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FEATURES

- Global Cement Trades
- Cement Handling
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MAY 2018 issue

featuring...



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Mixed signs for coal trade

Commodity imports into many countries could strengthen over the months ahead. World seaborne dry bulk trade may remain on an upwards trend in 2018 as a result. But the recent emergence of trade restrictions and retaliation emphasizes the potential for political influences to have a disrupting, negative impact.

Assuming that the global economy is not severely affected by trade disputes, IMF forecasts published in mid-April show world GDP growth improving slightly this year. After last year's upsurge to 3.8%, a further improvement to 3.9% is estimated, mainly reflecting a stronger performance among the advanced economies (mainly USA, Europe, Japan and Korea). China's growth is expected to resume a slowing pattern.

COAL

Although the background for coal trade on a longer term view is not encouraging, modest growth this year seems to be a possibility. Two recent reputable forecasters have suggested increases in world seaborne coal trade during 2018 within a range of 1.5% to 2.5%, following last year's upturn.

Yet not all analysts are optimistic. An updated forecast by the Australian Government Department of Industry, Innovation and Science suggests that world trade in steam coal (comprising about four-fifths of overall coal trade) could decrease by 1% in the current year. The total, which includes land

movements but is mostly seaborne trade, is estimated at 1,046mt (million tonnes). Asian regional imports could remain flat, while elsewhere reductions are envisaged.

IRON ORE

Prospects for steel demand, in producing countries which are also importers of the main raw materials, provide some clues to likely changes in trade volumes. The latest assessment by the World Steel Association of steel demand this year indicates only limited strengthening among these countries.

According to WSA calculations for 2018, both China's and Japan's steel demand based on finished steel products will remain flat at 737mt and 64mt respectively. In South Korea a 1% increase to 57mt is expected, while the European Union's demand is forecast to grow by 2% to 165mt. These nations receive over 90% of the world's iron ore imports. In some countries higher steel output, or a rise in the ratio of iron ore imports to steel output, may boost international seaborne movements.

GRAIN & SOYA

More attention is now being focused on the new 2018/19 crop year for grain trade, starting in July. An early forecast by the International Grains Council points to world trade in wheat plus corn and other coarse grains totalling 368mt, a 2% increase, following an estimated 3% rise in the current year ending June.

But there is still great uncertainty.

Import demand partly depends on summer 2018 domestic grain harvests in northern hemisphere importing countries. These crops are not yet accurately foreseeable because of unpredictable weather conditions affecting output. Currently, imports into India and some North African countries are showing signs of increasing.

MINOR BULKS

Trade in agricultural and related minor bulk cargoes apparently regained momentum last year and a strengthening trend could continue. Agricultural commodities in this group include sugar, oilseeds (excluding soya) and oilseed meal as well as rice. The 2017 total is estimated at over 230mt. In the fertilizer sub-sector volumes exceeding 160mt are estimated. Prospects for import demand evidently are mostly positive.

BULK CARRIER FLEET

Capesize (100,000dwt and over) vessels, mainly employed in the iron ore and coal trades, comprise two-fifths of the entire world bulk carrier fleet. Last year growth in the capesize segment accelerated further to 3%, as shown in table 2, despite much lower newbuilding deliveries. In 2018 growth of 2-3% seems likely even though deliveries are expected to see another reduction. However, scrapping volumes are very hard to predict, and there is also uncertainty surrounding the new capacity volume emerging.

TABLE 1: STEAM COAL IMPORTS IN KEY ASIAN COUNTRIES (MILLION TONNES)

	2013	2014	2015	2016	2017	2018*
Japan	114.5	114.2	120.1	115.8	121.0	122.0
South Korea	100.1	100.8	102.6	102.5	116.0	118.0
Taiwan	57.1	57.0	56.3	55.0	58.0	59.0
China	192.0	165.5	107.9	124.2	119.0	125.0
India	144.1	176.0	170.0	147.3	153.0	155.0
Total of above	607.8	613.5	556.9	544.8	567.0	579.0

source: various & BSA estimates

*BSA forecast

TABLE 2: CAPE SIZE (100,000DWT & OVER) BULK CARRIER FLEET (MILLION DEADWEIGHT TONNES)

	2013	2014	2015	2016	2017	2018*
Newbuilding deliveries	22.0	18.5	16.9	20.0	15.3	12.0
Scrapping (sales)	7.9	4.2	15.4	13.3	6.4	4.0
Losses	0.2	0.0	0.0	0.2	0.3	0.0
Plus/minus adjustments	0.1	0.0	-0.4	-0.5	0.1	0.0
Fleet at end of year	293.8	308.1	309.2	315.2	323.9	331.9
% change from previous year-end	+5.0	+4.9	+0.4	+1.9	+2.8	+2.5

source: Clarksons (historical data) & BSA 2018 forecasts

*BSA forecast

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Global cement production on the rise



Major shipbuilder Royal Bodewes has already built two cement carriers for Eureka Shipping — the Furuvik and the Cymbidium, and is currently building a further three for the same customer.

Healthy growth in construction good for cement market

Every industry goes through a process of churning periodically, writes Kunal Bose. Cement is no exception to this rule. Adjustments required to keep the business rewarding involve replacement of ageing capacity by capacity that incorporates modern cost effective and environment friendly technology. This is happening on a fairly large scale in the cement industry everywhere, including China and India, the two countries with the world's largest and second largest capacities. The point not to

be missed here is that as in steel, aluminium and copper, the cement industry in China has capacity in multiples of India's.

In 2017, China produced 2.4bn tonnes of cement, marginally down from 2.41bn tonnes in the previous year. Compared to the global giant, India made 280mt (million tonnes) last year, down from 290mt in 2016. The Indian setback in production is attributed to demonetization of the two highest value currencies on 8 November 2016 that threw the construction sector

out of gear. Cement demand in India started picking up from October 2017. Consultancy and research organization ICRA says: "A demand pick-up in the recent months, October 2017 to January 2018 by 13.4% is backed by low cost housing... along with infrastructure demand from the eastern, southern and western markets" of the country. This apparently remarkable growth happened on a low base and therefore, not much should be read in it.

The US, which hosts the world's third-

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largest cement industry, saw production in 2017 rising by 400,000 tonnes to 86.3mt. If that country's output in 2015 (83.4mt) and 2014 (83.2mt) is taken into account, then there are unmistakable signs that the infrastructure renewal programme will keep the demand for the binding material on an ascending curve. The Portland Cement Association (PCA) has in its spring forecast assumed a 2.8% rise in cement consumption in the US in the current year and also in 2019. Demand will then rise to 4% in 2020 as the impact from potential federal infrastructure spending is likely to take effect.

PCA estimates the US cement consumption at 99.3mt in 2018, 102.1mt next year and 106mt in 2020. According to PCA senior vice president and chief economist Ed Sullivan, the spring forecast has considered factors such as a strong economy supported by tax reforms, likely increases in infrastructure spending and an already low unemployment scene. Only people with jobs and a regular income get accommodation from banks to buy houses.

Analysts think cement imports into the US are set to grow from 9.2mt in 2016 to

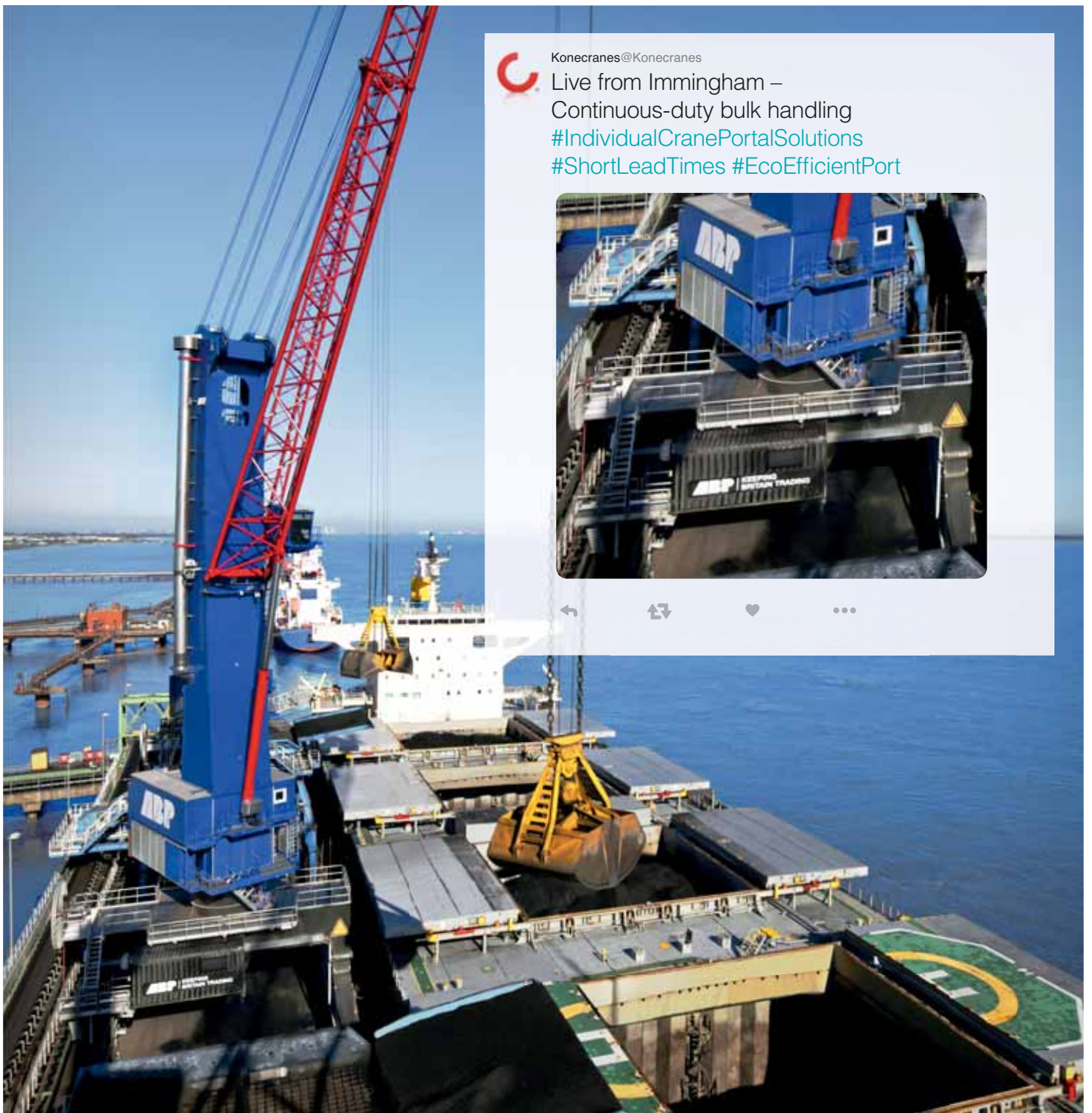
past 12mt in 2018, due to the fact that new production capacity is difficult to build in that country. The long coast and an extensive waterways system will support growing quantities of imports. Large concrete producers in the US will be inclined to develop their own import operations (or grinding mills). Imports of cement in Western Europe should grow on the back of a healthy growth in construction.

Interestingly even while large pockets in Africa are recording good economic growth and population there is rising, the *per capita* consumption of cement in the continent has remained low. Expectedly, cement producers in some countries, including China have identified African countries, albeit selectively as their next investment destination. Till such investments in the pipeline and the ones proposed get converted in cement capacity, Africa's dependence on cement imports will keep on rising. Precise cement import data for Africa are not readily available. It will still be safely assumed that around 50mt of cement and clinker made it to African shores in 2017. Although growing

cement capacity is being realized in Africa, part of this is made up of grinding plants that need imported clinker.

Global cement production is expected to advance from 3.27bn tonnes in 2010 to 4.83bn tonnes in 2030. But it will always be the case that only a small percentage of the production will make it to seaborne trade of the commodity. Ad Lighthart of Cement Distribution Consultants writes: "A cement producer's profitability is determined to a large extent by the utilization factor of its... plants. This is where seaborne cement trade and distribution play a major role. The ability to sell cement (or clinker) in long-distance markets not only brings the profits that go with the trade, but it ensures a substantial reduction in production costs per tonne..."

"In 2015 around 4.1bn tonnes of cement were produced by the global cement industry. Of this, 110mt of cement and clinker were traded internationally by water. This is just 2.7% of all cement trade. As marine transport is the most popular form of transport for cement, this can be used as a proxy for international cement trade. A further 93mt of cement and



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Vietnam is the world's fourth-largest producer of cement.

clinker were transported by sea domestically in 2015, with 18.7mt transported domestically on inland waterways, excluding China. This means that a total of 221mt of cement were transported on water... around 5.4% of the amount produced."

Vietnam, the world's fourth-largest producer, showed impressive growth in production from 60mt in 2012 to 78mt last year. The country has 82 cement production lines with aggregate capacity of 97.6mt. Since the domestic market is not big enough to consume all the cement that is produced, Vietnamese manufacturers have found outlets in Asian countries such as the Philippines, Taiwan and Bangladesh and also in Africa and Latin America. In the meantime, the Vietnam Cement Association has given warnings that the country will "face a glut of 25 to 36mt a year of the material by 2020 as production completely outstrips national demand." Vietnam is likely to have cement production of 120 to 130mt by 2020 when the local demand will at the most be 93mt, leaving a big amount for export.

In any case, taking a long-term view, the country has set an annual export target of 20 to 35% of the industry's cement and clinker capacity by 2030. To ensure that prices in the domestic market do not come under much pressure because of oversupply, the Vietnamese industry has no alternative but to become an aggressive exporter. In confirmation, the general department of Vietnam customs informs that the country exported 2.9mt of cement and clinker worth \$101.1m in January 2018,

up 32.3% in volume and 30.3% in value over last year's corresponding month.

Let the significant changes that are now taking place in the industry be considered. According to one consultancy, between now and 2022, globally but excluding China nearly 420 cement capacity expansion projects with an aggregate capacity of 580mt are due to be commissioned. Unless, of course, some of the projects do not suffer time and cost escalation — the major bane in developing and also emerging economies. The capacity in the pipeline comes under the following heads: (i) 150 greenfield projects will deliver new capacity of 250mt; (ii) 114 new production lines at existing operational sites will create fresh capacity of 220mt; (iii) Capacity of close to 100mt will come by way of commissioning of 131 grinding projects; (iv) Finally, in the process of execution of 25 modernization projects not only will there be migration to modern power efficient and environment friendly technology but some additional capacity will be created.

A noticeable feature of new investments in cement worldwide is the shifting of focus from building integrated plants with kiln lines to setting up grinding plants with capacities of up to 2mt. Grinding units offer the advantage of their installation close to the markets. Building a medium-size grinding plant will cost around \$60 a tonne. The consultancy says the "trend of ever increasing kiln lines is coming to an end." Most kilns will be of sizes ranging from 3,000 tonnes a day to 6,000 tonnes a day and "only a few with capacities larger than 8,000 tonnes a day are in the pipeline."

Large global overcapacity of which the major part is in China and also limited export possibilities are the factors influencing investor decision not to seek bigger and bigger kilns.

The consultancy further says most of the new projects are located in Africa and Oceania followed by south Asia and Latin America. For reasons of cost and sensitivity to the environment, the US and Western Europe, including Turkey, are hosting only a few new cement projects. At the same time, Europe remains the principal centre for further development of cement-related technologies. In the machinery sector, China is offering increasing competition to the likes of FLSmidth of Denmark and Loesche of Germany.

An Indian industry official says: "That China, which produced as much as 2.4bn tonnes of cement in 2017 would have developed formidable capacity in cement plant design and engineering and machinery building was on expected lines. This has been seen in steel and aluminium too supported by the size of Chinese production. China's rapid emergence in consultancy and machinery building along with improvement in quality of its processes and machinery has put price pressure on the Western companies."

Observers notice a great degree of discipline among cement companies as they build new capacity. Take the case of China. Beijing has resolved earlier this year of shedding more industrial overcapacity, including cement in a renewed attempt of supply side reform to usher in high quality

economic development. China is sitting on cement capacity of up to 3.5bn tonnes and at least 30% of it is surplus. The country's National Development and Reforms Commission (NDRC) earlier said that cement production was to be cut by 10%, part of permanently shutting of polluting and high cost mills. But buoyed by the success in reducing surplus steel and coal capacity, NDRC said recently the same could well happen in cement, meaning going beyond targeted capacity reduction. Along with capacity shedding, Beijing will encourage merger of cement companies to face the challenges of overproduction, depressed prices and bloated borrowings.

With huge excess capacity obtaining in the country and the banks not inclined to support construction of new mills, some Chinese cement groups and investors are involved in building a good number of new plants elsewhere in the Far East, central Asia and significantly in Africa. Expectedly, the Chinese arrival has made the local groups wary of how the future will unfold for them. But cement has for long been a global business with industry leaders owning plants in several countries. Like

LafargeHolcim, created out of the merger of Lafarge of France and Holcim of Switzerland in April 2014, operates in 80 countries. Incidentally, LafargeHolcim owns more than 60mt cement capacity in India and it is to build a 3.1mt greenfield cement factory in Rajasthan. Ahead of the merger Holcim acquired two leading Indian cement groups Ambuja Cements and ACC and Lafarge emerged as a major constituent of the Indian industry by first acquiring the cement unit of Tata Steel followed by the one owned by Raymonds and then expanding their capacity.

An official of Cement Manufacturers Association in India says: "We are the world's second-largest in terms of capacity and production and the market for the building material is growing as the country's focus is to strengthen infrastructure from concrete roads to ports and create millions of housing units. Naturally, foreign groups, some of them are already here, will always be contender to buy operating units in competition with local groups."

ICRA says Indian cement demand will grow 5% this financial year to end in March 2019. It, however, gives the warning that

profitability and debt metrics of Indian cement companies may come under pressure in the coming quarters because of higher petcoke, coal and diesel prices. Cement use demands its mixing with sand. But in a number of Indian major states sand shortages are negatively impacting cement sales. But there is hope of rural demand for cement to improve on the back of the government promise that minimum support prices for crops will give farmers at least 50% more than production cost, liberal provision of rural credit and forecast of a normal monsoon three years in a row.

India is an infrastructure deficit country and to sustain economic growth rate at 7.5% to 8%, it is imperative that major infrastructure projects are rolled out at regular short intervals. In fact in anticipation, cement companies with strong balance sheets are going ahead with greenfield and brownfield expansion programmes. Steelmakers, however, want the government to pass an order that like in developed economies, cement and steel use ratio should be 1:1 and not 4:1. That will be a negative for the cement industry.

Brazil's cement industry turns the corner

Brazil's 100mt (million tonnes)-capacity cement industry, the world's fourth-largest a few years ago, has now fallen to being the seventh, after four years of a steep sales decline, writes *Patrick Knight*. The shrinkage was caused by the severe recession which affected Brazil, and which included a collapse of civil construction, still almost at a standstill. Tens of thousands of completed, or semi-finished homes and offices still overhang the market, while the

parlous state of state finances has prevented the start of dozens of planned major infrastructure projects.

Thirteen of the 100 mills owned by the 24 companies which form the industry in Brazil have been halted, six in the state of Sao Paulo, the country's most developed state. The industry used less than half its capacity last year, and prices remain 14% below their levels of 2014, despite the fact that the cost of electricity, coke and the

special paper needed to make the 50kg bags in which up to two thirds of the cement is sold, have all risen sharply.

The economy is now showing some signs of recovery, led by the strong performance of exports — such as the strengthening price of most agricultural goods, as well as pulp. It is hope that this, combined with the stabilization of the price of iron ore, will help the industry — which produced just below 54mt in 2017,

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compared with the 71.2mt of record year 2014 — to produce 1–2% more in 2018 than last year.

A bright spot is the continued fairly buoyant use of cement by very small scale users, who continue to expand and improve privately owned homes, aided by a fall in unemployment. Industry leaders warn, however, that the economy will need to grow by at least 3% a year for at least seven years, before demand returns to the levels of 2014. The peak year had been preceded by 15 years of steady growth, which encouraged mills to invest.

With the outcome of key presidential elections to be held in November this year far from clear, there are worries that the present relative stability may not continue. Luis Ignacio 'Lula' da Silva, Brazil's president for the eight years 2003–2011, is the preferred candidate of more than 80% of the electorate. Lula, as he is known, presided over a period of boom, possible because the previous president, Fernando Henrique Cardoso, had managed to tame the high inflation which had previously infected Brazil.

Lula raised the minimum wage paid to the majority of Brazilians by far more than inflation, pensions were raised by a similar amount, while a scheme whereby the very poorest had access to a 'family wage' was extended. Soon after Lula was elected, huge reserves of crude oil were discovered under deep waters offshore. Lula promised that the profits from this would be used to start a big investment boom for industry, as well as infrastructure. This got off to a fairly good start, but the new climate helped allow the corruption which had always affected Brazil, to gain enormous ground. Then the so called 'car wash' scandal not

only caused Lula's successor to be impeached, it also caused the virtual collapse of Brazil's state-owned oil company, Petrobras, and a large number of firms, notably in the construction industry, which had been awarded juicy contracts for inflated prices. Although Lula himself was not found guilty of corruption, he has been found guilty of receiving illicit funds for a luxurious apartment complex. Unless this conviction is set aside, Lula is unable to stand for election this year. The present government is far less popular than Lula ever was, however, and none of the other candidates is supported by more than a tiny proportion of electors. There have already been violent protests about the fact of Lula's exclusion.

Brazil's cement industry is formed of four very large companies, the most important of which is the Votorantim group, whose 28 mills in 16 states, can make 35mt a year. In second place is the Intercement group, owned by the Camargo Correa construction company, whose 16 mills, in nine states, can make 16mt. In third position is the group formed by the merger of the Lafarge and Holcim groups, which following some mill disposals, now has ten mills, in seven states, able to make 12.5mt. Fourth is the Nassau group, whose 10 mills are concentrated in the north east and north of the country, which had grown by more than average in recent years. Nassau has ten mills, in eight states, with capacity to make 8.5 million tonnes.

The Votorantim group, also important in aluminium and other metals, and until recently, Brazil's largest producer of market pulp, whose eight mills could make eight million tonnes of market pulp, has recently sold its pulp holdings to the smaller Suzano.

In future Suzano will produce virtually half of the world output of pulp made from eucalyptus. It is not yet clear what Votorantim, which, like Intercement, already has several cement plants in neighbouring Latin American countries, as well as in the United States, will do with the proceeds of the sale. One option would involve the purchase of other cement makers in western hemisphere countries.

A major reason for Votorantim departure from the pulp industry, which is enjoying a period of record prices at the moment, is that the industry is very cyclical. Although civil construction is unlikely to emerge from its present difficulties soon, if only a few infrastructure projects go ahead, mainly aimed at cutting the cost of getting the cost of goods from where they are grown, or made, into ships, demand for cement could grow fast. Investments in building new railways, or upgrading existing ones, increasing the capacity of numerous ports, notably those in the north and north east of the country, and in improving the navigability of several rivers, and building new terminals alongside them should all boost the industry.

DCi

CEMENT PRODUCTION BRAZIL

Year	million tonnes
2017	53.8
2016	57.6
2015	64.4
2014	71.2
2013	71.0
2012	69.3
2011	65.0
2010	60.0
2009	52.0

Source: Cement industry





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Coldharbour initiates Japanese type approval process

Coldharbour Marine, a manufacturer of ballast water treatment systems based on unique inert gas technology, has engaged Japanese classification society ClassNK to assist in the process of obtaining Japanese type approval from the Ministry of Land, Infrastructure, Transport and Tourism. The approval is a requirement for all foreign companies in the marine sector seeking to sell their products to customers in Japan.

The type approval process, as required by Japan's Ship Safety Law and the Marine Pollution Prevention Law, will involve an independent assessment and verification of Coldharbour Marine's ballast water treatment technology as well as type approval of the product itself. An inspection of the company's manufacturing plant in Linby, Nottinghamshire, in the UK may also be required.

"This is a key step in establishing our commitment to the Japanese market," said Andrew Marshall, Coldharbour Marine Chief Executive. "This market is very important to us for a number of reasons. Japanese owners control the world's second largest fleet, including many of the vessels for which our technology is ideally suited. Japanese

owners control large numbers of bulkers, tankers and LNG carriers, which are all key target markets for us. Three of the world's ten largest owners are Japanese.

"In addition, Japanese shipbuilders are at the premium end of the ship construction market, appreciating high quality, technologically advanced ship hardware like ours. Our approach to business matches perfectly with the Japanese ethos of excellence and fit-for-purpose technology."

Marshall said that Coldharbour had engaged in Japan's type approval process in direct response to a number of requests from large Japanese ship-owning groups, among whom its unique treatment technology had already caught attention.

Marshall believes that the type approval process is likely to take about two months.

ABOUT COLDHARBOUR MARINE LTD

Coldharbour Marine Limited is a UK-based design, engineering business with nearly four decades of inert gas and water treatment experience. The company has a long history in the inert gas generation sector and has in recent

years developed Sea Guardian™ — a clean, green, compact "third generation" technology for use in LNG carriers and large tankers.

Sea Guardian™ inert gas generators incorporate a range of patented features that ensure stable, reliable, low maintenance operation and they are also integral to Coldharbour's award-winning GLD™ ballast water treatment system.

Key features of the GLD™ system are that treatment takes place in-tank and in-voyage and without the need for any form of in-line filtration. This approach ensures no disruption to terminal operations during ballasting and no risk of re-growth of marine organisms on long ballast voyages. With the GLD™ system, large vessels are now guaranteed to arrive at terminals ready to load or off-load ballast without the risk of delay caused by BWTS operational difficulties.

The system is fully type-approved by IMO, with testing undertaken by both the UK's Maritime and Coastguard Agency and Lloyd's Register. It also has US Coast Guard Alternate Management Systems acceptance and is currently undergoing the full US Coast Guard type approval process.

Bulk shipping operators rely on MacGregor's watchful eye to inspect essential equipment

MacGregor, part of Cargotec, has recently signed two inspection service agreements with experienced dry bulk shipping operators, ESL Shipping and Wagenborg Shipping, to ensure that essential MacGregor equipment is in good working order and any issues are identified quickly to avoid unexpected downtime.

The first was a three-year service agreement, effective from 1 February, with Finland-based ESL. It will see MacGregor inspect the folding hatch covers and K-cranes fitted onboard a barge and a fleet of nine bulk carriers.

Also effective from 1 February, is a two-year service agreement with the Dutch shipowner and broker, Wagenborg, to inspect hatch covers and winches onboard 19 of its bulk carriers.

"Both of these customers are well-known for their advanced approach to technology and modern, environmentally-friendly dry bulk cargo fleets, designed with year-round operative availability in mind," says John Carnall, Senior Vice President, Global Lifecycle Support, MacGregor. "Regular, expert inspections ensure that equipment functions as intended and that wear follows an expected pattern."

"ESL is an important player in Baltic Sea bulk shipping, securing the transportation of raw materials for industrial and power-generation use throughout the year. This requires its vessels to work hard even under difficult weather conditions," notes Kimmo Huhtala, Branch Manager, Baltic countries, MacGregor. "We are delighted to be the company that ESL relies on to

carry out the majority of drydocking inspections."

International shipping specialist, Wagenborg Shipping, owns around 170 vessels; most of which are ice-classed dry cargo ships designed for worldwide operations. "Wagenborg knows us and we understand its needs," says Gust Versmissen, Branch Manager, Benelux, MacGregor. "This new agreement covers the inspection of both hatch covers and winches."

Both agreements stem from new, simplified planned MacGregor service contracts, launched last year. Offered by the MacGregor Global Lifecycle Support division, they are designed to save customers' money and reduce their maintenance administration burden.

Palau keeps an eye out with Polestar

Palau International Ship Registry (PISR) the world's fastest growing flag has expanded its technology offering by linking with Pole Star to offer a comprehensive sanctions compliance and risk management service for its fleet vessels.

Pole Star's Purple TRAC is a comprehensive ship-centric economic sanctions compliance and risk management service used by shipping companies, ship financiers, insurers, port state agencies and ship registries. Using the latest technology it offers high level monitoring of assets designed to protect both the vessel and crew during operations.

Panos Kirnidis, CEO of PISR, believes the new smart datalink provides ship owners and managers with the most detailed information to maximize their operational performance.

"Over the past 12 months we have established Palau as the fastest growing ship registry in the industry and we are on course to make PISR the most

technology driven one as well. We appreciate how important it is for our clients to be informed of their operational status and by offering them a tracking solution to optimize this, is a real bonus. Pole Star has developed innovative and reliable systems that will enable us to monitor and manage our clients' assets worldwide. Along with our own unique Deficiency Prevention System (DPS) and our Smart Electronic Flag software, we can process vital information and give clients key performance indicators measuring the operational efficiency of their vessels."

Pole Star's Purple TRAC software enables a ship's details to be entered into a web-based interface, the vessel and then screened against a range of international economic sanctions lists and Port State Control databases. This determines if the ship, its owners or managers are on any sanctions lists, whether it has had any deficiencies found by port authorities, and if it has recently called at a blacklisted port or sanctioned

country. It can also actively track a ship's physical movements on a continuous long-term or short-term voyage-based basis.

Kirnidis sees this as the next step in driving the shipping industry and the flags they use even further into a technological age. "We have embraced new technology because we believe it is the only way the shipping industry will develop. Using Purple TRAC will give us an even sharper edge and peace of mind for our fleet clients. The age of paper certificates and records are coming to an end. There has been a reluctance on the part of some flags to fully adopt new systems but you only have to see how technology is driving transportation methods forward to appreciate it is here now and here to stay. Palau International Ship Registry will continue to work with companies that can offer us smarter ways of working. The age of the e-registry has arrived and PISR has been leading that charge for the past 12 months and we will continue to do so."

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Thordon gives new class of towboat greater life expectancy

Thordon Bearings, of Burlington, Ontario, Canada, has received an order to supply four comprehensive shipsets of stern gear for a new class of towboat.

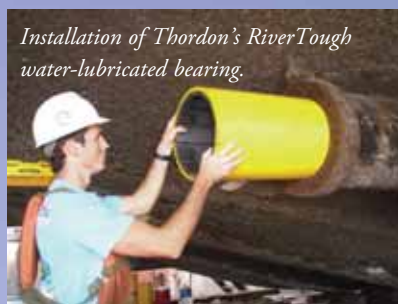
The four boats are being built by US shipyard Master Marine of Bayou La Batre, Alabama, for Waterfront Services, based in of Cairo, Illinois. The new vessels have been designed to meet the requirements of Subchapter M, a set of federal rules recently introduced by the US Coast Guard, relating to the inspection requirement for towboats, including seaworthiness standards and safety protocols.

The 67ft x 28ft boats, each powered by twin S6R2-Y3MPTAW Mitsubishi diesel engines, rated at 803hp at 1,400rpm, will drive 70in x 48in x 7in four-blade, stainless-steel propellers through Twin Disc MG 5321 gearboxes with 5:1 reduction ratio.

Thordon has been contracted to supply its RiverTough propeller shaft bearings for a 6in diameter shaft, along with hardened shaft sleeves, SXL bearings for main and flanking rudders, TG100 tailshaft seals, and ThorPlas Blue steering linkage bushings.

"These are fleet boats, operating virtually 24/7 on the Mississippi River," explained Jim Bright, Thordon's USA Business Development Manager. "They are operating in very abrasive water conditions, frequently running close to the river banks in shallow depths. The customer has previous experience of Thordon products, with some boats having clocked up 60,000 to 70,000 hours of trouble-free operation."

Steven Authement, from the sales and business development team at Master Marine, said that the decision to specify Thordon stern gear was made by the customer, based on the good performance of the company's products on other vessels. "Master Marine is very



Installation of Thordon's RiverTough water-lubricated bearing.

happy to be teaming up with Waterfront Services to provide these latest fleet boats with the best heavy-duty equipment available that's capable of meeting Subchapter M requirements," he added.

The first two vessels in the series, *Miss Deborah* and *Tom Toretti*, have already been handed over, in October 2017 and January 2018, respectively. The remaining two, *Sam P. Hise* and *Rick Pemberton* are scheduled for delivery in April and July 2018.

Thordon's RiverTough water-lubricated bearings were developed specifically for use in abrasive-laden dirty

flexibility/elasticity. The seal requires no routine maintenance, and although designed for abrasive conditions, it is equally at home in clean water.

"These new Waterfront vessels have the complete Thordon riverboat package," said Bright. "The scope of supply includes SXL rudder and ThorPlas-Blue steering linkage bushings. SXL has excellent friction resistance, with operating pressures up to 12N/mm² (1,740psi). These bearings can also withstand the high shock loads and edge loading typical of tow-boat operations. What's more, like the ThorPlas-Blue bearings, they completely eliminate the need for grease and greasing systems, removing any risk of pollution."

ThorPlas-Blue bearings, designed for a life-time of grease-free lubrication, are typically specified to replace the greased bronze bearings in virtually all steering and deck machinery applications. Since these bearings require no maintenance, the commercial advantages are obvious.

"Thordon's range of river towboat systems offers outstanding wear life in abrasive waters. Any extra up-front cost is quickly offset by longer wear life and reduced maintenance down time over the life of the vessel," said Bright.



The Miss Deborah, a recipient of Thordon's RiverTough bearing.

water such as that found in the Mississippi River system. When used in combination with hard-coated nickel-chrome-boron (NiCrB) shaft sleeves and a TG100 shaft seal, the arrangement can last twice as long as the rubber bearings.

The TG100 tailshaft seal uses high-quality, hard wearing silicon carbide faces and Thordon's proprietary elastomeric polymers to offer the optimum combination of strength/stiffness and

Bearings is renowned for supplying high performance, oil and grease-free bearing systems to the global marine, clean energy, pump and offshore markets. Thordon Bearings is the only manufacturer of propeller shaft bearings to guarantee its award-winning COMPAC system for a 15-year wear-life. Thordon systems and bearings are available worldwide through over 80 agents and distributors.

ABOUT THORDON BEARINGS

A respected supplier of seawater lubricated propeller shaft bearing systems, with over 35 years' experience in this technology, Thordon

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China sowing new seeds with Latin America



Unpaved roads are just one of the logistical problems in Latin America.

Thanks to an unprecedented offer of investment and support from the Chinese government aimed at bolstering transportation and wider infrastructure across Latin America, the fortunes of dry bulk commodity traders and handlers looks set to improve over the coming years, writes Terry Gidlow, chief executive officer, WaterFront Maritime Services.

China's renewed focus on bolstering and reshaping its trade relations with Latin America came into focus early this year, when Chinese Foreign Minister Wang Yi formally invited the Community of Latin American and Caribbean States (CELAC) to join its mammoth Belt and Road Initiative (BRI). To sweeten the offer, approximately US\$250 billion in Chinese investment has been inked for infrastructure and related projects across the region over the next ten years.

This is in addition to the reported \$150 billion in loans already extended to countries in the region by the Chinese state (through the China Development

Bank and China Export-Import Bank) since 2005, according to economic think-tank the Inter-American Dialogue. In this sense, China has already sown its seeds of influence across the region, but through the BRI, China is going to have a much more apparent influence, and a physical presence across almost every country in this vast and diverse region. While there is some pushback against the BRI project on the whole, the planned extension of the BRI across Latin America and the Caribbean is good news for all involved in bulk and break bulk commodity trading and shipping.

TILING THE EARTH TO SPUR GROWTH

The invitation in January of this year to formally include Latin American countries in the BRI matters to dry bulk industries because, prior to this meeting, Latin America was effectively locked out of what is increasingly recognized as the most ambitious attempt by any nation to proactively disturb the global trade status

quo. The BRI, at its heart, is a monumentally ambitious global infrastructural development programme seeking to bolster China's links with and access to the rest of the world. It will do so through more than 900 projects, throughout 60 countries and with a budget surpassing US\$1 trillion; and this was before Latin America was included in the BRI blue-print.

Under the original plan, the BRI will provide a vastly improved overland 'Belt and Road' route connecting Europe and the Middle East to China through Central Asia, across China's hinterland and onwards through Southern Asia. The 'Maritime Silk Road' simultaneously seeks to connect China, South East Asia, India and Africa. With Latin America now firmly included in the BRI brief, this all-encompassing project has expanded considerably and will affect every commodity trade, every commodity trader and every major industry in some way – from oil and gas to IT, fashion and education.



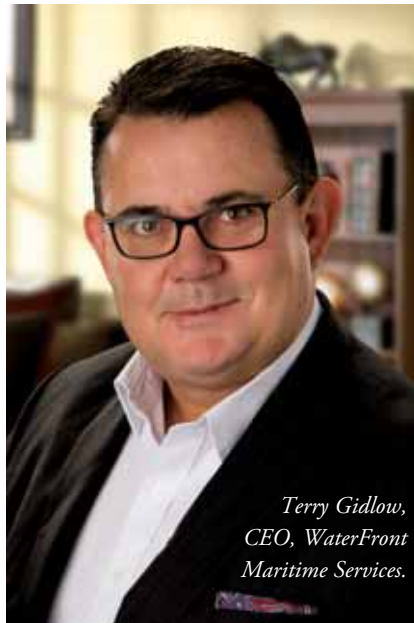
This offer to welcome Latin American countries into the BRI fold is a particularly significant development for bulk commodity traders involved in the global agribulk exports, including sugar, grains, petroleum, iron and steel in particular. The aim of the BRI, after all, is to better connect China and Latin America across the Pacific Ocean through a network of ports, terminals, industrial zones, storage facilities and the adjoining logistics infrastructure, facilities and communities that connect them. Naturally, this means that the impact will be felt across the maritime and logistics industries worldwide, given that the way in which goods and services are accessed, moved and utilized across the globe will inevitably shift.

SURVIVING IN A CHANGING ENVIRONMENT

China's offer to include Latin America and the Caribbean should also be understood as an extension of its existing activities in the region; China's involvement here is not unprecedented in and of itself. What is new — and unprecedented — is the clear declaration of China's intentions to hold greater influence across the region in future. China is already the top trade partner for Brazil, Chile and Peru, but the prospects for the wider region are quite considerable and provide a positive indication for commodity markets for longer-term stability in the region. According to the Economic Commission for Latin America and the Caribbean (ECLAC), China is also the second main source of imports into the region, and overall third main export destination.

Significantly, China's formal extension of the BRI to Latin America comes at a time when the United States — the region's main trading partner — is retreating from key trade agreements, namely the Transpacific Partnership (TPP) and NAFTA agreements upon which Latin and South American countries so heavily rely. When it comes to ports and terminals, the impact of Chinese port and terminal operators having increased access to state funds and a mandate to invest, acquire, build and manage storage infrastructure will surely be felt.

We are already seeing Chinese-owned port and terminal operators pursuing opportunity worldwide armed with a level of protection against risk that private companies would struggle to match, and as such, they have been able to take on more ambitious and risky development projects. This is evidenced by the fact that over the past twelve months, 50% of all port acquisitions worldwide have been led by or



*Terry Gidlow,
CEO, WaterFront
Maritime Services.*

included Chinese buyers. This includes the recent acquisition of 90% of Brazilian container port facilities operator TCP Participações S.A. for US\$924 million by China Merchants Port Holdings Co Ltd last year. A sign of things to come for the dry bulk segment, too.

AN EVOLVING ECO-SYSTEM

While the positive impact of increased Chinese investment in critical transportation infrastructure across Latin America may be a while in the making, there is no denying that improvements are required. According to a recent report in *The Economist* in March this year, more than 60% of the region's roads are unpaved, compared with 46% in emerging economies in Asia and 17% in Europe. As a global port agency business with a local representation in more than 400 offices across more than 60 countries, at WaterFront Maritime Services (WaterFront) we are critically aware of the impact that unreliable infrastructure across the region has on the ability to move dry bulk commodities efficiently and cost-effectively.

The same report highlighted that losses of electricity from transmission and distribution networks are among the highest in the world, which is a very common cause for supply chain issues across the region at present. This is why having people on the ground in every key port, with reliable facilities and access to real-time data and intelligence is so important. WaterFront's network of stringently vetted and highly reputable agency partners specializes in the handling of dry and liquid bulk cargoes and each brings with them unrivalled local market expertise and connections. This is key to

ensuring that WaterFront has the know how to circumvent common issues and problems and also have the clout to make changes on the ground should problems or delays occur. The company's partners in the region include Ultramar in Chile, Transtotal in Peru, Remar in Ecuador, C.B. Fenton in Panama, Naves in Colombia, Alpemar in Argentina and Unimar in Brazil.

This network structure enables WaterFront to anticipate problems and make tangible improvements across the supply chain. This includes building-in precautionary measures for avoiding bottlenecks further up the supply chain and identifying ways to counter bureaucratic delays in port which can often be lengthy and complex.

PREPARING TO HARVEST THE CROPS

We all know that changes in demand do not always bring immediate returns to all across the supply chain, so it is anticipated that the impact of the BRI's roll-out across Latin America will be gradual, and ongoing. However, for shipowners and cargo traders, the ability to respond to new opportunities as they arise is important, while being able to operate with optimum efficiency and to mitigate risk across every voyage remains critical. The port agent has an important role to play in ensuring this. Each country included in the vast BRI programme has its own unique challenges, including compliance and operational issues.

Drawing upon local expertise and having access to agents in port that can ensure the highest global standard of safety, compliance and service will be key to benefiting from any changes that result from China's increased involvement in Latin America and across the wider 'Belt and Road' and 'Maritime Silk Road' routes.

WaterFront believes that the BRI will be a once-in-a-generation shift in global and political trade dynamics that can bring great benefit to many. While it will bring with it significant change, opportunity and challenge, there will however, be some constants. The need to maintain lean supply chains, to operate efficiently and cost effectively to compete will remain the same. The ability of the port agent to support this will also remain the same. With global connections set to undergo a shake-up under the BRI programme, and in an increasingly unstable and unpredictable global political and trading environment, having a reliable agent at both load and discharge ports, seems like an increasingly safe tool for harvesting the benefits of a global economy in transition. DCi

New port master plan for Uruguay

Uruguay's National Ports Authority (ANP) and the Ministry of Transport & Public Works recently launched a master plan covering national ports development in 2018–2035. The highlight of the plan is the creation of a deep water hub port.

According to the minister, Víctor Rossi, it is still possible for the Port of Montevideo to achieve a draught of 14 metres (two metres deeper than present), but the government nevertheless also favoured construction of a complementary facility.

Alberto Díaz, who heads up the ANP, said that with private sector investment it would also be possible to build a dry port at Rivera and also help kick-start the proposed Puntas de Sayago terminal.

The idea, he added, is to connect the Rivera inland facility with the Port of Montevideo by road and rail, along a central corridor. Rivera is located some 500km north of Montevideo and will cover an operating area of 25ha.

As for the Punta de Sayago logistics port, the aim is to consolidate this by 2025, developing commercial quays on the River Plat along a distance of some 10km of the access channel to Montevideo port. This whole project will cover a total area of 187ha, which should attract various industrial entities.

Barry Cross

Bunge and M.Dias Branco to build Rio wheat terminal

Ceará state based company M. Dias Branco, which is Brazil's largest pasta and biscuit maker, is about to make a major new investment in the Port of Rio de Janeiro. After recently acquiring Piraquê for \$456 million, it is now teaming up with multinational Bunge on its latest project. This will see construction of a brand new wheat terminal within the port zone.

According to secretary Christino Aureo da Silva, this will require investment of \$38 million.

Both partners have formed the Maravilha consortium to manage the 25-year concession, for which they were the only bidders in an open tender.

The terminal, which will cover an area of 13,453 square metres, will have to meet a third year traffic guarantee of 682,000 tonnes, rising to 918,000 tonnes in the 20th year.

The concessionaire will have to pay the port a fixed fee of around \$10,500 per month and \$0.38 for each tonne handled.

The consensus of opinion is that Bunge was the main driver in the project, after its mill, the Fluminense, was removed from an area close to the port due to the construction of Porto Maravilha. The previous facility, which was close to the coast, was used to grind wheat arriving at the port and moved by an underground

conveyor. However, the renovation of the port meant that it had to build a new mill at Duque de Caxias, which opened in 2016. Nevertheless, after the move, it lacked warehousing for the wheat and a means to transport it to the mill. Nowadays, for example, wheat has to be discharged directly into trucks. Depending on the time of day, this causes major traffic congestion. Under the new concession, Bunge will be able to build a warehouse within the port and move the wheat by road to the mill at night, when traffic is lighter.

The warehouse will also supply other mills in the immediate area, not necessarily owned by Bunge.

Barry Cross

Port of Longview considers diversifying into biomass

The Port of Longview in the USA has been in discussion with potential customers to handle biomass cargoes at its Berth 2 dry bulk facility. With the worldwide boom in biomass use — and distribution — the port plans to be ready to diversify.

The Port of Longview's Business Development Manager, Laurie Nelson-Coolley, says: "We have been discussing the possibility of biomass exports out of Longview with several developers who have interest in white pellets or torrefied pellets for Asian markets. We have not added any new infrastructure for future exports. However, Bridgeview Terminal is an excellent opportunity.

Bridgeview Terminal, an export bulk facility that is capable of handling unit trains of cargo direct to ship is the most natural fit for immediate shipments. Current cargoes shipped out of Bridgeview Terminal are soda ash, bentonite clay, and talc. The facility has the capabilities of washdowns between cargo types to eliminate cross-contamination. The biggest challenge of this facility is the lack of on-site storage. There is space for silos or domes to be built, but the business needs to be in place to support the capital expenditure needed. Overall there are great opportunities in Longview to handle this cargo in the future."



The Port of Longview's Berth 2 (International Raw Materials) dry bulk facility.

Positive financial figures: a boost for Port of Blyth



The UK's Port of Blyth has released performance figures that confirm another year of success and growth, including encouraging financial results that are among the best in the Northumberland port's 135-year history.

The port has recorded a turnover of £20.6m alongside an adjusted operating profit of £1.32m, while in anticipation of growth over the next five years, total investment in 2017 climbed to more than £4m.

Already known as one of the UK's leading offshore energy bases, Port of Blyth welcomed a number of high profile new tenants in 2017, such as market leaders DeepOcean and Global Marine Group, which contributed to both rental and operational income.

In addition, the installation of EDF Energy Renewables' Blyth Demonstrator Offshore Wind Farm, which is being utilized

to test new wind energy technology, led to the French energy giant's renewables business creating an operational base at the port's South Harbour terminal.

Martin Lawlor, chief executive of Port of Blyth, said: "Whilst 2017 was a challenging year for many in the port industry, Port of Blyth continued to progress; growing our client base, hosting a number of internationally significant projects and again setting a number of performance records."

The port enjoyed a record year for commercial vessel movements which grew by 3% on 2016's previous record high while total cargo tonnage increased by 6% over the same period.

Meanwhile investment reached £4.2m for the year as the port undertook its most significant level of development in more than a decade. In preparing its infrastructure for an expected period of growth in the short to medium term, the port

continues to respond to considerable interest from the market for its services.

The Port of Blyth's financial results have been published in its annual review of 2017 and confirmed at the port's recent annual public meeting, both of which form part of its commitment to its stakeholders as a leading UK Trust Port.

ABOUT PORT OF BLYTH

Port of Blyth is the port operating division of Blyth Harbour Commission, an independent statutory trust established in 1882 and is one of the largest Trust Port's in the UK handling up to two million tonnes of cargo per annum across five terminal based around the River Blyth.

Together with major logistics and training divisions, the port group turned over £20.6 million in 2017 and despite challenging global trading conditions has again set numerous records for performance for the year.

Such success has been driven by growth across a variety of sectors but particularly offshore energy (oil & gas and wind) with the port is now recognized as a major strategic east coast base supporting the sector. Other trade handled includes containers, dry bulks (coal, aggregates, cement etc) and marine fuels.

As a trust, all profits are re-invested back into the port to improve facilities and to provide benefits for its wider stakeholders.



Gentle handling is key to OVET's success with biomass cargoes

On-board biomass transshipment.



OVET dry bulk terminal in the Netherlands is a stevedore company, which specializes in storing, transshipping and processing dry bulk. With over 100 employees, it has offered very high quality and flexibility in services since 1957. It can achieve a total unloading capacity of as much as 80,000 tonnes of dry bulk per day by the use of the four floating cranes.

With the four floating cranes, OVET is capable of working in the entire ARA (Antwerp–Rotterdam–Amsterdam) range. The floating cranes can be moved between the terminals in the ports of Vlissingen (Flushing) and Terneuzen, in a mere three to four hours. On top of that, lightering can take place at Terneuzen Rede and Everingen (on the Scheldt). Also, almost all equipment at the terminals is mobile.

OVET handles biomass cargoes at its Vlissingen terminal. It has noticed that demand for biomass is coming not only from power plants, but ever more from consumers. This rising demand for wood pellets for domestic use changes the way that biomass is handled. Pellets for industrial use can contain 10% or even in some cases up to 15% dust, but pellets for domestic use must contain a maximum of 1% dust. To make sure that the pellets contains as little dust as possible, the pellets must be handled softly, loading and discharging carefully in such a way that there will be the least breakage possible. Moreover, the pellets for domestic use will be screened a couple of times during the logistic process, in order to remove the dust out of the cargo.

OVET is highly skilled in ensuring that all these steps are followed.

Re-loading biomass cargoes into trucks for onward transportation.



Unloading biomass at the Vlissingen terminal.



Board-to-board transshipment.



Piling wood pellets in covered storage.



Port of Rotterdam looks back on successful trade mission to China

Michiel Nijdam, corporate strategist at the Port of Rotterdam Authority, participated in the trade mission (Logistics/eCommerce track) which took place in China in April. The mission was led by Sigrid Kaag, Minister for Foreign Trade and Development Cooperation.

The delegates visited Shanghai, where the Port of Rotterdam was a speaker at a seminar on the Belt and Road initiative and Guangzhou where a logistics seminar, a matchmaking event for 150 Chinese and 100 Dutch companies and a port tour were organized.

The Netherlands is China's third trade partner within the EU and each year ever more Chinese companies show interest

in investing in the Netherlands or developing joint initiatives together with Dutch companies.

The Netherlands is perceived as the gateway to Europe, and this was recently recognized by the Global Logistics Guide. The guide evaluated the supply chains and logistics networks of countries worldwide and rewarded the Netherlands with a perfect score as part of the Inbound Logistics 2018 survey, for its sound infrastructure and positive business climate, calling it "the model for European logistics excellence".

One example of an agreement signed during the trade mission is the Strategic Cooperation Agreement between the

Chengdu International Railway Port Investment Development Co. and GVT Group of Logistics, which will mark the start of the third year of co-operation on the Chengdu–Tilburg–Rotterdam Express. This rail connection between China and the Netherlands has been offering huge trading opportunities to companies who seek alternative logistic solutions besides air and sea. The new contract signed by the parties in 2018 will strengthen the economic exchanges and co-operation between the two regions. The train terminal in Tilburg will continue to act as the hub for further extension to the UK, Belgium, Scandinavia and other European countries.

OBA creates space for new operations

FIRST STEP IN PORT OF AMSTERDAM TRANSITION STRATEGY

Terminal operator OBA (Overslag Bedrijf Amsterdam) will be clearing part of its coal-handling site this year in order to further diversify into other dry-bulk commodities. Its decision is prompted by the reduced demand for coal storage. This represents a key new step for Port of Amsterdam in its push towards sustainability, while the change is part of OBA's strategy of becoming a multi-purpose terminal. OBA and Port of Amsterdam have expressed their joint intention to help advance the energy transition and have signed a Letter of Intent (LOI) to formalize this objective.

In signing the LOI, the two partners agreed for OBA to clear more than 20% of its site to accommodate new operations, starting in the first quarter of 2018. The site to be released — roughly the size of 28 football pitches — concerns the non-automated section of these industrial premises which will lead to more efficient business for OBA. Investments in the site will focus on creating covered storage capacity.

These efforts are part of OBA's goal of furthering its ongoing diversification into dry-bulk commodities and becoming a multi-purpose terminal. OBA and Port of Amsterdam have agreed to invest in new quays and in increasing water depths. The arrival of the new sea lock will help to advance these goals. Port of Amsterdam CEO Koen Overtoom: "In signing their

Letter of Intent, OBA and Port of Amsterdam are showing that they are serious about actively promoting the energy transition and diversification. As a 'Port of Partnerships', we are working with our customers to facilitate these changes. We need our customers' expertise, infrastructure and business experience to turn the energy transition into a success. This is therefore very much a combined effort in every way."

OBA Managing Director Harm Winkeler: "As a logistics services provider for various dry-bulk commodities, we are meeting the changing market demand, prompted in part by the energy transition. As Europe's fourth-largest port, Port of Amsterdam is very well positioned in the supply chain for various major industries in the Netherlands and Germany. We aim to provide high-quality services and it's vital that we adapt to our customers' changing needs.

"This LOI marks an important step in the ongoing process of diversifying our terminal and introducing more sustainable practices in our operations. Building and maintaining long-term partnerships with our new and existing customers remains a prime focus for our company."

ABOUT OBA

OBA Bulk Terminals Amsterdam specializes in the storage, processing and transshipment of third-party dry-bulk goods. From its base in Amsterdam's strategically located Westelijk Havengebied

(Western Port Area), OBA serves customers from a variety of sectors and industries, including the energy and steel sectors and the animal feed industry. OBA currently employs a passionate team of 120 employees who collectively are responsible for the annual storage and transshipment of around 19 million tonnes of dry-bulk goods.

The main items processed include agricultural products, minerals, coal and circular products such as scrap and soil.

ABOUT PORT OF AMSTERDAM

Port of Amsterdam is Western Europe's fourth largest port and plays a major role in the transshipment and processing of energy products. The North Sea Canal Area transshipped approximately 100mt (million tonnes) of goods in 2017, with Port of Amsterdam accounting for approximately 81mt of this amount. A total of 69,779 people work in the port region either at companies in the port or at port-related companies.

Approximately 32,461 of these people work in Amsterdam. Port of Amsterdam is committed to being a smart port and to adding value for customers and the environment in a sustainable and innovative manner. It seeks to promote growth at companies, while still taking a careful approach to the available space and the quality of water, soil and air. As 'Port of Partnerships', Port of Amsterdam works intensively with partners in the business community, city and region.

Focus on developments in Scandinavia



In 2016, the Port of Oslo reported a 10% increase in dry bulk traffic, although business development manager Carl J. Hatteland had been less optimistic about similar gains in 2017, writes Barry Cross.

“My forecast was correct,” he says. “In 2017, dry bulk increased by 1.3% to 1.82mt (million tonnes). This is partly due to where local construction projects are in the construction cycle; how many and how big these projects are; and partly our capacity/pace and ability to introduce new terminals and products to increase the market share of shipped products.”

There are several new products/services and terminals that will be introduced over the next couple of years, he adds; these are likely to increase dry bulk volumes in the port, improve and expand service and logistics quality, increase scope for return dry bulk cargoes, and buffer for natural ups and downs in construction activity. However, the full

effects of these are not expected to hit 2018 dry bulk volumes, so no big leaps are expected for this year.

According to Hatteland, it has indeed been the construction industry in and around Oslo that continues to generate large amounts of dry bulk traffic and remains a main driver for growth in this sector.

“There are many large scale construction projects in the pipeline. So, as long as port actors and the port remain competitive — which there is an underlying drive for, due to higher costs of other land-based sourcing — and increases the scope for services, it is possible to stabilize and further increase shipped dry bulk products for construction purposes,” he says.

Other dry bulk products, such as cement, which is related to construction projects, had a fairly even 2017. Salt, however, had a very good year due to

winter weather conditions being favourable for the salting of roads. Over the last year, new RDF (refuse-derived fuel) volumes have been captured, but these will not grow until (eventually) new incineration capacity becomes available; so, for now, volume and service have stabilized.

Hatteland says there are other, project-based dry bulks, such as clay, which rely heavily on the cycle of any given construction project. In Oslo terms, clay represents relatively large volumes over a short period, and could easily vary from 200,000 tonnes one year to absolutely nothing the next.

“We know, however, that over the next 10–15 years that, approximately, 1.2mt are needed, averaging 70,000–100,000 tonnes a year.”

Construction companies are, and have always been, present in the port, and there is an increasing tendency for construction companies at the executing stage of a

Oslo is world's third-best port city

Oslo is ranked number three among the world's leading port cities, after the top two, Singapore and Tokyo.

The ranking by 250 international maritime experts based on almost 50 indicators is performed on behalf of DNVGL in the report *The leading maritime capitals of the world 2017*.

Oslo is strong in maritime finance and law and technology. Oslo, Copenhagen, Singapore and London are also considered to be the best able to cope with the upcoming digital transformation in the maritime sector.

This ranking confirms Oslo as an important maritime city. The Oslo area's leading shipping, finance and maritime technology environments must take the credit, says Port Director of Oslo Ingar M. Mathisen. When it comes to maritime finance, Oslo is ranked ahead of New York, and is home to the world's two leading shipping banks.

ONE OF THE WORLD'S LEADING SHIPPING ENVIRONMENTS

"The background for the strong position among international maritime experts is the city's strong position as a global shipping centre, said Mohd Shahrin Osman, Head of Digital Solutions and Advice in DNV GL Maritime in the Middle East."

"Although Oslo and Norway are small in the big world, we enjoy one of the world's leading shipping environments around us. This helps to maintain focus on Norway as a maritime nation. We have access to world-leading expertise and research environments, including environmental technology and professional operators who knows shipping," says Mathisen. Oslo port is strategically located as the gateway to the capital and Norway. Half of Norway's citizens can be reached within a radius of three hours. "Port of Oslo aims to be a

pioneer port for modern and environmentally friendly maritime transport, for the benefit of business and consumers," the port director adds.

OSLO IS EQUIPPED FOR THE DIGITAL TRANSFORMATION

Digitalization is expected to be one of the major drivers for the development of the maritime sector in the future. The maritime experts predict that Oslo, Copenhagen and London and Singapore are the port cities best prepared for the digital shift.

"We focus on modernizing and digitalizing the port operations, and in co-operation with port operators adopt new technology. Port of Oslo has among other things one of the world's most modern container terminals, with advanced logistics systems and some of the world's quietest, zero-emission electrical cranes," says the port director.

project to make ports and shipping supply chains an integrated part of their 'green shift'.

Nowadays, there is a concrete plant in the port, while asphalt production also takes place there. A new recycling plant is about to open, handling clean and also contaminated construction items as part of early stage construction projects supply raw materials and other materials such as gravel and soil.

"Waste traffic generates large volumes for the port. This is mainly contaminated construction bulk that needs depositing. Then there is scrap that is sent to northern Norway for re-smelting (and returns as finished iron products). Household waste is treated and incinerated, locally, in Oslo," explains Hatteland.

Quizzed about productivity in the port's dry bulk handling facilities, he explains that there are several drives towards more automation and towards introducing modern handling equipment.

"Overall volumes are still generally low and fragmented, hence unit costs are generally too high to achieve high speeds in terms of productivity improvements. There are, however, many projects that will come in over the next years where modern and

low/zero-emission facilities will be introduced," says Hatteland.

As for capacity, he concedes that there is very limited space within the port, while the cost of expanding is both high and takes time to implement. Nevertheless, effective space management along with a will, acceptance and understanding for the importance of (in particular local) dry bulk products will be catered for.

Finally, although draught at Oslo is limited to a maximum of 10–12 metres —

instead, concentrate on sawn timber, pulp and perhaps paper. Viktor Allgurén, the Senior Manager Market Intelligence at the port authority, says this remains the case.

"Unfortunately," he says, "no breakbulk traffic involved in forestry products started in 2017. Furthermore, we don't see this happening in 2018, either."

At present, this the cargo is unitized, being shipped either in containers for lo-lo container ships or on cassettes and trailers for ro-ro ships.

"The forestry products that are sent as break bulk are destined for both European and North Africa markets," says Allgurén.

In terms of movement to the port of forestry business, he says that the role of rail is "crucial".

Asked about how much money the port authority is to invest in developing these markets, he says that no specific investment has been earmarked for breakbulk handling. However, the port authority is presently designing an on dock rail terminal to cross dock mainly forest products from rail to containers/trailers.

Finally, in respect of two small companies that handle sand and gravel in the port, he notes that, in 2017, Vikans Kross handled approximately. 200,000 tonnes.

Port of Gothenburg.



but is even lower in some terminals and at some quays — this is more than adequate for the majority of dry bulk traffic handled there, he says.

A number of years ago, Gothenberg began to pull out of traditional dry bulk handling traffic, which transferred to other, better-equipped ports. The aim was to,

Kokkola – a general port in powerful growth

Port of Kokkola is the third largest general port in Finland. Cargo traffic through the port has experienced powerful growth thanks to development efforts characterized by long term and thorough planning. The most important success factors at the port are, among others, customer friendly service, competitive pricing and investments in modern cargo handling equipment.

Port of Kokkola is a popular and foremost port in Finland serving the mining industry. The expertise of the logistics required by the mining industry is based on a co-operation that goes back more than 50 years. In addition to the mining industry, Port of Kokkola is an important actor in the transit traffic from and to Russia. The third significant customer group is the industry and local trade in Kokkola. In the close vicinity of the port, the industry concentration of the Kokkola Industry Park (KIP) has been established. This Industry Park is the largest concentration of non-organic chemical industry in Northern Europe. More than 60 companies are established in the area, employing more than 2 000 staff. Major investments are also made in the Industry Park. The companies active in the Kokkola Industry Park have announced additional investments, amounting to a total of €110 million, in 2012 and 2013 in Kokkola.

PORT OF KOKKOLA OPENED AN OFFICE IN MOSCOW

Port of Kokkola is developing and



expanding its activities in Russia and CIS countries. On 4 October last year, Port Kokkola opened an office in Moscow. With the help of the Moscow office, Kokkola will develop partner relations with Russia, and will be able to respond quickly to the needs and demands of Russian clients.

The representative of the Port of Kokkola, Kauko Tanninen will develop co-operative and partner relationships in Russia and the CIS countries. Tanninen has more than 20 years of experience in Russia in many industries, including mining and logistics.

Kauko describes the activities in Russia in the following way: "In Russia it is extremely important to dare and to establish business relations, to listen and

discuss about arguments, to own and create many personal contacts. Here, the quality and honesty of Finland and the Finnish mentality are valued, and it is very important to create trust between the client and the supplier. When the services, which re offered, are good, then it is an honour for me to provide them — and Port Kokkola is an excellent example of excellent port services."

THE PORT OF KOKKOLA PARTICIPATES IN THE FINLAND 100 YEARS CAMPAIGN

Finland celebrated 100 years at the end of last year. The Finns achieved independence on 6 December 1917. The nation celebrated its 100th year with numerous events in Finland and all around the world.

The Port of Kokkola participated in the Finland 100 Years Campaign, with the acquisition of its new crane *Karsten*, which was been delivered to its new home during the jubilee year.

Port of Kokkola applied for the Finland 100 campaign for the following reasons: the crane's total purchase value is €3 million and, during the anniversary year, *Karsten* arrived at its new home in Kokkola's Deep Port. For this reason, the Port of Kokkola wants to perpetuate this important project and respect the 100th anniversary of Finland by attaching the official "Finland100" logo to the crane. The logo on the crane is a reminder of the country's international and domestic shipping and it will continue to remind its crew about Finnish independence for many years (over 30 years).

The crane was also chosen as a point of attachment to the logo, because it combines the various stages of logistics and is the hub for international trade.



Indexator reaps success with its toughest rotators



XR rotators, from aimed at the toughest applications, continue to take market share in the industry. “The reaction from our customers around the world exceeds all expectations, and they’re enjoying a level of strength and service life that other products lack,” says Johnny Karlsson, Area Sales Manager at Indexator.

The Swedish company Indexator is globally renowned in the manufacture of rotators, and the prevailing boom and increased interest in the XR product range is easy to see in the company’s factory, located in Vindeln outside Umeå in Sweden.

“Extensive field testing and many hours of gruelling effort have provided excellent results, which are now also reflected in the increasing interest and positive response from the market,” says Karlsson.

The XR series comprises compact, powerful rotators equipped with strong bearings to cope with extremely strenuous work in forestry,

timber handling, recycling, and materials and scrap handling. The rotators are installed freely suspended from large material handlers, and also rigidly on excavators for e.g. sorting work.

“XR heavy-duty rotators can handle substantial axial loads as well as radial and

bending forces thanks to the over-dimensioned slewing ring bearing. This, together with the unique, patented torque transfer means the motor and swivel are not affected by external forces, and this adds up to long service life compared to competing solutions,” says Karlsson.





Johnny Karlsson, Area Sales Manager, Indexator.

CENTRAL LUBRICATION AND HOLES FOR CABLING PASS-THROUGH

The latest addition to the product range is the XR400 with a hole in the centre of the rotator for cabling — e.g. for power supply to tools or magnets for scrap handling. Rotators are available throughout the range that allow central lubrication of the grapple.

ADDITIONAL SIZES AND MODELS IN THE PIPELINE

Models are currently available in three sizes:



manufacturer of rotators, swivels and accessories. Today, Indexator is an extremely strong brand in the forestry, material handling and recycling industries all over the world. The company conducts world-class R&D that includes a dedicated, in-house test lab that international equipment manufacturers also turn to develop new products and functions. It currently has 140 employees and annual sales of around SEK260 million. A high proportion of the company's sales go to export, with around 80% of production being sold to more than 40 markets around the world.

XR rotators have a unique, patented torque transfer meaning that the motor and swivel are not affected by external forces, and this adds up to long service life compared to competing solutions.

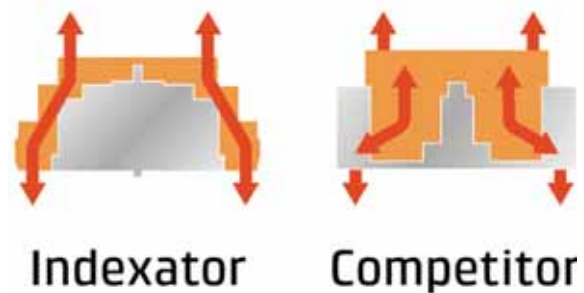
- ❖ XR600: Max ±30 tonnes axial, dynamic workload;
- ❖ XR500: Max ±25 tonnes axial, dynamic workload; and
- ❖ XR400: Max ±20 tonnes axial, dynamic workload.

“During the late autumn of 2018 we will begin series production of the XR300, which can handle dynamic loads in tension and compression up to nine tonnes. Field tests in this size have been extremely

successful and there is huge customer interest. We're also developing the existing product range to include further functions,” explains Karlsson.

ABOUT INDEXATOR ROTATOR SYSTEMS AB

Indexator Rotator Systems AB is a highly respected



Indexator

Competitor

Port of Aarhus plans major expansion to handle future growth

The Port of Aarhus is an active trade area with approximately 150 companies, creating the basis for about 10,000 jobs. The Port of Aarhus is Denmark's largest container port, with a market share of approximately 60%, and also the country's largest public bulk port. Therefore, a very large part of the consumer goods are imported to Denmark via the Port of Aarhus. Also, a significant part of the Danish export is shipped via the fine-meshed network of shipping routes to all parts of the world.

EXPANSION OF PORT OF AARHUS SUBJECT TO AN ENVIRONMENTAL ASSESSMENT

The Port of Aarhus plan to expand with new port areas in the sea to the east. The working title of the expansion is 'Yderhavnen' (the outer port) and is part of the agreement about the port areas near the city, which Port of Aarhus sold to the City of Aarhus for urban development. The expansion, which will now be environmentally assessed, is expected to be carried out in three phases. The last phase is expected to be finished in about 40 years.

The city as well as Port of Aarhus are growing remarkably. The population is

increasing, and so is the number of working places and companies. This implies an increased need for transportation of goods — import as well as export. New port areas are a prerequisite for continued growth and development, and a must for the port to be able to meet the demands of the customers.

"We are close to completing the port's current master plan from 1997. And it is with some pride on behalf of the entire company I can say that the forecasts and the vision have turned out to last. Currently we are working on the last phase, i.e. moving the ferry terminal away from the city to the eastern port. The outer port is an extension of the East Port, thus fulfilling the wish for moving the port out into the sea and away from the city", says Port Director Jakob Flyvbjerg Christensen. He emphasizes that the current port areas are largely utilized and that Port of Aarhus has sold no less than 600,000m² port area to the city. Initially, the Port of Aarhus wants an extension of approximately 300,000m², which forms the first phase (expected to be completed in 2030). The other two phases are of 650,000m² (expected to be completed in

2048) and 450,000m² (expected to be completed in 2060).

The current growth figures at Port of Aarhus Havn are two-digit, and forecasts continue to show growth in both the container and the bulk sections. In addition, it is generally believed that maritime transport should help solve the congestion on the Danish roads, so one might assume that even more freight will be transported by sea rather than by road in the future.

The environmental assessment that the Port of Aarhus has now requested must examine all relevant environmental conditions. The survey will take several years and there will be a number of consultation phases during the process.

"The outer port is a prerequisite for the continued growth of the city and the port. It will be located well away from Aarhus city, and at the same time it is possible to provide space for a purification plant at the port expansion instead of the present location at the 'Tangkrogen'. Therefore, I am convinced that such an overall solution will be well received by the majority. But of course, resistance can always be found somewhere," says Flyvbjerg Christensen. **DC**

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Bendezu Port Equipment delivers Gottwald HMK 300 EG from Belgium to Spain

Bendezu Port Equipment GmbH, an international trading company offering second-hand port equipment, has recently sold a Gottwald HMK 300 EG mobile harbour crane from Belgium to be operated in the port of Sevilla in Spain.

The second-hand crane with a maximum lifting capacity of 100 tonnes and a maximum radius of 50m, has one remote controlled rotator equipped with a double hook. This unit comes in a four-rope configuration.

The crane was loaded at the port of

Ghent in Belgium on board the vessel Palabora with the help of the two Liebherr 450-tonne SWL deck cranes. The loading operation took one day, after which the vessel sailed on 5 April bound for the port of Sevilla in Spain.

The transit time is estimated at seven to nine days and, at the time of writing, the crane was expected to arrive by 15 April at Sevilla Terminal.

Bendezu Port Equipment specializes in purchasing, selling and marketing of second-hand port equipment, providing customized technical advice to a variety of clients on an international level. The company has a wide experience and capabilities in port crane relocation and sea transport round the world.



Karl Woodhouse — new Sales Director for SAMSON Materials Handling Ltd.

SAMSON Materials Handling, under the roof of the AUMUND Group, has announced the appointment of Karl Woodhouse as Sales Director effective from 1 February 2018.

Woodhouse's career in materials handling started almost 27 years ago with B&W Mechanical Handling Ltd, which became SAMSON Materials Handling in 2013. By working within a variety of roles over the years he has amassed considerable knowledge of hands-on, theoretical and commercial aspects of the business, as well as bulk materials handling in general worldwide.

ABOUT THE AUMUND GROUP

The AUMUND Group is active worldwide. The conveying and storage specialist has special expertise at its disposal when dealing with bulk materials. With their high degree of individuality, both its technically sophisticated as well as innovative products have contributed to the AUMUND Group today being a market leader in many areas of conveying and storage technology. The manufacturing companies AUMUND Fördertechnik GmbH (Rheinberg, Germany), SCHADE Lagertechnik GmbH (Gelsenkirchen, Germany), SAMSON Materials Handling Ltd. (Ely, England), as well as AUMUND Group Field Service GmbH and AUMUND Logistic GmbH (Rheinberg, Germany) are consolidated under the umbrella of the AUMUND Group. The global conveying and storage technology business is spearheaded through a total of 15 locations in Asia, Europe, North and South America and a total of five warehouses in Germany, USA, Brazil, Hong Kong and Saudi Arabia.



*Karl
Woodhouse.*

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 Our know-how ...

CASE celebrates 60 years of wheel loader manufacturing in 2018

CASE Construction Equipment introduced the 4-wheel drive W9 in 1958 — today the company offers a full range of compact and full-sized wheel loaders for all applications, from road building to recycling centres, from urban construction to quarries.

This year, CASE Construction Equipment is celebrating its 60th anniversary of wheel loader production, which started with the W9, the first CASE integrated four-wheel drive wheel loader introduced in 1958. The W10 and W12 four-wheel drive models and the front-drive W5 loader soon followed. The W series grew through the 1960s and 1970s, including the mammoth 15-tonne W26, introduced in 1968. It was CASE's first articulated loader and the largest wheel loader offered at the



time. The W series loaders all featured cabs mounted on the front half of the machine.

With the introduction of Model 621 in 1987, the entire CASE loader line graduated into the 21 Series, a more rugged design that featured modern rear-mounted cabs. The 21 Series models were developed

under a new streamlined, cross-functional, concurrent process that became the guide for the rest of the company as it moved into the 21st century. Major innovations in productivity, serviceability and operator comfort continued, and this product line represented the first heavy earthmoving

equipment to deploy a Tier 4 Interim solution without a particulate filter, using selective catalytic reduction (SCR) emissions technology, with the F Series. Several new models were added to the 21 Series, including a new line of compact wheel loaders.

Jose Cuadrado, Vice President CNH Industrial Construction Equipment for Europe Africa and Middle East, commented: "The W9 marked the beginning of a long history of innovation pioneered through many generations of wheel loaders, culminating in today's G-Series wheel loader range, introduced a revolutionary windscreen design and raised the bar on operator comfort. These machines have come a long way since the original models, and reflect the practical innovation CASE builds into its equipment to maximize performance and dependability."

The latest wheel loader offering from CASE — The G Series — span 141 to 347



Back in the day: CASE entered the market in 1958.



horsepower, with bucket payload ranging from 3.9 to 10.2 tonnes and bucket volume from 1.9 to 5.5m³. In the short time since their introduction, the G-Series have won several awards, including the prestigious Good Design™ Award in the Industrial Category from the Chicago Athenaeum: Museum of Architecture and Design and The European Centre for Architecture Art Design and Urban Studies, and top new product recognitions from industry publications. CASE is celebrating the high quality of the latest generation of CASE wheel loaders with the launch of its ProTech protection plan, which covers powertrain and hydraulics for 1 + 3 years and 6,000 hours on all G-Series wheel loaders.

CASE is celebrating the 60th anniversary of its wheel loaders at the Intermat 2018 show with a dedicated display on its stand. It is centred on a G Series wheel loader model bearing a commemorative livery specially developed for this year's exhibitions, which includes a '60 Years' logo embroidered on the headrest and applied as a decal on the bucket, as well as an Eagle tattoo on the hood.

ABOUT CASE

CASE Construction Equipment sells and supports a full line of construction equipment around the world, including loader/backhoes, excavators, motor graders, wheel loaders, vibratory compaction rollers, crawler dozers, skid steers, compact track loaders and rough-terrain forklifts. Through CASE dealers, customers have access to a professional partner with world-class equipment and aftermarket support, excellent warranties and flexible financing.

CASE Construction Equipment is a brand of CNH Industrial N.V.

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Better belt cleaning is vital for a smooth handling process

HOW TO ENSURE BETTER BELT CLEANING

Keeping conveyor belts clean is a recurring problem for operators, write *Jean-Claude Mougeot, Product Manager at Cobra Europe* and *Marc des Rieux, Expert at C3 Expert*. Since the late 1980s, this operation has become crucial to guarantee the reliability, cleanliness and safety of bulk handling by conveyors. Many scraper models have been developed and the materials used in them have reached a high level of technicality. On the other hand, the belt, a major element of the 'cleanliness' problem, has not benefited from any significant progress on this point.

PRINCIPLE AND CONSTRAINT

The scraper blade is pressed against the surface of the belt; precisely against its top coating soiled by the product handled. It is this pressure from the blade — even the lowest pressure necessary, which remains broadly the same for all models of scraper on the market — which quickly generates a loss of performance (quality of cleaning, longevity of the blades).

A microscopic observation, at the interface of the rubber coating and the scraper blade, made it possible to demonstrate the formation of a consecutive rubber fold:

- ❖ at the pressure of the scraper blade; and
- ❖ at movement of the belt.

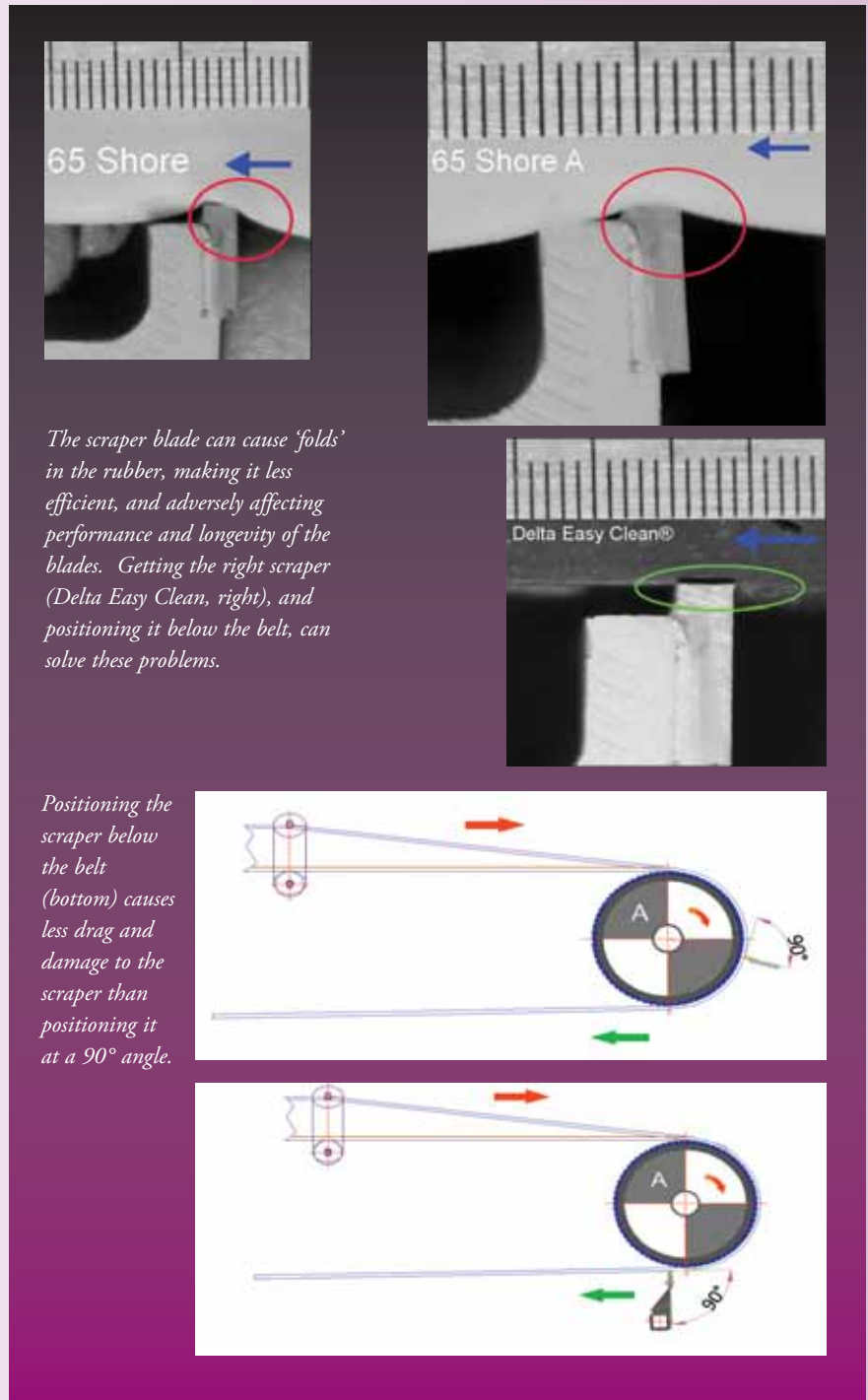
It is this deformation (rubber fold), however minimal, that is at the root of poor performance or rapid loss of belt cleaning and blade wear performance.

Other macroscopic factors intervene; these are more or less influenced by the model of the scraper, the blade holder and the blade on the one hand and, on the other hand, by the tension of the belt, as well as the position and adjustment of the scraper on the conveyor. By responding to the constraints of microscopic observation, the Delta Easy Clean® belt responds, in fact, to macroscopic observations.

DEVELOPMENT AND TESTS

In collaboration with a recognized expert in the field of belt conveyors, specifications have been drawn up to define the architecture of the belt and the qualities of an rubber perfectly adapted to the constraints of modern scrapers, especially with thin blades (thickness 2 to 5mm) in tungsten.

The tests have been successfully conducted on the handling of household cullet (recycled broken or waste glass). This product is characterized by a large amount of extremely abrasive and sticky



The scraper blade can cause 'folds' in the rubber, making it less efficient, and adversely affecting performance and longevity of the blades. Getting the right scraper (Delta Easy Clean, right), and positioning it below the belt, can solve these problems.

Positioning the scraper below the belt (bottom) causes less drag and damage to the scraper than positioning it at a 90° angle.

'fines', which are particularly damaging to the scraper blades and contain fatty substances, damaging to the belt coating.

This cullet accumulates two antagonistic constraints:

- ❖ abrasiveness requires a high-performance anti-abrasive coating rubber that is incompatible with fats;
- ❖ fat requires an anti-fat rubber coating, but it is of low abrasion resistance.

For those who like numbers, the period for one revolution of belt on the test conveyor is 28 seconds and the life time has been more than doubled for a 12-hour operation

a day, five days a week.

INDUCED ADVANTAGE IN TERMS OF SECURITY

The cleaning performance achieved with the Delta Easy Clean® belt has a significant impact on the path stability of the belt, return side, and on the cleanliness of the floors and the conveyor's immediate environment. These qualities are to be taken into account from the point of view of the safety obligations since the risks related to the adjustment operations and the risks of falls, slips, risks related to the cleaning are significantly reduced.

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Insulated buildings help increase storage space

FTS Eiendom in Norway is set to streamline its flow of goods and expand storage capacity with the help of Rubb fabric structures.

Rubb won the order to provide four FXG insulated Thermohall® structures measuring 30m (98.4ft) span × 59.25m (184.4ft) long, with 6m (19.7ft) sidewalls.

FTS Eiendom AS is a provider of a range of logistics products within shipping, forwarding, storage and distribution. FTS chose

Rubb as its partner to help set up four storage halls (1,800m² (19,375ft²) each). The concept includes rental of warehousing space for customers who need space near the growing import port in Fredrikstad.

In order to keep costs and rental rates down, FTS Eiendom decided not to build traditional warehouses, and selected insulated Thermohalls provided by Rubb instead. "We could have built an 'ordinary' steel building, but it was twice as expensive, and the rental cost per square metre had been too high," says Jon Børresen, General Manager of FTS Eiendom.



Rubb warehouses are a cost-effective alternative and sustainable solution to conventional structures, which are able to adapt to the changing requirements of the end user and their clients. Large clear spans and high translucent ceilings provide a bright, efficient working environment. Rubb storage warehouses are built to last but are fully relocatable or extendable to meet changing needs. This type of warehouse chosen by FTS Eiendom helps save on costs and is able to adapt to the changing requirements of the end user.

Rubb structures can be custom-designed to support a variety of bulk

handling methods. These relocatable buildings are highly flexible storage warehouse systems, as they can be easily and quickly reconfigured/relocated to suit the changing requirements of a busy port.

ABOUT RUBB BUILDINGS

Rubb Buildings Ltd is a renowned designer and manufacturer of custom-made relocatable engineered fabric structures.

Highlights include ground-breaking military buildings (aircraft hangars, shelters, storage facilities), specialist sports buildings and structures for a variety of sectors including aviation, ports, construction, bulk storage and environmental (waste and recycling).

All products are designed and manufactured at Rubb's UK plant at the Team Valley Trading Estate in Gateshead, Tyne and Wear. The company was founded in 1977 and has a proud history of delivering innovative and quality structures to a wide range of clients.

The Rubb Group also has plants in the USA and Norway.





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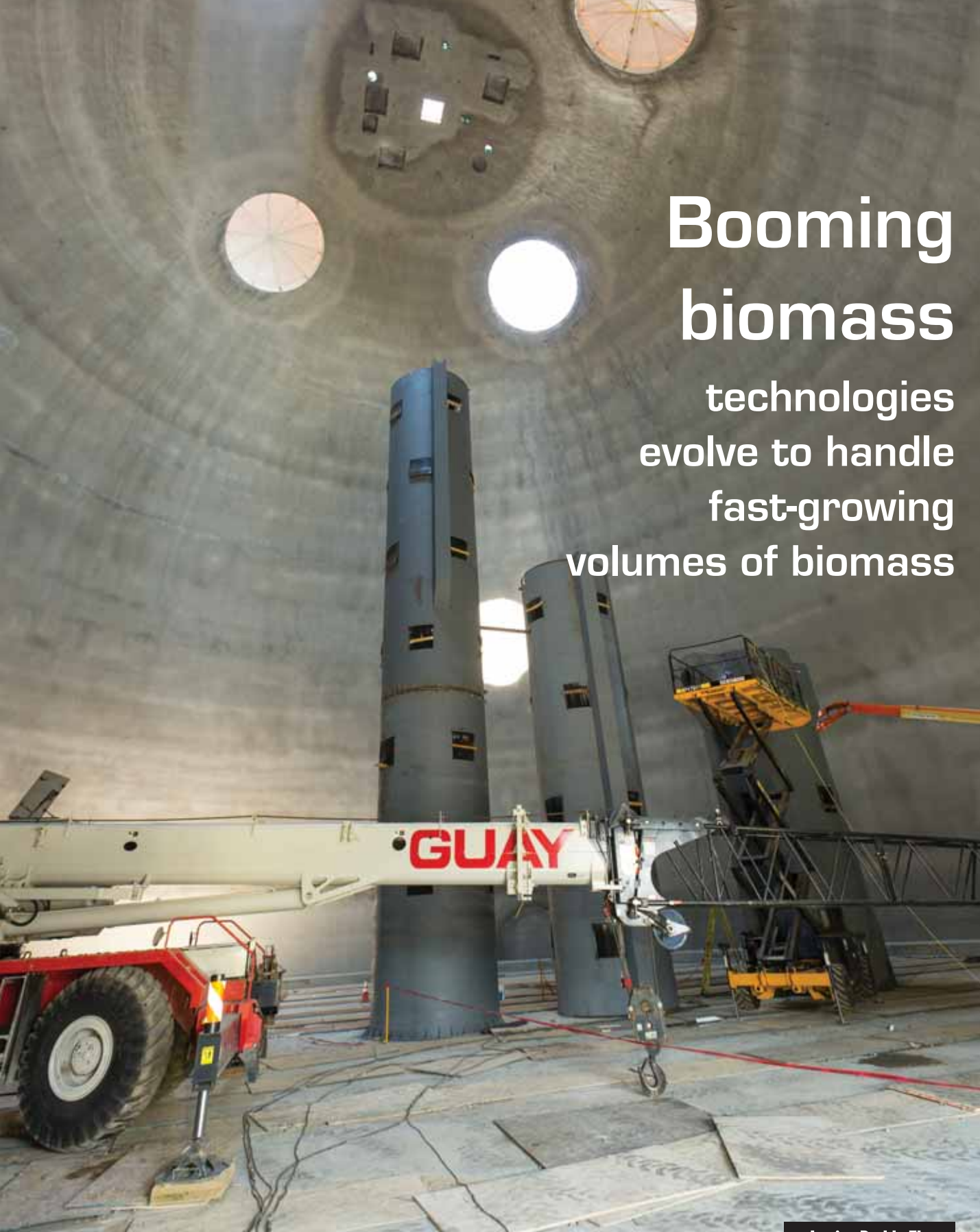
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Louise Dodds-Ely

Quebec Stevedoring Company opts for Dome Technology domes to store its biomass cargoes

QSL (Quebec Stevedoring Company) is a major Canadian maritime terminal operator and stevedore. QSL prides itself on the innovative solutions that it offers to its customers, and the fact that there is no

bulk cargo that it can't handle. All of QSL's terminals are equipped to handle bulk. St-Lawrence Stevedoring (SLS), situated in the Beauport Sector of the Port of Quebec, operates the largest

bulk terminal of QSL's entire network. Its 15 metres of available draught accommodates vessels of up to 175,000 tonnes of deadweight tonnage. SLS is defined as the deep-water gateway to the Great Lakes.

QSL is therefore in a good position to cope with the continued growth in the volumes of biomass cargoes being shipped. It has developed particular expertise in the handling of wood pellets — a commodity that offers many challenges. Wood pellets are dusty, and there are issues related to moisture, temperatures, deflagrations, density, structural integrity, location and public safety must all be thoroughly considered well before a single stake goes into the ground.

“The storage of large amounts of wood pellets is something that’s come on fairly recently,” says Eric Lapointe, director of



sidewalls, is also typically thicker than the bin’s sidewalls on top.

“Like grain, it’s important to keep wood pellets well-conditioned,” Jorgenson says. He says if product starts to heat slightly, fans can aerate and bring it back into condition. “But wood pellets are very combustible,” Jorgenson says, “and feeding air after the temperature reaches a certain point is just feeding oxygen to it, so you have to be careful.”

MOVING TO DOME STORAGE

While conventional steel bins and concrete silos have served their purpose over the years and continue to dominate pellet storage, a relatively new design — domes and DomeSilos — is changing the

engineering with QSL. “The industry is very young. We are more and more aware of the different risks associated with large-scale pellet storage—off-gassing, heating. And we are well aware of fires in the storage of pellets, both in Europe and in the southern US”

To date, concrete silos or corrugated steel bins have dominated the wood pellet storage market. Chief Agri/Industrial Group has been in operation since 1961 building steel bins — mostly for grain, but now also for wood pellets. Chief has also done a few projects for German Pellets, including building the silos in Port Arthur, Texas, that made headlines last year when pellets in one of the silos smouldered for months as extraction, extinguishing and debris clean-up efforts unfolded from April to July. The bin collapsed in June after on-site teams worked for a month to remove the contents. The incident remains under investigation, says Bradly Jorgenson, vice president of engineering at Chief.

There are myriad factors to consider when designing a corrugated steel bin, says Jorgenson, including product density. “We use external stiffeners that help carry



vertical loads,” Jorgenson says. “As the product pushes up against the side wall of the silo, that helps push the force down.” Then there is horizontal load to consider. “As product goes into the bin, it creates hoop stress if the product is heavier than what the bin is designed for,” he says. The thickness of the steel on the bottom, where more force exerts pressure on the

landscape, both figuratively and literally.

“When we decided to build pellet storage in our terminal in the Port of Quebec, our client wanted us to load Post-Panamax vessels,” or very large ships unable to fit in Panama Canal’s locks, Lapointe says. “There aren’t too many places that can load ships this size. In order to load these, we needed fairly large



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storage.” He says the rule of thumb is to build port storage sized at one-and-a-half times the vessel load weight. The average Post-Panamax vessel can hold 50,000 metric tonnes, but QSL would need to be prepared to load up to 68,000 tonnes. “To store 75,000 tonnes, we would have needed to build eight steel bins right next to the port community,” Lapointe says. After visiting Enviva’s port storage in Chesapeake, Virginia, and Wilmington, North Carolina, and Georgia Biomass’ port storage in Savannah, Georgia, QSL contracted with Dome Technology and its partner company Engineering System Solutions (ES2) to design, engineer and construct two large domes, each capable of storing 37,500 tonnes of pellets.

“Dome Technology and ES2 have been working together as strategic partners for close to 20 years,” says Douglas Weber, a professional and structural engineer, and CEO of ES2. “ES2 designs the storages that Dome Technology constructs, and the two groups bring design concepts to a reality. Together, both companies have innovated to pioneer new uses for domes and construction techniques that allow a large variety of products to be stored and reclaimed from domes and DomeSilos.”

DOME STRUCTURE

Jason Miller, Dome Technology’s vice president of marketing, says the company, founded by Barry South, started building domes in 1975. “We’re the original steel-reinforced concrete dome builder,” Miller says. “Our method of building has been perfected over the years. Barry had the idea in the 1970s that the best way to build these is through the inflation of a polyvinylchloride [PVC] membrane.” Miller likens the construction process to papier

mâché, but rather than inflating a balloon and coating the outside with paper soaked in a water-flour mixture, the membrane is inflated and intricate work is performed on the inside. A thin layer of polyurethane foam is first used to coat inside the PVC membrane, followed by placement of rebar and concrete. “When completed” Miller says, “you have an incredibly strong, steel-reinforced structure with a thin layer of polyurethane foam and a waterproof PVC membrane on the outside.”

Two reasons domes are safer than concrete silos or steel bins, according to Miller, are strength of design and construction, and their ability to keep temperatures stable. He adds that domes and DomeSilos can be engineered to allow for some limited ground settlement. “If a concrete silo leans, that’s a major problem,” Miller says. “But our domes have a larger footprint as compared to their height and, as a result, they can deal with some differential movement. Since the dome or DomeSilo is one continuous shell, without joints or seams, it has tremendous ability to transfer loads from one part of the structure to another. Consequently, less expensive foundation systems have been installed as compared to other storage types.”

Lapointe says one of QSL’s concerns in deciding which pellet storage design to choose for the Port of Quebec was temperature control. “We wanted to make sure there was no heating of the pellets,” he says. “We went with concrete domes to better control temperature.” Miller says the temperature inside the dome remains relatively stable, thanks to the concrete and layer of polyurethane foam. “When pellets are loaded, they can be warm,” he says, “while the ambient air temperature in

Quebec can be quite cool. The dome composition allows the wood pellets to retain much more of their heat, leading to less condensation and product degradation.”

With portside property at a premium, domes can also be advantageous because more product can be stored in a smaller footprint. “It’s important to maximize that land as best they can,” Miller says. Given QSL’s port terminal location in a community, Lapointe adds that the structures also had to be visually appealing. “Not just for the short term,” he says, “but for the long term. Concrete holds up nicer than steel silos over time.” Dome construction at QSL’s terminal in Port of Quebec began in autumn 2013 and was completed by the end of 2015.

DOME DUST, FIRE SAFETY

QSL could have chosen a flat, A-frame storage facility, “but because we are right here in Quebec City where a lot of tourists visit, we had to make sure there was no dust flying around — absolutely none, zero,” Lapointe says. “So all our conveyors are enclosed, the domes are sealed, and aeration inside makes sure the exhaust is filtered so there’s no dust flying out.”

Lapointe says instead of choosing a design like Drax’s domes in the UK, which have large openings on top, QSL wanted a filling tube installed through the dome’s centre that utilizes a dust-collection device. “It’s like a manifold, so when the pellets fall inside, it collects dust before it starts flying around inside the dome,” Lapointe says. This reduces the concentration of explosive dust inside the dome to less than 0.28 grams per cubic metre (g/m^3) during filling, Lapointe says, adding that the limit is $70\text{g}/\text{m}^3$. “We tested dust concentration in a

worst-case scenario of dropping pellets in when the dome is completely empty," Lapointe says. "During four full hours, we tested three different elevations inside the dome and maximum concentration never reached 0.28 g/m³. The system is very efficient."

Weber says there are several opinions about what safety measures should be part of dome storage. "We believe that the greatest improvement to pellet storage is the central filling tube," he says. "It has shown to decrease the amount of airborne dust to levels lower than that necessary for a self-igniting deflagration event. Also, it reduces fines generation during the reclaiming process, allowing operators to supply a better quality product to their customers."

The domes at QSL's terminals also feature smaller explosion vents in the unlikely event of deflagration from the very low concentrations of explosive dust. Explosion panels are used to allow pressure expansion without cracking the structure. "The size of the vent opening is critical," Weber says. "The greater the open area, the more venting is possible and the less pressure build-up inside the storage." But with the dust-collecting filling tube, Lapointe says the size of the vents needed



were much smaller than would otherwise be required.

"We take pride in our innovation and safety," Miller says. "Dome Technology, along with ES2, recently pioneered smaller, round explosion panels, which we built into the QSL domes as an optional feature." He says it is harder to predict how rectangle explosion panels will react to a deflagration event. "But with round panels," Miller says, "there's a much more even hit, which would minimize damage to the structure if an event occurred." Weber adds that a round opening has better performance characteristics structurally, since there are no corners, thereby eliminating stress concentrations.

Not only are round explosion vents safer, according to Miller, but Lapointe says

QSL saved a lot of money coupling the newly designed explosion vents with the dust-collecting filling tube. "We currently have four 8m-diameter openings," Lapointe says. "According to the computational fluid dynamics model used, the size of a vent to keep the overpressure below 0.6 bars during a 500g/m³ dust cloud deflagration would be one-third of the entire dome surface. The filling tube reduces the dust concentration and the volume of the cloud."

Each of the two domes at QSL's terminal also contains 47 cable temperature probes. "We are monitoring the temperature all the time," Lapointe says. "We've never reached a temperature higher than 48 degrees Celsius — even with pellets stored over six months."

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Other features built into the structures include aeration and nitrogen pacification. “Aeration has been shown to help moderate the temperature within the DomeSilos, but its effectiveness is limited,” Weber says. The domes in Port of Quebec each feature two fans capable of moving 40,000 cubic feet per minute (cfm) of air, totalling 80,000cfm per dome, Lapointe says. “They are equipped with variable speed drives to reduce the amount of air when it’s not needed, to save energy,” he adds. Because the domes are so big, separate vents are included with the ability to concentrate venting in certain areas if there’s a hot spot. “One thing we found out,” Lapointe says, “is aeration doesn’t have a short-term impact. It won’t produce a change in the pellet temperature overnight if it starts to heat — 80,000cfm is not enough to do that. So it’s not a drying or cooling ventilation system, just an aeration system. When used steadily long-term though, it helps keep temperatures regulated. It will slow down the heating vs. keeping the pellets cool.”

While QSL has never had to use it, its domes are also equipped with a 15,000-gallon nitrogen extinction system. The system features a top manifold to put a fire out on the surface of the pellets if needed, and the floor piping is divided into four quadrants with a manifold outside the dome to pinpoint nitrogen delivery inside. “The system has a capacity of 7,500m³/hour and is able to inert the dome head spaces within four hours,” Lapointe says.

To keep dust down in conveyance, QSL employed a French company to build enclosed tube conveyors. “The belt slides inside a tube,” Lapointe says. “There are no support idlers for the loaded belt, only the return belt.” One side is canvas to make it slide easier inside the tube, and the other is rubber. “With no idlers there’s less tension and the belt doesn’t need to be as thick,” he says. “Therefore, it needs less power.”

Lapointe says additional features at QSL’s port terminal include a gas analysing system present in the head space of the domes to alert in case of combustion well before any smoke is visible. “Furthermore,”



he adds, “to reduce off-gassing and heating related to the moisture content, we have a moisture analyser on the rail car receiving conveyor. Any pellets above 10% moisture are automatically diverted to a reject bin before entering the domes.”

FUTURE IMPROVEMENTS

Weber says that over time, Dome Technology and ES2 have developed innovations for its structures to meet the industry’s needs while utilizing their material-handling experience. “We are using the best practices and have more experience storing wood pellets in domes than anyone else in the world,” Weber says. “We are using the latest technology and practices.” Miller says there’s a reason more and more pellet companies are going with Dome Technology. “They can store more pellets in a smaller footprint, potentially save money on foundation costs and are safer to use,” he says.

As far as what the future might hold for further improvements in storage technology, Miller says he’s excited to see what new developments may arise in reclaim systems. “They’re only getting better and better with time,” he says. “We have some customers that use front-end loaders and others that use automated systems that include reclaim screws and vibratory floors, so we’re excited to see innovations in reclaim options. It’s important to keep people and workers outside the structures.”

Lapointe notes that the biggest challenge is not storage itself, but the mobile equipment working inside the domes to recover the remaining pellets. “Dust accumulates on hot components and becomes a fire hazard,” he says. “We have to regularly blow the dust accumulation. Manufacturers should address this.”

As time goes on, he adds, ocean transport vessels will continue to get larger. “With many weeks of travelling time, this will increase the risk of heating and off-gassing,” Lapointe says. “The shipping business will face the same challenges as large storage facilities.”

Ultimately, each storage facility faces different issues and is asked to manage different risks. “For example,” Lapointe says, “we were asked by the city to provide a smoke dispersion simulation in case of a surface fire inside a dome. To my knowledge this was not required elsewhere.” He would like to see a common risk analysis/assessment developed for all large storage facilities, and guidelines produced. Last, Lapointe says that aerating large storage facilities can be energy-intensive and costly. “It would be good to have efficient algorithms to manage the use of fans based on inside and outside temperature, dew point, residence time and more,” he says.

Dome designs for pellet storage have gradually leaned toward taller and more slender DomeSilos, Weber explains. “This is a result of needing a smaller footprint for the storage due to space utilization. In addition, a smaller footprint leads to economical savings, if aeration is desired.”

While Dome Technology has built many pellet storage domes over the past several years — with more builds on the docket — Miller says the biggest obstacle for his company is that the modern concrete dome, along with all of its benefits, is still often unknown to many people. “Even so, the pellet industry looks awfully bright for us,” Miller says.



Conveying biomass – the safety and critical importance of conveyor belt technology

The growing pressure to reduce CO₂ emissions has seen an enormous growth in the transshipment of biomass, writes Les Williams of Dunlop. With the Kyoto Protocol and the EU's continuing intention to reduce carbon footprints of its member states, more and more countries are making the push towards biofuel. In fact the EU is determined to achieve 63% of heat generation by biomass by 2020. In the Port of Amsterdam alone, the boom in biomass volumes means that the port could see handling of biomass products rise from its current 1.5mt (million tonnes) per annum to 6mt by 2020. At the same time, there continues to be a parallel decline in the volume of coal transshipment.

For a great many reasons, conveyor systems that carry coal or other cargo such as iron ore cannot simply be used to carry biomass. Adapting existing conveyor systems and building new ones entails enormous investment and very expensive lessons are already being learnt. Here we discuss the essential characteristics that biomass-carrying belts must have to perform efficiently and safely.

WHAT IS BIOMASS?

To the uninitiated, a commonly held belief is that biomass is simply compressed wood waste that is formed into pellets. Not unsurprisingly, it is not nearly as simple as that. Biomass can be made up of a combination of several different resources. Apart from wood and wood waste (of which there are several types), biomass can include agricultural crops and their waste by-products, municipal solid waste, animal wastes, waste from food processing and even aquatic plants and algae. Nowadays, ports often receive shipments that contain a mixture of different biomass pellets.

It is this multitude of different organisms plus other characteristics of biomass that provides such a wide range of challenges to conveyor belt manufacturers and those who operate the conveyors that carry it. Apart from the usual considerations of adequate tensile strength, tear strength, elongation and cross-rigidity, the type of rubber compound used on the belt covers must be able to cope with the differing demands created by different forms of biomass. There are four essential characteristics that biomass-carrying belts must have.

RISK OF EXPLOSION (ANTI-STATIC PROPERTIES)

Safety should always be the first priority

and one of the biggest issues concerning belts that carry biomass is dust emission and the prevention of biomass dust explosion. In the production process of biomass wood pellets, wood chip and similar renewable resources, the materials are continually broken down. This results in high levels of combustible dust. The dry flammable dust found in biomass can be ignited by static electricity created by abrasion within the conveyor system because the source only requires ignition energy as low as 17mJ for the ultimate ignition to take place. Biomass dust can also be highly prone to self-ignition, especially if the material has become damp. A chemical reaction can take place that

causes self-heating and what is referred to as 'off-gassing' (carbon dioxide, carbon monoxide and methane emissions).

There should be no more than 35 grammes of dust in a cubic metre of air (lower explosive limit) in the atmosphere immediately surrounding a biomass conveyor. Put into perspective, that is approximately the volume of a small tube of a popular brand of children's sweets. This means that conveyor design including dust extraction systems and chutes take on far greater importance.

Strict conformity to Directive 2014/34/EU should be a pre-requisite. This is also known as 'ATEX 95' or 'the ATEX Equipment Directive' and is applicable to



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potentially explosive atmospheres of zones 20, 21 and 22 where combustible dust is present.

The build-up of dust has to be kept to an absolute minimum, which means almost constant cleaning. When carrying out any form of maintenance or repair, the dust must be completely removed within several metres of the working area to prevent the possibility of ignition. From a conveyor belt point of view, it is absolutely essential that the electrostatic dischargeability (anti-static) properties of the conveyor belt cover rubber (according to ISO 284 test methods) do not exceed the maximum resistance value of 300MΩ.

Despite the claims of some manufacturers, not all rubber belts are sufficiently anti-static. The key ingredient in conveyor belt rubber is carbon black, which acts as an electrical conductor. It is widely accepted that top grade belts contain an optimum level of high quality carbon black whereas belting designed to compete in the lower price range end of the market will almost invariably contain much less carbon black. All too often, 'fillers' are used as a substitute to aid price competitiveness.

It is strongly recommended that the belt supplier be asked to provide certification issued by a recognized independent expert body for explosion protection such as DEKRA in Germany, which is the organization that we use in Dunlop Conveyor Belting.

FIRE SAFETY (SELF-EXTINGUISHING PROPERTIES)

Factual evidence (gained from laboratory testing) as well as anecdotal evidence certainly indicates that some of Europe's biggest users of conveyor belts, including some major ports, may be using belts that are not as resistant to fire as they are claimed to be. Only the best quality fire-resistant belting for conveyors carrying biomass should be considered.

The first thing to bear in mind about fire proof rubber conveyor belts is that they do not exist. By its very nature, rubber and the fabric inner ply material (usually polyester & nylon) used to make conveyor belts is combustible. They will burn — end of story. The two descriptions used by conveyor belt manufacturers are 'fire retardant' and, most commonly, 'fire resistant'. However, in truth, a more accurate description would be 'self-extinguishing'. This is because the ability of a conveyor belt to 'resist' fire is achieved by adding special chemicals and additives to the rubber compound during the mixing process. What actually happens when the

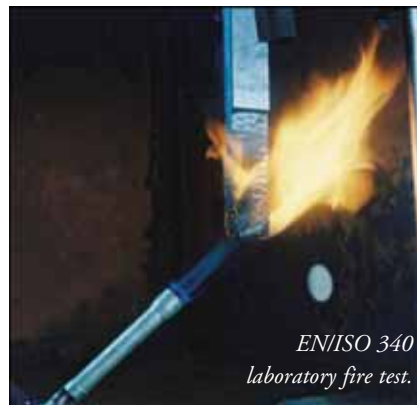
rubber is ignited is that it emits gases that effectively starve the source of the flames of oxygen, thereby extinguishing the fire.

If poor quality and/or insufficient amounts of the additives are used in the rubber compound then the ability to self-extinguish is slower and less effective. The time it takes for the belt to self-extinguish is enormously important because the conveyor is doing what it is meant to do, which is to convey at speed; only this time it is conveying fire. This means that literally every second counts.

There are numerous safety classifications and international standards for which there are many different tests used to measure the self-extinguishing properties of conveyor belts. The basis of virtually all fire testing for belting used in the cargo industry is ISO 340.

ISO 340 TESTING

The ISO 340 test standard makes the distinction between fire resistance with covers (K), which is grade EN 12882 Class 2A and fire resistance 'with or without covers' (S), which is grade EN 12882 Class 2B. The relevance of 'with or without covers' is that as the belt cover wears (becomes thinner) during its operational life the amount of fire-resistant rubber protecting the flammable carcass reduces.

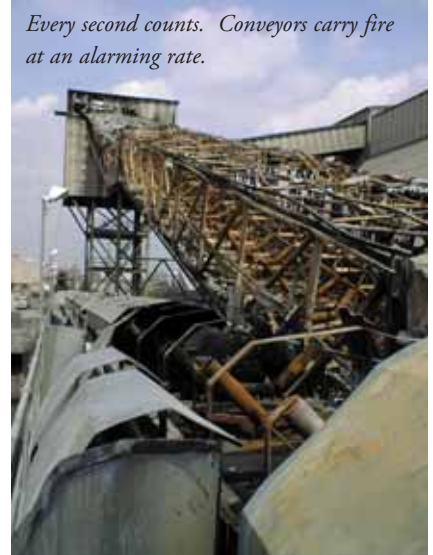


EN/ISO 340
laboratory fire test.

The actual tests involve exposing six individual samples of belt to a naked flame causing them to burn. The source of the flame is then removed and the combustion time (duration of flame) of the test piece is recorded. A current of air is then applied to the test piece for a specified time after the removal of the flame. The flame should not re-ignite.

The time it takes for each belt sample to self-extinguish after the flame has been removed is precisely measured. This is the crucial aspect of the test because the duration of continued burning (visible flame) should be less than 15 seconds for each sample. The absolute maximum cumulative duration for each group of six

sample pieces is 45 seconds. In other words, an average duration of less than 7.5 seconds per test sample. As has already been mentioned, this factor is of paramount importance because it effectively determines how far the fire can be carried by a moving belt. The effects of fire being literally 'conveyed' to adjoining buildings can be seen in the photograph.



Every second counts. Conveyors carry fire at an alarming rate.

Even if a manufacturer states that its fire-resistant/fire retardant belt has passed the ISO 340 test, the buyer should still exercise caution. A typical conveyor belt can easily travel more than 20 metres within the 7.5 seconds average allowed to pass the test so this would still allow the belt to carry flames over a potentially dangerous distance. For this reason our self-imposed self-extinguishing time limit standard in Dunlop is less than one second. It is always a wise move for buyers of fire-resistant belt to ask to see copies of the test results.

Given the highly flammable nature of biomass, in terms of actual fire resistance, we would recommend that 'S' grade (EN 12882 Class 2B) be regarded as the minimum standard. For conveyors that are in enclosed areas a higher level of fire resistance is needed. Here we recommend DIN 22109 part 4, which is Class 4A of EN 12882.

RESISTANCE TO OILS AND RESINS

Biomass, especially the wood and wood waste content, can contain vegetable oils and resins that can have a very detrimental effect on the performance and life expectancy of a conveyor belt. Over time the oils and resins penetrate the rubber causing it to swell and distort, resulting in serious running problems.

Oil (including fat and grease) resistance can be divided into two sources — mineral

and vegetable & animal. Rather surprisingly, ISO or DIN international standards for oil & grease resistance do not yet exist. At Dunlop we therefore apply the American ASTM 'D' 1460 test method, which is generally regarded as being the most demanding test of its kind in the world.

The level of oil and resin present depends very much on the type (origin) of the wood itself.

For most wood from Scandinavia, good resistance to oil is necessary as these trees are mostly pine trees, which have high turpentine content. In South-European countries and in Latin America, Eucalyptus trees are commonly used. The wood from these trees contains little or no turpentine so oil resistance is not so essential. If the origin of the wood used for the biomass can be from variable sources then we would recommend the use of conveyor belts that have a combined resistance to fire and oil.

OPTIMIZING SAFETY AND ECONOMY

The ingredients used to create a fire-resistant (self-extinguishing) and oil resistant rubber compound almost invariably have an adverse effect on the wear-resistance of the rubber. In plain



speck, fire-resistant and oil-resistant rubber usually wears significantly faster than belting designed purely to be resistant to abrasion.

However, the rubber compound technicians at Dunlop have proved that it is possible to have the best of both worlds by developing a fire (and oil) resistant rubber compounds that also have extremely good resistance to abrasion. This means that the belt retains its resistance to fire for much longer while at the same time considerably extending its operational lifetime. Sadly,

laboratory tests on non-Dunlop belts consistently reveal that this is very much an exception to the rule within the conveyor belt industry.

Fire-resistant conveyor belts are a very significant investment so for reasons of both safety and value for money, buyers should always request technical datasheets before placing an order because they include data on the level of abrasion (wear) resistance. It is important to remember that for abrasion, lower figures represent better resistance to wear.

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FIRE AND OIL RESISTANT BELTING

As a general rule, belts carrying biomass in open conditions should at least have a fire-resistant standard 'S' grade (EN 12882 Class 2B) combined with a good standard of oil resistance. For these conditions we recommend Dunlop BV ROM S. Belts operating in closed conditions should be EN 12882 Class 4A fire resistant. Here we recommend Dunlop BV-VT, which is both Class 4A fire resistant and oil resistant (ASTM 'D' 1460).

OZONE & UV RESISTANCE

The fourth essential characteristic of belting used to carry biomass (indeed all types of rubber conveyor belt) is ozone and UV resistance. Ozone (O_3) occurs naturally in the upper atmosphere, where it is formed continuously by the action of solar ultraviolet radiation on molecular oxygen (O_2). At high altitude, ozone acts as a protective shield by absorbing harmful ultraviolet rays. Wind currents carry O_3 to the atmosphere at the Earth's surface. At low altitude, ozone becomes a pollutant. Ground level or "bad" ozone is not emitted directly into the air, but is created by the photolysis of nitrogen dioxide (NO_2) from automobile exhaust and industrial discharges. The effects are known as ozonolysis.

The variability of weather, airflow patterns, seasonal changes, motor vehicle and industrial emissions, geographical and climatic conditions such as higher altitudes and coastal areas mean that ozone concentrations (and therefore the level of exposure) can differ greatly from one location to another. That said, ground level ozone pollution is an ever-present fact of life that must never be under-estimated.

Even tiny traces of ozone in the air will attack the molecular structure in rubber. It also increases the acidity of carbon black surfaces with natural rubber, polybutadiene, styrene-butadiene rubber and nitrile rubber being the most sensitive to degradation. This can have several consequences such as surface cracking and a marked decrease in the tensile strength of the rubber.

Belts that do not operate under shelter are especially prone to surface cracking, which can be extremely detrimental in terms of the performance of the belt and its working life. Even more significant are the environmental and health and safety consequences, especially when carrying biomass because the dust particles penetrate the surface

cracks and are then discharged (shaken out) on the return (underside) run of the belt.

At first glance, fine cracks in the surface rubber may not seem to be a major problem but over a period of time the rubber becomes increasingly brittle. Transversal cracks deepen under the repeated stress of passing over the pulleys and drums and, if the conveyor has a relatively short transition distance, longitudinal cracks can also begin to appear. There are also hidden long-term effects. One of those hidden effects is that moisture (as well as oils and resins from the wood waste) seep into the cracks and penetrate through the belt covers down to the carcass of the belt. The belt starts to distort and all sorts of difficult, expensive problems ensue.

To make matters worse, 'bad' ozone has a partner in crime that also has a seriously detrimental effect on rubber. Ultraviolet radiation causes chemical reactions to take place within rubber and the rapid decline in the ozone layer in the upper atmosphere over the past several decades is allowing an increasing level of UV radiation to reach the earth's surface. Ultraviolet light from sunlight and fluorescent lighting accelerates deterioration because it produces photochemical reactions that promote the oxidation of the surface of the rubber resulting in a loss in mechanical strength.

ISO 1431 INTERNATIONAL STANDARDS

At Dunlop Conveyor Belting we were amongst the very first to introduce mandatory testing to EN/ISO 1431 international standards. As a direct result, special anti-oxidant additives that act as highly efficient anti-ozonants were introduced into all of our rubber

compound recipes to provide protection against the damaging effects of ozone and ultra violet. At Dunlop the pass criteria is that the rubber sample does not show any signs of cracking after 96 hours inside the ozone cabinet (@ 40°C, 50ppm and 20% strain).

Although the prevention of such problems is surprisingly easy, unfortunately (for the users of conveyor belts) most belt manufacturers completely ignore the issue. It is therefore incumbent on the would-be purchaser to always insist that the belt supplier provides written verification that their belts undergo stringent conditional testing according to EN/ISO 1431 and are consequently resistant to the effects of ozone and UV.

PERFECT STORMS DEMAND A PERFECT SOLUTION

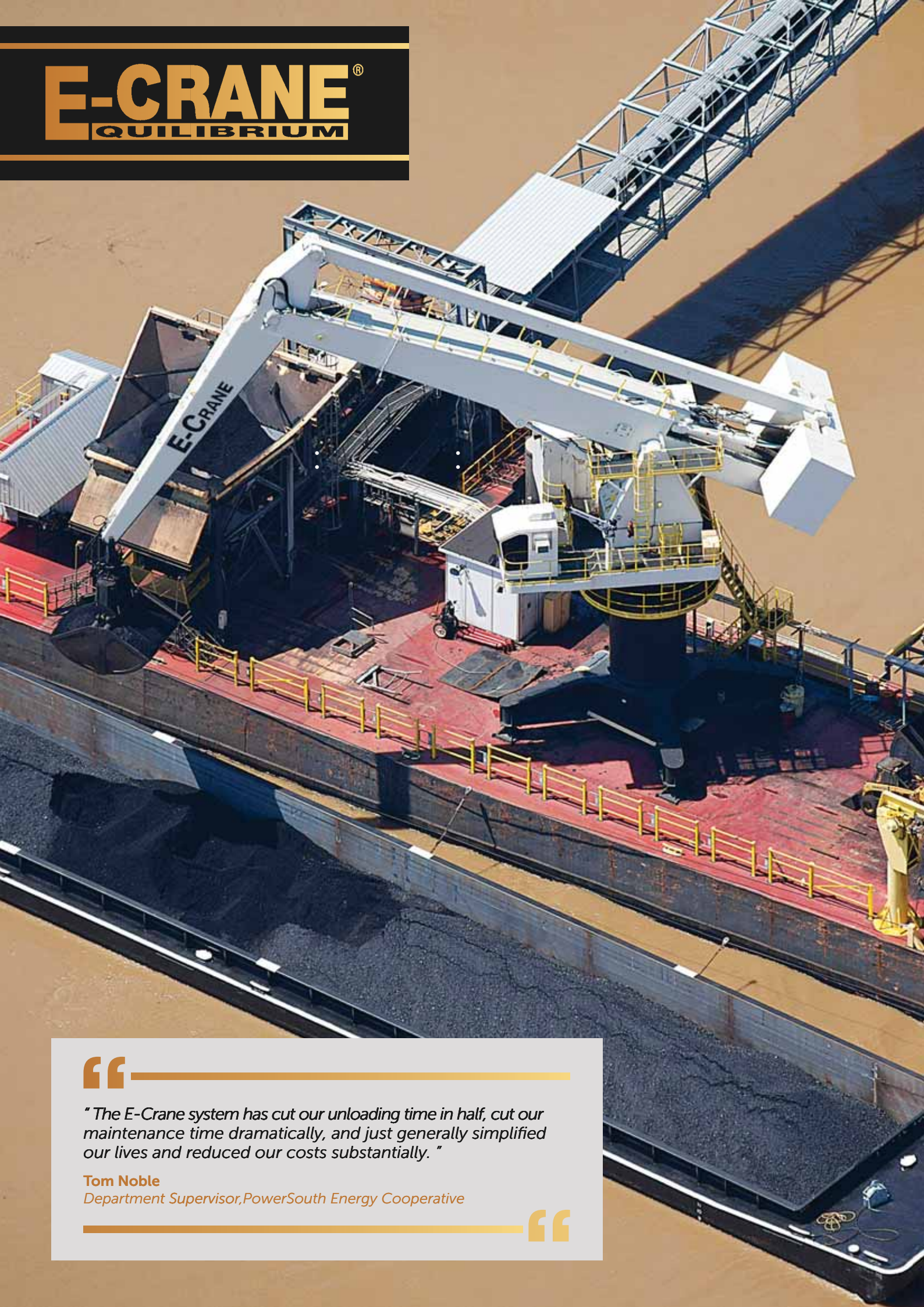
To summarize, conveyor belts carrying biomass have to face the perfect storm; they operate in highly explosive, combustible environments. They need to be completely anti-static and self-extinguish as quickly as possible if ignited. They convey materials that contain potentially damaging materials in terms of oils and resins. They are under constant attack by the elements including ozone pollution and ultra violet. They have to be safe, reliable and provide an operational life that is as long as possible in order to be economic. Such belts are, of course, available but you need to be absolutely sure of their providence and you need to be as sure as you can be that what the manufacture promises you will actually be delivered. When it comes to carrying biomass, belts that are not of the highest standard are a very dangerous and expensive liability indeed.



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“The E-Crane system has cut our unloading time in half, cut our maintenance time dramatically, and just generally simplified our lives and reduced our costs substantially.”

Tom Noble
Department Supervisor, PowerSouth Energy Cooperative

”

Neuro's Flexiport: a different pneumatic unloading system



Neuro Flexiport F800 unloading biomass.

Neuro's Flexiport ship-unloader combines a traditional pneumatic ship-unloader with a special feeder to work with non-free-flowing materials. Using the Flexiport means that there is minimal need for payloaders in the ship or during clean-up

operations. The reason for this is simple — it is because the material is picked up with air from the bottom. This is the advantage offered by this system. Unlike other systems, the feeder does not need to force the material inside, it only needs to

loosen the material.

The disadvantage of this system compared to the traditional pneumatic unloader is the cost. With a normal pneumatic unloader, the pipe hangs on a flexible joint. With a Flexiport the forces



Close-up of nozzle with feeder.



Three views of the Flexiport delivered to Marine Harvest in 2013.



River. The goal of one ship per shift of eight hours was achieved. Tests show an average of 70% during the entire ship-unloading operation. Later, the installation was upgraded from 600 to 800m³/h.

In 2013, the company Marine Harvest/Graintec gave Neuerco the opportunity to use the Flexiport to unload fishmeal and a variety of meals in Norway, Bergen. The good results achieved by the Flexiport were reflected in an order for a second unloader for a similar installation to be delivered in Scotland by mid-2018.

With the good response from clients, new developments for higher capacities are being planned.

created to loosen the material must be absorbed by the structure. The result is a vertical truss system and reinforcement though all structure. A simple system adapted for pneumatic unloaders can help to make bigger holes in the material, but cannot increase much the efficiency.

The Flexiport was first designed in the 1970s as a solution for meal discharging at feed mills. The capacity was low and was normally a fixed unloader design.

In 2002, with biomass use at a power plant by co-firing with coal, Neuerco supplied a machine for Essent energy at Gertruidenberg in The Netherlands. This

machine was designed to unload every type of biomass listed — from wood pellets to wood chips, wood pieces from demolition, palm pit kernel, even ONF (organic natural fraction) that in essence is a dusty, light material with a free density lower than 0.2t/m³. The low noise was required because of a nature park at the other side of the Amer



How to handle wood chips using grabs from Verstegen



Clamshell grabs offer a wide range of advantages over orange peel grabs (inset).

Verstegen is a major manufacturer of rope operated mechanical grabs for the dry bulk industry. Stevedoring companies, port authorities, steel works and power plants are among the customers for its grabs, using them to handle all kinds of bulk materials. More than 10,000 Verstegen grabs operate in more than 100 countries worldwide.

WOODCHIP HANDLING

Wood chips become more and more popular as an alternative energy source and are transported in large amounts across the globe. Verstegen has developed a better solution for handling wood chips in a fast and efficient way.

CLAMSHELL GRAB FOR WOOD CHIPS

Wood chips are often handled with orange peel grabs and many people are still under the assumption that wood chips can only be handled with orange peel grabs. The grabs however are heavy, expensive and unfit for cleaning up operations.

Below are the disadvantages of orange peel grabs:

- ❖ these grabs have a relatively high deadweight so this reduces productivity;
- ❖ the large circular footprint makes entry to a smaller ship hold difficult or impossible;
- ❖ orange peel grabs are not suitable for cleaning up;
- ❖ the outflow of wood chips with orange peel grabs is not controlled and can cause difficulties with discharging direct into hoppers or trucks;
- ❖ orange peel grabs are expensive and require more maintenance in comparison with clamshell grabs.

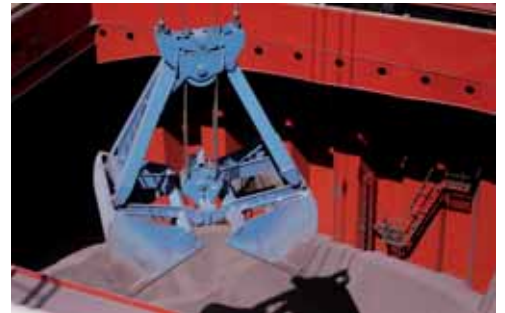


60m³ enclosed grab for handling wood chips.





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HIGH VOLUME AND LOW DEAD WEIGHT

Woodchips are normally difficult to handle. The material is very light but not free flowing and during loading of the ships, the material is often compacted by wheel loaders in order to store as much wood chips as possible in the holds. The combination of these factors creates a lot of digging resistance for the grab.

LONG HISTORY & WIDE BIOMASS EXPERIENCE

The first Verstegen grabs for wood chips were delivered in 1986 for a paper factory in the Netherlands. At that time, the design

of the grab was not optimal, but Verstegen has learned a lot from studying the operation.

When designing the new generation grabs for wood chips these factors were taken into consideration. Other important design criteria were a high volume in combination with a relative low dead weight, to make it possible to handle large amounts of wood chips in a fast and efficient way.

The grabs are equipped with removable teeth on the lower knives for a good grip and penetration into the material. The

teeth can be easily removed and with normal contact knives the grabs are very suitable for cleaning up operation and also for unloading other light free flowing materials. The shells are designed to minimize digging resistance and compression of the wood chips inside the shells. For the best filling rate the use of an excavator for loosening and collecting the material is recommended.

Over the years the grab model has evolved and in total more than 50 Verstegen 'high volume clamshell grabs' have been delivered for biomass.

Longview ponders future in biomass



Berth 2 (International Raw Materials) at the Port of Longview in the state of Washington, USA.

"We have been discussing the possibility of biomass exports out of Longview with several developers who have interest in white pellets or torrefied pellets for Asian markets," says Laurie Nelson-Cooley, Business Development Manager at the Port of Longview, Washington, USA.

She adds, "We have not added any new infrastructure for future exports.

However, Bridgeview Terminal is an excellent opportunity.

"Bridgeview Terminal, an export bulk facility that is capable of handling unit trains of cargo direct to ship is the most natural fit for immediate shipments. Current cargoes shipped out of Bridgeview Terminal are soda ash, bentonite clay, and talc.

"The facility has the capabilities of

washdowns between cargo types to eliminate cross-contamination. The biggest challenge of this facility is the lack of on-site storage. There is space for silos or domes to be built, but the business needs to be in place to support the capital expenditure needed. Overall there are great opportunities in Longview to handle this cargo in the future."

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Wuvio: keeping dust under control during the biomass handling process



All over the world more and more of energy production is generated by biomass conversion. Biomass has become an important substitute for other types of fuel such as coal, and has its place in the energy transition. Although biomass is seen as a 'cleaner' fuel looking at its footprint, it has similar problems when it comes to dust generation during handling. This is true whether it's woodchips, pellets or other types of biomass, during the process of handling, preparing and upgrading the fuel to be able to be used in the conversion facilities.

With every step in the process of handling, shredding or screening of biomass, dust is generated. Prolonged or repeated exposure to fine biomass dusts has an effect on workers' health: biomass dust is a human carcinogen¹. Dust emissions can travel for miles and possibly affect the direct surroundings and community. Besides the impact on the direct surroundings and community, a lot of biomass is lost during handling. Wuvio's years of experience in the field of dust suppression has led to the development of different solutions to deal with biomass dust.

FOAMING

This is a technique used for inline treatment with increased active duration up to 30 days. Applied with compressed air,



a very dry and thick foam curtain can be created with a minimum of water usage and low moisture levels, thus not influencing the (calorific) value of the biomass. Foam can be used by adding it to the flow on conveyor belts or adding into the shredder when preparing the biomass.

HUMIDIFYING

This is a technique used to make water more effective for usage in closed (production) warehouses. The easiest way of making the dust particles heavier is to make them wet. Wuvio achieves this by adding a wetting agent to the water that is sprayed, atomized or sprinkled. The advantage is that the amount of water can

be reduced significantly and material moisture levels can be reduced.

AGGLOMERATING

This is a technique that binds fine dust particles to the bigger particles and can be used for a single point application. The product has a double effect due to its 'stickiness'; while suppressing the dust, it also can increase the bulk density of the biomass.

WUVIO SOLUTION

- ❖ easily mixes and can be used with various qualities of water;
- ❖ has no effect on the aquatic environment;
- ❖ can be applied with standard nozzles and sprinklers; and
- ❖ has no effect on the quality of the biomass.

ADVANTAGES

- ❖ more than 90% dust reduction;
- ❖ save more than 80% on water;
- ❖ reduced dust during full supply chain;
- ❖ single application point;
- ❖ bulk density increase;
- ❖ 100% biodegradable and harmless to the aquatic environment; and
- ❖ 100% safe for people and environment.

¹ According to the International Agency for Research on Cancer

Fednav: busy in biomass for over 20 years



Canadian-based shipowner Fednav has for over 20 years played an active role in biomass markets carrying wood pellets from North America to European electricity producers. The company's modern fleet of Ultramaxs, Supramaxes, and Handy-size vessels are both CO₂ fitted and ice classed, providing year-round service from Canadian ports.

Wuvio deals with biomass dust

Handling and processing biomass leads to dust emissions. Prolonged or repeated exposure to fine biomass dusts has a negative health effect. Dust emission can travel for miles and possibly effect the direct surrounding and community. Besides the impact on the direct surrounding and community, a lot of biomass volume is lost during handling. The right dust control can prevent this.

Wuvio offers innovative solutions for dust suppression.

wuvio



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Handling and storage of biomass at ABP's Immingham port

The world's largest dedicated biomass handling facility, Immingham Renewable Fuels Terminal (IRFT) is owned by Associated British Ports (ABP) and was built at a cost of £135 million as part of a Humber-wide agreement with Drax power station.

The purpose-built facility has capacity to handle up to six million tonnes of biomass a year, through its purpose-built facility and state-of-the-art machinery. The site formerly handled other cargoes such as coal, steel and grain but in 2013, agreed to commence works on building IRFT, which once complete, would be able to store up to 200,000 tonnes of biomass in the form of wood pellet at any one time.

ABP carefully selected to work with asset management and project investment specialist, GRAHAM Construction, which was appointed to commence work on building the site in March 2013.

The first phase of the terminal saw the construction of four concrete silos, each measuring 50m high with a 36m circumference and with the ability to store up to 100,000 tonnes of wood pellets at any one time. Each silo also benefits from an innovative vibro-floor which assists in the cargo discharge from the silos.

The deep water berth enables vessels ranging from Panamax to Handymax to moor alongside and discharge the wood pellets in to Immingham via a fully automated conveyance system, on a berth which is equipped with two state-of-the-art continuous ship unloaders (CSUs).

The Siwertell CSUs were tailor made to meet the specific demands of the Humber International Terminal (HIT) by Swedish



Immingham Renewable Fuels Terminal, the world's largest dedicated biomass handling facility (photo: ABP).

bulk handling specialist Cargotec. The CSUs were assembled in Italy and were lifted off the vessel, fully assembled and ready for use.

The bespoke bulk handling machines, designed to handle a variety of cargoes, are attached to conveyors which feed the silos, then move on to the two rail load-out facilities.

The unloaders use a system based on the principle of the Archimedes Screw, where dry bulks are drawn up the vertical screw, then fed on to a horizontal system of conveyors.

The cargo travels through an intricate network of fully enclosed conveyors, which ensures that the highly combustible cargo is kept dry. The cargo is loaded into the silos, which have complex dust extraction systems installed, to minimize the amount of dust being created.

When the cargo is ready to be discharged to train, the biomass is fed to one of two rail load out (RLO) facilities which services the specialist rail wagons transporting the biomass to Drax's power station in Selby. The RLO can load up to 1,700 tonnes of biomass in a 30-minute process. The train travels through an automated system, and is loaded by a chute which drops the cargo into the wagon, once the hatches have been magnetically opened.

A new head-shunt was installed to service customer demand. The new 'turn-back' facility, with over 1.5 miles of new rail infrastructure, sees capacity 48 trains amounting to 75,000 tonnes of bulk product delivered per day.

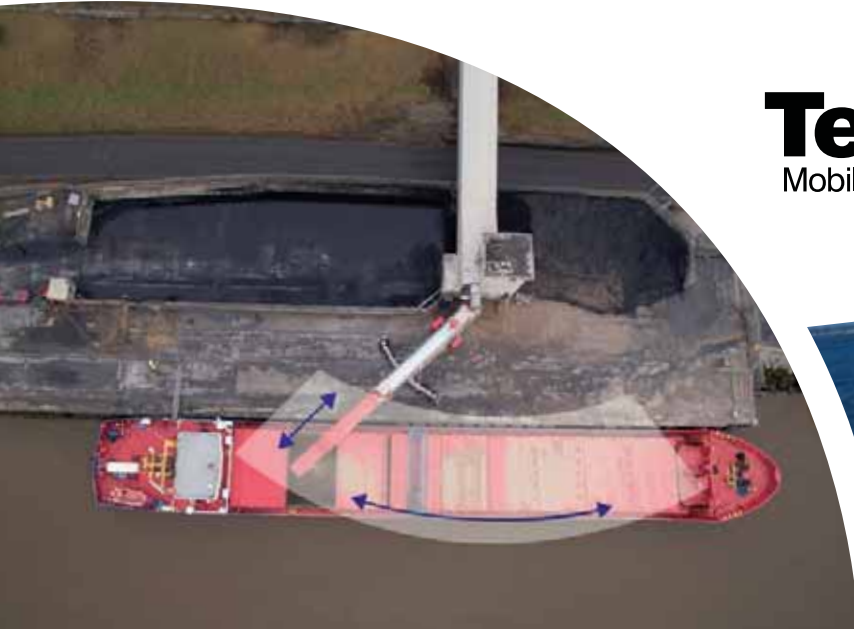
Now fully complete, the site boasts eight purpose built concrete silos, with a total capacity of 330,000m³, the equivalent to over 130 Olympic sized swimming pools.

The two Siwertell CSUs from Cargotec were customized to meet the needs of the Humber International Terminal (photo: ABP).





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Buttimer's DOCKSOLID hoppers ensure safe and efficient handling of biomass

Since Buttimer first opened its doors in 1978 primarily serving the Irish dairy industry the company has broadened its capabilities significantly, providing a very high level of service to various industries. Buttimer specializes in bulk materials handling systems and high-quality steel fabrication; as well as this, the company also operates across a range of industries. In fact, one would be hard pressed to find an industry that Buttimer hasn't delved into, covering everything from food & beverage to mining to pharmaceuticals. In recent years, due to an increased emphasis being placed on environmental awareness and finding renewable energy sources, the handling of biomass has become a key part of Buttimer's business. Biomass is becoming increasingly popular, and as Buttimer is always striving to move with the latest trends, this is an industry that it cannot afford to ignore.

STRIVING TOWARDS SAFETY AND EFFICIENCY

As part of the expanding biomass handling capabilities at the Port of Hull, UK, there are currently two state-of-the-art DOCKSOLID environmental hoppers from Buttimer. The primary function of the hoppers is to handle compressed wood fibre pellets which are then transported to the nearby Drax biomass power station, which happens to be one of the UK's largest (in terms of power generation). In fact, it provides a staggering 7% of the



Handling biomass cargoes at the Port of Hull, UK.

United Kingdom's electricity supply.

Safety is the quintessential concern at any power station, and due to wood pellets being an extremely dusty product, often liable to self-heating when they become damp or overly compacted, they can pose a significant fire and health risk. In order to guarantee effective, safe and responsible ship-unloading and forwarding of the bulk material to the biomass power station, the aforementioned characteristics need to be actively mitigated.

This is where Buttimer's environmental hoppers come to the fore, offering its patented dust control flex-flap, dust extraction filters and temperature and CO₂ monitoring (these features and more are detailed further on). Whilst safety is obviously of paramount importance, productivity is something that Buttimer also takes very seriously. To guarantee efficiency ABP (Associated British Ports), which operates the Port of Hull, is using two crane and grab systems to unload vessels into the pair of DOCKSOLID

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And that's because our bagging machines have been designed by leading engineers and our fleet is maintained by top notch technicians, ensuring it's constantly fit for purpose... in the right place... at the right time.

Rest assured, next time we offload your cargo...

...you can take a load off.



Buttimer has also carried out a range of projects for Gladstone Dock in Liverpool (and below), which handles large quantities of biomass.



hoppers. These load into trucks at a rate of between 400 to 500tph (tonnes per hour), per hopper, on average.

STATE-OF-THE-ART FEATURES BEHIND THE SUCCESS OF BUTTIMER AND DOCKSOLID

As mentioned previously, the DOCKSOLID hoppers have a wide range of anti-explosion, fire prevention and general safety features which help to alleviate some of the risks surrounding the handling of biomass. In terms of biomass handling, dust can be one of the greatest causes for concern and so it something that Buttimer has always been eager to tackle.

The hoppers incorporate a number of advanced dust prevention and suppression techniques, which help minimize some of the main health hazards and explosion risks as a result of the dust emitted during the loading process. These range from the relatively simple, such as a steel wind-block thimble around the grab opening, to the more complex, such as the reverse-jet dust extraction filter fan system.

The air extraction and filtering system works by creating a negative pressure inside the hopper, subduing rising product dust, as well as utilizing the rubber non-return-valve ('flex-flap') system to contain all product within the hopper as the grab is opened. In contrast, a positive air pressure is maintained in the hopper's plant room to prevent the intrusion of dust or dirt into the hopper's motor, hydraulic or mechanical equipment, which in turn significantly reduces wear and tear. This is of course especially useful as it negates the need for excessive maintenance and overall

extends the longevity of the equipment.

Of course, one of the final stages of the handling process is the discharge of the product, and it is here when a substantial amount of product can be lost. To combat this, the hoppers discharge the product — through pneumatic slide doors — via aspirated chutes which are retractable or operated and ensure that the product is not exposed to through-winds or falling from a height as it is loaded into the awaiting truck beneath the hopper. Although the features mentioned here do not incorporate all of Buttimer's highly advanced features, it gives an insight into how much emphasis is placed on safety and environmental awareness, especially when it comes to dealing with a product as volatile as biomass.

CONCLUSION

In a relatively short article, it can be difficult to fully comprehend the important role that biomass handling plays for a company such as Buttimer. It is a product that raises a plethora of potential issues, and for Buttimer to maintain its reputation as a company which values health and safety above all else, it is vital that every possible scenario is accounted for. This is what has led to the cutting-edge dust control features, environmental protection and unparalleled safety standards for loading and unloading. It appears that biomass could be the future of renewable energy and at the moment, it is becoming increasingly likely that Buttimer and DOCKSOLID will be the future of biomass handling.



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AMECO tackles renewable energy resources challenge

New reserves of fossil fuels are becoming increasingly hard to find. This has encouraged the power-generation industry to look for alternative fuels. As a result, more and more power plants are being built that use biomass as their feedstock. Examples of such biomass products are:

- ❖ agricultural residues (e.g. corn stalks, sugarcane bagasse);
- ❖ herbaceous crops (e.g. miscanthus, bamboo);
- ❖ wood crops (e.g. eucalyptus, pine); and
- ❖ forest residues (e.g. hardwood, softwood).

AMECO'S CONTRIBUTION TO THE ENVIRONMENT

CASE STUDY: AMECO SIDE SCRAPER (SS)

HANDLING BAGASSE IN SAN PEDRO DE MACORIS, DOMINICAN REPUBLIC

A particularly special project that AMECO is proud of is the installation of a side

scraper, currently under construction at a 30MW biomass plant in the Dominican Republic.

The Dominican Republic has set out to tackle its fuel import dependency by investing in a renewable energy resource, which can help meet domestic energy demands while also delivering socio-economic benefits.

This is the first biomass plant connected to the country's National Interconnected Electric System (SENI), which uses sugarcane bagasse as feedstock. AMECO's side scraper will handle 70 tonnes of bagasse per hour.

Bagasse plays an important role in the rapid development and growth of the country's internal and external markets.

Today, sugarcane biomass constitutes the energy source with the highest potential in the medium to long term. According to *BioenergyInsight.com*, "The

Power Plant will offset more than 80,000 tonnes of CO₂ emissions per year and is in the final process of certification for the United Nations Certified Emission Reductions (CERs)."

AMECO'S SIDE SCRAPERS

AMECO's side scrapers (SS) are travelling scraper reclaimers that enable large quantities of bulk material to be stored outside or inside for preventing the product from being disturbed by atmospheric conditions.

All AMECO machines are fit-for-purpose and designed specifically to the customer's requirements. AMECO modified the design of the side scraper handling bagasse by installing a central guiding system, which will in effect lessen wear and tear on the scraper chains, preventing unnecessary maintenance costs and repairs.

AMECO portal reclaimer (PS2) for woodchips, PSNH, New Hampshire, USA.



CASE STUDY: AMECO PORTAL RECLAIMER (PS2) HANDLING WOODCHIPS IN PORTSMOUTH, NH, USA

In 2006, AMECO delivered a portal reclaimer for woodchips to the Public Service of New Hampshire (PSNH)'s 'Northern Wood Power Project'. The goal of this project was to permanently replace Schiller Station's 50W coal-burning boiler with a state-of-the-art fluidized bed wood-burning boiler of the same capacity.

The AMECO portal reclaimer, with a rail span of 117 ft and a capacity of 90tph (tonnes per hour), is fully computer-controlled and contributes to the storage of a 14-day fuel supply for the boiler

The project has brought about lower emissions, a revitalized forestry industry, and lower electric rates for New Hampshire homes and businesses. New Hampshire is leading the way in adding 'green' power production while maintaining a significant price advantage for its customers.

In 2007, it was awarded with *Power Magazine's* prestigious "Marmaduke Award" for excellence in operations and maintenance.

Over recent years, AMECO has been following its customers into renewable energy. AMECO machines can also be found in other biomass plants in the USA, including a biomass cogeneration plant in Wisconsin, a major milestone being first-fire using natural gas.

AMECO'S PORTAL RECLAIMERS

Portal reclaimers have been historically the star product of AMECO since 1932. The company has strong knowledge in this type of longitudinal stockyard and its reclaimers can handle a broad range of bulk materials, for example, woodchips, urea, ammonium nitrates, coal, gypsum, iron ores.

The portal reclaimer is usually used in a production line as buffer storage of raw materials. The store operates with stockpiles placed in line. While building up one pile, another pile is being reclaimed. AMECO has more than 200 operating references working across the globe.

AMECO portal reclaimers can be installed inside or outside a storage building. For outside applications, a single boom portal reclaimer (PS1) is the normal choice. For this type of machine, the Scraper arm is long enough to reach across the pile. For inside applications, a double-boom portal reclaimer (PS2) provides the advantage of being more compact.

AMECO'S SERVICES

Design, engineering and manufacturing for customers, is at the heart of AMECO's operations. AMECO is committed to supplying its clients with excellent after-sales services, wherever they may be in the world.

AMECO completes the erection, installation, and commissioning of equipment from unpacking to the handover. It also offers maintenance services by a multilingual team of inspectors and engineers, covering all its customers worldwide, including inspections, refurbishment, preventative maintenance and repairs.

AMECO always ensures that clients have the right spare parts available — not only at the right time and place, but at the right price, keeping lead items in storage for emergency parts.



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BULK HANDLING EQUIPMENT

Port of Riga: unfavourable weather conditions cause drop in pellet handling



The Port of Riga handles biomass products such as wood pellets, woodchips, wood shavings and peat. Volumes in recent years in the Port of Riga and Q1 2018 indicators are shown in the table on p65.

Practically all timber products handled by the Port of Riga are Latvian exports.

The most promising group of cargo is wood pellets. However, their volumes have

slightly dropped in recent years. Experts in the sector have explained that weather conditions — which have been unfavourable for logging, which has caused a deficit of raw materials for the wood pellet factories — are the main reason for the decrease in timber turnover. Likewise, experts note that the turnover at the Port of Riga is also affected by Belarus's decision

to ban the export of round timber and direct it to its own processing factories. In addition, the deficit of raw materials and their high prices are causing difficulties for the manufacturers of wood pellets in fulfilling previously signed long-term supply contracts, which no longer comply with the actual market situation. A decrease is also predicted in 2018.



BIOMASS CARGOES AT THE PORT OF RIGA (THOUSAND TONNES)

	2013	2014	2015	2016	2017	2018 1st Q
Wood chips	907.1	520.4	643.6	555.0	646.4	214.1
Wood pellets	801.6	1,025.3	1,451.7	1,438.0	1,370.6	260.8
Wood shavings	313.4	291.2	258.2	249.6	430.7	84.5
Total (timber as dry bulk)	2,022.1	1,836.9	2,353.5	2,242.6	2,447.7	559.4
Peat (dry bulk)	126.5	117.4	136.4	145.1	148.4	56.5

The end of winter 2018 was slightly better for the logging industry, enabling chip and pellet volumes to go up; however, volumes are still somewhat smaller compared to the first quarter of the previous year.

In terms of the actual handling process, Riga Universal Terminal has introduced cargo containerization for pellet handling in order to optimize the process.

CONTAINERIZED BULK HANDLING

PORT OF RIGA INTRODUCES NEW AND INNOVATIVE DRY BULK HANDLING TECHNOLOGY

As part of its ongoing development of the terminal, and in order to increase the effectiveness of cargo handling, the company Riga Universal Terminal Ltd. (RUT) has introduced a new technology: containerized dry bulk handling. This technology is often called a revolution in dry bulk logistics and the Port of Riga is the first port in Europe to use it.

The company RUT is currently using the containerized handling method for handling wood pellets on large dry bulk ships. Pellets are delivered from warehouse to pier in special-purpose open-top 20-foot containers.

Using a portal-frame container lift equipped with a revolutive system (revolver), the entire contents of a container are delivered onto the ship by turning the container over into the holds.

Atis Šulte, RUT Trade and Business Development Director: "The main benefit from introducing the new technology is significant optimization of terminal expenses and increase in performance. Now, we can perform dry bulk handling operations involving a significantly smaller number of machinery and human resources. Savings on resources amount to almost 50%.

"By introducing containerized cargo handling, we have become more competitive and can better adjust to customer requirements. Following the general tendency in cargo carriage, dry bulk ships handled at our terminal are becoming even larger. By means of the new technology, we are able to ensure fast and effective loading of large ships. By applying

the new technology, we are able to load dry bulk and containers at the same pier, using one portal-frame lift. It allows us to quickly organize our work in the terminal and quickly handle any type of ship".

Containerized dry bulk handling is also an environmentally-friendly technology. Cargo is practically poured into the holds, rather than above them, which reduces the amount of dust that ends up in the air. Likewise, spread of dust and cargo losses are reduced by handling a great amount of cargo within one lifting time.

This method of containerized dry bulk handling is used in the ports of Australia and South America, where it is used with

the logistics of mining industry products, i.e. metal ore, coal, as well as grain. This technology is called a revolution in dry bulk logistics, since by using closed standardized containers, dry bulk can be transported from the place of extraction, stored at the terminal without unloading from the container and loaded onto the ship using the same container. As a result, no investments are needed for warehouses and the entire logistics chain from extraction to loading onto a ship can be optimized, using standardized containers and equipment which has been developed and is already used in container cargo logistics.

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BIOMASS — A VIABLE AND GROWING SOURCE OF RENEWABLE ENERGY

As the world grapples with dwindling fossil fuel reserves and the threat of climate change, developing alternative means of generating energy is of critical importance. One solution to the problem is biomass, plant-based material that is not used for food. One form of biomass comes in the shape of small pellets created as by-products of the wood and agriculture industries, and there is a growing market for using these as fuel for electricity generation. Infrastructure to transport them to previously coal-fired power stations is being developed, and FFE was recently selected to provide fire detection for a new biomass conveyor at Liverpool Docks in the UK.

THE INSTALLATION

The conveyor is part of a biomass handling depot constructed at Gladstone Dock in Liverpool by energy supplier E.ON. It actually consists of three separate conveyors with an overall length in excess of 700 metres, which carry the biomass pellets directly from the hold of the cargo ship to either a storage building or to a



Liverpool Docks biomass conveyor.

train for transporting to a power station. The presence of such a large quantity of combustible material in one place demanded a detailed and comprehensive fire and safety plan for the whole site, and it was decided that the conveyor needed a dedicated fire detection and suppression system. Fireworks Fire Protection was commissioned by E.ON to recommend and install a system.

Due to the nature of the fuel, which can

support both smouldering and flaming combustion, it was decided to install a high-pressure water mist system, with pipework and nozzles designed to apply water at a specific flow rate and spray pattern. To improve the efficiency and speed of response of the system, the conveyor is divided into zones, each equipped with a flame detector, control panel, valve and set of spray nozzles. Each zone panel is linked in turn to a site-wide addressable panel



Talentum IR3 flame detector mounted inside the biomass conveyor.

which triggers the water mist to operate in zones around the location of an alarm, and immediately stops the conveyors — essential if the fire is to be contained quickly. Therefore, rapid and reliable flame detection was a critical design requirement, and so Fireworks selected FFE's Talentum detectors to be used in the system.

WHY CHOOSE TALENTUM?

The detection system was faced with several specific challenges in this installation:

- ❖ high levels of flammable dust were to be expected, which could not only obscure a flame but could lead to false alarms from smoke detectors, as well as being potentially explosive;
- ❖ rapid fire detection was needed to quickly actuate the suppression system and prevent the fire from being carried further along the conveyor before being extinguished; and
- ❖ vents and gaps in the cowling of the conveyor could allow sunlight or, at night, artificial light to penetrate the interior, leading to potential false alarms.

The flameproof IR3 Talentum flame detector is designed to cope with all of these challenges. The three IR sensors

within the unit are able to detect flames through dust, steam or smoke. The detector contains an algorithm which analyses the shape and variation of the IR signals to determine if they match the characteristic flicker of a flame. Finally, the sensors each respond to different wavelengths in the infrared region of the spectrum, which allows very precise discrimination between a flame and the signals from other sources of radiation such as flickering sunlight. This level of false alarm immunity, combined with the speed of detecting flames, made the IR3 detector the ideal choice for this application. Although not critical in this instance, it can also detect flames from a wide variety of fuel types.

The flameproof (or Exd) version of the detector was chosen for two reasons. Firstly, it would prevent any chance of a spark from the detectors igniting the explosive dust. Secondly, it would ensure that the detectors themselves were held in a rugged casing to keep them protected from the relatively harsh working conditions. For these reasons, and due to their ability to cope with high levels of dust, the detectors could be mounted inside the conveyor cowling to provide the fastest

possible detection of a fire in each zone.

TESTING THE THEORY

With the conveyor built and the fire protection system installed, Fireworks conducted tests to check the response time. In one of these tests, a small burner flame was ignited at a distance of approximately seven metres from the Talentum detector. Within 15 seconds of the flame being ignited, the water mist was actuated. The video of this test can be viewed at <http://bit.ly/1FYIFzi>.

Steve Titterington, Marketing Manager at Fireworks, commented: "The Talentum flame detectors from FFE are the best products on the market as well as being highly cost-effective, and so we have no hesitation in recommending them to customers such as E.ON for protecting assets in the important and growing area of energy generation using biomass."

By combining the rapid and reliable response of FFE's Talentum IR3 detectors with the fast flame control and high cooling capacity of water mist, Fireworks has ensured that the Liverpool Docks biomass conveyor can safely play its part in fuelling a greener future for our energy generation industry.



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Logistec invests in major upgrade project to improve its biomass capabilities

Logistec is one of the largest cargo handling and port logistics companies on Canada's East Coast, and it is also growing steadily in the United States. The company's network includes some 35 ports and 58 terminals, and it handles all types of dry bulk and breakbulk, as well as containers.

One of Logistec's greatest strengths is that it can adapt its operations to the size, scope and specific needs of its customers and partners. It provides services to shippers, shipping lines, freight forwarders, brokers, traders, importers and exporters, as well as to various industrial clients.

Frank Vannelli, Senior VP – Commercial & Business Development, is responsible for Logistec's sales, marketing and business development activities in North America. Based in Connecticut, he has been with the company since May 2007. Vannelli has spoken to *Dry Cargo International* about Logistec's extensive involvement in biomass handling activities.

"We mainly handle wood pellets in Brunswick, Georgia, but have also worked with this cargo in Canada, specifically Ontario (Thunder Bay) and Atlantic Canada (Halifax/Sheet Harbour)," says Vannelli. "Most of our bulk facilities are quite

versatile, and the biomass market is an area where we want to grow," he adds.

Logistec has made significant investments in infrastructure to enable it to handle biomass — specifically wood pellets — at its terminals. One of its most significant investments is at Brunswick, where it has committed nearly \$40 million to renovating and expanding its facilities. In 2011, Logistec began an extensive development project to completely rebuild and modernize the site so that it would be ready for increased European demand for biomass cargo. Over the next five years, Logistec renovated the previous warehous-

es, overhauled the bulk load-out system, built new shiploaders and made significant upgrades to the conveyor systems.

In addition to the initial expansion, this ambitious five-year upgrade project includes electrical and rail upgrades, new warehouses, a new tower and conveyor, paving, infrastructure rehabilitation, and dust and traffic control measures.

BACK ON SCHEDULE

"We were about a year into our latest upgrade project when our terminal suffered a significant fire," says Vannelli. "The property damage was extensive but,



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THE THINGS WE DO

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LOGISTEC

most importantly, no one was hurt. We are proud to say that, through our team's hard work and support from our partners, the terminal is completely rebuilt and we're back on schedule."

When building the new warehouses, Logistec incorporated industry best practices with respect to safety, cleanliness, efficiency and dust control. The structure is coated with fire-retardant materials and the sprinklers are specifically designed to cover the entire conveyor system. Logistec's contractors from Allen & Graham and Clark Nexsen won a 2017 AGC Build Georgia Award for their work on these buildings.

Throughout the construction process, Logistec's project manager was also in



regular contact with local fire officials, engineering consultants, and its partners at the Georgia Ports Authority. This enabled Logistec to achieve the high safety standards that it has in the buildings. Vannelli also expressed gratitude to Harold Arnold and the team at FRAM Renewable Fuels for their professionalism and support.

MARKET CONSIDERATIONS AND FLEXIBILITY

Before moving forward with such a significant investment, Logistec took a number of factors into account. These included market conditions, financial criteria, and strategic assessments. It has been operating at Brunswick Marine Port Terminals since 1998, and has a strong commercial and operational partner in the Georgia Ports Authority, which shares its commitment to the wood pellet market. The pellets handled by Logistec are mainly sourced from the Georgia forestry industry, which creates jobs and supports the local economy, as well as Logistec's

business model.

Logistec also believes that flexible use of its facilities is key to offering the best service to its customers. "We're willing to go where our clients need us, and the size and variety of terminals in our network helps us to find safe, cost-effective options," says Vannelli.

He adds, "Our operations team is very

resourceful in cases where we need to adapt existing facilities and storage for speciality cargo. In one port, we've handled bulk wood pellets via a vacant grain silo. We can also handle shipments of speciality pellets as breakbulk in superbags at both ports and inland terminals. Through our container terminal in Montreal (Termont), we are also getting residential pellets to European markets via major shipping lines such as Mediterranean Shipping Company (MSC)."

TEAMWORK AND DEDICATION

Logistec is continuing its upgrades and renovations in Brunswick. It has carried out similar projects in the past for other sectors such as mining, metals, forest products and containers. Logistec has been able to rely on its dedicated and hard-working team in Brunswick during the renovation works. "Keeping a terminal running smoothly during a major construction project is challenging in its own right," says Vannelli.

"Our employees put in long hours and faced these stressful times head on, with incredible resolve. We're proud to work with them," he concludes. **DCi**





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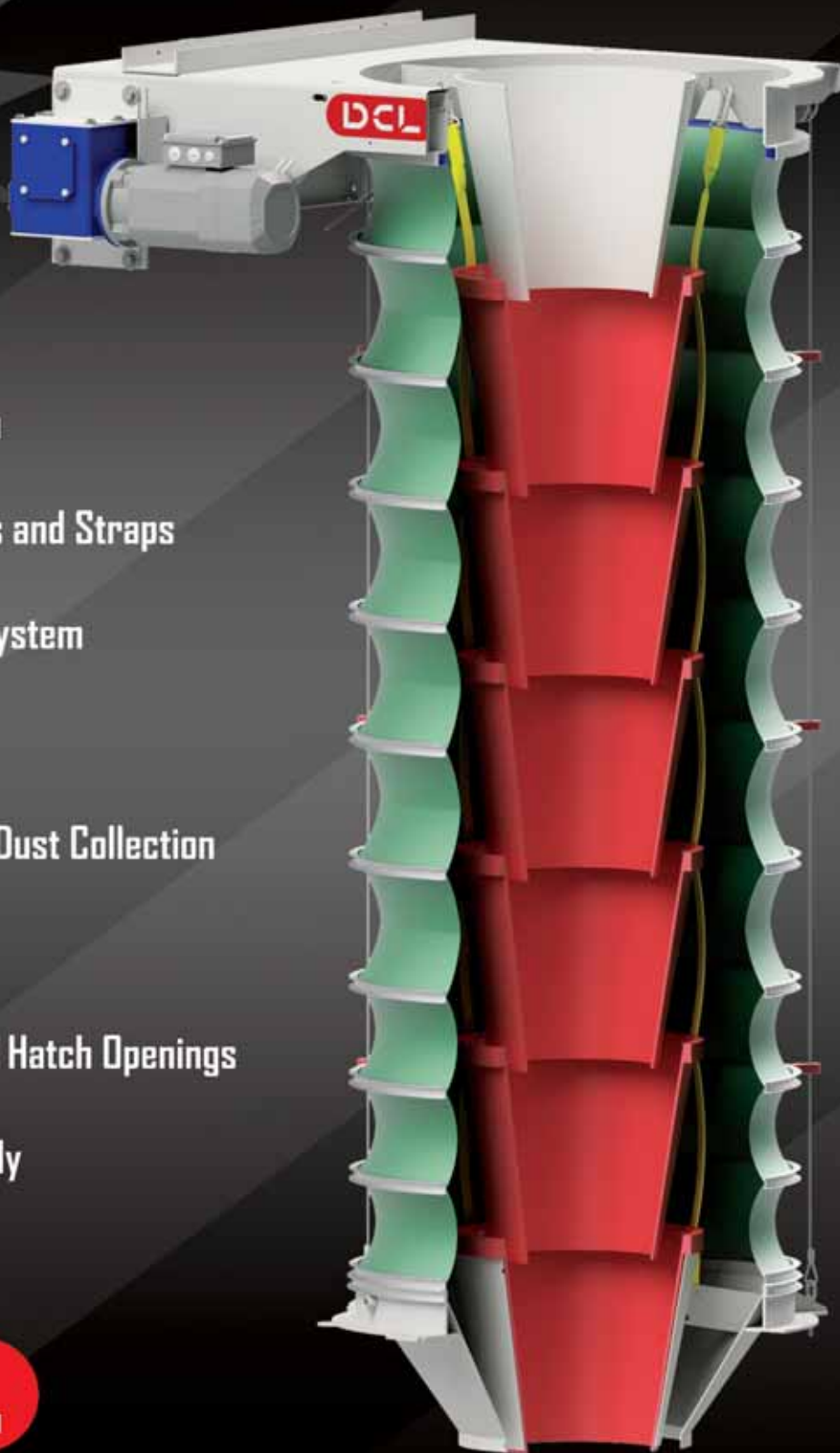
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Taking on the cement challenge

how to cope with this hard-to-handle cargo



Powered by the Roll Gen, a sensor detects material on the belt and communicates with control systems.

Louise Dodds-Ely

Cement plant solves remote conveyor issues using power generation technology

Engineered to operate at high speeds and over considerable distances, conveyors are generally designed with electrical power only at essential locations such as the head pulley, without secondary access for sensors, lights, accessories or other devices, writes *Dave Mueller, Senior Product Specialist at Martin Engineering*. Running auxiliary power can be complicated and costly, requiring transformers, conduits, junction boxes and oversized cables to accommodate the inevitable voltage drop over long runs.

That was the challenge on the outdoor conveyor located between the limestone crusher and stack-out conveyor at the Illinois Cement Plant in LaSalle, Illinois. Operators needed a power solution that was easy to install and maintain, but provided enough current to drive an automated dust-suppression system, a pneu-

matic belt cleaner tensioner and the air cannon equipment being implemented there. The goal was to curb fugitive dust and spillage, increasing cargo flow efficiency and minimizing labour costs for cleaning and maintenance.

“Running a line from the breaker was more of an investment than we wanted to make without knowing how successful the material control efforts would be,” explained Maintenance Planner Brian Brandner. “But when Martin Engineering technicians proposed that they use their Roll Generator to power the new equipment, we were sceptical, because we’d never seen anything like it.”

THE LONG RIDE

Coming from a quarry six miles (9.7km) away, trucks haul ~20 tons (~18 metric tonnes) of raw limestone per load and

drop it into a hopper leading to the crusher, which reduces the rock to 4-inch minus (102mm). The crusher deposits the aggregate onto the 164 foot long (50 m) #153 conveyor that transfers it to #107-1, which is fitted with a baghouse dust collection system at the transfer point.

It is the longest outdoor conveyor system on the site, running 600 feet (182m) and discharging either onto the #107-2 stack-out conveyor or the 250-foot-long (75m) belt leading directly into the plant, based upon immediate production needs. The #107-1 conveyor is a 30-inch-wide (762mm) mechanically-spliced belt with a 35° trough that travels at 400fpm (2mps), conveying nearly 300stph [short tons per hour] st/h (272mtph [metric tonnes per hour]) of limestone.

The belt is protected from the weather by a corrugated pipe dome leading from

the loading zone along the entire length of the belt, with the exception of the discharge zone at the head pulley. The LaSalle area experiences four distinct seasons, including freezing winters, hot dry summers and rain in between. This means cargo arriving from the quarry can be either wet, dry and dusty or anything in between. The changing conditions present challenges throughout the entire conveying system.



The 107-1 conveyor rises 20 feet (6m) at its mid-section.



To control fugitive emissions, the Martin® Surfactant Dust System treats the cargo at the transfer point.

belt, leading to accumulation around the discharge zone. In humid conditions, wet carryback would adhere to the surface and lodge in cracks in the belt, allowing it to travel and spill material along the entire conveyor path as far as the tail pulley.

“The primary cleaner blades we had in place wore quickly, causing spillage that required us to take personnel from other areas to clean the build-up,” Brandner explained.

“We were out there cleaning or adjusting the tension to minimize spillage a few times a week. Cleaning would intensify, depending on the material being conveyed or the weather conditions during operation. When it got really cold, we wouldn’t have as many issues with dust or carryback, but the frost accumulation required us to keep the belt running at all times, which lowered the blade life and caused undue wear on the belt.”

“After it’s crushed, dry limestone increases the potential for fugitive dust during several months out of the year, so we already have a highly efficient dust collection system in place,” said Brandner. “The issue is that the filter cartridges due to the moisture, and they are costly to maintain and replace.”

Different weather conditions also trigger various types of carryback, and cleanup was labour-intensive. Dry fines adhered due to cargo pressure and dislodged from the return side of the

AUTOMATION WITH ON-SITE POWER GENERATION

Having had a positive ongoing relationship with Martin Engineering for several years, managers at Illinois Cement invited a team to examine the issues on the 107-1 conveyor and offer solutions. Performing a Walk the Belt™ procedure, which assesses every aspect of the system from performance to safety, technicians offered a two-phase plan.

Phase one involved placing a ‘smart’ dust-suppression system at the transfer point between the 153 and 107-1 conveyors. Phase two included an automated, pneumatically-tensioned belt cleaner and air cannon system at 107-1’s discharge zone. Both components are powered by the Martin® Roll Gen™ System.

“It’s designed to be a self-contained mini power station that’s retrofitted onto existing idler support structures, so the generator can be employed on virtually any steel roller,” said Andrew Timmerman, Product Development Engineer at Martin Engineering. “As conveyors move toward more sustainable and autonomous ‘smart

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Image: LISTENOW Loading System 4090 with fill-level indicator

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The Roll Gen System uses the movement of the belt to produce localized power.

evenly distribute the engineered spray, delivering full coverage and shutting off when material is no longer present.

“All of the components are industrial-rated to ensure that they can withstand long operational periods in punishing environments,” Timmerman said. “An automated system defeats its purpose if it frequently needs maintenance, so the control panel carries a NEMA 4 rating to protect the inner workings from the outside elements.”

CLEANING THE BELT

Close to the mid-point of the system, conveyor 107-1 begins a gradual 20-foot (6m) rise and discharges into the transfer chute leading either to the stack-out conveyor feeding the storage area or the main conveyor entering the plant. At that transfer point, technicians installed a Martin® QCI™ Primary Cleaner XHD (extra heavy duty) tensioned with an Automated Blade System (ABS).

Built for demanding applications in varying

systems,’ the Roll Gen eliminates the power accessibility obstacles to employing sensors, cleaners and dust control systems such as we installed for Illinois Cement.”

The unit employs a magnetic coupling that attaches a ‘drive dog’ to the end of an existing roller, matching the outside diameter of the generator to that of the idler. Rotated by the movement of the belt, the drive dog engages the generator through the outer housing’s machined drive tabs. The magnetic attachment ensures that electrical or mechanical overload does not force the roll to stop; instead, the magnets disengage from the roll face. By placing the generator outside the material path, the Roll Gen avoids the damaging effects of heavy loads and fugitive material.

ADDRESSING DUST

To manage the dust, technicians installed a Martin® Surfactant Dust System at the transfer point between 153 and 170-1 to deliver a chemically-enhanced water spray as a topical treatment for material at the point of emission. Triggered by a sensor as soon as the load enters the transfer point, the system supports dust mitigation measures already in place to minimize the labour needed for maintenance and replacement of the dust collector cartridges.

Powered by the Roll Gen, the automated control panel features a manual shutdown on its face, as well as a material sensor that can be adjusted to fine-tune the system’s sensitivity and duration of spray. The pump box houses the water intake hose, dosing pump and booster pump. To maximize the effectiveness of the surfactant additive, specialized nozzles



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The Roll Gen (top right), air cannon (middle) and solenoid control box.

observed that the decreased spillage resulted in a proportional increase in fines discharged down the transfer chute. Exposed to the outside environment, the chute began to form significant buildup along the sides, at the diverter gate and on the internal shelf meant to slow the flow of material. The technicians had a solution to this unexpected result, and to mitigate the buildup, they installed a Martin® Hurricane Air Cannon.

The 70-litre (18.5 gallon) tank is attached to the chute wall by a straight pipe assembly, fed by the plant's existing compressed air system. Firing a blast of air

environments like those found at Illinois Cement, the QCI XHD can withstand temperatures from -30°F (-34°C) to 300°F (148°C). Handling belt speeds of up to 1,200fpm (6.1m/s), the patented blade design maintains a tight edge against the belt, while passing smoothly over the mechanical splice to deliver reliable cleaning across all stages of the blade's life.

Connected to a small 24V DC air compressor and a control panel powered by the Roll Gen, the ABS pneumatic tensioner delivers precise monitoring and tensioning to reduce the labor typically required to maintain optimum blade pressure through manual adjustment. Equipped with sensors to confirm when the belt is running empty, the system automatically backs the blade away, minimizing unnecessary wear to both the belt and cleaner. Upon detection of an empty belt, the system is set to run for one full belt rotation (about three minutes) to clean the surface thoroughly before pulling away. The result is consistently correct blade tension with reduced power demand on start-up, all managed without operator intervention.

"The new cleaner has been a game changer when it comes to the amount of maintenance, equipment wear and manpower for cleanup," Brandner pointed out. "The blade's no longer just scraping an empty belt, which has extended the blade's operational life and been a lot easier on the belt face and splice."

Timmerman said that after the new systems were implemented, operators reported a 75–80% reduction in carry-back. "Decreased spillage means less cleanup, but it also had another outcome," he said.

TRANSFER CHUTE FLOW

While monitoring the results of the installation, Martin Engineering technicians



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at up to 120PSI (8.27BAR) from a pressurized tank through a 12-inch (305mm) fan jet nozzle, the air stream is shot at a downward angle of approximately 225° across the surface of the shelf and down the wall. With an effective area of up to 22.6ft² (640 L), the air blast mitigates material buildup and promotes cargo flow.

To eliminate the risk of unintentional firing due to drops in pressure, the air cannon's valve requires a positive signal from the solenoid in the form of an air pulse to trigger discharge. Engineered to fire only when the belt is running and



The Automated Blade System eliminates the need for manual blade tensioning.



The belt cleaner's curved design ensures consistent contact throughout its life.

loaded, the system eliminates wasted air from firing when there's no cargo on the belt or when the conveyor is idle. The control panel is powered by the same Roll Gen as the ABS, while also giving operators the ability to fire the cannon from ground level.

"When there's cargo flowing, the cannon fires about every ten minutes, which keeps fines from clinging to the walls and promotes proper flow," Brandner said. "If the material is extra wet and building up faster than usual, we can just go over and fire it manually at any time."

RESULTS

After several months of operation, with some minor adjustments, the automated equipment has exceeded performance expectations. This includes the effectiveness of the Roll Gen system, which has delivered consistent power to the necessary systems.

"We've been closely monitoring performance and found little to no degradation in energy output so far," Timmerman pointed out. "Neither unit has required maintenance, and wear on the equipment has been minimal."

The use of multiple technologies working in tandem to control material flow and prevent fugitive particles has dramatically improved the material handling system's efficiency. The modifications have helped Illinois Cement reduce labour and equipment expenses, considerably cutting the manpower needed to clean spillage along the conveyor path. The result is a cleaner, safer and more productive operation.

"The entire project has been a success, particularly in how many man-hours we save in maintenance and upkeep," Brandner

concluded. "The tensioning system does a great job, and the Roll Gen puts out enough power that we're considering adding an automated secondary cleaner and a vibrating dribble chute to capture even more carryback. We're looking forward to working with the Martin Engineering team in the future."

Martin Engineering is a global innovator in the bulk material handling industry, developing new solutions to common problems and participating in industry organizations to improve safety and productivity. The company's series of *Foundations* books is an internationally-recognized resource for safety, maintenance and operations training — with more than 10,000 print copies in circulation around the world. The entire 500+ page volumes can also be downloaded as free PDFs from the Martin website. Martin employees take an active part in ASME, SME, VDI, CMA and CEMA, and the firm played a pivotal role in writing and producing the 7th edition of the CEMA reference book, *Belt Conveyors for Bulk Materials*.

Martin Engineering products, sales, service and training are available from factory-owned business units in Australia, Brazil, China, Columbia, France, Germany, India, Indonesia, Italy, Mexico, Peru, Russia, Spain, South Africa, Turkey and the UK.



The control panel enclosure carries a NEMA-4 rating to withstand the elements.

Cement manufacturer Aalborg Portland relies on BEUMER's pipe conveyor



BEUMER Group supplied a single-source system to Aalborg Portland to feed the calciner and the main burner with alternative fuels and raw materials. The main component is given by the pipe conveyors. They are fed via screw conveyors (all photos: BEUMER Group GmbH & Co. KG).

AN ECONOMICALLY CONVINCING ALTERNATIVE

The manufacture of cement is particularly energy intensive. For an economical and sustainable operation, Aalborg Portland A/S

therefore relies on alternative fuels and raw materials, in its Denmark lead plant, to ignite the calciner and the main burner. BEUMER Group supports the manufacturer with its AFR systems segment

(alternative fuels and raw materials) and develops individual single-source solutions in order to efficiently convey, store and feed the differently composed materials. The core of these systems is represented

The two pipe conveyors: BEUMER develops different system solutions for the various bulk materials.



by innovative pipe conveyors: these enclosed conveying systems ensure an environmentally safe, dust-free and low-energy transport of fuels and raw materials.

Aalborg Portland is part of the Italian cement group Cementir Holding S.p.A. This group of companies is one of the largest and most prominent manufacturers and exporters of this material world-wide. In addition to the main plant in Aalborg, Denmark, it has further production plants in China, Egypt, Malaysia, Italy, Turkey and the United States of America as well as numerous sales offices.

SECONDARY INSTEAD OF PRIMARY FUELS

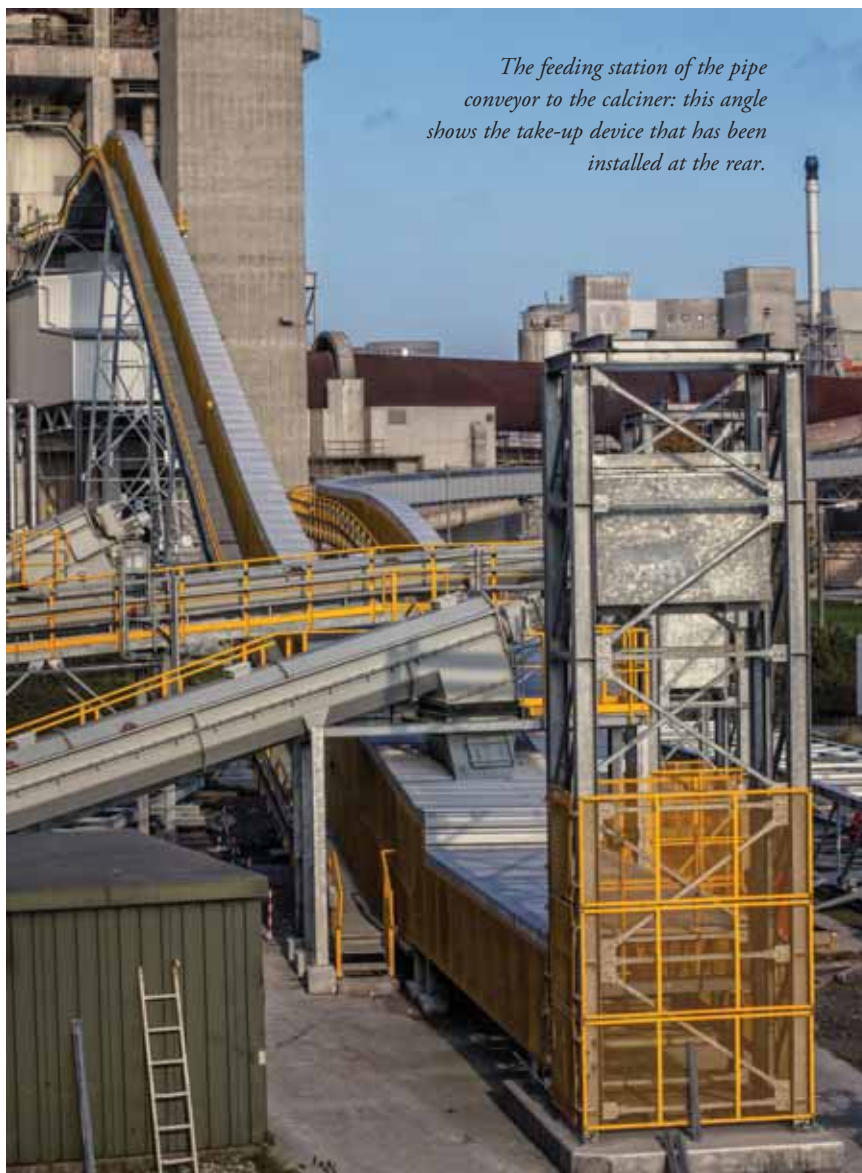
The production of cement has always been one of the most energy-intensive operations. In order to avoid expensive primary fuels such as carbon, gas and oil, and to produce in a more economic and sustainable way, Aalborg Portland has relied on alternative fuels for the incineration process in the calciner for several years. "In 2014 we decided to optimize and enlarge the existing system," says Ole Strøm Hansen, project manager of Aalborg Portland. Until then the manufacturer transported the fuels to both calciners through long pneumatic conveying lines. However, the producer did not have an initially positive experience, as pneumatic conveying lines are extremely maintenance-intensive and also susceptible to breakdown. "In addition, we intended to increase the capacity of the existing conveying line to 20tph [tonnes per hour] per calciner", explained Hansen.

With the new concept, the Residue Derived Fuel (RDF) is transported for the calciner and the Solid Recovered Fuel (SRF) to the main burner. The solution is to transport the alternative fuels from the storehouse to the rotary kiln area as well as the gravimetric feed of both the calciner and the main burner.

The decision was made to reduce the length of the pneumatic conveying line and to replace the remaining line by a mechanical transport system, but the manufacturer also wanted to install a completely new conveying line for the main burner feeding, with a capacity of up to ten tonnes per hour. "We evaluated different variants of mechanical transport systems", remembers Hansen. Finally, the Danish company opted for a single-source solution of BEUMER Group based on the innovative Pipe Conveyor technology.

IDEAL SOLUTION FOR EACH CASE

In order to support producers of cement in the alternative fuels and raw materials field,



The feeding station of the pipe conveyor to the calciner: this angle shows the take-up device that has been installed at the rear.

BEUMER Group has set up a complete business segment dedicated to AFR systems. "Our know-how and our tailor-made systems permit us to offer an optimum support to our customers," says Tomas Hrala, project manager at BEUMER Group. "We have many years of good experience and we always consider customers' specifications." With this capability, the system provider is able to supply and install the whole chain from the acceptance and unloading of the delivery vehicle, up to the storing, conveying and feeding process of the solid alternative fuels for the specific user. The customer receives everything from one source, thus having a unique contact.

PIPE CONVEYOR AS HUB AND PIVOT

"Due to the different grain sizes and the various compositions of these alternative fuels, it was necessary to develop an individual system solution for each line", explained Hrala. To enable the transport of the pre-processed fuels from the storehouse to the calciner and to the main burner, BEUMER Group supplied and

installed respectively one pipe conveyor as the heart of these systems as well as the accompanying equipment. "This conveying technology is not only eco-friendly and requires low maintenance," explains Hrala. "Its enclosed type of construction protects the environment safely from material falling down and emissions. Another advantage is the lack of dust development on the running line." Due to its ability to navigate curves, considerably fewer transfer towers are required compared to other belt conveyors, allowing for a substantial cost savings to the customer. BEUMER Group can customize each system to the individual routing.

EFFICIENT SINGLE-SOURCE SYSTEM

The delivery of the oven-ready material is carried out in moving-floor trailers. The alternative fuels are unloaded and stored at the receiving station. Both lines receive the material/items transported by the moving floors modernized by BEUMER Group from the existing storehouse. All transport systems supplied and the accompanying equipment are intertwined to ensure

One Source



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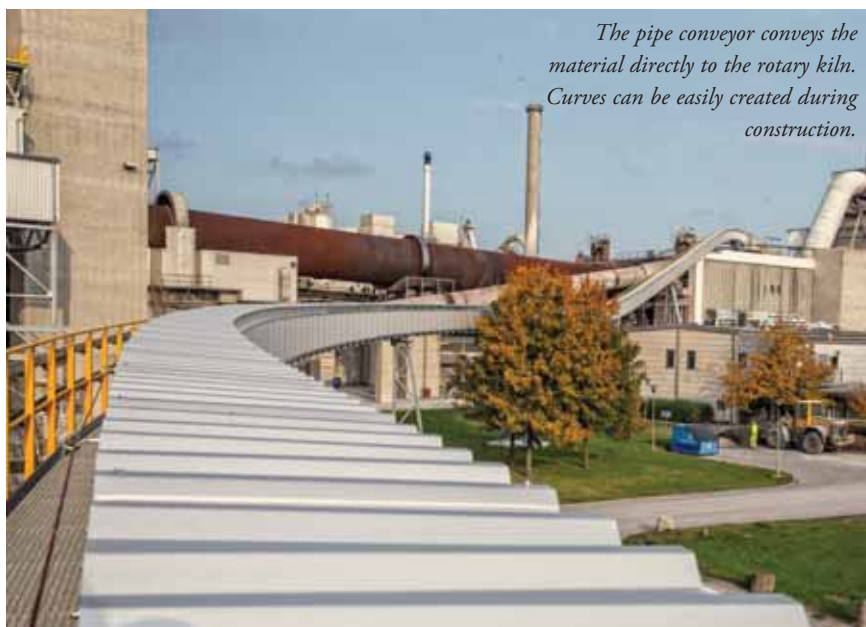
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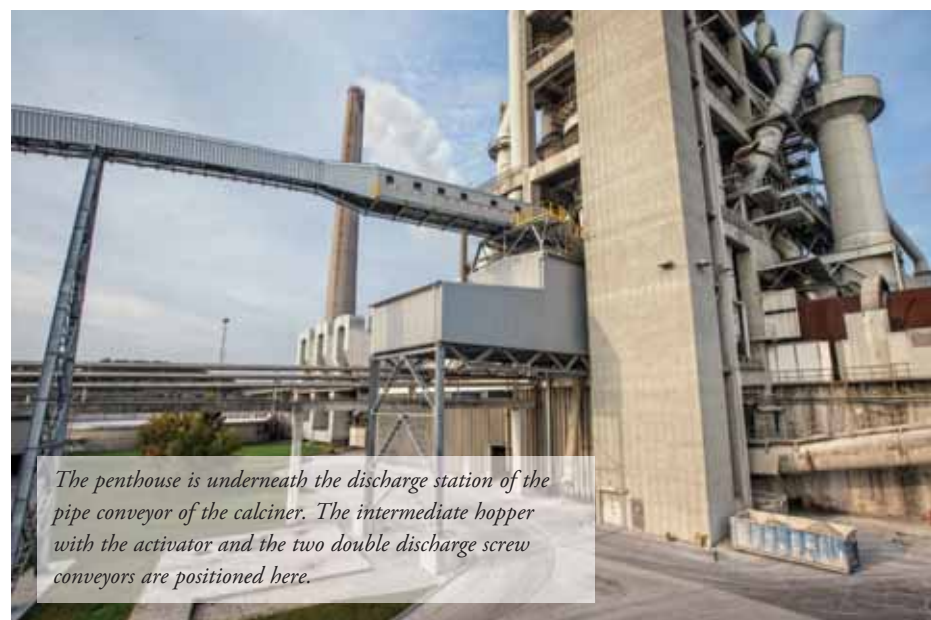
FLSMIDTH

steady fuel feeding. The pipe conveyor of the calciner has a diameter of 350mm, a length of 135m and can transport up to 50tph to an intermediate hopper with a volume of 35m³. This hopper is equipped with an activator and two double discharge screw conveyors, and distributes the material in two feeding and pneumatic conveying lines to both calciners. The two new pneumatic conveying lines to the calciner with rotary vane feeders and blowers were completely dimensioned and supplied by BEUMER Group.

“However, during the constructive dimensioning of this system we were faced with a particular challenge,” remembers Hrala. The buildings in which the calciners are placed include an additional part called penthouse. It supports, among others, the discharge station of the pipe conveyor, the



The pipe conveyor conveys the material directly to the rotary kiln. Curves can be easily created during construction.



The penthouse is underneath the discharge station of the pipe conveyor of the calciner. The intermediate hopper with the activator and the two double discharge screw conveyors are positioned here.

activator and double discharge screw conveyor and a weigh belt feeder. In addition, there is a pneumatic conveying line with blower and rotary vane feeder.

“We are very pleased with both single-source systems,” Strøm Hansen of Aalborg Portland sums up. “The transport systems and the accompanying equipment are intertwined to ensure steady fuel feeding.” Hrala continues, emphasizing BEUMER Group's role: “We could again demonstrate that we have substantial competence with regard to the handling of alternative fuels in the cement industry and that we can support our customers efficiently.”

intermediate hopper with the two double discharge screw conveyors and also both weigh belt feeders with the pneumatic conveying system. “From a static viewpoint, the penthouse had to be calculated trying to not exceed the available load application in the existing building,” explains Hrala. “At the same time, the subjacent requested thoroughway for plant vehicles had to be ensured.”

The heart of the line for the main burner is a pipe conveyor with a diameter of 200mm and a length of 201m. It achieves a conveying capacity of 12tph and is equipped with a spillage scraper conveyor for minimizing the cleaning, as well as a dedusting filter. The fuel feed of the moving floor in the storehouse to the pipe conveyor is carried out by a screw conveyor. The feeding system in the main burner building includes an intermediate hopper with a volume of 10m³, also with



The weigh belt feeder with the rotary vane feeder including a blower conveys the material pneumatically to the main burner through the pipes.

Geometrica offers comprehensive storage solutions for cement

We've used concrete for millennia. The basic ingredients — stone, a burnt mineral binder, and water — have been mixed since antiquity. The Romans used it to create such wonders as the Pantheon in Rome, with its 43m-diameter concrete dome.

Today, concrete is one of the most widely used materials on the planet — some say second only to water. The amount of concrete used worldwide, tonne for tonne, is twice that of steel, wood, plastic, and aluminium combined.

To ensure continuous production, most plants store about 30 days' worth of raw and processed material. That is quite a lot of material, and the most common way to store it is in open air stockpiles.

But, this is changing. Quality control requirements and environmental compliance now demand that raw and processed materials be stored under cover.

For a new site or existing cement plant — Geometrica moves the task of covering stockpiles into the twenty-first century. Its storage domes fight off wind and rain, and contain dust comprehensively.

Versatile and flexible design options are



Open air stockpiles — exposed to the elements with lots of fugitive dust.

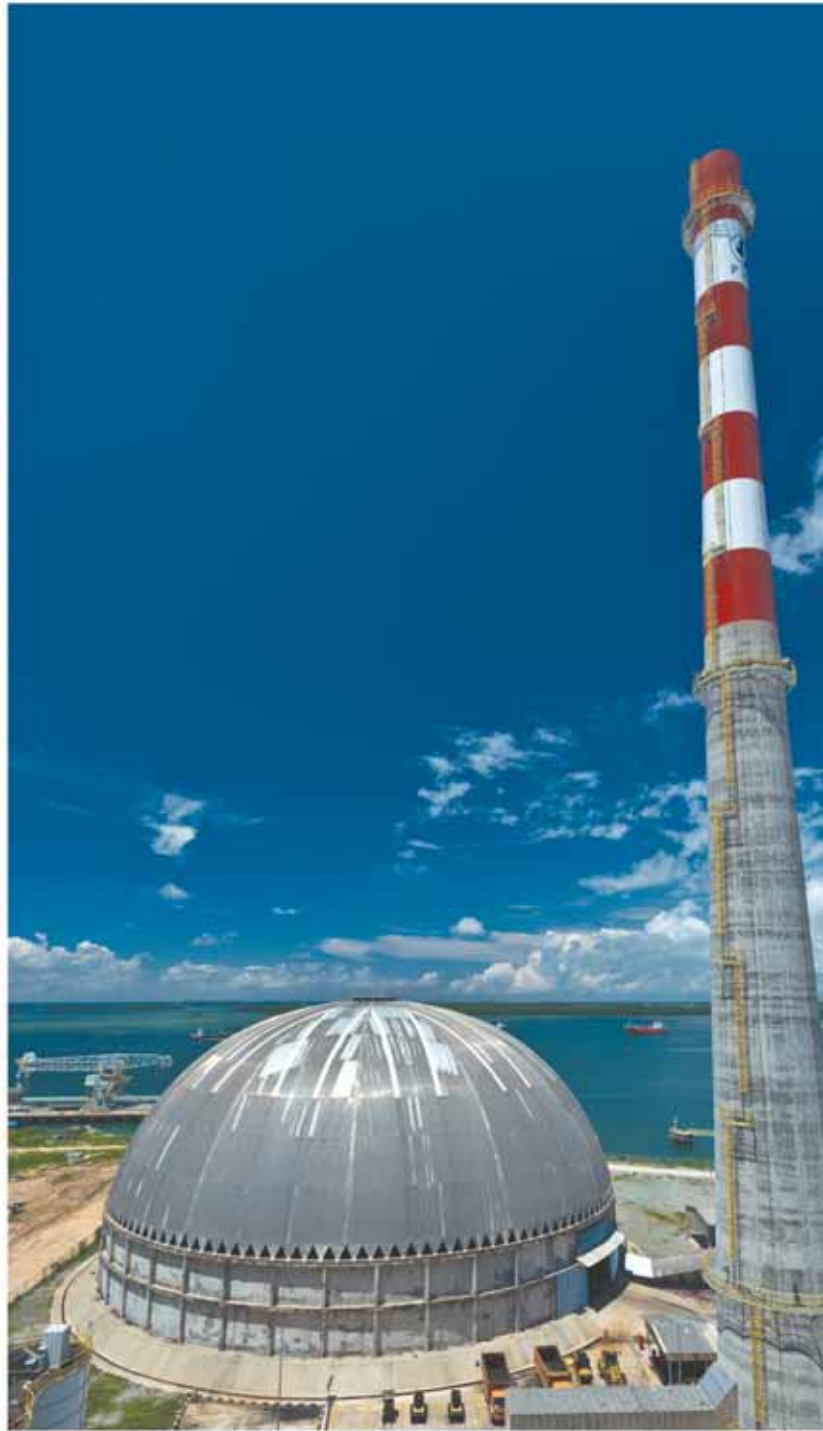
offered for piles with spans up to 300m. This cutting edge, patented, all-terrain building system offers safe, economical, efficient storage with low maintenance.

Geometrica's domes are custom designed to fit any type of stockpile or

plant. For instance, its solutions for cement production can cover ring stockpiles for limestone and clay; conical piles for clinker; or free form and longitudinal piles for coal, additives and bagged cement storage. Geometrica domes have even been used to



Limestone, pozzolana and pallets of bagged cement protected at Cementos Bio Bío (Chile).



DEFEAT DUST WITH A DOME.

Tread softly around Mother Nature. If your stockpile produces dust, tame it with a freestyle dome or barrel vault. Whether quayside or on a mountain, protect the surrounding environment while preserving your own stockpile from erosion and loss of fines. We'll build right over your live operations and eliminate downtime. Corrosive saltwater? No problem. Typhoon-force winds? No worries. Torturous snow loads? Never fear, we've got you covered. Build a Geometrica dome for your raw materials and the dust is history.

 **Geometrica**®

www.geometrica.com/bulk-storage



In the United Arab Emirates, a 92m diameter circular dome covers a ring stockpile.

cover entire crushing plants.

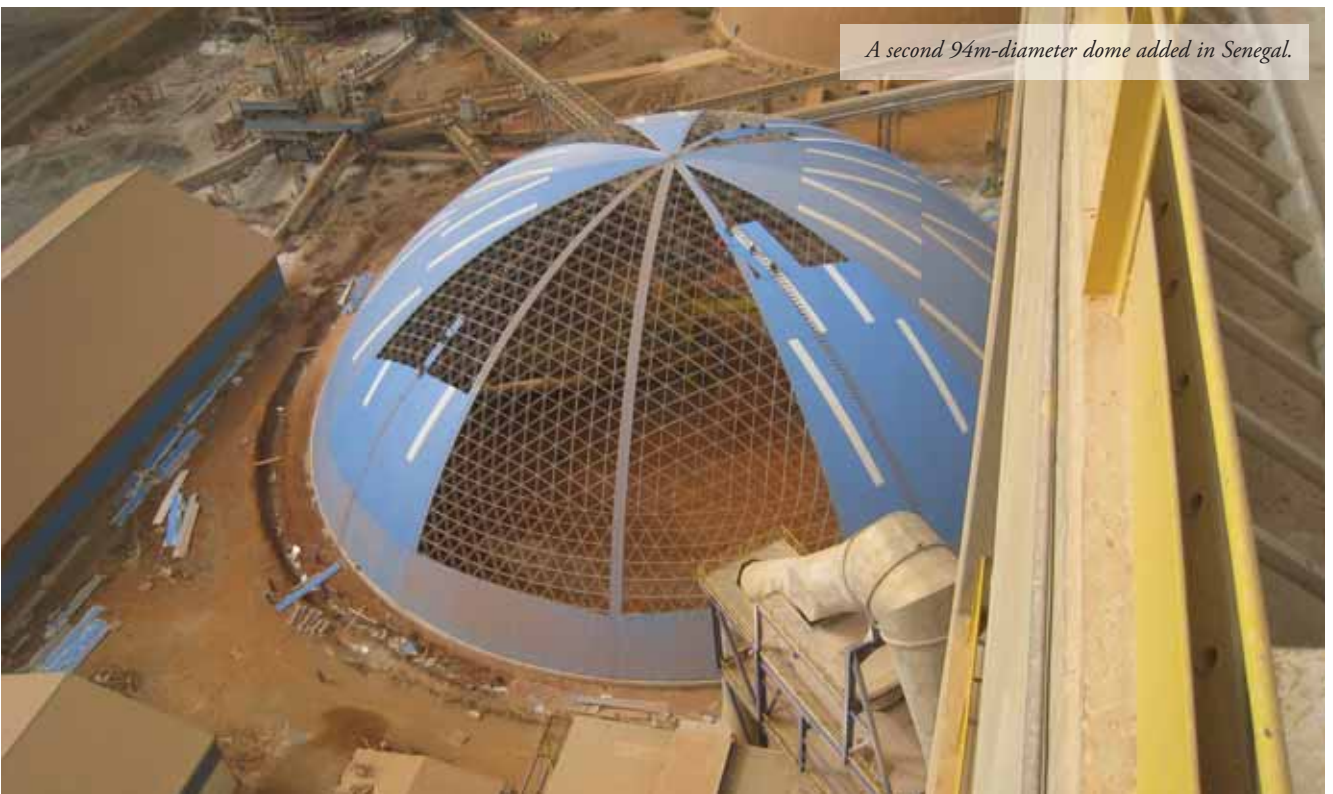
When it comes to covering cement handling, storage and bagging operations, the advantages offered by Geometrica's domes surpass the alternatives offered by conventional structures made with concrete shells or steel. A comparison

follows in Table 1 on p88.

A select few storage solutions provided for cement operations include the following;

- ❖ Star Cement's (UAE) dome allows for ample clearance for the stacker-reclaimer system, incoming conveyor,

four entrances for vehicles and space for a traffic lane inside of the dome, around the ring rail of the reclaimer. Crucial to the construction schedule was Geometrica's ability to accommodate the stacker-reclaimer and the conveyor gallery while building the structure.

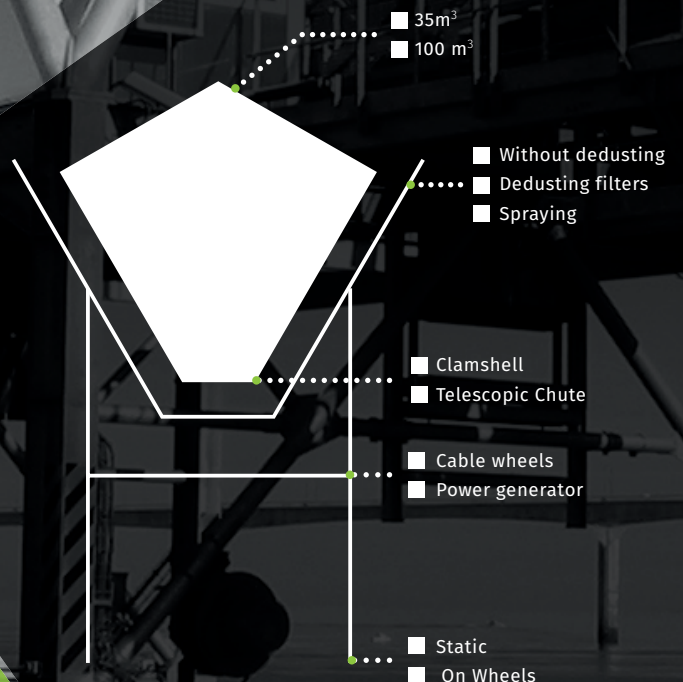


A second 94m-diameter dome added in Senegal.

RBL REI BULK UNDER CONTROL MULTI-BULK HOPPER

GENERAL CHARACTERISTIC		
Util capacity	35m ³	100m ³
Feeding height without dedusting filters or with spraying	10m	11.5m
Feeding height with dedusting filters	12m	13m
Opening diameter without dedusting filters or with spraying	7m	9.5m
Opening diameter with dedusting filters	5.5m	8m

- 
DEDUSTING FILTERS
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- ❖ As part of an expansion plan to increase production in Senegal, a second dome was added. Two ring stockpile domes at Ciments du Sahel house and blend raw materials with stringent quality and environmental standards.
- ❖ Spanning 86m, the limestone blending bed for Kampot Cement (Cambodia) is covered with an environmentally friendly design, and spares the surrounding landscape from dust and loss of material during the rainy season. The stockpile remained in operation during construction.



- ❖ For Edo Cement in Nigeria, internal and external cladding was applied to stop the clinker from aggregating (and applying large loads) on the structure. Uncovered stockpiles (especially in this region) are subject to heavy heat, humidity, and severe storms.

As the world continues to develop, the market for concrete products continues to outpace population growth. Cement manufacture is vital for such development. Geometrica believes that industry and nature can coexist on some of the largest scales imaginable.

Regardless of geography or climate, Geometrica designs domes that deliver both business- and eco-friendly solutions to enclose and protect limestone, coal, clinker, or gypsum. Not only are there more structure types to choose from, Geometrica domes are more economical and efficient than traditional steel or concrete shells.



Edo Cement's dual clad dome for clinker storage.

TABLE 1: COMPARISON

Geometrica's Domes	Concrete shells	Steel structures
Can be constructed over operating machinery with zero downtime or minimal disruption	Cannot be easily built over operating machinery	Cannot be easily built over operating machinery
Can be built with semi-skilled and unskilled local labour	Require highly skilled labour	Require highly skilled labour
Do not require special construction equipment	Require special construction equipment	Require special construction equipment
Require a light foundation	Require a heavy foundation	Require a very heavy foundation
Weigh less than 10% of a concrete shell structure	Very heavy	Very heavy, especially in spans exceeding 70m
Adapt to match restrictive space and clearance requirements. Versatile geometry optimizes the volumetric space inside the dome.	Follow rigid spherical geometry and are not versatile	Follow rigid bent-frame geometry
Ensure exact height and shape. Components made to ASTM or equivalent standards in an automated process.	Experience surface blistering, non-uniform interior colour and difficulty in assuring exact shape	
Can be built on existing walls or columns (in most cases)	Cannot be built on existing walls or columns	Custom engineering required
Reach spans up to 300m without any interior columns. (Most popular spans 68–200m dia.)	Typically limited to spans of 75m	Custom engineering required
Made of galvanized steel for high durability, low maintenance and better protection against corrosion	Made of reinforced steel and concrete	Normally made of primed and painted steel; need frequent maintenance
Cost-effective and efficient	Expensive for a given capacity	Expensive over life of the building



Interior view of coal storage (Tunisia).

Ensuring smooth running with a range of products from Standard Industrie

For 40 years, Standard Industrie International has been a major player in the design and manufacture of equipment to facilitate the handling of powdery bulk products, including cement. Respect for the environment and safety are among the requirements set by the group. With the company's specialized methods, it is possible for an operator to optimize the performance of its production tools while reducing operating and maintenance costs. Certified to ISO9001 and OHSAS1800 (internationally recognized), the company guarantees rigorous controls of the equipment.

The innovative and reliable solutions developed by the design office have been adopted by many industrial companies in various sectors such as cement plants, mines and quarries, glass making factories, incineration plants and many others.

Standard Industrie produces a wide range of equipment, which fall under four main categories:

- ❖ **blockage & build-up removal:** customized technologies for different kinds of blockages and preventative solutions allowing operators to optimize productivity by regaining their full storage capacity.
- ❖ **industrial vacuum cleaning:** a wide range of industrial vacuum equipment to meet all cleaning, pumping and recycling needs: from 4 to 300kW — electric or diesel — fixed, mobile units, or trucks.
- ❖ **silos & hopper cleaning services:** service provider conducting operations for cleaning and vacuuming silos and hoppers in complete safety and without human intervention inside storage units.
- ❖ **conveyor belt optimization** innovative system that optimizes the sealing of any belt conveyor. Problems with safety, dust emissions and costly maintenance can be resolved with Standard Industrie's patented system.

Standard Industrie International has designed an innovative system that optimizes the sealing of any conveyor belt: the LIFTUBE®. It is an item of equipment that is easy to install, and which makes it possible to cover the conveyor belt with hoods. This solution significantly reduces dust emissions during material conveying, whilst optimizing the operators' safety.

In this way, the LIFTUBE® reduces product losses and cleaning requirement during the transport of products such as limestone, clinker, sand, aggregate, grain, flour, etc. This solution is also ideally suited for recycling or wood treatment factories. Around the world, many Standard Industrie International customers using this patented system have expressed complete satisfaction with the results: optimizing productivity, reducing maintenance time and costs.

With its know-how and experience in transporting products by conveyor belt, this international group recommends LIFTUBE®. This equipment is suitable for conveying systems with the following characteristics:

- ❖ bandwidth: 19.6 to 55 inches;
- ❖ band speed: 16ft feet per second maximum;
- ❖ density of the product transported: up to 4;
- ❖ maximum particle size: 19.6 inches; and
- ❖ maximum operating temperature: 572°F.

“DO I HAVE THE RIGHT SOLUTION TO REMOVE BUILD UPS AND BLOCKAGES IN MY SILOS AND HOPPERS ?”



**STANDARD
INDUSTRIE**
INTERNATIONAL

YOUR **BULK**
SPECIALIST



LIFTUBE® installed at cement plant in Hercules Pretoria in South Africa.

LIFTUBE® is a solution that offers numerous advantages: reduction of the tape offset, noticeable noise reduction, protection against re-entry points and disappearance of scalloping (overflow of material), and reduction intervention time and operating losses. LIFTUBE® also

optimizes productivity and safety between loading and unloading points.

RECENT CONTRACTS

LIFTUBE® INSTALLED IN A CEMENT PLANT IN SOUTH AFRICA

This project involved a conveyor belt used

to transport recovered clinker crushed in the tunnel to the cement preparation building. The problems for this client included high dust emissions and material loss when the clinker falls. The access to the tunnel is impossible when the belt is running. The installation of the LIFTUBE®

A German repeat customer installed Liftub2-800s on four conveyors



has drastically reduced the dust emissions and material losses. In the long run, this will reduce the costs of cleaning and maintenance. Coupled with a good dust collection system, the LIFTUBE® allows accessibility to the tunnel and a continuous monitoring of the wear condition of the belt (220 metres).

The site in Hercules Pretoria receives clinker from pre-heating towers based all over the country. A wagon tilting system enables the unloading of 80 tonnes of clinker in less than seven minutes by means of three dosing systems and a return belt. A LIFTUBE® has been installed since January 2018, and drastically reduces the cloud of dust caused by the gravity drop of the production the tunnel.

REPEAT ORDER FOR LIFTUBE® FOR GERMAN CUSTOMER IN 2017

The customer needed optimized sealing, and a reduction in the need for cleaning, so decided to install a LIFTUBE® on several conveyors. The customer already had with LIFTUBE® 600 for testing on two belts, so had full confidence in the product and ordered LIFTUBE® for all of its belts for its new quartz sand treatment unit. Knowing the issues caused by its specific product,

the customer overcame the problems by installing Liftub2-800 on the four conveyor belts. The success of the previous installation combined with the ease of installation and the confidence that cleaning time would be reduced were behind the customer's decision to choose this equipment.

LIFTUBE® FOR UK CUSTOMER FOR CONVEYING OF FOUNDRY SAND

Foundry sand is very fluid and abrasive making it difficult to be transported. This black sand — used to cast metal parts during their melting — is very abrasive, dusty, and dirty. Transport on conveyor is possible, but working conditions in these areas are difficult. The use of the LIFTUBE® system reduces maintenance costs (fewer rollers to change, good terms of warranty) completely seals the sand conveyors and considerably reduces the number of dusty areas. Other projects are under way to continue to equip the site with the goal of covering all the conveyors in the medium term.

STANDARD INDUSTRIE CELEBRATES ITS 40TH ANNIVERSARY

Standard Industrie International in Roubaix

(France) was established in 1978. Its founder Hervé Simoëns came up with the idea that compacted powder can only be discharged from a silo with a large influx of air. He filed a patent and offered his solution to cement manufacturers with which he achieved great success in France and internationally. Forty years later, the company has over 10,000 customers in nearly 90 countries, export revenue of 80% and 110 employees. The family business continues to be run by Hervé Simoëns, assisted in recent years by his daughter Laetitia Simoëns.

RECENT TECHNOLOGICAL DEVELOPMENTS

These include:

- ❖ dust-collector for belt conveyor sealing optimization;
- ❖ new accessory: a 2m-LIFTUBE® kit with filtering unit atop hood-air-jet filter cleaning. This allows for the reduction of very fine dust emissions just after discharge;
- ❖ online dust-collector or online dust-suction;
- ❖ belt width : from 650 to 1,400mm;
- ❖ compatible with following LIFTUBE® models :ATEX, High Temperature, food-grade and self-extinguishing.



A UK customer selected the LIFTUBE® to reduce costs while transporting abrasive foundry sand.



MAIN FEATURES

- Rugged construction for heavy duty
- Hermetically sealed against water and dirt
- Manufactured according to DIN, AFNOR, JIS, CEMA, FEM, BS

BENEFITS

- Totally safe and controlled roller
- Longer bearing and roller life
- Ability to supply rollers to every market worldwide

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Steel rollers - PSV series:

- perfect for mines, quarries, cement works, coal-fired electric utilities, dock installations and all bulk handling conveyors
- shaft ranging from 20 to 40 mm diameter
- tube ranging from 63 to 194 mm diameter
- minimum 30.000 theoretical bearing life
- no need for early replacements
- successful for more than 45 years

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Royal Bodewes: specialized cement carriers

Major shipbuilder Royal Bodewes builds vessels in the 1,500–12,500dwt range. As well as dry cargo vessels, tankers and customized ships, it also manufactures 'special' vessels including hybrids, offshore vessels, ro/ro and lo/ro and, most interestingly for this article, cement carriers.

Royal Bodewes has already built two cement carriers for Eureka Shipping — the *Furuvik* and the *Cymbidium* (pictured). It is currently building a further three for the same customer. Of particular note is the ships' low fuel



The 6,100dwt Furuvik.

The 7,700dwt Cymbidium.



consumption — about 3.1 tonnes per day in ballast.

With over 200 years of experience in the maritime industry, Royal Bodewes is proud of the quality and range of its vessels. It specializes in dry cargo vessels, and over the years has gained solid experience in all types of vessels, which it builds from scratch. All of its vessels can be customized and tailor-made to meet the exact specifications of the client. For example, its hull-form models comply with the Energy Efficiency Design Index (EEDI).



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Gambarotta Gschwendt's cement expertise is in wide use in the industry

Major bulk handling equipment manufacturer Gambarotta Gschwendt Srl provides solutions for lifting and hauling of bulk materials, including cement. The main sectors it serves are:

- ❖ cement and gypsum industry (conveyors, bucket elevators, screw conveyors, feeders)
- ❖ metallurgical and mining industry (conveyors, apron feeders, bucket elevators)
- ❖ chemical and food processing industry (screw conveyors, bucket elevators)
- ❖ materials recycling industry (conveyors)

Gambarotta Gschwendt works closely with its customers to develop the best solution, and its efficient after-sales assistance and maintenance service provides support throughout the plant's life.

The company is also able to modify and update existing conveying systems of any manufacturer, to guarantee continuity, operational efficiency and even enhanced machine performance through appropriate machine conversion and upgrading projects.

All components and semi-finished goods

suitable for the construction and maintenance of its machines are rigorously manufactured in Western Europe and undergo stringent quality controls.

EXPERIENCE AND PRODUCTION QUALITY

Gambarotta continuously works on developing new and innovative solutions for the market, and prides itself on its ability to solve its customers' problems in a timely manner, offering stable, reliable production quality of an extremely high standard.

Gambarotta has been in business since 1919, and in all these years, it has developed its production capacity while keeping up with technological developments and organizing synergies with important European companies and research centres.

Gambarotta offers a wide range of solutions for the cement market, including:

BUCKET ELEVATORS

In several industrial sectors, the need for vertically lifting free flowing bulk material, of any type and size, can be satisfied by the various types of bucket elevators designed and manufactured by Gambarotta

Gschwendt. Three different categories of bucket elevators are available:

- ❖ high-speed bucket elevators;
- ❖ medium-speed bucket elevators: generally used for medium-sized materials (between 40 and 80mm); and
- ❖ low-speed bucket elevators: suitable for large-sized materials (even up to 300mm or more).

Gambarotta Gschwendt is able to upgrade, modify and enhance elevators from any manufacturer and solve any problem related to the handling of continuous flowing bulk material. The company can also supply any spare part for lifting and hauling machines.

CONVEYORS

Box conveyors are particularly suitable for cement and clinker, as they work even at high temperatures, at an inclination exceeding 40°.

These metal pan conveyors comprise a series of boxes capable of conveying fine-grained material without any spills.

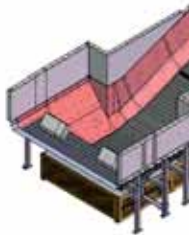
Two link chains with pins and fixed bushings, which are bolted under the boxes, connect the various boxes so as to

SURFACE FEEDER

Receives various type of bulk materials at yard level, following rapid flow discharge to convey them onto a hauling and processing plant with controlled and adjustable flow rate, **minimizing the installation costs.**

Combines the strenght of a metallic plate extractor with the retaining quality of the rubber belt that seals off any potential escape points **for even the finest materials.**

visit www.gambarotta.it





Box conveyors generally used for conveying material with inclination above 40°.

form a continuous jointed series thanks to the chain pins.

Every second box mounts a pair of rollers with guiding edge and rolling-element bearings: the former roll on appropriate tracks and support the series of boxes both on the upper driving run and on the lower return run.

The vertical support structure

comprises trestles (two small columns with crossbeams), while the horizontal support simply consists of the tracks connecting the trestles spaced out at regular intervals.

The drive station in the discharge zone includes a drive unit that imparts movement to the boxes, while the return station on the opposite end includes the chain take-up station.

SCREW CONVEYORS

In several industrial sectors, the need for conveying fine-grained or small-sized bulk material with sealed machines, generally over small distances, can be satisfied by the various types of screw conveyors designed and built by Gambarotta Gschwendt.

The company's product range includes various types of screw conveyors used in the cement industry and in the pre-mixed product, lime, gypsum, steelworks, mining, chemical and power station sectors etc. These machines are also widely used for recovering and conveying dust in dust-filtering ecological plants, in any sector.

They can be divided into two main groups:

- ❖ horizontal screw conveyors: generally used for powdered materials or small-sized material to be conveyed horizontally or with slight inclination

(which may reach 45° or more).

- ❖ vertical screw conveyors: used for vertically lifting fine-grained material (also known as screw elevators).

Gambarotta Gschwendt is able to upgrade, modify and enhance screw conveyors from any manufacturer.

LOADING BELLOWS

In many industrial sectors, the need to be able to unload solid material, fine grade or in lumps, into lorries or other vehicles with little or no dust, is satisfied by the loading bellows designed and built by Gambarotta Gschwendt. Its manufacturing programme includes various types of loading bellows used in a range of sectors, such as the cement industry, for lime, gypsum, and premixed plasters steelworks, mining, chemical, power station sectors etc.

- ❖ CS loading bellows: these are used to load bulk materials, in powder or small lumps, from a silo or installation, onto a generally closed vehicle (lorry or rail wagon);

- ❖ CSM loading bellows: these are used to load abrasive bulk materials, in small lumps, from a silo or installation, onto a generally open vehicle (lorry or rail wagon) or discharged at a yard.

 **GAMBAROTTA**[®]
S.R.L. G.M.B.H.
GSCHWENDT
Advanced Conveyor Technology



Strategic design gives UBC cement carriers a built-in advantage



United Bulk Carriers (UBC), located in the Philadelphia suburbs in the USA, is a member of the Hartmann Group (Germany) and a renowned commercial ship manager within the maritime industry. Since its present-day inception in 2001, UBC has maintained commercial management of a versatile fleet serving as a popular carrier for major cement companies in the Caribbean and worldwide.

UBC's fleet is comprised of Handysize bulk carriers that are trade focused on the Caribbean while their pneumatic cement carriers trade worldwide. In 2017, UBC's Handysize fleet carried over 500,000 metric tonnes of clinker within the Caribbean while the pneumatic cement carriers serviced regional cement trades in Europe, the Far East, Australia, and the Caribbean. The Handysize bulk carriers consist of three classes of ships each with a series of sister ships, ranging from 24,000dwt up to 38,000dwt, known as the B-Class, S-Class, and T-Class. The vessels are box shaped holds that are double skinned with cranes and grabs to service all holds.

The entire fleet of bulk carriers at UBC

are fitted with Class-approved cement holes in the hatch covers. The pre-existing cement holes are designed for loading operations conducted by shore piping systems and can be connected quickly on vessel's arrival to the berth, providing quick turnaround time in port. The closed loading system also facilitates a reduction in dust creation which is a special consideration in many environmentally sensitive areas.

The foresight in the design plan of the

dry bulk vessels has continued UBC's strong appeal as a preferred cement and clinker carrier. Each Handy bulk carrier is equipped with cranes and grabs which have proved to be a valuable investment for the shipowners especially in remote ports that otherwise do not have means of cargo handling.

The bulk carriers were built with MacGregor hydraulic folding hatch covers, an asset in minimizing interruptions to cargo operations for opening and closing



the hatches and eliminating the otherwise clumsiness of pontoon hatch covers.

Another quality that sets UBC apart is the thorough training by vessel's seamen at the Hartmann Group crew training facilities. The well-trained crew are specially trained in handling, cleaning, and the self-loading and self-discharging of cement cargoes. Cleaning a vessel after loading a cargo of cement or clinker can be problematic if the cargo comes in contact with water/high humidity or if vessel's subsequent cargo requires grain cleanliness hold conditions. However, with the proper materials and equipment, the vessel's crew minimizes the amount of idle time necessary between cargoes to remove residues from even the highest and hardest to reach crevices of the vessel's cargo holds.



of six vessels, three 8,400dwt vessels and three 15,000dwt vessels. As UBC's C-class is typically traded on period time charterers, vessels and owners make no hesitation in modifying the vessels as required to fit the charterer's trade. Each

vessel is equipped with the capability and ability to make modifications to loading/discharging manifolds in order to become compatible with shoreside facilities. UBC and the technical managers, Intership Navigation of Cyprus, have also made additional modification to the C-Class such as noise dampening

trade. A notable project that the UBC C-Class has assisted in is the carriage of cement from the US to Panama for the construction of a hydroelectric plant dam in Panama.

Again, the success of the UBC vessels begins at the yard with intentional and strategic ship design. Three holds, serviced by a screw conveyor system function as the backbone of the vessel's MacGregor Nordstroms pneumatic cement handling system. With the capability of up to 600tph (metric tonnes per hour) pneumatic load or discharge through two lines vessels are able to minimize time in port, a critical asset to maintaining cement plant production schedules.

With a first-class reputation in the shipping industry for the carriage of cement and clinker cargoes and the experience to match, it is no wonder that UBC has such a strong reputation among its customers and competitors alike for its consistent and prominent presence in the cement industry.



The pneumatic cement carriers of UBC, also known as the C-Class, are comprised

equipment, master pilotage certification, labor requirements to fit the charterer's



Environmental considerations foremost with Bedeschi equipment

In 1992, the UN introduced the concept of 'sustainability', defined as 'Development that meets the needs of the present without compromising the ability of the future generations to meet their own needs'. Work for a sustainable development is required to operate on three different levels: economic, social and environmental. It is clear that ports have a responsibility towards the environment and that port governance should take care of effective logistics and operations.

While in the past, environmental safeguards were not an issue, nowadays ports worldwide consider the prevention of pollution a primary objective, especially with import/export of dry bulk cargo (cement, coal, grain, iron ore, fertilizer, etc...). In this case, the risk of spillage and dust production is very critical. Problems can occur during loading or unloading operations, but also if the material needs to be stored in the port zone.

To achieve a reduction in emissions, the first step could be the use eco-friendly bulk handling equipment. Bedeschi, thanks to its research and development in green technology, is able to design and produce machines, which incorporate sophisticated dust control measures, able to reach the highest environmental standards.

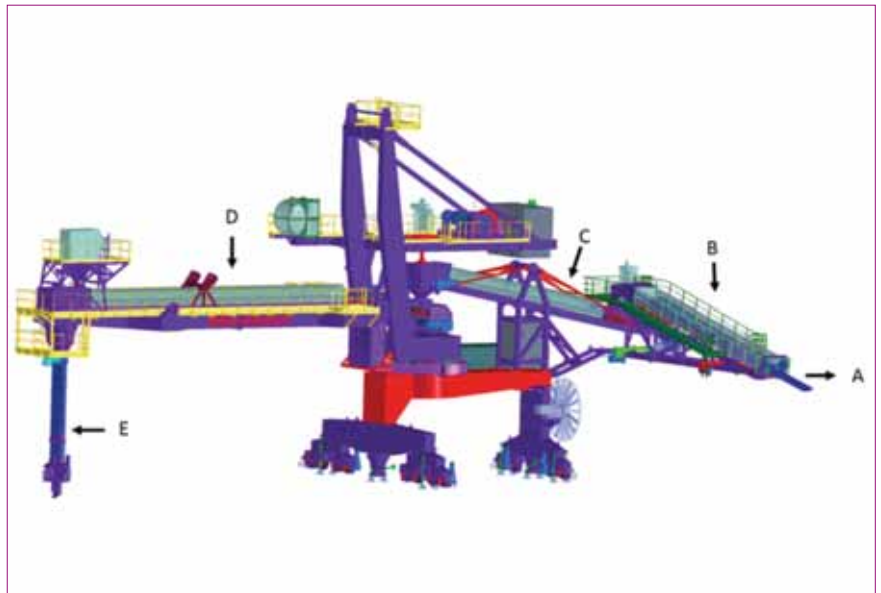
In this article, we will examine different devices used by Bedeschi to reduce dust emissions during bulk material loading operations.

The standard flow sheet of a shiploader (see graphic, top) generally include the following portions:

- A. A longitudinal belt conveyor installed on the dock.
- B. A tripper lifting the longitudinal belt conveyor installed on the dock.
- C. A connection belt conveyor between the tripper and the conveyor installed on the shiploader boom.
- D. The shiploader boom conveyor.
- E. A loading chute to distribute the material in the cargo hold, that could be telescopic, trimming, slewing and/or tilting.

FOR PORTION C:

- ❖ The positioning of the connection conveyor in an enclosed gallery.
- ❖ The belt conveyor could be equipped also with closed canopy.
- ❖ The belt speed is kept slow.
- ❖ If the conveyed material contains a high level of fine dust, instead of a connection rubber conveyor, a chain conveyor or a screw conveyor completely sealed can



be used.

FOR PORTION D:

THE SHIPLOADER BOOM COULD BE EQUIPPED WITH:

- ❖ Belt conveyor closed into the gallery and rubber belt protected with canopy.
- ❖ Loading and discharge points could be dedusted with bag filters or water spray systems.
- ❖ The entire gallery could be maintained in light air depression, to avoid the escape of fugitive dust.
- ❖ Alternatively, a chain conveyor or screw conveyor, completely sealed, could be used.

FOR PORTION E:

The choice of the chute depends on the material's fragility, especially for the pelletized or briquetted types that are easily broken.

Bedeschi dedicated special attention and in-depth studies to the loading chutes, that can be collected as follows.

1. Telescopic chute with tiltable hopper

to better control the flow. Very low environmental impact, suitable for dusty product. The telescopic chute is an ideal solution to prevent the problem of breaking particles and to minimize dust generation when loading bulk material. The design of telescopic chute ensures that material particles are kept in mass flow form and at low velocity. In fact the internal lining of the module cones minimizes the liberation of dust particles without affecting loading rates. The extraction system, represented by the top boom filters, guarantees a perfect vacuum atmosphere into the vessel hold, preventing any dust emission.

Due to the minimal free-fall and the low velocity that the material experiences, greatly reduced material degradation is evident when loading sized product.

2. Spiral Chute: Loading spiral chute to allow the loading of the vessel, so that the material does not have to fall from a great height. This, on the one hand, limits the dust production and on the other side keeps the chemical property of the material unchanged. The loading speed is controlled by the diameter and inclination of the spiral chute.

3. Trimming chute, slewing and tilting, very good filling of holds, minimum impact on the environment depending on the type of product. Suitable for low density products. The final part of the chute, which can be oriented inside the cargo hold, allows for the perfect filling of the vessel. The material is compacted inside the chute, ensuring a compact flow and avoiding the separation of the dusting part from the granular one.

SHIPLOADER WITH SCREW CONVEYORS

After describing from the technical point of view, the different quay technologies to reduce polluting emissions and guarantee a reduced environmental impact, according to the highest international standards, here follows details of two projects where Bedeschi developed specific technologies to fulfil these requirements.

SÖNMEZ, A TAILOR-MADE SHIPLOADER

Sönmez Çimento improved its export capability by constructing a new port at the Yumurtalık TAYSEB freezone in Adana, Turkey. Designed with both high loading

rates and the environment in mind, using the new facility the company expects to increase its cement and clinker exports to the rest of the Mediterranean, Africa and South America.

With a 5000tpd (tonnes per day) clinker and 2mtpa (million tonnes per annum) cement production capacity, Turkey-based Sönmez Çimento is a key producer in the eastern Mediterranean region. Its plant enjoys a seaside location at Yumurtalik TAYSEB freezone, Adana, which enables the company to export 85% of its output to the rest of the Mediterranean as well as Africa and South America.

To improve the flexibility of its exports and increase loading rates, the cement producer decided to establish its own port, Sönmez port, with a handling capacity of 2mtpa. The facility is directly connected to the cement plant by a 1.3km-long jetty, which includes conveying lines and truck lanes. The 200m-long and 30m-wide piled jetty contains two berths with draughts of 14m and 10–11m, respectively.

Sönmez Çimento, which is close to raw material resources with 230 employees, is the first cement plant in Turkey that has been allowed to be built into free zones. In addition to this, the plant that has a

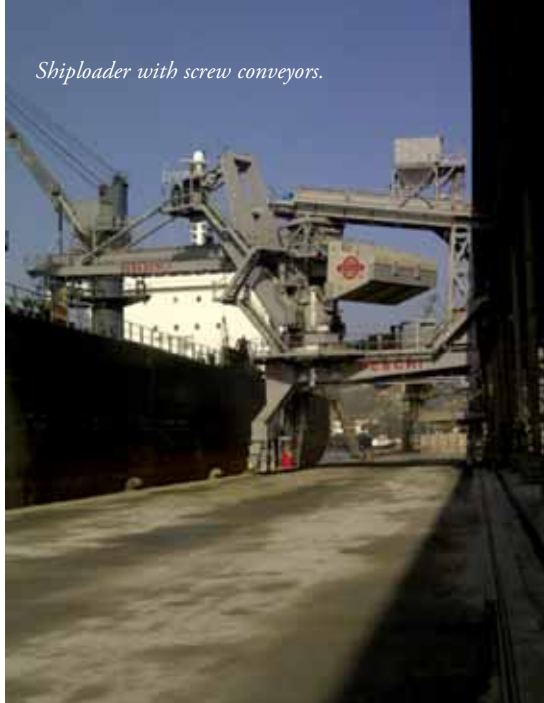
distance of 4.5km to port renders the best service to its customers by using this advantage.

Sönmez is a tailor-made shiploader, conceived, designed and manufactured for Sönmez Çimento by Bedeschi to optimize the available space on the new jetty client. The shiploader has been fully customized to meet the needs of this important customer. The high-capacity system is designed for clinker and cement.

Only a few years after the installation of the two shiploaders complete with trippers and a mobile hopper with feeder and conveyor for Yesilovacik port in Turkey, the latest evolution of the Bedeschi shiploader has been installed for Sönmez Çimento at Adana port.

The shiploader is able to reduce the dust emissions, thanks to careful design and the use of latest-technology. The fully automated shiploader boasts a proven design offering state-of-the-art Bedeschi engineering excellence. Every day Bedeschi

Shiploader with screw conveyors.



strives to improve efficiency, transparency in order to maximize the research and development of detail and give the right solution to its customers, resulting in saving time and money for them.

The Bedeschi shiploader has a rail span of 10m with 18.5m boom extension. The length of the tripper conveyor on the docks is 110m.

All electrical equipment has been

DIGGER

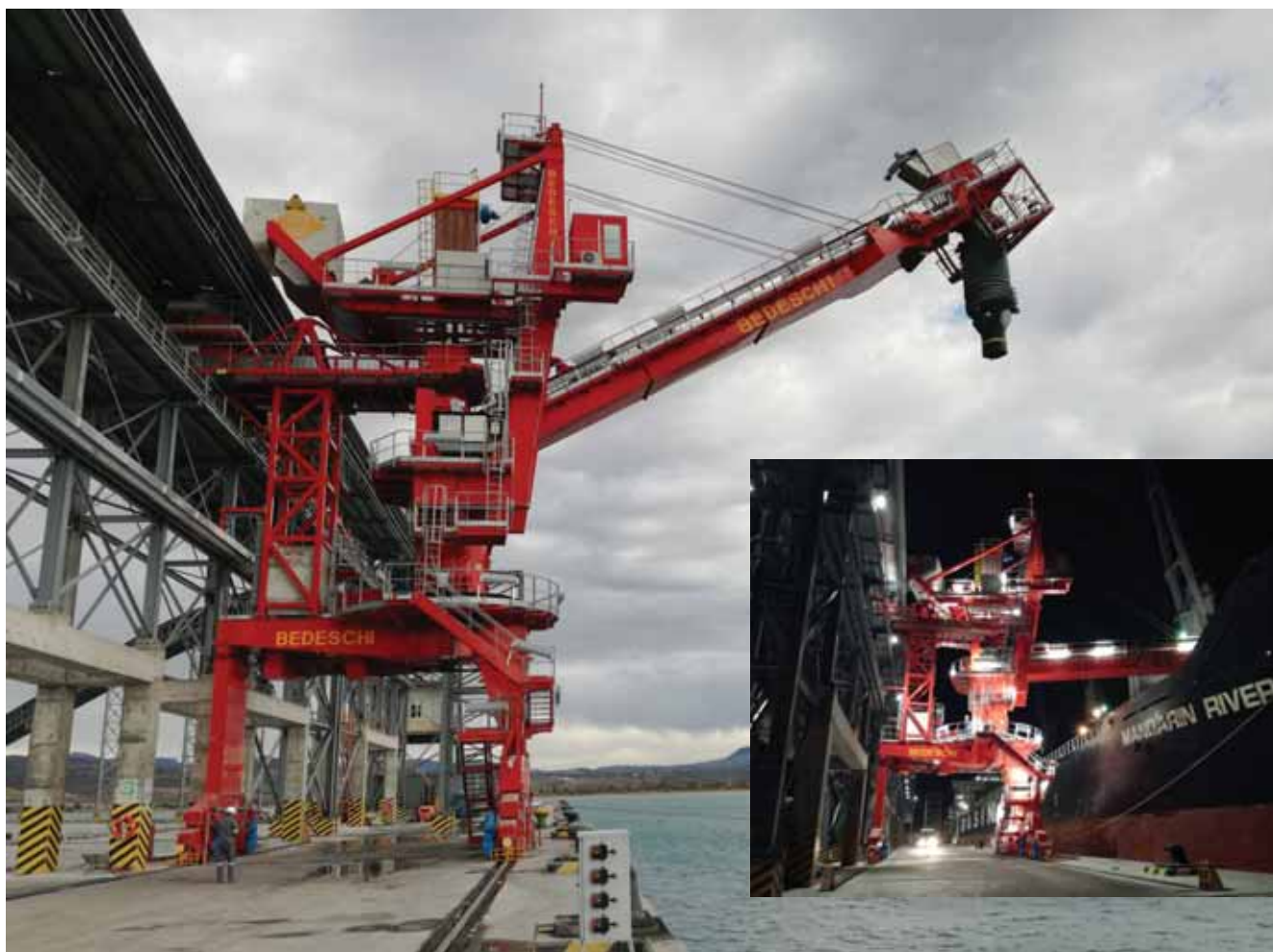
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DATA ON SOMNEZ SHIPLoader AND DOCK CONVEYOR

Vessel size	30,000 to 56,000dwt Handymax
Operation:	Automatic
Rain span:	10m
Restricted available width to operate on jetty	12.9m
Dock length conveyor:	110m
Material (s) handled:	cement and clinker
Annual tonnage handled	700,000 tonnes
Bulk density:	0.9 to 1.35 tonnes/m ³
Particle size, typical:	0–50 mm
Characteristic of material:	Abrasive
Material temperature:	110 °C
Loading capacity:	1,100tph

article confirming its great satisfaction and Bedeschi reliability as supplier.

Bedeschi is very proud of this; since 1908, the company's mission has been to provide reliable and innovative solutions for its customers creating a longlasting relationship.

A NEW CLINKER EXPORT TERMINAL FOR VASSILIKO CEMENT

Another specific project is based in Vassiliko (Greece), quoted as an example of alternative technology related to the information above, since it's a rubber mounted shiploader demonstrating the fact that Bedeschi is able to understand

provided to IEC IP65/66 standards with all steelwork painted to a marine specification for corrosion protection. A cascade chute with cones has been installed with lining in ceramic and pivoting interface. All the latest technologies has been used to ensure safety and control during operation.

The design of the port focused primarily on high loading rates and reducing the facility's environmental impact. For instance, all can operate within a dust emission limit of 10mg/Nm³. In addition, the pipe conveyor minimizes dust formation at the transfer point.

The client has recently published an



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client's requirements and to offer high-level engineering solutions.

For Vassiliko Cement Plant Bedeschi realized ten years ago a circular limestone storage. Recently, Bedeschi has won a contract to develop a clinker export terminal. The system will be installed in the port terminal of the cement plant equipped with a shiploader on tyres and with a surface feeder. The trucks arrive on the dock, and discharge the material on the surface feeder directly connected with belt conveyors to the shiploader. The entire

system moves along the quay to optimize the loading of the vessels. The capacity is up to 550tph, and it is possible that this will be increased to 800tph in the future.

Because of the need to respect the port environment, Vassiliko opted for a receiving track surface feeder. This is a closed system with cover closed and negative pressure. No dust is emitted during the unloading activities, and the belt has a low speed. The chute drop is limited, so that it is not too high. The unloading chute between surface and belt has negative pressure.

CONCLUSION

Investments into eco-friendly and innovative equipment are unavoidable for the complete port environment. Because the port's infrastructures — which consist 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, taking care of all the pollution aspects and able to guarantee the perfect filling of the vessels cargo hold.

DCi





TAKRAF systems add value to bulk processes



TAKRAF's underground material handling system in Indonesia delivering 8,000tph of primary crushed ore (source: TAKRAF)

More than a century after their invention, belt conveyors remain a key element in delivering bulk material to the process and production of products and material that feed the world's burgeoning economies. The technology has evolved significantly throughout the 20th century and continues developing to keep pace with the demands of the 21st century. Today's belt conveyor systems are capable of continuously transporting high volumes of material efficiently over long distances and challenging terrains negotiating through curves and rough relief areas. Recent conveyor installations have exceeded 20km in length and have had multiple thousands of tonnes per hour in capacity, and up to 25 megawatts in installed power. Although generally having greater initial capital costs, these systems are able to recover them through significantly less operational costs

stemming from the higher quantities of material moved, energy efficiency, reduced labour requirements, higher availability and lower maintenance demands. Furthermore, they provide increased levels of safety and smaller environmental footprints.

Globally respected materials handling and minerals processing systems supplier, TAKRAF, part of the Tenova group, boasts a significant portfolio of diverse and unique references across an assortment of applications; from in-plant conveyors to large scale sophisticated systems with conveyors as the backbone. Three case studies demonstrate its broad spectrum of notable conveyor applications.

OVERBURDEN REMOVAL

In surface mining, the ore body is typically buried beneath overlying soil or rock layers that

need to be removed, transported and deposited at a location some distance away. Handling such overburden or waste material, that has no value, dictates it be conducted as quickly and efficiently as possible. This requires moving very high capacities that only conveyors can accomplish at reasonably low costs. Adding to this challenge is the consideration that must be given to system design for a number of important reasons. On many occasions it is minimizing community impact and environmental regulations that ultimately call for the re-cultivation of the impacted areas.

A waste or overburden removal system in hard-rock typically consists of a crushing station that feeds conveyable size material to an overland conveyor arrangement that brings it to a stacking facility at the deposit zone. Vast amounts of this overburden

TAKRAF'S WASTE MATERIAL HANDLING SYSTEM IN MEXICO

Item	Belt width (mm)	Speed (m/s)	Length between centres (m)
Overland conveyor	1,829	5.6	1,865
Downhill conveyor	1,829	5.6	3,454
Extendable head conveyor	1,829	5.6	3,040
Shiftable dump conveyor	1,829	5.6	1,000
Intermediate spreader conveyor	2,134	4.2	75
Spreader boom conveyor	2,134	4.2	58

must be placed, often in layers, in a continuous operation over a very large area. High capacity extendable and shiftable conveyors are required along with mobile machines that only shut down for short periods of time to relocate or extend. When the waste removal stops so too does the production of ore.

An open pit copper and gold mine in Mexico was looking for a solution to move approximately 55mt (million tonnes) of waste material per year. TAKRAF designed and supplied a material handling system with overland conveyors and stacking equipment with shiftable and extendable conveyors. The system boasts a capacity of 12,000mtph (metric tonnes per hour) and consists of an extendable conveyor with a self-propelled crawler mounted drive station, a shiftable conveyor with self-propelled crawler mounted tripper car, and a crawler mounted slewable spreader.

Commissioned in 2013, the conveyors have substituted the numerous heavy haul trucks that would otherwise be required, travelling many kilometres daily, half of the time empty, and burning diesel fuel around the clock. This system requires a vastly smaller labor force to operate and maintain with the majority of servicing conducted during pre-scheduled shut downs. The result is that getting the waste rock out of the way has caused very little impact to the planned production of the mine. Operation for the past four years has demonstrated both exceptional reliability and efficiency.

MOVING AND DELIVERING MATERIAL UNDERGROUND

With near surface orebodies diminishing, existing mines have to adjust their approach to meet the changing requirements of an ageing mine. For many, the alternative is closure or shifting the mining operations to below the surface.

In Indonesia, an underground material handling system was recently commissioned to deliver 8,000mtph of primary crushed ore from a new block cave to existing mill facilities above ground (see picture on p103). The project included six underground conveyors with a total length of 4,075 metres and an overall vertical lift of approximately 500 metres. The design, undertaken by TAKRAF's USA office, incorporated 6,000 installed horsepower per conveyor flight. At full capacity, the mine operation is capable of processing up to 240,000 tonnes a day.

Another significant project currently being undertaken by TAKRAF Germany concerns the supply of a highly sophisticated belt conveyor system for a critical underground project in Chile. A highly innovative belt conveyor scheme will overcome a number of technical challenges including significant elevation change from the underground mine to the surface, and will comprise steep uphill tunnel conveyors that transport copper ore from underground storage bins. The arrangement will also include a number of feeder conveyors as well as an overland conveyor feeding into an existing conveying system.

The conveyor system will employ state of the art gearless drive technology with the tunnel conveyors boasting the highest power ever to be installed on a single belt conveyor. Gearless drives do not use a gearbox but only a variable speed motor having high torque throughout its speed range. With the challenges of limited space and accessibility and steep grades, the gearless solution is the main reason such a system can be achieved. The high power for each drive permits longer flights. Meanwhile, they have a smaller footprint and reduced maintenance and increased efficiency and reliability without a gearbox.

Safety, as well as the ease and speed of maintenance are also critical success factors for operating high capacity conveyors underground. TAKRAF has developed an innovative solution that allows for regular chute maintenance to be conducted from the outside with no one having to enter into the chute.

Another significant achievement will be the installation of the newly developed ST 10,000 steel cord belt on the tunnel conveyors. This will mark the world's very first conveyor system to employ this highest rated steel cord belt technology. Additionally, with its 10,000mtph design capacity and total installed power of 55MW the system will include a complex cooling system to manage and dissipate the intense heat generated within the confined spaces underground.

PIPE CONVEYORS AND THEIR LOW ENVIRONMENTAL IMPACT

Introduced in the 1970s, the pipe conveyor has evolved as a solution for many of the drawbacks of the conventional troughed belt. Interactions between the environment and conveyed material (such as dust emissions and water absorption/contamination due to rain or snow) are eliminated by encapsulating the material while in transportation.

Further to the advantages of enclosing the material, pipe conveyors can have horizontally curved alignments which allows for elimination of transfers thereby less emissions points, not to mention lower maintenance requirements. Although TAKRAF has successfully developed curved trough conveyors for high capacity overland conveyors, the radii can be much smaller for pipe conveyors which is advantageous for negotiating facilities within a plant without the need for a lot of transfer stations.

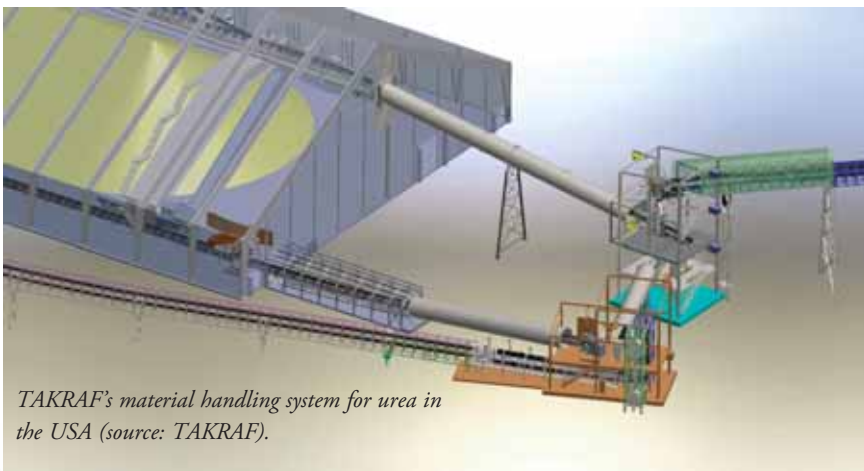
In a typical application for this type of conveyor, TAKRAF recently supplied a material handling system for a new urea

TAKRAF's material handling system for waste material in Mexico with overland conveyors and stacking equipment (source: TAKRAF).



plant in Enid, Oklahoma. The system provided consists of five pipe conveyors, three troughed belt conveyors, one surge bin, one portal scraper reclaimer, and one truck/train load out station.

TAKRAF pipe conveyors are employed in this plant to handle material that is extremely sensitive to contamination and in several instances curved alignments allow for a more compact plant layout. In this layout parallel pipe conveyors deliver material from the fertilizer plant to a 550-tonne-capacity



TAKRAF's material handling system for urea in the USA (source: TAKRAF).



Direct drive assembly with TAKRAF-designed motor base frame and ABB direct drive motor (source: TAKRAF).

ABOUT TENOVA

Tenova, a Techint Group company, is a worldwide partner for innovative, reliable solutions in metals and mining. Leveraging a workforce of over three thousand forward-thinking professionals located in 22 countries across five continents, Tenova designs technologies and develops services that help companies reduce costs, save energy, limit environmental impact and improve working conditions.

DC:

bin. From there, another pipe conveyor distributes it to either a storage dome or new stockpile. The 90,000-tonne enclosed stockpile is loaded via a travelling tripper car and reclaimed by a TAKRAF portal scraper machine. The reclaimed urea is transported via a reclaim conveyor and another pipe conveyor to a truck/train load-out station. At this load-out station, rail cars or trucks are loaded in an automated single batch system utilizing weigh bins, knife gates, and shuttle conveyors.

These examples of TAKRAF's recent projects demonstrate how conveyor technology has advanced to meet the current demands and challenges of delivering material needed to produce the equipment and products that feed and enhance the world's economies. The limit of the concept has not yet been reached and more is yet to be found to advance it further. It will be interesting to see what develops next.

ABOUT TENOVA TAKRAF

Tenova TAKRAF is an integrated solutions provider to the global mining, bulk material handling, minerals processing and beneficiation industries, offering innovative technological solutions as well as process and commodity knowledge along the industry value chains. With the integration of the well-known DELKOR and, more recently, the Tenova Advanced Technologies (formerly Bateman Advanced Technologies) brand of products into TAKRAF, the company's portfolio for the mineral processing and beneficiation sectors has been considerably enhanced.

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VIGAN

celebrating 50 years of history

VIGAN team in 2018 in front of two NIV cabins with filter.



Founded in May 1968, the Belgian company VIGAN designs and manufactures a complete range of pneumatic and mechanical conveying systems for products in bulk. VIGAN not only supplies equipment, but also manages complete turnkey projects.

Thanks to his in-depth knowledge of helicopters 50 years ago, Stany Hage implemented the technology of aircraft engines to industrial devices intended for the transport of granulated products. This was a revolution in ship unloading! He created and designed the turbo blower (three stages) and the first airlock (75L), hoping to create a machine that would be able one day to convey 80 tonnes of grain per hour.

The same year, with technical evidence and drawings in hands, he succeeded in selling his first machines to the

Netherlands. With the proceeds of this order, he built up a prototype, and on 15 November of the same year, a delegation came to inspect the machine that successfully reached a capacity of 60tph (tonnes per hour)!

Since then, VIGAN has delivered and commissioned around 1,100 portable grain pumps, with capacities up to 250tph depending on the model chosen.

In 1976, VIGAN enlarged its product range by developing the first 'NIV'-type pneumatic ship unloader type. NIV is simply the contraction of Nivelles, the Belgian city where VIGAN is located.

The first NIV was a NIV 160 pneumatic unloading machine equipped with a four-stage turbo blower, a 160kW motor and an airlock of 120L. The machine was also equipped with a 15m-long boom for the discharge of 55,000dwt ships. VIGAN's

pneumatic ship unloaders now offer capacities of up to 800tph.

In 1988, the company was bought by the Beauduin family, a family of Belgian industrials, and has been included in a Belgian consortium of several companies: the group Vandewiele. Since then, the company has invested continuously in new technology, materials and in qualified labour to be well prepared for further international growth.

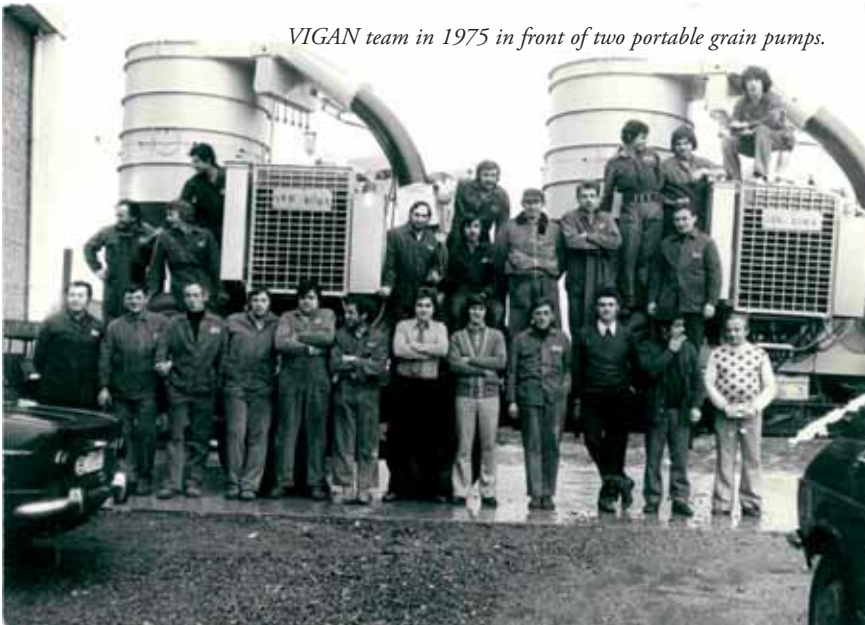
In 1992, VIGAN commissioned its first shiploader for GSFMO (now Sago) in Saudi Arabia (Yanbu). The loader was designed to load grains at a capacity of 300tph. Currently, shiploading devices installed by VIGAN reach up to 2,000tph.

In 2006, VIGAN built its first terminal for SDTV (Société Djiboutienne de gestion du Terminal Vraquier), for which the company delivered various types of

One of the first VIGAN machines.



VIGAN team in 1975 in front of two portable grain pumps.



equipment, like pneumatic ship-unloaders, conveying systems, bagging stations, warehouses, and so forth. Ten years later, VIGAN is proud to have received a new order for an additional grain and fertilizer terminal for the Port of Djibouti.

In 2007, VIGAN bought the company

ASC in United Kingdom, and added mechanical ship-unloading technology to its expertise, by the manufacturing of the 'SIMPORTER' product range.

This acquisition was followed in 2008 by the opening of a local office in Algeria, in order to offer quick and efficient technical



support to its numerous clients in the country, where more than 150 portable grain pumps and 40 ship-unloading gantries have been installed by VIGAN since its creation date.

At the end of April this year, VIGAN celebrated its 50th anniversary!

It was also a great opportunity to inaugurate the company's new big assembly hall, adding not less than 2,000m² to its existing 10,000m² factory in Nivelles.

The complete pre-assembly of all ship-unloaders and loaders is essential to guarantee quality and to prepare the future commissioning of the equipment at the customer's site. VIGAN confirms its strategy of controlling the value chain from A to Z in its own facility by its own qualified and experienced workforce: engineering, manufacturing, pre-assembly and testing, erection and commissioning, and finally after-sales support.

VIGAN has recently added a lifting capacity of up to 50 tonnes to its factory, which will allow the erection of ever bigger machines.

Since it started doing business, VIGAN has sold more than 1,350 machines in around 100 countries worldwide.

The whole VIGAN team is keen to say 'thank you' to all its customers!

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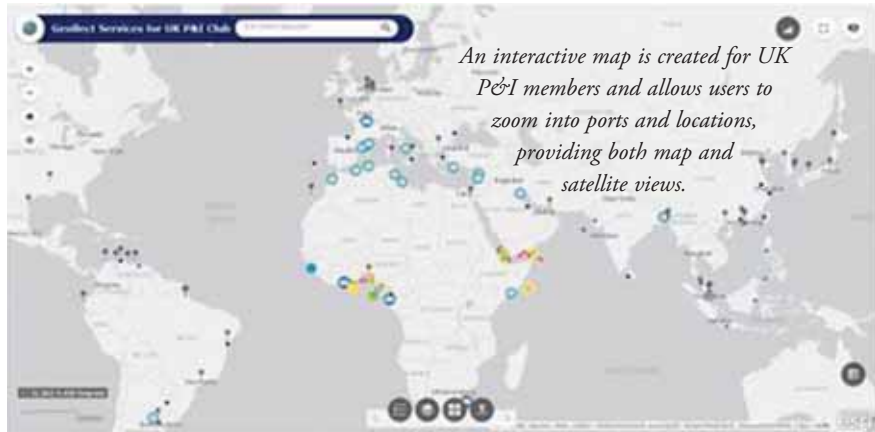
UK P&I Club joins forces with Geollect to give members valuable geospatial data

The loss prevention team at UK P&I Club has announced it has been working with Geollect, the UK and US based Geospatial Intelligence Company, to provide its members with cutting-edge data feeds with geospatial analysis, providing essential information on ports and locations across the globe.

Geollect creates proprietary, dynamic algorithms within user-friendly software to deliver a new form of timely and actionable intelligence. The data is collated from satellite imagery, social media updates, intelligence data, geospatial data and the Club's own information to build up a complete picture of worldwide maritime incidents and alerts.

As well as listing collision areas, live incident reporting, infrastructure repairs to port areas and the latest piracy reports, the map also links to UK P&I Club's 'Lessons Learnt' experience, allowing users to click from the portal through to more thorough information on the Club's website.

George Devereese, Senior Loss Prevention Executive, UK P&I Club, said: "We believe there is a compelling need within maritime risk to modernize and fuse disparate reporting mechanisms. Visualizing the political atmosphere on top



of port infrastructure and activity layers via geospatial data services can provide insights into the risks associated with each specific port and the Club is aiming to create the most extensive incident and information resource within the P&I industry.

"Incorporating Geollect's data and information will give us an operational advantage over our competition, as well as providing us with lower operational risk and increase efficiencies. This is just the start for us and we will look to our members to let us know what other information will be useful."

Cate Gwilliam, CEO, Geollect said "The

key to our success has been our agility and ability to adapt to the customer requirements, this has only been possible through the strong relationship we have built with UK P&I.

"Our products have wide application across government and commercial sectors, our niche is in the maritime sector encompassing shipping, insurance, energy, infrastructure, safety and security. The Geollect team is committed to remaining at the forefront of any and all geospatial technological advances to ensure our clients and partners receive the most effective and cost-efficient support and services."

United Nations Global Opportunity Report recognizes Cavotec solutions

Cavotec's MoorMaster™ automated mooring technology has been included in the 2018 *UN Global Opportunity Report* that highlights how "innovative technologies are making genuine progress towards a more sustainable world."

The report is compiled by the United Nations Global Compact, global quality assurance and risk management company DNV GL, and sustainability advisory group and digital studio Sustainia. It aims to encourage progress towards the achievement of the United Nations

Sustainable Development Goals (SDGs).

This year's report features the world's first combined wireless induction charging and automated mooring system, developed by Cavotec in partnership with Finnish group Wärtsilä. The system was successfully tested in September last year with a Norled hybrid passenger ferry, representing a breakthrough in the evolution of fast charging for electrical vessels.

"The vacuum-based automated mooring technology allows the ship to

dock precisely so that the wireless induction chargers can boost the ship's batteries in port. This in-port electrification has the potential to reduce greenhouse emissions of the maritime transport sector, which currently accounts for around 2.5% of global emissions," the report says.

According to the authors of the report, one third of all ships will be battery-powered by 2050 if current trends continue.



Why your port agent needs greater agency in their day-to-day

How and when we work has fundamentally changed in recent years, largely thanks to the accessibility afforded by the smartphone, writes *Lars Fischer, Managing Director of Softship Data Processing Ltd, Singapore, a wholly-owned subsidiary of Softship AG.*

How we consume information, how we communicate with each other or travel to where we need to be is now significantly influenced by our ability to access, manipulate, and document information in all its forms – from anywhere, and at any time. These mobile devices, which are increasingly automated and integrated in their functionality, have infiltrated our lives so much so that most of us would struggle to go about our normal day without our phone or tablet computer. This has its drawbacks, of course, but by-and-large, the benefits brought about by the smartphone revolution vastly outweigh the negatives; particularly for businesses.

KEEPING UP WITH THE TIMES

As such, the ability to work on the move is increasingly important to every business, across almost every industry, as our own behaviours as consumers, partners, suppliers, or customers have changed. We expect to be able to communicate at all hours, to access documentation when and where we need it, or to find a solution to any problem within a few taps of the finger. There is an expected immediacy to business that we all must find ways to work around, now, to compete long into the future.

It is, for this reason surprising that many of the world's ship agents still operate almost exclusively from offline computer systems, disparate sets of spreadsheets and files and often from hardcopy notebooks. In many ways, this lack of connectivity means they have limited agency – the ability to act independently – in how they can go about their business in port.

This matters to ship owners and operators because time in port could be reduced, their costs lowered, and their lives made much simpler just by working with a port agent with the right tools at their disposal, including the ability to work remotely, from any location. FONASBA, the industry association for port agents identified more than 130 separate operations that a port agent may potentially be required to undertake during any port call; and to document, communicate and invoice for. Many of these administrative tasks that ship agents

perform for every port call could be simplified significantly by simply using a more appropriate IT solution, accessible at any time through the cloud on a web-hosted platform.

STREAMLINING THROUGH THE CLOUD

Put simply, cloud computing is the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. A purpose-built cloud-based IT software solution developed specifically for ship agents like Softship.SAPAS, which works through a web browser, enables agents to work faster and smarter. It also provides additional transparency across their operations, minimizes the risk of error or confusion and increases efficiency across the supply chain by automating routine data entry and communications tasks, and integrating information flows across all departments.

For bulk shipowners and operators, there are very important operational safety and insurance benefits to working with a more agile, better equipped port agent able to accurately document tasks in real time. According to the professional indemnity insurance provider ITIC, liner agents' errors or omissions resulted in claims presented to them in excess of US\$13 million over a five-year period. That's only one mutual insurance provider. Most of these claims, ITIC asserts, relate to simple negligence, omission, and human error in administration. In our experience, many of these errors occur during the administrative process, which is both complex and pressured. A digit or two missing in a disbursement account, a simple manifest error; incorrect freight quotation or wrong port information provided can end up costing the agent considerably, and irrevocably damage their relationship with principals.

For example, verifying the condition of the cargo, recording measures taken to decontaminate cargo holds or engage the relevant port authorities are all done in person, whilst the agent is in port, and working directly with the ships' master. One significant mistake in reporting the interaction and measurements could have significant ramifications in a bulk supply chain, for example, if a vessel is held or cargo damaged. If the agent has to wait until they get back to the office to type up their notes from hours earlier, this risk is certainly amplified. Such errors in any

organization are to be expected – humans are, after all, inherently flawed creatures; but these mistakes can be avoided with the right IT solutions, and the ability to work on-the-go.

FUTURE-PROOFING SUPPLY CHAINS

Our ship agency clients understand by using the Softship.SAPAS platform that the prospect of long costly wait times in port is greatly reduced because they have a cloud-based solution that gives them the capability and confidence to complete port-side tasks, from any device and at any time of the day, efficiently. Port agents can access Softship.SAPAS by simply logging in to the software through a mobile phone or tablet where they can manage all port call processes through a simple, organized and easy to use platform.

As the dry bulk segment continues to benefit from relatively positive sentiment, it is critical that every opportunity is taken to modernize, improve and future-proof shipping supply chains. This means embracing the advantages provided by cloud-solutions, promoting transparency across operations, and making a concerted effort to improve the bulk shipping supply chain.

Lars Fischer is Managing Director of Softship Data Processing Ltd, Singapore, a wholly-owned subsidiary of Softship AG, provider of shipping software solutions.



For intralogistics of the future: mounting components protect self-driving transport systems

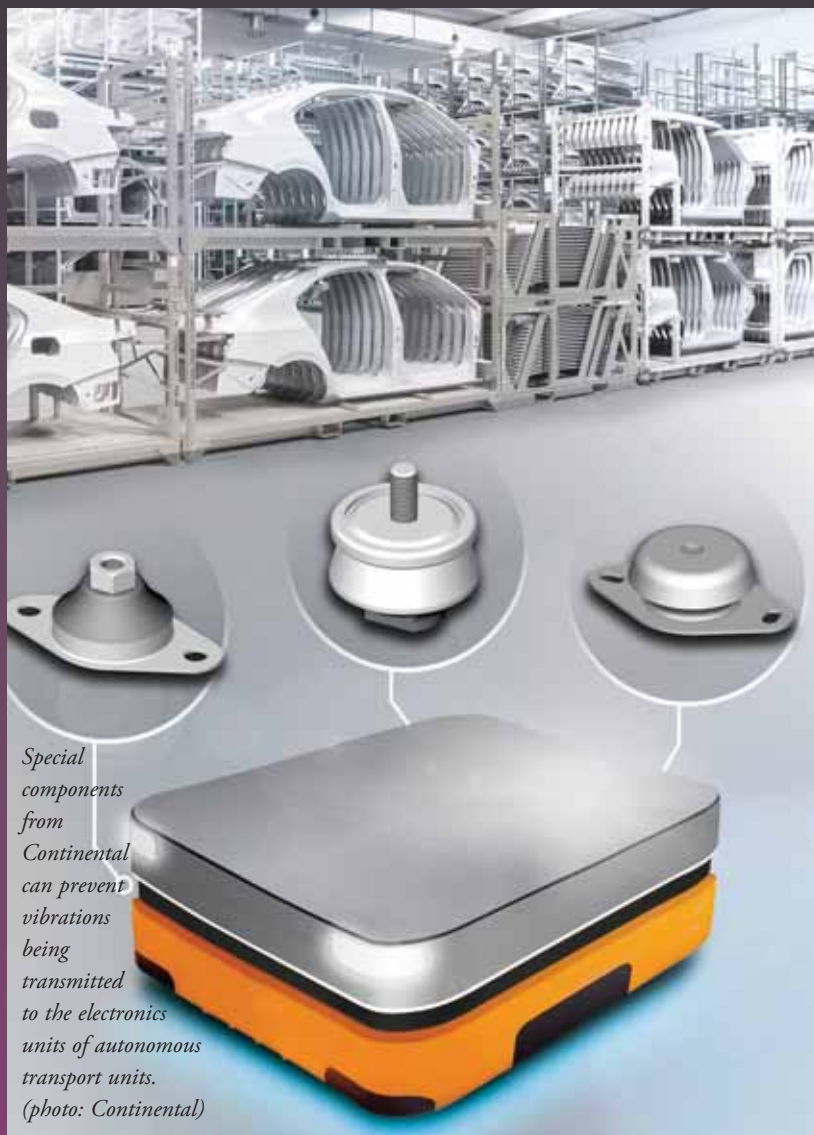
SELF-DRIVING TRANSPORT PLATFORMS INCREASE FLEXIBILITY IN THE FLOW OF GOODS AND MATERIALS

ELASTOMER-BASED MOUNTING COMPONENTS PROTECT SENSITIVE SWITCHGEAR UNIT

CUSTOMIZED SOLUTIONS ALSO POSSIBLE

Digitalization, automation and robot technology are gaining ground in intralogistics as well. In the factories and logistics centers of the future, intelligent, autonomous systems will take on the task of transporting products between the different work steps, right through to final storage. The predominant trend is toward self-driving platforms that, for example, replenish production robots and machines at the right time and move independently around the area. They therefore fulfill crucial criteria of modern intralogistics. They ensure fast response times in flows of materials and goods, and, at the same time, even greater flexibility in processes. Continental mounting components ensure dependable operation for the services in question.

When moving across the shop floor, the autonomous transport units will also cope with bumps such as thresholds or minor differences in height. "However, the development of prototypes and practical use have increasingly shown that the switchgear unit of self-driving platforms in particular is a weak point that is sensitive to jolts and vibrations," says Dr. Stefan Narberhaus, head of industrial mounting component development at the Continental Corporation. If vibrations are not cushioned, the electronics may be damaged. Cable tears and line breaks are possible consequences that may bring to a standstill the autonomous transport system and therefore the flow of materials and goods.



VIBRATIONS EFFECTIVELY REDUCED

To prevent unscheduled downtimes and ensure a high degree of dependability, manufacturers are increasingly relying on an additional mounting for the sensitive switchgear unit. Special elastomer-based components prevent vibrations from being transmitted to the electronics units.

Continental offers the appropriate solutions for this. The product portfolio of anti-vibration elements includes mounting components such as rubber-metal components that are fitted at the transition point between the chassis and

switchgear unit. They isolate the sensitive electronics from any vibrations and thus protect them against damage and failure. Another advantage is that the additional mountings can also provide protection for material being conveyed that may be sensitive to vibration.

"In addition to products from our standard range, we can also manufacture customized mounting components in response to customer demand," explains Narberhaus. "We therefore offer tailor-made solutions that are specifically designed for the challenges of the application concerned and the sector in question."

TBA Group presents sophisticated software solutions at TOC Europe 2018

TBA, provider of designs and simulations benefiting ports and terminals globally for over 20 years, is shining a light on the group's software portfolio at this year's TOC Europe event (12–14 June) in Rotterdam, the Netherlands.

PRODUCTS AND SERVICES

Visitors are encouraged to stop by and find out a bit more about TBA's sophisticated software offering, including:

- ❖ Autostore terminal operating system (TOS);
- ❖ CommTrac bulk and general cargo TOS
- ❖ TEAMS equipment control system (ECS); and
- ❖ Autostore warehouse management system (WMS).

Coupled with the renowned design and planning, consultancy and implementation offering, TBA's software portfolio gives the team at TBA Group the unique ability to utilize data analysis across many operational touchpoints to provide a comprehensive and tailor-made service to its customers.

PRESENTING LEADING SPEAKERS IN THE BULK AND CONTAINER INDUSTRY

In addition to exhibiting at the Rotterdam-based event, TBA has several team members that will be presenting at both the TECH TOC conference and the BULK conference:

- ❖ Dr Yvo Saanen, Commercial Director and founder of TBA, will be speaking in the TECH TOC Seminar on the subject

❖ of Operating Smarter on 12th June from 12.30–14.15hrs.

- ❖ Ian Crowder, Head of IT at the Doncaster office, will be speaking in the Bulk Seminar on the subject of Centralised Multi-terminal TOS Systems: the path to Heightened Business Intelligence on 13th June from 14.00–14.30hrs.

- ❖ Dr Mi-Rong Wu, Project Manager with expertise in design and performance assessment in the bulk sector, will be speaking in the Bulk Seminar on the subject of A Systematic Approach to Creating a Data-driven Master Plan for Import Bulk Terminals on 13th June from 16.00 – 16.30hrs.

MORE ABOUT TBA'S SOFTWARE

AUTOSTORE TOS IN A NUTSHELL

Autostore Terminal Operating System (TOS) allows one to control the movement and storage of various types of cargo in and around a container terminal or port.

The system enables the user to make better use of their assets, labour and equipment, plan their workload and receive real-time information that enables cost-effective, improved decision making.

COMMTRAC BULK, BREAKBULK AND GENERAL CARGO TERMINAL OPERATING SYSTEM SOFTWARE

CommTrac is the total terminal operating system (TOS) software package for bulk and multi-purpose terminals handling coal, ores, grain, agri-bulk, general cargo, RO-RO, liquid bulk, marine and more.


CommTrac enables the user to plan, track and manage all bulk or non-containerized cargo, manned/automated assets and people right across their terminal or terminal network — in real time. It gives users the tools, control and management information they need to maximize their operations, profitability, compliance and growth potential — all while reducing risk.

TEAMS IN A NUTSHELL

Automation of terminal operations holds many promises: cheaper and safer operations, less emissions, and better infrastructure utilization. More importantly, automation should guarantee an exemplary performance and a stable operation. However, the high complexity of a real life terminal poses equally high demands on the control of automated equipment.

TBA's TEAMS real time control software plays a crucial role in meeting the promises of terminal automation, and guarantees that equipment is used to its full operational potential.

AUTOSTORE WAREHOUSE MANAGEMENT SYSTEM SOFTWARE

Developed and implemented by TBA's in-house WMS software engineering team, Autostore Warehouse Management System is proven worldwide. Robust and modular, it is easily scalable for small and medium sized warehouse management applications right through to the largest enterprise WMS operations. 

“A man who stops advertising to save money is like a man who stops a clock to save time”

– Henry Ford



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Got it in the bag?



the benefits of bulk bagging

Jay Venter

Bag compactor now also for big bags

In order to process empty bags in as efficient, cheap and environmentally friendly a way as possible, Van Beek designed the bag compactor. From now on, the Van Beek bag compactor will also be able to compact big bags easily.

TECHNIQUE ADAPTED TO BIG BAGS

The operation of the bag compactor is as effective as it is efficient. The screw in this machine compacts empty bags, which reduces the volume by some 60% to 80%. The market asked Van Beek if the bag compactor also worked for big bags. The answer was no, but Van Beek likes to come up with solutions and so set to work on this one. "Big bags are bigger and made of a coarse fabric that is a bit more difficult to

compact," says Joram van der Heijden, sales engineer at Van Beek. "During testing it was found that big bags are in particular more difficult to feed into the screw. To draw big bags into the screw, we devised a technique that exerts extra pressure on the bags and as a result big bags are fed properly into the screw and then compressed."

ADVANTAGES OVER OTHER PRESSES

The bag compactor can be used for compacting plastic bags, jute bags, cardboard bags and combinations of these. Van der Heijden says: "The machine has many different designs. The standard design is a steel-coated version. For bags containing residues of aggressive powders

that come into contact with steel, we have stainless steel versions." For processes in an explosive atmosphere, Van Beek can produce an ATEX version of the bag compactor. By using a chute the empty bags can be fed into a continuous process. The bag compactor can be used stationary, but a mobile version is also possible.

COST SAVING

According to Roel Kneepkens, sales engineer at Van Beek, the biggest advantage of the bag compactor is in the cost saving. "A hydraulic system is not in fact necessary to drive this press, only electricity. As a result the bag compactor is many times more economical and sustainable than a hydraulic press."



BulkSak® Flexible Products Division gives access to order history and reordering

On 6 March this year, Conitex Sonoco USA, Inc., a manufacturer and distributor of flexible intermediate bulk container (FIBC) bulk bags as well as other innovative packaging products, announced the release of a new customer portal to better serve its Flexible Products Division, BulkSak®.

“We are excited to provide our valued customers useful technology to enhance their customer experience,” explains David Monteith, VP of Flexible Products Division at Conitex Sonoco. “We are still committed to providing the highest level of service with designated customer service reps available to field phone calls and email inquiries, but our new portal will allow customers to access current orders and order history as well as easily reorder

within the system anytime, day, night or weekend.”

As part of the new customer portal, an automated email program was established to proactively alert customers of order confirmations and changes to their order status.

The company also recently (30 October last year) announced a new multi-layer barrier bag product line from its Flexible Products Division, BulkSak®:

MULTI-LAYER LAMINATED FILM PACKAGING PROVIDES PUNCTURE-RESISTANT BARRIER AGAINST UV LIGHT, MOISTURE AND OXYGEN

Offered in 20–50kg bag sizes, the high-quality, multi-layer barrier film bag provides

up to ten-colour customizable packaging and comes in a standard 25kg (55lb) size. The construction of the barrier bag provides puncture-resistant packaging against corrosive damage caused by humidity, moisture, oxygen, salt spray, aromas, grease and other airborne contaminants. In addition, an optional one-way degassing valve exhausts air from inside the bag to preserve freshness and maintain quality for products sensitive to oxygen.

“We see an opportunity to offer a competitive advantage to our customers and prospects with this new multi-layer barrier bag,” explains Monteith. “When there is no compromise for quality, these barrier bags provide a means to maintain a brand’s promise to their customer for a quality, delivered product.”

This superior alternative to the multi-wall paper bag, offers a variety of customizable laminated film layers. Composite materials available for laminated coextrusion include high-density polyethylene (HDPE), polyethylene terephthalate (PET), aluminum (AL), nylon (PA), ethylene vinyl alcohol (EVOH) and others available upon request.

As with all its packaging products, Conitex Sonoco offers engineering and technical support.



Starlinger's rPET PP*STAR: a real world star

For many years, the PP*STAR, a pinch bottom bag produced on Starlinger machinery, has been known as a robust and attractive packaging solution for products such as dry pet food, fertilizer, sugar, flour, or rice. Since early 2017, the PP*STAR can be manufactured directly from PET bottle flakes, turning it into the rPET PP*STAR. This sustainable concept has recently been awarded two prizes.

A pinch bottom bag made of woven tape fabric is currently making headlines. It turns out that the rPET PP*STAR, which has been designed for dry bulk goods, is a real world star. At national level, it was first awarded the national Green Packaging Star Award in September 2017. At the international level, the rPET PP*STAR is among the winners of the prestigious international WorldStar Award in the category “Packaging Materials and Components” and on the shortlist for the Sustainability Award. The WorldStar award ceremony took place on 2 May this year in Gold Coast, Queensland, Australia. Bag

manufacturing in a fully closed loop: this is the concept that impressed the jury. While other types of packaging are made from recyclable virgin material, the rPET PP*STAR already consists of 100% recycled material. To be more precise, the bag is made from rPET bottle flakes, without the use of virgin material. Used bottles are turned into bags that are in turn recyclable: a maximum of waste reduction!

This point is also emphasized by Stéphane Soudais, Head of Consumer Bags at Starlinger: “Whereas others only talk about the theoretical recyclability of their product, our product is actually made from recycled material. We are proud that our efforts for an environmentally friendly and cost-efficient bag production are rewarded with such prestigious awards.”

The recycling in a closed loop is favoured by the use of the plastic PET. Through a process known as polycondensation, the original properties of the material can be restored, meaning that a bag can theoretically be recycled indefinitely. The



quality of the material remains the same, and with it the proven break resistance and the bag's suitability for use in food contact.

Well in advance of receiving any prizes, the PP*STAR was known as distinctly environmentally friendly, given that it is a real lightweight. While a three-layer paper bag for 50kg fertilizer weighs about 140–160g the weight of a one-layer rPET PP*STAR is a mere 117g. And that does not only save material, but also transport cost and carbon dioxide because a great number of unfilled bags can be transported on one pallet.

Starlinger: coating and conversion lines for tight cement packaging

Starlinger is well-known as a machinery manufacturer which offers a comprehensive portfolio for the production of woven bags: tape extrusion lines, tape winders, circular looms, coating and laminating lines, flexographic printing lines and sack conversion lines. In addition, the company supplies testing and laboratory equipment for quality control as well as recycling machinery for post-consumer and post-industrial plastic waste.

Starlinger sells its machines worldwide to a wide range of customers; its main clients are packaging producers that supply the construction and building materials industry (e.g. cement, lime, gypsum), but also producers of chemicals or food.

To date, over ten billion AD*STAR® block bottom valve sacks are produced on

*Starlinger's AD*STAR® block bottom valve sacks.*



Laminated fabric makes a good impression.



Starlinger machinery every year in more than 150 production plants. Customers value the sacks' extreme resistance to breakage coupled with a low deadweight; they are exceptionally tight and ideally suited to use on automatic filling lines such as high-speed roto-packers. The sacks can be stacked neatly due to their uniform shape and therefore take up little floor space. This article will introduce the machinery that Starlinger offers for fabric coating and sack conversion, as these production steps are instrumental in producing tight packaging for cement.

COATING AND LAMINATING LINE lamiTEC

Woven packaging is often coated or laminated to protect the product from dust or moisture; moreover, coated fabric has

excellent printing properties. For this purpose, Starlinger offers the coating and

High quality sacks have advantages in handling and storage.



laminating line lamiTEC, which can be used for a variety of woven plastic fabrics: flat or endless tubular fabric, standard woven sacks, AD*STAR® cement sacks, as well as technical fabrics made from polypropylene (PP) or high-density polyethylene (HDPE). The lamiTEC series was developed in 2013; in April 2018, the 100th machine of this type left the Starlinger factory and set course for Asia.

The machine reaches a line speed of up to 250m/min; an automatic roll change can be performed with only minimal reduction in speed. Apart from being efficient, this ensures constantly high quality, as the coating shows the same thickness across the entire fabric surface. It should be pointed out that such a uniform and complete coating reduces the creation of dust during filling and handling of cement, which has a positive effect on the environment and greatly improves the working conditions in cement filling plants. For many applications, it is enough to



The high-speed valve bottomer!

CONVERSION LINE ad*starKON SX+



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simply apply coating to the fabric, but for optimal visual results, the fabric is laminated with reverse-printed BOPP (bi-axially oriented polypropylene). A special technical feature of the lamiTEC is the newly developed Starlinger edge trim refed, which enables the customer to recycle not only common edge trims, but also a composition of fabric, coating and BOPP film. This process leads to a substantial reduction of the production waste that occurs throughout the lamination process.

SACK CONVERSION LINE AD*STARKON HX

In the next step, the coated or laminated fabric is turned into sacks. For AD*STAR® sacks, Starlinger offers the well-established sack conversion line ad*starKON. The new generation, the ad*starKON HX, has been



*AD*STAR® sacks on an automatic filling line.*

replace it, and less packaging is required as well. Consequently, fewer greenhouse gases are produced, making AD*STAR®

International Packaging Corporation on the Philippines, which ordered two lines of this new machine generation. Sakomoto has been buying its machine park from Starlinger since 2010 and produces 500 million AD*STAR® sacks every year for the local cement industry. Another longtime Starlinger customer is Jagdamba Synthetic, a member of Shanker Group based in Nepal. Jagdamba Synthetic is the largest manufacturer of woven PP bags in Nepal, and prides itself to be the only Nepalese company able to produce laminated AD*STAR® cement bags. In February 2018, the company hosted an impressive conference for its customers from approx. 50 cement plants. In addition to informative talks, visitors were invited to enjoy an entertainment programme that included a unique fashion show. The models were wearing trendy dresses made of woven fabric — the very fabric that is used in the production of Jagdamba’s cement sacks. What a great way to present cement packaging in a good light!



*Starlinger’s sack conversion line ad*starKON HX.*

equipped with a number of intelligent features that focus on optimizing sack quality.

To compensate for variation in fabric width, the feature iSHAPE monitors fabric dimensions during production and automatically adjusts bottom forming in order to produce a sack with precise geometry.

A similar purpose is fulfilled by the feature iPATCH: the length and position of cover and bottom patches is adjusted automatically to achieve a perfect fit on each cement sack. The result is tight packaging that protects the cement from external influences such as moisture, and perfectly closed corners prevent the loss of cement due to leakage. Waste is significantly reduced, both in terms of production waste and product loss. Little product loss means that there is no need to

sacks an environmentally friendly solution for cement packaging.

Recently, the 300th ad*starKON sack conversion line was delivered to Sakomoto

AD*STAR® is a registered trademark. AD*STAR® sacks are produced exclusively on Starlinger machinery.



Cement sacks on the runway (photo: ©Jagdamba Synthetic).

Carriage of agricultural bagged cargoes – loss prevention briefing by North P&I Club

INTRODUCTION

Agricultural cargoes include crops and commodities such as wheat, rice, oilseeds and nuts. One of the largest exported agricultural cargoes shipped globally in bags is rice.

Agricultural cargoes are hygroscopic, meaning that they have a moisture content that can interact with the air. If the air in the cargo hold has high relative humidity in comparison with the moisture content of the cargo, then the cargo will absorb moisture from the air. Conversely, if the air has low relative humidity in comparison to the moisture content of the cargo, then the cargo will release moisture to the air.

This briefing serves to assist operators with the carriage of bagged hygroscopic cargoes by discussing the various risks associated with them, and how to reduce the risk of claims by the use of best practice methods during the loading, carriage and discharge of such cargoes.

WHY DO PROBLEMS ARISE?

Issues can arise with these cargoes due to the environmental conditions within the regions they are loaded and discharged. Poor handling and carriage of the cargo can also lead to problems.

Some of the issues encountered with bagged agricultural cargoes, however, are directly due to the inherent moisture content of the cargoes.

Moisture content & stowage life

The moisture content and temperature of the cargo affects how the cargo behaves. As a general rule, the higher the average moisture content and the higher the loading temperature, the less time the cargo can be stored without the risk of cargo damage.

Self-heating

High moisture content can accelerate mould growth in agricultural cargoes, which in turn can lead to self-heating.

Oxygen depletion

Excessive moisture and the metabolic processes within some agricultural cargoes can lead to oxygen depletion in the hold.

WHAT CAUSES CARGO DAMAGE?

This section outlines some of the common causes of claims to bagged agricultural cargoes.

Ship's sweat:

A common issue with bagged agricultural

cargoes is wet damage due to ship's sweat.

Ship's sweat is the condensation which occurs when warm moist air in the holds comes into contact with the colder steel work of the vessel.

Cargo sweat

If the Master decides to ventilate after loading cargo in colder climates and sailing into warmer climates, then the opposite will occur. The warm moist air entering the hold will be cooled below its dew point, and sweat will form. However this time the sweat will gather on the cargo itself.

Water ingress

Any ingress of water into the ship's holds can cause damage. Therefore it is important to ensure that the hold's hatch covers are weather tight.

Cargo infestation

Some agricultural cargoes are susceptible to infestation from storage pests and insects. Fumigation is routinely required for these cargoes.

Insects in the cargo can cause an increase in the cargo temperature and can physically damage the cargo.

SHORTAGES AND PILFERAGE

Incorrect tally work during loading or discharge and cargo spillage due to damaged/substandard bags are among the main reasons for reported cargo shortages.

Bagged cargoes are easily damaged, often by:

- ❖ rough handling by stevedores;
- ❖ the use of cargo hooks;
- ❖ overloaded cargo nets; and
- ❖ the use of wire slings.

Even small holes in the bags can cause cargo to be rejected or cause spillage leading to shortage claims.

Cargo pilferage is common in many ports, particularly in West Africa for imported rice cargoes.

Therefore, it is important for tally clerks and ship's crew to remain vigilant and keep accurate records.

LOAD PORT

In many regions claims are common place, in particular for shortages. Wet damage claims can result in much larger claims. Therefore the Master and the crew must protect the ship by ensuring preparations prior to loading are correct and that they are alert to issues during loading

operations.

The following section will concentrate on vessel actions before and during loading

Hold cleaning

Before arriving at the load port, the Master should ensure that the vessel's holds are suitably cleaned in line with the requirements of the charter party or shipper's instructions.

This may include:

- ❖ all previous cargo residues removed;
- ❖ check holds for any signs of insect infestation;
- ❖ wash the cargo holds down with fresh water;
- ❖ ensure bilges are cleaned and covered with burlap;
- ❖ bilge non return valves tested and confirmed as fully operational;
- ❖ ensure hold ventilation is operational and well maintained;
- ❖ ensure hold fire detection and prevention systems are operational;
- ❖ ensure sounding pipes or temperature sampling pipes are clean and clear;
- ❖ hatch coamings and drainage channels should be clear of debris; and
- ❖ any tank lids in the holds should be fully secure.

Appointment of surveyors

Operators carrying such cargoes should consider appointing a suitably qualified and experienced surveyor, in particular for trades such as the South East Asia to West Africa bagged rice trade.

Cargo delivery

In many regions of the world moisture can be introduced into the cargo during its period of storage or transportation prior to loading. For example in South East Asia, rice is commonly transported to barges in trucks. These trucks are often open-topped and can be exposed to rainfall.

A weather eye

The crew should closely monitor the weather forecast and current weather situation at all times. If during rain the barge or truck delivering the cargo remains uncovered, or the bags are left uncovered on the quayside, this should be recorded by the crew, and any wet bags should be rejected.

Hooks and slings

The use of cargo hooks should not be allowed and the ship's crew must be vigilant to the stevedores using these.



A common issue with bagged agricultural cargoes is wet damage due to ship's sweat.



The use of bamboo sticks with bamboo matting is not an effective method of dunnaging.

Stowage and dunnage

As previously discussed, it is common for ship's sweat to occur inside the cargo holds.

It is therefore extremely important that the bagged cargo does not come into contact with the ship's structure.

Dunnage is loose wood, matting, or similar material used to keep a cargo in position in a ship's hold. Examples of dunnaging methods that are not very effective are:

- ❖ the use of bamboo sticks with bamboo matting;
- ❖ Kraft paper or plastic sheeting;
- ❖ expanded polystyrene foam alongside plastic sheeting; and
- ❖ application of inconsistent materials around the hold.

A more effective form of dunnage is dry timber planks in a lattice formation or wooden pallets covered with Kraft paper or plastic.

Ventilation channels

There is some advice advocating the use of ventilation channels within the cargo stow.

However there is little evidence to demonstrate the effectiveness of the channels.

If shippers or charterers insist on the use of ventilation channels, then the Master should obtain written instructions to this effect.

Sealing

Upon completion, the hatches should be closed and secured properly with the charterers and shippers representatives in attendance. Ideally, the hatches should be sealed and seal numbers recorded.

Record keeping

The crew should keep full records of the entire process, including officials and superintendents that have visited the

vessel, and take photographs or videos of any issues.

Rain letters

Masters are strongly advised to avoid loading or discharging bagged agricultural cargoes in the rain. Where a ship owner is asked to load cargo in circumstances that might cause damage to that cargo, there is a risk that complying with this request might be considered imprudent and/or hazardous. A rain letter is a letter of indemnity provided by the charterer which allows the owner to recover from the charterer in the event of wet damage through rainfall.

Masters are advised to contact their P&I club before agreeing to such terms.

ON PASSAGE

Wet damage claims often start life during the sea passage. Be this through the formation of ship's sweat, or cargo going mouldy due to its inherent moisture, it is important that the Master keeps accurate records and details of the passage.

Ventilation

Owing to the issues of sweat on the vessel's steel work, it is advised that the Master ventilates the cargo holds only as appropriate.

Maintenance

Ventilator closing appliances are often exposed on deck and easily become corroded. They need to be kept in good condition so that they can be opened and closed with ease.

When to ventilate?

Before ventilating, the Master should consider any fumigation requirements, or other charterers'/shippers' instructions.

To know when to ventilate, crews have two methods available to them:

- ❖ **three degree rule:** this rule states that when the outside air temperature is three degrees lower than that of the temperature of the cargo upon loading, you should start ventilation.
- ❖ **dew point rule:** according to the dew point rule, ventilation should commence when the dew point of the outside air is lower than the dew point of the hold air.

When not to ventilate

The Master should always follow any written fumigation requirements or reasonable instructions from the charterers/shippers when deciding whether to ventilate or not.

Here we will investigate some of the common situations in which ships have stopped ventilation whilst on passage.

Rain: In the case of rain, Masters should carefully assess the situation and be fully familiar with their vessel's ventilation arrangements. They should assess how much water ingress can be expected by those vents.

Bad weather: It is a similar situation stopping ventilation during periods of heavy weather when shipping spray.

If the Master believes there is a risk of water ingress, then ventilation should be stopped and accurate records made of this action.

Mist and fog: The presence of mist or fog should have no bearing on the ventilation, and Masters should simply continue to apply either the three degree rule or the dew point rule regardless of fog.

Hours of darkness: It has been common practice to stop ventilation at night. This is sometimes down to the belief that the formation of dew at night will affect the cargo. However this is incorrect, as long as the application of the dew point rule or the three degree rule

dictates to ventilate, then ventilation should go ahead. However, a possible issue with ventilation at night is that the crew's ability to judge the severity of rain or shipping spray in the hours of darkness may be impaired.

Ventilation logs

Whilst on passage, it is important that accurate records of ventilation are kept.

Bilge and tank records

A record of tank and bilge levels should be maintained whilst on passage, noting the times of any pumping operations.

Discharge port

As with the loading port, it may be appropriate that the Master appoints an independent surveyor.

Opening the holds

When opening the hatches with the surveyors, the Master or his representative should be present.

Outturn reports

The surveyors should produce outturn / tally reports. Often the cargo interests and Master's appointed surveyor's reports will not tally. The Master is advised against signing the cargo interests' outturn report.

Bills of lading and letters of protest

The Master and his crew should remain vigilant to the risk of cargo damage throughout operations.

Wherever possible, the Master should ensure that damaged or wet bags are rejected before loading. This highlights the importance of appointing competent and independent surveyors and tally clerks.

If clean bills of lading are required, Masters should reject any cargo that would mean they need to clause the bill of lading. Otherwise, the Master should clause the mates receipt and bill of lading as required should the cargoes pre shipment condition require it.

Charter Party


Operators should be fully aware of the

risks to bagged cargoes from stevedore damage and condensation when allocating responsibility for the loading, stowage and discharge of the cargo in the charter party. This includes considering the provision of adequate and appropriate dunnage in the holds.

SUMMARY

During the loading, carriage and discharge of bagged agricultural cargoes, the Master should ensure that good records are maintained and that they retain all possible evidence to protect the ship.

Photographs, signed letters of protest, statements of fact, shipboard documentation and any other documents are useful evidence. In the event of claims such documentation and evidence has great weight placed on it.

North's Loss Prevention Guide entitled "The Mariner's Role in Collecting Evidence" is a useful source of information in this respect. Members can download this publication from the Members area on the North website. 

Getting it right: a properly packed hold offers benefits all round.



Focus on Lower Mississippi



Port of New Orleans takes centre stage

Port of New Orleans is a deep-draught multipurpose port at the centre of the world's busiest port system — Louisiana's Lower Mississippi River. Connected to major inland markets and Canada via 14,500 miles of waterways, six class I railroads and the interstate highway port is a gateway for cargo, as well as passenger cruises. An extensive network of ocean carrier services and added value services make the Port of New Orleans the superior logistics solution.

FACILITIES

The port's facilities include 20 million square feet of cargo handling area, more than 3.1 million square feet of covered storage area and 1.7 million square feet of cruise and parking facilities.

INTERMODAL ACCESS

The Port of New Orleans is America's most intermodal port. It is connected to major markets across the continent by the interstate highway system and is the only seaport in the US served by all six Class I rail lines, 50 ocean carriers, 16 barge lines and 75 truck lines. The Clarence Henry Truckway, a two-lane roadway on Port property, makes fast transit times even faster. The port also offers on-dock rail and direct ship-to-barge services.

The Port of New Orleans has an intermodal rail terminal adjacent to its Napoleon Avenue Container Terminal providing on-dock access for all rail shipments. The new Mississippi River Intermodal Terminal, a \$25.1-million project completed in the first quarter of

2016, is a modern, efficient intermodal container transfer terminal located within the container yard, offering on-dock access to the Port's rail partners.

STAYING AHEAD OF THE MARKET

The Port of New Orleans set records for container traffic and cruise passengers in 2017. To stay ahead of market demand, the port has invested over \$140 million in capital improvement projects since 2012 and has a masterplan to expand the Napoleon Avenue Container Terminal to 1.5 million TEU capacity.

ORIGIN/DESTINATION OF VESSEL CALLS

American Midwest (Via the Inland Waterway System), Latin America, Europe, Asia, Africa

CARGO HANDLING CAPABILITIES

BREAKBULK

- ❖ 13,511 feet of berthing space available at six terminals ideally suited for a broad spectrum of breakbulk cargo including, heavylift/project cargo and cold storage;
- ❖ 1.6 million square feet of transit shed area for the temporary storage of breakbulk cargo;
- ❖ discharge directly to/from barge; and
- ❖ certified by the London Metals Exchange to handle and store non-ferrous metals traded on the Exchange.

INDUSTRIAL REAL ESTATE

The Port of New Orleans owns an industrial park with over 1,000 acres of properties that lease under long- and short-term agreements. The properties feature convenient access to the interstate highway system, waterways and the New Orleans Public Belt Railroad — a Class III switching railroad with the primary mission of serving the port, its six Class I railroad partners and local industry, which was acquired by the port on 1 February this year.

The properties are zoned for heavy and light industrial uses including shipbuilding and repair, warehouse and distribution, truck and container depots, basic materials handling, cement handling, steel distribution, refrigerated warehousing, manufacturing, packaging and transloading.

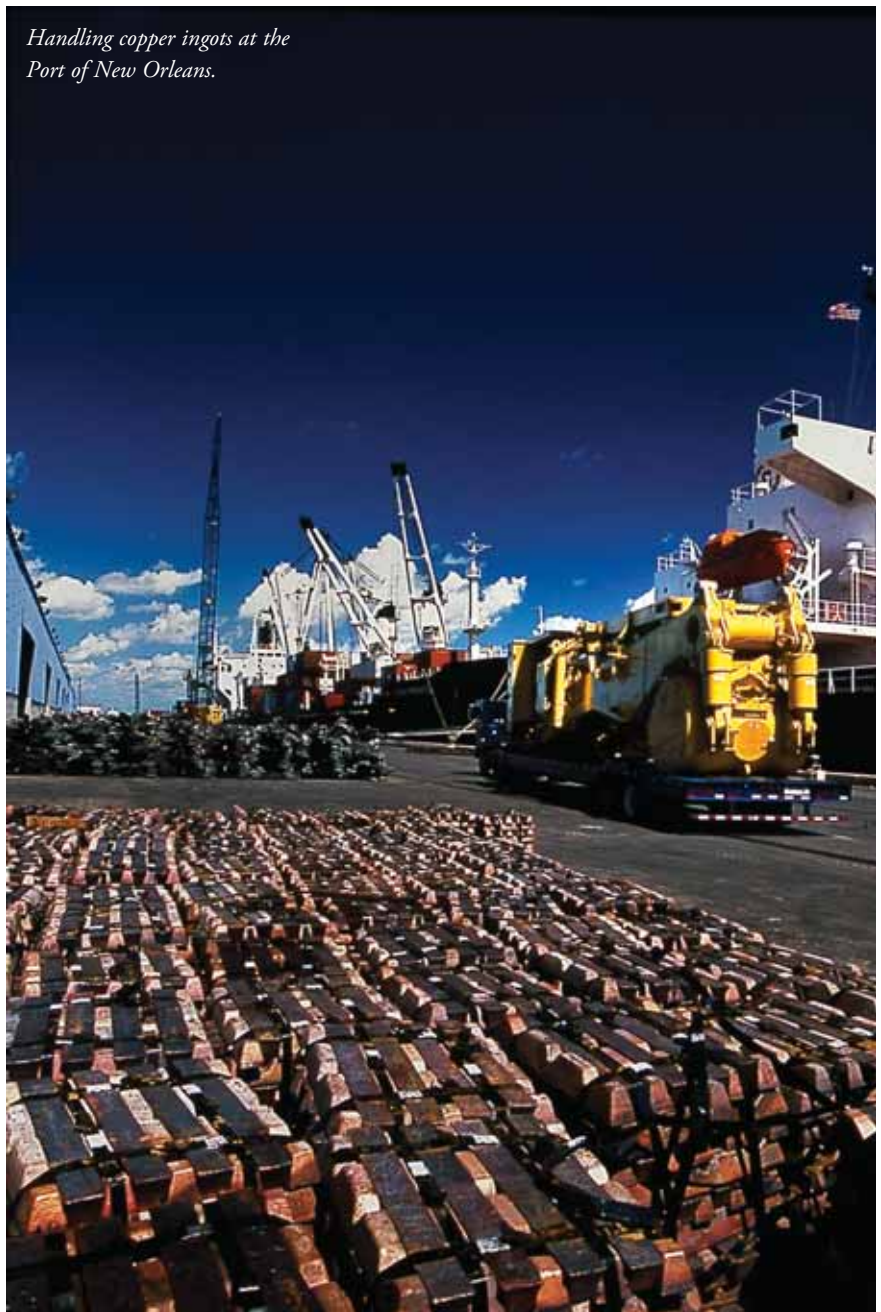
PORT OF NEW ORLEANS CELEBRATES SPECIAL TRI-CENTENNIAL MARITIME MONTH

The Port of New Orleans (Port NOLA) is celebrating its second annual Maritime Month through May and National Maritime Day on 22 May to pay tribute to the region's rich maritime history and to recognize the hardworking men and women who serve in the industry.

The theme of Port NOLA's 2018 Maritime Month is 'Your Working River 300' to honour the city of New Orleans' Tricentennial year, and includes a number of activities to demonstrate the industry's vital role in job creation and its connection to the community.

The month-long celebration kicked into high gear on 3 May with the New Orleans City Council presenting a proclamation to Port NOLA President and CEO Brandy D. Christian recognizing Maritime Month and Maritime Day.

"We have coordinated with city and state elected officials, media partners and various stakeholders to celebrate the hardworking men and women of the Port,



Handling copper ingots at the Port of New Orleans.

Public Belt and maritime industry who play an important role in the success of our city, state and region," said Christian.

"Maritime Month is an opportunity for Port NOLA to connect with our community and invite them to see for themselves what we experience daily — the magic of the working river in action."

Port NOLA also hosted students from New Orleans Charter Science and Mathematics High School who participated in the second annual Maritime Month Career Exploration Day, an event that allows high school students to learn about the diverse career paths available in the maritime industry.

The port will honour the men and women who serve in the Harbor Police Department during National Police Week from 13–19 May. As part of Infrastructure Week, 14–21 May, Port NOLA will host the

Southeastern Infrastructure Summit on 17 May. The event will be headlined by Louisiana Gov. John Bel Edwards and New Orleans Mayor-elect LaToya Cantrell who will be sworn in to office. Speakers will discuss the critical role that infrastructure plays in the regional economy, discuss the future of funding and financing major infrastructure projects, and explore ways to better connect the region.

On 24 May, Port NOLA's finalized Strategic Master Plan will be released. The New Orleans Public Belt Railroad will host an open house on 24 May. Finally, the port will host its monthly public boat tour on 25 May.

Declared by Congress in 1933, National Maritime Day calls attention to America's proud maritime heritage and to honour the men and women who serve and have served as US merchant mariners.



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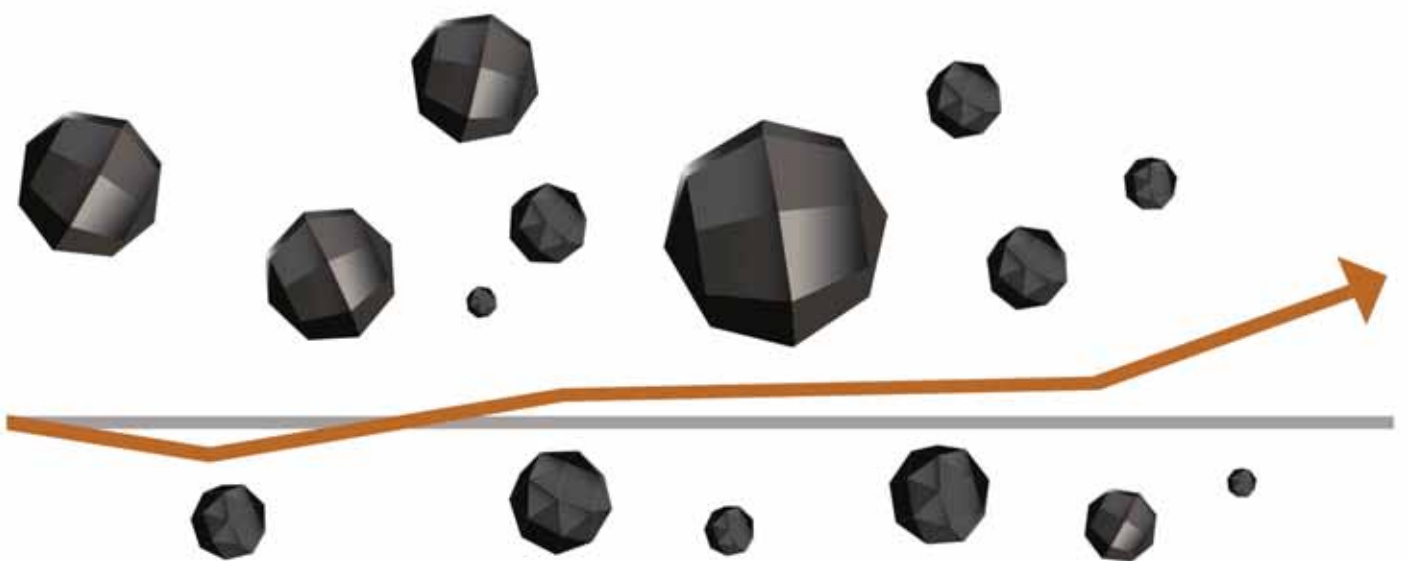
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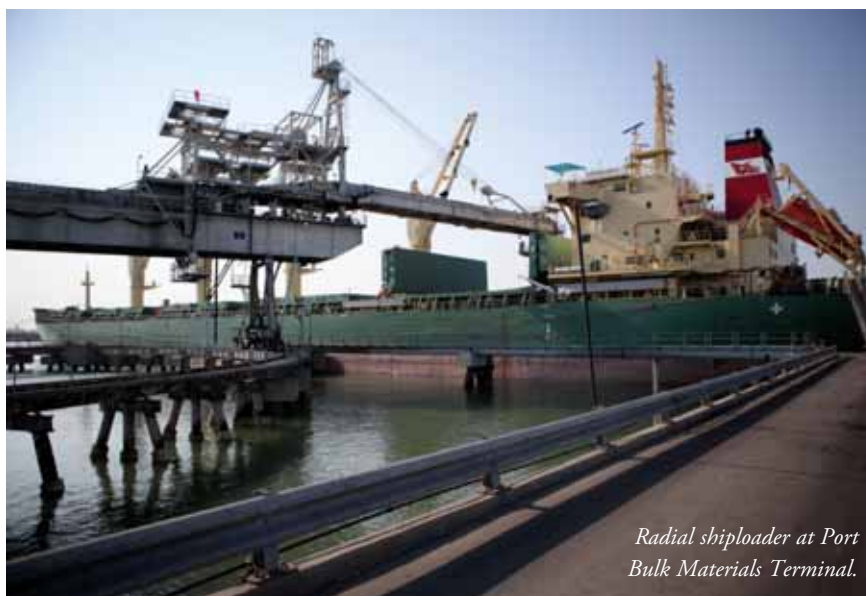
Port Corpus Christi wins a 2018 Texas Environmental Excellence Award

The Port of Corpus Christi, the fourth largest port in the US in total tonnage and an environmental leader in Texas's Coastal Bend, has earned the 2018 Texas Environmental Excellence Award (TEEA) in Pollution Prevention, presented by the Texas Commission on Environmental Quality (TCEQ). TEEA is an annual awards program that honours achievements in environmental preservation and protection and is considered the state's highest environmental honour.

According to TCEQ Chairman Brian Shaw, Port Corpus Christi demonstrated a genuine commitment to environmental stewardship by adopting a progressive environmental policy, and setting targets for improvement each year.

"The Port of Corpus Christi is guided by principals," Shaw said. "They not only set standards for themselves, but also for their partners, setting examples as forward-thinking environmental stewards in the industry, and in the community."

Environmental leadership by Port Corpus Christi commissioners has been integral to winning the 2018 Pollution Prevention award; a recently approved environmental policy identified five key precepts to consider when evaluating new developments and operations: air quality, water quality, soils and sediments, wildlife habitat, and environmental sustainability. The port's environmental stewardship efforts focus on improvements and proactive measures related to these precepts, and the TEEA awards committee cites the implementation of the port's strategic plan to ensure operations and activities are environmentally sustainable and resilient.



Radial shiploader at Port Bulk Materials Terminal.

TEEA also noted several milestones Port Corpus Christi has achieved in finding balance between the environment, community, and the economy, from dredge material reuse, to its impressive green energy utilization. Cited among the most impressive, however, "is its strong educational, training, and outreach components."

"Environmental stewardship is an effort that we must undertake to be successful, and this prestigious recognition is a culmination of the diligent efforts and willingness of our port employees and our stakeholders to continually reduce the environmental footprint of our operations," said Sarah Garza, Port Corpus Christi Director of Environmental Planning and Compliance. "Prioritizing our improvements and each year committing to continually improve has brought us to this

point and will sustain our operations in the future."

Other categories in the prestigious environmental awards are Education, Civic/Community, Innovative Operations/Management, Individual, Youth, Agriculture, and Water Conservation. These diverse award categories provide citizens, communities, businesses, and organizations an opportunity to obtain the state's highest environmental honour and be recognized for environmental projects.

Since 1993, the TEEA has honoured over 250 successful environmental projects and efforts. By honouring these winners, the TCEQ hopes to encourage others to initiate like-minded projects and reinforce a spirit of environmental stewardship.

ABOUT PORT CORPUS CHRISTI

As the leading US crude oil export port and a major economic engine of Texas and the nation, Port Corpus Christi is the fourth-largest port in the United States in total tonnage. Strategically located on the western Gulf of Mexico with a 36 mile, 47 foot (MLLW) deep channel, Port Corpus Christi is a major gateway to international and domestic maritime commerce. The port has excellent railroad and highway network connectivity via three North American Class-I railroads and two major interstate highways. With an outstanding staff overseen by its seven-member commission, Port Corpus Christi is 'Moving America's Energy'.



Shiploader and gantry cranes on the voestalpine dock at La Quinta Terminal.

EXCELLENCE

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Port of Brownsville has much to celebrate after record results

The Port of Brownsville is a deepwater seaport in Brownsville, at the southernmost tip of Texas. Opened in 1936, the port is connected to the Gulf of Mexico by a 17-mile-long ship channel. With approximately 40,000 acres, the Port of Brownsville is also the largest land-owning public port authority in the nation.

The Port of Brownsville is the only deepwater seaport directly on the US–Mexico border.

With more than \$43 billion worth of projects currently in the works, the Port of Brownsville is transforming the Rio Grande Valley by creating positive investment opportunities and jobs. Activity at the port is responsible for adding more than \$2 billion to the regional economy, \$3 billion to the Texas economy, and for the creation of more than 44,000 jobs.

PORT OF BROWNSVILLE AND BIG RIVER STEEL LLC SIGN OPTION AGREEMENT

The Brownsville Navigation District (BND) Board of Commissioners — the governing body for the Port of Brownsville — has signed an option agreement covering up to 800 acres of property with Big River Steel LLC enabling the steel-maker to continue its due diligence pursuant to the company's interest in developing a LEED-certified steel manufacturing plant, storage and distribution facility. The plant would cost more than \$1.6 billion to construct.

“This is good news for Brownsville and the result of hard work by many individuals and organizations over a long period of time. Our rail partner OmniTRAX played an important role in introducing this opportunity to the port,” stated John Wood, Chairman of the BND. “We are excited about this step forward and remain confident the venture will be beneficial for all parties, for Brownsville and the Rio Grande Valley.

“The addition of 500 new full-time local jobs, and the impact of those jobs in terms of retail spending, services, and new housing impacts represent a transformational moment for Brownsville and the Valley,” Chairman Wood continued. Wood expects up to 1,500 construction workers would be needed to build the specialized steel plant.

The Port of Brownsville transships more steel into Mexico than any other US port.

PORT OF BROWNSVILLE ACHIEVES RECORD YEAR IN FY 2017

A full house of regional stakeholders

applauded Port of Brownsville officials during reports of record revenue and tonnage in 2017 at its annual State of the Port Address on 8 March.

“The state of the Port of Brownsville is strong and getting stronger,” said Brownsville Navigation District Vice Chairman John Reed. “As evidence, I offer two critical measures of success: total operating revenue and tonnage.”

The port's total operating revenue reached nearly \$24 million in unaudited total revenue, exceeding the previous high-water mark of \$19.9 million set in 2015 by more than \$4 million. On the annual tonnage side of the business, the volume of cargo handled at the port topped 10.3 million short tons, also a new record.

Reed cautioned the crowd of more than 230 the Port of Brownsville cannot afford to rest on its laurels and will work even harder to accelerate this momentum.

“Just because we have always done things in a certain way, doesn't mean there's not room for improvement, aimed at advancing the everyday lives of those living in Brownsville, Cameron County and the Rio Grande Valley. And that is what we intend to,” he added.

BND Commission Secretary Sergio Tito Lopez and Commissioners Carlos Masso and Ralph Cowen discussed new businesses at the port and current and future projects including channel deepening, the \$1.5 billion Valley Crossing Pipeline project and the renovation and expansion of the port's administration facilities.

Other noteworthy achievements of 2017 discussed at the State of the Port:

- ❖ **vessel traffic:** a 21% increase in vessel traffic. A total of 1,317 vessels called on the port in 2017 — up from 1,091 vessel calls registered FY 2016;
- ❖ **new tenant operations:** CSC Sugar/Sugaright; West Plains LLC; SteelCoast; Texan Cement;
- ❖ **Foreign Trade Zone No. 62:** the port's FTZ again ranked second in the nation for the value of exports in 2016, according to the US Foreign-Trade Zones Board's annual report to Congress. FTZ No. 62 reported more than \$2.8 billion in exported goods in 2016. Additionally, it ranked 25th nationally for the

value of imports totalling more than \$2.5 billion. FTZ No. 62 consistently ranks in the top five nationally since 2012 and this marks the second time in a row it achieved the nation's number two spot.

- ❖ **ship recycling:** the *USS Independence* completed its final voyage of 16,000 miles after arriving at the Port of Brownsville from Bremerton, Washington in June. International Shipbreaking Ltd. won the Navy bid to recycle the 60,000-tonne vessel, the last of the *Forrestal*-class of 'supercarriers' to arrive at the port. This is the third vessel of its kind to be recycled by the company, which is part of the EMR Group;
- ❖ **Keppel AmFELS:** Honolulu-based Pasha Hawaii announced the selection of Port of Brownsville-based Keppel AmFELS for the construction of two containerships, with an option to order two additional vessels. The contracts are worth \$400 million to Keppel, creating 700 local well-paying jobs.
- ❖ **regional collaboration:** the BND signed an MOU with the Mission Economic Development Corporation to collaborate on international trade opportunities with Mexico and other development projects. This effort was subsequently followed with similar MOUs with the Cameron County Bridge System and Pharr Bridge, all promoting international economic development.

❖ Awards/Recognitions:

- ❑ 2018 AVA Gold Digital Award for the port's website;
- ❑ 2017 Platinum MarCom Award for the Port of Brownsville Directory;
- ❑ Certificate of Achievement for Excellence in Financial Reporting by the Government Finance Officers Association. This is the sixth consecutive year the BND has received this award. DCi



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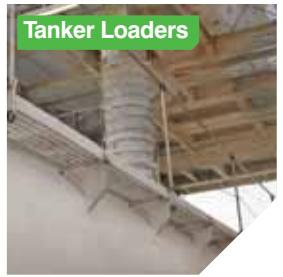
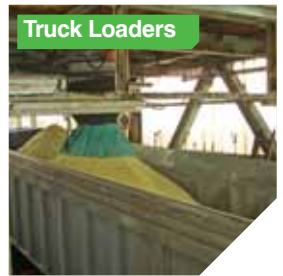
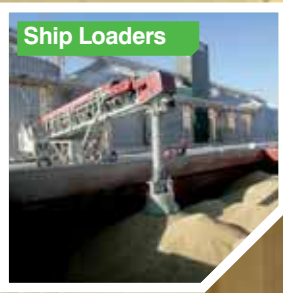
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