. The vessel had on board 167,152 tonnes of steam coal inbound for Adani Power Ltd. It berthed at Mundra ports West Basin and was entirely discharged within 25 hours and 15 minutes.

West Basin currently handle up to 60,000,000 tonnes of coal per annum and the above-mentioned record covers the fastest discharge for steam coal at any Indian port.

BC



Ports of America continues investing in its West Coast strategy

Ports America announced on 12 April this year that it is continuing its business growth strategy to increase its West Coast presence through additional investments, services and expansion of its terminal capacity. The latest transaction includes a significant expansion and 20-year lease extension of the Husky Terminal in Tacoma, Washington. International Transportation Service, Inc. (ITS), a joint venture between Ports America and 'K' Line, negotiated an extension of its Husky lease with the Northwest Seaport Alliance (NWSA) through 2046. Ports America is an equity holder and service provider to Husky Terminal. Included in the lease extension is a planned expansion project of over \$141 million approved by the NWSA, which will greatly enhance the terminal's capacity and is expected to be completed by July 2018.

Husky Terminal's extensive enhancements will provide the terminal with approximately 104 acres of leased and preferential berthing area in this major gate port in the U.S. Pacific Northwest. Additionally, NWSA has agreed to order four of the largest, most modern gantry cranes and to complete yard and gate improvements. Upon completion, the newly-designed Husky Terminal will be capable of

simultaneously accommodating two 18,000 TEU mega-container vessels.

Ports America is a 30% owner of ITS, with the remaining interest owned by 'K' Line. ITS has been operating container terminals for 40 years in the ports of Long Beach (Calif.) and Tacoma, providing services to major shipping lines including 'K' Line. Ports America has a long-established relationship with 'K' Line and is pleased to provide world-class terminal operations and process excellence to its distinguished partner.

ABOUT PORTS AMERICA

Ports America, headquartered in New Jersey, is the largest independent marine terminal operator and stevedore company in the United States.

The company currently operates in more than 42 ports and 80 locations. Ports America handles all types of cargo, including container, bulk, breakbulk, automotive, project, military and cruise, typically handling 13.4 million TEU, 2.5 million vehicles, 10.1 million tonnes of general cargo and 1.7 million cruise ship passengers annually.

Port of Longview announces cargo terminal opportunity; seeks interest from prospective developers, operators

On 22 June this year, the Port of Longview announced a major opportunity for available industrial waterfront property on the Columbia River of the United States West Coast. As the first port on the deep-draught shipping channel with direct transportation connections to international markets, this is significant opportunity to establish new cargo operations on the Columbia River.

Bridgeview Terminal, comprised of two cargo docks and upland areas, recently became available when a long-term lease with its former bulk cargo operator/tenant expired earlier this year. While the port is primarily interested in responses to import or export bulk cargoes, it will consider opportunities for other marine-dependent uses.

"Opportunities to establish new terminal operations or terminal redevelopment are minimal on the West Coast," said Business Development Manager Laurie Nelson-Cooley. "Here at the Port of Longview, we have a facility ready to handle cargo with direct transportation connections and an experienced work force."

The port has issued a formal Request for Expression of Interest to determine interest in the property. Included in the request, respondents will find a summary of terminal property, on-site facilities and additional potentially available properties.

"Our intent is to maximize this terminal based on cargo throughput, job creation and return on investment to our customers and community partners," said Nelson-Cooley.

Seeking interest in the Terminal is the first step in evaluating potential uses and agreements. Based on initial responses, the process will move into a formal Request for Qualifications and/or Request for Proposals phase.





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- Panmax- and partly laden Cape Size Vessels with a draft up to 13,10 m (43') fw

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The Port of Gdansk plays host to yet another Chinese delegation

On 30 June 2016, a delegation of three entrepreneurs from the People's Republic of China visited the Port of Gdansk, accompanied by representatives of the Pomeranian Special Economic Zone.

It was yet another visit by guests from China in that same week. They expressed an interest in establishing co-operation with Poland's largest port located in Gdansk. The visit of the Chinese delegation, which included representatives of the China & Poland Friendship Association, the China & Poland Investment Development Company, and Novara Energy, was one of the scheduled meetings planned for their four-day stay in the Tricity.

The meeting at the Port of Gdansk Authority SA was hosted by Lukasz Greinke, President of the Board, who invited the guests to a lecture about the port, following the official welcoming ceremony. This short visit to the Port of Gdansk provided an opportunity to present information about what we do, our investment projects and potential development scenarios for the coming years. The concept for the construction of a new deepwater terminal at the port, the so-called Central Port, met with great interest. This confirms that thanks to its convenient location, existing ocean links and rapidly growing importance on the logistical map of the world, Gdansk is more and more frequently becoming an object of interest among Chinese entrepreneurs.

All in all, the Port of Gdansk's recently intensified relations with the Chinese are a result of last week's official government visits, which took place in Warsaw, and the meetings at the port and the topics of the discussions are confirmation that there is a real chance of expanding business co-operation between Poland and China.

Dunkerque posts new grain record

After the historic records of the previous grain campaigns in 2013/2014 (2.4mt [million tonnes]) and 2014/2015 (3.09mt), the Port of Dunkirk has seen the advantages offered by its operator and infrastructures confirmed with record traffic of 3.226mt for the 2015/2016 campaign.

A total of 2.32mt of wheat was shipped to the Middle East, North Africa, Asia and Central America, and 0.77mt of barley to Asia and the Middle East.

These excellent results reflect the drive of the operator Nord Céréales which has improved its productivity through significant investments on its site, allowing it to berth and load very large ships (14.20m draught). Collecting agencies and farmers have also worked hard to improve the quality of the grain.

While the modal share of transport by waterway is now 46%, rail is also a very popular transport mode, further extending the hinterland of Dunkerque-Port towards eastern

France and Picardy. New traffic volumes have been carried by rail to the Port of Dunkirk since the beginning of 2015, representing 12% of supply. Five rail operators are active on the market and run full trains. The volume of grain carried by rail has now exceeded 385,000 tonnes.

Nord Céréales, with the second-largest terminal in France, is a major stakeholder in the north and east of France in the service of grain operators. It boasts an exceptional site in the heart of the industrial area of Grand Port Maritime de Dunkerque, to service the largest grain carriers in the world.

ABOUT DUNKERQUE-PORT

The ninth port of the Channel and North Sea Range and the third-ranking port of France, Dunkirk has built a strong reputation in many sectors: the busiest passenger port in Europe (Calais–Dunkirk axis); the largest port complex in France (traffic of more than 90mt through Calais–Dunkirk); France's largest energy hub; the largest LNG terminal; the leading port for containerized fruit and vegetable imports; the leading French port for ore and coal imports; France's largest rail port; the largest waterway port in the region; and France's third-ranking port for grain traffic. Dunkerque-Port is also a sustainable port. It is the trading port of the new Hauts de France Region, the country's largest agricultural region, the leading rail industry region, and the leading car industry region. Traffic in 2015 was 46.6mt.



Port of Antwerp CEO Eddy Bruyninckx becomes a baron

After 25 years as CEO of Antwerp Port Authority, Eddy Bruyninckx has been raised to the nobility by H.M. the king of Belgium with the rank of baron. In Belgium the title of baron or baroness is reserved for those who have made a notable contribution in a particular sector. In the case of port boss Eddy Bruyninckx, his unremitting efforts on behalf of the Port of Antwerp over many years, helping to defend and develop its solid N° 2 position in Europe and top 15 in the world, have led to him being awarded the title of baron along with seven other Belgians.

Port Authority chairman Marc van Peel congratulated Bruyninckx on being raised to the nobility: "Eddy Bruyninckx has performed countless valuable services for the port over the 25 years that he has been in charge. Under his direction the port has developed a very strong performance. This resulted last year in a record freight volume of more than 208 million tonnes, and this year too the port is on the way to a new record."

The three foundations on which the port is based — maritime transshipment, logistics storage and industrial activities — have all become more and more important over the past 25 years. "The Port of Antwerp has developed into a major logistics hub," explains Van Peel. "In the industrial sector too the port landscape has undergone great changes, witness the numerous large investments in the chemical and petrochemical cluster and the strong growth in handling of liquid bulk. In the container sector Antwerp has become the undisputed N° 2 in Europe, with a volume of well over 9 million TEU last year. But as CEO Eddy Bruyninckx will give credit first and foremost to the 150,000 people who work directly or indirectly for the port of Antwerp."

Eddy Bruyninckx (65) is due to retire at the end of 2016. "As CEO he has demonstrated that he is able to build bridges. As such this title of nobility is justified recognition for his work," Van Peel concluded.

Baron Eddy Bruyninckx will be succeeded as CEO of Antwerp Port Authority by Jacques Vandermeiren with effect from 1 January 2017.



Outside the Box

The Port of Long Beach ships much more than containers.

We have facilities to efficiently and responsibly transport pet coke, gypsum, salt, iron ore and more.



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LONG BEACH
The Green Port

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Inspection, analysis and sampling

quality control remains vital



Jay Venter

CITA Energy Services obtains ISO 17025 accreditation

CITA Energy Services, part of CITA Logistics LLC, is an independent inspection and coal testing facility, which has been serving customers from North America and Europe for over 50 years.

Laboratories play a key role in the supply chain of the Energy industry, this is why in 2008 CITA Energy Services decided to provide its customers the assurance they deserve and obtain ISO 17025 accreditation for the quality system.

The accreditation standard provides the management and technical guidelines to create a dependable quality system, by ensuring traceability of results, participation in proficiency testing, and implementation of regular internal and external audits.

WHY USE AN ISO 17025 ACCREDITED LABORATORY?

To CITA Energy Services the accreditation has created more than customer satisfaction, it has proven to be equally valuable

for consumers and internally.

Accreditation provides to both businesses and consumers peace of mind that the quality of the management system and test is verified against international standard.

It has given the company the tools to continuously progress in all aspects and maintain excellence both technically and in the management of the quality system.

Additionally, it continues to provide its customers the confidence in the technical competence and the soundness of the measurements.

TRACEABILITY:

Each test result is traceable within the lab to the equipment, reagents, technician and calibration standards used to produce the test result. Measurements made by the laboratory and calibrations are traceable to reference standards (including NIST).

PROFICIENCY:

The laboratory's continuing performance is monitored through extensive participation in proficiency testing (round robin). It allows CITA Energy Services to validate its measurement methods, technical training, traceability of standards and uncertainty budgets.

CITA Energy Services often encourages its customers to request the proficiency testing report and verify the accuracy of the results produced for the scope of accreditation. Through proficiency testing programme participation, it indirectly provides its customers insurance of results accuracy. For the testing laboratory it is the opportunity to compare results with a wide range of laboratories and detect trends, investigate and initiate appropriate corrective actions where needed.

COMPLIANCE AUDIT

A disciplined approach to evaluate the effectiveness of its

procedures is essential in order to achieve CITA Energy Services' goals, additionally it allows the staff to cultivate a mindset of continuous improvement.

CITA Energy Services undergoes two comprehensive audits per year. The accrediting body mandates an assessor to perform a complete review of the laboratory technical and managerial practices and ensure that compliance is respected. In addition to the external surveillance the company also enforces an internal audit policy which takes place every year.

The management system is reviewed bi-annually through in-depth management review and comprehensive audit. The accreditation is reassessed by the accrediting body every 24 months.

CITA Energy Services is part of CITA Logistics LLC, which offers back office services, freight forwarding and vessel agency services in Australia and USA.

Continuous analysis with Scantech International Pty Ltd analysers

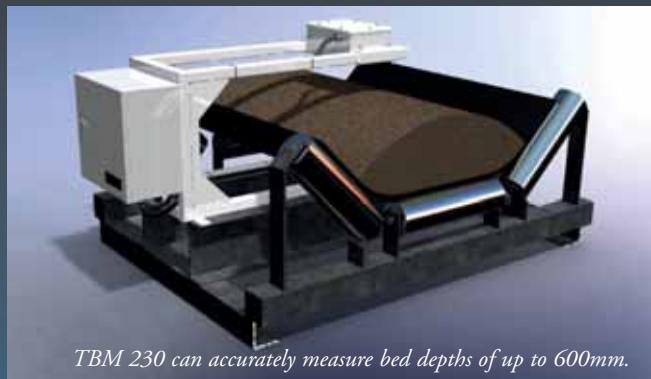
Scantech International is a developer, manufacturer and supplier of real time analysis technologies for conveyed bulk materials.

All the company's technologies measure through the conveyed material and provide very representative composition analysis in the coal, cement, and minerals sectors worldwide.

With over 1,000 installations in over 55 countries the analysers are used for measuring at mines, process plants, load out operations for rail and ports and at smelters and processing sites at the customer.

The analysis parameters include moisture content, ash content in coal, elemental content in coal, cement and mineral ores, pellets, concentrates, etc.

Analysers are very representative as they measure continuously, unlike sampling systems which take intermittent increments. For materials with high composition variability the sampling systems cannot eliminate the larger sampling error, so analysers end up being a better tool for tracking composition and its variability.



TBM 230 can accurately measure bed depths of up to 600mm.



GEOSCAN – C is used in cement industry applications such as stockpile building and raw mix proportioning.



The MINERALSCAN Model 1500 measures the natural radiation from ores and concentrates.

Scantech's major clients are the main resource companies in the world, which are keen to implement these technologies as most applications have paybacks of a few weeks or months.

Clients include BHP, Vale, Rio Tinto, Anglo American, Glencore/Xstrata, Shenhua, Teck, Peabody, Codelco, Severstal, Alcoa, Barrick Gold, Eskom, China Steel, Nippon Steel, Fortescue Metals Group, Holcim/Lafarge, Cemex, MMG and Heidelberg Cement.

Sampling, inspection and analysis of Group A dry bulk cargoes



The potential for cargo liquefaction can have devastating implications on ship stability due to cargo shift, writes *Dr Aime Harrison, Geotechnical Civil Engineer, London Offshore Consultants.*

When a cargo that is comprised predominantly of fine particles appears wet at the time of loading and/or when free water appears in the hold, the shipping documentation and the condition of the cargo can arouse suspicion for the Master, the crew and the P&I Club regarding the safety or fitness of the cargo for carriage by sea transport.

When a Group A cargo (defined as 'likely to liquefy' in the IMSBC Code) has a moisture content greater than the certified Transportable Moisture Limit (TML) value, 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 (not likely to liquefy) in the absence of proper test certification, or by improper sampling and testing procedures leading to invalid certificates.

LOC recently investigated the analysis of a cargo that was reported to be Group C which suffered moisture contamination during loading. Instructed parties argued what the potential implications could be for the saturated cargo as it contained a proportion of finer particles. During discussions and inspection of the product, LOC's surveyor was able to ascertain that the cargo was in fact a Group A cargo. The moisture content of the cargo was below the TML and therefore fit for transport, however the declaration of the product must be correct to be in accordance with the IMSBC Code requirements. The producers agreed to revise their cargo declarations to Group A as a result of LOC's investigation.

Confusion can exist for shipments whose schedules appear as both group A and group C in the IMSBC Code. If a cargo is suspected to have been misdeclared, determining its group is not always a straightforward process. A sound knowledge of the test methods is essential. Although group C cargoes do not flow and therefore do not require the laboratory testing and certification that group A cargoes require, samples are sometimes taken from ships during loading and sent for testing in order to validate a cargo declaration or test certificate based

on visual inspection.

LOC recently provided advice regarding the proper declaration for a cargo that is listed in the IMSBC Code as both Group A and Group C. The mechanical characteristics that determine the flow potential include the correlations of moisture content, density and other soil parameters to the liquefaction resistance of materials as tested in geotechnical engineering laboratories.

LOC is aware that laboratory analysis can lead to delays for shipments and the additional costs can quickly increase if parties disagree on the sampling and/or testing methods for analysis.

In this case, LOC maintained that the cargo was Group C (not likely to liquefy) which was supported by the subsequent laboratory tests. Appendix 2 of the IMSBC Code describes the test for the determination of moisture content and three test procedures for the determination of a TML value. A deep understanding of the expected soil behaviour under the different test methods and experience of the expected behaviour are required in order to understand the liquefaction potential of a cargo.

The results of extensive laboratory analysis on the mechanical properties of mineral ores are regularly prepared and presented at the IMO with the aim of inclusion in the International Maritime Solid Bulk Cargoes (IMSBC) Code. Proposals for new cargo schedules and modified test methods for mineral ores (such as iron, nickel, bauxite, coal, etc.) are reviewed by experts of geotechnical engineering, the study of soil behaviour, based on technical and editorial content. These scientific investigations are carried out in response to numerous disputes that arise in the shipping industry from claims of 'wet' iron ore cargo that are reported to the IMO (International Maritime Organization).

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

Expertise in inspection, sampling and analysis on dry bulk commodities



RC Inspection was founded in 2006 as an independent, privately owned inspection company operating in the field of dry bulk commodities, metals and marine survey related services.

Since 2009, RC Inspection is expanding its services worldwide and in various commodities. The operating offices are strategically based around the globe enabling to perform the services prompt on request and giving excellent turnaround times to the customers, irrespective of the time zone.

Hence, all global services are co-ordinated from the head office in Rotterdam, where a permanent team of specialists in inspection, sampling, sample preparation and analysis of dry cargo commodities is based. With their professional knowledge and adequate working they provide fast and reliable results.

To be able to live up to the high standard within the market, the staff understands the value chain from A to Z. This requires the knowledge and experience to grant the customers the highest quality to be found in the business. With management members having more than 40 years of experience in inspection, sampling and analysis, ensuring that the specialists know all aspects and characteristics on all types of ores, solid fuels, solid biomass commodities, agricultural products, fertilizers, metals, minerals, bulk ferro and noble alloys, concentrates and ferrous/nonferrous scrap.

In the product range of solid fuels, RC Inspection is leading in deep temperature control and infrared temperature control. It owns all the necessary equipment and the expertise to conduct deep temperature control and infrared temperature control during loading and discharge operations, prior discharge operations and as well as during the period of stockpiling and re-loading operations ex-stockpile to avoid spontaneous combustion.

As a result of the management's longstanding personal experience, RC Inspection recognizes the importance of extensive knowledge and experience, as well as the ISO standards in order to perform highly representative inspection and sampling services, including the sample preparation of the obtained bulk samples.

This has led to the managing experts of RC Inspection

developing special internal procedures for sampling, inspection and sample preparation for all kinds of dry bulk commodities.

The surveyors are all well informed and instructed according to these internal procedures, which are necessary to guarantee high quality services.

These procedures are recognized by the fact that various group companies have obtained accreditation according to the NEN-EN-ISO/IEC 17020:2012 international norm.

This accreditation has been valued upon the following services:

- ❖ Visual cargo inspection, sampling and sample preparation.
- ❖ Weight determination established by gauging and draught survey for both loading and discharging operations.
- ❖ Inspection of storage facilities and transshipment equipment.
- ❖ Loading Compartment Inspection (LCI) for feed transport

This accreditation guarantees the clients that the policies, practices and procedures of the companies can be ensured with consistent high quality and expertise in the range of commodities and the provided services worldwide.

As RC Inspection strives to keep analysis in-house conducted by its group company, 'RCI Analytical Services'. The laboratories are to-date strategically located in The Netherlands, Ukraine and Mongolia and equipped with the most modern and advanced instruments to drive accelerated turnaround times and up-to-the-minute reporting through a service driven approach and innovative use of technology.

RC Inspection carries out an independent qualitative and quantitative evaluation of the chemical elements contained in metals listed on the LME, using relevant techniques to define the required purity and analytical specifications that registered brands must meet. RCI Analytical Services provides chemical analysis for RC Inspection Group companies and their related customers.

The analysis are performed using all relevant modern analytical techniques such as:

- ❖ ICP-OES (Inductively Coupled Plasma-Optical Emission Spectroscopy),
- ❖ X-ray Fluorescence,



- ❖ Instrumental Gas Analysis for all relevant gases,
- ❖ X-ray Diffraction (XRD) Analysis.

Additionally, RCI Analytical Services performs analysis on metals such as Gold and Silver in Copper, Zinc and Lead Concentrates by Fire Assay/Cupellation techniques with ICP-OES Finish in combination with Graphite Furnace AAS and Titration in a state-of-the-art equipped laboratory.

With future prospects in sight, RCI Analytical Services is working on getting all the laboratories accredited under NEN-EN-ISO/IEC 17025 and are actively participating in inter-laboratory tests and international round robins.

Besides rendering the analytical services, the company also offers supply of analytical equipment, auditing of laboratory management systems and implement/manage laboratories as outsourcing to the industry.

Besides its skills, RC Inspection takes high value of a personal

relationship with the customer. By adding a personal touch in the communication and services, RC Inspection wants to make the difference in providing the customers' needs. The core business philosophy is to provide independent, fast and reliable services with a direct people to people approach as befits a modern inspection company.

The RC Inspection Group companies are:

- ❖ LME listed — without any sort of limitations on geographical locations or metals -
- ❖ Member of the MMTA
- ❖ Member of the MRAI
- ❖ Certified with ISO 9001:2008
- ❖ Accredited with ISO/IEC 17020:2012
- ❖ Accredited with ISO/IEC 17025
- ❖ Member of Verein der Kohlenimporteure
- ❖ Approved laboratories under GlobalCOAL SCoTA
- ❖ Superintendent and surveyor member of GAFTA

RCI Ltd. In Hong Kong is associate member of LBMA.

RC Uluslarasi Gozetim Ltd Sti. (Turkey) is a member of the Accredited Inspection Companies (AGDF).

RC Uluslarasi Gozetim Ltd Sti. (Turkey) is working with the permission of Ministry of Economics.



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RC INSPECTION
GROUP

Understanding temperature behaviour in dry bulk cargo stockpiles

KEEPING BIOMASS AND ANIMALFEED SAFE

One of the major risks in bulk handling is product self-combustion, which can lead to enormous damages and costs. Detecting combustion spots is challenging; however it is of the utmost importance to have the ability to detect them in large dry bulk stocks at an early stage.

Inspection companies that receive an order to monitor temperature evolution within stockpiles of biomass or stockpiles of feed, typically send an inspector. The inspector physically visits the cargo to perform the temperature measurement. This traditional approach carries an element of risk for personnel and does not provide information on how the temperature evolves between two manual measurements. Monitoring this temperature trend can help provide an early warning system for possible self-combustion.

DAMAGE CONTROL IS A NECESSITY

Monitoring self-heating in stockpiles and analysing the trends in temperature is a necessity, yet from a costs perspective frequent manual measurements are too expensive and produce only a snapshot, rather than providing constant observation. The characteristics of biomass, create a potential safety risk for persons entering storage facilities due to the possibility that gases such as 'CO – CO₂ – H₂ – CH₄' are present. Because of the presence of these gases, personnel entering these warehouses may result in severe consequences. Choosing the optimal monitoring solutions heavily depends on product characteristics and the storage facility, and ranges from in-product temperature



Probe in biomass.

Supply chain





TEMO in cargo.

monitoring to environmental gas composition measurements.

Peterson offers a cost-effective solution to generate continuous temperature monitoring, allowing for trend analysis. The 'Peterson Temperature Monitoring system', can be used in biomass and feedstuff and gives real time insights into the behaviour of temperature within a stockpile. The company has have an established track record, gained over 12 years of conducting automated temperature monitoring services for international clients, across a wide range of commodities (i.e. biomass, feed, food and coal). This expertise helps it in understanding temperature behaviour and suggest preventive actions for warehouses/cargo owners.

The portable Peterson TEMO system can be used for various different applications and is a wireless, easy-to-use system which automates the process of temperature monitoring in (floating) storage facilities. In addition to record keeping and reporting, this service sends automatic alerts when set parameters are exceeded.

FEATURES AND BENEFITS

- ❖ easy-to-use, non-disruptive deployment — no need for expensive hardwired infrastructure;
- ❖ global access to information when and where you need it;
- ❖ 24/7 temperature monitoring and trend analysis;
- ❖ real-time alarming and alerting to take preventive action, run reports, and keep log files for the customer's records and compliance; and
- ❖ automated periodic (weekly, monthly, yearly reports per sensor (graph, statistic) and gas measuring on request.

Probes are available in various lengths, by installing multiple probes grid wise an entire parcel can be covered/monitored.

Peterson offers a unique perspective to its customers to ensure it delivers sustainable added value. It does so by combining inspection and logistics expertise with the insight obtained from continuous co-ordination between parties involved throughout all stages of the value chain.

Peterson is an independent global service provider. It offers a wide range of specialized logistics solutions, commodity inspections and laboratory services. Its activities cover many

industries, including food, animal feed, minerals, energy, forest products, biomass and biofuel.



Monitoring rapeseed.



Alex Stewart Agriculture

Experienced Biomass Inspections



Alex Stewart Agriculture Ltd

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Liverpool L30 1RD United Kingdom

Call Glenn Forbes

T: +44 151 525 1488

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www.alexstewartagriculture.com

Alex Stewart Agriculture Ltd. – serving the grain trade market

Grain and oilseed inspection and analysis are core businesses of Alex Stewart Agriculture Ltd. Alex Stewart is a superintendent and analyst member of the Grain and Feed Trade Association (GAFTA).

Alex Stewart works with many leading grain traders by providing trustworthy professional inspection and laboratory services globally. In addition, ASA can arrange fumigation services in most areas of the world to ensure that its customers' cargoes are treated as with the greatest care. Upon nomination, Alex Stewart's mission is to protect customers' interests at loading and/or discharge ports worldwide. ASA is also able to provide collateral management services such as supervision of long term storage of grain or control of transportation between storage facilities.

The head office of Alex Stewart Agriculture Ltd in the UK also provides consultancy services. Strategically and commercially located operations offices offer support and advice regarding ports and silos worldwide and will provide information concerning the latest industry standards in sampling and analysis.

AGRICULTURAL LABORATORIES

Huson & Hardwick and A. Norman Tate Laboratories are GAFTA/FOSFA (Federation of Oils, Seeds and Fats Associations) registered analytical laboratories that specialize in the analysis of oilseed and edible oil, grain, barley, rye and wheat, animal feed, sugar and food products operate from Alex Stewart's head office in England. They are able to perform a full range of commercial and shipping sample including protein, fat, fibre, ash, moisture analysis via classical wet chemistry and hi-tech instrumentation including NIR (near infrared), ICP (inductively coupled plasma) and HPLC (high performance liquid chromatography); also infestation, foreign matter and admixture, hazardous contents, fuzarious grains, nutritional values, toxic contents (eg. arsenic, mercury & lead) mycotoxins and pesticides.

DRY BULK COMMODITIES CERTIFIED BY ALEX STEWART

Fertilizer

Alex Stewart Agriculture's highly experienced and knowledgeable inspection team has built a trusted reputation within the international fertilizer-trading arena. The fertilizer division offers first class inspection and analytical services for bulk, bagged and liquid fertilizer with the aim of protecting client's interests at production site, during transportation, or at store. ASA has fertilizer laboratories in the UK, Belgium, Ukraine, Russia, South Africa, China and India. Its offices in the UK, Belgium and the Ukraine are all members of the International Fertilizer Association.

Animal feed

The Alex Stewart Group provides a fully comprehensive package of inspection and analytical services. Its GAFTA/FOSFA-registered and approved laboratories strategically located around the world perform a full range of analysis for soya, oilseeds – sunflower and rape, and fish meal including infestation, foreign matter and admixture, hazardous contents, fuzarious grains, toxic contents (e.g. arsenic, mercury & lead) mycotoxins and pesticides.

Sample preparation.



Grain and wheat

Grain inspection and analysis is a core business of Alex Stewart Agriculture and is a superintendent and analyst member of the Grain And Feed Trade Association (GAFTA), working with many leading grain traders by providing monitoring, testing and consultancy services globally. In addition fumigation services can be offered as ASA works closely with fumigation companies to ensure that cargoes are loaded and stored in appropriate condition and quality is not affected during transportation. Grain inspection services also extend to provide collateral management services such as supervision of long-term storage of grain or control of transportation between storage facilities.

QUALITY INSPECTION SERVICES

Warehouse inventory control and collateral management: ASA can provide a diverse range of services, from stock audits and control procedures, to security advice and commodity/store condition surveys.

- ❖ **pre-shipment inspection and analysis:** the Alex Stewart inspection team will check that the customer's product is within specification and fit for the intended use.
- ❖ **quality control:** checking that cargo conforms to contractual specifications, checking cargo for signs of contamination, odour, colour change, moisture levels, friability, protesting/rejecting inferior cargo on sight, granule sizing, radioactivity testing and laboratory analysis.
- ❖ **vessel hatch inspection:** service includes checking hatch condition ensuring that they are free from loose rust and paint flake, free from previous cargo, checking that hatches are tight fitting, checking hatch open and closing operation is functional and timely, inspecting hatch rubber condition, hatch hose water testing, checking that holds are water-tight.
- ❖ **vessel hold cleanliness:** detailed inspection ensures that holds are clean, dry, free of loose rust and paint flake, free from previous cargo, free from infestation and odour and in every respect fit to receive the designated cargo.
- ❖ **continuous supervision:** ASA guarantees continuous supervision of customers' cargo loading and/or discharge (24 hours), representative sampling/sealing as per contract.
- ❖ **quality control inspection:** packaging reporting when applicable.



- ❖ **weight verification:** gross, tare & net weighing.
- ❖ **weighbridge control:** test weight checking, scale calibration and certification check, recording truck movements across scale ensuring that all cargo is weighed.
- ❖ **bagging supervision and tallying:** full tally and checking for bag strength and durability (laboratory testing is available) and verifying markings.
- ❖ **continuous information updates:** ASA's busy administration centre is in contact with all of its inspectors operating in the field and provides its customers with up-to-date, hour-by-hour detail of all loading and discharging operations.
- ❖ **documentation:** Alex Stewart Agriculture uses state-of-the-art technology to supply standardized reports and certificates; certification and reporting can be tailored to suit customer requirements. Photographic reports by conventional and digital camera can also be supplied for evidence purposes.
- ❖ **damaged cargo assessment:** establishing possible source, cause, and severity.
- ❖ **loss prevention:** supervision of reconstitution of acceptable cargo.
- ❖ **container services:** supervision of stuffing and unstuffing, container sealing, container condition surveying (on/off hire, damage assessment).
- ❖ **transportation services:** whether the commodity is manufactured, stored, shipped, railed, trucked or containerized, ASA can assist customers in their trading activities.

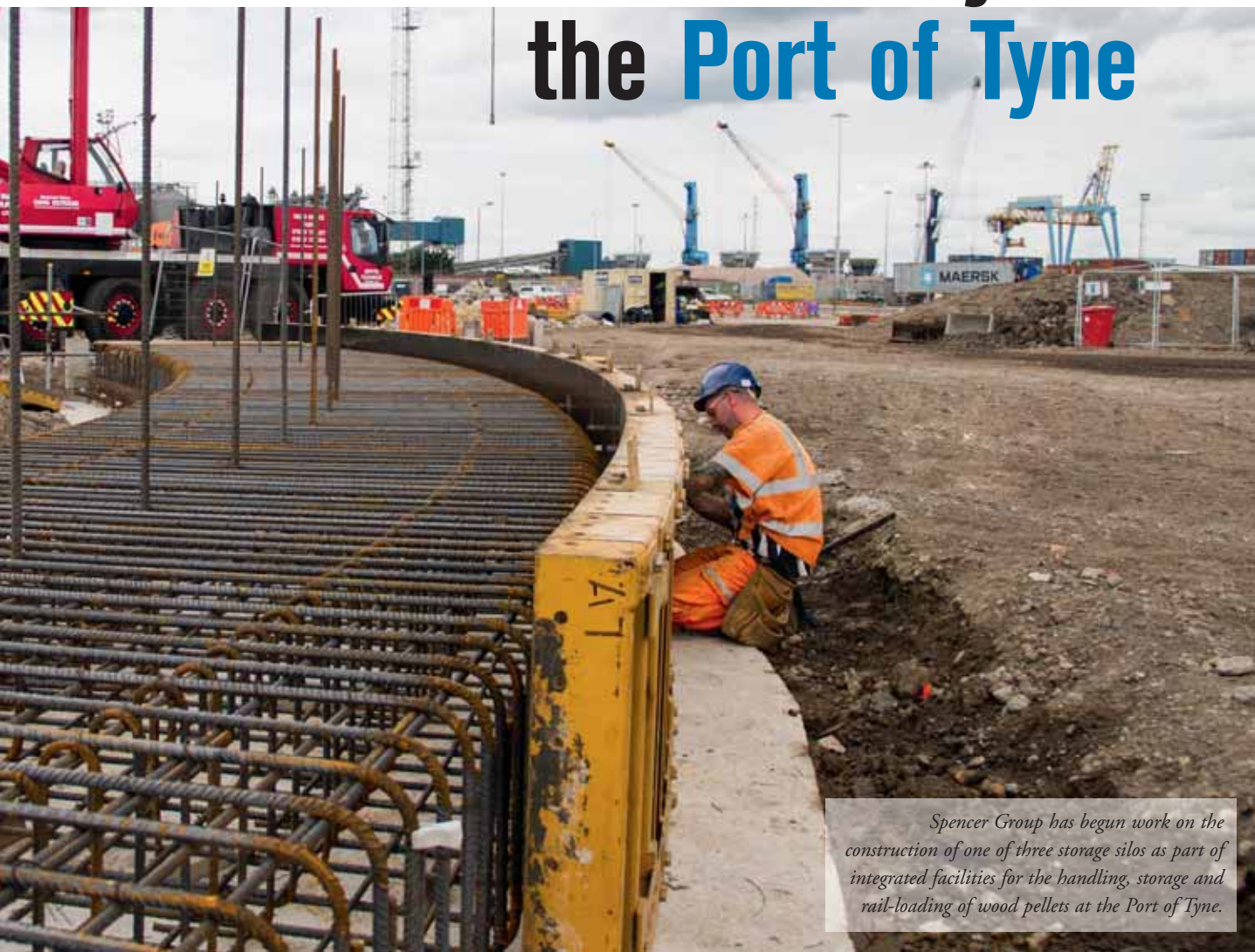
- ❖ **consultancy:** ASA offers consultancy services to assist customers on methods concerning material handling, weighing, transportation, sampling and analysis. Local knowledge and years of experience are primary assets of its business.

KEY AGRICULTURAL GAFTA/FOSFA SUPERINTENDENT OPERATIONS WITHIN ALEX STEWART AGRICULTURE

Argentina, Australia, Belgium, Brazil, Bulgaria, Chile, China, Egypt, Estonia, Germany, Italy, India, Indonesia, Kazakhstan, Latvia, Malaysia, Netherlands, Peru, Philippines, Romania, Russia, Spain, Thailand, Turkey, Ukraine, UK, Uruguay & USA.



Biomass facility for the Port of Tyne



Spencer Group has begun work on the construction of one of three storage silos as part of integrated facilities for the handling, storage and rail-loading of wood pellets at the Port of Tyne.

Spencer Group wins major contract to design and build wood pellet facilities

In early July, Spencer Group announced it had won a significant contract to design and build wood pellet facilities at the Port of Tyne in the UK.

Lynemouth Power Ltd, which operates Lynemouth Power Station on the Northumberland coast, has awarded a contract to the specialist engineering business for the design and construction of a facility for the handling, storage and rail-loading of wood pellets at the port.

Up to 200 construction jobs will be created as a result of the contract awarded to Spencer and work on the project has now begun.

The facilities being designed and built by Spencer are at Tyne Dock, South Shields, where the Port of Tyne recently invested £25m in extending Riverside Quay to support the project.

The new facilities will handle up to 1.8mt (million tonnes) annually of wood pellets, offering the capability to meet the full requirements of Lynemouth Power Station.

The fully integrated and automated Spencer system will enable wood pellets to be conveyed mechanically to one of

three newly-built silos, each capable of storing 25,000 tonnes of material. The pellets will then be discharged from the silos via two conveying streams to a rail-loading facility to take the material to Lynemouth.

Industry-leading particle controls will be in place throughout the system, as well as sophisticated measures to monitor and manage the condition of the wood pellets.

Spencer's in-house Slipform Engineering technology and equipment will be used for construction of the silos to deliver enhanced quality and safety performance during the build.

The Spencer project also includes construction of a control room, workshops, stores and welfare facilities, creating a standalone facility at the port. In addition, Spencer will carry out modifications to the existing rail infrastructure to provide dedicated rail lines to serve Lynemouth Power Station and connect the new facilities to the 11,000V mains supply.

Hull-based Spencer Group is one of the UK's leading privately-owned multi-disciplinary engineering businesses and has substantial renewable energy activities. The company has carved

out an industry-leading reputation for biomass facilities, including being the first UK contractor to have successfully constructed and commissioned renewable fuels handling facilities at both ports and power stations.

Flagship Spencer schemes have included designing and building a biomass reception, handling and storage facility at Drax Power Station in 2010 and, in the same year, a wood pellet storage and rail-loading facility at the Port of Tyne, which was then the first of its kind in the world, again to serve Drax.

In 2013 Spencer constructed biomass handling, storage and discharge facilities at the Port of Hull, once more to support Drax's biomass conversion. Those facilities set industry-leading standards and reinforced further Spencer's demonstrable track record in this field.

Spencer founder and Executive Chairman Charlie Spencer OBE said: "This is the largest single contract Spencer Group has secured in the materials handling and storage sector and is great news for everyone within the business.

"It validates our long-term strategic focus on major infrastructure projects in the renewable energy field and recognizes our industry-leading capability in the safe, reliable and efficient movement, storage and loading of biomass materials.

"We are proud to be contributing once again to a significant project supporting the UK's transition to a secure and sustainable low-carbon economy."

Engineering Director Ian Atkinson said the contract win recognized Spencer's experience and expertise in the design and construction of renewable fuels handling facilities and reflects the long-term, trusted relationships it has in the industry.

He added: "We are delighted to have worked with the Port of Tyne and Lynemouth Power to develop a design and build solution to meet the exacting requirements of both the port and the power station.

"Our in-house expertise and proven track record in developing and delivering materials handling, storage and loading systems gives the client, Lynemouth Power, the confidence that we will deliver this business-critical project in line with their programme, performance and cost expectations."

On January 7, 2016 it was announced that Energetický (EPH), a leading Central European energy group, had acquired Lynemouth Power Station from German energy giant RWE. On May 12 this year, EPH confirmed that plans to convert the power station to biomass were proceeding according to schedule.

SPENCER GROUP

Spencer Group is one of the UK's leading privately-owned multi-disciplinary engineering businesses. The company delivers



Piling works in readiness for the construction by Spencer Group of one of three silos for the storage of wood pellets at the Port of Tyne.

innovative engineering solutions in the energy, transport, infrastructure and industrial sectors, from initial design concepts through to construction, and specializes in logistically complex schemes.

Founded by Executive Chairman Charlie Spencer OBE in 1989, the entrepreneurial company has its headquarters in Hull, Yorkshire, with offices in London and Glasgow.

Spencer has an outstanding track record of applying engineering expertise to the renewable energy field. Flagship projects have included designing and building a biomass reception, handling and storage facility at Drax Power Station in 2010 and, in the same year, a biomass rail-loading facility at the Port of Tyne, then the first of its kind in the world. It has continued to support Drax in delivering critical infrastructure projects and in 2013 developed a further biomass rail-loading facility at the Port of Hull.

Spencer forms part of the delivery team building Energy Works, a £200m environment-friendly power plant in Hull. Spencer steered the Energy Works project from its conception in 2010, making a multi-million pounds investment to develop the scheme to its current delivery phase. Energy Works will be the largest facility of its type in the UK and will generate renewable electricity from domestic and commercial refuse-derived fuel, using an innovative energy recovery process called fluidized bed gasification.

Spencer Group is a principal infrastructure contractor for Network Rail, operating nationally on a variety of complex rail infrastructure projects both directly and for a number of train operating companies.

Spencer is also a renowned expert in high-level bridge works, having developed the trademarked Cable Crawler™ gantry system to enable vital dehumidification work to prevent corrosion of cables on the Severn, Forth Road and Humber suspension bridges, as well as the Alvsborg Bridge in Sweden. Last year the company completed the largest retro-fitted bridge dehumidification project ever undertaken globally — on the East Bridge in Denmark, the third largest suspension bridge in the world.

Phoenix broadens its products to include conveyor belt lighting

Phoenix Lighting has announced the debut of the Conveyo. The US-based company has applied its 'Durability by Design' philosophy to yet another critical lighting application — conveyor belts, a new addition to one of the strongest brands in the bulk handling industry.

After offering traditional lighting for over seven decades, Phoenix installed its first LED fixture in 2009.

That installation was the first of thousands around the world and elevated the company to become one of the industry leaders in LED lighting for bulk handling equipment. Phoenix is pleased to add the Conveyo to its product offering and further support the industry with this purpose built solution.

The Conveyo is very competitively priced and offers versatility with a variety of mounting options. At 50W, the Conveyo delivers 6,000 lumens to conveyor belts, narrow pathways as well as general wall or pole mount lighting. Phoenix has incorporated a marine grade, cast aluminium housing with powder coat finish, an impact-resistant lens and a vibration-resistant, fully potted driver into the design. The Conveyo was designed and engineered in the US and is backed by a three-year warranty. It is listed to UL 1598 and UL 1598A and is CE certified. The Conveyo features an amber option for high dust and Dark Sky friendly environments. The LED optic is designed to provide customers with better and safer illumination levels on the working surface, when compared to traditional lighting. At the same time, it reduces the number of fixture positions used on most new build or LED retrofit projects.



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The evolution of containerized bulk handling

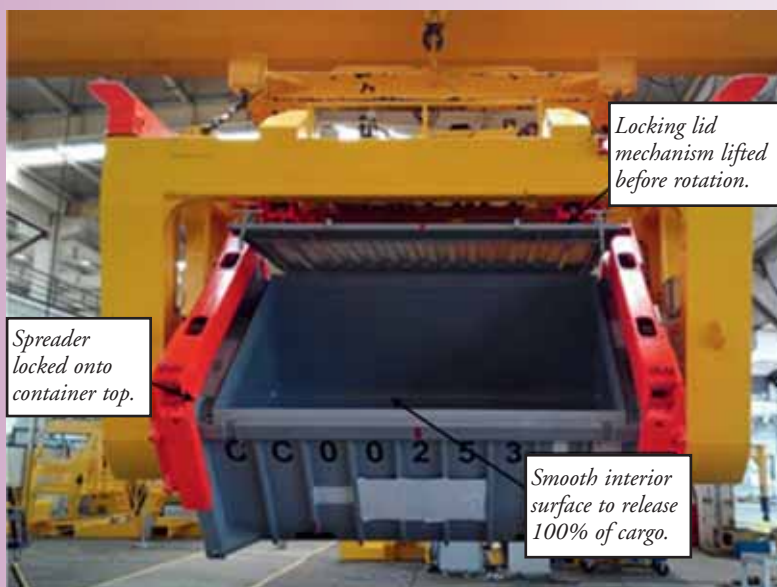
Since the turn of the century, the shipping industry has taken advantage of empty shipping containers that need to be relocated to Asia, and used this as a discounted means of back-hauling bulk cargo like grain or fertilizers that would normally be shipped in open bulk transport, writes Joel G. Shirriff, P.Eng., Global Practice Lead, Terminals & Transportation, Ausenco.

The filling of containers with bulk cargo typically requires either a shuttling conveyor and baffles at the back doors, or tipping the container at an angle. This process requires additional facilities and equipment, and is not without challenges and hazards. At the receiving end, the loaded containers are equally difficult to open and discharge, requiring one end to be lifted with the doors open. While this is successful in offering a lower cost logistics option, and making the movement of empty boxes to Asia more efficient, it is not a simple exercise and often transfers costs and complications to another area in the logistics chain.

In recent years, a new containerized bulk handling technology has been developed which removes many of the challenges associated with conventional containers while also offering significant opportunities for increased efficiency. This system utilizes specially manufactured open top containers which are built to ISO footprint dimensions and equipped with a removable rigid lid. This design allows the boxes to be easily filled with bulk cargo from the top using mobile equipment or an automated loading system. The real innovation for this system comes in the discharge of cargo from these containers as a speciality spreader is used to pick the box up, remove the lid and in one motion spin the container on its long axis 360° to dump the cargo to the side. These containers are built with no internal ledges or stiffeners and are painted with a high-release coating to ensure that 100% of the cargo (even if it is wet or sticky) is discharged during the rotation.

The primary application of this system is when containers are loaded at the production source (mine) and discharged directly into the open hold of a bulk carrier vessel at port using the rotary spreader. The use of this equipment in this fashion provides a very simple and low capital option for moving bulk cargo to export without the need to develop a conventional bulk terminal logistics option. Benefits include using the containers as temporary storage at the port, and maintaining cargo quality as it remains sealed in the containers until being loaded into the ship.

However, despite the benefits of the system, its use to date has been somewhat limited to a handful of basic direct-to-ship installations in Australia (where the concept was originated), South America and Africa, moving mining products and grain. The challenge faced by the container and spreader equipment vendors marketing this system is the reluctance of customers to



try something new, or the uncertainty they feel not knowing how to implement this concept for their particular application.

Addressing this client apprehension is where Ausenco has been working recently with the vendors as the overall “logistics system integrator” where we incorporate the containerized system into the bulk commodity logistics, making use of existing infrastructure and simplifying the process.

This holistic approach to the transportation of product from source to destination offers our clients significant value through innovative customized logistics solutions.

An excellent example of this is the logistics system for the Las Bambas copper mine in Peru, where we provided an integrated solution that incorporated the benefits of modern containerized bulk handling into a conventional bulk terminal logistics system. The original mine development plan anticipated that 1.5 million tonnes of copper concentrate would be moved by open truck over 700 km from the mine site at 4,300 m above sea level, to the port, where a new third party bulk terminal was being constructed to service multiple mines in the area. Ausenco was contracted to optimize the logistics system and after assessing a number of options recommended that a containerized system be implemented where custom containers are loaded at the mine and trucked 420km to a trans-load facility. At this facility, containers are moved onto trains for the continued trip to the port where they are discharged to the conventional bulk system for storage and loading onto ships. This concept was further refined using dynamic simulation modelling to validate the number of trucks, containers and rail cars required.

The final system, commissioned in early 2016, reduced both capital and operating costs by integrating this technology while making use of the existing infrastructure. This system included supplemental options of using the spreader equipment on a forklift to dump containers in an alternate storage building as well as being able to divert the cargo to the existing container dock for discharge by shore crane directly into the ship's hold while the bulk system was not yet in service.

Modern containerized bulk handling has evolved significantly from the idea of filling empty containers on the back haul to Asia. The speciality equipment available today, offers a safe, efficient and environmentally friendly alternative to conventional bulk handling systems. The challenge to its application reaches beyond simply buying the equipment, but lies in developing an integrated logistics solution that is optimized for geography, existing infrastructure and specific commodity. Ausenco specializes in providing unbiased advice and delivery of integrated logistics solutions, which includes the implementation of containerized systems.

Cat® GSH425/525 grapples feature new tine design

NEW DESIGN ENABLES EASIER LOADING AND DURABILITY ENHANCEMENTS FOR LONG-TERM SERVICE

The new Cat® GSH425 and GSH525 orange peel grapples are designed with horizontal cylinders, creating a profile that allows for greater material penetration and more efficient bulk-material handling. The design enhances the strength, reliability, and durability of the



new grapples, which are available in both four-tine and five-tine shell configurations, in either closed or semi-closed versions, and that feature an improved rotation function.

The GSH425 and GSH525, which replace GSH20B-Series grapples, are designed for a wide range of applications: handling shredded scrap, long structural beams, and car bodies; handling rocks at construction sites; and handling waste at recycling and transfer stations. The performance and efficiency of the new Cat grapples help waste-handling operations, in particular, meet the challenges of increased environmental regulation, growing pressures to recycle materials, and more stringent budgets.

LONG-TERM DURABILITY

The design of the GSH-Series grapples features high grade, impact resistant steel construction that protects vulnerable areas, such as hydraulic cylinders. For added durability, high quality bushings with lubrication grooves and hardened pins are used in all pivot points. Tines are configured with replaceable cast tips made from BHN 445-555 material that resists wear.

In addition, solid hinge-point construction and more robust end-stops ensure long service life, and routing hydraulic hoses within the tines reduces hose wear. All mounting brackets feature a solid pin to keep the bracket in an upright position for

ease of installation. Also, the new GSH grapples feature a standard lifting eye on the bottom of the housing for expanded versatility, such as mounting a magnet.

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Proven technology from MacGregor sought for new era bulkers

Optimized cargo handling and cargo hold arrangements from MacGregor have been developed with the owner to maximize cargo handling efficiency and flexibility



Two new LNG-powered bulk carriers for ESL Shipping will set industry-leading standards in environmental protection and efficiency; they are the first of their kind and will feature comprehensive equipment packages from MacGregor.

Bulk carriers are not known for showcasing major efficiency advances; however, the relatively unglamorous ship type looks set to enter a new era with the introduction of dual-fuelled eco-bulkers.

The first liquefied natural gas-powered bulk carriers to enter the market will be two new 25,600dwt Handysize vessels for Finnish owner ESL Shipping. They will be equipped with both dual-fuel main and auxiliary engines and will have 400m³ capacity type-C LNG tanks. Each vessel will feature extensive equipment packages from MacGregor.

The 160m bulkers are currently being built by Sinotrans & CSC Shipbuilding Industry Cooperation's Qingshan shipyard in China to a Deltamarin B.Delta26LNG design. They have been developed in close cooperation between Deltamarin and ESL Shipping and will be classified according to new DNV GL rules, introduced in January 2016, for general dry cargo ships with DNV GL ice class IA.

Deltamarin notes that the vessels' emissions will be below all current environmental requirements and CO₂ emissions per cargo tonne transported will be reduced by over 50% in comparison to the present generation of vessels.

The first ship is scheduled for delivery at the end of 2017 and the second in early 2018. Once in service, they will primarily be used to carry raw materials for steel and energy industries in the Gulf of Bothnia and Baltic Sea.

"The owner has closely participated in the design process in order to fully tailor-fit the ship to meet its trading requirements for the Baltic area," says Konstantinos Fakiolas, Deltamarin Sales Director. "For example, the optimized cargo handling and cargo hold arrangements have been developed together to ensure as efficient and flexible cargo loading as possible."

MacGregor secured its contracts early in 2016. For each vessel it will deliver three MacGregor K3030-4 mechanical grab cargo cranes with a safe working load of 30 tonnes at 30m outreach, a design and key components package for multi-folding-type hatch covers, arranged as 6+6 panels for three holds, electrically-driven Hatlapa deck machinery and Porsgrunn steering gear.

SETTING NEW STANDARDS

"The ships have been designed to set new standards in efficiency and environmental performance," says Anders Berencsy, Sales Manager at MacGregor. "They will be exciting additions to the bulk carrier market and we are happy that our customer chose MacGregor to supply the extensive equipment packages for them." ESL Shipping has operated in the bulk shipping market for around 60 years. It cites flexibility as one of its key strengths and included in that flexibility is the fact that all its vessels are fitted with cranes, providing cargo-handling capability at sea and in port.

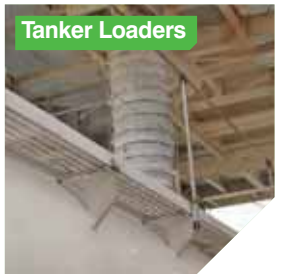
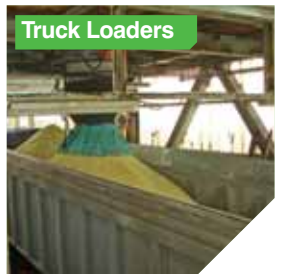
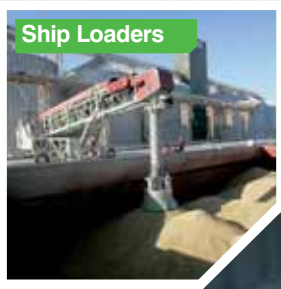
YEARS OF PROVEN PERFORMANCE

"ESL knows our equipment and has operated MacGregor cranes and hatch covers for a number of years on several bulkers in its fleet," Berencsy continues. "The fact that it has returned to MacGregor demonstrates the company's trust in our products and in MacGregor's ability to deliver the multi-discipline expertise required for complete equipment packages, which now of course include Hatlapa deck machinery and Porsgrunn steering gear."

"We wanted to have a highly efficient and reliable cargo handling system on our newbuildings, with service and spares close to our operations," says Mikki Koskinen, Managing Director at ESL Shipping. "The extended commissioning service that MacGregor is able to provide, was also an important factor in securing the contracts."

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Mamonal Seaport: Ceremonial opening and commissioning of FAM technology

FAM Förderanlagen Magdeburg has successfully commissioned a handling system for the terminal of the Port of Mamonal in Colombia. The use of modern conveyor technology helps transport and load resources efficiently, safely and in environmentally friendly ways.

On 27 February 2016, Colombia's president, Juan Manuel Santos, opened the Mamonal seaport terminal in Cartagena. In his speech, the president referred to the project tied to investments of a total of \$160 million as an infrastructural revolution that will expand the export opportunities of his country and immensely improve its competitiveness. The new port has created some 500 new jobs and another 470 directly or indirectly connected with port operations. This new investment into the port's modernization will help make transportation and loading processes more efficient, safer and environmentally friendly.

FAM's handling system for coal and metcoke forms the heart of the transport complex of FAM's client, Puerto de Mamonal S.A. (PMSA). The installed system comprises the following equipment for handling bulk material:

- ❖ one 750tph (tonnes per hour) stacker, type ST 750.40;
- ❖ two 2,750tph portal scrapers, type KP 2750.50;
- ❖ five 2,750tph belt conveyors; and
- ❖ one 2,750tph radial-type quadrant shiploader, type SLRQ 2750.76/28 OX.

Trucks transport the bulk material to the port where they are unloaded using tilting platforms. Coal /metcoke is stacked using the

FAM stacker at a stacking rate of 750tph/600tph. The cascade chute installed at the tip of the boom not only helps to decrease dust but also to optimize the flow velocity of the material and to

FAM radial-type quadrant shiploader type SLRQ 2750.76/28 OX.



facilitate a softer landing to ensure that the grain size of the bulk material remains largely undamaged.

The FAM portal scraper reclaims the material at a maximum reclaiming rate of 2,750tph for coal and 1,350tph for metcoke. Ships are loaded using the radially movable shiploader, which has a maximum loading capacity of 2,750tph. The shiploader is suitable for loading ships of up to 70,000dwt without moving them.

The order also included basic engineering, detailed engineering, manufacturing, preparation and packing of the material and machine components for sea transport, sea transport, assembly management and supervision, commissioning and testing of the system.

THE FAM GROUP

FAM successfully designs and manufactures turnkey installations and systems for mining, conveying, loading and stockpiling of minerals, raw materials and goods. FAM offers the complete range of engineering and manufacturing services including after-sales services. For more than 100 years FAM has combined serial and customized solutions and has proven to provide the highest level of technical expertise, engineering and project management competence as a global solution provider.



FAM portal scraper, type KP 2750.50.



Colombia's president, Juan Manuel Santos (photo: Juan Pablo Bello – SIG).

Dimisa chooses Bedeschi for Blue Dolphin Power Plant expansion

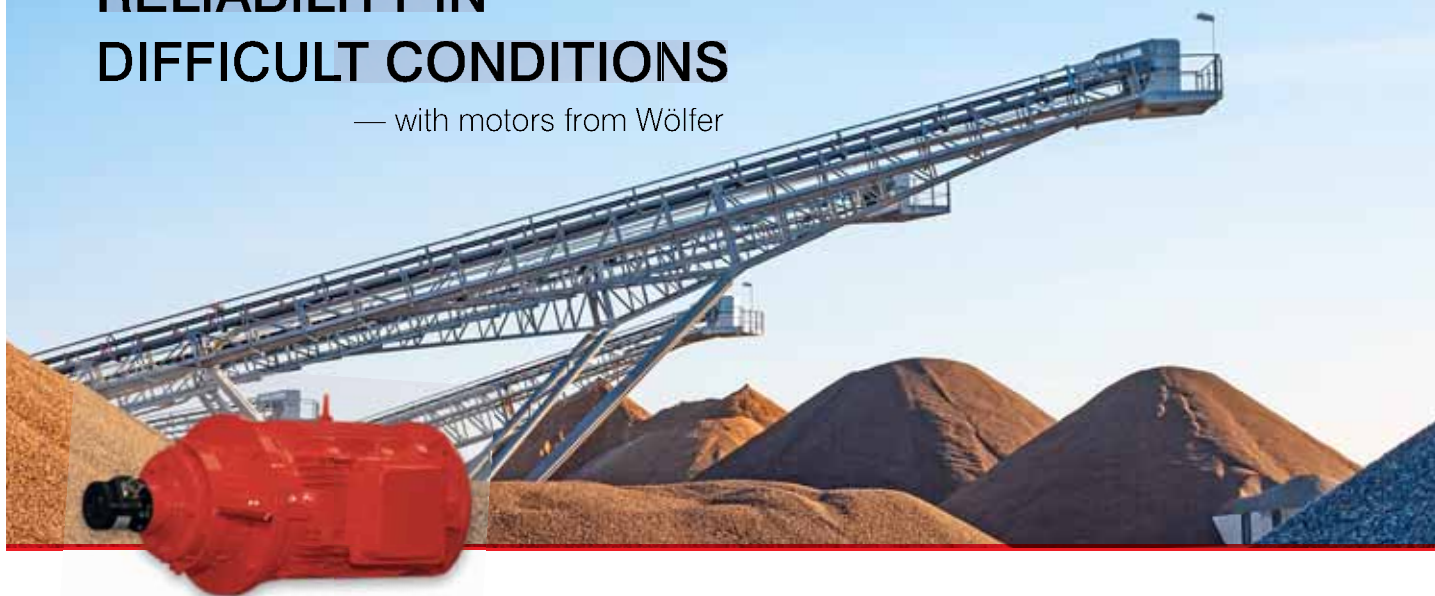
Bedeschi has been contracted by Dimisa Mexico for the Blue Dolphin Power Plant expansion project located in Mejillones, Chile. The final customer is ECL, one of the Chilean power utility market leaders.

The project consists of developing a coal stacking and reclaiming system with a total stored volume of 160,000 tonnes. The supply includes a luffing slewing and travelling stacker with a 55-tonne boom and with a stacking capacity up to 3,000tph (tonnes per hour). The reclaimer is considerable: a double boom blade portal reclaimer with a capacity of 1,500tph and a 67-metre rail gauge. All the system will be in accordance with the Chilean seismic rules and Class II Div I hazardous area rules.



RELIABILITY IN DIFFICULT CONDITIONS

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Electrical motors for use in dry cargo equipment need to be powerful and fulfil high efficiency values to reduce energy consumption at the same time. Germany's Franz Wölfer Elektromaschinenfabrik Osnabrück GmbH designs and produces special inverter-driven low-voltage squirrel-cage motors for cargo equipment such as conveyors and cranes, which meet both requirements.

A special rotor geometry leads to a higher pull-out torque of the motor. A Wölfer motor has a pull-out torque of up to 400%, compared with a pull-out torque of approximately 250% with some other motors. This means that Wölfer motors can handle higher overload requirements and the motor can provide high torque also in the high range of speed. In this way, the motor can also be controlled easily, even if it is operated at speeds of 1,600 or 1,800rpm.

Wölfer's goal is not only to optimize the efficiency of the motor itself, but to minimize the energy consumption and maximize the power of the whole equipment with the special motors. The special rotor-design additionally results in a lower inertia. Based on this, the total inertia of the power-train is reduced. This lower total inertia leads to lower energy consumption. On the other hand, it is possible to accelerate the power-train, using the same energy levels as another motor. Based on the faster acceleration and deceleration process, a higher number of goods can be handled. Therefore the user can increase turnover by handling a higher number of goods, or can reduce energy costs and thus protect by this the environment.

The lower inertia leads to further advantages; for example, other components can be downsized. Depending on the design of the equipment, smaller gearboxes, brakes, inverters or cable diameters can be used. Thereby the weight of the application is lower, reducing investment costs. Finally not only is the efficiency of the motor at a high level, the efficiency of the whole equipment is also increased by using Wölfer motors.

Beside these technical characteristics the reliability of a motor is a critical factor. In motors which are driven by frequency-inverters, the windings need to resist partial discharges, so-called voltage peaks. By using material, which is designed for inverter operation, and handmade windings, Wölfer achieves a very long lifetime of the windings. Also AC (alternating current) motors reduce the amount of maintenance required when compared with DC (direct current). While DC motors need periodic inspections and reconditioning, especially for brushes, AC motors get by with inspection of motor connections and lubrication. The AC motors run very smoothly, so that significant reductions in mechanical wear and mechanical repairs e.g. in cranes have been noticed. The higher reliability of the electric motors results in fewer outages due to motor failure.

"We apply our know-how to produce robust reliable motors for individually adapted drive mechanism solutions," says Klaus Spreklemeyer, Head of Sales at Wölfer. "Our motors are built for use in extreme demanding environments, like dust, heat or marine conditions." For 70 years now Franz Wölfer Elektromaschinenfabrik has been developing and manufacturing electric motors for use in hoisting equipment, in and on ships as well as in general mechanical

engineering.

Wölfer provides steel-welded housings in addition to grey cast iron housing for surface-cooled motors, which is e.g. relevant to make a technology change as easy and efficient as possible. By the steel-welded design, Wölfer provides 1:1 drop-in motors for retrofits. "Normally the new AC motor can be offered in a smaller frame size compared with the existing DC motor. Therefore the machinery house needs to be adjusted to the new dimensions. Wölfer offers a new AC motor with minimized inertia, but with the same mounting dimensions as the DC motor. So the motor itself can be changed within one day, without modifying the basement of the machinery house and without shaft adjustments. This leads to a shorter downtime and lower cost," says Spreklemeyer. This steel-welded housing design is available for surface cooled applications like conveyor- and excavator motors.

Klaus Spreklemeyer is the head of sales of Franz Wölfer Elektromaschinenfabrik Osnabrück GmbH. He has worked for the company for more than 16 years with over ten of these years in the sales department. In 1999, Spreklemeyer started an apprenticeship for three years as a blue collar employee and white collar employee in parallel. After achieving several technical and commercial skill enhancements, Spreklemeyer took over the responsibility for the sales department in 2007. Since the beginning of 2014, Spreklemeyer has been a member of the board.

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Harbour solutions from FLSmidth

reliable and environmentally friendly



FLSmidth delivers shiploading and ship-unloading solutions worldwide, for the cement, minerals and power industries. Currently in fabrication, are a shiploader and five coal grab unloaders.

The shiploader is a 6,000tph (tonnes per hour) machine, for bauxite and will be delivered fully assembled to a client in western Africa, demonstrating FLSmidth's capability to deliver turnkey equipment with minimum plant downtime for the customer. This loader will be equipped with two electrical systems of variable-frequency-drives, providing a full redundancy. With this system, shiploading can carry on even in the unlikely event of a failure on an electrical component.

The grab unloaders are five identical units, each capable of handling 350tph of coal, travelling on rails. Each unit has its own receiving hopper, equipped with state-of-the-art dust reduction system and feature a proven four-rope grab system mounted directly on the trolley. These units are part of a complete material handling installation FLSmidth will deliver to a new power plant for its customer in Vietnam.

In May 2016, FLSmidth signed an EPS (engineering, procurement and supervision) contract with the Russian marine export terminal owner OTEKO-Portservice LLC for the engineering, supply and supervision of material handling equipment. The equipment is to be installed at the port of

Transport of the shiploader to its final location.



Taman on the Russian Black Sea Coast, approximately 1,500km south of the capital Moscow.

The order is part of the construction of a new cargo terminal to handle the increasing export of coal, iron ore, sulphur and fertilizers from production sites in Russia. Included in the scope of supply are: railcar unloading, screening and crushing, stockyard machines, shiploaders and associated conveyor systems including auxiliaries such as dust suppression or sampling.

“FLSmidth and Oteko have worked jointly on this project for a long time and have now found a technically and commercially viable solution that allows this project to go ahead despite the

headwind from the commodity market.

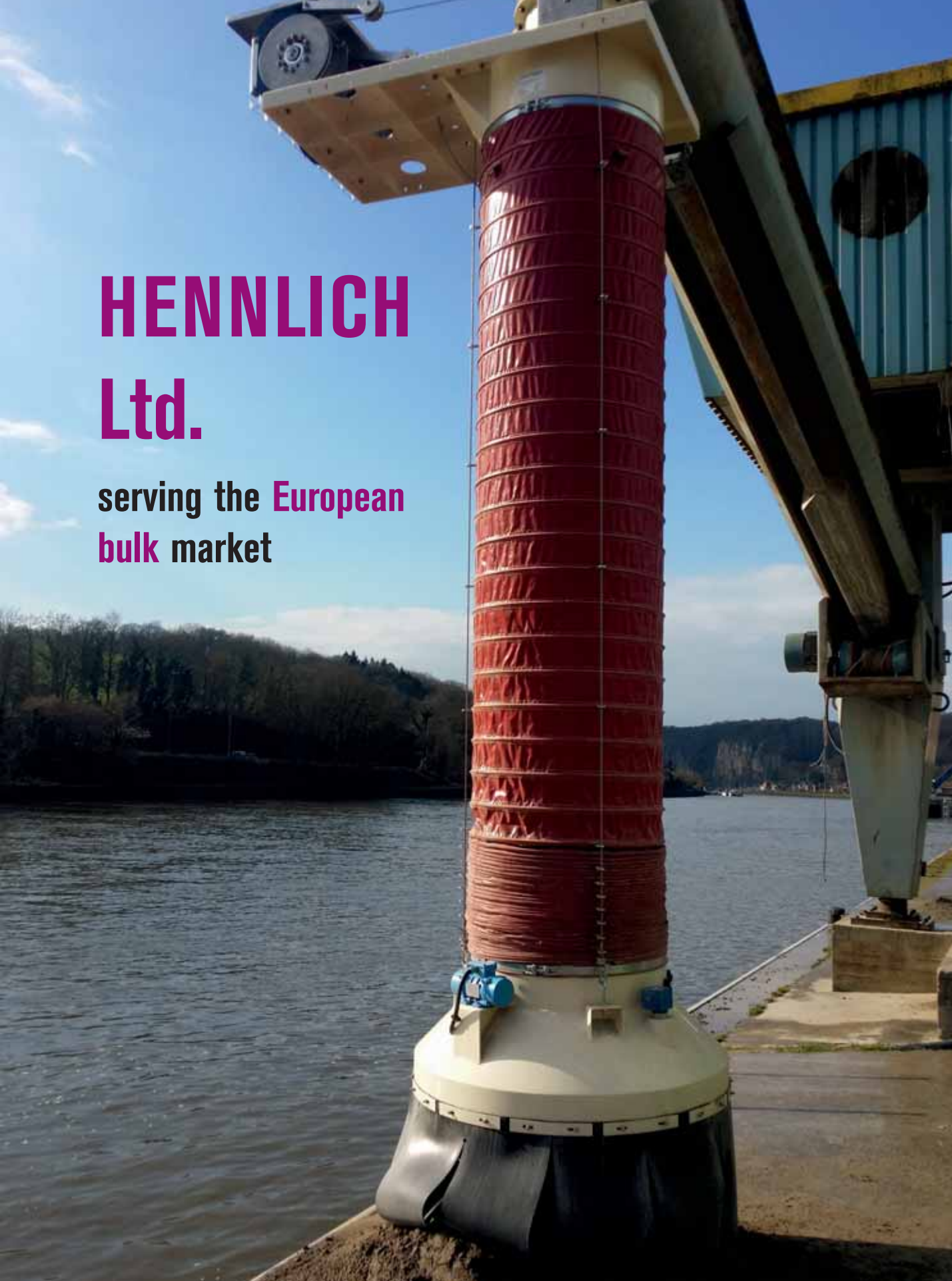
It is a good example of how customers can benefit from engaging with FLSmidth early in the development of a project. This order includes supplies and services from various FLSmidth business units and is particularly valuable in times with low capital investments in the mining and minerals industry,” Group Executive Vice President of the Minerals Division Manfred Schaffer comments.

FLSmidth has also recently commissioned two shiploaders for phosphate and two continuous screw unloaders for sulphur in Morocco and a 500tph screw unloader for limestone in Korea. **DCi**



HENNLICH Ltd.

serving the **European
bulk market**



HENNLICH Ltd. was established in 1991 in city of Litomerice, 60km from Prague, in the Czech Republic. Since then, it has followed the traditions established by its original company, which was founded in 1922. The company has become a major supplier to Czech industry.

Today, HENNLICH Ltd. has over 200 employees in the Czech Republic, and belongs to the HENNLICH GROUP, which can be found in 20 European countries.

HENNLICH Ltd. manufactures a wide range of equipment for the bulk handling market, including: telescopic loading spouts for



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Stockpile coal loading spout, power plant Ledvice, Czech Republic



Stockpile loading spout, coal up to 450 mm, Kazakhstan



HENNLICH, a company with a tradition dating back to 1922, is the leading manufacturer of dust suppression technologies today. Apart from the telescopic chutes, we also supply dust collectors and fog cannons that are reliably in operation all over the world.

HENNLICH ENGINEERING DIVISION

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ships, stockpiles, trucks, railcars and tankers; dust collectors for silos, transfer points; and central dedusting fog cannons for dust suppression for coal handling (stockpiles, shipyards etc.)

The company's equipment can handle all types of bulk solids, though it works mainly with coal, cement, clinker, coke, limestone, ore and grain.

HENNLICH Ltd. has some very major companies among its clients, including: BP Oil, ExxonMobile, Lhoist, Lafarge, Carmeuse, TotalOil, CEMEX and HeidelbergCement. To date, its principal markets have been in Spain, Germany, France, the United Kingdom, Russia, Poland, Austria, and Kazakhstan.

In order to remain competitive in the market, HENNLICH Ltd. strives to ensure that it offers extremely high quality equipment. It also provides excellent support for customers and partners. The company is continuously working to optimize and improve its products, and to offer unique solutions and tailor-made deliveries.

RECENT CONTRACTS AWARDED/COMPLETED

Israel Electric Corporation: in 2014, the Israel Electric Corporation (IEC) bought three HENNLICH loading spouts to replace the existing cascade chutes.

Loading spouts are for coal loaded at 3,500tph (tonnes per hour) from an 18.5m conveyor bridge to the stockpile. The spouts have been designed for ATEX 21/20 outside/inside.

Commissioning and installation were carried out by HENNLICH ENGINEERING after the delivery.

Duro Felguera: HENNLICH ENGINEERING is about to deliver a shiploading spout for the Spanish company Duro Felguera.

This 15m-long shiploader will load the copper concentrate at 1,500tph. The chute has auto raise-lower capability and is fitted to a pivoting head chute capable of working in tandem with the luffing boom.

The bottom part of the chute is equipped with a distribution spoon that will rotate and tilt.

The inner tubes and spoon are lined by PE UHMW to minimize the product stickiness.

Grupo Navac: in 2015 and 2016 HENNLICH ENGINEERING delivered two stockpile chutes to Port of Huelva. These 20m-long spouts load copper concentrate at 3,000tph; the inlet diameter of the unit is DN800.

The inner tubes and bottom part are lined by PE UHMW to minimize the product stickiness.



Ekibastuzskaya GRES-I: this power plant, owned by Kazachmys/Samruk, purchased a 22m-long stockpile spout in 2013.

The chute was designed for loading the coal at 1,100tph with a maximum particle size of 450mm.

HENNLICH ENGINEERING has made carried out hot commissioning on site. A repeated order is awaited in 2017. **DCi**





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Conveyor system expertise from REMA TIP TOP



The RFID Belt Rip Detection System is used to monitor the belt in real time.

REMA TIP TOP AG has gained international renown across the years due to its high-quality products and professional services. It operates in the automotive, material processing, surface protection, service and solutions sectors.

In terms of material processing, REMA TIP TOP specializes in the consistent optimization of production plant operational readiness. In over 50 years of research and development work, the company has striven continuously to production and application possibilities in co-operation with its customers.

The use of specific REMA TIP TOP products lengthens the service life of conveying and processing plant and reduces downtime. Special products optimize operational readiness, increase production capacities and thus maximize profit for the plant operator.

Among REMA TIP TOP's specialities are:

- ❖ **wear protection:** REMA TIP TOP's wear protection materials and the company's know-how ensure that its clients' systems continue to function well.
- ❖ **conveying solutions:** REMA TIP TOP products and technologies decisively increase the life expectancy and economic efficiency of conveyor belt systems.

- ❖ **mineral processing:** experienced specialists ensure specific individual planning and the smooth fitting of the optimum equipment for every application.
- ❖ **Dunlop conveyor belts:** the acquisition of DUNLOP Belting Products South Africa makes REMA TIP TOP one of the leading suppliers of conveyor belts.

This article will focus on some of REMA TIP TOP's conveying products, and the impact they are having on today's bulk handling market.

NEW MOMENTUM FOR THE COLD SPLICING OF TEXTILE CONVEYOR BELTS

The electrically driven, dual action REMAPRESS EDR roller from REMA TIP TOP provides top quality and offers a previously impossible degree of ergonomcy.

With its electrically driven, dual action roller, the REMAPRESS EDR, REMA TIP TOP facilitates absolutely even rolling with optimum pressure and a significant reduction in physical effort. The innovative drive concept greatly simplifies the cold splicing of conveyor belts.



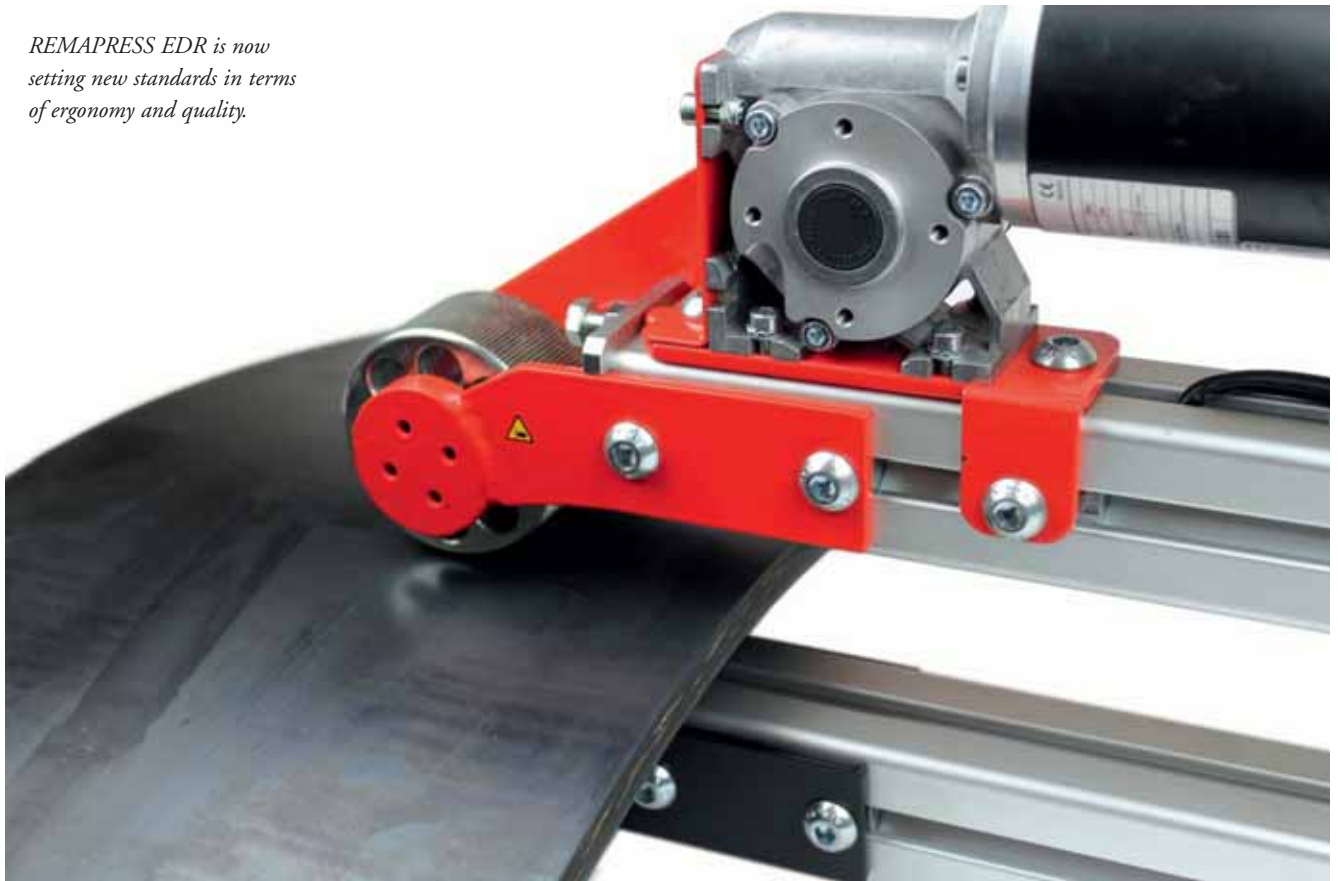
When it comes to conveyor belt systems, the range of products offered by REMA TIP TOP represents extremely high quality in production, service, maintenance and repair. The traditional company, with over 90 years of industry experience, is once again demonstrating its innovative ability. The REMAPRESS EDR is the latest development of the tried and tested dual action roller, which has been in use for decades. In practice, this roller already offers a long service life and user friendliness, and greatly simplifies work on conveyor splicing points. REMAPRESS EDR is now setting new standards in terms of ergonomics and quality.

Consistent quality, every time

This new roller, with its IP 54 electric drive and angular gear motor, also benefits the user, by significantly reducing the amount of physical effort required for its operation. Defined results, reproducible every time, are also guaranteed — and fluctuations in quality due to human error are practically excluded thanks to

the motorization. An even speed during forward and reverse operation and constant contact pressure across the entire splicing surface produce homogeneous bonding at every splicing

REMAPRESS EDR is now setting new standards in terms of ergonomics and quality.





BTM system (sensor array).

point. For this purpose, a contact pressure can be specified using a torque wrench, just like the classic manually driven roller, the REMAPRESS MDR.

The roller is equipped with a rocker switch for simple handling during forward and reverse operation. The hand grips slide along the aluminium profile and help guarantee continuous ergonomic working, even during longer operating periods. Smooth-running pressure rollers with a needle bearing and a drive roller with profiling guarantee even running and prevent slip. All rollers are treated with a galvanic zinc coating and the power supply unit is housed in a protective plastic box. All rollers are supplied with an operator manual in the language of the country of operation and are delivered in a shockproof carrying case.

CONTINUOUS SYSTEM MONITORING WITH THE REMA M³ SYSTEM

The belt itself is one of the most expensive components in a conveyor belt system. The REMA M³ from REMA TIP TOP helps with system monitoring and can prevent costly malfunctions.

Short downtimes, long service life, low operating costs — these are all advantages that every operator looks for in their conveyor system. However, the reality is often very different. Handling complex, conveyed goods can lead to significant material wear. Ever larger and longer conveyor routes make it harder to ensure continuity of operation. To help system operators increase the service life of their equipment, REMA TIP TOP offers its REMA M³ system.

The electronic monitoring of individual conveyor belts and the entire belt system involves three systems. The BTM Belt Thickness Monitoring System is used to measure layer thickness for the continuous wear measurement of the drive and running sides of the belt during operation. The measuring procedure is based on robust ultrasonic technology. Continuous monitoring allows the system to predict the expected remaining service life of the belt. Thus, the system can also provide information on any service and maintenance work that may be necessary. This makes it possible to procure a replacement before any damage occurs.

Belt monitoring in real time

The RFID Belt Rip Detection System (see picture on p67) is used to monitor the belt in real time. Thanks to innovative RFID antenna technology, the entire width of the belt can be monitored at once. If a longitudinal slit appears in the belt, the system brings the belt to an immediate standstill. For this purpose, the RFID Belt Rip Detection system can also be integrated within the belt guidance system. This prevents costly repair work. The belt rip detection system can be used with ST, EP and solid woven belts, for both new and existing belts.

The Steel Cord Scanning system monitors steel wires and belt connections. The system locates defective wires in the belt and provides a clear graphic display of any problematic points.

Service software connection

The REMA M³ system is completed by the connection to the Computerized Maintenance Management Software. This service software was developed in order to optimize the service processes offered by REMA TIP TOP all around the world. Unlike conventional solutions for system inspections and maintenance, REMA CMMS does not require complex and time-consuming configuration. Thanks to careful programming, combined with decades of know-how and the experienced staff at REMA TIP TOP, the REMA CMMS can be deployed immediately. The software makes it possible to initiate preventive maintenance measures at an earlier stage, thereby preventing undesirable system downtimes and significantly lowering costs.

The benefits of the software are evident in particular in its worldwide 24/7 availability. Irrespective of the location, all systems, components and parameters are continuously accessible to the customer service team. Changes are updated in the system on an ongoing basis, so that all service staff always have access to the same information. As a result, information gaps are minimized and the usual high service quality customers are used to is guaranteed.

BETTER SERVICE AND EFFICIENCY FOR CONVEYOR SYSTEMS

Better service, better products, better integration — REMA TIP TOP can show system operators what it means to find

everything they need from a single source.

The new monitoring systems from REMA TIP TOP were exhibited at the bauma exhibition earlier this year, at its REMA M³ MONITOR // MAINTAIN // MANAGE area. Electronic monitoring of conveyor belts and belt systems involves three monitoring components. The BTM Belt Thickness Monitoring System uses ultrasonic technology to measure wear on the drive and running sides of the belt during operation, in order to predict the remaining service life of the conveyor belt. The RFID Belt Rip Detection System component uses RFID technology to monitor the belt in real time and shuts down the system automatically in the event of longitudinal slits in the belt, thereby preventing significantly higher downtimes and the complete destruction of the conveyor belt.

The system can be used with ST, EP and solid woven belts. It can be installed directly in belts from the new Dunlop Belting Products range, and it is also technically possible to retrofit the system on existing belts. The third monitoring component, the Steel Cord Scanning System, monitors steel wire and steel cable belt connections. This system allows defective wires in the belt and damage to the cover plate to be located and displayed graphically.

REMA CMMS – the configurable service software

With REMA CMMS in the MANAGE area, REMA M³ completes the service concept from REMA TIP TOP. The computerized maintenance management software helps system operators to optimize service processes and to perform maintenance operations. At bauma, REMA TIP TOP presented its latest version of its Cloud Solution. This software, which can be configured for all industry sectors, gives customers a continuous overview of

system status, mobile data acquisition via the service provider REMA TIP TOP, and automated reporting. It is a key part of the service concept, which sets REMA TIP TOP apart from the competition with its many years of industry expertise.

Conveyor belts with all-round service

REMA TIP TOP also offers an extended portfolio of conveyor belts. The wide range for overground and underground mining applications, with all cover plate properties (high wear resistance, heat-resistant, resistant to oil and grease, low inflammability, flame retardant) and cover plate qualities (AA, Y, X, W, T, G, G+, I G, K/S, V, PVG, PVC1, PVC2) are available from in-house production. The product range is completed by special belts manufactured in-house, such as aramide fibre, elevator, PIPE, SLIDE, FLEX, solid woven, steep conveyor belts and corrugated sidewall conveyor belts.

Highly specialized belt constructions are offered with the new Dunlop Belting Products. This means REMA TIP TOP can cater to the requirements of various sectors even more specifically. As a global service provider, the long-established company is a valuable partner, standing by the side of its customers, helping them to run, maintain and repair their belt conveyor systems with greater efficiency.

Repairs with added efficiency

With REMAPRESS EDR, an electrically driven dual action roller, REMA TIP TOP presents an innovative new development for the cold splicing of conveyor belts. The electric drive facilitates absolutely even rolling with optimum pressure and a significant reduction in physical effort. This greatly simplifies the cold splicing and repair of conveyor belts.

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Steel cord scanning system.



SIEMENS

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Continuous operation: FLENDER drive components and Integrated Drive Systems (IDS)

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The world's widest range of mechanical power transmission equipment sets standards for operational reliability, performance, and flexibility. FLENDER drive components are an integral part of Siemens Integrated Drive Systems.

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Cat[®] MH3295

material handler unveiled



High-strength structures, enhanced serviceability, US EPA Tier 4 Final/EU Stage IV engine and world class safety features

Designed specifically for bulk material handling and scrap recycling applications, the new Cat[®] MH3295 Material Handler is designed for high production, with an operating weight in its heaviest configuration of 219,056 pounds (99,362kg) and developing 533 net-flywheel horsepower (397kW). The impressively built mainframes and track-roller frames combine with a choice of two heavy-duty front linkages (barge and scrap) to ensure reliable performance and long-term durability. The MH3295's powerful hydraulic system is designed for precise, responsive control, and the hydraulic cab-to-ground riser provides optimum safety for the operator.

STRUCTURES

The foundation of the MH3295, the carbody — the structure joining the upper to the track roller frames — is both wider and fabricated with thicker plates, compared with similarly sized conventional excavators, resulting in increased load capacity. In a similar manner, the upper frame uses thicker sections and higher-strength material, with the boom tower featuring double-plate construction to handle increased side loading.

High tensile strength steel is used throughout the MH3295's undercarriage, which features sealed/grease-lubricated chains that incorporate the Cat Positive Pin Retention system to ensure consistent fit between track pins and links. Specially

designed track idlers and raised final drives enhance lifting performance and overall stability. Lift capacity is equal over the front and sides when track frames are positioned at full extension, adding 31 inches (787mm) to the 3295's lateral stance.

The MH3295 offers a choice of two front lengths: 56.5ft (17.2m) for barge applications and 71.4ft (22m) for scrap applications. Both fronts feature welded box-section designs for optimum strength and for dissipating working forces. A standard close-proximity stick limiter allows operators to set the stopping distance of the stick in front of the cab, enhancing safety.

OPERATOR ENVIRONMENT

The patented cab-to-ground hydraulic cab riser allows lowering the cab to the ground in any position in the machine's 360° rotation for safe, convenient entry/exit. In the MH3295's spacious cab is a full-colour, graphic and video-ready monitor, which displays high-resolution images from the standard rearview camera. Special roof lining and cab sealing ensure a clean, quiet environment.

Seat features both heating and ventilation along with air-suspension, and an automatic climate-control system maintains consistent temperatures. Both joystick control levers can be adjusted for gain (lever stroke in relation to cylinder speed) and

for response (the interval between lever movement and full cylinder speed), tailoring machine performance to individual preferences.

ENGINE AND HYDRAULICS

The 18.1-litre Cat C18 ACERT™ engine meets Tier 4 Final/Stage IV emission standards and uses after-treatment systems that function without interrupting work cycles. Building on the fuel-efficient C18 ACERT, the MH3295 also incorporates features to reduce fuel burn such as automatic engine speed control (lowers engine speed when loads are lighter) and automatic engine idle shutdown (stops the engine after a present idling interval).

The shutdown feature not only lowers fuel consumption, but also reduces hour accumulation, resulting in extended service intervals, full-term warranty, and increased resale value. A choice of two power modes, high and economy, allows managing fuel and hydraulic pump flow to match the work at hand. Collectively, these fuel-saving features result in reduced exhaust and sound emissions, reduced repair/maintenance costs, and increased engine life.

Hydraulic controllability is an essential design feature for the MH3295, and at the center of the hydraulic system the Cat Adaptive Control System (ACS) valve. This Caterpillar patented valve intelligently manages restrictions and flows for optimum hydraulic response and smooth operation. In addition, the valve's automatic oil-warm-up function puts the MH3295 to work more quickly in cold weather, and the auxiliary-hydraulic system provides tool versatility. In the event bio oil is required, the MH3295's hydraulic system is fully compatible.

MH3295 PRODUCT SPECIFICATIONS

Engine	Cat C18 ACERT
Net power, hp (kW)	533 (397)
Barge front weight, lb. (kg)	210,839 (95,635)
Scrap front weight, lb. (kg)	219,056 (99,362)
Max. drawbar pull, lb. (kN)	132,637 (590)
Max. speed, mph (km/h)	2.8 (4.5)

SERVICEABILITY AND TECHNOLOGY

The MH3295's side-by-side cooling system, separated from the engine compartment, provides optimum engine and hydraulic temperatures. The cooling system features easy-to-clean cores



and a variable-speed fan that reverses to blow out debris. Filters and fluid taps are safely and conveniently reached via slip-resistant catwalks. A fuel-tank drain facilitates removing water and sediment, and a fuel-level indicator reduces the possibility of over-filling.

The Cat Product Link™ telematics system wirelessly connect the MH3295 to the VisionLink® website user interface, providing data such as machine location, hours, fuel consumption, productivity, idle time, and diagnostic codes — allowing timely, fact-based decisions that improve productivity and lower operating costs.

In addition, Cat Connect offers the technology and services to improve overall job-site efficiency, using data from technology-equipped machines to monitor production, optimize uptime, and enhance safety.

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Unloading bulk cargo

streamlining operations with state-of-the-art equipment



Louise Dodds-Ely

Bühler's mechanical unloaders serve the bulk cargo industry

Bühler has over 150 years of experience in processing and handling food products and has gained considerable experience in the continuous unloading of ships. More than 100 years ago, the first mechanical unloader was designed and installed by

Bühler, and since that time the company has continually improved and refined CSUs (continuous ship-unloaders). Today, its flagship mechanical CSU is the Portalink.

Bühler's design and product improvements set new standards



MOBILE COAL HANDLING SYSTEMS



Radial Telescopic Shiploader and Mobile Truck Unloader loading pet coke to Handymax vessels



Radial telescopic stockpiling coal @ 2000tph
in powerplant receiving from ship unloading system



Hopper Feeder & Radial Telescopic reclaiming/
stockpiling coal in stockyard of powerplant

Telestack **mobile** coal handling systems offer significant **operating costs savings** compared to traditional methods of material handling (e.g wheel loaders, mobile harbour cranes, stacker/reclaimers etc.) as well as providing **environmental** and **health & safety benefits**. Additional benefits include **reduced planning** permission required due to product **mobility**. Also the **flexibility** to move Telestack Mobile Conveyors off site. Telestack Conveyors can be **rapidly deployed** on site with handling rates of up to 3,000 TPH.

THE POWER TO MOVE MATERIALS



in the industry. Key improvements include significantly reduced energy usage and product breakage, as well as lower overall operating costs. The company also has a clear advantage in the increased efficiency of its machines, due to easy operating thanks to the auto sink-in function. This means that the Portalink unloader is often the best solution for the customer.

Through its long-term and intensive market experienced, Bühler has developed an extensive portfolio, which includes its Portalink product range which aims to meet its customers' need to unload vessels quickly and efficiently. The Portalink is ideal for unloading vessels of up to 125,000dwt, and has an unloading capacity of 300tph (tonnes per hour) up to 1,500tph.

Bühler's CSUs can unload all free-flowing food products, including mealy products such as soya meal. Its mechanical CSUs are particularly efficient when handling cargo with delicate characteristics.

The handling and processing of grains presents its own

problems, and this is compounded by the need to do so economically. Bühler's worldwide network of experts means that it is able to solve all its customers' problems with the greatest care, and with customized solutions when necessary.

The main clients for Bühler's equipment are, naturally, the large trading and importing facilities which demand reliable, high capacity, efficient unloading and loading equipment with low operating costs. Customers also include direct end-users such as millers, brewers, feed plants, etc., which are trusted and important clients for Bühler.

One example of a long-standing customer is the company South African Bulk Terminals (SABT) in the Port of Durban in South Africa. SABT has placed a repeat order based on its excellent experiences with the Portalink 800tph. This unit was installed in 2004 and has unloaded roughly 20mt (million tonnes) in the last ten years. The repeat order consisted of a new Mobile Portalink 800 and Mobile Portaload 1,000tph, both on rails, and which are installed and operational.

STAYING COMPETITIVE

Bühler is always looking for new developments, product improvements, and trying new materials. This is especially true in the case of the mechanical unloaders such as the Portalink. Here, Bühler is setting market standards for low energy consumption and high operating efficiency due to easy handling for the operators. The model also offers high availability due to reduced maintenance times, and low wear-and-tear, with the result that there is a short ROI (return on investment).

In the past year, Bühler has focused on a new operating and control system for its loading and unloading portfolio. The operating system is developed on direct customer feedback to simplify the basic functions and increase functionality for maintenance and traceability. The time needed to search for errors and training new staff to understand the equipment is reduced, generating a higher ROI.





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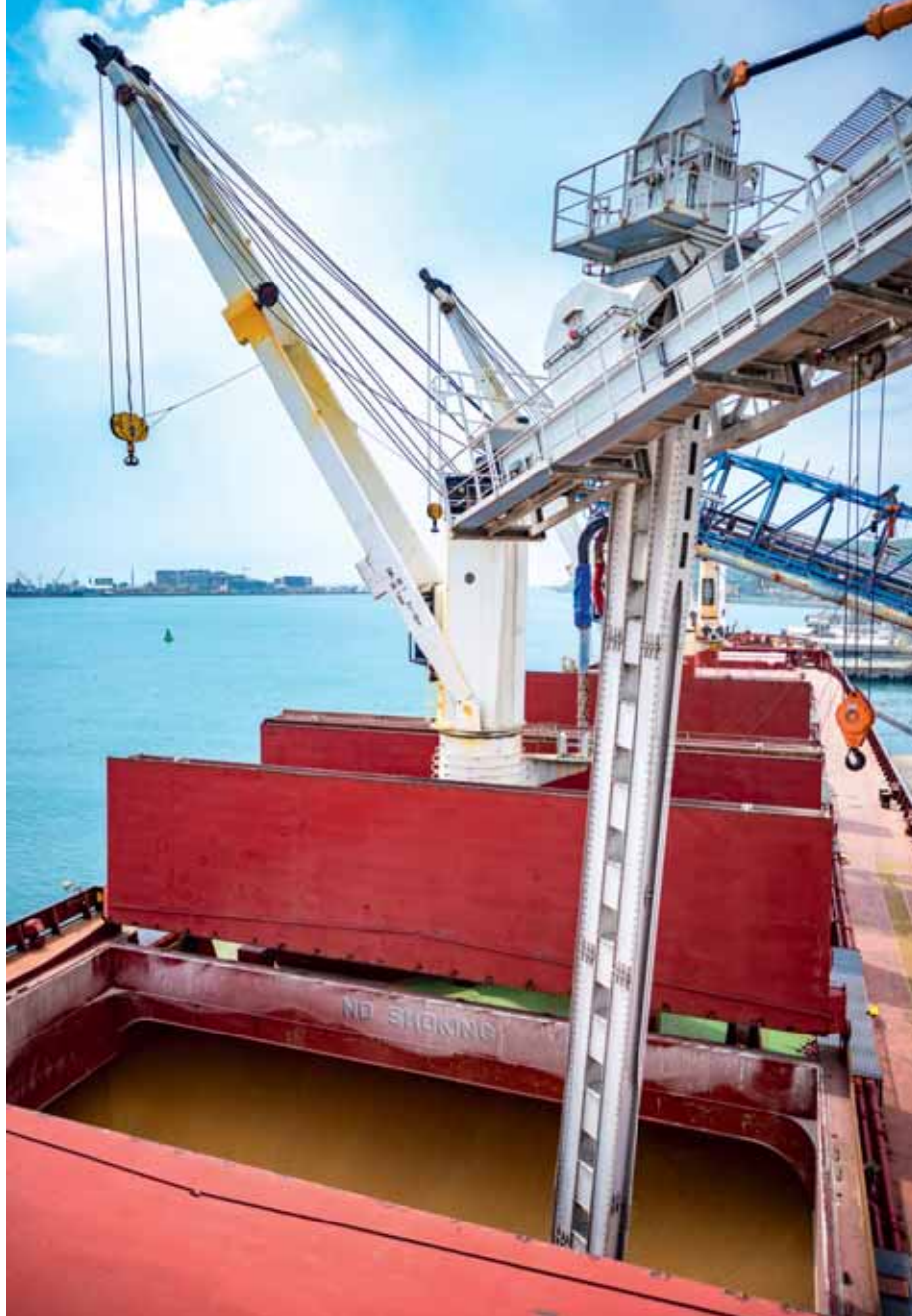
RECENT CONTRACT AWARDS

Among the various projects in which Bühler is involved, it is particularly proud of:

- ❖ a contract award for two 600tph Portalinks, in the Middle East;
- ❖ a contract award for two large Portalink mechanical unloaders, each with a nominal capacity of 1,300tph; and
- ❖ the ongoing construction of a loading boom with a nominal loading rate of 1,600tph for a stationary loader to be installed later this year in North America.

BÜHLER — COMMITTED TO SUSTAINABILITY

Every day, billions of people come into contact with Bühler technologies to cover their basic needs for foods and mobility. With its industrial process technologies and solutions, it contributes significantly to feeding the world's population, setting the focus on food security and safety. The global production and processing of wheat, maize, rice, pasta, chocolate, and breakfast cereals relies strongly on Bühler. Furthermore, Bühler is a leading solution provider of die casting and surface coating technologies, with an emphasis on automotive and optics. As a leading technology group, Bühler invests every year up to 5% of its turnover in research and development. In 2015, the company's around 10,800 employees in over 140 countries generated a turnover of CHF2.4 billion. The family-owned company Bühler is proud of its Swiss roots and feels particularly committed to sustainability.



Powering up today's ship-unloaders with help from Conductix-Wampfler

Conductix-Wampfler is a leading supplier of power and data transmission systems to mobile applications. With the largest portfolio of products on this market, it is renowned for delivering high availability solutions in critical applications. With demurrage charges running at an all-time high, fast and efficient unloading of shipborne cargo is a pre-requisite for profitable shoreside operations. Conductix-Wampfler cable management systems are trusted to deliver safely and efficiently by ports all over the globe.

CABLE REELS

The contactless solution MAG Drive

The MAG Drive motor cable and hose reel is the system of choice for operators around the world. Combining robustness, simplicity and quality, the MAG Drive offers virtually maintenance-free handling of the wide range of cables and hose types used in slow moving or standstill ship-unloader operations.

Torque is transmitted to the spool through the patented MAG Drive magnetic coupler. The drive motor powers an induced plate, which rotates within the lines of flux of a set of strongly magnetic TiCoNiAl rare earth permanent magnets. Cutting the lines of flux transmits a torque to the permanent magnet plate, which is close coupled to the reduction gearbox. The gap between the plates determines the torque transmitted. With no contact between the two surfaces, the wear associated with alternative solutions is eliminated and the safety of the cable is



assured. Factory set, but tunable on site, the MAG Drive offers a truly commission free/plug-and-play installation. The MAG Drive features a power off functionality during standstill operations, as the torque to the spool is permanent, due to the magnetic force generated.

With slip rings rated at 100% DC at standstill, the MAG Drive means peace of mind for the guys at the sharp end. Standard squirrel cage motors can be locally sourced, meaning worry-free replacement if things go wrong whilst robust gearboxes and low moment of inertia spools ensure the reels are up to the job.



Data transfer with minimal attenuation

The patented Conductix-Wampfler fibre-optic transmitter (TFO) offers the industry standard when it comes to putting data over a cable reel. The clever method of encapsulating the optical fibres in a magnetic tape ensures faultless alignment within the spool, meaning the fibres behave perfectly during winding and unwinding, whilst the permanent ST connectors (as standard) at each end of the tape minimize signal losses.

SMART Drive: the variable-frequency drive (VFD)

Ideally suited to highly dynamic applications such as those found in container handling applications, variable-frequency drive motor reels offer a different solution to the more common MAG Drive in slow or standstill operations. SMART Drive systems from Conductix-Wampfler are derived from the container handling market, offering a range of control solutions from complete integration into the crane plc, through to a simple standalone system local to the reel. Featuring specially selected gear motors from SEW and the company's own design of High Dynamics main gearbox, the unit is easily capable of handling the forces associated with ship-unloader operations. Again, the slip rings are sized to handle full load current at standstill for long periods.

SLIP RINGS AND FESTOONS

As well as the unsurpassed range of cable and



hose reeling systems, slip rings for a multitude of applications, including continuous ship-unloaders are on offer. Trouble-free slewing of unloader booms is a fundamental requirement for efficient unloading.

Power, control, data and fluids can be combined in complex assemblies which allow for good sealing of cabinets and minimal wear of sliding surfaces. Handling currents of up to 500A per ring set (higher currents just means adding additional rings) and voltages of up to 36kV, low voltage control signals and a choice of data transfer protocols can be coupled with fluidic joints with multiple ways (their highest number to date has been 110) up to 250mm NB and pressure ratings over 100Bar in a single unit designed specifically for the machine and application. The Conductix-Wampfler Centre of Excellence in Agrate Brianza, Italy has a team dedicated to fulfill customer requirements on a global basis.

The Centre of Excellence in Weil am Rhein, Germany is the world's leader in the supply of heavy duty festoon systems that are the choice of port operators who know what it takes to provide a fast, efficient turnaround, with their grab ship-unloaders working 24/7 when on duty. The 0360 Series festoons are designed to handle the high acceleration and deceleration forces generated by high speed unloading. With a large range of roller types and diameters, wire rope tension relief and rubber shock cords, the 0360 Series is configurable to the running beam of choice, ensuring a perfect match for the hardworking crane.

WORLDWIDE COVERAGE

Conductix-Wampfler has over 80 years' experience in producing motor cable and hose reels. From its Centre of Excellence in Belley, France, over 2,500 motor reels per year are produced for a wide range of markets and applications, with a high proportion heading into bulk port operations. Conductix-Wampfler's sales and marketing organizations offer global coverage, operating all around the globe, and its Mining & Bulk Materials Handling Focus

Market team works closely with them to bring the right solution to End-Users, Consultants and OEM's.

RECENT CONTRACTS

Conductix-Wampfler is currently part way through a three-year contract to supply eight cable and hose reels, plus cables and hoses to a large coal handling facility in Canada. Featuring reels with CSA approval, delivered through China, the HD30 SMART Drive reels are the largest type made by Conductix-Wampfler, reflecting the heavy duty nature of the applications. The contract, which will be completed in 2017, also included an order for festoons for the ship loader and was won in the face of intense competition from local and international rivals.

A bulk port on the Lower Mississippi River has, this month, placed an order with Conductix-Wampfler for a replacement cable reel for a grab ship-unloader on its wharf. The company beat off a rival offer from a local company with a long history in the region. With a short lead time required, Conductix-Wampfler undertook to meet the customer's requirement with an expedited delivery.

China is also a key region for Conductix-Wampfler and recent contracts include an order to supply four reels for a bulk port at the confluence of the Yangtze and Jialing rivers in Southwestern China. The port, which can handle a variety of products, has chosen Conductix-Wampfler reels to power stockyard and ship-unloading machinery. Additionally, contracts have been placed for the supply of a ship-unloader reel at a different Yangtze delta port, with delivery recently completed.

Iain Barton, Global Market Manager – Mining & Bulk Materials Handling said, "Winning these contracts shows that end-users and OEMs trust Conductix-Wampfler to deliver the right solution at the right time to the right place at the right price. Our global footprint enables us to utilize cost-effective routes to market, with central functions supporting local manufacturing and sales operations."

DOCKSOLID addresses customer needs with clean flexible robust solutions

The trend in recent years has seen a significant increase in the use of hoppers for unloading at ports, due to both increased regulation and desire for higher efficiency and throughput. This does mean that port operators are looking for a variety of solutions, as different materials require different levels of dust suppression, and port managers need to balance requirements where the highest performance is necessary with solutions which can quickly, easily and efficiently be moved

from one task to another and do not require high performance dust suppression. With this in mind DOCKSOLID has developed a new range of cost effective, portable and flexible standard hoppers.

DOCKSOLID Bulk Port Equipment is a range of mechanical handling solutions for port terminals handling grains, coal, minerals, cement, fertilizers, powders or other dry bulk commodities. The brand includes extremely robust and reliable ship unloading systems, with a focus on flexibility of use and highly manoeuvrable mobile equipment. DOCKSOLID port equipment is designed and fabricated by Buttmer Engineering for bulk ports, logistics hubs and industrial facilities to handle dry bulk commodities ranging from grains and foodstuffs to minerals,



coal, ores, biomass, woodchip, oilseeds and much more besides.

DOCKSOLID is epitomized by its core values: 'Clean. Flexible. Robust'. To DOCKSOLID, this is more than a slogan, it's the key characteristics delivered in every hopper that is delivered to customers. Clean and robust are essentials in the delivery of any port equipment. Flexible can often be a bigger challenge. Providing a solution that addresses the customer needs, rather than trying to convince that an off-the-shelf solution will work, is often not the easiest path for companies to take. However, because DOCKSOLID takes responsibility for the entire process, through design, fabrication and installation, it delivers a level of flexibility not commonplace in the market. And in 2016 DOCKSOLID exemplified this with the delivery of a new range

of hoppers, which delivered the robustness and efficiency of DOCKSOLID's higher end units while simplifying use and reducing costs.

In working with customers, a number of key requirements were identified

- ❖ **simplicity:** the hopper was to be capable of handling a variety of materials without requiring setup when switching to a new material, and be straightforward to operate;

- ❖ **manoeuvrability:** easy moving around the port was





DOCKSOLID BESPOKE BULK PORT EQUIPMENT

DOCKSOLID State-of-the-art Dust Prevention and Suppression Systems.

DOCKSOLID Patented Steering and Suspension Innovations for Highly Manoeuvrable Mobile Units.

DOCKSOLID Built for Reliability and Longevity: Structure Designed for Dynamic and Static Loads.

DOCKSOLID Low Carbon Emissions.

DOCKSOLID Engineered in Ireland.

necessary. The hopper had to be able to move quickly from position to position as simply as possible.

- ❖ **cost-effectiveness:** the customer already had a number of high-end environmental hoppers and a cost-effective solution that offered robust operation while forgoing 'nice-to-haves' was key.

These requirements echoed the main benefits that the new range of hoppers from DOCKSOLID was developed to deliver. The new range offers fast, efficient unloading across a variety of materials while delivering a portability and ease of use not typical of traditional hoppers, benefits which are delivered through several key features:

- ❖ **manoeuvrability:** the hoppers feature a single set of wheels on one side, which hydraulically raise for loading. The other side of the hopper is lifted by readily available port equipment; such as forklifts or tug masters. This allows units to be quickly and efficiently moved from one unloading project to another;
- ❖ **simplicity:** the new range addresses a range of use cases where the dust suppression features of the other units in the range are not needed. The units can be designed to easily switch from one material to another with no configuration needed, or without the concerns of how different materials



will affect installed filters.

- ❖ **cost-effectiveness:** the range focuses on base units which balance the base features needed for efficient operation with value and cost. It then allows customers to add on the additional features they see as necessary, such as cabins, external lighting and other extras which they see as essential to their specific requirements.

In delivering this new range of Standard Hoppers, DOCKSOLID and Buttmer Engineering have delivered a more innovative, useful and effective solution for ship-unloading than what has traditionally been available in the market, providing concrete proof of DOCKSOLID's position at the forefront of ship-unloading hopper manufacturers.

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Bedeschi guarantees efficiency and a eco-friendly solution with the bucket chain continuous ship-unloader

The environment is constantly changing and there is a need to become increasingly aware of the problems that surround it. This is why Bedeschi always pay attention to environmental issues, basing its projects on the stability and sustainability of the surroundings. Nowadays there is often a need to transport raw materials and combustible solid material from one continent to another by sea. The ships that do this are becoming bigger, so the modern port has to be equipped with all kinds of machines like shiploaders, ship-unloaders, cranes, conveyors, etc. to be able to complete the vessel's loading/unloading process in the minimum time.



To guarantee efficiency in the ports it is necessary to optimize the position and the volume of the material that is stored and in transit, waiting to be shipped, to have adequate machinery to reduce the time of loading and unloading of the ships, and the delivery of the raw material. It is also necessary to organize the layout of the terminal in the most functional way and to reduce the number of operators needed through automation of the process, creating eco-friendly terminals by using dedusting equipment.

Thanks to its wide experience and knowledge in material handling, Bedeschi is successful in all of the above mentioned aspects. For example, when considering the bucket chain continuous ship unloader (CSU), all the solutions that Bedeschi proposes, and the executive design, are developed with the utmost care to dust control. The CSU will travel on rails and will be travelling and luffing boom type, it will be equipped with a bucketwheel elevator with continuous rotation for digging, with belt on the boom and central hopper to unload on a feeder that will load the pier conveyor.

When unloading, the material reclaimed by buckets will be luffed to the unload point, on the top of the elevator, and unloaded on a rotating plate which, independently from the rotation position of the elevator, will convey the flow on the boom belt. From the boom belt, through the central hopper, the material will be unloaded on the belt feeder under the hopper that will convey onto pier conveyor.

The proposed design with fixed foot will allow to extend the elevator enclosure, leaving the foot only on open air. While in operation, even at the real beginning of the unloading, the elevator foot is almost entirely inside the hold avoiding any

possible dispersion. Once the material is inside the buckets, the entire stroke is protected.

Drive sprockets of the elevators will be equipped with a suitable device to avoid any possible egress of material inside the elevator enclosure.

CSUs are normally compared with a traditional grab type ship unloader. While the grab type ship unloader, even if equipped with ecological grabs, does not make it possible to completely eliminate dust dispersion during the transfer from the hold to the hopper — especially in windy conditions — with the CSU the route of the material is completely enclosed and the transfer points are equipped with dedusting systems.

This means that, once reclaimed by the buckets, the material can be fully enclosed without any possible dust dispersion.

Particular care will be taken to avoid any material accumulation inside the elevator in order to avoid any possible material falling during machine transfer operations. The unloading chute will be closed, with sealed inspection doors.

This is why the CSU ensures a homogenous material flow, with dust kept to an absolute minimum.

Going green and sustainable practice is now seen as an essential part of any business in the bulk industry.

Considering the fact that port's infrastructures which consists of the land and space necessary for operations is expensive, Bedeschi is able to help the client by providing compact, functional, and eco-friendly machines that are able to adapt to a smaller space but are still able to offer the high volumes requested by the client.

Bedeschi is also able to minimize environmental problems due to dust emission by stacking material in an enclosed warehouse. In addition, all of the machines have dust filters created by the Bedeschi affiliate company CTP, therefore Bedeschi Group is able to offer totally dust free environmental friendly solutions.

IDEAL SOLUTIONS FOR PORT FACILITIES



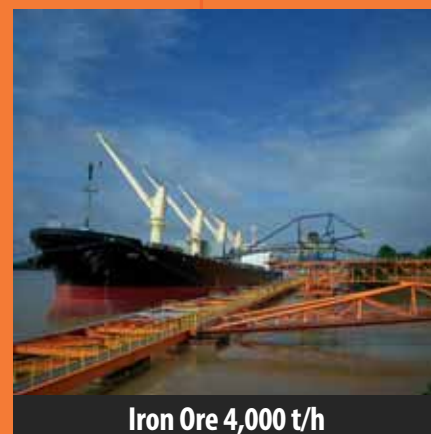
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- Designed to meet customer's needs
- High quality, excellent durability
- Reliability and short term delivery
- Shiploader retrofit and upgrading
- Dust aspiration systems



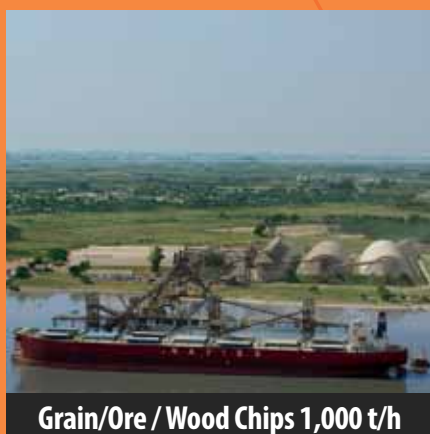
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Grain 1,500 t/h



Grain/Wood Chips 2,500 t/h



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TMSA
Tecnologia em Movimentação

Ship unloaders: TMSA – the choice of a port terminal specialist

TMSA 400tph fixed discontinuous grab unloader in Paraguay.



TMSA Tecnologia em Movimentação S/A, headquartered in Brazil, is one of the big suppliers in the South American market for bulk solids material handling, especially in port terminals, heavy duty and long distance conveyors. The company, which started operating in 1966, has a large portfolio of different ship and barge loader and unloader designs.

Various designs of ship and barge unloaders systems are available; some are specifically used for unloading of grains and oilseeds, others are used for all kind of granular products and some special ones are ideal for the unloading of non-easy flowing products.

Depending on the way they are supported, the existing systems can be classified as:

- ❖ shore based units, which can be stationary or fixed.
- ❖ floating units, and
- ❖ self-unloading ships.

For shore-based and floating unloading systems, there are different type of elevations available:

- a. **discontinuous elevation** (grab unloading), and
- b. **continuous elevation**, which can be further divided into:
 - ❑ pneumatic units, with free hanging telescopic suction lines and conventional intake nozzles; and
 - ❑ mechanical units, which elevate the product mass by means of a chain, a screw, or a belt with or without buckets.

The selection of a particular system mainly depends on the type of vessel to be unloaded, hourly capacity and the properties of the products to be handled. Aspects as environment, product loss, contamination and degradation during handling operations may also be put in consideration.

DISCONTINUOUS UNLOADING: THE GRAB

The best known discontinuous unloader is the grab, capable of handling vessels of all shapes and sizes. They have gained worldwide acceptance as flexible, reliable and versatile items of

An integrated solution for unloading fertilizers in Brazil: Manitowoc Cranes (USA) and TMSA (Brazil) mobile gantry.



equipment for the handling of a wide variety of bulk commodities and almost all dry granular products, including all grains, oilseeds and by-products. Powders cause more problems than granular products and need care and special grabs to minimize leakage and spillage.

The major advantage of a grab unloader over other types of unloading equipment is its familiarity and proven ability as grabs are a flexible, robust, simple to handle and relatively easy to maintain.

The fixed slewing tower or column type grab unloader can reach the whole hatch area from one position. Conventional column cranes will take grabs of up to 30 tonnes and gantry unloader cranes will take high capacity grabs from 30 tonnes up to about 85 tonnes.

Bulldozer and front wheel loader assistance is required for cleaning-up and for bringing the product from the 'dead corners' under the deck overhang to within the reach of the grab. Feeding should keep pace with grab unloading.

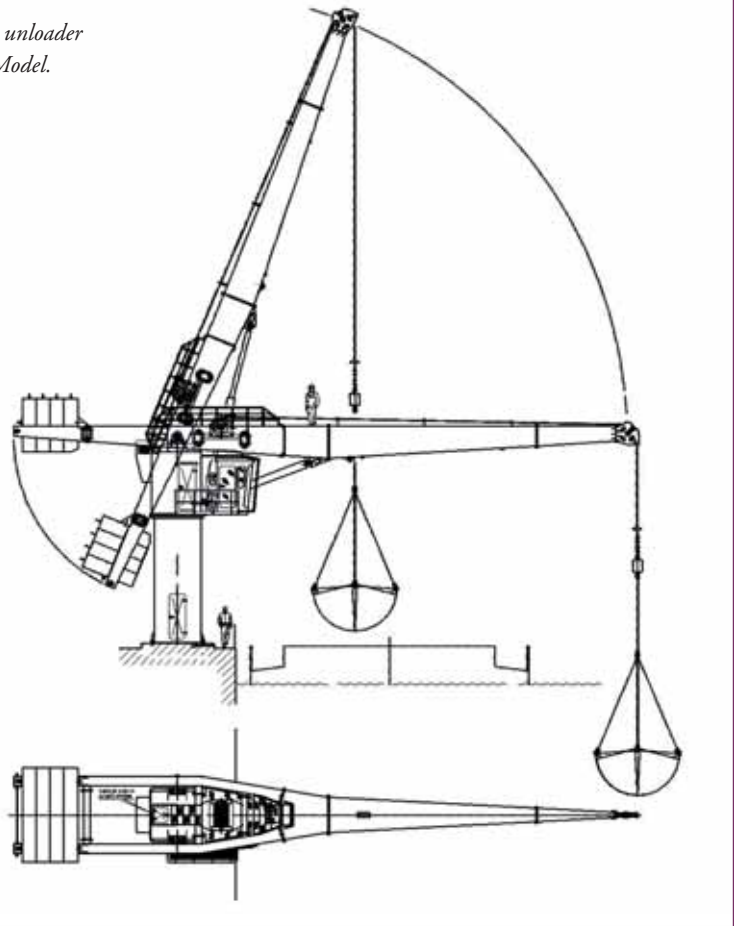
Grab unloaders incorporate a hopper that feeds the bulk materials direct to a conveyor belt system or to a truck. The hoppers can be equipped with spraying devices or suction systems to minimize dust emissions.

The nominal unloading rate of a grab unloader is determined



Two mobile travelling TMSA integrated solution with Manitowoc Cranes (USA) and TMSA (Brazil) mobile gantry and two aspirated hoppers with belt feeder, as well as 790m belt conveyor (2,000tph capacity) for a fertilizer import terminal in Brazil.

TMSA grab unloader
TM20-15-Model.



by the achieved number of handling cycles per hour multiplied by the average grab load.

Grab unloading always starts with a peak performance with optimum digging conditions and short hoist distances, and finishes with very low performance when trimming and cleaning the remaining cargo out of the hold.

Co-ordinating the movements of grab and front loaders needs operator skill and close attention. It is a batch type operation. The shuttling of the bucket between the ship's hatch and the land-based hopper occupy most of the cycle time. A certain amount of product spillage and loss is almost inevitable along the grab travel, making dust pollution a problem that can be controlled but not easily eliminated.

Despite all these circumstances, grab unloaders still have not been superseded by continuous methods of unloading, they co-exist.

GRAB SYSTEM VARIANTS FROM TMSA

Description/Model	TM 20/15	TM 22/20	TM 22/25
Capacity (density 1.0 tonnes/m ³)	300–400tph	400–500tph	500–600tph
Hook hoisting capacity	15 tonnes	20 tonnes	25 tonnes
Boom radius (max. and min.)	5.5/20m	7.0/22m	7.0/22m
Hoisting speed	60m/min	60m/min	60m/min
Time to lift the boom (from max. radius to min.)		40 s	40 s 40 s
Rotation speed	1.6 rot/min	2.0 rot/min	2.0 rot/min
Boom rotation	electric motor/planetary gear	electric motor/planetary gear	electric motor/planetary gear
Boom lifting	hydraulic cylinder	hydraulic cylinder	hydraulic cylinder
Counterweight	34,000kg	43,000kg	52,000kg
Installed power	350KW	480KW	615KW
Drivers control	Joysticks within cabin	Joysticks within cabin	Joysticks within cabin



BASIC DESIGN CHARACTERISTICS OF THE GRAB

The type and potential of the grab depends on the crane capacity and upon the product to be handled. The closing time should be short, but a grab that closes too quickly may pick-up less than its maximum load. Overfilling should be avoided as this generates spillage and leaking lips.

Unloading gantries can be fixed or mobile; each unloading system has its own merits and must be considered case by case. To reach the holds of a wide range of vessels the design must take into account the following:

- ❖ fixed or travelling along the ship (on quayside rails/on a pontoon);
- ❖ luffing of the boom in a vertical plane is of particular importance to insert the grab and to follow the product level and the tide;
- ❖ slewing of the boom, clockwise and anticlockwise through a minimum angle of 180°;
- ❖ parking position when the machine is not being used;
- ❖ storm anchor to have the ship-unloader structurally anchored to the pier; and
- ❖ unloading must be closely co-ordinated with the load in systems of the port terminal.

In order to cover this wide range of requirements, TMSA conceived a fix grab unloading system and has representations

and partnerships of different technologies for discontinuous and continuous unloading systems.

DUST GENERATION DURING GRAB UNLOADING

A recognized problem of operating grab unloaders is that it may generate a lot of dust. Dust is generated each time the product is moved or discharged and, wind can make matters worse.

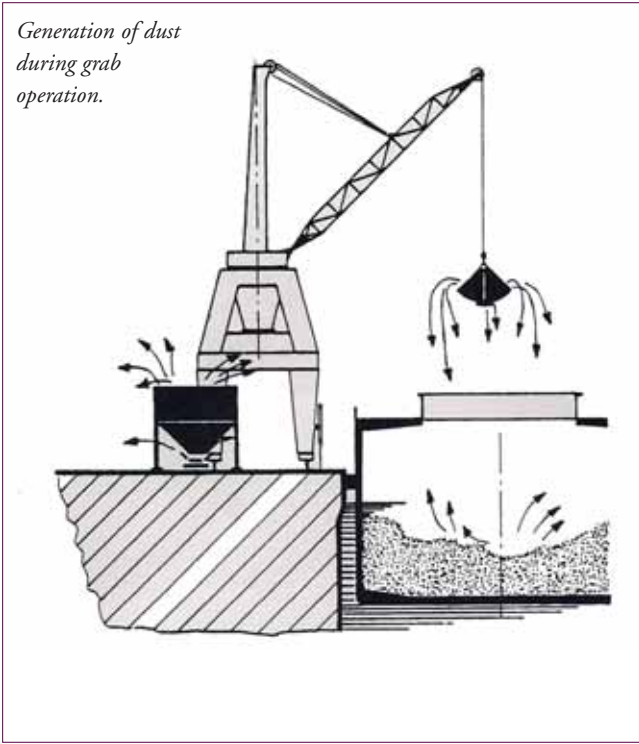
The most important instances of dust generation during the grab cycle are just after digging and during discharge into the receiving surge hopper. Foreign objects may prevent the grab from closing fully and additional spillage occurs as the bucket travels from ship to hopper.

Following strict regulations to environmental concerns TMSA supplies dust extraction systems whose designs are influenced by:

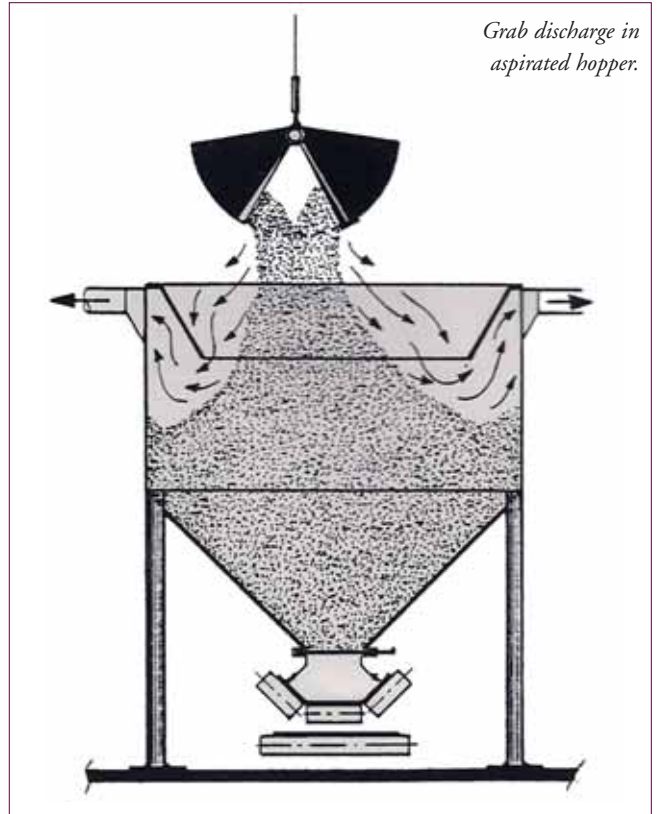
- ❖ dimensions of the grab in the open and close position;
- ❖ displacement speed of the grab;
- ❖ weight, volume of the product batch and number of batches per hour;
- ❖ type of product, particle size, bulk density and moisture content; and
- ❖ wind effect.

The aspirated hoppers have extraction systems which guarantee a maximum result. The grab is lowered into a double wall casing, maintaining an air current in the direction of the

Generation of dust during grab operation.



Grab discharge in aspirated hopper.



product flow. During operation, the grab is enclosed in a casing, to eliminate wind effects. The dust generated during the discharge of the grab is aspirated by a well-designed dust control system installed between the hopper walls.

TMSA searches for the best-cost proposal selecting specifications, based on its long and rich experience as a port terminal specialist that meet the client's requirements of performance and reliability — all this is weighed against not only the capital costs but also the operational costs of the project.

ACCESSORY/COMPLEMENTARY EQUIPMENT FOR PORT TERMINALS

TMSA partners with other interesting equipment suppliers for port terminals, such as:

- ❖ **Absam, France:** surface truck unloading unit and the Manutube, an enclosed belt conveyor with a belt sliding inside a plastic tube with no idlers, fully enclosed.



- ❖ **VIGAN, Belgium:** pneumatic ship and barge continuous unloading;
- ❖ **Telestack, Ireland:** mobile telescopic shiploaders and unloader systems; and
- ❖ **Ravestein, the Netherlands:** a shipyard and construction company, specialized in building bridges, modular loading quays as well as design and construction of crane and shiploader/unloader pontoons which substitute the conventional concrete pier avoiding long term civil works.

TMSA offers different solutions for the conveying of bulk material. Its wide technological portfolio includes belt conveyors that can be open, covered or enclosed, such as the RopeCon system, pipe conveyors, overland conveyors or conventional trough conveyor belts with high capacities, up to 20,000tph. TMSA has the knowledge and experience for the proper selection of a shiploader/ship-unloader and conveying system which will fit the needs and budget of each project.

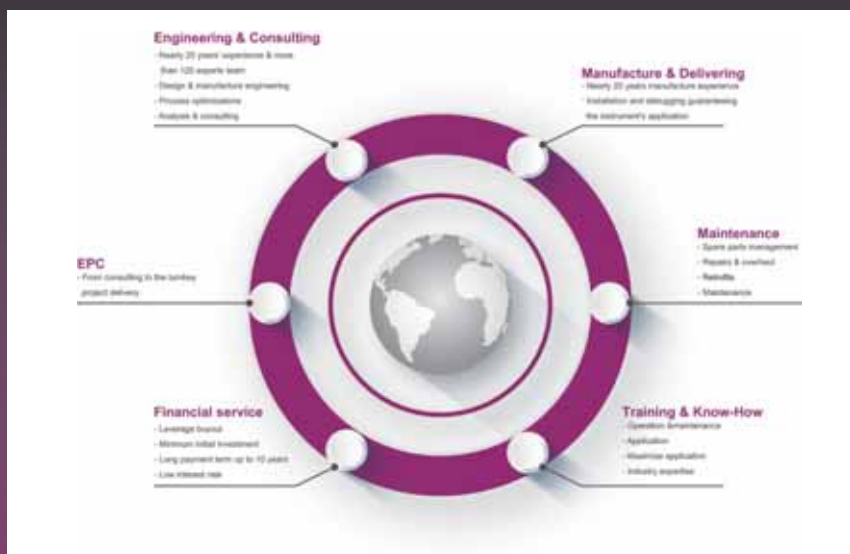
GENMA sells four pneumatic ship-unloaders to Venezuela

GENMA, part of Rainbow Heavy Industrial, is a cargo handling solution provider from China. The company has nearly 20 years of experience and considerable expertise in cargo handling. As well as experience in container handling, GENMA is also now expanding seriously into the bulk handling business.

GENMA's product line includes: for **loading**, mobile shiploaders; for **unloading**, bridge grab ship-unloaders and three types of continuous ship-unloaders — pneumatic, bucket chain and scraper. Its **multi-purpose equipment** includes mobile harbour cranes and floating terminals. In **conveying process**, it offers mobile environmental hoppers and belt conveyors.

As well as its standard range of equipment, GENMA is also able to offer customized equipment and solutions to its customers. The company's team comprises over 120 technical experts, among which are many top-ranking specialists in the port machine industry.

In terms of ship-unloader activity at GENMA, the company will be delivering four of its pneumatic unloaders to a client in Venezuela in September this year. GENMA is also organizing a conference in China in September, focusing on 'Eco-friendly & Intelligent Ports' and 'Efficient Bulk Handling'.



Sumitomo acquisition enhances its position in the unloading market

On 1 October last year, Sumitomo Heavy Industries Material Handling Systems Co., Ltd acquired the Material Handling subsidiary of Mitsubishi Heavy Industries, Ltd. With this move, the company has been able to enhance its range of industrial cranes and services, and expand its technical skills and expertise to allow it to serve its global customers better.

One of Sumitomo's primary products is the bucket elevator type continuous ship unloader, which it has been manufacturing since 1976, having delivered around 80 units to customers in Japan and overseas. The capacity of its CSUs ranges from 200tph (tonnes per hour) up to 3,500tph, and the unloaders can handle a variety of materials such as coal and iron ore.

Sumitomo has continued to expand and improve its track record. Recent contracts include the delivery of two 2,700tph CSUs to Shikoku Electric Power and an additional 2,700tph CSU to another power plant in northern Japan. Further, it has just received an order for one 3,500/2,100tph CSU for a Japanese steel mill, scheduled for delivery in 2018. As for overseas customers, Sumitomo is now in the process of commissioning



two 2,200tph CSUs for Taiwan Power Company, which are scheduled for completion by the end of this year.

Sumitomo's CSUs have an excellent reputation with all customers, especially with their high unloading efficiencies and reliability delivered by our unique design. Combined with the expertise gained by its recent acquisition, Sumitomo will be able to provide even more extensive provide bulk unloading solutions to its customers.

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Metal Corporation) | Nisshin Steel



SENNEBOGEN debutts its 730 model

making light work of timber handling



By purchasing the new SENNEBOGEN 730 of the current E-series, the Pfeifer Group in the Bavarian town of Unterbernbach has shown its confidence in the latest generation of Pick&Carry material handlers. Here, the 730 will be used for any type of log handling. With its extended boom range and compact dimensions, the machine can show its full potential.

With seven branches in three countries, the Pfeifer Group is not only one of the largest enterprises in the European timber industry, but also a company steeped in tradition. Since 1948, the company has been concentrating on the industrial processing of soft wood. At its location in the Bavarian town of Unterbernbach, Pfeifer produces 560,000m³ of sawn timber annually. In the log yard, most of the lumber is moved by green SENNEBOGEN material handlers. The latest addition is the brand-new SENNEBOGEN 730 material handler of the E-series.

PICK&CARRY CONCEPT: MAXIMUM FLEXIBILITY AND MOBILITY

Operator Rupert Mahl has been operating the machine for some

weeks now, and he is impressed by the ease of use and performance of the SENNEBOGEN 730. "During my shift, I travel about 30km along the lumber sorting lines. Thanks to the slewing uppercarriage, I can empty the boxes directly in the direction of travel, and manoeuvring between the log piles is easy." The automatic detection of travel direction, which always allows forward travel independent of the uppercarriage's slewing direction, is a great assistance.

At the Pfeifer location in Unterbernbach, softwood lumber measuring between 3.60m and 5.10m in length and 900mm in diameter is processed. Using a 2.0m² SENNEBOGEN log grapple, the logs are removed from the boxes and piled up to 10m high.

The new piece of machinery is equipped with a 168kW diesel engine and all-wheel drive. When compared with other equipment designs such as the wheel loaders which had been used by Pfeifer until recently, the benefit of the Pick&Carry machines is obvious. Laborious manoeuvring is omitted, and the

Working on the sorting line and the timber sawing table: The new SENNEBOGEN 730 E-series shows its flexibility at Pfeifer in Unterbernbach.



II equipment makes it possible to pick up lumber along the sides of the alleys and to stack it high. Thanks to the powerful travel drive, the machine does moves swiftly, with the resilient and robust undercarriage with push-blade providing maximum stability.

UNOBSTRUCTED VISIBILITY FROM INSIDE THE CAB

When designing the new 730 as a genuine Pick&Carry material handler, SENNEBOGEN relocated the boom's attachment point to the rear. As a result, the center of gravity of the loaded machine is right above the slewing ring. This not only reduces





material stress but also allows a smaller counterweight to be used. Accordingly, the machine could be designed for compact dimensions, making it highly manoeuvrable. Its light weight requires less energy to accelerate and decelerate the machine, reducing fuel consumption. Operators benefit from an unobstructed view to the right-hand side of the cab. The elevated Maxcab is equipped with a sliding door and a camera system, allowing the operator to keep an eye on the entire surroundings of the machine. The massive base frame, the reinforced mobile undercarriage, the bump guard and the protective grid fully enclosing the cab ensure the safety of man and machine.



Happy with the new generation of the SENNEBOGEN 730 E-series: service technician Andreas Schäffler, operator Rupert Mahl and head of maintenance Klaus Klemm. (from left)

Klaus Klemm is the Head of Maintenance at Pfeifer in Unterbernbach. The determining criteria for his decision to procure the latest generation of material handlers was based on the vehicle's high degree of reliability and his excellent experience with existing machines. Last but not least, the ease of servicing and the well-arranged design of the green machine are a clear sign of quality that cannot be praised enough, according to Klemm.

The machine is maintained by sales and service partner Fischer&Schweiger which is also responsible for servicing the other SENNEBOGEN material handlers at the site.

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Jay Venter

A Guven Grab for every product

Guven Kepce Makine İç Ve Dis Tic. Ltd (Guven Grab) was founded in 1984 at K.Maltepe/Istanbul under the name of Guven Grab.

It manufactures grabs for the loading and unloading of different products, and exports these abroad. Production takes place at the company's plant in Cayirova, Kocaeli, Turkey which covers an area of 9,500m². Ninety per cent of sales are exported to foreign countries and for use on oceangoing vessels.

To date, Guven Grabs has exported its products to more than 60 countries, including Greece, China, Hong Kong, Spain, Germany, Denmark, Romania, Bulgaria, Georgia, Tunisia, Russia, Egypt, Tanzania, Ivory Coast, Ghana, Nigeria, Algeria, the UAE, Kuwait, Pakistan, Singapore, Bangladesh etc.

Its main activity is to supply grabs for bulk carrier vessels belonging to first class shipowners (Ultramax, Supramax,

Handymax, Handysize vessels).

Along with shipowners, its main customers are stevedores, ports and steel factories. Guven's grabs can satisfy the requirements of customers, such as competitive price, European quality, less maintenance, fewer spare parts and reliability.

The majority of Guven's products are delivered to Chinese and Japanese shipyards for newbuild bulkers. By combining technology with the creativity and the unique skills of human beings, Guven is always one step closer to its goal of catering for the requests and expectations of its customers at higher levels.

FACTORY

There are four CNC milling machines, 11 CNC lathes and 28 cranes for various purposes and with differing capacities at Guven Grab's machining centres in its plant.



Products

Radio remote control grab

This grab operates with a central cylinder and with its own gravity circulation of oil.

The grab is very popular for new generation bulkers, preferred instead of electro hydraulic grabs in order to avoid the cable drum system and grab stabilizer on the crane jib, without any additional electric supply and consumption of fuel by generators it operates with a battery and a remote control unit, without any motor, pump, electricity supply, cable drum, stabilizer and etc.

It does not require cable drum system, grab stabilizer on the crane jib. It can be attached on to the hook of any kind of crane and the handling of the load can be started. It can be controlled through remote control unit up a distance of 100 metres. It can be used for handling of every type of bulk load and it is the most efficient and economical digger type.

More than 1,800 units have been manufactured between the years of 2005 and 2014 and almost all of them have been exported. This type of grab constitutes 75% of the total production capacity of Guven Grab. It is produced in sizes ranging from 2m³ up to 50m³. The design and patent are registered to Guven Grab

Electro hydraulic clamshell grab

Can be used to handle all types of bulk. Electrically powered (380–440 Volts). It is produced in sizes from 1m³ up to 50m³.

Electro hydraulic orange peel grab

Used to handle scrap and for sea bed trawling. Electrically powered (380–440 Volts). Sizes range from 1m³ up to 40m³.

Mechanical single wired touch down grab

For all types of bulk, on single wire cranes. Opens by touching the bunker or the ground. Sizes range from 1m³ up to 30m³.

Mechanic double wired clamshell grab

For all types of bulk. The digger can only be used on cranes with double drums. Sizes range from 1m³ up to 50m³.

Mechanical single- and double-wired polip peel grab

It is used on single- and double-wire cranes, to handle and load materials like coal. Sizes range from 1m³ up to 40m³.

Mechanical log grab

It is manufactured according to single- and double-wire cranes. Used for loading and handling. Sizes range from 1m³ up to 25m³.

Mechanical clamshell roundnose grab for dredging

The 12m³-capacity mechanical clamshell roundnose grab is made for Izmit Bay Bridge Construction, and has a tare of 35 tonnes.

Other grabs also manufactured by Guven Grab are mechanical single wired coal grabs, mechanical rock grabs, electro hydraulic orangepeel grabs, underwater dredging grabs, hydraulic orangepeel excavator grabs, mechanical double wired orangepeel grabs and mechanical hand-trip grabs.

SERVICES

Guven Grab provides 24-hour service facilities to its customers.

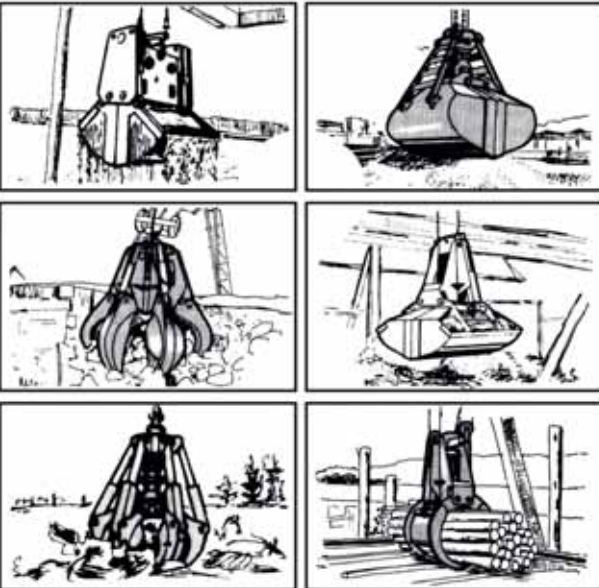
To save the transport cost to its customers, Guven Grab provides door to door service delivery and assembly on site.

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Calim Grabs: modular and flexible

Electro hydraulic orange peel grab for waste.



Calim Grabs (Calim Kepce) has been engineering, manufacturing and delivering equipment to customers and port authorities since 1970. In that time, the company has earned a strong reputation in the grabs and marine equipment industry.

Calim Grabs specializes in the manufacture and repair of grabs which are used to handle a wide range of materials.

Its well-trained and experienced staff work to develop highly efficient and cost-effective grabs. The company's product range, one of the most complete on the market, offers high lifecycle value, heavy-duty grabs such as quality rope operated, hydraulic and electro-hydraulic or motor grab catalogue, radio remote control grabs etc.

Since the company was founded, it has delivered over 2,600 grabs to customers around the world. As well as its standard product range, it also regularly develops customized, unique solutions for specific situations when the customer needs these. The company's domestic and international market activity has been growing since the end of 2011. One source of satisfaction for CALIM GRAB is the recent sale of ten units to Latin America. Over the last few years, the products have been in operation in the largest ports in the world. Port activity is one of its key sectors and it is very conscious of the market's new demands concerning product efficiency and evolution.

Its last project was for a Dubai-owned port and construction site. Calim's products can be seen all over ports, cement and steel factories and on ships world wide. They are especially popular in Latin America, North Africa, Venezuela, the UK, Romania, Pakistan, Singapore, Ireland, Bangladesh, Cyprus, Ghana, Madagascar, Ukraine, Sudan and more. The company also ships spare parts with any purchased product which may be needed in, say, six months, at no cost.

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

Ease assembly and maintenance

MODULARITY AND OPERATIONAL FLEXIBILITY

Return-on-investment (ROI) when purchasing grabs can be significantly reduced if the structure can be modified by

detachable plates or arm replacement and use same motion system to handle materials of different shapes and densities. The design of Calim's products is based on a modular conception so that grab's structure could be easily transformed.

ROI also depends on:

- ❖ grab productivity (tonnes per hour) vs. operational costs;
- ❖ purchase investment vs. maintenance costs;
- ❖ modularity and operational flexibility; and
- ❖ cycle times (opening-closing-transport movements); and material loss during transportation movement

SAFETY FIRST

To guarantee the safety of all workers and operators, Calim's technical specialists carry out regular inspections of all its products. Hydraulic pipes, electrical wiring and connections are fully protected. The cylinders are fitted with oil damping at the end of the travel to reduce noise and increase durability. The cylinder barrel and piston rod are additionally protected against mechanical damage. High-quality chrome-plated steel is used in hydraulic cylinders. The inside and outside shell plates and grabs' jaws are made of highly wear-resistant Hardox steel new product:

ELECTRO HYDRAULIC ORANGE PEEL GRAB FOR WASTE

Calim Grabs' Electro hydraulic orange peel grab for waste is an efficient tool for handling garbage, wood, solid waste and demolition etc. The number of tines change between five and eight according to capacity of grabs, which ranges from 0.5–25m³. It has an electro-hydraulic system that works with electricity. Its motor force is increased related to grab force. It is used by a control panel. The mechanical structure for opening and closing is succinct and original. No maintenance is required, except greasing. It is easy to use and can work under any circumstances.

Technical features

- ❖ It is used to transport scrap loads which have 0.5–2,5 tonne/m³ density.
- ❖ It is turned on and turned off by a remote panel which works with 380-440 volt.
- ❖ Products have capacity between 0.5m³ and 20m³.
- ❖ Double coated against the corrosion.
- ❖ It is used by attaching to ship and port crane hooks.
- ❖ Grab tines are made of steel 52–3 or Hardox 400 steel.

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CFS Handling delivers water tight bucket



The bucket is watertight (down to 25m, depth and paths presence of water, at least 10 metres).



Dust cannon with a range of 100m, rotation of 320°.

CFS Handling has recently delivered a watertight bucket to a client who will use it to excavate at a metro station.

Commissioned two months ago, it will be put into operation in about mid-August 2016.

The bucket is provided with the electro hydraulic type piston pump with variable flow and plant Bosch Rexroth 4 thrust cylinders.

This is not a standard bucket: due to its clayey soil working

environment, the valves inside the bucket have specially installed scrapers, which allow for the cleaning of the valves. Also present, is equipment in 4/20mA used for sending messages to the PLC onboard bridge crane.

The bucket is watertight (down to 25m, depth and paths presence of water, at least 10 metres).

ABOUT CFS INTERNATIONAL ENGINEERING HANDLING

CFS Handling operates in the design and construction of equipment for material handling. Thirty years experience of the management team merges into a new company, which is based on three principles: innovation, quality and efficiency.

The company, located in Montichiari in the province of Brescia in Italy, makes use of facilities and operational structures at an advanced industrial level.

Anvil Attachments buckets and grapples – attachments for all applications

Anvil Attachments is one of the oldest suppliers of grabs, grapples and clamshell buckets for bulk material handling. Anvil has been supplying products under various brand names since 1905.

Today, Anvil Attachments continues to supply high quality material handling products under the brand name Hawco, Pro-Line, Anvil, Owen, Yaun, Williams, and Drott. Anvil's testament to quality shows in that many of these products are still in use today.

BUCKETS

Anvil Attachments offers clamshell buckets for all material handling applications. Manufactured in Slaughter, Louisiana with

the highest quality materials and modular designs that feature the use of standard parts, Anvil clamshell buckets offer fast delivery times and a largest selection of options.

Offered in hydraulic, cable, electro hydraulic and diesel hydraulic configurations, Anvil has attachments right for any application.

Hydraulic

Anvil Attachments hydraulic clamshell buckets are offered in several size/capacity options to best fit any material handler machine. Separated by cylinder bore sizes each model offers a range of capacities available. These units are built using a modular system that allows all capacities in each model to use

the same centre section, rotation, cylinders and head weldment. This allows for lower costs and quicker deliveries on both new units and parts orders. This also allows for fewer stock parts for customer using multiple units of varying capacities.

Cable — single-rope

Anvil Attachments single-rope cable-operated clamshell buckets are manufactured for use on ships gear cranes, overhead bridge cranes or any crane not configured with separate holding and closing lines. These units are typically used for temporary projects where cranes are used primarily for other applications. With a simple hook on and use design featuring options of 'touch and go', remote trip or radio control operation these units are built to maximize production while in use. These units are custom sized using customers' crane capacities, working limits (dimensions) and material weights.

Cable — two- and three-rope

Anvil Attachments two- and three-rope-operated clamshell buckets are designed for any crane configured with holding and closing line operation.

Cable — four-rope

Anvil Attachments four rope operated clamshell buckets are designed for cranes configured with dual holding and closing line operation.

Electro hydraulic

Anvil Attachments electro hydraulic-operated clamshell buckets are designed for cranes that have the capacity to supply power and/or control wires to the clamshell. These units are typically used for ship's gear or overhead gantry cranes.

Diesel hydraulic

Anvil Attachments diesel hydraulic-operated clamshell buckets are primarily designed for ships gear and shore cranes to unload barges or ships. These units are self contained with radio remote control operation and do not require any capability to supply power and/or control wires to the clamshell.

GRAPPLES

Like its clamshell buckets, Anvil Attachments offers grapples for all material handling applications. Manufactured in Slaughter, Louisiana with the highest quality materials and modular designs that feature the use of standard parts, Anvil grapples offer the fastest delivery times and the largest selection of options in the industry.

Anvil grapples are offered in hydraulic, cable, electro hydraulic and diesel hydraulic configurations.

Hydraulic — two-tine

Anvil Attachments hydraulic grapples are offered in several size/capacity options to best fit the user's material handler machine. Separated by the type of material designed to handle each model offers a range of capacities available. These units are built using a modular system that allows all capacities in each model to use the same centre section, rotation, cylinders and head weldment. This allows for lower costs and quicker deliveries on both new units and parts orders. This also allows for fewer stock parts for



customer using multiple units of varying capacities.

Hydraulic — four- and five-tine

Anvil Attachments hydraulic grapples are offered in several size/capacity options to best fit the user's material handler machine. Separated by the number of tines each model offers a range of capacities available. These units are built using a modular system that allows all capacities in each model to use the same centre.

Cable single rope

Anvil Attachments single rope cable operated grapples are manufactured for use on ships gear cranes, overhead bridge cranes or any crane not configured with separate holding and closing lines. These units are typically used for temporary projects where cranes are used primarily for other applications. With a simple hook on and use design featuring options of 'touch and go', remote trip these units are built to maximize production while in use. These units are custom sized using your crane capacities, working limits (dimensions) and material weights.

Cable two-rope

Anvil Attachments two rope operated grapples are designed for any crane configured with holding and closing line operation.

Cable four-rope

Anvil Attachments four-rope-operated grapples are designed for cranes configured with dual holding and closing line operation.

Electro hydraulic

Anvil Attachments electro hydraulic-operated grapples are designed for cranes that have the capacity to supply power and / or control wires to the clamshell. These units are typically used for ship's gear or overhead gantry cranes.

Diesel hydraulic

Anvil Attachments diesel hydraulic operated grapples are primarily designed for ships gear and shore cranes to unload barges or ships. These units are self contained with radio remote control operation and do not require any capability to supply power and/or control wires to the grapple.

RENTALS

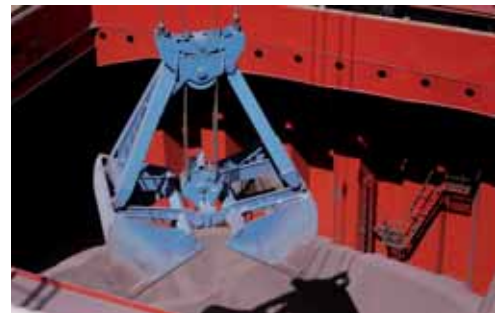
Anvil Attachments also rent out their products.

REBUILDS

Anvil not only rebuilds its own line of buckets and grapples, but it also rebuilds and repairs buckets and grapples from every manufacturer in the industry.



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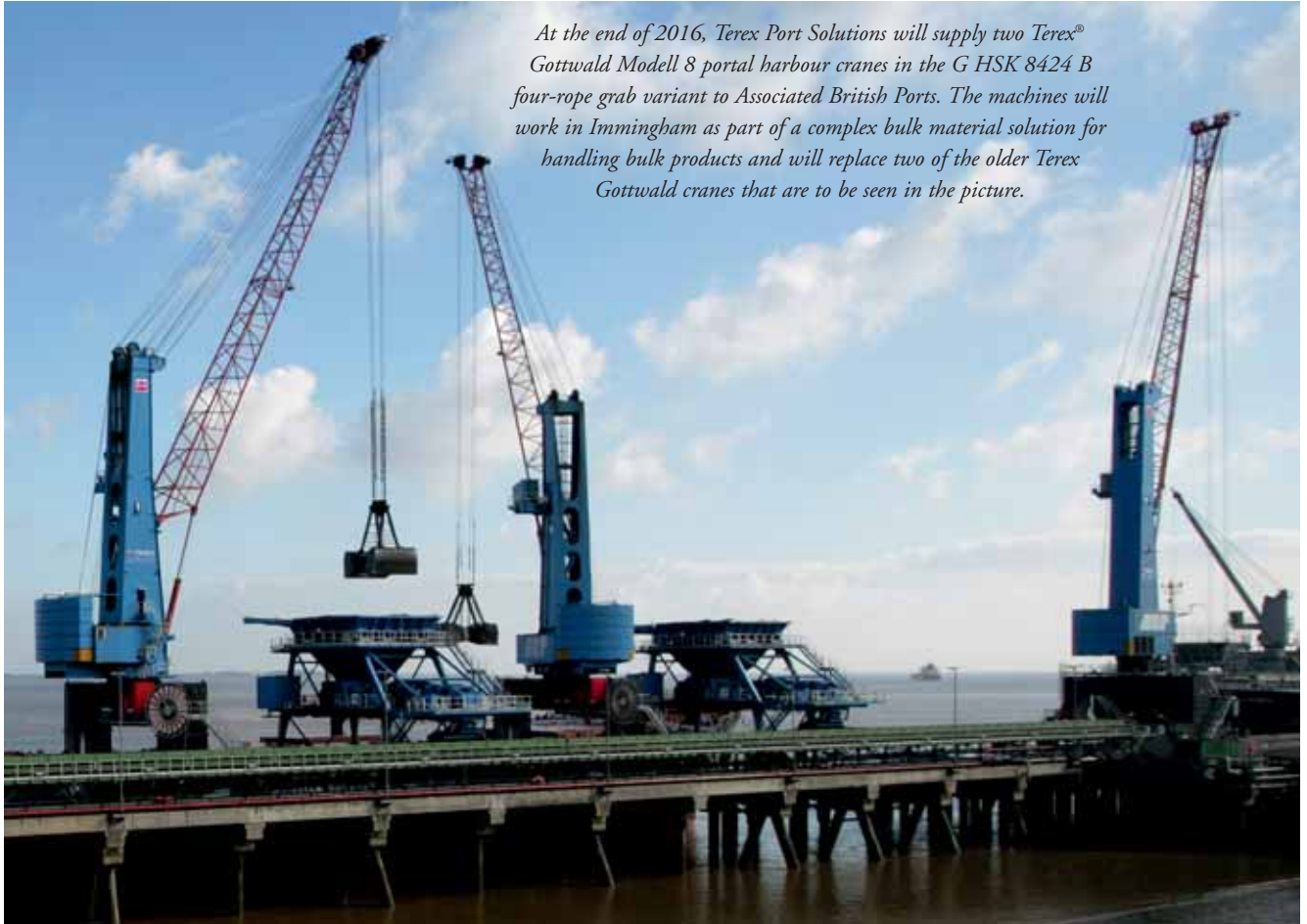
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Associated British Ports continues to trust Terex® Gottwald portal harbour cranes for bulk handling



At the end of 2016, Terex Port Solutions will supply two Terex® Gottwald Modell 8 portal harbour cranes in the G HSK 8424 B four-rope grab variant to Associated British Ports. The machines will work in Immingham as part of a complex bulk material solution for handling bulk products and will replace two of the older Terex Gottwald cranes that are to be seen in the picture.

PORT OPERATOR EQUIPS TERMINAL IN IMMINGHAM, UK, WITH TWO G HSK 8424 B CRANES

Terex Port Solutions (TPS) has received an order from Associated British Ports (ABP) for two electric Terex® Gottwald Model 8 portal harbour cranes in the G HSK 8424 B four-rope grab variant. The British port operator has ordered the two machines for its terminal in Immingham, located on the North Sea estuary of the Humber. The cranes have been adapted to the individual conditions of the terminal and are particularly efficient as they are driven with power from the terminal's own electricity supply. From the middle of next year, they will significantly increase handling capacities for professional loading and unloading of bulk products.

PRESENT IN THE HIGH-PERFORMANCE TERMINAL SINCE 2002

The machines based on Terex Gottwald mobile harbour crane technology will be part of a particularly high-performance terminal, where many Terex Gottwald mobile harbour cranes and portal harbour cranes have been operated since 2002. There they will replace two older Terex Gottwald HSK 360 EG portal harbour cranes from Generation 4 of TPS. The new machines have a 50-tonne grab curve and a maximum lifting capacity of 100 tonnes. They offer an outreach of up to 50m and maximum lifting speeds of 140m/min. TPS has adapted the crane portal to the existing infrastructure of the terminal by providing 14m track gauge and 6m headroom. This also includes the rail-bound travel units that comprise a total of 24 wheels — six in each corner — in order to comply with maximum permissible rail loading.

PART OF A COMPLEX BULK MATERIAL SOLUTION FOR TERMINALS

In Immingham, the G HSK 8424 B portal harbour cranes, like their predecessors, will act as part of a complex, specific bulk material solution, including hoppers controlled from the crane and a conveyor belt. Sean Blissett, Engineering Manager Humber, ABP: "The terminal at Immingham handles a significant amount of bulk products. The solution from TPS has proven its reliability in this demanding environment over the years."

CONTINUOUS GROWTH WITH TECHNOLOGY FROM TPS

Neil Griffiths, the new Sales & Service Director UK and Ireland, TPS, is delighted that ABP is now taking the next step in its long-term business relationship with TPS: "The terminal in Immingham shows how customers can continuously expand their business with our technology. ABP has opted for Terex Gottwald mobile harbour crane technology for 14 years. The cranes now ordered again stand for another visible leap in growth and performance. Griffiths: "The two G HSK 8424 B machines will be the largest cranes based on mobile harbour crane technology in the whole of Great Britain."

LEADING ROLE IN TERMINALS FOR HANDLING BULK PRODUCTS

The order from ABP also highlights the leading role of TPS in solutions for professional bulk handling. Griffiths: "Machine solutions based on our portal harbour cranes are in great demand in this area all over the world, and are used among others in North America, India or Turkey. We have in addition recently chalked up several successes in Brazil."



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Terex® Gottwald mobile harbour cranes from Terex Port Solutions gain foothold in another Indian port

TWO MODEL 4 CRANES, G HMK 4406 B VARIANT, ARE DESTINED FOR IRC NATURAL RESOURCES IN HALDIA

Terex Port Solutions (TPS) is continuing its success in India with its diesel-electric Terex® Gottwald mobile harbour cranes. IRC Natural Resources Pvt. Ltd., which is part of the IRC Group (IRC), has ordered two Model 4 mobile harbour cranes in the G HMK 4406 B four-rope grab variant for its contract at Berth No. 13, Haldia Dock Complex, located to the south of Kolkata on the Ganges estuary. In August 2016, the cranes will be transported, completely erected, by heavy-load vessel to India, where they will handle coal, coke, manganese ore and limestone from October onwards. The two identical machines have a 40-tonne grab curve and a maximum lifting capacity of 100 tonnes. They offer an outreach of up to 46m and maximum lifting speeds of 85m/min and are equipped with a propping system adapted to the conditions at the berth.



Terex® Gottwald mobile harbour cranes continue to be in demand in India. IRC Natural Resources Pvt. Ltd. will commission two Model 4 mobile harbour cranes in the G HMK 4406 B 4-rope grab variant in the fall. The number of cranes ordered by Indian customers since mid-2014 has therefore risen to twelve.

PROVEN TECHNOLOGY FOR NEW BUSINESS SEGMENT

With the two cranes, IRC is placing its trust in globally proven technology for the development of its new port logistics business segment. The group of companies previously specialized mainly in excavation of raw materials and logistics solutions on land. Anil Gupta, Chairman, IRC Group: "Our global growth strategy continues to be aimed at diversification. Here, the port sector at the Haldia site will play a major role. To win the trust of our customers in our capability in this new sector right from the start, we opted for cranes from TPS in our new contract. These machines offer us both excellent productivity and high availability." Particularly with a view to the availability of the cranes, the order also includes an extensive spare parts and service package for three years.

TWELVE CRANES FOR INDIAN PORTS SINCE MID-2014

Andreas Moeller, Sales Director Harbour Cranes TPS is delighted to have captured the attention of yet another new Indian customer, IRC, with mobile harbour crane technology from TPS: "We have significantly expanded our Indian business within a very short time. IRC is the eighth customer to order mobile harbour cranes from us since mid-2014. The machines for Haldia will be the eleventh and twelfth cranes to go to India in this period. We will then have delivered around 40 machines there overall." Robust cranes for professional bulk handling are particularly in demand in the second most populous country in the world. Moeller: "It is especially operators of bulk terminals who are deliberately opting for the productivity and reliability of Terex Gottwald cranes, since fast-growing local industrial production requires a reliable supply of energy carriers such as coal."

FIRST CRANE FROM TPS FOR IRC AND HALDIA

The cranes ordered in the past two years, including the latest two machines for Haldia, are spread over six ports on both the east and west coasts of India. Here, TPS has succeeded in

gaining the interest of highly diverse terminal operators. Shyam Pathak, Regional Director South Asia TPS: "In addition to existing customers established on the market, we have been able to win over up-and-coming terminal operators, such as IRC, with the versatility and high performance of our cranes." The sites in question are characterized by particularly high economic growth. Pathak: "Since 2014, the Indian economy has again gained momentum in many parts of the country. With these cargo-handling machines, we are once again pleased to be able to make a long-term contribution to this positive development. With this order we have also succeeded in extending our presence in India to another port."

ABOUT TEREX PORT SOLUTIONS

Terex Port Solutions is part of the Material Handling & Port Solutions business segment of Terex Corporation that supplies customers in ports with a unique combination of machines, software and services under the Terex and Terex Gottwald brands.

Whether it is ship-to-shore cranes, reach stackers or fully automated, integrated handling systems for containers and bulk, Terex Port Solutions provides reliable solutions for rapid, safe, efficient handling of all forms of cargo with low downtimes and excellent return on investment.

ABOUT TEREX

Terex Corporation is a lifting and material handling solutions company reporting in five business segments: Aerial Work Platforms, Construction, Cranes, Material Handling & Port Solutions and Materials Processing. Terex manufactures a broad range of equipment serving customers in various industries, including the construction, infrastructure, manufacturing, shipping, transportation, refining, energy, utility, quarrying and mining industries. Terex offers financial products and services to assist in the acquisition of Terex equipment through Terex Financial Services.



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Seaway wraps up 2015 navigation season with OECD innovation award

The Great Lakes/Seaway System is a 'marine highway' that extends some 3,700km from the Atlantic Ocean to the Great Lakes. Approximately 160 million tonnes of cargo travels over the combined Great Lakes/Seaway System on an annual basis, supporting over 227,000 jobs and \$35 billion in economic activity.

The binational St. Lawrence Seaway serves as the linchpin within the Great Lakes / Seaway System, connecting the lower St. Lawrence River to the Great Lakes. Beginning in Montreal and extending to points west, the Seaway's 15 locks (13 Canadian and two US) enable ships to climb a total of 168 metres from 'sea level' up to Lake Erie.

US SAINT LAWRENCE SEAWAY DEVELOPMENT CORPORATION (SLSDC)

The Saint Lawrence Seaway Development Corporation is a wholly owned government corporation created by statute on 13 May 1954, to construct, operate and maintain that part of the St. Lawrence Seaway between the Port of Montreal and Lake Erie, within the territorial limits of the United States. Trade development functions aim to enhance Great Lakes/St. Lawrence Seaway System utilization without respect to territorial or

geographic limits.

The mission of the Corporation is to serve the US intermodal and international transportation system by improving the operation and maintenance of a safe, reliable, environmentally responsible deep-draught waterway, in co-operation with its Canadian counterpart. The SLSDC also encourages the development of trade through the Great Lakes Seaway System, which contributes to the comprehensive economic and environmental development of the entire Great Lakes region.

The SLSDC headquarters staff offices are located in Washington, DC Operations are located at the two US Seaway locks (Eisenhower and Snell) in Massena, NY.

CANADIAN ST. LAWRENCE SEAWAY MANAGEMENT CORPORATION (SLSMC)

The St. Lawrence Seaway Management Corporation is a not-for-profit corporation responsible for the safe and efficient movement of marine traffic through the Canadian Seaway facilities, which consists 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,

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which it shares with its American counterpart, the Saint Lawrence Seaway Development Corporation.

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 coordinate 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 programs. The unique bi-national nature of the System requires 24-hour, year-round coordination between the two Seaway entities.

OECD AWARD: A GOOD END TO THE 2015 NAVIGATION SEASON

With water temperatures well above the ten-year average, the St. Lawrence Seaway closed its 2015 navigation season ice free on 31 December. Thirty-six million tonnes of cargo transited the waterway during the season, with grain, at volumes well above the five-year average, leading the way. The Seaway once again proved to be a key asset for farmers as they shipped their crops to markets at home and overseas.

Grain volumes on the Seaway amounted to 10.8mt (million tonnes), one of the strongest years in recent memory. The Port of Thunder Bay, the principal point of entry for grain into the Great Lakes/Seaway System, reported its second-best season in 15 years. Combined with grain being loaded onto ships from other ports such as Hamilton, Duluth/Superior and Toledo, agricultural commodities have become increasingly important to the Great Lakes/Seaway System.

Terence Bowles, President and CEO of The St. Lawrence Seaway Management Corporation (SLSMC), noted that "the Seaway continues to serve as a vital trade artery, enabling cargo to move to more than 50 countries across the globe."

In May, the SLSMC received the Promising Innovation in Transport Award from the International Transport Forum at the OECD, during the 2015 Summit of Transport Ministers held in Leipzig, Germany. The award recognized the SLSMC's pioneering

work in developing, with the supplier Cavotec, the world's first Hands-Free Mooring (HFM) system for ships transiting locks. The use of this equipment will largely replace the traditional practice of manually securing ships in locks with steel mooring lines, enabling the Seaway to orchestrate gains in operating efficiency and safety, and become yet more competitive.

On this subject, Terence Bowles said "the OECD's recognition of the Seaway's work on Hands Free Mooring underscores the value of the innovative spirit demonstrated by our employees, a quality that is essential to success in today's global economy. With strong support from a wide variety of stakeholders, we are setting the stage for a thoroughly modern lock operating system, which will ensure the Seaway's future competitiveness and sustainability well into the 21st century, and attract more vessels to use our waterway."

The 2015 season opened on 2 April, about a week later than usual, reflecting the frigid conditions in early spring, and closed on 31 December with the passage of the vessel *Mississagi* through Welland Canal Lock 1 at 3:41am. The last vessel to exit the Montreal/Lake Ontario section was the *Baie St. Paul*, which exited the St. Lambert Lock at 8:41pm on 30 December. The 2015 navigation season was 274 days in length.

"Now that the navigation season has concluded, winter maintenance projects at the US Snell and Eisenhower locks are already underway. The maintenance of the US locks is a year round job and Seaway employees are diligently working as we continue to rehabilitate and modernize the Seaway infrastructure under our Asset Renewal Program" said Betty Sutton, Administrator of the US Saint Lawrence Seaway Development Corporation.

"The 2015 navigation season saw highs and lows in traditional cargoes that move through the Seaway System. Global demand for coal remained below last year's levels whereas general cargo to and from international and domestic markets remained high with over a 100% increase. Project cargo and dry bulk materials to support the construction and manufacturing industry also remained in positive standings."



The SLSMC has won the OECD award, recognizing its pioneering work with Cavotec on the world's first Hands-Free Mooring system for ships transiting locks.



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FMT invests \$3.7 million in its terminals



In early May this year, Federal Marine Terminals (FMT) announced \$3.7m in investments to ensure that its terminal cargo handling facilities meet their promise to deliver higher standards in safety and efficiency, and by doing so, remain at the forefront of the industry.

These investments include \$1.7m for a new crane, \$1.3m in new forklifts, and \$700K in other equipment and gear for seven of its 12 terminals.

The new crane, a Kobelco CK2750G model, to be delivered this summer to the company's terminal in the Port of Cleveland, will significantly improve production. It will feature a Tier 4 Final engine, the newest generation of motors for this type of equipment, and is expected to achieve 90% reduction of nitrogen oxides and particulate matter emissions when compared with the Tier 3 engines.

The new forklifts acquired for FMT's Burns Harbor, Milwaukee, Cleveland, and Hamilton operations will also feature Tier 4 Final engines as well as urea-based Selective Catalytic Reduction (SCR) controllers, thereby achieving near-zero emissions. In addition, they will be equipped with Hyster wireless monitoring systems to ensure increased

safety and efficiency. FMT aims to install the system on all forklifts owned by FMT throughout 2017–2018.

Other equipment on order for Burns Harbor, Cleveland, Eastport, Calvert, Milwaukee, and Lake Charles to improve safety and productivity include coil trays, street sweepers, side-by-side vehicles, skid steers, and rubber spray for forks and coil rams.

These \$3.7m in investments will enable FMT to make strides in production while reducing emissions, thereby living up to its promise to customers to meet its commitment to respect community and environment.

FMT is also proud to announce the release of its corporate video which are available for viewing on its website.

FMT is the terminal handling division of Fednav, a privately owned shipping company and is the largest international dry-bulk shipping group in Canada. Fednav operates a fleet of 85 vessels and employs 280 office staff worldwide — 150 in its Montreal headquarters — and maintains commercial offices overseas in Antwerp, Charlotte, London, Hamburg, Rio de Janeiro, Singapore, and Tokyo.

Lakes warn mild winter must not derail effort to build another heavy icebreaker

US-flag vessel operators on the Great Lakes are concerned that the mild winter of 2015/2016 will derail efforts to build a second heavy icebreaker. Lake Carriers' Association (LCA) is warning in its 2016 State of the Lakes report released in mid-March that it is concerned that the mild ice season is going to lull Great Lakes shipping and those who regulate it into a false sense of security regarding icebreaking resources. "We'll do ourselves a great disservice if we breathe a sigh of relief, declare the winters of 2013/2014 and 2014/2015 a 100-year occurrence, and say the US and Canadian Coast Guards have enough icebreaking

resources. They don't."

The Coast Guard Authorization Act of 2015 authorizes another heavy icebreaker for the Lakes, and the Senate's Homeland Security Appropriations bill includes \$2 million for initial survey and design work, but full funding for the \$200 million vessel still needs to be approved. The Association is confident funding will come. "The new icebreaker has lots of horsepower behind it. In the House, Representatives Candice Miller (R-MI), Louise Slaughter (D-NY) and Sean Duffy (R-WI) are laser-focused on the issue. In the Senate, Senators Gary

Peters (D-MI) and Tammy Baldwin (D-WI) are leading the way.”

In addition to a second heavy icebreaker, the Association is calling for the US Coast Guard to accelerate modernization of its aging 140-foot-long icebreaking tugs by moving the work from its yard in Baltimore to Great Lakes shipyards.

LCA’s State of the Lakes report also addresses last summer’s 20-day closure of the MacArthur Lock at Sault Ste. Marie, Michigan, calling it a “wake up call” that a second Poe-sized lock is desperately needed. Again, there is forward progress to report. “The US Army Corps of Engineers will produce an Economic Reevaluation Report that will reassess the lock’s benefit/cost ratio. Michigan Governor Rick Snyder (R) called for twinning the Poe Lock in his January 2016 State of the State address. Not long after that the Ohio House of Representatives voted 93-0 to pass a resolution with the same goal. The momentum is building.”

A Department of Homeland Security report on the need for a second Poe-sized lock to connect Lake Superior to the lower Great Lakes and St. Lawrence Seaway issued on 4 March forecasts almost 11 million Americans would lose their jobs if

the Poe Lock were down for six months and the nation suffer a \$1.1 trillion decrease in economic activity.

LCA remains concerned that the government has yet to enact a uniform, federal standard for ballast water and urges passage of S. 373, the Vessel Incidental Discharge Act that requires vessels entering the Lakes from the oceans to treat their ballast and lakers continue to employ their time-tested best management practices.

While progress has been made on the dredging crisis, more than 17 million cubic yards of sediment still clog the Great Lakes Navigation System. LCA calls on Congress and the Administration to 1) continue to increase annual funding for dredging as called for in the Water Resources Reform and Development Act of 2014 so that outlays from the Harbor Maintenance Trust Fund (HMTF) equal receipts no later than 2025; and 2) allocate 10% of HMTF outlay to the Lakes each year.

The Association stresses that once again unfair trade in steel is having significant and negative impacts on Great Lakes shipping and its customers and urges Washington to enact and enforce trade laws that protect America from predatory trade laws.

Ballast water facts, not hype: the view from the Lake Carriers Association

Recently, several articles, editorials and letters have perpetuated exaggerations and inaccuracies about the Vessel Incidental Discharge Act (VIDA). The Lake Carriers Association (LCA) believes the public deserves the rest of the story.

VIDA consolidates vessel ballast water regulatory authority under the US Coast Guard (USCG), confirms the current USCG ballast water regulations, and provides for a periodic process to upgrade the USCG ballast water discharge standard (BWDS) with input from states and the EPA.

Some VIDA opponents claim it eliminates current requirements that vessels treat their ballast water, inferring that only judicial enforcement of the Clean Water Act (CWA) drives this requirement. Others claim this consolidation would make the Great Lakes vulnerable to more aquatic non-native species (ANS). Most cite the Lakes’ experience with zebra mussels as an example of what will happen. The LCA agrees that ANS introduced into the Lakes years ago caused harm, but the rest is hype.

What they do not say is that Lakes ANS were all introduced before 2006, when the USCG, under a separate authority than the CWA, began requiring vessels entering the Lakes from outside US waters to exchange their ballast water with ocean water. Since then, no new ballast water-borne ANS were introduced into the Lakes, despite thousands of foreign vessels entering the Lakes since then.

These articles, editorials and letters claim the USCG’s rules for treating vessel ballast water are too weak, but they are just beginning to be implemented so their effectiveness cannot yet be fairly assessed. Also, ballast water treatment is in addition to the Lakes’ already highly effective ballast water exchange requirement. Equally important, the USCG and the EPA independently determined that the technology doesn’t yet exist to meet a more stringent BWDS. VIDA opponents also claim VIDA would freeze the current USCG discharge standard. This is a wild exaggeration of VIDA’s process for reviewing and improving the USCG BWDS. Also, contrary to some statements, the USCG has far greater experience regulating vessel discharges and inspecting vessels than the EPA or the states.

Some VIDA opponents claim its exemption from ballast water

treatment for vessels serving only Lakes ports (lakers) will spread ANS among these ports. However, current EPA and USCG regulations already exempt lakers from ballast water treatment and instead require extensive best ballast water management practices. Since the USCG began requiring mid-ocean exchange for other vessels, lakers have discharged approximately 66 billion gallons of ballast water from the lower Lakes into Lake Superior waters. According to the EPA, US Geological Service, and National Oceanic and Atmospheric Administration, no ANS have been moved anywhere in the Lakes by lakers. Clearly, lakers are not the problem.

Why is there opposition to VIDA? Some groups focused on general environmental goals see lawsuits against Federal, state, and private entities as their preferred mechanism of change and confuse competing and conflicting regulations with progress. However, laker operators were one of the first groups to sound the alarm on ANS. In 1993 the LCA instituted its own best management practices to prevent ANS inter-lake movement. Laker operators work with government agencies, universities, research institutions, and environmental and engineering experts to move the state of science and technology forward. The Federal government is establishing ballast water management technological standards, inspection and monitoring criteria, and enforcement capabilities. The LCA sees few signs that VIDA opponents are working equally hard for solutions that really work.

CWA was specifically designed for fixed industrial facilities handling substances such as industrial wastes, sewage, and garbage, not the Lake water used as ballast by lakers. Commercial aircraft and trains do not have to meet varying equipment requirements for each state they serve or pass through; they meet nationwide Federal standards. Applying the same approach to vessels will not have a disastrous effect on the health of the Lakes; it will just reduce conflicting and redundant regulations that cost good-paying jobs and increase consumer prices.

VIDA is well-reasoned, common sense legislation, and it will result in significant new protection against ANS threats. VIDA keeps the gate closed to aquatic non-native species and gives the Coast Guard, the agency who closed the gate, primary responsibility as our national invasive species gatekeeper.

Second phase of the Interlake Steamship Company's exhaust gas scrubber installations complete



*The Lee A. Tregurtha
(photo: Rod Burdick).*

ONE THIRD OF FLEET OUTFITTED WITH EMISSION-REDUCTION TECHNOLOGY

On 22 June, the *Lee A. Tregurtha* sailed from Fincantieri Bay Shipbuilding Company in Sturgeon Bay, Wis., becoming Interlake Steamship Company's third self-unloading bulk carrier to be outfitted with exhaust gas scrubbers.

Interlake became the first US-flag fleet to test scrubbers on the Great Lakes in April 2015 after pioneering the emission-reduction technology on its *Hon. James L. Oberstar*. Earlier in June, the *James R. Barker* sailed as the fleet's first thousand footer with scrubbers.

"With the *Lee A. Tregurtha* back in service, one third of our fleet is now equipped with innovative scrubber systems

implemented specifically to net significant emission reductions," says Interlake President Mark W. Barker. "Reducing our environmental footprint and leading the way with this technology illustrates our commitment to continuous improvement across our fleet."

The retrofit of the *Lee A. Tregurtha* was supported by a \$500,000 cooperative agreement from the US Department of Transportation's Maritime Administration (MARAD).

"We're thrilled to have MARAD as a partner and to have their fiscal support to help prove our ongoing emission-reduction technology," Barker says. "These types of public-private collaborations will fuel the advancement of cutting-edge technologies to promote more sustainable solutions in the



*The James R. Barker
(photo: Glenn Blaszkiewicz).*

CANADA'S GATEWAY TO THE WEST



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shipping industry.”

Exhaust gas scrubbers reduce sulphur emissions to a level that meets or exceeds North American Emissions Control Area requirements.

“This investment accelerates the growth of alternative fuel and environmental technologies throughout the United States’ maritime industry. This project will yield data that will support future commercial investment decisions and will provide lasting benefits for our nation while helping us reduce the industry’s environmental footprint,” said Maritime Administrator Paul ‘Chip’ Jaenichen. “This is how government can work to encourage technology advancement and environmental stewardship.”

Fincantieri Bay Shipbuilding handled the successful installation on the 806-foot *Oberstar* and was the clear choice to complete the second phase of installations on the 1,004-foot *Barker* and the 826-foot *Tregurtha*.

Both the *Lee A. Tregurtha* and the *James R. Barker* are equipped with the same single-inlet, closed-loop DuPont™ Marine Scrubbers from Belco Technologies Corp. (BELCO), a DuPont company, that were installed on the *Oberstar*.

The scrubber units, which are attached to the exhaust system of each of the ship’s two engines, effectively strip the majority of sulphur from its stack emissions. Here’s how the systems work: Exhaust gas from the engine is sent through a series of absorption sprays that ‘wash’ and remove impurities, specifically sulphur and particulate matter. That washed exhaust gas then travels through a droplet separator before a clean plume of white steam is discharged into the atmosphere.

A total of five Interlake vessels — including two additional 1,000-footers: the *Paul R. Tregurtha* and *Mesabi Miner* — will be outfitted with these types of scrubbers by 2017.

As the first US-flag fleet to implement the scrubber technology, the company was not only tasked with proving its emission-reduction capability but also taking the lead in developing a sustainable supply-and-delivery infrastructure to support its widespread use on the Great Lakes.

Specifically, the scrubber system relies on an injection of sodium hydroxide — to neutralize and remove sulphur from the exhaust gas — and that chemical has to be delivered to the vessel about twice a month.

Working with partners, Hawkins Inc., PVS Chemicals Inc., Garrow Oil & Propane and OSI Environmental, the company has established waterfront supply capability at Sturgeon Bay, Wis., and Detroit, Mich. Calumet Specialties LLC has become a vital partner and stakeholder in the development of a new supply capability within the Twin Ports of Duluth, Minn., and Superior, Wis. A supply-and-delivery infrastructure is expected to be built out at ports located near East Chicago, Ill., and Burns Harbor, Ind.

Propelled by a long-term vision to create the most efficient and environmentally responsible fleet on the Great Lakes, Interlake is shoring up its ten-year, \$100 million fleet modernization which includes the steam plant conversion program and the repower of its final vessel, the *Herbert C. Jackson*.

ABOUT INTERLAKE

Headquartered in Middleburg Heights, Ohio, the Interlake Steamship Company was launched in 1913. For more than a century, the company has led the Great Lakes shipping industry through its commitment to flawless service, environmental stewardship and continuous innovation. ISO 9002 certified, Interlake’s modernized fleet of nine vessels deliver raw materials to ports throughout the Great Lakes region.



Logistec provides high quality cargo-handling services to marine and industrial customers through a strong network of strategically located facilities in the Great Lakes, the St. Lawrence River, the U.S. Gulf, and on the Eastern Seaboard of North America.

THE CHALLENGES WE MEET

At Logistec, our commitment to provide timely responses and services is enhanced by our ability to monitor real-time performance. We are committed to the new opportunities that the latest technologies provide.



CUSTOMIZED SOLUTIONS YOU CAN COUNT ON.

For over 60 years, McKeil Marine has successfully delivered customized logistics solutions. Led by highly skilled crew, our ever-growing and versatile fleet of tugs, barges and ships, operate throughout the Great Lakes, St. Lawrence River, East Coast and Canadian Arctic.

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CSL helps set the stage for one of yachting's biggest races

The eyes of the sailing world will be focused on Bermuda in 2017, when the prestigious America's Cup competition is held there for the first time in its 165-year history. CSL played a fundamental role in this milestone by literally laying its foundation.

More specifically, the Handysize CSL International Pool vessel *Venture* (previously *Balder*) deposited loads of aggregate in the island's dockyard, which was too small to handle the significant amount of traffic the event is expected to draw. The aggregate shipments were the first step in solving Bermuda's problem. The question is: what do you do when you're on an island and you need more space? The answer is: you build another island.

Large amounts of aggregates were deposited to build up the foundation for an artificial land mass. Among the world's most outstanding examples of this technique are the elegant palm-shaped islands that were created off the shore of the Arabian Gulf city of Dubai.

The government of Bermuda is planning on something almost as dramatic in order to enhance the existing dockyard's potential. However, as CSL's Managing Director Jeff Barnes explains, building a new island off Bermuda called

for some additional effort, which took advantage of CSL's key capabilities.

"Usually these islands are built with dredged materials," he says. "That wasn't possible in Bermuda. They wouldn't have had enough to do the job."

Captain Sergey Osminkin, CSL's Senior Manager of Port Operations, oversaw the safe delivery of the aggregates. Captain Osminkin ensured that pile driven moorings were correctly positioned and that two tugs with sufficient horsepower were on standby to assist *Venture* as she manoeuvred into place for the precision discharges.

At the beginning of November 2015 *Venture* began picking up material from the quarry and transporting it to Bermuda, where it was discharged in position to create the new island.

By mid-January 2016, *Venture* had delivered its seventh and final load of aggregates, making for a total of some 250,000 tonnes brought on site for the work. In June 2017, this site will be a striking addition to an international sailing destination that will become the primary venue for a race watched around the globe. CSL, for its part, literally set the stage.



An inside look at the Port of

The Port of Indiana-Burns Harbor is a gateway to America's Heartland. Located in Portage, Ind., on the south shore of Lake Michigan, just 18 nautical miles from Chicago, the port handles international ships via the Great Lakes connection to the Atlantic Ocean.

Northwest Indiana is North America's top steel-producing area and the port is home to 15 steel-related companies. The port is well equipped to handle bulk commodities for use in the steel-making process with 17 berths that can accommodate ocean-going ships as well as all vessels traversing the Great

Lakes and inland rivers.

Port facilities include:

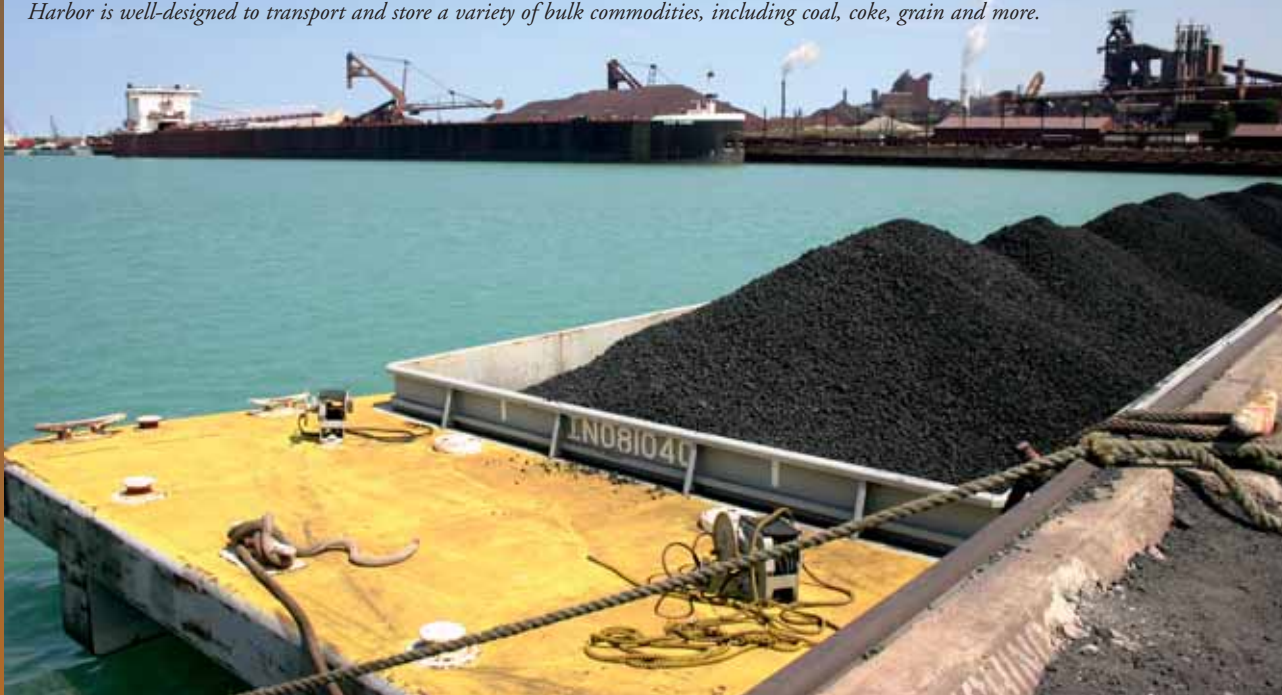
- ❖ 9,000ft of piers;
- ❖ 55 acres paved lay-down storage area;
- ❖ 330,000ft² of warehouse storage;
- ❖ climate-controlled storage;
- ❖ cranes with multiple lift capabilities; and
- ❖ ro/ro dock.

Major cargoes include steel, coal, limestone, grain, dry fertilizer, minerals and large project cargo.

Flanked by steel mills, the Port of Indiana-Burns Harbor is located in North America's top steel-producing area. Here the port handles a shipment of iron ore.



With 9,000 feet of piers, 55 acres of paved lay-down storage and 330,000ft² of warehouse storage, the Port of Indiana-Burns Harbor is well-designed to transport and store a variety of bulk commodities, including coal, coke, grain and more.



Indiana-Burns Harbor

Located just 18-nautical miles from Chicago, the Port of Indiana-Burns Harbor has the capability to handle a variety of bulk cargoes ranging from road salt, dry fertilizer, grain and coal.



The Port of Indiana-Burns Harbor Cargill facility is home to a 2,400ft berth used primarily to export grain and agricultural products from the Midwest's agricultural corridor.

The Port of Indiana-Burns Harbor handles approximately 100 ships, 200 laker vessels and 400 barges annually. Here the port receives a barge shipment of the fertilizer ammonium sulphate.



Rand Logistics introduces newest Canadian-flagged self-unloader



In December last year, Rand Logistics, Inc. introduced its newest Canadian self-unloading vessel, the *Manitoulin*, into service. The new vessel has the largest carrying capacity of any existing river-class self-unloader and is anticipated to be the most efficient vessel of its class on the Great Lakes.

The new addition increases the size of Rand's fleet to 16, including ten Canadian-flagged and six US-flagged vessels, and supports recent new long-term contracts, which took effect in April 2015.

"As reported in our second quarter fiscal 2016 financials, the new vessel will service existing business that is presently being delivered through a third party time charter," commented Mark Hiltwein, Rand's CFO. "We are in the process of transferring tonnage to our new vessel and ending the third-party time charter agreement that has been in place throughout the current sailing season. We do not expect that our newest vessel will have a meaningful impact on our fiscal 2016 financial results. In the 2016 sailing season, we expect per day profitability generated from our newest vessel to exceed that of any of our existing assets."

Hiltwein added, "We estimate that the new vessel will increase our overall return on invested capital by approximately 1% and our free cash flow per basic shares outstanding at the current Fx rate by between \$0.18 and \$0.22 on a full year basis."

"The *Manitoulin* is officially in operation in the Great Lakes Region after successfully completing the voyage from China to Canada over the last two months, travelling across the Pacific Ocean, through the Panama Canal, along the East Coast, and down the St. Lawrence River. We are pleased with the vessel's performance and are thankful for our skilled crews and all who contributed to delivering the vessel into service safely and within the expected timeframe," said Scott Bravener, President of Lower Lakes Towing Ltd. and Grand River Navigation Company, both subsidiaries of Rand.

MIRACLE MONTH

Rand will donate \$0.05 for every tonne of cargo carried by its fleet during August 2016 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. Total donations could amount to in excess of \$100,000 based on historical August tonnage. Rand expects to distribute funds to designated charities in September 2016.

"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. "We are looking forward to making Marine Miracle Month an annual event for Rand, our customers and the organizations and children in the communities that it positively impacts."

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 four 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.

Major developments under way at the Port of Trois-Rivières

For 2016, the traffic seems to be slowing down at Port of Trois-Rivières. It will be a normal year rather than one of the increasing seasons that have occurred in the past.

Nevertheless, the Trois-Rivières port Authority has many development projects going on.

Located on the St Lawrence River, the Port of Trois-Rivières is open year-round to ocean-going vessels of all types. A successful port due to its workforce productivity and its key position as an efficient terminal centre on the North American Continental Gateway, the Port of Trois-Rivières offers smooth connections between marine, rail and road networks to serve the world's largest market.

NEW 62,000M² MULTI-PURPOSE TERMINAL

Currently under construction, this new multi-purpose terminal is specifically designed to be used to handle a large variety of products. The port's multi-purpose area, includes docks 10 and 11, sheds 9, 10 and 11, and lots 10 and 11. Major investments were made in this area during Phase I of On Course for 2020. The construction of Terminal 13 and dock 10 will complete this area and greatly improve its productivity.

The improvements in the multi purpose zone total \$40 million in infrastructure investments between 2015 and 2017. The Government of Canada has committed up to \$16.3 million from the Gateways and Border Crossings Fund. From this amount, \$3.6 million is being invested specifically in the dock extension. The Government of Quebec will contribute up to \$4.9 million from the Programme de soutien aux investissements dans

les infrastructures de transport maritime [program to support investments in maritime transportation infrastructure], adopted as part of the Government of Quebec's maritime strategy. The Trois-Rivières Port Authority will cover the rest of the project costs, estimated at \$18.8 million. In addition to these

MULTIPURPOSE ZONE STATISTICS

Total investments in the multi-purpose zone	\$55m
Government of Canada	\$16.3m
Government of Quebec	\$4.9m
Trois-Rivières Port Authority	\$18.8m
Private sector (handling equipment)	\$15m

Delivery dates and project costs included in the multi-purpose terminal

Sheds 24 and 25	\$5m (\$2.5m each) – 2016
Redevelopment of dock 13	\$20.2m – 2016
Extension of dock 10 and development of its storage area	\$14.8m – 2017

Dock 10 \$14.8m

Government of Canada	\$3.6m
Government of Quebec	\$4.9m
Trois-Rivières Port Authority	\$6.3m
Total project cost	\$14.8m



Ongoing construction at Dock 13.

infrastructure investments, \$15 million from the private sector will be provided for handling equipment.

TERMINAL 13'S DOCK FACADE IS TAKING SHAPE

Terminal 13 is part of the port's multi-purpose area.

Construction work on Terminal 13 includes rebuilding Dock 13, consolidating Dock 14 and constructing the storage area located alongside these docks, and the roads and train tracks that provide access to these facilities designated as Terminal 13. Old Shed 13 will be



Coast Guard agencies play a vital role

The Canadian and United States Coast Guards have a critical role in fostering safe, secure and environmentally-responsible maritime activity on the Great Lakes and St. Lawrence Seaway.

Crews from both countries play a vital role in ensuring the safe movement of cargoes, flood mitigation, and search-and-rescue serving their maritime communities 365 days a year.

The two Coast Guards deliver a multitude of maritime services including Icebreaking, Search and Rescue, Environmental Response, Marine Communications and Traffic Services, Aids to Navigation, Maritime Security and Waterways Management.



The crew of the Canadian Coast Guard Ship Griffon carry out their aids to navigation duties on the St. Lawrence River in March 2014.



The crews of the Canadian Coast Guard Ship Griffon and the United States Coast Guard Ship Bristol Bay assist a commercial vessel through the St. Clair River in January 2015.



The Canadian Coast Guard Ship Samuel Risley escorts a commercial vessel along the St. Clair River near Sarnia Ontario in March 2016.



Before and after — this picture shows Docks 10–13 before development, and the picture below gives a projection of what the docks will look like in December 2018 when all work is completed.

replaced by a modern outdoor storage area with a strong load-bearing capacity. This project also required the construction of sheds 16, 24 and 25 to replace Shed 13, which had reached the end of its useful life and had to be torn down to make room for the new terminal. Sheds 24 and 25 have already been completed.

“Terminal 13 is the final component of the On Course for 2020 plan that the Port of Trois-Rivières will have completed three years ahead of schedule. This work will increase the port’s outside dock storage by 40%, but above all it will give companies better access to overseas markets and contribute to job creation in the region,” proudly states Gaétan Boivin, President and CEO of the Port of Trois-Rivières. The construction of Terminal 13 is ongoing and will be completed at the end of the year.

MAJOR INVESTMENT TO EXTEND DOCK 10

Extending dock 10 and improving storage capacity are part of the improvements in the multi purpose zone.

The project involves extending dock 10 towards the east and filling the space between this extension and the current dock 9.

The project alone will increase exterior storage space in this area from 3,000m² to 12,000m², which will enable increased shipping of a large variety of products and non-containerized general cargo. As a result, this will improve the competitiveness of shipping on the St. Lawrence and of the region’s manufacturing companies.

ESTABLISHING A MULTI-PURPOSE ZONE FREIGHT TRANSPORTATION RELATED TO REGIONAL BUSINESS ACTIVITIES

The sector of the port covered by the project is part of the multi-purpose terminal used to handle a large variety of products. This freight is directly related to regional business activities, either as inputs (steel and cocoa beans) or export products (wind turbine towers, aluminium and cable reels). This terminal can also be used for short sea shipping (SSS) and several such projects have been carried out.

EXTENSION OF DOCK 10

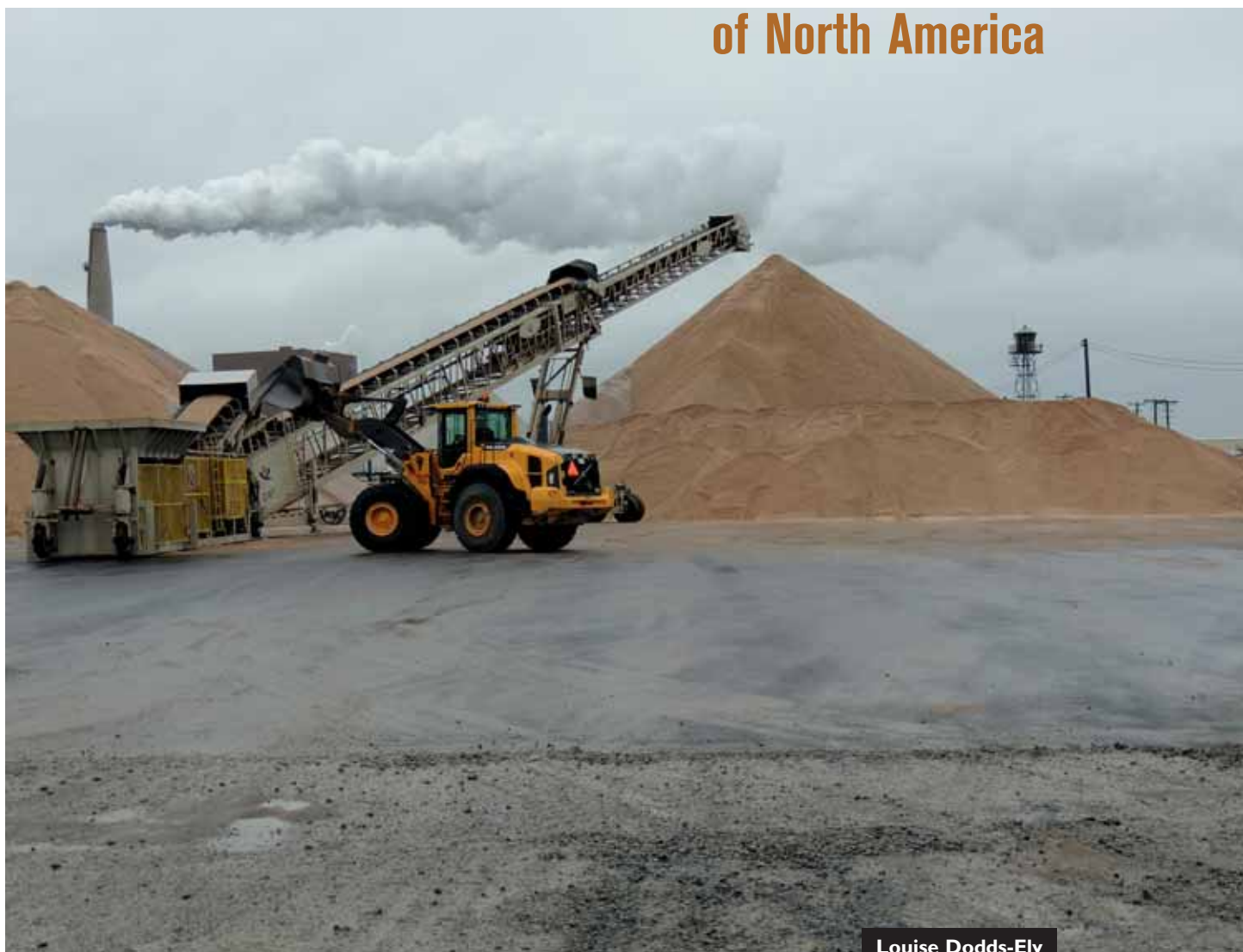
By extending dock 10 towards the east, the project will increase exterior storage space in this area to 12,000m². **DCi**





Eastern **promise**

bulk handling on the East Coast of North America



Louise Dodds-Ely

Port of Belledune enters the salt handling arena

The Port of Belledune in Canada is a year round, ice free, deep sea port strategically located close to the entrance of the St Lawrence River; the gateway to central Canada and North America's vast interior market. The port's proximity to Europe provides shippers easy access to global markets.

Safety is always the first priority at the Port of Belledune. The BPA holds an A+ safety rating from Transport Canada.

The Port of Belledune has over 24 hectares (60 acres) of outdoor lay down area directly adjacent to or on its terminals. An additional 650 hectares (1,600 acres) of port own land

available for development next to the port marine facilities.

Bulk cargo makes up the majority of cargo shipped through the Port of Belledune. A sample of the dry bulk cargoes handled thus far in 2016 include; coal, petcoke, lead, wood chips/biomass, wood pellets, gypsum, and armour stone. For the first time in the history of the port, it has now handling salt shipments. Dry bulk volume for 2015 was 1,590,086 metric tonnes. The port categorizes cargo into five sectors; Energy, Forestry, Mining/Minerals, Agriculture, and Modular.

January 2016, the Port of Belledune welcomed a new

President & CEO, Denis Caron. In this role, Caron is responsible for the overall operation of the port and its financial success and has the ability to connect vision and strategy into even further world-class execution and leadership to drive the Belledune Port Authority's (BPA) success for the next chapter.

The Port of Belledune is currently working on its new business plan, which is set to be released in autumn this year.



ABOUT THE PORT OF BELLEDUNE



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

The transformation of the port since that time has been impressive. In 1968, the first wharf was constructed to serve Brunswick Mining & Smelting Corp. (now strata Zinc Inc). In 1970, FS101 was built. In 1991, terminal 2 (wharf) was constructed, to service NB Power & Irving Oil. In 2003, the

84,400ft² Fab Facility 104 was built. In 2008, FS102 & FS103 were built (in 2014 FS103 was extended). In 2009–2011, a \$67 million infrastructure project took place. This included 2m of dredging; containment cells, 18 acres of laydown area; ro/ro/barge terminal; completed dock face on terminal 3. In 2011, Fab Facility 105 was built (100ft x 400ft, with 65ft clearance under 2 20-tonne overhead cranes.)

The Port of Belledune benefits from its small town advantage, which allows for a more personal relationship between the community and the port, with an obvious economic impact. The community has the freedom to voice any questions or concerns directly with the port. The safety and security of the local



Tonnage & Vessels

Sector	2014		Sector	2015	
	Actual Tonnage	Vessels		Actual Tonnage	Vessels
Energy	1,156,091	28	Energy	1,164,277	32
Forestry	163,304	10	Forestry	226,479	10
Mining & Minerals	171,922	11	Mining & Minerals	192,038	17
Agriculture	164,159	9	Agriculture	191,645	11
Break Bulk	314	3	Break Bulk	526	1
Total	1,655,790	61	Total	1,774,965	71

community is of paramount importance to the Port of Belledune, and the BPA has been awarded an A+ safety rating from Transport Canada. Transport Canada Marine Safety & Security has not identified any vulnerabilities during its past two assessments.

There are also a range of opportunities for local entrepreneurs — more than 650 hectares (1,600 acres) of land rich in aggregate resources are available for development.

The port boasts great hinterland connections, with direct access to CN Rail and highways, which provides 75% of the US population and all Canadian markets.

Coal expertise from Dominion Terminal Associates

Dominion Terminal Associates LLP's (DTA) coal shipping and ground storage facility is located on the east coast of the United States in the port of Hampton Roads at Newport News, Virginia. DTA's emphasis on efficiency, quality and reliability, together with its state-of-the-art sampling and blending systems, combine to provide outstanding service to customers worldwide. DTA also handles compatible bulk products, such as petcoke.

DTA is managed and operated by an on-site team of employees.

Railroad service: CSX Transportation delivers unit trains from Eastern coal mines. Highly efficient transit times from the mines to the terminal, combined with ground storage capacity of 1.7mt (million tonnes) combine to minimize total time in port for vessels.

Vessels accommodated: Seagoing and coastal barges and colliers of up to 177,000dwt. Pier length is 1,162 feet with berths for loading on either side. Both berths are dredged to a mean low water depth of 50 feet to match the harbour channel. The pier will support future dredging to 55 feet on both sides.

Ground storage: 1.7mt net capacity depending on the number of piles. Coal is segregated in storage areas by coal type and shipper.

PLANT DESCRIPTION:

- ❖ 13 miles of track;
- ❖ a three-railcar thaw shed eliminates the need for freeze proofing;
- ❖ tandem rotary dumper and railcar positioner capable of dumping up to 5,200tph (tonnes per hour);
- ❖ two stacker/reclaimer units and one reclaimer unit with travel, luff and slew capabilities have booms 200 feet long, each capable of stacking 5,900tph or reclaiming 6,800tph. Coal is reclaimed through a grate to remove contaminants;
- ❖ one travelling shiploader with travel, luff and slew, telescoping chute, rotating spoon and 143 feet long boom with 79 feet of air draught capable of loading 6,500tph;
- ❖ 19 belt conveyors varying in length from 79 to 1,713 feet with over four miles of belting;
- ❖ twin 4,000-tonne silos and variable speed vibrating feeders permit precise blending from multiple coal piles. Coal can be stacked into piles according to a blending scheme, and further blending can be accomplished through layering coal into the vessel. DTA will work with customers to adjust to their specific blending needs;
- ❖ inbound and outbound belt scales, metal detectors, mechanical samplers, reclaim grates, magnetic separators, an emphasis on pile separation and good housekeeping



assure product quality;

- ❖ Programmable Logic Controllers communicate with DTA's proprietary production database (DTAbase) to confirm that the stacker/reclaimers are in the correct position before stacking or reclaiming to assure that coal is being transferred to/from the proper storage location;
- ❖ mechanical samplers, inbound and outbound are operated by a third party independent sampling company; and
- ❖ an impervious surface of storage areas, a system of runoff ditches, chemically balanced holding ponds and a computerized storage area water spray dust suppression system combine to make DTA an environmentally safe, state-of-the-art facility.

BLENDING OPTIONS

Dominion Terminal Associates LLP offers a multitude of blending options which can produce blending to meet customers' needs, including pile/direct dump blending, two-pile blending, and three-pile blending.

Pile layering (stacking): in addition to the above methods of blending, layering can be done in stacking to achieve a degree of blending in the piles. Inbound trains can be scheduled with the CSX Railroad to arrive at certain times so as to stack or layer coals into a pile in a planned sequence. DTA can also line up the cars in the load tracks for dumping in any sequence desired by the customer to accomplish layering in the piles. The piles stacked in this fashion can be reclaimed in a stair step manner to obtain a good cross section of the pile to insure uniform quality throughout the vessel loading.

Silo layering (reclaiming): DTA can establish a sequence of reclaiming set amounts of coal from one pile then switching to another pile, layering the coals in the outbound silos and alternate reclaiming from two or more piles. As many as eight piles have been involved in a reclaiming rotation.

Port of Palm Beach enjoys record year handling sugar



Loading sugar at the Port of Palm Beach.

The Port of Palm Beach, 80 miles north of Miami and 135 miles south of Port Canaveral, handles bulk sugar, molasses, steel and asphalt. The port is currently enjoying a record year in terms of sugar throughput. All of the exported raw sugar that is produced in the Glades area, almost 900,000 tonnes, is shipped through the Port of Palm Beach.

The ship entrance at the port is through an inlet channel 300ft wide with no aerial obstructions leading into Lake Worth. Transit time is a short 20 minutes from the sea buoy to the docks, with operating draughts of draughts of minus 33 feet (MLW).

The Port of Palm Beach is the fourth busiest container port of Florida's 14 deepwater ports and is the 18th busiest container port in the United States. As well as containers, the port also handles diesel fuel, molasses, liquid asphalt, and other bulk commodities. There is also substantial tonnage involved in the movement of heavy lift and project cargoes. All of this happens in a port that has only 156 acres of land.

Unlike most ports in the United States, the Port of Palm Beach is an export port, with approximately 80% of its cargo being exported, with the subsequent improvement in the balance of trade. The majority of the exported cargo goes toward supporting the island nations of the Caribbean. The Port of Palm Beach supplies 60% of everything consumed in the Bahamas and is the essential lifeline to the rest of the Caribbean.

The Florida East Coast Railway Company services the docks and piers through the port's industrial rail switching operations. It is the only port facility in south Florida operating a rail system with pier-side box, hopper, and intermodal cars operating 24 hours a day. Located on port property are six miles of trackage for intermodal transfers and handling.

All essential federal agencies with oversight for international trade and passenger flow are located in the Maritime Office Complex. A foreign Trade Zone (FTZ # 135) has been in operations since 1987. It encompasses several port and private sector sites.

There is one privately owned general purpose warehouse in Boca Raton, four privately owned warehouse sites in Martin

CARGO THROUGHPUT (SHORT TONS)

FY2015 (1 Oct 1 to 30 Sep)

Asphalt	80,732
Petroleum	53,045
Molasses	100,553
Sugar	544,780
Steel (recyclable/scrap)	26,604

Year to date

Asphalt	57,833
Molasses	77,892
Sugar	324,980
Steel (recyclable/scrap)	18,727

County (near Stewart International Airport), and the Port of Palm Beach Cold storage terminal.

CARGO CAPABILITIES

Cargo services at the Port of Palm Beach are unlimited with seamless cargo movement of bulk, breakbulk, containerized, heavy-lift and cold cargoes. Additionally, the Port's multi-modal transport including rail, truck, barge and vessel services are offered 24 hours a day, seven days per week. Benefits of the port include:

- ❖ non-union work force;
- ❖ no aerial obstructions;
- ❖ -33MLW draught;
- ❖ 6,500 linear feet of berthing and 685 feet of ro-ro berthing;
- ❖ 1,400ft x 1,100ft turning basin;
- ❖ three slips, 17 berths, and four ro-ro ramps;
- ❖ on-port warehouse and office space;
- ❖ 100,000ft² cold storage facility;
- ❖ Foreign Trade Zone #135;
- ❖ on-dock rail linked to five miles of port-owned track, linked directly to the Florida East Coast Rail Company; and
- ❖ over \$100 million in capital improvement projects.

ASGCO®'s heavy duty wash-box belt cleaning system reduces airborne dust by over 90% at Trona Mine

PROJECT

Industry: Minerals — soda ash
Application: Conveyor transfer point from sectional to main line
Product: ASGCO® Wash Box™ secondary belt cleaning system
Objective: To greatly reduce the airborne irritable dust levels and the residual material from the belt



CHALLENGE

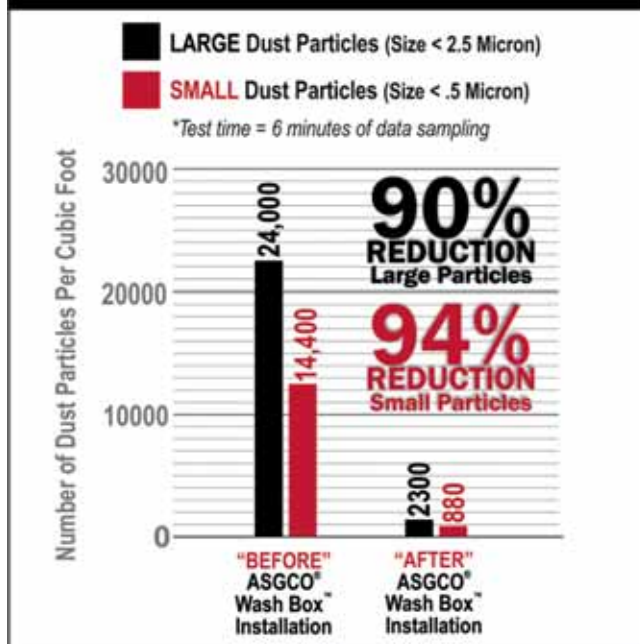
This Trona mine lent itself to high concentrations of extremely irritable dust. The mine was over 1,500ft deep, going through the waterline. The existing cleaners were not heavy duty enough to handle the high speed belt and high pressure water.

RECOMMENDATIONS

ASGCO®'s engineering department listened to the concerns of the customer. They recommended designing and installing a



DUST PARTICLE TESTS BEFORE/AFTER WASH BOX™ INSTALLATION



customized stainless steel Mine Duty Wash Box™ system with a wider, deeper box that included specialized high pressure nozzles and plumbing to withstand 750psi, Retractable Razor-Back® secondary cleaners with Spring-Shoc™ tensioners and custom-designed mounting brackets to meet the customer's special requirements. The self-contained belt cleaning system also contained heavier duty pillow block bearings for high speeds and work loads.

RESULTS

The ASGCO® Wash Box™ provides the highest degree in belt cleaning technology. Air quality tests performed, have proven that the airborne dust levels in the plant showed a huge reduction and are almost normal fresh air quality. The Residual Materials Test showed how well the customized system worked.

In addition, ASGCO® offers exceptional underground mining support and service.

WASH BOX™ FEATURES AND BENEFITS:

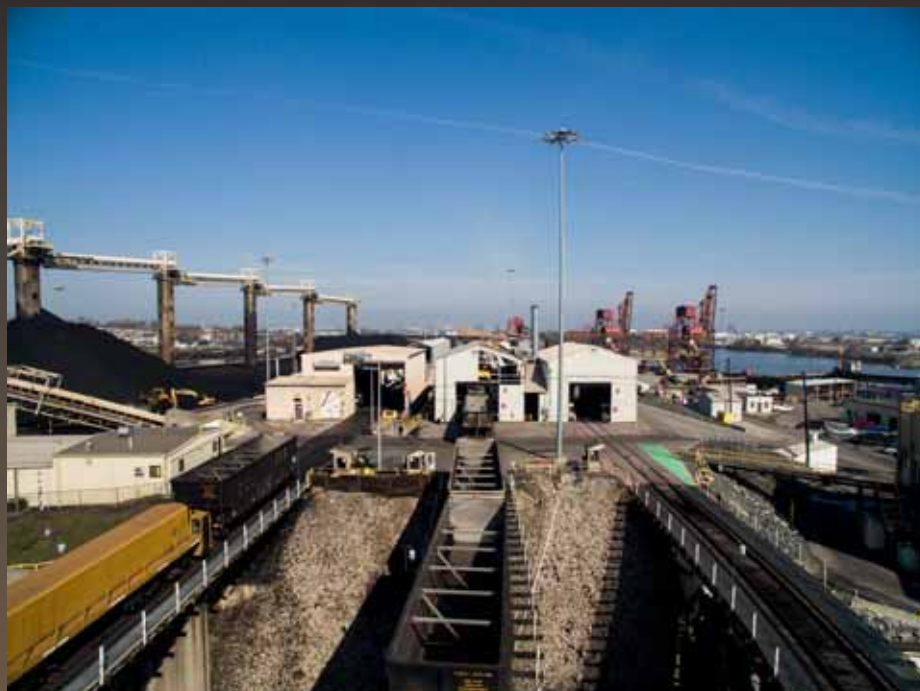
- ❖ complete belt cleaning system that incorporates a series of spray bars, belt cleaners and pressure/deflection roll to maximize effectiveness and virtually eliminate all carry-back;
- ❖ fully enclosed system that contains the wash waste fluid and carryback;
- ❖ large removable service doors allow for easy inspection and service access; and
- ❖ can be customized to meet exact application needs.

Railroad transportation from CSX Corporation

CSX Corporation, together with its subsidiaries based in Jacksonville, Fla., is one of the USA's leading transportation suppliers, and transports a great deal of bulk cargo. The company's rail and intermodal businesses provide rail-based transportation services including traditional rail service and the transport of intermodal containers and trailers.

Overall, the CSX Transportation network encompasses about 21,000 route miles of track in 23 states, the District of Columbia and the Canadian provinces of Ontario and Quebec. Its transportation network serves some of the largest population centres in the nation. Nearly two-thirds of Americans live within CSX's service territory.

CSX serves major markets in the eastern United States and has access to over 70 ocean, river and lake port



terminals along the Atlantic and Gulf Coasts, the Mississippi River, the Great Lakes and the St. Lawrence Seaway. The company also has access to Pacific ports through alliances

with western railroads.

CSX moves a broad portfolio of products — including bulk cargo — across the country in a way that minimizes the effect on the environment, takes traffic off an already congested highway system, and minimizes fuel consumption and transportation costs.



Host Terminals – a warm welcome on the waterfront



T. Parker Host currently runs several ship agency locations throughout the East and Gulf Coasts of the United States and throughout the Northern Coast of Colombia. It handles over 3,000 vessels per year as agents. While it is the largest dry bulk agent in the United States, it also works extensively with tankers.

In 1999, T. Parker Host established Host Terminals, Inc. to provide marine terminal operations and stevedoring. Host Terminals currently operates or manages labour at several US East and Gulf Coast locations, handling over 9mt (million tonnes) of dry bulk, 150,000 tonnes of breakbulk, heavy lift and project cargoes and 25 thousand container moves annually, while continuing its rapid expansion. In terms of liquid cargo, T. Parker Host operates seven tug boats and eight barges and uses these to move over 100 million gallons of liquid cargo a year. These vessels also move over 2.75mt of dry bulk.

T. Parker Host has a comprehensive suite of services, making it dynamic in every operation. All work is carried out according to the principles of: people;



safety; service; relationships; detectives; opportunity; integrity; and legacy.

Currently, Host has 16 agency locations and 16 terminal locations. Bulk commodities handled by Host include: coal; grain; oil; biomass; fertilizers; minerals; and metals.

Safety is a high priority for the company. In 2013/14, the company had a total of 4.7 total recordable incidents, comparing well to the industry average of 9.4. This improved in 2014/15 to 2.24 (industry = 9.9), and in the 2015/16 fiscal year, it has zero recordable incidents, compared with the industry average of 6.8.



- ❖ working with the customer to jointly develop LEAN culture; and
- ❖ defining and creating the Host Terminals' consistent 'Look and Feel' at all locations.

KEY PERFORMANCE INDICATORS (KPIs)

Host Terminals works collaboratively with terminal clients to develop Key Performance Indicators (KPIs). Measurements include: gross and net production, weather delay, standby time, equipment reliability, trimming and cleaning. Host collects data at the point of service, evaluating metrics for trends, and making recommendations based on their findings.

DCi

LEAN PRINCIPLES

Host Terminals has implemented a LEAN philosophy, aimed at protecting the environment, reducing waste and improving its services to its customers. The specific aims of LEAN are:

- ❖ continuous process improvement;
- ❖ improving efficiency to better serve the customer's needs;
- ❖ freeing up time and resources to do work that brings value to the operation and to the customer;



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'Demand is for more solutions providers'

interview with Beumer's Gregor Baumeister



Q: Mr. Baumeister, you have been Manager of the Palletizing and Packaging Systems Division at the BEUMER Group in Beckum since October 2015. In this function, you control and co-ordinate the global competence centre in this sector. What are your tasks and which goals do you want to achieve?

Gregor Baumeister: With the management of the Palletizing and Packaging Systems Division, I have taken on a highly exciting and varied task. In this position, I control and am responsible for all global sales activities via the competence centre. Together with my team, I am also responsible for developing and expanding the comprehensive solutions portfolio. I can formulate my goal very simply: I want to continuously promote the worldwide growth of this business sector. To achieve this, we must establish ourselves in a regionally balanced manner to enable us to support our customers throughout the world in the best possible way. We

"Demand is more for solutions providers and not so much for product suppliers"
Gregor Baumeister, Manager of the Palletizing and Packaging Systems Division

concentrate on industries with potential but with different economic cycles. And with our intelligent solutions, we will continue to address sectors in which we are firmly established, such as construction materials, chemicals and consumer goods.

Q: Can you explain the procedure within the competence centre in more detail? And how do customers throughout the world benefit from this?

Gregor Baumeister: In our target sectors, we integrate packaging and intralogistics solutions for industry-specific applications. A good example is integrated packaging lines for the chemical industry. The bulk material passes from the silo along a conveyor section to our innovative Form-Fill-Seal system (FFS system). The bagging machine is fitted with an integrated, high-precision weigher. This ensures that the weight of the bags

is accurately reproduced. Our reliable high-performance palletizers from the BEUMER paletpac range then stack the bags efficiently on pallets. Our customers use the innovative high-performance packaging systems in the BEUMER stretch hood series to secure the load. All machines in this line used the same Human Machine Interface (HMI). This makes it easier for the user to operate, and considerably reduces familiarization time. But there is more to come at the end of this packaging line. With our system solutions, we ensure that the palletized and packaged product is forwarded to a connected store — or directly to dispatch. At the same time, our systems ensure continuous material and data tracking.

We have combined the appropriate solutions and expertise required to realize this material flow in our intralogistics team. The customer is therefore provided with complete solutions from a single source. The team also develops special solutions for very demanding tasks. For example, we have installed a highly redundant application for the rubber industry, which enables an efficient material flow, and complex packaging systems, which are used by wood-processing companies throughout the world.

Q: *What experience do you bring to your new position?*

Gregor Baumeister: In my professional life, I have acquired extensive experience in intralogistics which I will be putting to outstanding use in my current position at BEUMER. For example, this includes several years abroad. This has shaped my multicultural understanding. Among other things, I have held responsible posts in design and sales for renowned packaging line and intralogistic system providers. Most recently, I held an international sales management position for a provider and manufacturer of logistics systems, logistics software, workstation equipment and storage technology. The thing that appeals to me in particular about the new job at BEUMER is the all-embracing scope of work which is associated with managing this business sector.

Q: *How have the requirements for intralogistics and in particular in filling, palletizing and packaging equipment changed over the years?*

Gregor Baumeister: I also see a clear trend towards integrated systems in this sector. Customers also want a complete solution



Gregor Baumeister is the new Manager of the Palletizing and Packaging Systems Division. (Photo: BEUMER Group GmbH & Co. KG)

from a single source and therefore only one — reliable and competent — point of contact for the whole job. Demand is more for solutions providers and less for product suppliers. However, this does not mean that we will no longer be selling individual machines. We have only established, particularly with very large organizations such as building material or chemical concerns, that they prefer to combine the responsibility and have only one point of contact for their whole line.

Q: *Controlled, fault-free and above all appropriate handling of products is required. To what extent has the importance of the control equipment in intralogistics changed as a result?*

Gregor Baumeister: You have raised a very wide ranging subject. The control equipment is a central part of every mechatronic system. Furthermore, the trend towards parallel material and data flows, which has already been around for many years, is consolidated particularly within the Industry 4.0 environment. Here, we see an evolution which we are approaching positively and with an open mind.

The advantages which the user has from self-optimizing and controlling systems are obvious. For example, they automatically detect blockages in the material flow and select alternative routes. Or, workpieces carry all important information in the form of parameters relating to the production process in themselves. They know who they are and can 'converse' with the system via RFID technology.



Q: How do you ensure that users are provided with reliably controlled and regulated material flows?

Gregor Baumeister: This always depends on how complicated the task is. Many applications can be implemented solely at PLC level. Others, in turn, require high-level material flow computers or Warehouse Control Systems. Although every system that we plan and install is based on standard modules, the solution is specifically matched to the customer. This is because no customer requirement is exactly the same as another.

Q: BEUMER has developed from being a machine builder to a system integrator and software provider. How do your customers benefit from this?

Gregor Baumeister: One is inseparably associated with the other — and companies really only want one point of contact. The system integrator must therefore also provide the associated software. If we supply a complete packaging line with connected block storage for a customer, he gets from us a fully functioning system with all mechanical and electrical components as well as the associated software program. We often see software-based strategies as being the key to increasing performance or energy efficiency. Take, for example, the 'Sport' and 'Eco' gear selector in a car. The changeover is not mechanical but is undertaken by software. And it is exactly the same with the different operating states in intralogistics systems.

Q: What do these intralogistics systems consist of and what are the specific benefits for the user? In which industries are they used?

Gregor Baumeister: As far as the users are concerned, we are problem solvers, and this is also how we want to be seen by the industry. This is what we will be showing with these systems. We are not bringing so-called 'me too' solutions to the market, but extremely efficient and specific systems which overcome quite individual challenges. I have already mentioned a highly redundant application for the rubber industry. This is a very good example. With this application, after cutting, the rubber bales must be film-wrapped and packed in large containers. The special challenge here is that they must not stop on the conveyor as otherwise the rubber would flow and it would no longer be possible to transport them. We have developed a system for the customer which ensures a continuous material flow in all operating states. We have implemented this with components from our proven portfolio. At the same time, we are also using technologies from other sectors — for example, we transfer solutions from the Airport sector to the tyre industry. As we work across different sectors, we are able to offer our customers quite different perspectives.

Q: Which components are these systems built from and can they be expanded in a modular fashion?

Gregor Baumeister: The components are substantially transport technologies such as conveyor equipment or vehicle-based systems. Added to these, for example, are various handling solutions and manipulators such as robots, buffer and storage modules. As we always use our system building blocks, the solutions can be expanded at any time and can grow with the customer's business. Furthermore, good planning always provides for different growth scenarios. We therefore plan potential expansions in right at the design phase.

DC



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Brazil timber exports boosted



The Paraná pine used to be extremely popular, but low stocks mean that it is being replaced by the Eliotis and Grandis varieties.

Pulp and paper are not the only forest products important in Brazil, and a severe domestic slowdown is giving a boost to exports of timber products.

When the subject of forest products is raised in Brazil, what comes to mind first is the country's massive market pulp industry, whose production and exports continues to increase. About 18mt (million tonnes) of pulp will be made each year, about 12mt of which will be exported. Several new mills are under construction or planned, which will push these numbers up by 2020.

But the country is also the source of a wide range of wood and wood-based products, both from species found in the native forest, most of that in the Amazon region, as well as from plantations, mainly of pine, which have been established in states in the more temperate south.

As befits its size and climatic diversity, Brazil is the world's fourth-largest producer of timber products, and is an important exporter of a wide range as well. For various reasons, far less timber has been exported in the past few years than the record 7mt shipped in 2005. Exports fell to a low of just over 3mt a year between 2007 and 2012. This was partly because of a slow down in demand in the country's then leading market for timber, the United States and partly because the rise in the strength of the local currency made Brazilian timber less competitive. But

the main reason was because a decade of strong economic growth at home meant millions of Brazilians had more money to spend. Some of this was used to buy furniture, or build new homes and other buildings.

Although exports fell, production did not. For various reasons, the Brazilian economy has slumped in the past few years, and with unemployment soaring and the currency weakening, exports of a wide range of timber products are growing again. A much higher proportion is now being sold to China and other countries in Asia than was a decade ago.

There are about four million square kilometres of native forest in Brazil, most of that in the Amazon region, which covers almost half the giant country. Close to 20% of that has been cut down in the past 50 years, most to clear the way for cattle or arable crops, notably soya beans, which has caused concern about the impact this may have on global warming. But efforts are now being made to bring some order into what has until now been a chaotic process, with few real controls on the cutting of trees.

Most of the wood from the north of the country is only partly processed, some still leaves as raw trunks, some after being sawn into planks. Most of what is produced in the region is taken south by road to where the main domestic markets are. A growing amount of this often top quality hardwood is being

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processed locally into laminates, as well as products for use by the construction industry, such as doors and window frames and flooring. The timber exported from the north is shipped from the port of Belem, at the mouth of the Amazon river, and the main centre for wood processing in the Amazon region, as well as from the nearby Vila do Conde. Some leaves from Santarem, 48 hours' sailing time up the Amazon, but accessible to large vessels. Many importers in Europe at least now insist that the products they buy must be certified as coming from sustainable projects. But because so many new roads are being cut through the still virgin jungle, allowing lumbermen to move in, and sawmills to be set up, it continues to be extremely hard to police the sprawling area properly. A high proportion of what is being cut is still not certified, with considerable amounts being smuggled out, notably via Venezuela, or shipped bearing false labelling.

The situation is completely different in the south of the country. There, a timber industry first came into being in the middle of the last century, based on the fine quality pine which grew naturally in the native forests in the states of Paraná and Santa Catarina, the almost knot free 'Paraná pine'. This timber was very popular in many export markets, and gave birth to a strong processing industry, involving the manufacture of high quality plywood, and other cut wood widely used in Europe and elsewhere. There is now almost no Paraná pine left, but the variety has been replaced by plantations of *Eliotis* and *Grandis* pines. This has resulted in a very strong industry involving various types of panels and board being set up. More recently, with the growth in demand for furniture by an increasing proportion of the country's 200 million-strong population, most of it concentrated in the southern region, MDF (medium-density fibreboard), and more recently, particle board has become more popular, with some exported as well.

As well as sawn products, Brazil has become a leading exporter of various types of panels and veneers, as well as furniture, door and window fittings and flooring. All this requires a large amount of processing machinery, as well as the basic equipment for milling, and the latest generation of sophisticated machine for planting and cutting trees.

Brazil is a leading market for this sort of machinery, some made in Brazil, but the latest models are imported from Europe, as well as from Japan and now China. Although most of the wood is produced by independent companies, and involves relatively small scale growers, most of the very large manufacturers of pulp and paper, notably *Fibria* and *Klabin*, themselves process and export some of their best quality logs. They also encourage local companies to set up manufacturing facilities close to their mills.

Brazil's large iron and steel industry is a major user of charcoal, huge amounts of which is used to make pig iron. Laws have been passed to try to ensure that the wood from native forests, which was used widely in the leading steel making state of Minas Gerais until very recently, should be replaced by specially grown exotic species, notably eucalyptus. The same thing is now happening at the 20 pig iron plants located alongside the 800km-long railway line which carries ore from the Carajas mines to the port of Itajai.

Wood as a source of energy for generating electricity is also growing, and most pulp mills are now entirely self-sufficient in energy, burning both the residues from processing, such as black liquid, as well as offcuts and other wood.

Until recently, the timber used to make pulp was de-barked and chipped at large plants at the mills. But increasing amounts

are de-barked and chipped in the forest itself, eliminating the need for large chippers at the latest generations of mills very large mills. The need for large storage areas for trunks at mills has diminished.

Great strides have been made by the pulp industry in raising productivity in the forests, with the development of high yielding clones in recent years. Whereas in the past, eucalyptus trees used to be cut first at about eight years of age, and then allowed to re-sprout twice before stumps were removed, now the first cut usually occurs at six years. Only one more cut is done before stumps are dug up, or chemicals are used to destroy them. This is because the latest generation of clones is invariably much more productive than what went before. The result has been a steady rise in the amount of wood produced per hectare each year. The average is now about 45m³ per hectare/year, with a maximum of 60m³ in the most favoured places, much higher yields than almost anywhere in the world.

Significantly less land is now needed to produce the same amount of wood as was the case previously. Until recently as well, the large companies tended themselves to own most of the land on which their forests were planted. Now, much of the forest is being gradually sold to investors. This reduces the amount of capital which is tied up in land, at a time when a new mill with the capacity to make 2mt of pulp a year, can cost up to US \$3 billion dollars, much of which has to be borrowed.

The political situation in Brazil is extremely chaotic at the moment, with the person elected as president for the second time just 18 months ago, Ms Dilma Rousseff, suspended following a massive vote of no confidence in congress. She is likely to be impeached, her place taken by the vice president. The economy is shrinking for the third year in succession, unemployment is soaring, and the currency is weak. But the positive favourable long-term prospects for the Brazilian economy, and the fact assets can now be acquired cheaply, is encouraging several key international players in the pulp and paper industry to set their sights on assets in Brazil. International Paper has had a presence in Brazil for several years, both in printing, writing, and newsprint.

The limited potential for growth in Chile, the home country of the Arauco and CMPC companies, means these two companies have already acquired assets in both pulp and paper, and also timber processing industries, and they may expand further. Timber processing tends to be more important for the large Chilean companies, as it has been so far in Brazil. Several wood processing companies from the United States have also started operations in Brazil in recent years, while the Irish Smurfit company, a considerable player in Colombia and Mexico, has also bought mills in Brazil in recent times. Stora-Enso is also a major player, in some cases in partnership with *Fibria*.

Partly in an attempt to avoid an unwelcome takeover by outsiders, Brazil's two largest pulp and paper makers, *Fibria*, formed by a merger of the Aracruz and VCP companies and the Suzano company, have long been holding discussions about merging. This seems likely to occur in the fairly near future, and is being encouraged by Brazil's National Development Bank, the BNDES. The BNDES has provided much of the finance for the building of new mills, so is very influential in such matters. The latest newcomer to the industry, the Eldorado company, and one which unlike the other two, is still headed by members of the founding family, may also find itself under pressure to join such a consortium. Eldorado has also been a major beneficiary of BNDES loans, as has its parent company, the JBS meat company, the world's largest.



Plastic? Yes please!

sometimes plastic is the 'greenest' option



*AD*STAR cement sacks are made of robust polypropylene tape fabric. The sack bottom and top are closed by means of a specially developed sealing technology. (photo: ©Starlinger)*

In quite some cases plastic packaging is more environmentally friendly than other materials. A recent study shows that plastic sacks are the most sustainable packaging solution for cement: AD*STAR cement sacks made of coated polypropylene fabric achieve considerably better results than sacks made of paper or recycled polypropylene tape fabric.

The effects on the environment, a much-discussed topic regarding plastic bags for everyday use, also play an increasingly important role for industrial packaging. A new study which compares different types of cement packaging now proves that woven plastic packaging is the most environmentally friendly solution for this application. The results of the life-cycle-analysis, carried out by the German PE INTERNATIONAL AG (now thinkstep AG) and commissioned by the Austrian machinery supplier Starlinger & Co. Ges.m.b.H., clearly show that AD*STAR sacks — welded block bottom valve sacks made of coated polypropylene tape fabric — have lower global warming

potential (also known as carbon footprint) than paper sacks or sewn PP sacks which are widely used, especially in Asia. For comparison, sewn sacks made in China as well as kraft paper sacks made in Saudi Arabia were analysed; all sacks had a filling capacity of 50kg cement.

The results are clear: The AD*STAR sacks developed by Starlinger do not only show the lowest values regarding global warming potential, they are also the most environmentally friendly packaging in terms of acidification potential (acid rain), ozone depletion potential, photochemical ozone creation potential (causes summer smog), as well as energy and fresh water consumption.

LOW BREAKAGE RATES — SMALLER CO₂ EQUIVALENT

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study, 100 % virgin material was used both in China and Saudi Arabia. Due to the special production process AD*STAR sacks are extremely robust despite their very low weight. The strength and resistance results in breakage rates below 1% in the entire life-cycle, while paper bags and sewn sacks have breakage rates between 2.3 % and 4.4 %. This means that if AD*STAR sacks are used, less cement is lost and must be replaced, and less packaging is needed — consequently, fewer greenhouse gases are produced.

GREAT SAVINGS POTENTIAL FOR GREENHOUSE GASES

The study analyses the environmental impact of the sacks during their entire life-cycle — from raw material to the disposal of the sack. Raw material production, sack production, filling, transport and storage until disposal — by means of landfill, recycling or thermal utilization — were analysed.

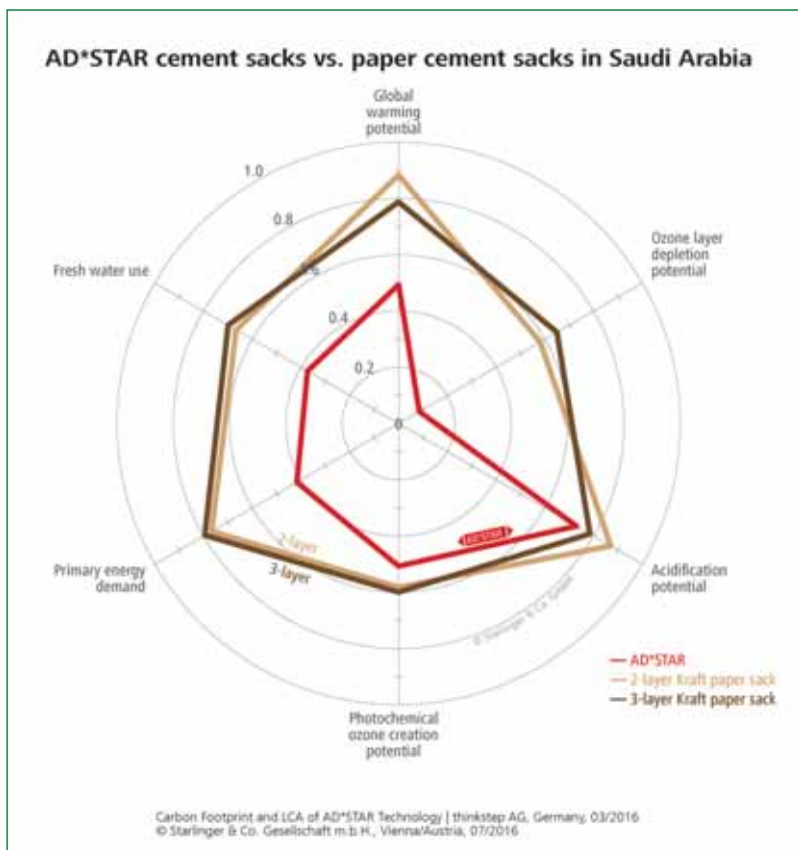
Starlinger has commissioned the study with comparable products from China and Saudi Arabia because the type of cement packaging analysed forms the biggest share on the cement market in the respective country. In China, the world's biggest cement producer, around 20 billion sewn cement sacks made of polypropylene tape fabric with recycled content are produced. In the study, sacks made of 50% virgin material mixed with 50% recycled material, and sacks made of 100% recycled material were analysed. The quality of the sacks is comparatively low because the recycled material used to produce the sacks is in most cases severely degenerated, i.e. the necessary level of strength can only be achieved by



increasing the fabric weight. In addition, the sewing process further weakens the material by up to 50%. Sewn cement sacks have significantly higher breakage rates and thus cause considerable cement loss which has to be compensated by additional production. Changing over to AD*STAR sacks does not only reduce CO₂ emissions caused during production and relieve the environment, it also helps to automatate the entire

cement filling and transporting chain — a process that is already under way considering the current investments in modern equipment on the Chinese cement sector.

In Saudi Arabia, one of the biggest producers and exporters of plastic granulates worldwide, imported paper is used for cement packaging. Thus, two- and three-layer kraft paper cement sacks were analysed in the study. In this case, switching over to the more robust AD*STAR sacks would not only prevent the loss of countless tonnes of cement caused by sack rupture, but also greatly reduce raw material input for sack production and avoid long transport routes. In addition, the entire value created by both raw material and sack production would remain within the country.



MORE THAN 7.5 BILLION SACKS PER YEAR WORLDWIDE

The worldwide-used AD*STAR sacks have been developed and patented by the Austrian mechanical engineering company Starlinger & Co. Ges.m.b.H. The company is a leading supplier of machinery and complete plants for the production of woven plastic packaging and has installed AD*STAR production plants with a total yearly capacity of more than 7.5 billion sacks all over the world. DCi

INDEX OF ADVERTISERS

Company	Page	Company	Page
Agrico Sales, Inc.	48	Nemag BV	101
Alex Stewart International	42	Neuero Industrietechnik GmbH	Inside Back Cover
ASTOCA	59	o.z. HENNLICH ENGINEERING	64
Beumer Group GmbH & Co KG	137	ORTS GmbH Maschinenfabrik	96
BLUG Credeblug S.L.	98	Ovet BV	18
Bulk Logistic Landmark	56	Pasha Stevedoring & Terminals	27
Buttimer Engineering	83	PINTSCH BUBENZER GmbH	107
Christianson Systems Inc.	78	Port of Corpus Christi	7
Cimbria Bulk Equipment	56	Port of Long Beach	34
Civettini Italo & c sas (CFS Handling)	102	Port of Longview	31
Cleveland Cascades Ltd	53	RC Inspection B.V.	39
Coaltrans Conferences Ltd	92	RHB Stevedoring & Warehousing	28
Fednav Ltd	112	Rhenus Midgard GmbH & Co. KG	31
FLSmith Wadgassen GmbH	60	SENNEBOGEN Maschinenfabrik GmbH	Front Cover
Franz Wölfer Elektromaschinenfabrik Osnabrück GmbH	58	Siemens AG International	71
Gambarotta Gschwendt	51	SMB International GmbH	Back Cover, 139
Gans Cargo Operations	15	St Lawrence Seaway Management Corp	110
Guyen Grab and Machine Ltd. Co	99	Starlinger & Co. G.m.b.H.	142
Huadian Heavy Industries Co., Ltd.	47	Telestack Limited	76
Hudig & Veder BV	22	Terex MHPS GmbH	Inside Front Cover
IBAU HAMBURG	54, 55	Thordon Bearings Inc	23
Jacobs Consultancy	14	Thunder Bay Port Authority	116
KRANUNION GmbH	84	thyssenkrupp Industrial Solutions AG	74
Logistec Corporation	117	TMSA Tecnologia em Movimentação S/A	86
Mack Manufacturing Inc	101	TOC Events Worldwide	134
Maritime Bulk Terminal Gdynia Ltd	4	TTS Marine AS	24, 25
McKeil Marine Limited	118	Van Aalst Bulk Handling BV	66
Metro Ports	16	Verstegen Grijpers BV	105
MRS Greifer GmbH	98	Zeeland Seaports Port Authority	32
Negrini Srl	107		



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