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Subdued outlook for coal trade

Prospects for dry bulk commodity import demand around the world are not entirely unfavourable, but negative signs are very prominent. The positive changes taking place may not prove strong enough to produce much overall growth in the broad picture this year. But it still seems possible that a reduction will be avoided and possibly a minimal increase achieved.

Economic activity is providing only limited underlying support. The latest (mid April) IMF forecast indicates virtually no improvement in 2016 compared with the slow average 3.1% global GDP growth seen in the previous twelve months. Of particular significance for bulk trade, China's economy is expected to decelerate to 6.5% (the first quarter growth rate was 6.7%), and continue slowing next year.

Coal

Despite clear pointers to further weakness in coal trade, some countries are likely to raise imports. A number of Asian buyers could see higher steam coal volumes in the current year, as shown in table 1, more than offsetting reductions elsewhere in the region as well as a possible decrease in Europe's large volume imported.

Updated estimates by the Australian Government Dept of Industry, Innovation and Science suggest that world steam coal trade will be almost unchanged in 2016, at 1,054mt (million tonnes). However, this reputable forecaster is less positive about the smaller metallurgical trade element, predicting a decline of just over 3% to 289mt. In both segments, lower imports into China are a feature, contrasting with higher imports of both coal types into India.

Iron ore

Among the principal steel producing countries which import iron ore, steel demand prospects are mixed, according to the latest World Steel Association forecasts published last month. Global demand for finished steel products is predicted to see a marginal 1% reduction this year, after falling by 3% last year.

The biggest negative change envisaged is in China, where a 4% decline in steel demand during 2016 is expected to follow the 5% fall seen in the previous twelve months. Elsewhere, small increases could be seen, including 0.6% in South Korea, 1.4% in the European Union, and 2.3% in Japan. Restraints emphasized by the WSA are weakness in capital investment spending and in manufacturing activity.

Grain

Attention in the grain trade is shifting towards the new 2016/17 crop year starting July. Some indications of positive as well as negative changes in import demand around the world are already visible. But world trade forecasts will remain largely speculative until output from summer domestic harvests in northern hemisphere importing countries is clearer, as these harvests greatly affect requirements for foreign grain.

Tentative early signs point to three countries with potential for additional imports over the next twelve months, reflecting shortfalls in their domestic grain production. In Morocco the current wheat crop has been severely damaged by inadequate rainfall. India's wheat crop also has been affected by adverse weather, while drought has devastated South Africa's corn crop. However, China's imports are likely to be lower as attempts are made to reduce excessive corn stocks built up in recent years.

Minor bulks

Agricultural and related cargoes are a significant component of the minor bulks trade sector. USDA forecasts suggest that global soyameal movements could increase by over 7% in 2015/16 to reach 64mt. Trade in some fertilizers, which together amount to around 130mt annually, also appears to be strengthening.

Bulk carrier fleet

Within the world bulk carrier fleet, Capesize vessels exceeding 100,000dwt comprise the largest segment. As shown by table 2, growth in this part of the fleet was minimal in 2015, when substantial deliveries of newbuilding vessels were mostly offset by scrapping. A similar outcome is foreseen in 2016, despite possibly higher newbuilding deliveries, because of intense pressure to scrap old or uneconomic ships.

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

	2011	2012	2013	2014	2015	2016*
Japan	106.6	113.7	114.5	114.2	120.1	118.0
South Korea	103.2	98.9	100.1	100.8	102.6	108.0
Taiwan	56.0	55.2	57.1	57.0	56.3	58.0
China	138.4	181.5	192.0	165.5	107.9	102.0
India	92.7	123.4	144.1	176.0	172.0	178.0
Total of above	**496.9**	**572.7**	**607.8**	**613.5**	**558.9**	**564.0**

source: various & BSA estimates *BSA forecast

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

	2011	2012	2013	2014	2015	2016*
Newbuilding deliveries	45.6	41.9	22.0	18.5	16.9	20.0
Scrapping (sales)	10.5	11.7	7.9	4.2	15.4	18.0
Losses	0.0	0.0	0.2	0.0	0.0	0.0
Plus/minus adjustments	4.7	–0.1	0.0	0.0	–0.3	0.0
Fleet at end of year	**249.9**	**280.0**	**293.9**	**308.2**	**309.4**	**311.4**
% change from previous year-end	+19.0	+12.0	+5.0	+4.9	+0.4	+0.6

source: Clarksons (historical data) & BSA 2016 forecasts *BSA forecast

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South America's grain and soya exports uplift

Exports of grain and soya from South America are predicted to remain high overall in 2016. After a massive surge in volume last year, the total could remain at about the same level, exceeding 170mt (million tonnes), based on recent forecasts. This quantity, comprising almost one-third of world trade in these commodities, is equivalent to over 3,400 Handymax size bulk carrier cargoes.

The largest part of exports from Brazil and Argentina consists of soyabeans and meal, about two-thirds of the total. The balance is mostly corn, plus some wheat and other grain types. Brazil is the biggest of the two suppliers. Growth in regional exports during the past decade has been remarkably strong.

Forecasts prepared last month, summarised in the table below, provide a guide to changes unfolding. However, as last year demonstrated dramatically, expectations sometimes change greatly as the season progresses. Estimates for harvests now under way in South America, and calculations for export sales may be revised. Assessments of global import demand, and how much will be purchased from competitors in other countries are subject to constant modification.

A bright outlook

Following the huge increase in cereals and oilseeds shipments from both Argentina and Brazil seen in 2015, this year's volume may be marginally lower, by about 1%. Based on an analysis of US Dept of Agriculture figures, last year's South America total was just over 175mt, a 29% expansion, and a similar 173mt is predicted for the current period.

Several separate USDA forecasts published in mid-April have been used for these calculations. But marketing periods for cereals and oilseeds exports differ slightly, and so the calculated total is not as precise as it may appear. Marketing periods differ mainly because harvest timing varies.

Nevertheless, the result is a broad indication of what can be foreseen currently. Twelve months ago a roughly 5% increase was expected in 2015, but the upsurge proved far stronger, emphasising how circumstances may change.

Lower grain export volumes

The annual crop production cycle in South America starts with Argentina's wheat harvest. Output in the latest harvest completed several months ago was lower then seen twelve months earlier, at 11mt, reflecting a reduced crop area. However, exports in the marketing year ending November 2016 are expected to be 42% higher at 7.5mt, resulting from enhanced competitiveness.

Corn and sorghum production in Argentina this year is now approaching completion and is estimated to total just below 32mt, about 2% lower than the previous harvest. Crop yields (amount produced from each unit of land) appear to have decreased slightly. Exports in the marketing year ending February 2017 could remain stable at 20mt, similar to the preceding volume.

During the past few years corn exports from Brazil have risen massively, becoming a major part of the regional and global export scene. In 2016, corn production from two separate crops could decrease marginally by 1% to 84mt, although that figure is about twice the volume produced a decade earlier. Exports, however, are unlikely to be as high as the over 34mt seen in the year ending March 2016, and USDA forecast a 28mt total, 19% lower, in the current period.

Higher soyabeans and meal exports

Last year sales of soyabeans and meal from South America, to a wide range of countries, jumped by a remarkable 20mt or 21%, reaching 114mt. In 2016 exports could be about 2% higher at 116mt. Brazil and Argentina compete strongly with other suppliers, principally the USA, in many export markets and global import demand continues to expand robustly.

In the current harvest, Brazil's soyabeans output looks set to increase further by around 3%, compared with the previous crop, reaching the symbolic 100mt level. Continued growth in the area under cultivation has assisted the upwards trend. Beans and meal exports in marketing year 2016/17 ending January could rise by 5% to just over 73mt, based on USDA's estimates.

Argentina's soyabeans production in the current harvest, by contrast, seems likely to decline by about 4% to 59mt amid slightly lower crop yields. Localised excessive rainfall appears to have adversely affected production. During the marketing year ending March 2017, beans and meal exports could be about 2% lower at 43mt.

Solid global import demand

Exports from South America depend upon several factors. The availability of grain and soyabeans in the latest harvests is a crucial element. Competitiveness among suppliers is also relevant and, ultimately, consumption trends and reliance on foreign supplies in importing countries determines the pattern.

Currently there are contrasting changes among importers. In the wheat and coarse grains sector, signs of reduced import demand in China and the Middle East area have been prominent. Good harvests of domestic crops within importing countries last summer led to some easing of import requirements, exacerbated by over-abundant corn stocks in China.

From mid-2016 onwards the picture is less clear. Domestic grain harvests in northern hemisphere importing countries (not yet accurately predictable) will affect how much grain is subsequently purchased.

Import changes in the soyabeans and meal sector are mainly positive. Presently, a rising trend is still clearly evident in China, which relies on imports for most of its supplies, amid strengthening soyameal and oil usage. Elsewhere around the world soya import trends look favourable.

Richard Scott

SOUTH AMERICAN GRAIN AND SOYA EXPORTS (MILLION TONNES)

Argentina and Brazil — wheat, corn, sorghum, soyabeans, soyameal (varying marketing years — see text)

	2011	2012	2013	2014	2015	2016*
Wheat	12.0	14.9	5.2	2.4	7.0	8.8
Corn and sorghum	26.4	44.5	45.5	39.4	54.3	48.0
Soyabeans	44.2	38.0	50.7	53.2	66.3	68.7
Soyameal	41.9	35.8	37.6	41.2	47.6	47.8
Total	**124.5**	**133.2**	**139.0**	**136.2**	**175.2**	**173.3**
% change from previous year	+2.5	+7.0	+4.1	–-2.0	+28.7	–1.1

source: US Dept of Agriculture (12 April 2016) & Bulk Shipping Analysis ** USDA forecast for 2016*

Cement trades

Is India set to be the next big producer?

Planned infrastructure improvements could mean growth of India's low per capita consumption of cement – and other commodities

The ranking of countries on the basis of capacity owned in a particular industry and production thereof could be misleading, *writes Kunal Bose*. This is as much true of steel and aluminium as of binding material cement. The way China ferociously went on building capacity in the past two decades, which mercifully has now stopped, means it has more than half the share of world production in a good number of commodities. Like in cement, China alone accounts for close to 60% of global annual output of over 3.6bn tonnes. It will be instructive to show how India, the world's second-largest producer of cement, stands in comparison to China. According industry data, India has installed capacity of 372mt (million tonnes) of cement. But consumption being 271mt in 2015, the Indian industry is nursing idle capacity of over 100mt. India has 7% share of global cement production.

In steel in particular and also in aluminium, high levels of Chinese exports resulting from sustained big production in the face of fall in domestic demand have invited trade action, including invocation of anti-dumping measures by nations injured by imports originating in China. Cement, however, is an exception where despite production well in excess of 2bn tonnes, China has managed to use the whole amount itself for construction, infrastructure and housing projects. As a result, *per capita* use of cement in China could be around 1,700kg. India where infrastructure deficit remains monumental, except in a handful of states and housing for all remains a major concern for the government, has in comparison to its neighbour a rather low *per capita* cement use of 201kg. In fact, this compares very poorly with the world average *per capita* of 543kg.

An official of the Confederation of Indian Industry says: "the Indian *per capita* cement use is disappointing considering the fact the economy in 2015–-16 grew at 7.6% and the forecast for GDP growth in the current year is 7.8%. Forget about praises heaped upon India as the brightest growth spot in the world by the IMF, the World Bank and the rest, a rapidly developing country should be using cement in multiples of what is consumed here now. There are quite a few examples of rapidly developing economies having *per capita* cement consumption much higher than the world average. Singapore at its infrastructure and house building development phase spanning many years in the past recorded cement *per capita* use of more

than 1,000kg." But then India's *per capita* steel use at about 60kg is nearly one-fourth the world average. As for aluminium, *per capita* consumption in India at 1.3kg compares poorly with the world average of 7.4kg.

This, however, shows given the government and private sector being earnest in pushing through infrastructure and housing projects, rapid rises in cement consumption growth in India remains a distinct possibility. According to industry officials, the immediate challenge is to bring the idle capacity of 100mt into production stream by generating demand for the binding material. The 2016–17 (April to March) national budget holds high hopes for the industry as it promises to activate the "languishing" infrastructure projects and launch highly ambitious ones. Asked by *DCI* to list the budget proposals whose implementation will give a major boost to cement consumption, an industry official said: "What we find encouraging is government development focus is back on strengthening urban and rural infrastructure and creating affordable shelter for the masses. All such work will be cement- and steel-intensive." A government push of this kind is needed as India's cement consumption growth of 2% in 2015 was the slowest in a decade. The slow demand growth in a situation of high surplus capacity made the market highly competitive with prices remaining under pressure.

For the cement industry, the exciting budgetary announcements are: (i) likely approval for building nearly 10,000km of national highways in the current financial year. Earlier, the government decided for running of smooth heavy traffic and longevity of surface, national highways will be built with cement concrete only. (ii) New Delhi is trying to convince the state governments that like the centre they should also opt for cement concrete construction of all state highways. Hopefully, the nearly 50,000km of state highways to be taken up for up-gradation will be made of cement concrete. (iii) Mainland India's coastline is 6,100km. To boost the country's foreign and coastal trade, the budget has proposed the building of many greenfield ports both on the east and west coast. At the same time, sufficient investments are proposed for modernization and capacity expansion of operating ports. In both areas, the private sector will have a major role. (iv) Fast tracking of long-languishing 89 irrigation projects that will water over 8m hectares.

Ahead of the budget, the government took a decision to build 60 million houses under the 'housing for all by 2022' and create 100 smart cities across the country. In further cement demand creation moves, the government is ensuring that all roads to be built in smart cities will be with cement. ACC, one of India's leading cement producers and an ultimate subsidiary of LafargeHolcim of Switzerland says cement "consumption could pick up well beyond 6% if infrastructure development and ambitious projects such as 'Make in India', smart cities mission... are accelerated. Housing demand stimulation is linked to progressive reduction in interest rates and greater supply of affordable dwellings."

Cement Manufacturers Association (CMA) says cement imports are the last thing that the country needs when the local industry is nursing much idle capacity. For curbing imports, CMA wants high tariff barriers as they now obtain for steel. At the same time, CMA recommends certain government moves to enable particularly the factories not far from the coast to export cement and clinker. The suggested steps are: (i) Royalty paid on limestone is to be neutralized to facilitate cement sales in the world market. This will ensure that exports do not carry the burden of domestic levies. (ii) Duty drawback needs enhancement to 3%. (iii) For the purpose of exports, cement and clinker should be so classified as to invite lower rail freight. (iv) Investments made for developing private jetties and ports for cement exports that would also help in decongesting national ports should be extended higher rates of depreciation.

Whatever the industry demands from the government, the fact is less than 5% of global cement output finds its way into seaborne trade. That India makes cement of global standards of any number of varieties as its new generation factories are equipped with best machines will not automatically boost exports unless the government creates the 'ideal condition'. Many developing and emerging nations building own cement capacity is also restricting seaborne trade in the commodity, which should preferably be produced close to consumption point. "Export certainly is not the answer to 100mt capacity lying idle. But if the government acts in the way CMA has recommended, then India like in the past could be a regular exporter of 10mt or so," says an industry official.

Cement remains a highly taxed industry in India. Central and state level taxes account for 60% of ex-factory cement prices. CMA wants government levies to be reduced by up to 25% to leave more money in the hands of cement companies for periodic modernization and capacity creation. Capacity consolidation continues to make progress in India. Under pressure from banks to pare their debts, many groups, which in the past diversified into cement, are selling plants for cash. Infrastructure and power group Jaypee has sold earlier this year 22.4mt cement capacity to Ultratech Cement for nearly $2.49 making it the largest deal in the cement sector. Birla Corporation purchased recently 5.5mt capacity from Anil Ambani-owned Reliance Infrastructure at a valuation of $140 a tonne. The acquired plants are in Madhya Pradesh and Uttar Pradesh. The transaction has boosted Birla Corp's capacity to 15.5mt.

Following the global merger of Holcim and Lafarge, the Indian regulator has asked the merged entity to dispose of assets totalling 11mt. LafargeHolcim Chief Executive Officer Eric Olsen said the company was "attracting strong interest for capacity it's forced to sell in India" following a merger that created the world's largest cement maker. Olsen told Bloomberg: "We see a wide range of interest, both financial and strategic. We expect to get a very attractive price overall." In the coming days more capacity consolidation will happen since a good number of cement companies have capacity of up to 10mt. Most such groups remain takeover targets.

Every major cement group in the world is extremely bullish about the future of the industry in India. The reason is the country must continue to invest heavily in infrastructure development for any number of years to achieve sustainable GDP growth of close to 10% a year. According to the Planning Commission study group, India will need cement manufacturing capacity of over 1,035mt by 2027 to meet the demand emerging from infrastructure and housing sectors. India has the two principal resources, namely, limestone and coal in great abundance to support large new capacity development. According to Indian Bureau of Mines, the country has cement grade limestone reserves of nearly 90bn tonnes. More will continue to be added to reserves through conversion of resources by way of further exploration. And India's coal reserves are over 300bn tonnes. Cement factories have also started using steel blast furnace slag and fly ash from power plants in growing quantities.

Construction halt leads to collapse of cement sales in Brazil

Cement sales collapsed in Brazil last year, and further falls are expected in 2016, *writes Patrick Knight.*

Lafarge's Matozinhos cement plant in Brazil.

With the sole exception of market pulp, which has benefited from being particularly competitive at a time when numerous high-cost mills in other parts of the world are closing down, demand for all the other commodities produced in Brazil has fallen sharply in the past couple of years, and none more dramatically than cement.

With construction of all kinds at a virtual standstill, 10%, or 6.4mt (million tonnes) less cement was sold in Brazil last year than the 70.9mt consumed there in 2014. Demand is now falling month after month, it is expected that a further 10–12% less cement will be needed this year, and that annual sales could soon fall to less than the 60mt of a decade ago. With cement being such a bulky commodity, Brazil exports very little, apart from small quantities to neighbours such as Paraguay, Bolivia and Uruguay and imports are almost insignificant as well.

For the ten years up to 2014, demand for cement increased by an average of 10% a year, and the country's 95 cement making plants had increased capacity to about 85mt. The expectation was that demand would reach 100mt in the near future.

An estimated 100,000 completed homes stand unsold at the moment, with new starts few and far between, with unemployment shooting up. A large proportion of consumers are having difficulty keeping up with debt repayments, with the result that civil construction, which uses 75% of all the cement sold in Brazil, is almost at a standstill. When the economic downturn began a couple of years ago, the government's plan was that state spending on infrastructure would fill the gap, and that long-postponed road, rail and port building programmes would be speeded up. But with tax revenues falling fast, both the federal and local governments are having difficulty paying salaries

and wages, so there is little or nothing left for investment.

The high cost of transport in Brazil has meant that the cost of getting the soya, maize and sugar produced in areas far from the sea, to ports, eats into profits. Because of this, the leading grain trading companies had prepared plans for investing in new railways. But with world soya and maize prices down sharply in the past few years and sugar prices still to rise significantly, the trading companies have also been forced to shelve their plans as well.

Numerous foreign companies are taking advantage of the fact that many Brazilian companies are facing financial difficulties, to buy them up. It is hoped that some of the newcomers may have the funds to make the investments which are badly needed if some Brazilian goods and commodities are to remain competitive in world markets.

Most of the 22 companies which own cement plants in Brazil, have slowed expansion plans or shut high cost plants. Votorantim, the largest, and which owns 26 plants in 14 of Brazil's 26 states, has shelved expansion plans at several plants and closed four. The number two 'Intercement' company, in which the Odebrecht construction company has a large shareholding, has also cut back. The fall in demand has affected the entire country, including the North East region, which had long been Brazil's poorest region, but which has been catching up fast in the past few years, as many manufacturing companies in labour-intensive industries, such as textiles, footwear, and even car manufacturing have re-located plants there, encouraging the cement industry to build new plants there.

About 10% of all the cement used in Brazil is bought by the owners of small houses, who build them themselves, or make improvements to accommodate more family members as time passes. In addition, it is estimated that Brazil has a housing deficit of about 5.5 million homes, while much needs to be spent on improving main drainage. But with unemployment rising, and wages being squeezed, the bottom segment of the market has been hit even harder than average.

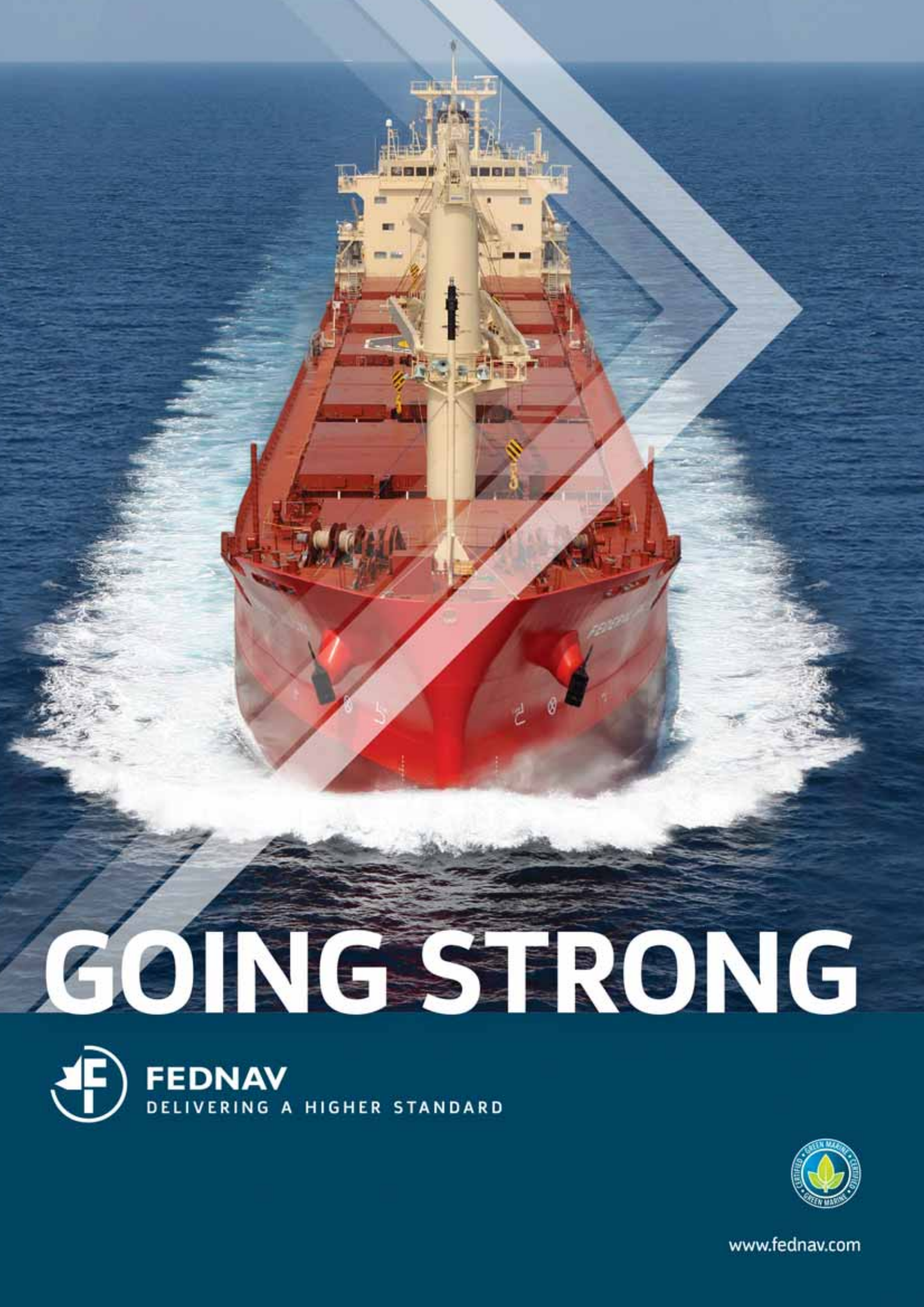
The Brazilian economy is expected to shrink by up to 3% this year, on top of the 2.5% fall in 2015. With no end in sight to the current political deadlock, which is preventing the strenuous action which is needed to get finances in order being taken, it seems unlikely that the situation of the cement industry will improve much for another year or two yet. The only bright spot is that following the 50% fall in the value of the Brazilian currency in the past 18 months, the cost of imported goods has fallen by substantially more than the earnings from exports have risen. The result has been that for the first time in a decade, Brazil's trade has generating a surplus in the past couple of years.

BRAZIL CEMENT SALES

Year	million tonnes sold
2015	64.5
2014	70.9
2013	69.9
2012	68.3
2011	63.9
2010	60.0
2009	51.6
2008	51.7
2007	45.9
2006	41.8

Source: Cement industry.

Construction is at a virtual standstill in Brazil.



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North P&I club encourages its shipowner members to join the CSO Alliance

North P&I Club has partnered with CSO Alliance — a fast-growing online community of maritime company security officers (CSOs) — to encourage its members to join and take part in security-related information sharing. In a first for the P&I (Protection & Indemnity) sector, all CSOs in North's 131 million GT owned fleet will receive a 20% reduction in membership fees for the first year and North will subsidize a further 40%.

Founded in the UK in 2012, the CSO Alliance already has over 380 members responsible for security on more than 6,000 ships worldwide. Members have access to a comprehensive and authoritative real-time incident and attack database and can share information, opinions and best practice. The management team is in regular contact with key naval commands and maritime crime reporting centres, evolving a rapid, co-ordinated response capability.

North deputy loss prevention director Colin Gillespie says, "North supports the concept of information sharing on security-related risks, both physical and cyber. As such we believe membership of the CSO Alliance will offer real benefits to CSOs employed by our members, so we have negotiated a subsidized rate for their first year of membership."

CSO Alliance managing director Mark Sutcliffe says, "North has long been one of the most innovative and forward-thinking P&I clubs and we welcome their support. They join BIMCO, the International Chamber of Shipping and numerous national shipowner associations and security suppliers in supporting our mission to build a scalable, adaptable and durable coalition against organized crime."

North says membership of the CSO Alliance will assist individual CSOs in the prevention of criminal attacks against their ships, including from piracy, stowaways and fraud. "The sharing of security information, opinions and views in a closed, community-based online forum will aid operational efficiency too," says Gillespie. "For example, access to maritime crime data allows port risk assessments to be produced more cost-effectively."

With maritime cyber security moving further up the regulatory agenda, North says the CSO Alliance also provides an ideal forum for CSOs to explore and discuss the technological issues relating to this new area of fraud and operational disruption. "Above all we believe membership of the CSO Alliance will increase knowledge and assist professional development of CSOs through international workshops, video conferencing, newsletters and online information exchange."

North P&I Club is a leading global marine insurer providing P&I, FD&D, war risks and ancillary insurance to 131 million GT of owned tonnage. Through its guaranteed subsidiary Sunderland Marine, North is also a major insurer of fishing vessels, small craft and aquaculture risks. The Standard and Poor's 'A' rated club is based in Newcastle upon Tyne, UK with regional offices in Greece, Hong Kong, Japan and Singapore and Sunderland Marine offices worldwide. North is a leading member of the International Group of P&I Clubs (IG), with 11.5% of the IG's owned tonnage. The 13 IG clubs provide liability cover for approximately 90% of the world's ocean-going tonnage and, as a member of the IG, North protects and promotes the interests of the international shipping industry.

CSO Alliance is an international online community of maritime company security officers (CSOs) run by an experienced, CSO-qualified management team based in Waddesdon, Buckinghamshire, UK. It provides a global, members-only risk management platform for all shipping sectors, helping CSOs to drive best practice and fight organized crime. Founded in 2012, the CSO Alliance has over 380 members from throughout the world who manage the security of more than 6,000 ships of all types. Members, who pay an annual fee of £250, have access to a comprehensive and authoritative real-time incident and attack database and can share information, opinions and learning for mutual benefit.

ABS releases new condition monitoring guidance

ABS, a major provider of classification and technical services to the global marine and offshore industries, has published two documents to help industry with condition monitoring. The new *ABS Guidance Notes on Condition Monitoring Techniques* helps owners choose appropriate monitoring techniques, and the *ABS Guide for Surveys Based on Machinery Reliability and Maintenance Techniques* provides updated methodologies for achieving classification notations applied to machinery reliability and maintenance management programmes. Together, these documents form a valuable resource for industry.

The newly issued *Guidance Notes* include a summary of condition-monitoring techniques, guidance for selecting the appropriate technique based on expectations and needs, information on measurement frequency, personnel skill requirements, company resources, and approaches to risk assessment.

This Guide explains the process and requirements for ABS review of design submittals and explains how designs and maintenance plans throughout lifecycle stages of the asset are analysed.

"There have been significant advances in condition monitoring software and diagnostic technologies that have the potential to improve operational efficiency and enhance overall safety," says Chief Technology Officer Howard Fireman. "These changes are reflected in these newly released documents."

ABS has cooperated with owners to develop and implement preventive maintenance programs since 1978 and issued its first guide for survey based on preventive maintenance techniques in 1984. The newly released documents draw on the knowledge and experience gained over the course of nearly four decades.

WSS highlights dangers of neglecting on board welding equipment

Wilhelmsen Ships Service (WSS) conducts safety inspections of on-board welding equipment and consumables at 26 ports throughout the world. Its findings reveal how a lack of maintenance, respect and care for this essential, yet highly dangerous, technology is putting safety, efficiency and even lives at risk everyday.

WSS, the leading global provider of maritime products and services, offers inspections at a network of key international shipping hubs, including New Orleans, Dubai, Rotterdam, Panama and Shanghai. These involve approved port representatives systemically working through a list of 75 checkpoints to assess the safety of all electric arc and gas-welding equipment.

These inspections, usually lasting for one to two hours, reveal a litany of safety risks and non-conformances, most of which can be easily remedied.

"Welding work is obviously dangerous in its own right and must be conducted by qualified crew in accordance with all necessary safety procedures and regulations," comments Leif Andersen, Technical Product Manager Welding, WSS Marine Products. "However, what is often overlooked is basic care and maintenance of the equipment itself and this can result in serious, and totally unnecessary, risks."

Andersen highlights common issues such as cracked gas hoses, missing or makeshift hose clips (allowing highly flammable gas to escape), earth/ground cables that are connected to the hulls of ships during electric arc welding (feeding the return current into the surface that the welder may be standing or lying on) and industrial welding machines where the Open Circuit Voltage (OCV) exceeds 70V, and are therefore not in compliance with the MCA's Code of Safe Working Practices for Merchant Seamen.

One of the most dramatic, and most dangerous, risks, he explains, is from 'flashbacks'.

"In short, this happens when the equipment's combustion velocity is higher than the gas exit velocity, causing the flame to burn into the equipment. This can cause damage to the hose and regulator and in worst cases trigger decomposition and an explosion of the acetylene cylinder. It goes without saying how serious this can be, for operators, and entire vessel operations."

He continues: "Poorly maintained cutting nozzles and welding necks are a main cause of this phenomenon, as they lead to turbulent gas flow and disturb the gas mix exit velocity, increasing the risk of flashback. It's therefore vital to inspect nozzles and welding necks regularly, making sure they're clean and replacing damaged nozzles. Welding shanks must also be fitted with non-return valves and regulators fitted with flashback arrestors.

"These are simple measures, to avoid very serious incidents."

WSS says the majority of the issues highlighted under inspection are often 'housekeeping' ones that can be remedied with improved handling, storage and maintenance of equipment. Recommendations on how to address these areas, along with details of any repair work or necessary spare parts, are included in the confidential reports that inspectors compile for shipowners and operators after their visits.

"This is an easy way to ensure that all equipment is in good order and address any potential issues before they put safety, and operational efficiency, at risk," Andersen concludes. "Welding equipment non-conformances are often not front of mind for crews and operators until an incident occurs. Unfortunately, by that time it's too late. High quality inspections will deliver the peace of mind, and safety, that every vessel deserves."

WSS, which also markets the globally leading Unitor brand of welding products, carries out inspections at the following strategically located ports; Vancouver, Fremantle, Piraeus, Los Angeles, Singapore, Genoa, New York, Hong Kong, Algeciras, Philadelphia, Shanghai, Lisbon, Jacksonville, Guangzhou, Antwerp, New Orleans, Kaohsiung, Rotterdam , Houston, Yokohama, Hamburg, Panama, Dubai, Barcelona, Rio, and Fujairah.

Wilhelmsen Ships Service is part of Wilhelmsen Maritime Services, a Wilh. Wilhelmsen group company. It has the world's largest maritime services network, with 4,500 marine professionals servicing 2,200 ports in 125 countries. Wilhelmsen Ships Service supplies safety products and services, Unitor products, Unicool refrigerants, Unitor and Nalfleet marine chemicals, maritime logistics and ships agency to the maritime industry. Last year the company made product deliveries to 25,000 vessels and handled 70,000 port calls.

ICS welcomes progress on CO_2 reduction

Global CO_2 data collection system

In late April, the International Chamber of Shipping (ICS) welcomed progress made by the IMO Marine Environment Committee (MEPC) towards the adoption of a global CO_2 data collection system.

Once the amendment to the MARPOL Convention enters in force, all ships over 5,000 GT will be required to provide information on CO_2 emissions via their flag states.

ICS says that once the system is adopted, IMO Member States will be in a better position to consider the development of additional CO_2 reduction measures and respond to the Paris Agreement on climate change.

"Most of the details have been agreed, including the important fact that CO_2 reporting will be mandatory. We are confident that the IMO system will be fully adopted at the next MEPC meeting in October" said ICS Secretary General, Peter Hinchliffe. "We believe that IMO Member States have agreed an acceptable compromise between governments primarily interested in data on fuel consumption and CO_2 and those that wish to collect additional information, for example on so called transport work."

Speaking from IMO, Hinchliffe added "The priority now is to persuade the European Union to adjust its unilateral regulation on the reporting and verification of individual ship emissions to make it compatible with what has now been agreed at IMO. While this may be an uphill struggle, we have been encouraged by the constructive attitude taken by EU Member States this week, as well as those other nations that initially had concerns about the decision to make the IMO system mandatory."

CO_2 Reduction Commitments

In a separate submission to the MEPC meeting, ICS responded to the Paris Agreement on climate change with a radical proposal that IMO should develop an Intended IMO Determined Contribution for CO_2 reduction on behalf of the sector. This would mirror the commitments or Intended National Determined Contributions (INDCs) which governments have made for their national economies, but from which international transport is currently excluded.

ICS says its proposal was well received by a number of IMO Member States and will be taken forward to the October meeting with other submissions made by governments and others with respect to how IMO should respond to the Paris Agreement.

Newcastle subject of environmental protests

In early May, at least 57 people were arrested at the Port of Newcastle, New South Wales, Australia, as they demonstrated against coal exports. A 94-year-old veteran of the Second World War was among those arrested.

The protest was part of the Break Free series, a planned series of parallel climate actions worldwide. Attended by 1,500 to 2,000 people, the protest reportedly blocked sea and land routes in and out of the world's largest coal port for part of the day. Activists in kayaks positioned themselves across the harbour entrance, while others blocked a railroad bridge. There were no reports of commercial vessel traffic attempting to pass through the blockade.

The Port of Newcastle told local media that coal export volumes were not affected. The port's PWCS coal terminal currently has a shorter vessel queue than in years past, due to lower Chinese demand, and average offshore waits are down to two days. However, as of April 25 there were nearly 50 ships sailing for Newcastle with a notified arrival time, a positive indicator for forward demand.

Bill Ryan, 94 years old and a veteran of the Second World War, was among those detained on charges of trespassing. "When I look at these young people I think of my own grandchildren and great grandchildren," he said. He was involved in a similar protest at the port in 2010, and he said that police recognized him from the earlier action. First time protesters Burt and Layo Nathan, 64 and 66, also cited concern for their descendents' futures in their decision to join in.

Some local residents criticized the activist group for alleged harm to the local economy, including the loss of a visit by the cruise ship *Insignia* due to the disruption.

Cam Pha port handles domestic coal

In Vietnam, Cam Pha port and logistics company, an affiliate of the Vietnam National Coal and Mineral Industries Group (Vinacomin), loaded 33,000 tonnes of coal in early February. The port, which is located in the northern province of Quang Ninh, put shipments aboard the Hai Phong 19 and Vinacomin Ha Long vessels. These took the coal to the Vinh Tan 2 and Duyen Hai 1 thermal power plants.

In 2015, the port exported more than 25mt (million tonnes) of coal, 674,000 of which was for exports, earning revenue of $1.68 billion. As for Vinacomin, in 2015, it produced 37.6mt of coal, of which 35.5mt was for domestic consumption and 1.26mt exported. Revenue for the year was up 3% to $4.85 billion. For the current year, the aim is to sell 38mt of coal, of which just 1.2mt will be exported. *Barry Cross*

Port of Kiel acquires property and warehouse at the Ostuferhafen

Site grows by 3.2 hectares, gets 18,500m² more storage space

The Port of Kiel has acquired a 3.2-hectare commercial site with warehousing from Agrar Terminal Peter Rothe GmbH & Co. KG, which lies right next to the Ostuferhafen.

The warehouse boasts more than 18,500m² of usable floor area as well as an office building and waterfront loading facilities. The Managing Director of the Port of Kiel (SEEHAFEN KIEL GmbH & Co. KG), Dr Dirk Claus, said: "This is a further important step in the development of the Ostuferhafen. Because of our currently very good work load, this expansion of the port is taking place at just the right time." The extension of warehousing capacity is of particular significance given that demand for it is rising continuously. "This year alone", commented Dirk Claus, "we are taking an additional 50,000m² of warehousing space into operation. Our overall capacity will more than double as a result".

In the newly acquired warehouse, grain will continue to be stored for the time being along with pellets and, later, sawn timber. Claus said: "This additional warehouse capacity strengthens our liner shipping services to and from eastern Europe and sends a strong signal to our timber customers." The Ostuferhafen was built in the mid 1980s on the site of a former shipyard and has been transformed to date in five development phases into a freight and logistics hub for the commercial Port of Kiel. At that time the adjacent property with its flat-roofed storage hall was first sold by the City of Kiel and not transferred into the ownership of the Port of Kiel. "I am very happy that the SEEHAFEN KIEL has now had the chance to acquire this site, which is so important for the further development of the port", said Claus. With this most recent site extension, Kiel is underscoring the universal character of its port in order to offer all its customers possibilities for expanding business.

Liner shipping services to and from Russia and the Baltic region are located in the Ostuferhafen. The RoPax ferries of DFDS Seaways link Kiel daily with Klaipeda in Lithuania. In addition, RoRo services with Russia call at St. Petersburg and Ust-Luga. As part of its new paper product business the port will in future also be served two to three times a week by SCA RoRo ships from Sundsvall in northern Sweden or, via the Kiel Canal, from the Benelux countries and England. In addition bulk cargo like grain or coal and containers are handled, along with heavy cargo and project loads. Last year more than 2.6 million tonnes of cargo were loaded or unloaded in the Ostuferhafen.

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Co-operative agreement renewed between the Ports of Antwerp and Montreal

In mid-April, during a joint trade mission in Montreal, the port authorities of Montreal and Antwerp, Belgium renewed their co-operative agreement.

The first agreement, signed in March 2013, resulted in four trade missions to Montreal and Antwerp during which extensive business contacts were developed. These meetings also enabled productive exchanges of information on issues such as sustainable development, land use, the Comprehensive Economic and Trade Agreement (CETA) between Canada and the European Union, global trends in the markets, and the development of port logistics zones.

Port of Antwerp (© Antwerp Port Authority).

As Sylvie Vachon, President and CEO of the Montreal Port Authority (MPA), pointed out, this agreement's renewal is a great fit with the Port of Montreal's commitment to strengthen its ties with its largest European trading partner. "In the last three years, we were able to realize how much our two ports share the same concerns. We got to know each other, to collaborate effectively and we are now at a level of mutual trust that lets our departments discuss many issues of common interest and take concrete action on joint business development. The renewal of this agreement beautifully illustrates our commitment to further our collaboration and in doing so, continually provide better service to our clients."

For Luc Arnouts, Chief Commercial Officer and member of the Port of Antwerp's Board of Directors, "The Port of Antwerp and the Port of Montreal share many common traits. As large container ports located inland, Antwerp owes its prosperity to the Scheldt River and Montreal to the St. Lawrence River. During our collaboration we have deepened trade relations, among other things, resulting in a network that greatly benefits both partners. Implementation of the CETA agreement will give rise to a new dimension in our co-operation."

Montreal grain terminal.

Every tier of government in Canada has recognized the agreement between the Port of Montreal and the Port of Antwerp. In fact, the agreement between the two ports has been repeatedly cited by the federal and provincial governments, along with the City of Montreal, as an example of beneficial strategic development for international trade.

A gateway of choice for European markets and a major transshipment hub, the Port of Antwerp is the Port of Montreal's largest trading partner. One container in five handled at the Port of Montreal arrives from or gets sent to the Port of Antwerp.

About the Port of Montreal

Operated by the Montreal Port Authority (MPA), the Port of Montreal is a major diversified transshipment centre that handles all types of goods — containerized and non-containerized cargo, liquid bulk and dry bulk. It is a leading container port served by the largest container shipping lines in the world.

Based on preliminary data, the Port of Montreal handled 32 million tonnes of cargo and welcomed 91,000 passengers and crewmembers at its cruise terminal in 2015. It has its own rail network directly dockside. It is connected to the two national rail networks and a highway system.

Port activity supports 16,000 jobs and generates $2.1 billion in economic spin-offs annually.

About the Port of Antwerp

A true economic powerhouse for the region of Flanders, Antwerp is the largest port in Belgium and the second largest in Europe. From wind turbines to automobiles to oil, from coffee to fruit: the most varied products transit through it. However, the Port ensures far more than loading and unloading cargo, having positioned itself as a unique logistics platform and becoming one of the world's leading centres for the petrochemical industry. While providing the fastest and least expensive connection to the European hinterland, it also operates responsibly and sustainably.

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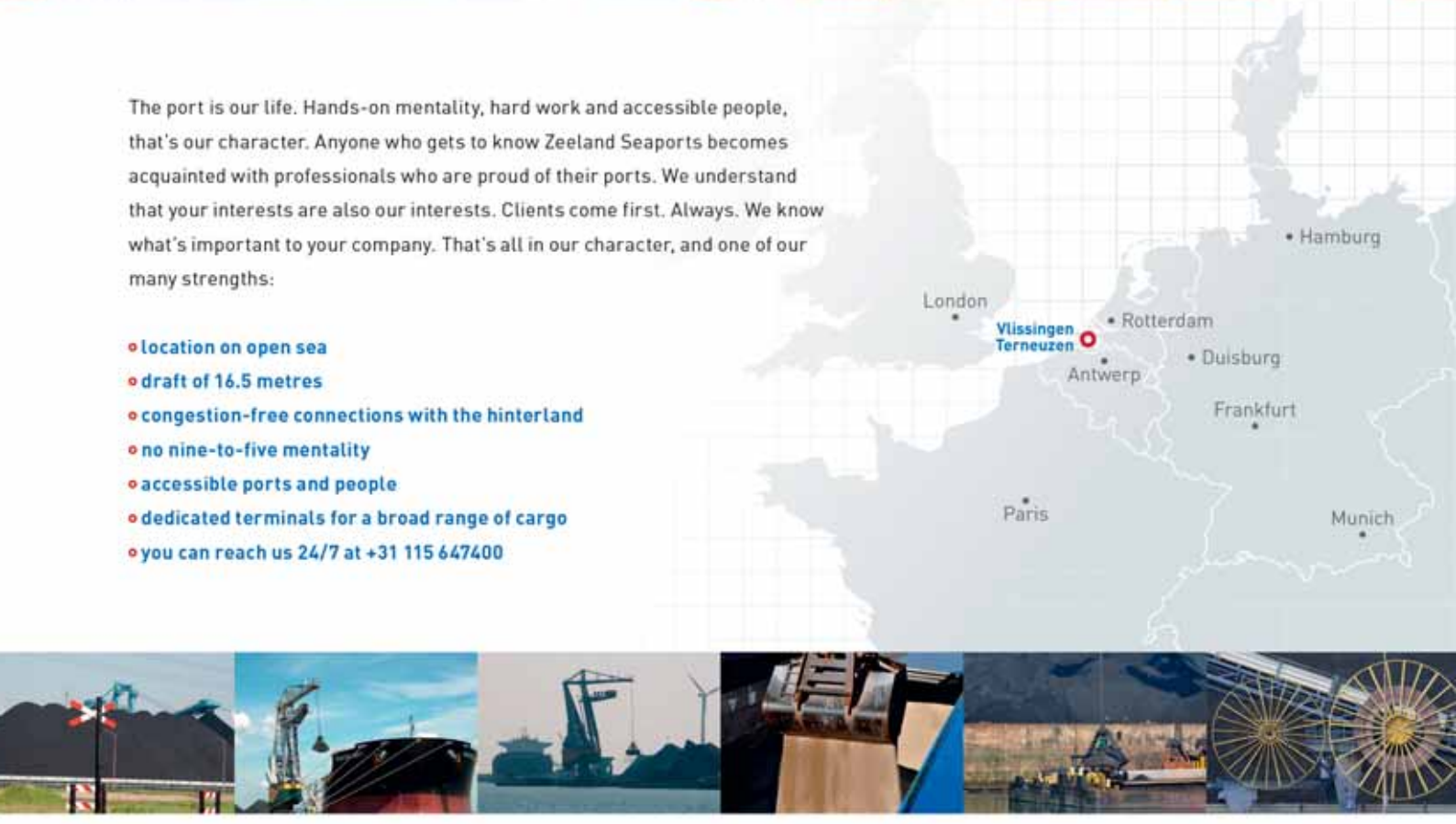

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Duqm commences dolomite exports

In Muscat, the Port of Duqm has begun shipping export dolomite from the commercial quay. The first vessel, which docked in February, was loaded with three grades of dolomite, the whole shipment amounting to 50,000 tonnes. It later sailed to India.

Dolomite is produced some 30 kilometres from the port, where reserves are estimated to be 300 million tonnes. Of the several hundreds of thousands of tonnes to be produced monthly, the vast majority will be exported via Duqm port.

Port CEO Reggy Vermeulen noted, "One of the three major markets that port of Duqm is aiming for is the support of the mineral industry of Oman. This first shipment is a key milestone towards port of Duqm playing a significant role in the diversification of the Omani economy. Having flows of minerals going through the port of Duqm is an enabler for the setting up in the mid-term of a proper mineral related industry cluster offering potentially numerous jobs for Omanis."

The port is planning to further develop minerals traffic to become a major international export hub for industrial minerals in the next few years. Dolomite, gypsum, silica sand and limestone are just four of a dozen industrial minerals located close by.

The Dry Bulk Terminal could potentially handle up to five million tonnes per annum as part of the port's Phase 1 development. Facilities include 300 metres of berth line, allowing the simultaneously handling of up to two large bulk carriers.

The Special Economic Zone Authority at Duqm (SEZAD) will also make use of these easily available minerals, whose use will grow once a new gas pipeline from central Oman allows this fuel to be used as of 2018. *BC*

Cargill to open Yuzhny grain terminal

An agreement was signed on 24 February between Cargill and the MV Cargo company to build a new grain terminal at the Black Sea Port of Yuzhny. According to the Ukraine prime minister, the new terminal will provide more jobs and enhance the country's export potential for grain, demonstrating the strength of relations between the US and Ukraine. *BC*

Namport upgrades rail access to Walvis Bay

Port of Walvis Bay.

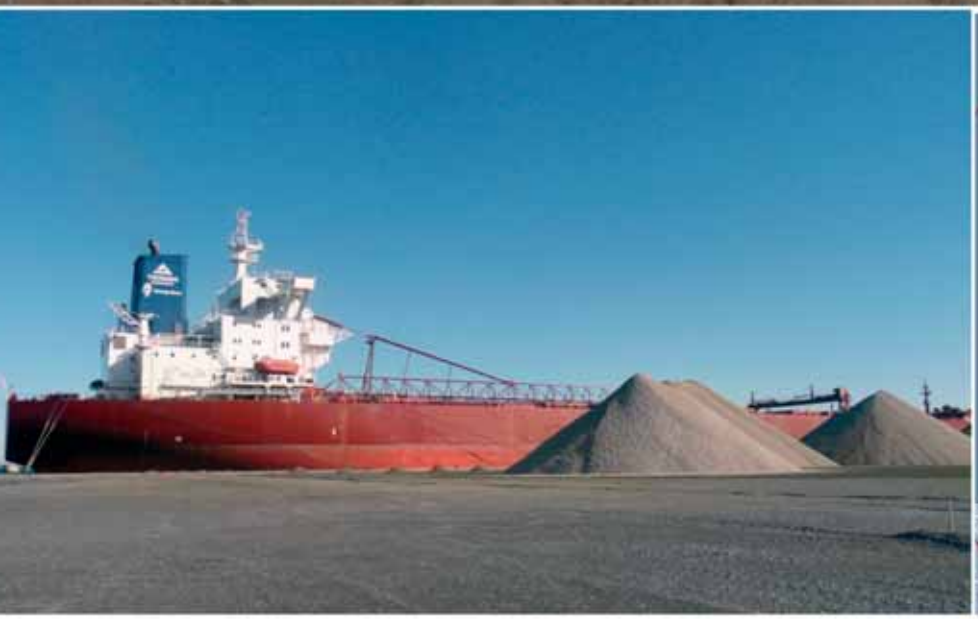
In Namibia, Namibian Ports Authority (Namport) has invested $1.373 million in upgrading its railway infrastructure, which is the first time new investment has been made in the network since it was established in 1994.

Within the country's main export port of Walvis Bay, all rail infrastructure is owned and maintained by Namport. However, despite this, planned renovation of the system slated to take place more than five years ago was never undertaken.

As part of the recent upgrade, the main feeder line into the port has been modernized, while other sections of track have had to be completely rebuilt. This has involved the laying of new rails and sleepers, as well as re-ballasting.

According to Namport, "Although of relatively small value, this project was significantly complex due to the requirement for minimum operational interruption to the track, which is in daily use." *BC*

Dry bulk operations the Scandinavian way!



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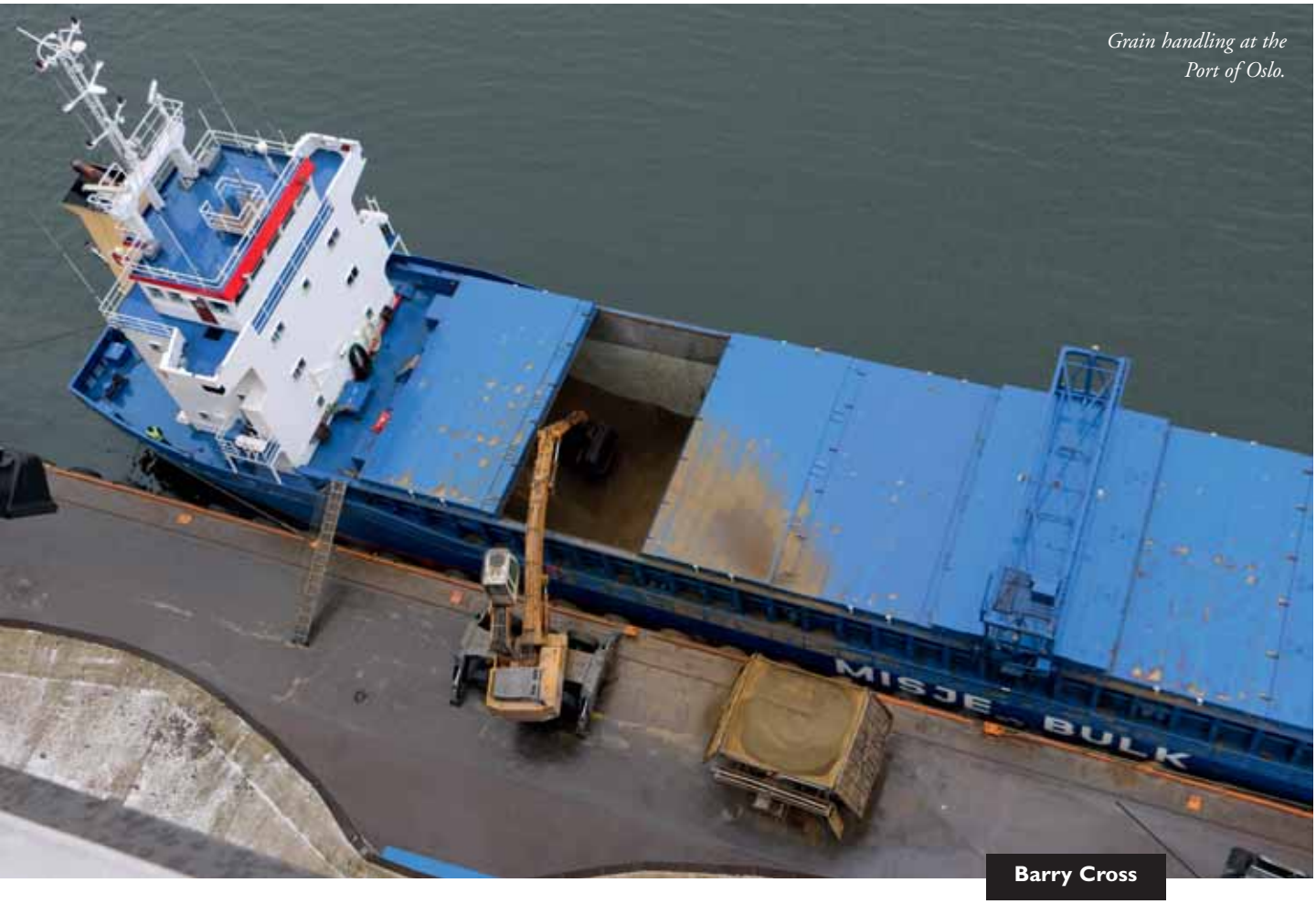
Bulk handling at Scandinavian ports



Grain handling at the Port of Oslo.

Barry Cross

In 2015, the Norwegian Port of Oslo reported a dry bulk throughput of 1.63mt (million tonnes), compared to 1.39mt the previous year. There were, notes Market and Strategy Director Siw Hauge, significant changes in how the numbers were made up; nevertheless, the single most contributing factor was an increase in domestic shipments from local construction projects to landfills.

"Expectations for 2016 are very promising. The first two months have resulted in an increase of 39% compared to the first two months of 2015. Again, bulk flows from construction projects have been the main driver, but as this tails off, the various construction projects are turning towards the building phase, which means a need for cement, concrete, iron, and so on," says Hauge.

In addition, she notes that imports of RDF — sorted waste for incineration — and other environment-driven flows are driving change and growth in dry bulk traffic.

However, the downturn in the Russian and Chinese economies will have little or no impact on traffic, she stresses.

Quizzed as to which dry bulks the Port of Oslo specializes in, Hauge says that this is possibly not the right term to use, since the port tends to handle commodities that are driven by the local and regional markets, since the port itself is not a hub for industrial producers as such. In general, the main commodities handled tend therefore to be salt, grain, fertilizer, cement, concrete, asphalt, various construction masses, waste and scrap.

Asked whether were any new dry bulk commodities that the port would like to handle in the future, she remarked that the timber industry in Norway is undergoing major change and that timber may become an important cargo, either shipped in bulk or container. There is also a significant trend for the growth of environment-driven flows, from depot-flows to recycling-flows that will, she predicts, impact the dry bulk market in the future.

As for new investment, "There are several projects in the pipeline to underpin the development of these new traffic flows and we are opening a new area in the port mainly for dry bulk cargo."

The Port of Oslo is also predominantly a landlord port.

Hempel's Dynamic delivers fuel savings for Lemissoler

Global shipmanagement company, Lemissoler Navigation, via its affiliated and managed company Frontmarine Co. Ltd, has achieved significant fuel savings from coating its newbuild 58,500dwt Supramax bulk carriers with Hempel's Dynamic antifouling product.

As part of an environmental efficiency drive, Lemissoler has adopted a unique hull design for the new vessels, fitted them with fuel-efficient propellers and coated the undersides with Hempel's Dynamic antifouling.

According to the design specification, fuel consumption was calculated at 24.7 tonnes per day at 14.2 knots in ballast condition. Thanks to the eco-innovations, these vessels in sea trials are achieving a fuel consumption of just 23 tonnes.

Lemissoler Navigation has coated four of the eight newbuilds with Dynamic and, based on its successful performance, is planning to coat the remaining four vessels with the same product.

Hempel's Group Product Manager, Andreas Glud, explains why Dynamic has been so successful: "Dynamic is a low friction, hydrolysing silyl acrylate, which gives our customers an outstanding antifouling service and delivers average fuel savings of up to 4%. Our patented microfibre technology, which is integral to this paint, gives it an exceptional mechanical strength that reduces cracking and peeling. Based on the fuel savings demonstrated in these trials, our Dynamic antifouling is a contributing factor to an overall fuel saving of 7% for the new Frontmarine vessels."

Lemissoler Group's Technical Manager, Mr. Dimitris Solomonides says: "We are delighted with the results of the recent sea trials of the first four new vessels. Lessening the environmental impact of our activities and improving fuel efficiency is one of our top priorities and we believe that the innovative design of the newbuilds, the fuel efficient propeller and Hempel's Dynamic antifouling have proved to be a winning combination in delivering these efficiencies."

About Hempel

Hempel is a renowned coatings supplier for the decorative, protective, marine, container and yacht markets. From wind turbines and bridges to hospitals, ships, power stations and homes, its coatings protect man-made structures from the corrosive forces of nature.

With a focus on R&D, advanced production techniques and professional coating advice, Hempel works around the globe to help keep its customers' investments safe and beautiful for longer. Its working concept is simple: we are curious, creative and self-critical, and always aim to create extra value for its customers. With 11 R&D centres, 28 factories, and more than 150 stock points around the world, Hempel is present in 80 countries employing more than 6,000 people.

Historically, it has owned and operated cranes. However, recently, G. C. Rieber Salt has acquired a Mantsinen 120 material handler, prompting Mrs Hauge to suggest that, in the future, both ownership and operation of cranes will transfer to private operators.

"We do offer an assortment of value-added services, such as bagging, sorting, and grading. Furthermore, we can undertake transformation activities, such as in the production and distribution of concrete and asphalt," she says.

Although the Port of Oslo does not have inland waterway connections, some cargo is either transshipped in the port or despatched domestically by coastal shipping. Significantly, while rail connections are in place, it is not presently used to transport dry bulk. Having said that, Hauge suggests that as timber export traffic ramps up, rail may have a part to play in moving consignments to the quayside.

The Norwegian Port of Larvik openly concedes that, while it is a major player in the ferry and breakbulk markets, not to mention also being the country's third-busiest container facility, dry bulk traffic remains somewhat marginal in nature.

Last year, for example, dry bulk accounted for 700,000 tonnes, which was a substantial improvement on the 400,000 tonnes reported for 2014. For 2016, the port authority believes it will handle around 500,000 tonnes.

According to port spokesperson Jan Fredrik Jonas the state of the Chinese economy may have some impact on what takes places in Larvik, although the Russian economy is not a factor.

At present, Larvik does see substantial traffic in export granite, which is produced at the nearby Larvikit quarries. Most of the granite blocks are stuffed into containers and then despatched via the container terminal, but some are still shipped in bulk carriers.

Furthermore, residual stone products from the quarries are shipped by barges and short sea to UK, the European mainland and also to Central America for both coastal building purposes and for offshore cable laying.

The bulk stone is handled at a dedicated facility within the port.

Asked whether there are any dry bulk commodities that Larvik would like to handle in the future, Jonas says that minerals

The Port of Larvik.

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The Port of Narvik.

might be interesting, as the British company Kodals Minerals is looking into a possible local deposit of ore and phosphate.

As for movement to and from the port, this is uniquely by road.

One of Norway's main dry bulk ports is Narvik, which is due almost entirely to the presence of Luossavaara-Kiirunavaara AB (LKAB), which ships more dry bulk through Narvik than through any other port in the country. The choice of Narvik is clear: it is ice free all year round and has sufficient draft to accommodate large bulk carriers, as well as being sheltered from rain and wind.

Furthermore, the port can handle up to 20mt of cargo annually if required.

The LKAB facility is served by a 650-metre long quay, equipped with an eco-friendly, automated unloading station, offering high levels of storage capacity. Known as Sila, the terminal has twelve, 60-metre deep storage silos blasted into the mountainside. It is run using advanced automation technology and specially designed ore wagons operating there can be unloaded in just five seconds. This means that an ore train consisting of 68 wagons can be unloaded in just six minutes.

Iron ore is brought into the terminal from Northern Swedish mines in Kiruna and Kaunisvaara by rail, the distance being relatively short, making Narvik the natural maritime outlet for mining production. From here, iron ore is shipped all over the world.

However, the port's rail network is even more extensive, with trains running to and from Southern Scandinavia, Central Europe, Russia and Asia.

VPS and Seagull Maritime launch fuel management e-learning

Veritas Petroleum Services draws on fuel testing expertise to deliver fuel management e-learning to shipping industry with Seagull Maritime AS

On 25 April this year, Veritas Petroleum Services (VPS) and Seagull Maritime AS announced that they have signed a collaborative agreement that will capitalize on their complementary strengths to bring state-of-the-art fuel management training to the maritime industry.

First conceived to plug a gap in the knowledge and experience of ship managers and vessel crews in fuel management, this novel but comprehensive computer-based training tool is now being developed to provide e-learning onboard and ashore.

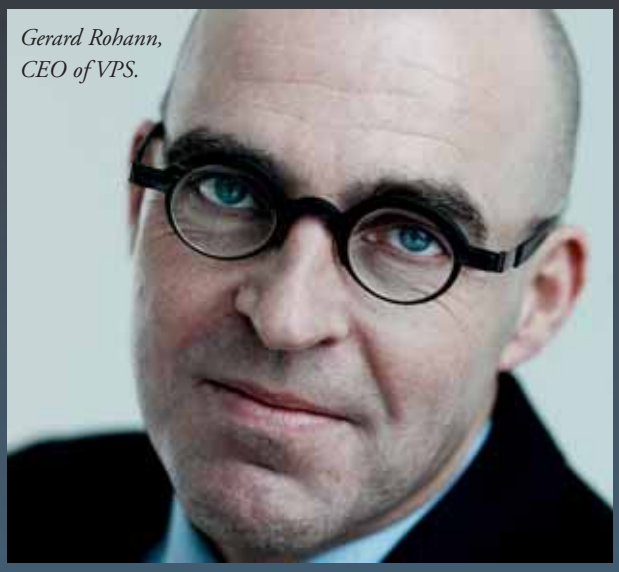
"As the pioneer of fuel quality testing and analysis with more than three decades of global experience, we have noticed a pressing need for seafarers to fully understand fuel quality issues and learn how to handle such challenges. At the same time, we have also observed that ship crew are invariably short-handed and hard-pressed for time," said Gerard Rohann, CEO of VPS.

"Hence, now more than ever before, such fuel-related knowledge and capabilities are increasingly becoming the keys to mitigating engine breakdowns and unplanned operational downtime. We will give our clients a competitive edge by bringing carefully designed e-learning to their crew and staff, anywhere, anytime, and by leveraging technology and combining our unique competencies with those of Seagull Maritime."

"As the leading provider of computer-based training systems to the shipping industry worldwide with 9,500 user sites, it is logical for us to gravitate toward VPS, the recognized leader in fuel testing and inspection, to provide e-learning on total fuel management solutions for our customers," added Oscar Johansen, Chairman of Seagull Maritime AS.

The first module of the comprehensive computer-based educational and training system will focus on fuel sampling, testing and bunkering, and is expected to be ready for the shipping industry by the middle of the year.

Oscar Johansen, Chairman of Seagull Maritime AS.



Gerard Rohann, CEO of VPS.

About VPS

Veritas Petroleum Services (VPS) delivers testing, inspection and advisory solutions that help customers achieve measurable improvements to fuel management, fuel cost, operational efficiency and marine fuel regulatory compliance. In close collaboration with the industry, the company introduced the first commercial bunker fuel testing and bunker quantity surveys for ships in 1981 and 1987, respectively.

VPS operates a global network of customer service offices supported round-the-clock by technical experts integrated with four specialized and wholly-owned ISO 17025 accredited fuel testing laboratories strategically located in Rotterdam, Singapore, Houston and Fujairah. Its bunker quantity surveys are available at more than 200 key bunkering ports worldwide.

About Seagull

Seagull Maritime AS is the leading provider of competence management solutions and e-learning material for seafarers worldwide and offers a comprehensive library of training and onboard courses for regulatory compliance and improved seafarer knowledge.

Founded in 1996 by experienced mariners we have grown into a dynamic company in partnership with leading shipping companies to deliver a full range of competence management, training administration, assessment and training tools that ensure meeting and exceeding STCW and IMO standards.

Seagull Maritime understands the unique challenges facing shipping companies today and is committed to leading the maritime world in providing training solutions for seafarers. Seagull's solutions have been delivered to over 9,500 ships and office installations around the world.

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shorecranes up to 208 tons

MacGregor self-unloading systems selected for Algoma's Great Lakes fleet modernization programme

MacGregor, part of Cargotec, has received an order for gravity self-unloading systems for two 29,800dwt bulk carriers (lakers) from the Yangzijiang shipyard, in China. The vessels will be delivered late 2017/early 2018 to Canadian Great Lakes operator, Algoma. The order was booked into the first quarter 2016 order intake.

"MacGregor enjoys a good, long-term relationship with the Yangzijiang shipyard and we are happy to see our position in the self-unloading market strengthened through this order," says Mikael Hägglund, Sales Manager, Selfunloaders.

The contract will see MacGregor deliver a highly-automated, efficient self-unloading system to each of the new vessels. The system is designed for a maximum unloading rate of 5,450tph (tonnes per hour) for stone or iron ore and 4,360tph for coal. MacGregor is responsible for the design of the complete self-unloading system, which includes a discharge boom, full flow cargo gates, conveyor belts, cross conveyors, and a C-loop.

"MacGregor thoroughly discussed Algoma's technical requirements during the pre-contract phase and was able to offer the most efficient solution that best suited the operator's needs," notes Hägglund. "Meeting the tight delivery schedule and the co-ordinated teamwork with the shipyard was also an important factor in securing the order."

The new bulkers will join Algoma's fleet of 13 domestic self-unloading vessels operating on the Great Lakes and the St Lawrence Seaway, all of which have to comply with extremely strict environmental protection legislation.

"MacGregor's gravity self-unloading technology is well-recognized by the industry for being able to provide improved levels of cargo handling efficiency, which in turn delivers a commercially competitive advantage to shipowners," Hägglund adds.

MacGregor shapes the offshore and marine industries by offering world-leading engineering solutions and services with a strong portfolio of MacGregor, Hatlapa, Porsgrunn, Pusnes and Triplex brands. Shipbuilders, owners and operators are able to optimize the lifetime profitability, safety, reliability and environmental sustainability of their operations by working in close cooperation with MacGregor.

MacGregor solutions and services for handling marine cargoes, vessel operations, offshore loads, crude/LNG transfer and offshore mooring are all designed to perform with the sea.

LKAB is also present at the key Swedish Port of Luleå, where it mainly handles pellets from Malmberget, at Malmhamn, which are en route to customers in the Baltic.

This facility opened as long ago as 12 March 1888, with the first iron ore train arriving at Svartön. The harbour was modernized in the 1960s, including building a brand new quay, as well as putting in place brand new shiploaders and iron ore stockpile yards. Then, in 1996, all harbour facilities moved to a new home on Sandskär.

LKAB has an experimental blast furnace located at Luleå. It is used to evaluate different pellets recipes.

The port is also the location of LKAB's bentonite plant, limestone plant and oil depot.

In Sweden, four ports have come together to form North Sweden Seaport. This organization spans a 230km stretch of coastline in the Gulf of Bothnia and encompasses the ports of Skellefteå, Piteå, Luleå and Kalix.

The aim of the collaboration is to boost competition in the shipping industry in the region. This, in turn, should help both local industry and society.

Together, the three ports account for around 8% of all cargo passing through Swedish ports.

Each of the ports has important dry or breakbulk traffic.

The Port of Skellefteå, for example, mostly handles forestry products and bulk cargo. As for the Port of Piteå, this is the second largest in Sweden in the forestry products sector, handling such commodities as paper pulp, kraft linerboard and pulpwood, as well as sawn timber. Significant investment has been made in key supporting infrastructure and storage capacity. In addition to two ro-ro connections, the port is also linked by liner services to both England and Germany.

The Port of Luleå, for its part, remains one of Sweden's leading ports, handling large volumes of bulk cargo, such as coal, limestone, bentonite and scrap metal. In addition, Luleå is the home port of the Swedish icebreaking fleet.

Finally, the Port of Kalix has become a specialist in the despatch of wood pulp, much of which comes from pine trees from across countries in the Baltic region.

One company that operates in all four ports is ShoreLink AB, which supplies a full range of services, including loading, transport, warehousing and clearance services, as well as handling 5mt of cargo annually.

Also in Sweden, the port of Hargshamn had a difficult year in 2015 in terms of dry bulk traffic, with volumes dropping from 1.5mt in 2014 to just 622,000 tonnes last year. The port's managing director, Curt Nilsson, attributes the downturn to the bankruptcy of its most important client: Dannemora Mineral (DMAB). This became insolvent in March of last year, having previously operated an iron ore mine some 40km from the port. To appreciate exactly how big a blow this was to Hargshamn, it should be recalled that, in 2014, DMAB accounted for 1.2mt of iron ore traffic at the port.

In an attempt to partially offset the loss of DMAB, the port authority is now trying to increase the handling and storage capacity of grains. Simultaneously, it continues to promote itself as a project cargo handling port, whist also making stringent attempts to attract further building equipment and materials, for which storage facilities already exist within the port.

Nilsson also identifies peat briquettes as another commodity in long term decline, forecasting that within the next five years most of this traffic will have completely disappeared.

Hargshamn mainly attract bulk carriers in the 1,000dwt to

The Port of Kalundborg.

23,000dwt range, as well as dealing with some small barges. Some vessels are geared, but most use quay-based portal cranes or conveyor belts for loading and discharge duties. However, there is a definite trend away from the deployment of coasters towards more Handysize vessels, notes Mr Nilsson.

The port doesn't simply handle raw materials, but also seeks to add value to some products. Peat briquettes, for example, are loaded into containers, while other commodities are loaded into big bags. Firewood is additionally processed into woodchips.

Landside movements to and from the port do involve rail as well as road, although some consignments never even get that far, being rotated in and out of the quay by sea. However, Nilsson believes that ever more volumes will be moved by rail in future.

At the Finnish port of Hamina, Baltic Bulk has increased its commitments to dry bulk handling by building a new railway wagon unloading station. Opened at the beginning of July, the covered facility was driven by requests from the company's customer base, notes spokesperson Kim Lindström. It had earlier offered a similar service earlier in Kaskinen, but the new facility in Hamina has been so popular that trains are now arriving on a weekly basis.

Simultaneously, Baltic Bulk also installed a new truck weighbridge at the beginning of November. The full-length weighbridge of 100,000 tonnes is located alongside Baltic Bulk's warehouse in the quay area.

Baltic Bulk, which operates at five ports in Finland, serves the mining, bio-energy, food, animal feed, paper, construction, chemical and metal industries in terms of both port warehousing and in the transport of bulk materials.

In neighbouring Denmark, the Port of Kalundborg handled 1.2mt of dry bulk last year compared to 980,000 tonnes in 2014. Liselotte Rørup says the 22% increase is down to the price of grain, which has boosted shipment of export wheat.

Nevertheless, the port is not making any significant new investment in dry bulk infrastructure, although is seeking to handle more fertilizer traffic in the coming year to offset what has been something of a long term decline.

Kalundborg certainly has the draught to handle large ships and currently accommodates anything up to Panamax size vessels.

Within the port, there is a privately owned packaging factory for salt and pellets, which helps to add value to the basic commodities handled.

Most onward transport of dry bulk is by road, although there is also some vessel-to-vessel transfer too, with larger ships decanting consignments onto smaller vessels for onward delivery of cargo.

Liebherr mobile harbour cranes spread in Scandinavia

- Liebherr delivered a fully electrical LPS 420 portal slewing crane to AB Fortum Värme, co-owned with City of Stockholm;
- Risavika Terminals is about to increase container throughput with new LHM 420; and
- Port of Aabenraa opted for an LHM 550 with tandem lift software Sycratronic®.

The recent deliveries of three Liebherr mobile harbour cranes underline the strong demand for innovative cargo handling solutions in the Scandinavian region, tailor-made by Liebherr.

Thirty-seven years after the first delivery of a Liebherr mobile harbour crane to Scandinavia, the demand for Liebherr products remains constant. In 2015 three Liebherr mobile harbour cranes were delivered to Scandinavia. With these forward-looking investments, the Scandinavian market made a consequent commitment to modern and environmentally friendly technology from Liebherr.

Innovative technology for special requirements

The Swedish energy company Fortum Värme was searching for a reliable solution to unload bio fuel for its new combined heat and power plant in Stockholm, Sweden. Although the energy company was initially not searching for a mobile harbour crane, Liebherr's Swedish sales team offered them a powerful material handling solution out of the maritime product portfolio. Knowing that a Liebherr mobile harbour crane mounted on a portal can fulfil or even exceed the customers' requirements, a Liebherr portal slewing crane LPS 420 was offered to Fortum Värme.

The crane is installed very close to the city centre of Stockholm hence very close to residential areas. Very strict requirements not only in regards to the noise level, but also in regards to the appearance of the whole machine had to be fulfilled. Furthermore Fortum Värme defined very strict performance guarantee on the whole bio fuel supply unit to guarantee lowest possible downtimes, because up to 190,000 households in Stockholm rely on the on the combined heating and power plant being operational at all times.

Fully electrical Liebherr portal slewing crane LPS 420 handles bio fuel at a combined heat and power plant in Stockholm.

Experience the progress.

LPS 550

With its portal crane models, Liebherr offers a unique combination of tested Liebherr harbour crane technology and space-saving assembly on rail-mounted portals. The model series of Liebherr portal slewing cranes (LPS) is suitable not only for handling bulk goods and cargo but also containers in sea and inland harbours.

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LIEBHERR

In order to comply with the requirements Liebherr delivered a fully electric driven portal slewing crane, type LPS 420. The four-rope machine has a maximum lifting capacity of up to 124 tonnes and a maximum outreach of 48 metres. Fitted with a 50m³ Verstegen grab and Liebherr's hybrid drive system Pactronic® the LPS 420 is able to efficiently unload up to 2,240m³ bulk per hour.

"We have the highest demands regarding quality for all equipment suppliers for our combined bio power and heating plant. The crane is going to be used for many years to come, and therefore it feels satisfying that the crane is delivered from one of the biggest suppliers at the market, who has many years of experience for this type of equipment," said Mats Strömberg, Head Project Leader for Fortum Värme's new bio power and heating plant.

A special feature of the crane is the elevator, which provides easy access for the crane operator. The elevator was manufactured by the Swedish company Alimak, which is specialized on industry elevators. Alimak installed the elevator in close cooperation with Liebherr engineers.

LHM 550 to suit new needs

The Port of Aabenraa is the fastest growing Danish harbour in terms of cargo handling. The port acts as a loading and unloading hub for the entire Baltic Sea and is one of Liebherr's long-time customers in Scandinavia.

Over the last three years the demand for heavy lift operation at the port increased rapidly. Therefore, the port of Aabenraa decided to swap their existing LHM 280 for a stronger model, a new LHM 550. The four-rope machine is driven by a 750kW Liebherr diesel engine which complies with the latest emission standards Tier 4 final/stage IV. With a maximum lifting capacity of up to 144 tonnes the crane will be mainly used for bulk operations and heavy lifts. Equipped with Liebherr's tandem lift software Sycratronic®, the crane can be synchronized with Aabenraa's existing LHM 320.

Liebherr LPS 420 supports a combined heat and power plant in Stockholm to produce green energy.

Long-term partnership

When it comes to service, speed and reliability are essential elements for every customer. Liebherr Maritime Cranes fully understands the value of a quick response to reduce down time and restore LHM productivity straight away. To benefit from the Liebherr customer service the three Scandinavian customers (FORTUM, Risavika Terminals and the Port of Aabenraa) signed a service agreement with Liebherr.

The fast availability of spare parts and service engineers ensures high productivity for each terminal. With these forward-looking investments the entrepreneurs of all three companies made a consequent commitment to a long-term partnership with Liebherr Maritime Cranes.

Superior appoints Bramco-MPS as dealer

Superior Industries, Inc., a major US manufacturer and global supplier of bulk material processing and handling systems, appointed Bramco-Mineral Processing Solutions (MPS) as a new equipment dealer in Indiana, Kentucky and Tennessee.
Bramco-MPS will market, sell and service Superior brand crushing and screening equipment in Indiana, plus washing and conveying equipment in Indiana, Kentucky and Tennessee.

"We are very impressed and excited to start working with Bramco's veteran, industry-experienced sales and service teams," says Bill Humphrey, Superior's equipment sales territory manager in Wisconsin, Michigan, Indiana, Illinois, Kentucky and Tennessee. "Their team is equipped with individuals who possess dozens of years of industry experience building aggregate and coal focused mineral processing systems for their customers."

Headquartered in Louisville, Kentucky, Bramco-MPS is one of the largest multi-state construction, mining, material handling, processing and earthmoving equipment distributors with thirteen full-service branches throughout Kentucky, Indiana, Tennessee and Mississippi. Its business provides customers with support services for single or multiple locations including determining machinery to best fit an application, production expectations and operation and maintain training and support.

About Superior Industries, Inc.

Superior Industries engineers and manufactures groundbreaking, bulk material processing and handling equipment and cutting-edge components related to the machinery. From its headquarters in Morris, Minnesota, USA, the manufacturing firm supplies bulk crushing, screening, washing and conveying systems for industries including construction aggregates, mining, bulk terminals, agriculture, power and biomass.

In addition to its home plant in Minnesota, the 44-year-old Superior operates from additional engineering and manufacturing centres in Arizona, Georgia, Michigan and Nebraska, USA; Alberta and New Brunswick, Canada; and three production facilities in Brazil.

New coke unloading plant at voestalpine

In early November 2015 voestalpine's new coke unloading plant was inaugurated in Leoben/Donawitz in Austria.

voestalpine, Innofreight and the Rail Cargo Group have jointly developed the loading system which will revolutionize raw material logistics at this site.

The new unloading station allows for a 100% delivery of raw materials by rail. A central component is Vollert's shunting robot KR 100, which pulls the loaded carts through the unloading station. The new plant technology will not only conserve resources and increase efficiency in Donawitz, but has also added value to the site and the region.

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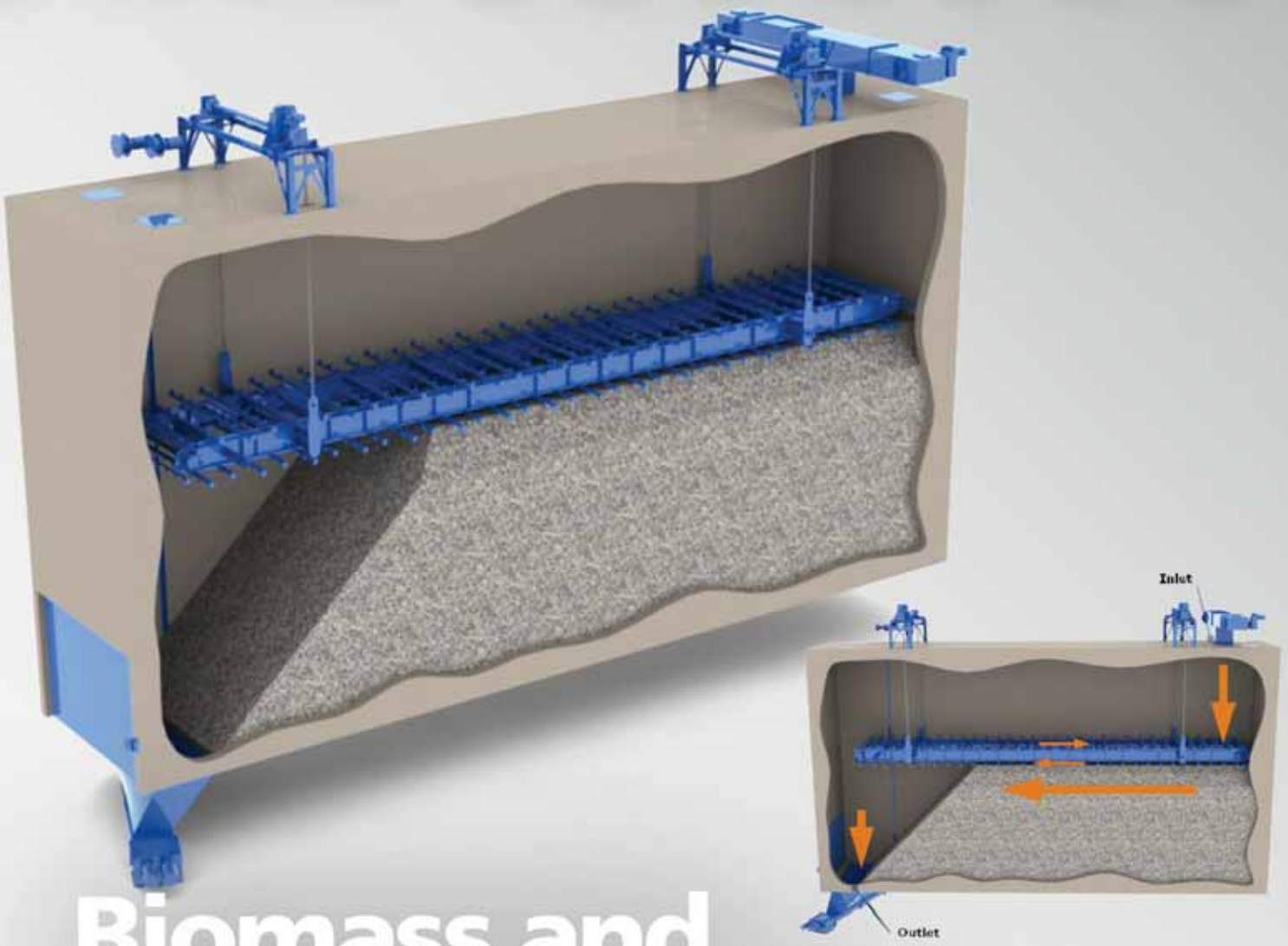

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Duro Felguera wins US$109m contract in Algeria

❖ SECOND PROJECT FOR DF IN ALGERIA, AS THE ENERGY DIVISION IS CURRENTLY BUILDING A COMBINED CYCLE POWER PLANT

The DF (Duro Felguera) Mining & Handling business division has won a contract to supply bulk handling equipment at a new iron and steel complex in Bellara (in the north-east of Algeria), after reaching an agreement with Algerie Qatar Steel (AQS), the promoter of the plant construction project. The shareholding structure of AQS consists of the company Sider and Qatar International, a joint venture between Qatar Steel and Qatar Mining.

The purpose of the project is to supply local demand for finished products and the plan is to reach a production figure of 2mt (million tonnes) of steel per year. Duro Felguera will deliver the project as a turnkey contract, including the engineering, procurement, manufacturing, construction and commissioning of the equipment necessary for the bulk handling package.

The estimated budget for the project is US$109.4 million dollars, which will cover two different parts. Firstly, the port terminal facilities at the port of Djen Djen, for the reception of 3.5mt of iron ore pellets per year; and secondly, the equipment for pellet storage before being sent to the direct reduction plant (DRI) within the new iron and steel complex at Bellara.

The equipment will include ore unloading gantries, conveyor belts, stackers and reclaimers, train loading and unloading docks, and service equipment to support these facilities.

This will be the second project that DF has implemented in Algeria, as the DF Energy division is currently building a gas-fired combined cycle power plant at Djelfa (300km south of Algiers). This power plant will have four gas and two steam turbines and will be the largest built yet by DF, at over 1,250MW. The Djelfa project, awarded by the Algerian company Societé de Production de Electricité, a subsidiary of the Sonelgaz group, is also an EPC turnkey project.

With this new project announced in April this year, Duro Felguera is strengthening its commitment to the market in Africa, where the various different business lines are currently carrying out projects. More specifically, the DF Mining & Handling division is building two iron ore processing plants in Mauritania and a bulk port terminal in Egypt. The subsidiary Felguera IHI has implemented two projects for the design, engineering and procurement of LPG storage terminals: an 8,500m^3 spherical tank in Nigeria and eight 64,000m^3 vertical tanks in South Africa.

About Duro Felguera S.A.

Duro Felguera (DF) is a Spanish company that specializes in the delivery of turnkey projects for the energy, mining and handling, oil & gas, smart control systems, communications, security and defence sectors. It is at the same time a supplier of assembly and industrial plant operation and maintenance services, mainly in the field of power plants. The company is also a prestigious manufacturer of equipment, pressure vessels and fractionating columns etc. for the oil industry and railway crossings for high speed trains.

The company's headquarters are in Gijón (Asturias), and it boasts over 150 years' experience in industrial activity. It has been quoted on the Stock Market of Madrid for over 100 years. DF is currently represented in Mexico, Brazil, Colombia, Venezuela, Argentina, Chile, Peru, Costa Rica, USA, India, China, Indonesia, Saudi Arabia, Bahrein, Dubai, Japan, Australia and Algeria.

Tenova confirms completion of sales of Bateman Projects to SGS

Tenova is pleased to announce the successful demerger of its EPCM business operations known as Bateman Projects, based in South Africa. As communicated in October 2015 (see press release attached) the swiss-based SGS acquired these assets from Tenova.

Tenova will further develop its activities in the Mining and Minerals industry by focusing on the equipment and process technology sector through Takraf and Delkor, both worldwide recognized partners for the industry with strong market positions.

Bateman Projects specializes in providing process plant design and engineering, project management and commissioning and optimizations services for mineral processing plants and over a variety of minerals including gold, iron ore, copper, uranium and coal. The Bateman Modular Process Plant business and expertise formed part of the transaction.

Based in Johannesburg and active throughout South Africa, Sub Saharan Africa as well as providing specialized project services in many other parts of the world, the business employs 250 experts and staff and has generated revenues in excess of €30 million in the latest financial year (ended 30 June 2015).

"With SGS we have found a perfect fit to pursue further opportunities for our South African EPCM operations to grow within the industry. Tenova will further develop its activities in the Mining industry, focusing on the technology and equipment sector and through its successful branches Takraf and Delkor, both worldwide recognized partners for the industry with strong market positions." commented Andrea Lovato, CEO of Tenova.

About Tenova

Tenova is a worldwide supplier of advanced technologies, products and engineering services for the metals and mining industries providing innovative, integrated solutions for complete process areas. Tenova's network companies operate in 26 countries on five continents with some 4,000 employees worldwide.

SAMSON Stormajor: ideal when fixed equipment is not available


SAMSON Stormajor® boom feeder.

SAMSON Materials Handling designs and manufacture a range of mobile equipment for effective conveying of materials for diverse mining and quarrying operations. From pit face to onward processing and export SAMSON provides equipment that minimizes touchpoints and maximizes efficiency.

SAMSON specializes in tailoring equipment to the precise needs of the individual customer.

The SAMSON Material Feeder eliminates the need for fixed civil works and truck ramps. It is the ideal mobile solution to receive materials such as coal and aggregates where fixed plant is not a viable option. Stockpiling is made simple with minimal movement of equipment. The Stormajor® range can be tailored to specific stockpiling requirements in terms of material characteristics and space for stockpile. Barge, ship or rail car loading is facilitated with an outloading boom and controlled discharge rates. The Stormajor is compatible with wheel loaders, articulated dump trucks and road tipping trucks. Best of all the Stormajor range is highly manoeuvrable and can be removed from the area when not in operation and the boom can be folded in for transport.

For larger shipping requirements the SAMSON Shiploader can quickly convert a multi-purpose berth. It can be used for loading bulk carriers to post Panamax size and when combined with twin SAMSON Material Feeders peak loading rates of over 2,000tph (tonnes per hour) are possible with through-the-ship rates in excess of 1,500tph.

The SAMSON Eco Hopper is a dust controlled grab unloading hopper which provides an economically and ecologically sensitive solution designed to suit the characteristics and flow properties of virtually any bulk material such as limestone, iron ore, bauxite, coal, clinker etc. Rates of up to 5,000tph can be achieved depending on the grab crane's performance.

About the AUMUND Group

The AUMUND Group is active worldwide. The conveying and storage specialists 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 Logistic GmbH (Rheinberg, Germany) are consolidated under the umbrella of the AUMUND Group. In conjunction with the headquarters of the manufacturing companies, the global conveying and storage technology business is spearheaded through a total of ten subsidiaries in Europe, Asia, North and South America and supported by four warehouses in Germany, Hong Kong, USA and Brazil.

Eco Hoppers in operation.

HCME to support dealer network with Mascus used equipment management solutions

As part of its aim to support its authorized dealer network with the best tools available, Hitachi Construction Machinery (Europe) NV (HCME) has formed a strategic partnership with Mascus. The online marketplace for buying and selling used construction machinery, as well as other vehicles and equipment, will supply a series of remarketing tools that will be of direct benefit to Hitachi's European dealers.

Mascus will build an inventory management system for HCME in the form of an intranet, where its dealers will be able to manage their stock of used machines. In addition, they will have the opportunity to sell this equipment on HCME's used equipment webpage and through the Mascus public marketplace.

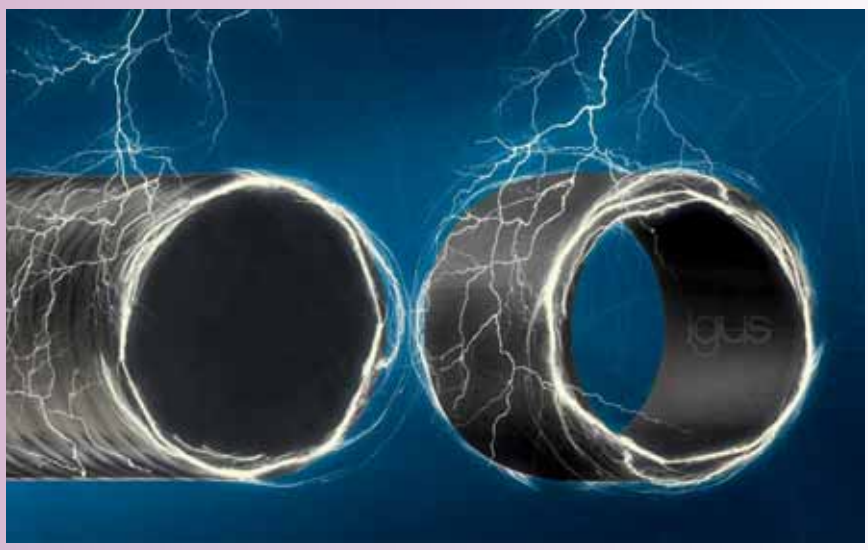
The intranet is one of the most complex products in the Mascus portfolio, which it has tailored to meet the specific needs of OEMs. It offers a basic inventory management system, as well as other features such as the opportunity to create a stock catalogue and the facility to email stock directly to potential buyers.

With over 40 dealers spread across Europe and Africa, representing more than 50 countries, HCME's network has a consistent stock of many high-quality used machines for sale. "In our capacity as a manufacturer of reliable construction equipment, HCME must provide dealers with the tools that will help them to be successful in their respective markets," says Tom van Wijlandt, Assistant Manager Service Business Support.

"We believe that Hitachi used equipment is an essential part of the product life cycle. With this in mind, our target was to find a solution that would enable our dealers to easily manage their used equipment inventory, share this with their colleagues and market it in an appropriate manner. Mascus has the knowledge and expertise to provide this facility."

Mascus COO Rickard Krøtø says, "We are proud to have formed a partnership with HCME, the latest large construction machinery manufacturer to adopt Mascus products. This is a sign that our work is not only appreciated and valued, but also brings efficiency and support to our clients' everyday business."

iglidur® F2 – antistatic material from igus® for ESD-compatible applications



Self-lubricating and maintenance free

igus® has introduced a universal plain bearing material that helps prevent the build-up of electrostatic charges. Being electrically conductive, any electrostatic charge is safely discharged avoiding sparking, and like all other iglidur® materials, the bearings are self-lubricating and require no maintenance.

The ESD-compatible iglidur® F2 plain bearings are suitable for use in wet conditions, in addition to numerous applications including material handling, automation and electronics manufacturing.

iglidur® F2 plain bearings demonstrate good wear and media resistance, and can operate over a wide range of temperatures from –40°C to +120°C, with short-term use at +165°C. The maximum moisture absorption is a low 0.2% (weight) at 23°C and 50%RH. The bearings also have a good resistance to chemicals and most lubricants.

The universal bearings are currently available in two types, a cylindrical sleeve and with a flange, with six standard internal diameters and lengths ranging from 6mm to 20mm. Other standard sizes can be requested.

About igus®

Based in Northampton in the UK, and with global headquarters in Cologne, Germany, igus® is the largest producer of injection moulded polymer bearings and reinforced plastic cable carriers in the world. Product lines include industry-leading e-chain cable carriers, chainflex continuous-flex cables, iglidur® plastic plain bearings, igubal® spherical bearings, drylin® linear bearings and guide systems. The company has 26 subsidiaries across 31 countries and employs more than 2,150 people worldwide.

With plastic bearing experience since 1964, cable carrier experience since 1971 and continuous-flex cable since 1989, igus® provides the right solution based on 100,000 products available from stock with between 1,500 and 2,500 new product introductions each year.

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Joint venture between Oxbow and Wuvio scales up dust control

Less waste. Less dust. And a smaller footprint by intelligent use of recycled fibres as the basis for innovative dust control agents

Oxbow Energy Solutions B.V. and Wuvio Chemicals International B.V. have formed a joint venture company called Wuvio Ecoatings B.V. By combining forces, knowledge and technologies, the joint venture clears the path for large scale application of highly effective, environmentally friendly dust control agents.

From by-product to environmentally friendly products

Many industrial activities, mining, demolition, construction and the handling of dry bulk products all can generate large amounts of dust if not carefully controlled. Dust is a major source of environmental pollution and can create serious health hazards. Uncontrolled, it also can lead to costly loss of valuable goods. Dust can be controlled by using water or by treating dry bulk products with a crust forming agent. The Wuvio Ecoatings product range helps reduce dust related problems by at least 85%, and can reduce water usage by up to 90%.

A partnership with a mission

The joint venture is the result of an intensive period of collaboration and development. Among other activities, Oxbow upgrades, handles, transports and sells carbon products and other dry bulk goods into worldwide markets where they are used to produce aluminium, steel, electric power, fertilizer, cement and other critical products for the world economy. The Netherlands-based Wuvio has more than ten years of specialized experience in the development of various proprietary dust controlling technologies. This joint venture helps both companies fulfil an ambition to foster safe, environmentally sound and efficient operations.

According to Marck Hagen, the CEO of Wuvio, "We want a clean and healthy environment for all, and our alliance with Oxbow is a major step forward in achieving that ambition. This partnership with a world renowned player like Oxbow confirms we are on the right track with Wuvio Ecoatings."

Minimal pressure on the environment, maximum results

Wuvio Ecoatings uses recycled fibres as the basis for its dust controlling products. The other ingredients in the formula are also derived from re-used or renewable raw materials whenever possible. By applying this approach, the use of water, chemicals and paper pulp is either reduced dramatically or eliminated altogether.

One Source

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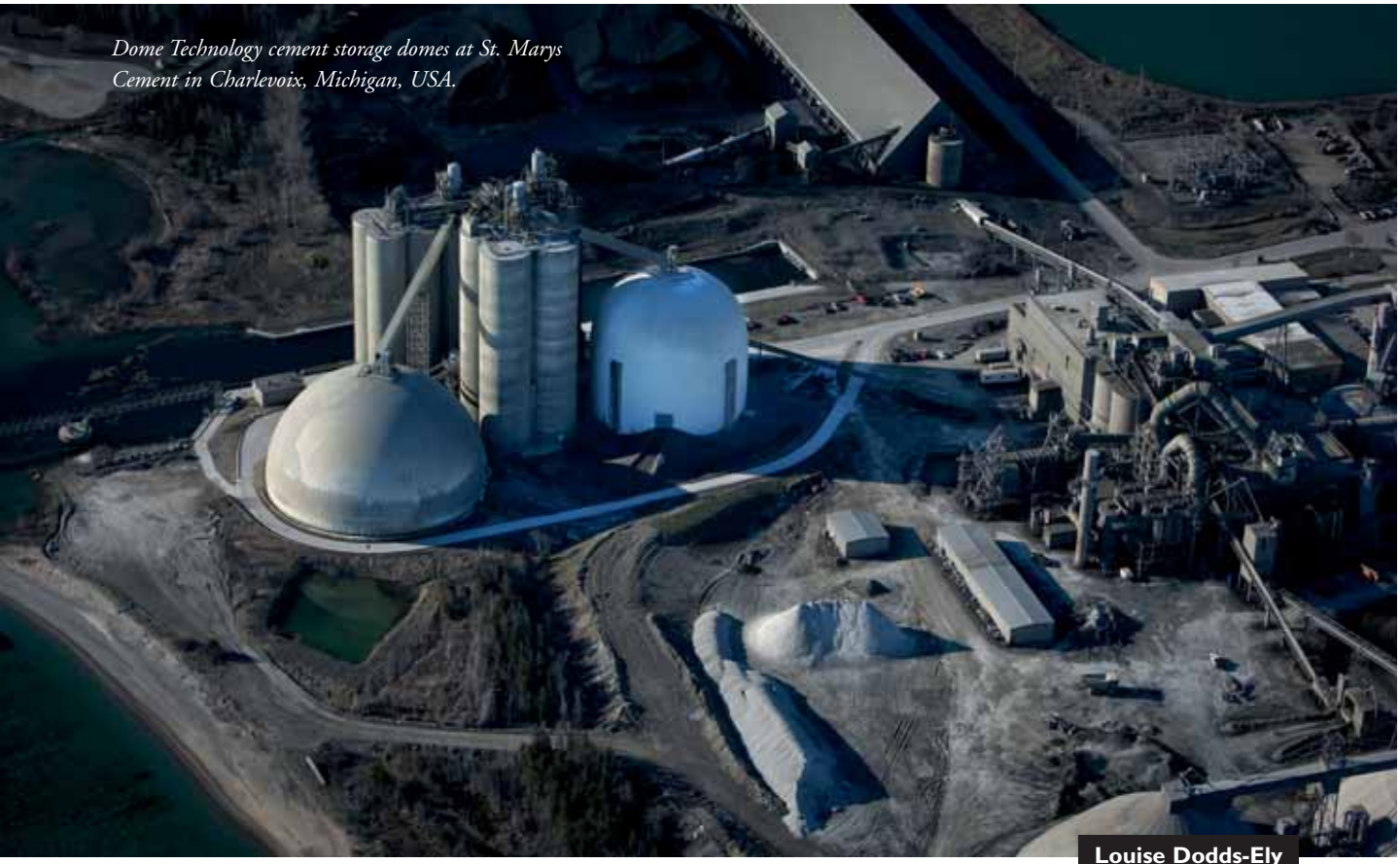
Starting with a range of four basic sizes, FLSmidth can supply the right DOCKSIDER ship unloader for any terminal – whether you're unloading river barges or bulk vessels, and whether you're conveying to an adjacent belt conveyor or through a long pipeline.

Find out more at www.flsmidth.com

FLSmidth

Far from set in cement?

how storage and handling technologies are continuing to evolve



Dome Technology cement storage domes at St. Marys Cement in Charlevoix, Michigan, USA.

Louise Dodds-Ely

Dome Technology: storing cement with a small footprint

Dome Technology, headquartered in Idaho Falls, Idaho, USA, is a leading provider of bulk-storage Domesilos™ that store a large volume in a smaller footprint, stacking product deeper and taking up less valuable property at the site. While some customers require three to five warehouses to store product, one dome will likely accommodate the same amount of material in a single structure.

The double curvature of a dome lends itself to the ability to build up, rather than out, and that curve provides strength at all points of the structure, even near the apex. The entire interior of a dome, then, can be used to contain product, so a dome will hold significantly more than a silo of similar diameter and height. In essence, the greater quantity a company wants to store, the more competitively priced a dome will be.

With cement storage significant savings can be found in foundation costs alone, said Dome Technology sales manager Lane Roberts. "Silos almost always require costly deep foundations, where often with domes we can mitigate the foundation cost considerably."

Dome Technology also provides features beyond the dome, helping companies select a material-handling system by analysing the qualities of their stored product and the desired reclaim rate. Whether a company needs bucket elevators, traditional conveyors, drag-chain conveyors or pipes that transport product pneumatically, Dome engineers use their material-handling know-how to customize a system for each business. Engineers work closely with owners to design material-handling systems and ensure proper installation.

Recently St. Marys Cement contracted with Dome Technology to build a 70,000-metric-tonne storage dome in Charlevoix, Michigan, USA, allowing the company to bulk up on storage and to schedule maintenance outages during windows of better weather. The dome was completed in October 2015.

A 50,000-metric-tonne dome, completed in January 2016, was also built at an existing St. Marys location in Chicago, Illinois, USA, a transload facility that receives product made in Charlevoix and other locations, temporarily stores it, then loads it onto trucks for transport.

An airslide system has become typical for cement reclaim — it's a "really common way to handle fine-grained products like cement," said engineer for Dome Technology Adam Aagard. A fully fluidized floor comprised of troughs side by side and with an acceptable slope throughout the floor is especially common and provides nearly 100% cleanout, but it is cost-prohibitive for some customers.

Rather than opting for traditional systems for cement handling, both St. Marys domes were engineered to include an innovative hybrid system of airslides paired with a reclaim screw. The advantages include better reclaim, increased safety and decreased energy usage. Dome Technology and storage and reclaim-system provider Laidig Systems developed the hybrid system as an efficient, less-expensive option for processing cement.

The dome floor consists of an aerated centre hub and ten airslides embedded into the sloped floor. The floor's air-distribution system, comprised of troughs two to three feet wide with fabric covers that allow air permeation from below and into product, causes the cement to slide.

The airslides are arranged like spokes in a wheel to reclaim most of the product. When the system starts, various air gravity conveyor spokes are turned on in sequence. In the process pie-shaped piles of material are left behind, and the mechanical screw, located in a 'home position' over one of the radial spokes, breaks down remaining piles and hard pack, mobilizing the product so it can also be reclaimed. "At every spoke you'll be able to draw down cement, but between the spokes there will be peaks (of cement)," Aagard said. "From that point, the screw comes in and sweeps out remaining product."

A PLC control system activates air-gravity conveyor zones to coincide with the location of the mechanical screw; at shutdown the screw returns to the nearest home position over one radial spoke.

The fluidized screw working along the floor of the dome is preferable to screw-type systems lowered from the top of the structure, providing uneven and inconsistent reclamation and requiring full-time personnel for operation, said Laidig Systems President Wyn Laidig.

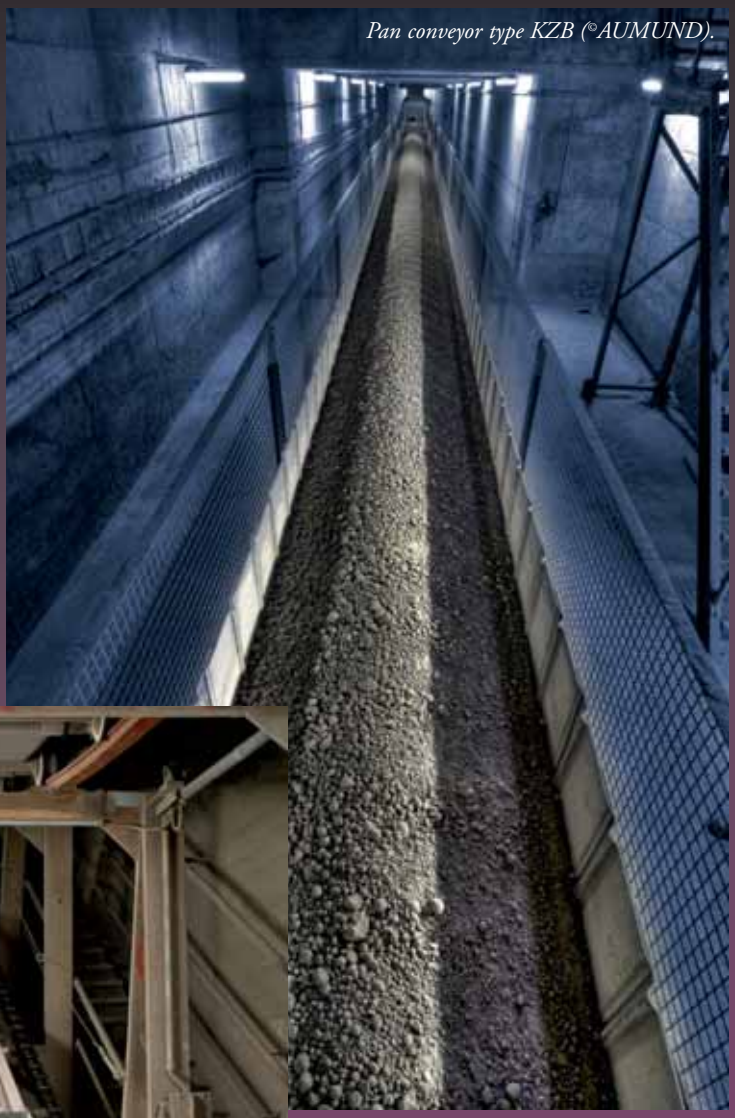
The hybrid system provides a major advantage to companies with prolonged storage where hard pack is likely. But a benefit for all customers is that "Laidig's fully automated controls mean no personnel entry and 'push-button' reclamation with only minimal personnel supervision," Laidig said. The system will save St. Marys on energy costs too because spokes operate in sequence instead of working all at once.

24 AUMUND machines for Turkish cement mill

The Turkish Çimsa Cimento company ordered 24 AUMUND machines for its mill at Çimsa. The order includes 18 deep drawn pan conveyors, five bucket elevators with central chain and a pivoting pan conveyor. With five plants in Mersin, Eskişehir, Kayseri, Niğde and Afyonkarahisar, a mill in Ankara and two cement packaging plants in Marmara and Malatya, Çimsa is one of the leading companies of the Turkish cement industry.

All AUMUND machines will be used for clinker transport: the deep drawn pan conveyors have a pan width from 600 to 1,400mm, axis-centre distances between 17 and 139 metres and they work with a conveying capacity from 106 to 548tph (tonnes per hour). The five bucket elevators with central chain have axis-centre distances from 26 to 42 metres and have been designed for a transport capacity from 240tph to 472tph.

The pan conveyor of type SPB (axis-centre distance: 108 metres, conveying capacity: 180 tonnes per day) is built by only two producers worldwide. It makes the simultaneous transport of material in upper and lower run possible. With the reversible steel pan conveyor, a sliding back of the material conveyed is prevented by welding baffles to U-shaped pans. The material to be conveyed can be discharged anywhere by remote control into intermediate discharge stations. The pan conveyor being delivered to Çimsa Cimento will be equipped with six discharge stations.



Pan conveyor type KZB (©AUMUND).

Pivoting pan conveyor type SPB (©AUMUND).

The pivoting pan conveyor makes the loading of silos by fixed discharge stations possible. The design of the pans is for charging several silos and bunkers simultaneously. Thus several otherwise necessary drive and tension stations, complete steel platforms to accommodate the stations and dustproof transfer chutes can be saved.

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BEUMER SUPPLIES WORLD'S HIGHEST BUCKET ELEVATOR TO INDIAN CEMENT MANUFACTURER

The ACC Ltd., part of the Lafarge-Holcim Group, is also benefiting from the construction boom in India. The Indian cement manufacturer has therefore expanded the capacity of its factory in Wadi in the south Indian state of Karnataka to 13,000 tonnes per day. The BEUMER Group as main (EPC) contractor has got a repeat order on turnkey, for high-performance belt bucket elevator, type HGBW-HC 1,250 × 175.3m. With a distance between centres of 175.3 metres, this is currently the highest in the world.

ACC's decision is the result of the reliable performance of the bucket elevators supplied by BEUMER Group to the same client in the past with heights of 174m and 171m. The enormous size of this system enables a flow rate of around 600 tonnes per hour to be achieved, ensured by high-quality steel wire belts of particularly high strength.

The BEUMER Group is an international manufacturer of intralogistics systems for conveying, loading, palletizing, packaging, sortation and distribution. Together with Crisplant a/s and Enexco Teknologies India Limited, the BEUMER Group employs 4,000 people worldwide, and achieves an annual turnover of about €680 million. With its subsidiaries and sales agencies, the BEUMER Group serves customers around the globe, across a wide range of industries.

BEUMER belt bucket elevators: these are reliable, have long service lives with low operating costs and are amongst the highest in the world — for example at ACC in the Indian town of Wadi. (photo: BEUMER Group GmbH & Co. KG).

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New technology generates electrical power from conveyor belt energy

Conveyor belts transport tonnes of bulk material — including cement — between disparate points, often at high speeds and over considerable distances, *write Andrew Timmerman, Product Development Engineer and Paul Harrison, Global Engineering Manager, Martin Engineering*. In most cases, electrical power is supplied only to the locations where it is needed, such as the drive motor, and is not typically available for general purpose use. Running auxiliary power can be both complicated and costly, requiring expensive labor and oversized cables to accommodate the inevitable voltage drop over long runs, as well as transformers, conduit, junction boxes and other components. Using even a small conventional generator to provide power introduces a different set of issues, including flammable fuels. In many operations, this lack of available power means that any monitoring of the conveyor must be done by technicians physically walking the length of the structure, which can be a difficult and time-consuming task when the systems are long and span difficult terrain.

The O.D. of the generator matches that of the roll, but places the generator outside the material path.

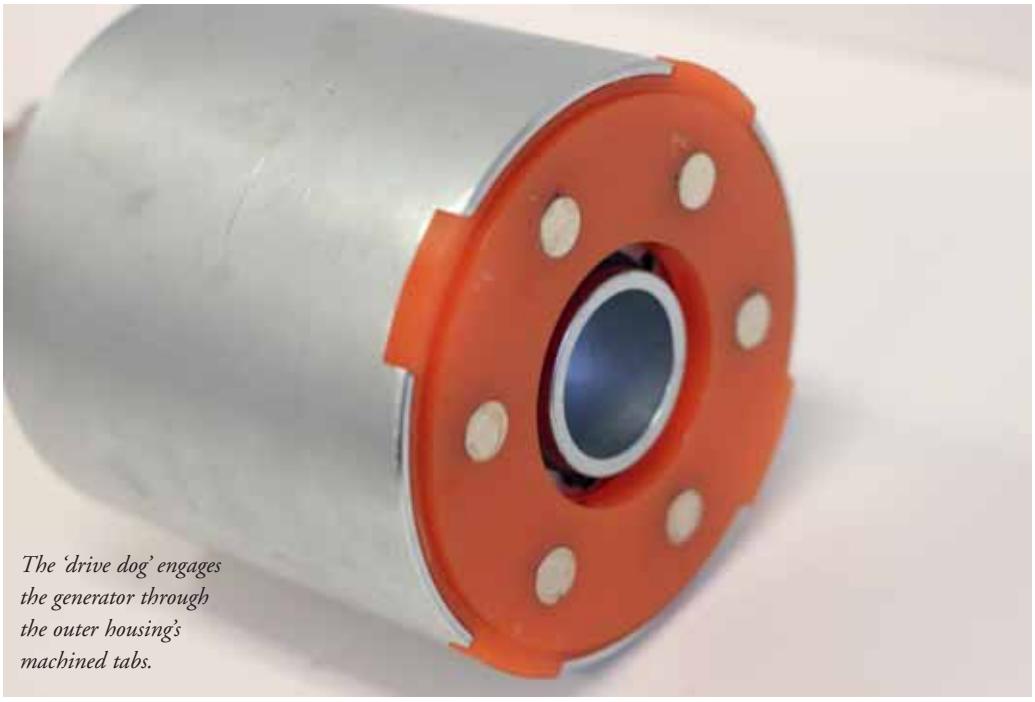
A more efficient approach is to employ sensors to transmit important data from remote points to a central location where it can be monitored in real time and recorded for later analysis. But intelligent monitoring systems for any conveyor system require power for extended operation. Due to the distances involved, cabled communication systems are not ideal, and therefore wireless communication systems are more advantageous. Options such as solar are not well suited to the general conditions of a conveyor system, as monitoring devices are often required in an enclosed structure without access to sunlight, or for continuous operation during both day and night.

Kinetic energy

A conveyor is driven by a multi-kilowatt motor, and this power is readily available system-wide in the form of the moving belt. The motors driving the belts are typically sized with a considerable power safety factor to account for parasitic loads, such as rolls with damaged bearings, tracking devices (which may not work continuously), sealing systems, belt cleaners and material changes due to different moisture levels and variable loads. For these reasons, engineers have searched for ways to take advantage of the available kinetic energy of the moving belt to bring power to the specific places where sensors and other devices would provide advantages.

One of the approaches to obtaining electrical power from the belt's energy has

been to use a wheel running along the belt surface that acts much like the small dynamo powering a bicycle light, spinning via contact with the belt surface. Unfortunately, conveyor systems are rarely a pristine environment, and in most operations some amount of bulk material leaves the belt in the form of dust and spillage, usually building up on both the rollers and the conveyor structure below the belt. This fugitive material rapidly adheres to the generator wheel, which causes a host of problems that can include vibration, excessive rolling inertia, high shaft loads and other issues which invariably cause the generator system to fail.



The 'drive dog' engages the generator through the outer housing's machined tabs.

Another method that has been tried with some success is to build the generator into a roller itself, but load-carrying rollers are subjected to a wide range of stresses, including those introduced by fugitive material, heavy loads and high speeds. Sealing the generating mechanism and providing adequate support to prevent damage can be a daunting challenge, and any failure of the roller generally means the loss of the generator, which creates an expensive replacement proposition.

The challenge

In most conveyor designs, the belt runs on a set of rollers that provide support and guide the belt. The typical conveyor roller is a very reliable device, with key components such as bearings, seals and the 'steel can' all well understood in the industry. Martin Engineering product designers theorized that they could draw power from a moving belt by attaching an independent generator directly to one of the rollers. In this way, they felt that power could be drawn from the conveyor without altering the structure of the system or affecting its physical configuration.

Being able to add a generator to a roller delivers the benefit of utilizing the proven reliability of existing roller designs, while drawing power from the belt for a wide variety of electronic devices. If the attachment could be engineered with the versatility to retrofit existing idler designs, operators would not be required to maintain a special stock of conveyor rollers, as the

The load is carried by the generator's large support shaft, which is rigidly mounted to the idler support structure.

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All components to maintain a steady 24VDC are enclosed in a protective cabinet.

generator could be employed on virtually any steel roller.

Product engineers developed a design to accomplish this through the use of a magnetic coupling that attaches to the end of an existing roller. The outside diameter of the generator matches the diameter of the roll, but places the generator outside the material path to avoid the heavy loads and fugitive material that tends to damage existing design attempts. The roll generator is held in a fixed position by the roll support system, but is not normally required to bear any of the material load.

In the new, patent-pending design, a 'drive dog' is attached to the end face of the roll that is resting on the generator, using magnets. 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 will slip on the roll face.

Two seal flanges are attached to the shaft, preventing large debris from entering the generator. The seal flanges also house the secondary seal preventing infiltration of dust. Inboard of the seal flanges are bearing flanges, which support the rotating outer housing. Affixed to the housing's inner diameter are a series of radially-arranged permanent magnets.

When rotated by the drive dog attached to the roll, these generate electrical energy by induction in a set of windings around an armature. The wires from the armature exit the generator through a slot.

The conveyor roll loads are carried by the large support shaft in the generator, which does not rotate and is rigidly mounted to the idler support structure. The generator forms a lightweight driven unit that does not affect the existing roll in any way, except to be rotationally engaged via the magnets, and so draw a small amount of mechanical power in order to generate the electrical energy. The generator is sealed from fugitive material and forms an integral unit independent of the conveyor roll.

Because the outside of the generator has the same diameter as the outside of the roller, this allows the conveyor belt to ride over — and be supported by — the generator outer housing, in the event that the belt mistracks in this location. The bearings of the generator are able to handle the conveyor belt load, as they are of similar size to the roller.

On conveyors that already employ Martin Trac-Mount Idlers (TMIs) outside of a loading zone, installation is as easy as removing the wing slide on one end and replacing it with the Roll Generator slide, a two-minute procedure. The TMI design is particularly well-suited to tight spaces, with just 8" (203mm) of clearance needed for 6" (152mm) rolls. While standard rollers can be difficult to replace without ample clearance, the slide-in/slide-out roller frames allow quick service, without the need to raise the belt or remove adjacent idlers.

The generator can also be installed on its own mount or on other existing support structures, such as a belt tracker. All components to "condition" the power to a steady 24VDC are enclosed in a protective cabinet, typically mounted directly on the idler support slide.

The reliable power supply helps bring a new level of sophistication to conveyors, allowing designers to equip their systems with devices such as weigh scales, proximity switches, moisture sensors, pressure switches, solenoids and relays, as well as timers, lights and even additional safety mechanisms. Wireless communication can be used to transmit directly to a central controller, giving operators a cost-effective way to access data that has not been readily available in the past — and taking another step toward 'smarter' conveyor systems.

Already in development is the capability to store power in a small battery bank, allowing the generator to produce 5–10× higher amperage for short periods to power higher-wattage devices.

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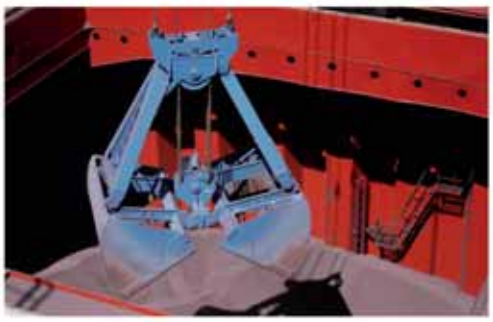

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New clinker export terminal for Vassiliko Cement

Ten years ago, Bedeschi supplied a circular limestone storage facility to Vassiliko Cement Plant. Recently, Bedeschi was awarded a contract to develop a clinker export terminal.

The system will be installed in the cement plant's port terminal, and will be 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 vessels. The capacity is up to 550tph (tonnes per hour). In the future, it will be possible to increase this to 800tph.

Keeping it clean and safe with Mole•Master's silo and bin cleaning services

Mole•Master Services Corporation is located in Marietta, Ohio, and has been setting the gold standard for silo and bin cleaning for years. Mole•Master has evolved over time to serve many different industries. In addition to the cement industry, Mole•Master also works with the powder/bulk industry, feed and grain, ethanol/biofuels, power, coal, and more. Mole•Master has always had a 'safety first' philosophy, and that is borne out in the number of safety organizations of which it is a member. These organizations include BROWZ Group LLC, ISNETWORLD, SMI, PICS, and First, Verify. In the three decades since its founding, Mole•Master has relied primarily on its proprietary Big Mole™ service in addition to its Junior™ 360° whip machine and the Arch•Master™ portable auger drill. However, new products and technology, embodied in the Safe-T-Shot™ CO_2 blasting system, are now entering the mix.

When less-complex jobs are the order of the day, Mole•Master brings its Junior™ 360. The Junior™ 360 (available with either pneumatically or hydraulically actuated cutting heads) is designed with a fully adjustable boom and crane bearing mount that allows the unit to provide 100% (360°) coverage of the vessel's interior walls. The Junior™ 360° includes a hose reel independent from the boom assembly which allows for easy set-up. The primary advantage of the Junior 360 is that no human entry into the silo is required. It is portable, safe, and highly efficient.

The Junior™ 360H features a hydraulically-actuated cutting head that is significantly smaller in diameter than any head on the market. This allows it to fit into extremely small flow channels or ratholes without losing any power or cleaning capacity. The

The Junior™ 360 has a fully adjustable boom and crane bearing mount that allows the unit to provide 100% (360°) coverage of the vessel's interior walls.

Junior™ 360P is designed with a pneumatically actuated cutting head with hydraulic assistance.

The Arch•Master is designed to drill through tough cement silo blockage jobs. The Arch•Master portable auger drill is useful when material is 'arched' or 'bridged' across an entire silo. The drill can create flow channels through the build-up, which may be all that is needed, or it can be a preliminary step preceding Big Mole or the Junior™ 360. Featuring a high torque, variable speed, hydraulic power head that can drill rapidly through the toughest of materials, the drill also offers a double-roller chain drive, a special duty hydraulic motor for variable speed drilling, and sturdy, all-aluminium construction.

For decades, Mole•Master has relied on the Big Mole System, the Junior™ 360 and the Arch•Master to completely clean out cement silos. Recently, however, Mole•Master has added another weapon to combat silo blockages. That weapon is the Safe-T-Shot CO_2 blasting system.

While the Junior™ 360 and the Arch•Master can be used in any industry for silo cleaning purposes, Safe-T-Shot is manufactured specifically with the cement industry in mind. This technology is something that Mole•Master has used since the eighties, so the pros and cons of CO_2 blasting are known factors. The primary benefit of a Safe-T-Shot System is that the CO_2 blast can directly target difficult-to-remove rings, loosening tonnes of hardened, compacted material in one single step. When placed correctly, Safe-T-Shot will not damage cement silo walls.

Like all Mole•Master equipment, Safe-T-Shot can be operated by small crews instead of labour-intensive, manual cleaning, shift after shift. This is advantageous for several reasons. Fewer workers means less chance for injury, and it also increases the crew's effectiveness and efficiency. The methodology also reduces the risks inherent in other silo cleaning processes because the workers do not have to be exposed to extreme heat, falling debris, and contaminated air. Safe-T-Shot can be used in kilns, silos, pre-heater towers, conditioning towers, by-pass ducts, coolers, feed pipes or riser ducts.

While equipment like Safe-T-Shot helps Mole•Master work quickly and effectively, Mole•Master also succeeds because communication is always a high priority. Part of this is because of the company's focus on safety. It is necessary to communicate when workers are cleaning the inside of the silo or when cement plant workers need access to the silo. However, communication also keeps the customer confident and happy. If there are problems, notification happens immediately. Mole•Master personnel also know to keep customers informed with realistic job completion time estimates so that no guesswork is necessary.

The biggest obstacle Mole•Master faces in the cement industry is the health of the industry itself. When construction projects around the world are booming, cement kilns are in full production, which means the need to maintain them and clear any blockages is highest.

The Safe-T-Shot CO_2 blasting system is manufactured specifically with the cement industry in mind.

thyssenkrupp to supply new cement clinker production line to HeidelbergCement

A 3,600tpd cement plant in Kirène (Senegal) which was built by thyssenkrupp.

thyssenkrupp Industrial Solutions has received a contract from HeidelbergCement AG to supply a new cement clinker production line. The 4,500 tonne per day facility will be built at the Schelklingen plant in Baden-Württemberg as a replacement for an existing older production line. Start of production is planned for spring 2018.

Lothar Jungemann, CEO of the Cement operating unit in the Resource Technologies business unit of thyssenkrupp Industrial Solutions: "Although most of the cement contracts we have been awarded recently have been to build new production capacities in growth regions, this order shows that there is also demand in Europe to modernize and expand existing facilities. Our highly efficient technologies, which we continually improve together with our customers, guarantee maximum reliability and allow producing innovative products in an economical and environmentally friendly way."

HeidelbergCement is one of the world's biggest cement producers and a leader in the use of energy-efficient and emission-reducing production technologies. Upon completion the new kiln line will be one of the most advanced and eco-friendly cement production facilities in the world. Innovative thyssenkrupp technologies to reduce the consumption of thermal and electrical energy will ensure that current and future emissions standards are met.

For the new kiln line thyssenkrupp Industrial Solutions will supply state-of-the-art components including a five-stage, single-strand DOPOL preheater, a POLRO rotary kiln with a POLGUIDE drive system and a POLYTRACK clinker cooler with roll crusher. The innovative design of the calciner used in the preheater will ensure outstanding fuel burnout with low nitrogen oxide emissions. The POLYTRACK cooler also features a highly efficient heat recovery system that minimizes fuel input.

The Industrial Solutions business area at thyssenkrupp is a leading partner for the engineering, construction and service of industrial plants and systems. In addition to chemical, coke, refinery, cement and other industrial plants, thyssenkrupp's portfolio also includes mining, ore processing and port handling equipment along with corresponding services. In the naval sector, it is a major global system supplier for submarines and surface vessels. As an important system partner to its customers in the automotive, aerospace and battery industries, thyssenkrupp optimizes the value chain and improves performance.

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Cleveland Cascades chutes for all cement loading applications

Cement is one of the most commonly produced construction materials in the world and is a staple of the dry bulk transportation industry. Along with its semi-manufactured counterpart, clinker, cement and clinker are traded globally in vast quantities. To minimize transportation costs, they are typically shipped by ocean freight and re-distributed locally by road and rail vehicles and tankers.

The particular properties of the material pose a number of challenges for suppliers of handling equipment. Cement is a very free flowing material with very small particle size and needs very careful handling to avoid dust pollution. Clinker is less dusty than cement, but is very abrasive and is often loaded at high material temperatures in excess of 90°C. Both cement and clinker need to be kept dry during transportation to ensure material quality.

One of the key features of the Cascade, controlled flow technology chute, from Cleveland Cascades is its ability to control dust creation at source and consequently cement and clinker applications have always been a big part of the company's business. The company has developed a full range of loading chutes suitable for each stage of the cement and clinker distribution chain, including ship-loading chutes, open vehicle loading chutes and tanker loading chutes.

Shiploading Cascade chute, loading cement clinker.

Both shiploaders and open vehicle loading chutes use the same Cascade technology, but whereas quayside shiploaders can be over 30 metres in length, vehicle chutes need to be much shorter and to accommodate more frequent loading patterns and more intricate logistics of tanker and open vehicle loading. While the vehicle loading chutes are lighter than shiploaders, they are designed with the same robust construction and similar operational functionality of the larger chutes. Material detection probes housed in the carrier, enable automatic raising of the chutes on detection of the material pile, to ensure continuous material loading. Limit switches in the hoist system can be set to limit travel and ensure optimum loading levels.

Road tanker loading chute, loading cement.

The Cascade loads material through a series of oppositely inclined cones, which creates a mass flow at low velocity, yet high volume. During its descent, the material is supported through the full length of the chute, ensuring a soft delivery from the outlet to the material pile, for every load. It therefore arrives at the load pile with minimal degradation. The controlled descent of the material prevents air separating the particles and largely eliminates dust generation at source.

Cleveland Cascades tanker loading chutes utilize a vertical free fall cone design. The free fall principle is highly effective when loading in to the enclosed space of a tanker and the system is fitted with a completely sealed closure cone which connects to the tanker inlet. A weatherproof shroud is fitted over vertical cones to ensure dust cannot escape into the environment, and also to allow for the effective extraction of dust-laden air if required. The shroud is built to the same proven, robust design used in Cascade chutes. Once loading is completed through the

Open vehicle loading chutes, loading cement.

chute, the closure cone delays lifting for a short period of time to ensure that any excess dust held up in the system, has settled.

Cleveland Cascades has supplied numerous cement and clinker chutes in all three of these applications across Europe, Asia, Africa and North and South America.

The wharf at Yamaguchi, Japan, has a Cleveland Cascades shiploader installed loading cement clinker up to a capacity of 650tph (tonnes per hour). The inclined cascade cones discharge material through a 20-metre-length chute and the cones have a 6mm ceramic liner, to withstand the high abrasion and high material temperature of clinker.

At Irish Cement in The Republic of Ireland, Cleveland Cascades has several vehicle loading chutes installed to load cement clinker enabling 14 trucks to be loaded per hour, each with a 28t load capacity. The cascade chute extends to 3.9 metres in length and the steel cones have 4mm ceramic liners to cope with the abrasion from clinker cement.

At Titan Cement in UK, Cleveland Cascades have multiple tanker loading chutes, loading cement in to road tankers. Each chute can load 150tph through a 2m long chute and they utilize a rubber seal at the outlet to ensure a perfect seal during loading. The air displacement is controlled by an internal extraction system which recycles the dust born material back in to the storage silo.

A big part of the package provided by Cleveland Cascades is ongoing product support, from the moment the product is delivered and throughout its operating life. Commissioning engineers can visit site to help install and optimize the operation of the chute according to customer needs, upon delivery. Manuals are comprehensive and detailed to give the operators the information they need to maintain the product and maximize its operational efficiency. To complete the support package, original OEM spare parts can be supplied with the original order and subsequently during the life time of the chute.

On the level: Hycontrol systems keep the cement industry safe

Redditch, UK-based Hycontrol has been supplying level measurement instrumentation and safety systems to the cement industry for over 30 years. The company has been at the forefront of developing systems to protect cement silos against the dangers of over-pressurization — a serious but sometimes hidden threat.

To understand the need for silo protection one must first understand what creates excess pressure in a silo. Pressure occurs where product, in this instance cement, is pneumatically transferred from a vessel (for example a road tanker) into a silo. If the filtration system allows the pressurized air to escape sufficiently quickly then there should be no problem.

Silo over-pressurization occurs when the volume of air entering the silo exceeds the volume air escaping or venting from the silo. This can occur because of several factors, either individually or combined:

- failure of the pressure sensor;
- failure of the filtration system to vent air efficiently;
- failure of the level measuring equipment;
- uncontrolled discharge from the tanker;
- filter-blinding caused by over-filling;
- inadequate maintenance of safety equipment; and
- faulty or damaged inlet control valves.

Hycontrol MD Nigel Allen has described many silos as "disasters waiting to happen," adding, "It's quite frightening that operators accept pressure blow outs via the pressure relief valve (PRV), erroneously thinking that 'It's OK — the PRV is doing its job'. This couldn't be further from the truth — PRVs are there as a last resort. If the silo protection system is working correctly and is fitted with an automatic shut-off feature to prevent over-filling, the PRV should never be used. If a PRV blows then there's an inherent problem with the system or the filling protocol and corrective action must be taken." Powdered cement blown out of the PRV is likely to solidify due to atmospheric moisture, eventually leading to the valve becoming completely blocked and useless.

As the majority of silos are not pressure-rated vessels, they can rupture at pressures as low as 1 or 2 psi. Without adequate safety systems in place sites risk fatal injury to staff, damage to equipment, product loss and environmental pollution — not to mention hefty Health & Safety fines. Therefore silo protection is essential for avoiding the risks of over-pressurization and overfilling. Guidelines from the Mineral Product Association (MPA), the HSE and DEFRA all make clear the importance of a reliable, testable safety system that is kept in optimum condition through regular servicing.

However, even with a protection system in place there is still risk: testing safety equipment at the top of a silo brings additional hazards involving working at height. This also means it is unlikely sites will test their safety equipment before every fill.

Hycontrol's SPS Advanced Silo Protection System is not only the most advanced on the market, but it is also the only system that meets and even exceeds current safety guidelines. Since the SPS system was introduced it has received widespread industry recognition and several awards. It is the first to eliminate working-at-height risks with the introduction of a complete ground-level test (GLT), enabling all essential safety components (including the pressure relief valve and pressure sensor) to be checked before each and every fill. The entire system is checked in just six seconds before allowing the fill. If any component is not functioning correctly the system will alert the user and the valve will not open — it's that simple.

The patented FLEX-501D pressure sensor is the only such device custom-designed for silo protection. It is fully and accurately testable over its entire working range, ensuring correct functionality as part of the GLT. It is also self-cleaning and controls the inlet valve throughout the filling process.

The PRV test facility is precisely calibrated to ensure it will only lift at the correct pressure. Previously this was only possible by removing the unit and bench-testing it. This has the added bonus of cleaning the valve of any accumulated product.

Hycontrol's system also incorporates a vibrating high-level sensor, which (unlike old-fashioned paddle switches) have no mechanical parts to wear out and break, and a highly efficient, self-cleaning filter unit.

Crucially, the system records high pressure, high-level and PRV lift events with a time and date stamp, and counts the number of times an alarm condition is reached. This is essential for preventative maintenance purposes as it will allow engineers to address issues in the system before they become acute problems. As with all safety and protection systems, regular servicing and maintenance is essential to ensuring continued optimum performance.

Hycontrol continues to work to raise awareness of silo safety issues online and at trade exhibitions, including focusing on current legislation and guidelines, highlighting industry best practice and recommending solutions to common issues.

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Biomass handling and storage

adapting to a raft of new challenges

Drax unloading and storage facility.

Louise Dodds-Ely

Spencer Group – a history of success in biomass handling and storage

The materials handling market in the UK is long-established, with the basic requirements for raw material extraction and transportation having existed for hundreds of years for the manufacturing industries and the energy market.

In recent years, the energy industry has entered previously uncharted territory with the emergence of the biomass market creating a huge demand for pelletized biomass to be used as an alternative to fossil fuels, specifically coal.

The industry has seen a number of huge infrastructure projects emerge to modify and enhance ports and power stations to handle this new source of fuel, many which have also been industry-firsts in their construction. Even now, the industry is still learning from the unique properties and characteristics of biomass pellets and consistently developing new technology to ensure safe, efficient handling.

The materials handling industry has long been the stronghold of technology-driven manufacturing organizations whose equipment often represents a majority-proportion of the value of a project. With many companies operating in specialist areas and offering a complementary installation and construction offering, industry-ready in-house delivery — based on a client-specified or known solution — has often been the normal model of delivery in the market.

The biomass sector, however, introduced a new challenge — one that is fundamentally underpinned by scale. The sheer quantities involved in the shipment and storage of pellets instantly rule out any possibility of storing the material in shop-built vessels or silos. It's a challenge that necessitates site-constructed civil engineering structures, many of a scale never seen before. The associated handling systems often have to be the largest options available in the market and the capability to undertake a complex, multi-disciplinary construction project valued at tens of millions cannot be met by those manufacturers simply used to erecting their own equipment on a pre-determined concrete slab or steel module.

The biomass market created a new layer in the supply chain, with the need for medium-large scale construction and project management companies with a balance sheet strength to take on

Port of Tyne biomass storage and rail loading.

the role of principal contractor. These organizations are required to gear up quickly and understand the complexities of such projects, selecting, managing and integrating a complex list of specialist sub-contractors, many of which have limited experience of collaboration on a scale such as this.

It is this opportunity which UK-based Spencer Group (Spencer) welcomed with open arms. Spencer has over 25 years' multi-disciplinary experience in the construction and civil engineering sector, but the immeasurable value it adds comes from its steadfast foothold in the rail and port sectors, two essential links in the biomass logistics supply chain.

Biomass pellets arriving in the UK by ship are typically unloaded, transported to temporary storage facilities, loaded onto trains and transported to power stations, where they are unloaded, stored and finally distrusted into the energy production process.

Spencer's ability to design, develop, build and integrate projects, combined with a vast portfolio of port logistics and rail projects under its belt, made the group a worthy contender to create a valuable offering to this new, rapidly emerging market.

Spencer's credentials for being a vital part of the supply chain extend beyond its expertise in construction, engineering and transportation logistics. Recognizing a need for large-scale materials handling projects in traditional UK industries such as aggregate, coal and recycling, the company's founder and Executive Chairman Charlie Spencer OBE recruited a team of industry experts to join his growing business. Bolted to firm credentials in civil, mechanical, electrical and structural engineering and contracting, Spencer was creating the perfect team in anticipation of the perfect storm.

Drax unloading and storage facility: March 2009 to June 2010

Spencer's role in the UK biomass market started in earnest in March 2009 with the unloading and storage facility for Drax Power Ltd. Associated Ports. This was a technically complex project to design, supply, install and commission all civil, structural, electrical and mechanical works associated with the rail unloading project, supporting the co-firing project.

The works completed by Spencer emphasized the group's multi-disciplinary capability in handling high-value schemes with a rapid and complex delivery programme. The design and build of this facility required a combination of Spencer's in-house design, process design, civil and construction, M&E, rail and project management expertise.

Close collaboration with the Drax team allowed challenges to be overcome through meticulous project and design management. Spencer also guaranteed that no critical systems came off-line at any point, thus maintaining existing access routed and rights of way during construction.

The site presented a vast network of overhead and buried utilities and services, such as HV and LV supplies, fibre-optic cables, telecoms and potable water. Spencer developed a site-specific system of work within the relevant method statement detailing control measures to protect the various services.

Port of Tyne biomass storage and rail loading: October 2009 to November 2010

Spencer set a world first with this project. Up until then, no standards existed for design of bulk wood and pellet stores as none had previously been built on this scale. The facility is largely

bespoke-designed and built by Spencer's in-house team.

The scope of works comprised:

- the construction of a steel storage building: 150m × 75m × 20m high, to accommodate up to 75,000 tonnes of biomass wood pellets;
- a loading annex for loading bio-fuels onto conveyor systems via five loading hoppers;
- a rail loading system capable of accurately loading biomass trains while they travel through the facility;
- 200 metres of transit conveyor structures and trestle supports up to 40m in height;
- a 40-metre-high rail loading silo formed in slip form concrete, capable of storing 2,000 cubic metres of biomass pellets; and
- the installation of 1MVA 11kV/400V outdoor transformer, 400V power distribution system, instrumentation and control systems.

This and similar projects have allowed Spencer to develop an industry-leading understanding of biomass process engineering and the critical issues associated with handling fuel of this type.

Drax – Project Phoenix: February – July 2011

The Project Phoenix involved the design and build of two reclaim link conveyors between the new biomass handling facility and the existing coal handling facility at Drax Power Station, providing additional co-firing capabilities.

Spencer's approach to collaborative working was key in securing this contract and was continued through using its internal online document handling system, SOS, affording Drax direct access to all project correspondence, records and cost ledger management.

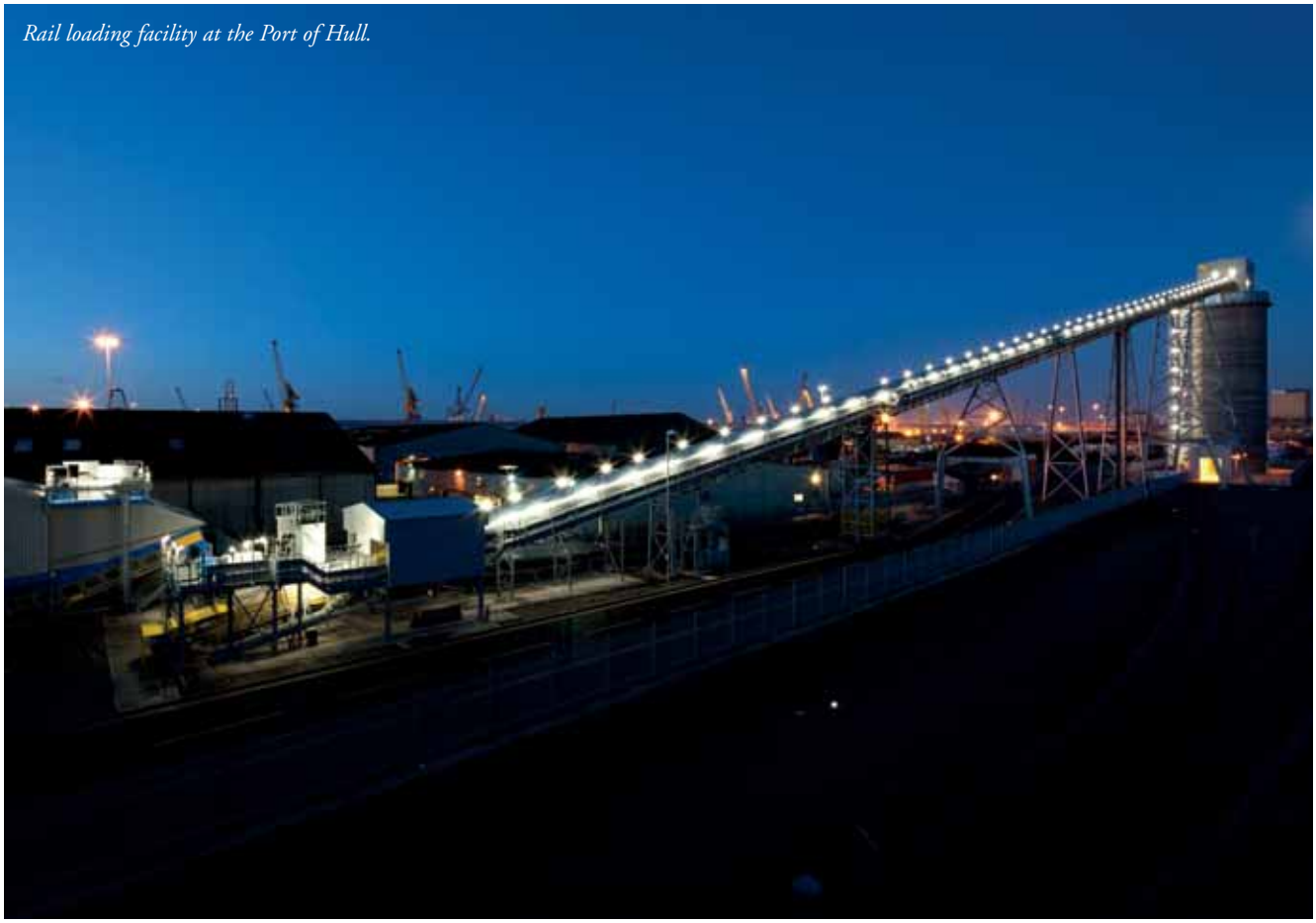
Key to the success of the project was the management of complex operational and system interfaces, while maintaining existing system availability. Utilizing initial and ongoing project workshops and appropriate control measures, Spencer was able to ensure impact on existing operations was minimized. Construction methods involved pre-fabrication, workshop assembly of mechanical items and, where possible, ground level assembly, resulting in improved safety and a much more efficient working environment.

Spencer was able to reduce response times and minimize reliance on an extended supply chain, when compared with a construction-only contractor, via the benefits of collaboration and co-location. The group's in-house expertise allowed the client to alter design ideas throughout the project and challenges were successfully overcome through meticulous management. Spencer's collaborative approach was further enhanced through the co-location of its staff and Drax employees at the Selby site.

Port of Hull: February – December 2013

This contract involved providing biomass fuel import, road unloading and train loading facilities. Spencer's scope in the project included designing all elements of the works, creating: a road reception facility; transit conveyor structures; a rail loading silo; a rail loading system capable of accurately loading biomass trains as they travel through the facility; site road and infrastructure works; and the installation of a 1MVA 22kV/400V transformer, 400V power distribution system, instrumentation and control systems.

This project required extensive experience of working in operational port environments, which Spencer had acquired since 1989. Therefore, the group fully understood the need for careful project management to ensure that facilities remained operational during all works and disruption to all stakeholders was minimized. Spencer was able to use its experience and learning from previous projects with Drax Power Plant Ltd. to deliver a successful solution.



Rail loading facility at the Port of Hull.

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Biomass transportation update: dramatic increase in throughput since 2005

Global production of wood pellets has increased dramatically from 5.2mt (million tonnes) in 2005 to 25.5mt forecasted in 2015, *writes Walter Mitchell of Mitchell Consulting Group, Inc. of Brooklandville, USA.* Their high energy density, relative ease of handling, and low carbon emissions meet many of the criteria being requested of new era power producers. Significant demand is created in Europe by the 'Europe 2020' programme, which mandates the following:

- reduce greenhouse gas emissions by at least 20% compared to 1990 levels (or by 30% if certain conditions are right);
- increase the share of renewable energy sources in final energy consumption to 20%; and
- increase energy efficiency by 20%.

This paper addresses the marine transportation requirements and ports that connect the sources of supply to end-use destinations, and serves as an update to our May 2013 paper published in *Dry Cargo International*.

The 23 existing export pellet plants in the USA and the two currently under construction have the capacity to produce 8.9mtpa (million tonnes per annum) industrial wood pellets, and in Canada eight plants operating or under construction contribute an additional 2.5mtpa of capacity to meet the current demand. In addition, there are 19 proposed plants representing 7.7mtpa capacity that could come on line in the period 2016–2019.

In 2014, the last year of public reporting on tonnages shipped, just over 4mt were dispatched by seaborne means from Atlantic ports in the USA and Canada to European generation stations. Additional tonnes were shipped to Europe from the British Columbia ports of Prince Rupert and Vancouver via Panama, and to Asia. By 2019 total seaborne tonnage is expected to reach 10.8mtpa, creating stems for the Supramax, Handymax, and Panamax-class dry bulk carriers. Government support in the form of subsidies and tax incentives in countries such as the UK, Germany, Sweden, and South Korea to replace carbon emitting coal as primary generation fuel is expected to foster additional growth in the seaborne industrial wood pellets market.

Exporting ports

Port of Quebec

At Wawa in central Ontario, Rentech produces 445,000mt wood pellets under a take-or-pay period contract with Drax, UK. Tonnage from Rentech's Wawa plant is railed via the CN to the port where there is 70,000 tonnes storage capacity in two domes. Rentech has a 15-year operating contract with Quebec Stevedoring Company to load up to Panamax size vessels for dispatch to Drax's ports in the UK.

Port of Chesapeake

Enviva owns the Chesapeake wood pellets terminal near Norfolk, VA. The selection of this location is brilliant as it is geographically closer to North Europe than most other ports, and the over-land distances from its production sites in Virginia and North Carolina are relatively short. The pier at Paradise Point, now fully functional as a wood pellets export terminal, can accommodate light-loaded Panamax vessels at 39 feet draught. Accordingly, Enviva's marine department is able to leverage these physical advantages into relatively low cost freight arrangements to Europe. Host Terminals has operated the Enviva terminal since 2011, but has been operating on the site since 1999 with Giant Cement, the previous owners of the terminal.

Port of Wilmington (NC)

In partnership with others, Enviva will utilize a marine terminal in Wilmington, NC to serve its production from a newly constructed plant at Sampson County, NC. It is a 'copy-and-paste' rendering of the Paradise Point terminal except that it will accommodate 1mtpa throughput. In 2015 Enviva inflated two 170-foot, 17-storey white domes at the Port of Wilmington for wood pellet storage. The pellets will come from a newly constructed plant at Sampson County in North Carolina. Each of the domes can store 45,000 tonnes of pellets. Loading the domes is achieved through the top of the domes, and conveyance to shiploaders is through the bottom of the domes at grade. The Sampson project is scheduled to come on line in Fall 2016 with shipments to follow to DONG Energy's plants in Europe.

Enviva's 17-storey wood pellet storage domes at the Port of Wilmington will commence exports in the second half of 2016.

Port of Savannah

Continuing down the East Coast, the Port of Savannah serves multiple wood pellet producers — the largest of which is Georgia Biomass, with capacity to produce up to 800,000tpa at its Waycross, GA plant. In addition to the four exporters at Savannah, there are nine proposed production plants in close enough proximity for selection of Savannah as the export port of choice. These nine plants represent 3.8mtpa potential exports should all be constructed. E-Pellets entered into a long term agreement that provides for terminal operations at Savannah, allowing for as much as 1.35mtpa industrial wood pellets for export.

Port of Brunswick

This port in southern Georgia is a biomass behemoth. In FY2015 the port loaded out just over 625,000 metric tonnes wood pellets for export, representing a handsome increase over 2014 in spite of a devastating fire. In July 2015, fire destroyed two leased wood pellet warehouses and the conveyance system. Logistec, the large Canadian stevedoring company lessee of the facility, was able to restart operations quickly, and is rebuilding larger and more efficient warehouses that will return the facility to full capacity in 2016. FRAM Renewables is the dominant exporter at Brunswick.

Port of Panama City

Rounding the coast to Gulf of Mexico ports, Panama City has served as the export loading port for Green Circle Biomass, which was acquired by Enviva in January 2015. The Cottondale plant, with capacity at 650,000 metric tonnes per annum, is one of the largest wood pellet plants in the world. Production is railed to Panama City where it is warehoused and loaded into Supramax vessels that are subsequently dispatched to Europe. At the moment, Enviva-Cottondale is the only industrial wood pellets exporter from the Port.

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Port of Mobile
Mobile serves the export needs of several producers: Zilkha, Westervelt, and Enviva. Westervelt and Enviva take advantage of barge transportation on the Tennessee–Tombigbee Waterway (the 'Tenn–Tom') and can transfer from barge to vessel or to ground via third-party agreements. Zilkha did at one time utilize barge and over-the-road transport as a means to reach Mobile. In 2013, the last year reporting, the Port of Mobile exported approximately 400,000 metric tonnes primarily to Europe.

Port of Baton Rouge
Drax Biomass entered the USA producer market in 2014 as a way to hedge its supply options by reducing its reliance on independent contractor suppliers. Its two plants, Morehouse and Amitie, have a combined production capacity of 900,000 metric tonnes per annum, and a third plant at Pike (Magnolia, MS) is planned to produce up to 450,000tpa. Drax's loading facility, Baton Rouge Transit, can handle as much as 2mtpa wood pellets and can load up to 40 vessels per year. Two domes each hold 40,000 tonnes. Baton Rouge Transit dispatched its first vessel in April 2015.

Port of Port Arthur
Port Arthur is the export loading location of German Pellets, which operates the Urania I and II and Woodville plants with total capacity of 1.65mtpa. The port is rail-served and occupies deep water along the Sabine River that is capable of serving Panamax-sized vessels. Unfortunately German Pellets has filed for insolvency, leaving doubt as to the future of the operations, including a long term contact with its ocean carrier, Oldendorff.

Port of Vancouver (BC)
Fibreco operates a terminal that has capacity to store 45,000 tonnes of wood pellets. Storage is achieved in six silos and a covered warehouse. Supramax and Handymax vessels may be loaded here with wood pellets produced by Pinnacle Renewable Energy and Pacific Biofuels. Loading draught pier length limit ship size at the moment, making it difficult to achieve economies of scale on the long voyage via Panama to Europe, however, the port is easily able to serve the growing Asian market, especially South Korea.

Port of Prince Rupert
The Westview Terminal is a newly constructed facility that serves the northern pellet producers in British Columbia. Similar to Vancouver, Prince Rupert, being located 11,000 miles via Panama to the UK (compared with Chesapeake at 3,600 miles and Baton Rouge at 4,900 miles) must overcome the distance disadvantage by economies of scale and terminal efficiencies that can reduce overall landed cost. Pinnacle prefers to sell wood pellets on FOB (free on board) terms and leaves the marine transportation function to its customers.

The growth of biomass
There are many reasons for the popularity of wood pellets in Europe and elsewhere. In Europe, environmental issues such as climate change have triggered the EU 2020 programme, described earlier, and other nations are embracing these initiatives as evidence by the 150 nations signing the Paris Agreement in April 2016. Additionally:

- specific emissions reduction targets desired by national governments are achievable with coal replacement by wood pellets;
- the efficiency of marine transportation has enabled seaborne deliveries and, in the past several years as the North American plants have come on line, the charter market for suitable bulk carriers has been in oversupply resulting in low-cost transportation;
- ageing coal fired power generation plants can be relatively easily converted from coal to wood pellets as primary fuel.

Investment is of course needed to accommodate covered storage for wood pellets and terminal upgrades for increasing tonnages from ship arrivals.

Looking ahead to 2017 and beyond, the UK continues to make the largest imprint on the industrial wood pellet market by adding more generation fired by wood pellets. Conversions we know about are:

- Drax's third unit at Selby, which is undergoing conversion now, will require more than 2mtpa;
- Czech Republic-based EPH's facility at Lynemouth is planned to burn more than 1.5mtpa;
- MGT's Teesside Renewable Energy Plant is likely to require approximately 1mtpa. All of these tonnes are planned to be imported. See below;
- E.ON's Langerlo facility in Belgium plans to convert by 2017 and will require more than 1.5mtpa; and
- South Korea and Japan are expected to import close to 4mtpa wood pellets to fire generation that will convert from coal-fired. No one is talking about China demand at this point, at least not to us for the purposes of this article.

The long-term risks for producers in the space are many. On the downside, the major challenges we see ahead are:

- the sustainability of sourcing raw wood fibre, which must be managed through cycles of tightening supply, weather, continual re-population, and disease control and management;
- government policies, which can have a profound impact on this sector as it involves international trade, tariffs, and the application of science to climate change;
- industry regulation and certification issues are arising that could increase the cost of wood pellets production and provision;
- handling issues, such as fires which have occurred at Brunswick, Panama City, and Tilbury UK, moisture migration, and product degradation from excessive handling;
- fragility in the vessel charter markets – while a considerable portion of the seaborne deliveries are under period contracts of affreightment that limit volatility in rates, the market has strengthened since the start of 2016 (BDI is now over 600 at this writing, having been as low as 298 in February) and is expected to gather strength out to 2020. We are also likely to see more bankruptcies in the vessel ownership space as shipowners become challenged to continue earning rates below OPEX.

One exporter's experience with marine transportation

Westview Wood Pellet Terminal, Prince Rupert. (Photo courtesy: Rupertport)

Pinnacle Renewable Energy Inc. is a wood pellet producer in Western Canada, founded in the 1980s, *writes Walter Mitchell of Mitchell Consulting Group, Inc. of Brooklandville, USA.* The company produces heating pellets for the home heat market, and industrial pellets for the power generation market. Pinnacle currently operates seven pellet plants in British Columbia with total production capacity of more than 1.5mtpa (million tonnes per annum).

In January 2014, Pinnacle's Westview Wood Pellet Terminal commenced operation in the Port of Prince Rupert, British Columbia. The terminal is owned and operated by Pinnacle. It is reportedly the first greenfield purpose-built wood pellet export facility to be constructed in North America.

Annual throughput is 800,000–1,000,000 tonnes and there is storage capacity of 50,000 metric tonnes. Pinnacle confirms a rail unloading rate of 600tph (tonnes per hour), and the design load rate is 2,000tph. The single berth has water depth of 12.5m at low tide, and the terminal has loaded 5 Panamax size vessels to date.

Pinnacle and Westview recorded a first in 2015 when it loaded a Panamax vessel with 60,000 tonnes of wood pellets. The 80,227dwt vessel was chartered in order to provide economies of scale for the 9,200-mile voyage from Western Canada to Immingham UK, via Panama. The cargo was unloaded at the Immingham Renewable Fuels Terminal for the account of Drax, the power generation company which has converted two of its four units at Selby, UK to fire wood pellets and is in process to convert a third unit at this writing.

Westview is the market entry point for Pinnacle's seaborne exports. The opportunity it presents is its proximity to the Asian wood pellets market, which is evolving slowly as Pacific Rim countries such as South Korea continue to express interest in replacing coal with wood pellets as primary power generation fuel.

However, the challenge presented is that the major market for industrial pellets is at the moment in Europe, where most discharge ports are more than 10,000 miles distant. Pinnacle must deal with the freight disadvantage *vis-à-vis* competitors such as Enviva, which exports from the Port of Chesapeake — 3,900 miles to Immingham, or Drax Biomass which exports from Baton

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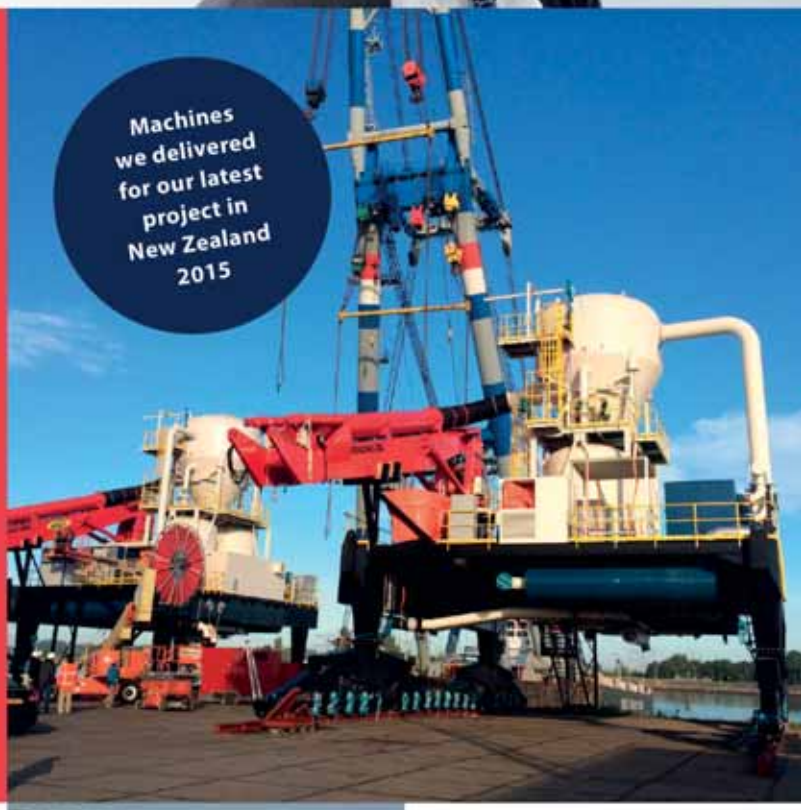

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Rouge — 4,980 miles to Immingham. Comparative voyage days are 36 from Prince Rupert, including the Panama Canal transit, versus 12 from Chesapeake and 21 from Baton Rouge. As a result, Pinnacle needed to develop scale in order to compete on freight, and improve on its freight programme that was based on the Supramax vessel loading ±50,000 tonnes.

The maths is pretty straight forward. Over the past decade, the dry bulk market cycle has often produced time charter rates that are lower for the Panamax than its smaller cousins in the Supramax class. Fuel consumption is essentially the same, therefore voyage fuel cost is essentially the same. Both classes of vessel are constrained by draught at the Panama Canal rather than at the load berth. Port costs and Panama Canal tolls for the Panamax are higher, but the ability to distribute those higher costs over 20–25% larger cargo stems is the freight advantage presented.

Before Pinnacle and other shippers were able to shift consistently to the Panamax class, another challenge had to be overcome: the requirement to use an inert gas fire extinguishing system, such as CO_2. Participants in the sector report that, while most of the Supramax class has these systems installed, only a small percentage (some claiming just 15%) of the Panamax sector has them.

The Wood Pellet Association of Canada became involved in a collaborative effort with the University of British Columbia to assert the claim that gases produced in the cargo hold containing wood pellets were not flammable, and presented its findings to the IMO. In 2015, the Maritime Safety Committee ratified the related IMSBC amendments and commencing 1 January 2016, wood pellets became exempt from the list of cargoes requiring fixed fire-suppression systems. As a result, any Panamax vessel is now able to transport wood pellets in bulk.

This development adds an important dimension of flexibility to the shipping programme for wood pellet importers as well. Considering Drax's requirement for as much as 6mtpa cargoes to be delivered on a consistent and reliable basis, increasing the arriving cargo size from 35,000 metric tonnes in the Handymax and from 50,000 metric tonnes in the Supramax to 65,000 metric tonnes in the Panamax results in a reduction in the number of vessels calling from 170 (Handymax) and 120 (Supramax) to about 90 Panamax vessel arrivals per year. Pinnacle reports that it has a Panamax loading programme in place for 2016.

At the Port of Immingham's Renewable Fuels Terminal, Panamax vessels are discharged by two state-of-the-art continuous ship unloaders. The design unloading rate is 2,300tph. These machines utilize suction and rotation techniques to elevate the cargo from the ship's hold and feed it to a conveying system to silos ashore. The CSUs are designed to rise and fall with the significant tide on the Humber. From the silos, the wood pellets are loaded into trains for onward shipment to Selby.


Photo courtesy: Pinnacle Pellets

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ASGCO®'s Safe-Guard Modular Conveyor Flat Guard protects workers from moving parts — quick installation

ASGCO®'s Safe-Guard® Modular Conveyor Flat Guard is a modular, powder coated all-steel guard that can be mounted to the conveyor or surrounding area to serve as a barrier between workers and moving equipment. This eliminates accidental contact with pinch points and greatly enhances safety in the workplace. Safe-Guard® panels are pre-engineered and are easy to install in almost any part of the plant to prevent workers from both accidental injury or unauthorized access to restricted areas.

The Safe-Guard® panels are quickly connected with wedge clamps allowing for easy removal and can be secured with a cable tie in the closed position, meeting MSHA and OSHA safety standards. Safety yellow powder coated steel provides high visibility and corrosion resistance. The installation of safety-oriented products can help create a safer plant that is easier to service and maintain.

Key features of Safe-Guard® Modular Conveyor Flat Guards

- ❖ available in various standard and custom sizes;
- ❖ modular and easily adaptable to any application;
- ❖ powder coated in safety yellow for maximum visibility and durability in harsh environments;
- ❖ drop pin/wedge clamps holds the guard securely;
- ❖ shipped with mounting kit for quick assembly;
- ❖ comes in two patterns, square/oval;
- ❖ includes both (two) single clips and (two) wedge clamps; and
- ❖ custom guards, floor posts and rail assemblies also available and built to spec.

Benefits

- ❖ prevents injuries to workers by serving as a barrier to all pinch points;
- ❖ can be used for access control;
- ❖ open patterns provide opportunity for visual inspection of key components;
- ❖ easily removed for conveyor access and maintenance;
- ❖ creates a safer environment in accordance with OSHA/MSHA mandates; and
- ❖ Total Satisfaction Guarantee (TSG) – ASGCO's unmatched customer service policy ensures your satisfaction.

ASGCO®'s Safe-Guard Modular Conveyor Flat Guard.

ASGCO® solves a Midwestern wood and paper mill's chute plugging problem while providing proper support in the load zone area to eliminate spillage

Challenge: a high volume paper mill was experiencing constant chute plugging, and leaking in critical areas, causing wood chips and dust to escape containment. A secondary problem was chronic belt mistracking and material leakage under ill-fitting rubber skirts. Due to the extreme capacity of this mill and the

MIDWESTERN PAPER MILL PROJECT

Industry:	Wood Chip and Paper Mill
Application:	36" wide V-cleat conveyor belt
Product:	ASGCO® 3-DEM® redesigned chute and installed ASGCO® Slide-N-RollTM, to support the belt, along with Clamp-Mount® Skirtboard Sealing System with angle support and Dura Seal® Red ORG 45 durometer Skirtboard Sealing Compound
Objective:	Redesign the chute for better material flow and reduce the dust in the load zone area

Paper milling plugging

Before: *Fugitive material build up on the conveyor chute and the load zone area caused by chute holes and improper sealing systems.*

24 hour operation, ASGCO® engineers had only eight weeks to take field measurements, design and fabricate a new chute and load zone, and have everything installed.

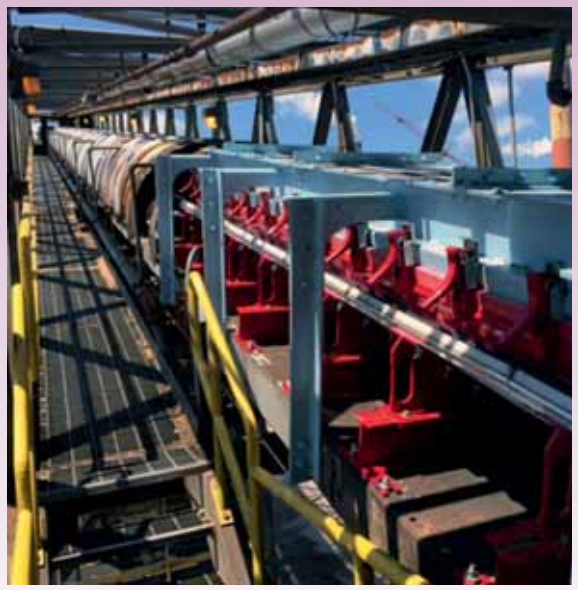
Solution: after surveying the conveyor system, ASGCO® recommended a new chute design to help with the material flow plus Slide-n-Roll® Slider Beds to support the belt. In addition, the system could greatly benefit from ASGCO® 's Clamp-Mount® Skirtboard Sealing System with angle support, Dura-Seal® (ORG), 45 durometer skirting rubber to seal the dust from escaping from the skirting area, and a Hinged V-Plow™ that keeps any material from getting caught between the tail pulley and the belt. The chute was redesigned using ASGCO®'s 3-DEM® Chute Analysis Program to improve the material flow, along with installing Safe-Guard® Inspection Doors for quick inspection of the chute and equipment. The load zone improvements included several Conveyor Dust Curtains and a Tru-Trainer® Return Idler that would keep the conveyor belt from mistracking into the tall pulley.

Results: After implementing all of the listed improvements in the tight time period allowed, the mill is operating at a much higher level of productivity. Chute plugging is no longer a problem, and dust and debris have been adequately contained. This has greatly reduced clean up time, and improved safety conditions. Due to the success of this project, the mill operator has ordered the redesign of additional chutes as well as installing many other ASGCO® products.

About ASGCO®

ASGCO 'Complete Conveyor Solutions' headquartered in Allentown, PA, USA is recognized as a worldwide authority in bulk conveyor material handling systems that are designed to be technologically advanced and cost effective. ASGCO strives to make the handling of bulk materials cleaner, safer, and more productive.

problem: before and after



After: *ASGCO® Slide-N-Roll® system along with new engineered chute design and proper load zone support with sealing rubber.*

Lenzing RopeCon® – highest availability to ensure smooth production

Lenzing AG, a world leader in cellulose fibre technology, was looking for a way to transport beech wood chips from the storage area to the digester house. The distance to be covered was basically across all existing infrastructure on the premises. Furthermore, highest system availability had to be guaranteed to ensure a smooth production process.

Another challenge, along with the aggressive sulphurous atmosphere, was the low weight of the transported material, as continuous operation had to be guaranteed also in strong winds.

LENZING PROJECT STATISTICS

Transported material	wood chips
Horizontal length	665m
Vertical rise	32m
Conveying capacity	350tph
Motor rating, continuous	53kW

The solution

With just two tower structures, the Lenzing RopeCon® establishes a straight conveying line — perfectly integrated in the factory premises. With its high availability of 99.9% and with extremely low maintenance requirements, RopeCon® from Doppelmayr is just the reliable means of transport the customer needs for the trouble-free operation of the plant. The special belt housing structure permits the transport of the lightweight material even in wind speeds of up to 130km/h.

RopeCon® — the system

RopeCon® is designed and manufactured by the Austrian company Doppelmayr Transport Technology. The system combines proven ropeway technology with the features of conventional belt conveyors. The continuous conveyor is elevated off the ground, thus reducing space requirements on the ground to a minimum. RopeCon® easily crosses obstacles such as deep valleys, mountainous terrain, rivers, roads or other infrastructure, thus allowing for a straight route between the loading and the discharge point while avoiding unnecessary detours. The below description briefly explains the main components and features of RopeCon® and highlights the potential of the system as well as possible applications.

Belt and wheel sets

RopeCon® consists of a flat belt with corrugated side walls. The belt may be fabric-reinforced or a steel cord belt, depending on the application. The corrugated side walls are cold-bonded or vulcanized onto the belt. The individual belt sections are joined by way of vulcanization to form one continuous belt, just as on conventional belt conveyors.

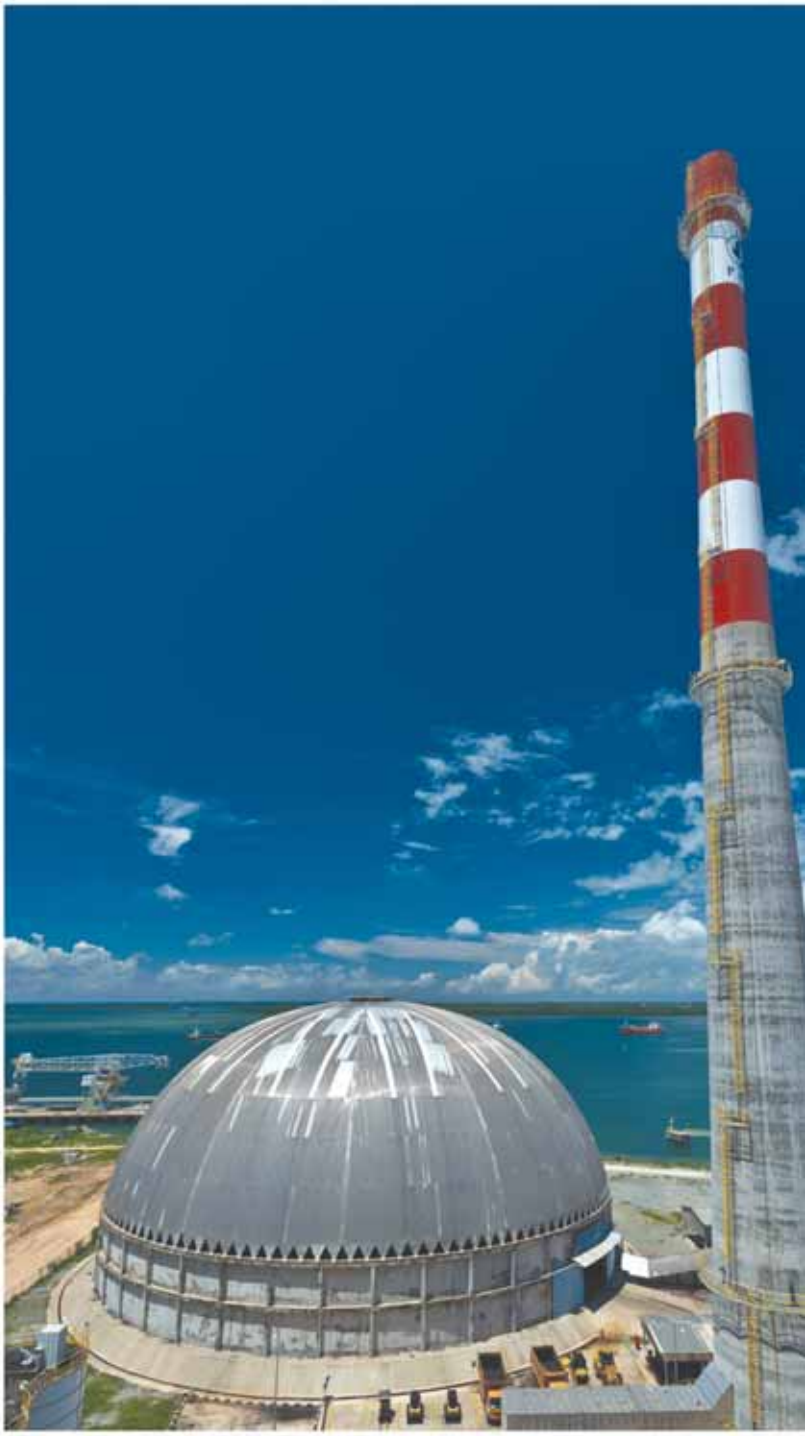
The belt is fixed to steel axles arranged at regular intervals which support the belt. Polyamide running wheels are fitted to either end of the axles. These wheel sets run on track ropes and provide positive belt guidance while preventing the belt from skewing. The combination of polyamide wheels on steel track ropes minimizes rolling resistance and therefore energy requirements.

Support structure

The galvanized, fully locked steel track ropes on which the wheel sets run are of the type used for suspension bridges or ropeways. RopeCon® uses three pairs of ropes: the bottom-most rope pair supports the bottom belt while the rope pair in the middle supports the top belt. The upper-most rope pair gives additional stability to the structure and serves as the travelling rope for the inspection vehicle by means of which each point along the line can be accessed. Track rope frames are fitted to the ropes at regular intervals to maintain the ropes in their relevant position and to distribute the loads. The ropes have fixed anchoring at both ends and are guided over tower structures, similar to passenger ropeways. Depending on the terrain and on the individual requirements of each project, different types of RopeCon® tower structures are used.

Drive

The belt performs the haulage function, as on conventional belt conveyors. The belt is driven and turned back by a drive drum in the head or tail station. After the material has been discharged, a turning device turns the belt by 180° to bring the soiled side of



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the belt upwards once more and to prevent residual material from falling off the bottom belt. The belt is turned once more before it runs onto the drum again in the loading station. The drive system is similar to that of a conventional belt conveyor and consists of a gearbox and an electric motor. RopeCon® features two independent mechanical braking systems. All braking actions are regulated to ensure constant deceleration and a controlled stop of RopeCon® under all circumstances.

Loading chutes for all biomass applications

Shiploading Cascade chute, loading wood pellets, biomass.

In the global trend towards renewable energy sources, biomass has become a major sector and the volume of biomass material shipped internationally has grown exponentially. The number of biomass-fired power stations in the developed world has increased significantly, often at the expense of coal, as governments have adopted green energy policies and sought to

Silo loading chutes, loading wood pellets, biomass.

hit their renewable energy targets.

Biomass has become a globally traded commodity and the growth in its transportation has led to interesting technical challenges and positive business opportunities for Cleveland Cascades Ltd, the specialist in the design and manufacture of bespoke dry bulk loading chutes.

The volumetric energy density of wood pellets is significantly less than coal, for which it is often a substitute. This means that more than twice the volume of wood pellet biomass is required to produce the equivalent thermal and electrical energy output of coal. Consequently, to be economically viable the material has to be handled in huge quantities.

Wood pellets are also brittle and need careful handling to prevent material degradation during transportation. Poor handling equipment during transportation can not only damage the product but also create unwelcome air born dust pollution. When flowing, the material also carries some explosion risk and typically chute components need to be designed to operate safely in this environment.

Unlike coal, which can be stored outside, biomass wood pellets need to be stored in a dry environment to prevent biological degradation. Storage of the material also needs to be continually rotated, as prolonged static storage in a silo can lead to further degradation, requiring bigger and taller covered silos for storage.

Consequently, loading chutes handling the transportation of this relatively delicate material need to able to handle huge volumes very gently and carefully and the Cascade, controlled flow technology chute from Cleveland Cascades Ltd is designed to effectively handle all of these challenges.

The Cascade loads material through a series of oppositely inclined cones, which creates a mass flow at low velocity, yet high volume. During its descent, the material is supported through the full length of the chute, ensuring a soft delivery from the outlet to the material pile, for every load. It therefore arrives at the load pile with minimal degradation .The controlled descent of the material prevents air separating the particles and largely eliminates dust generation at source.

When moving biomass from its source to its ultimate end use in power stations, the Cascade chute can be adapted to multiple applications in the distribution chain. It can be designed as a shiploader at the port of discharge, an open vehicle loading (road or rail) chute from the port or a silo loader at the covered storage area of the power station.

Cleveland Cascades has supplied numerous biomass chutes in all three of these applications across Europe and North America.

The Port of Prince Rupert, British Columbia, Canada, has a

Open vehicle loading chutes, loading wood pellets, biomass.

Cleveland Cascades shiploader installed loading wood pellets up to a capacity of 2,000 cubic metres per hour. The inclined cones have an 8mm polyethylene liner and discharge the material through a 25-metre length chute.

At Port of Tyne in UK, Cleveland Cascades have several vehicle loading chutes installed to load biomass from a hopper in to trucks for delivery from the port. The six-metre-length chutes can load to 500 tonnes per hour through stainless steel lined cones. To meet local safety standards, the chutes are ATEX zone 20 compliant.

At Ironbridge Power Station in UK, Cleveland Cascades has multiple silo loading chutes, handling biomass inside enclosed high-capacity storage bunkers. Each chute can handle up to 3.5 million tonnes of wood pellets per annum through the 10-metre-length chute and ATEX zone 20 explosion proof certification.

A big part of the package provided by Cleveland Cascades is ongoing product support, from the moment the product is delivered and throughout its operating life. Commissioning engineers can visit site to help install and optimize the operation of the chute according to customer needs, upon delivery. Manuals are comprehensive and detailed to give the operators the information they need to maintain the product and maximize its operational efficiency. On site technical advice, repair and maintenance is also available during the life of the product using factory-trained engineers. Cleveland Cascade engineers have extensive international experience maintaining, servicing and optimizing Cleveland Cascade systems all over the world. To complete the support package, original OEM spare parts can be supplied with the original order and subsequently during the life time of the chute.

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Dome Technology: second project for biomass company Enviva nears completion

Dome Technology is an industry leader in bulk storage, and its concrete Domesilo™ is an insulated, waterproof and fire-resistant option for holding more product than other types of silos with similar dimensions. In addition, "silos almost always require costly deep foundations, where often with domes we can mitigate the foundation cost considerably," said Dome Technology sales manager Lane Roberts.

Dome Technology will soon complete a project for biomass manufacturer Enviva at the Port of Wilmington in North Carolina, USA. The site includes two domes standing 170 feet tall, capable of storing 45,000 metric tonnes apiece and engineered to withstand winds up to 300mph.

The Port of Wilmington domes constitute the second Dome Technology project for Enviva. In the spring of 2011 and November 2012, two Enviva domes were completed at the Port of Chesapeake in Virginia.

Dome Technology also completed two projects with power-generator Drax; two biomass-storage domes were built at the company's Port Allen Facility in Baton Rouge, Louisiana, USA, and four domes built in Selby, England, comprise Europe's largest decarbonization project to date.

Recent innovations

The Dome Technology team has pioneered a proprietary round explosion vent ideal for products prone to deflagration. Until now, square and rectangular explosion venting has been the norm, but Dome Technology's round hybrid model has been and will continue to be installed on multiple bulk-storage domes.

"No matter what system, you're creating a weak spot with panels, whether it's a pre-manufactured rectangular panel or a metal cladding piece. This is a round panel, which in a dome is nice because you don't get sharp corners for stress concentrators," said engineer for Dome Technology Adam Aagard.

The explosion vents are made with a metal ring fastened directly to the dome with pressure-release screws; these screws are engineered to remain secure through dead, live and wind loads but release should interior pressure reach critical levels. To the metal ring is fastened another ring, this one attached to a geodesic steel lattice covered with fabric. The lattice helps the fabric hold its shape, and the fabric acts as a waterproofing shield protecting product and helping maintain the dome's interior climate.

When an explosion occurs, the fabric accepts the load and transfers it uniformly around the ring's circumference. "Because it's circular we can predict the load going to each of the fasteners really well," said Jason South, Dome Technology Vice President of Engineering, Research and Development. "If it were rectangular,

the pressure going to each fastener could be different," and more difficult to estimate.

Why choose a dome for biomass

Stability can change in an instant for wood pellets, but companies can mitigate concerns about explosion, moisture and product integrity by selecting a dome for bulk storage.

Domes are airtight, lending themselves to flexibility when managing pellets. Because pellets self-heat and can self-combust when stored for extended periods, nitrogen used to pacify the product is trapped within the dome, equalling cost savings in would-be-wasted nitrogen.

Warehouses and flat-storage structures can only be built so tall before their strength is compromised; with domes, customers can store more product in a smaller footprint, stacking it deeper and taking up less property at the site. While common for businesses to require three to five buildings for flat storage, one dome will likely accommodate the same amount of material in one structure. The dome's double curvature lends itself to strength and the ability to build up, rather than out. Increased storage means more opportunities to make money by moving tons into and out of the dome, maximizing business efforts as product is moved through the facility.

Domes are completely waterproof, preventing pellets from exposure to moisture that causes them to expand, contributes to degrading and results in self-heating. The dome's insulated nature also prevents heating and cooling of the walls and air inside, thus preventing condensation from forming and protecting the integrity of the product. Temperature fluctuations are tempered, so self-heating and combustion happens much less frequently than in traditional storage structures.

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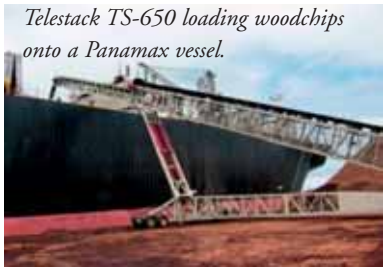
Telestack's biomass handling and storage solutions



Telestack TS-650 loading woodchips onto a Panamax vessel.

The energy sector has undergone major transformation in the last number of years with increasingly restrictive legislative measures and associated fluctuations in the demand for certain fuels. The industry has been forced to pursue alternative fuel sources and as the subsequent increase in demand for biomass products as an alternative energy source came, so too did a new set of challenges and a greater emphasis on the material quality and environmental regulations. The Organisation for Economic Co-operation and Development (OECD) expects biomass usage as an energy source for production in power plant to more than triple in the next 20 years as power plants strive to gain greater independence from fossil fuels thus reducing their carbon footprint.

Biomass fuels vary considerably including wood chip, forest product wastes, wood pellets, agricultural wastes, animal litter, meat and bone meal, sewage sludge and combustible fraction of garbage that cannot be recycled or refuse derived fuels (RDF). Each of these brings differing concerns and considerations.

Malachy Gribben, Telestack's Commercial Director explains "One of the key issues in handling the range of biomass applications is the location of the material source relative to the power plant and the need to transport the biomass material by a range of transport including ship/barge, truck and rail. Each demands specialist equipment for the environmentally acceptable transfer between each mode of transport. Where Telestack's expertise is particularly valuable, is in their experience and range of handling systems that support the varying biomass characteristics from light and friable materials such as woodchip and wood pellets through to heavy, wet and sticky sludge such as sewage and chemical residues."

Gribben continues "Each application differs and first-hand knowledge and experience is necessary! In the case of wood pellets for example, degradation of material at transfer points can often compromise the composition and size of the product which could in effect reduce the selling price per tonne. Also its potential abrasiveness could make it highly flammable and we have to implement stringent ATEX-approved features. Receiving, feeding, handling and storing these materials is a real challenge, particularly in continuous process applications where availability 24/7 is mandatory. Delivering reliable and efficient solutions requires both ingenuity and experience in applying existing and proven technologies in new and extraordinary applications."

Flexibility as standard — shiploading and stockpiling biomass

A common theme in purchasing from Telestack's range of mobile shiploaders is the flexibility offered in terms of higher handling rates and environmental performance yet avoiding the need for expensive and permanent civil works and dedicated port infrastructure. A case in point is the commission of a TS-650 Telescopic shiploader and HF-615 hopper feeder to Buchanan Renewables in Liberia. The Telestack equipment is designed to load the 14.0m freeboard, 70,000dwt Panamax vessels at 600tph (tonnes per hour) directly from wheel loaders via stockpiles located adjacent to the quay area. The ability of the mobile system to load the vessel as well as stockpile the material in the stockyard was one of the key customer on-site requirements.

The multiple-functionality of the units is a key advantage for Buchanan as they can use the units for loading vessels as well as to stockpile the woodchips in the stockyard when there was no vessel in the port, reducing the need for further capital investment. Moreover the same equipment may be used for a wide range of bulk materials with minimum or no modification whatsoever. The radial telescopic features of the conveyor allow the unit to stockpile 'automatically' up to 18m in height in the stockyard eliminating the need for labour to operate the units and coupled with the automatic PLC programme, the drop height of the woodchips is reduced, minimizing dust emissions compared with a fixed height conveyor system.

Buchanan Renewables produced high quality and low moisture content woodchips from non-producing rubber plantations and was exporting approximately 1mt (million tonnes) of woodchips annually to Germany and Sweden, where they were used by some of the world's largest coal fired power plants such as RWE Power. The woodchips were blended with the coal in the power plant before getting sent to the furnace for burning. The overall benefit was to reduce the carbon emissions in the power plants and ensure they are burning a renewable energy source. This allowed the power plants to secure their 'carbon credits' requirement and allow for a more environmentally friendly process.

The Telestack solution consisted of a TS-650 radial telescopic shiploader (51.4m open boom centres) along

MOBILE
COAL HANDLING SYSTEMS

Telestack
Mobile Bulk Material Handling

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

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

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

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

THE POWER TO **MOVE MATERIALS**

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Telestack TS-150 telescopic conveyor used for stockpiling wood chips at the Port of Tilbury with size ranges from 300 × 300 × 50mm down to typically 100mm minus including some small sawdust at a handling rate of around 100tph. The customized design included a number of special features required by the customer including operational lighting, radio remote control, anti-collision laser sensors, PLC custom package for stockpile generation, cross bonding on all joints, IP65 minimum electrical rating, dual access ways with full length trip wires, covers along both fixed and telescopic booms, wind deflection plates and an extensive safety package for alarms, sensors and warning devices — a truly customized solution.

with an HF 615 hopper feeder which ensures complete flexibility and efficiency during the loading process at rates of up to 600tph at 0.35t/m³ (>1,700cu³/hr.). The customer was previously using a 120ft fixed length conveyor but was unable to load Panamax vessels, hence the need to upgrade to the Telestack equipment. One of the key drivers for the purchase of Telestack equipment was the ability to reach several hatches from a single feed-in point at a 14m freeboard height, greatly reducing production downtime. In addition the telescopic feature of the shiploader allowed the customer to trim all parts of hatch with ease, via the optional remote control, providing maximum flexibility and control during the loading operation.

The HF615 hopper feeder, with an 18m³ hopper capacity, enables direct loading from a front end loading shovel and has an integrated variable speed drive on the belt feeder so loading rates can be controlled. As with the shiploader, the hopper feeder can also be moved around the site via an integrated toe hitch to the rear of the unit, which again allowed for enhanced manoeuvrability.

These units were also specified with an integrated 230KVa generator which was used to drive the conveyor belts on both the HF615 hopper feeder and TS 650 shiploader ensuring a fully independent system. In addition the customer also requested the optional over-band magnet which removed any tramp ferrous metal which could have potentially contaminated the woodchips.

The Telestack equipment can be easily moved between berths in a large port or even from one port to another perhaps even in a different country if trading patterns change. This flexibility in application and operation is very attractive for investors, particularly for short-term contracts or in regions of political instability as, in the event the export contract is terminated for any reason, the equipment retains intrinsic value and may be moved on for another purpose altogether.

Telestack is the only mobile provider that is able to offer both telescopic and cambered boom shiploaders. The Telestack range provides solutions for handling as little as 100tph up to 3,000tph and has the ability to load small coasters to the largest Capesize vessels. In addition, options are available to customize each detail from vessel trimming, movement, power supply, environmental considerations and feeder devices among others, to ensure that each solution is designed specifically for each application. When dealing with biomass — one solution certainly does not fit all!

TITAN TRUCK UNLOADING — IMPORT OF BIOMASS BY ROAD TRUCKS

Telestack has been manufacturing apron belt feeders since the late 1990s which have either been on a standalone basis, or more recently, incorporated into its range of mobile units. The TITAN range of bulk reception feeders combines the success and knowledge that Telestack has generated over the last 15 years designing and installing bulk reception feeders across the world to create a new brand — the TITAN range of truck unloaders/bulk reception feeders.

The Telestack TITAN feeder is supplied as an independent fixed or wheeled/tracked mobile unit for the intake of biomass, and all other bulk materials, direct from tipping or walking-floor type road trucks, wheel loaders and grabs.

The wide belt is available in widths from 1.8m to 3m and is supported on trapezoidal steel apron bars, the ends of which are connected to conveyor drive chains to provide a high torque, low speed drive. This compact solution is a key feature of the TITAN, the benefit of which allows easy surface mounting for truck delivery with no risk of bridging or blockage when handling wet and sticky agri-biomass for example, in any implementation, either inline or side tipping, or even in underfloor mounting for drive over applications.





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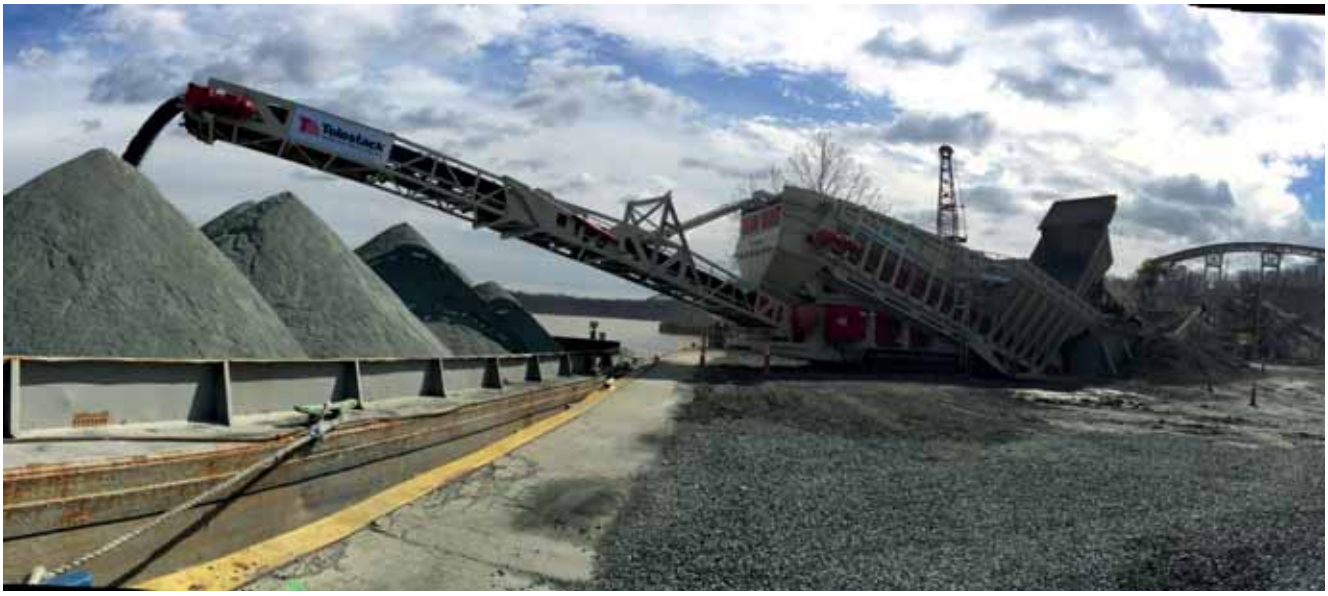

Weighing 120 tonnes in weight, 35 metres in length and 8 metres in height, the Telestack TITAN T-1600-8 is the largest truck unloader in the international market. With a throughput in the region of 2,000tph, this unit is loading barges in North America.

The TITAN is supplied in a wide range of standard specifications that will enable receiving all bulk materials with a density range from 0.1–3.0t/m³ and for handling rates from only a few tonnes per hour to up to 2,000tph. Each TITAN is designed specific to each application with a selection from a wide range of standard drives, chains and belt widths to ensure long-term reliability, the most cost effective design and aftermarket support for replacement parts.

Just some of the additional benefits of the standard modular design are faster delivery, lower engineering and supply costs and improved aftermarket support for replacement parts. The TITAN S-450 range will make its debut at the forthcoming Hillhead exhibition in Buxton, 28–30 June before making its way to Norway.

TITAN TRUCK UNLOADING — IMPORT OF BIOMASS BY RAIL WAGONS

The TITAN range has also been developed to work underground and can be located beneath rails enabling rail wagons to be discharged. The true benefit of the TITAN as a rail wagon discharger is the reduction in cost for civil works compared to more traditional solutions, due to the wide belt and ability to

TITAN is designed to receive various bulk materials.

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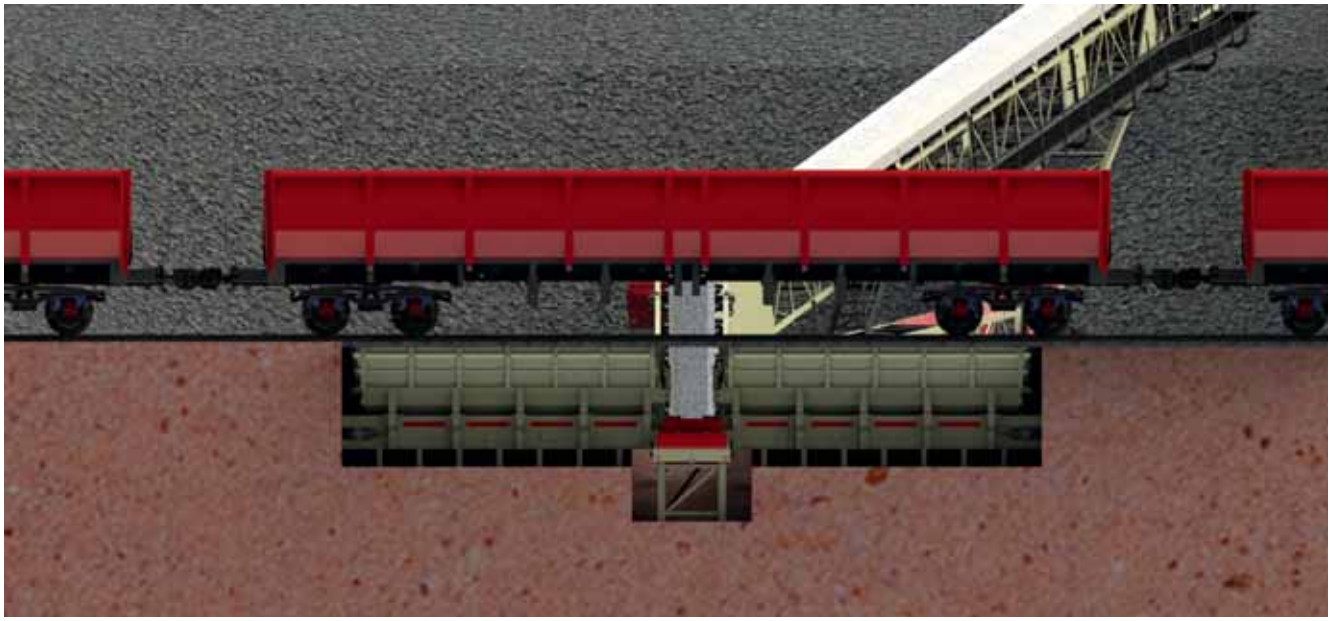

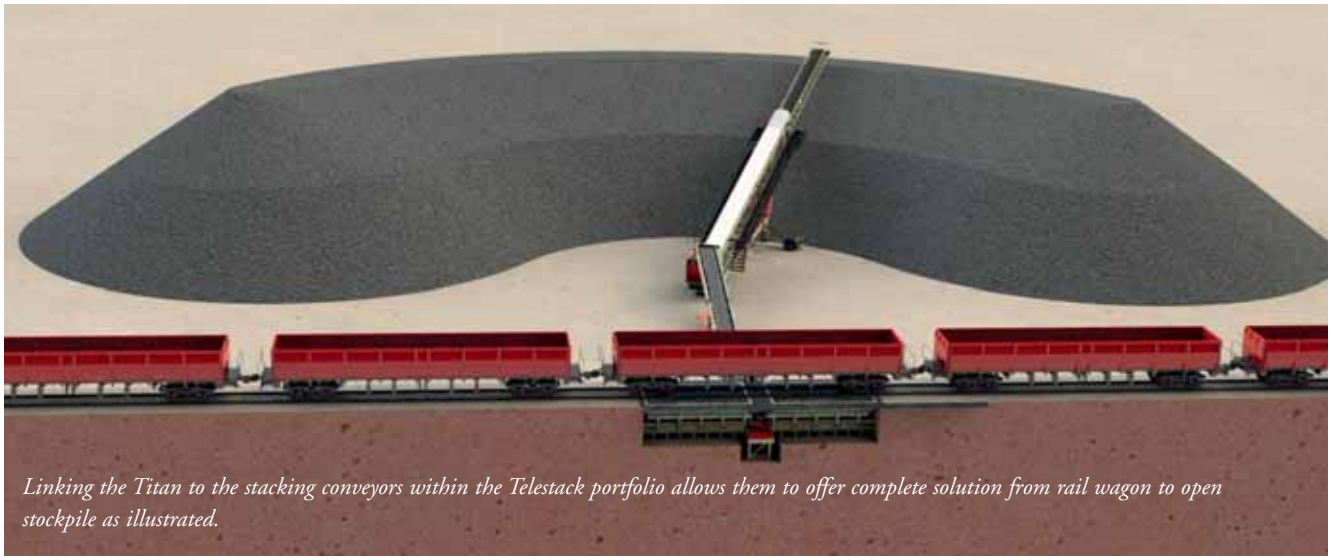

Linking the Titan to the stacking conveyors within the Telestack portfolio allows them to offer complete solution from rail wagon to open stockpile as illustrated.

receive high impact loads, the TITAN needs a pit depth of only 2.5 metres, which is around 50% of the normal pit requirement for vibratory or belt feeder installations.

The vertical walls of the TITAN also aid material flow and difficult, less free flowing materials can be handled with ease, also due to the wide belt, high outputs and handling rates can be achieved with the TITAN operating at very low speeds.

Dockside unloading hoppers (DUH) — ship unloading — biomass import:

Import from vessels requires substantial handling facilities at the port which would generally include grab cranes discharging to hoppers before transfer to storage either by conveyor or trucks. To receive the products and, where necessary, control the dust generated from such operations, Telestack has developed a range

The DUH matched with a mobile harbour crane as shown here, offers significant benefits for biomass fuel imports in that no dedicated port infrastructure is required and the equipment may be simply travelled to a storage area when not in use thus freeing the berth of other port operations. With truck haulage from the berth to a local storage facility close to the port the operator has maximum flexibility.

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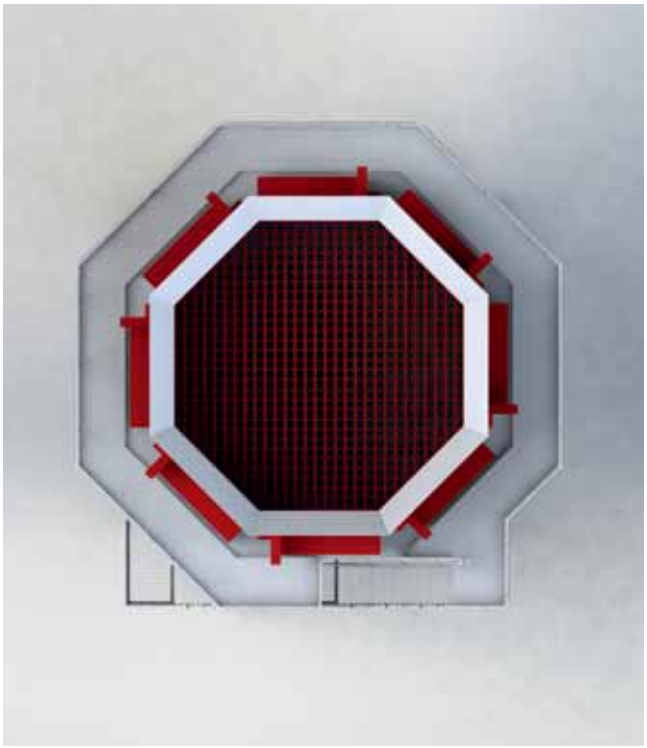


Numerous options are provided for either no dust control or full environmental dust control, static hopper or with mobility via rubber tyres or steel wheels, discharge options to truck or conveyor, power by quayside electrical supply or own diesel generator, the DUH concept is fully flexible and is an exciting addition to the Telestack portfolio of products.

of Dockside Unloading Hoppers (DUH) with optional integrated dust control and feeder equipment along with mobility options to meet client demands for flexibility.

The Telestack DUH is offered in sizes from 6.0m to 12.0m entry widths, all entry sections are octagonal in shape (see plan view) which gives the combination of strength, as you would expect from a round design, to the ease of manufacture and assembly seen from more traditional square designs. Each DUH is available in either complete flat pack design for clients own assembly, or full assembled by Telestack for delivery to site by floating barge.

The combination of products including the DUH, link conveyors, stackers and shiploaders enables Telestack to offer the most comprehensive range of products to allow complete handling and storage systems for biomass, all sourced from a single company.

Telestack has always been renowned throughout the industry for the quality of its machines and the company was awarded UKAS accreditation covering key global standards; ISO 14001 (Environmental Management), OHSAS 18001 (Health & Safety Management) in 2015. This is in addition to the firm's existing accreditation to ISO 9001 (Quality Management). Telestack has just surpassed its 30th year in business and is part of the Astec Industries family of companies. It has a global proven record in the ports and inland terminals, aggregates and mining sectors and its products exist in a range of applications including the coal, mining and quarry industries, stockyard management, ports and inland terminals, power stations, rail yards, steel mills, cement plants and many other bulk material handling industries. Telestack has established a reputation of quality, trust and integrity and looks forward in anticipation to the remainder of 2016 and a future based on sales that will enhance this reputation.

With such a wide and diverse range of products, Telestack is able to support principal contractors when the schemes are going beyond the simple layout of either material source to ship or ship to stockpile. This may include on site storage by silo, external pile or covered sheds, batching and weighing systems and a wider range of general material handling. Telestack is a perfect partner for the principal contractor for individual items of equipment and can support them with high-quality proposals, drawings and documentation.

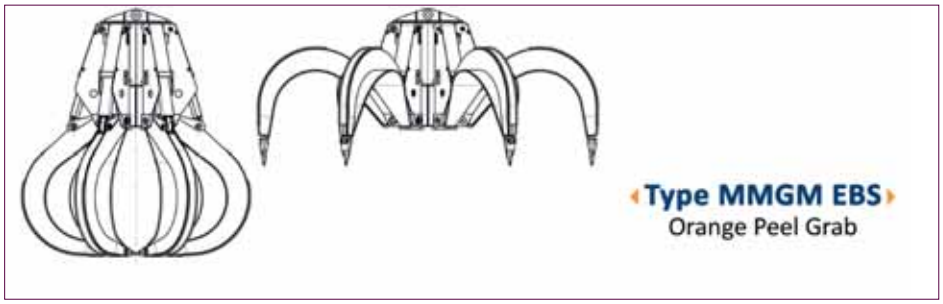
KRÖGER grabs for biomass incinerator plants

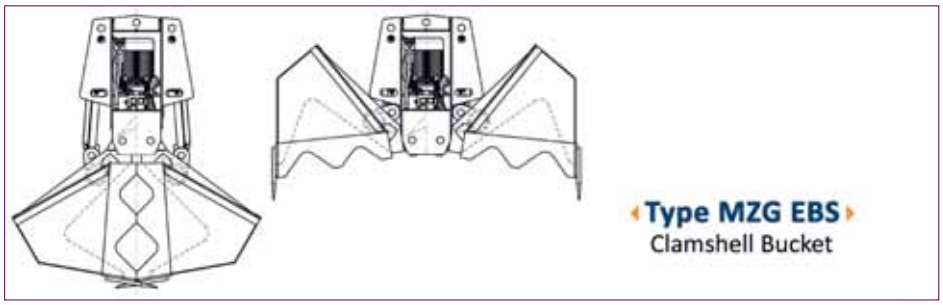
Special design and sensors guarantee maintenance-free long-term operation

Today, biomass is growing in importance as a combustible in large incinerator plants, where it is mostly used in the form of pellets or chips. However, the handling of biomass materials poses new challenges for plant operators. This is why KRÖGER has developed special motor orange-peel grabs (type MMGM EBS) and motor clamshell grabs (type MZG EBS) that have prevailed increasingly in recent years in handling biomass.

The design of the grabs, which are dimensioned exactly according to the specifications of the customer, is completely new. A change in designed was required because not only do the grabs have to cope with limited space

Construction and maintenance-free bearings guarantee a minimum of 3,000 hours of continuous operation.





requirement in plant bunkers, but they must also be able to collect as much of the lightweight material (such as woodchips) as possible. Moreover, it is important to ensure optimum filling of the grabs to allow smooth operation of the incinerators. This is achieved by a particular grab shape on the one hand and a special design of the teeth and openings on the sides on the other.

Since incinerator plants mostly run fully automatically, the grabs are also operated for long time without manual control, and should therefore be maintenance free. This is why KRÖGER uses special sensors, which not only ensure the opening and closing of the grabs, but also react to pressure and changes in the oil temperature. In terms of its bearing technology KRÖGER goes as far as to guarantee 3,000 hours of trouble-free operation. It is only these features that make it possible to have fully automatic operation of the plants.

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

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- Grab loading into barge/seagoing vessel at Main Terminal and Terminal North
- In ttl 10 heavy duty magnetic separators installed in all inward and outward bound conveyor belt routes, including the railcar loader. Board/board into barge barge/coaster also possible via the magnetic separators.
- Homogenising of various grades of coal whilst loading via the conveyor belt incl. weight assessment per quality
- Screening/crushing/mixing
- Covered storage capacity at Main Terminal in 5 sheds directly under reach of the grabs; ttl. 25,000m² for

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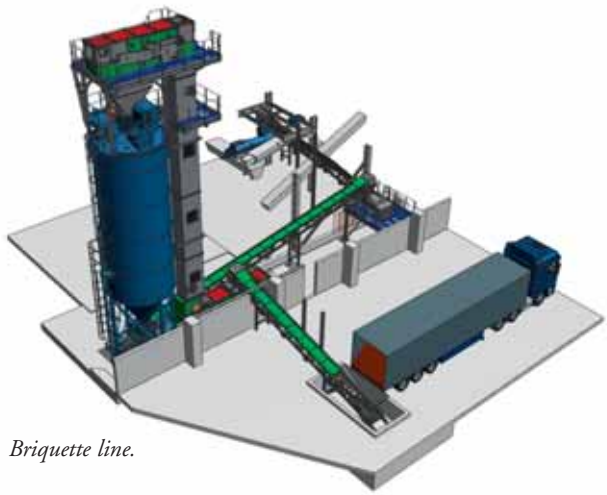
Website: www.oba-bulk.nl

Motogroup enables co-firing of waste wood briquettes at A&S Energie

A&S Energie N.V. is a biomass power plant located in Belgium. Every year, the plant processes 180,000 tonnes of non-recyclable waste wood into green energy for 54,000 households.

The biomass power plant produces 190GWh annually. Up to now, it has generated energy by burning only waste woodchips in its incinerator (a fluid bed type). This summer, it will also begin co-firing briquettes, made of waste wood dust, continuously.

To burn wood dust briquettes, A&S Energie had to expand its incineration line with an additional supply line for waste wood dust briquettes. Motogroup



Briquette line.

engineered, manufactured and assembled this supply line.

The waste wood dust briquettes arrive by a walking-floor truck and are dumped into a hopper in the woodchip warehouse. The trucks unload the briquettes at a rate of 60m³/h. From the receiving hopper they fall onto a 12m-long belt conveyor. This transports the briquettes to a 100m³ silo outside used as a buffer. The briquettes are transported up into the silo via a corrugated belt conveyor. It is very important that during the handling of the briquettes, they keep their original shape and don't get degraded to optimize the burning process and to avoid dust formation. This way A&S Energie is able to generate more energy. This is the reason why Motogroup has chosen belt conveyors to handle the product.

In a second phase the briquettes are handled with a Spaleck-dosing feeder under the silo, to a conveyer belt line. An efficient weighing system, installed on one of the belt conveyors, informs A&S about the quantity of briquettes that are to be sent to its incinerator. Depending on the demand, the co-firing operates at a rate of 1tph (tonnes per hour) to 10tph. Finally a rotary valve and a bi-directional screw conveyor move the briquettes to two existing bucket elevators. The waste wood dust briquettes are burnt together with the wood chips.

Explosion safety

Dust explosions or fires at production facilities do not occur without a reason. Fine dust is often the cause of a dangerous situation. Wood dust mixed with air is very hazardous. Therefore all components of the complete installation are carefully engineered and selected to fulfil strict ATEX requirements.

All plastic and rubber components (e.g. wear plates, belts, scrapers, etc.) of the conveyors are flame retardant and anti-static. The Spaleck-dosing feeder is constructed in stainless steel to suppress the potential occurrence of sparks.

Low dust emissions

To keep the briquettes in a dry condition and dust emissions low, Motogroup engineered a 100% dust- and waterproof construction for its conveyors. Although the complete installation is fully enclosed, all rotary components are visible from the outside at the demand of the client so that he can easily inspect the installation for possible blockages of these components.

Maintenance

The complete installation is equipped with the necessary structures, platforms, stairs, inspection hatches so that critical components of the installation are easily accessible for maintenance.

High volume revolver and container for biomass market

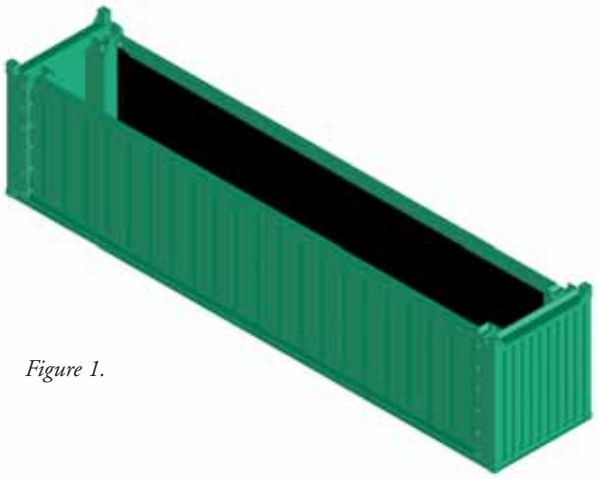


Figure 1.

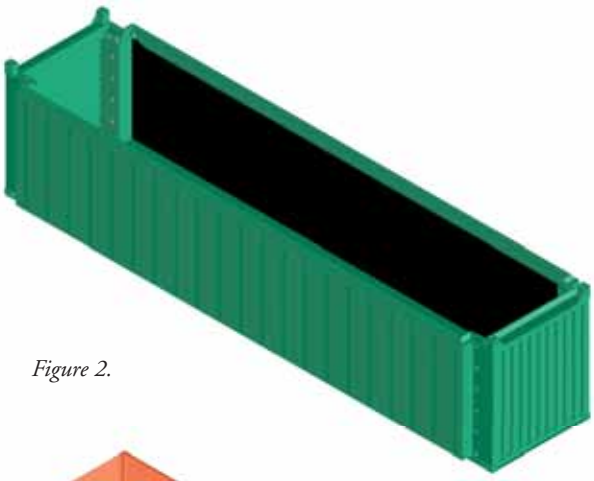


Figure 2.

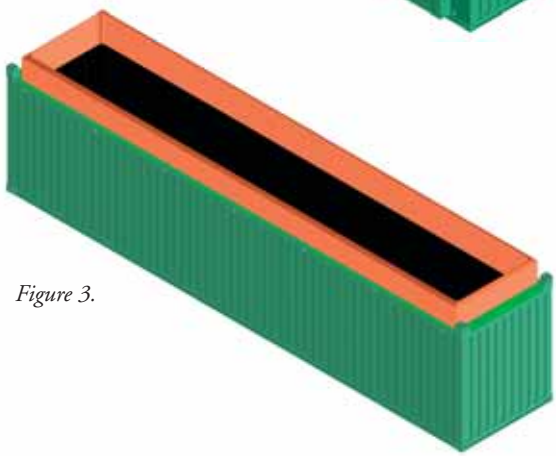


Figure 3.

RAM Spreaders develops high volume Revolver® – Container combination for low density bulk

In order to meet the need of its customers who wish to handle low density dry bulk products, RAM Spreaders has developed a high volume 'Revolver® – Container' combination, to add to its extensive range of container handling solutions.

With a growth in biomass and other low density dry bulk materials, RAM has been investigating ways to maximize the efficiency of loading with its customers. Essential to the investigation process and the feedback it received, was the need and ability to load large volumes (>100 cubic meters) per cycle.

After consulting with customers RAM has developed a solution with the 'Revolver® – Container' combination being able to handle this level of load rate, by introducing a high volume container capable of achieving a higher volume load capacity.

This new innovation allows the Revolver® to handle large volumes and provide our customers in getting the very best load rates available.

With a maximum volume of standard open top containers being limited, it ultimately restricts its efficiency. So you would think to increase the volume, you would have to introduce an out-of-gauge container, which would be expensive to build and to ship.

To solve this problem, RAM has developed a two-tier container, which is an 'in-gauge' design solution for shipping but out-of-gauge for operations. So for the customer it will increase efficiency but still remain cost effective.

The design and construction of the high volume 'in-gauge' container is innovative and very easy to introduce into the containerized bulk handling process.

The key areas of the design and construction of the container:

- a wider container which is capable of being shipped 'in-gauge' and then easily assembled on site; and
- a top insert, capable of making the container taller which is shipped 'in-gauge' and easily assembled on site.

These new innovations enable the customer to ship the container 'in-gauge' and then assemble the container to the larger volume capacity on site.

This can be seen in figure 1 where the side walls of the container are at their standard ISO 'in-gauge' width for shipping purposes.

Then on site figure 2 shows the side walls being extended past the ISO width and bolted to the end walls.

The same occurs with the container height extender as shown in figure 3, which is based on the old concept of "hungry board" which could enable the container to be shipped in gauge but be extended beyond ISO dimensions.

These innovations form part of RAM's commitment to innovation and providing the best solution to its customers. DCi

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The wind beneath my wings?

pneumatic equipment remains a vital bulk handling tool

VIGAN offers full range of pneumatic – and mechanical – unloaders

VIGAN is renowned worldwide for its bulk handling machines, and is a world leader in the supply of pneumatic ship unloaders. For years, it has supplied approximately two-thirds of the world's pneumatic unloaders for agri-bulk cargoes.

VIGAN offers a full range of unloaders, including:

- models ranging from small grain pumps offering capacities of 100tph (tonnes per hour) right up to high-capacity 1,500tph mechanical unloaders;
- unloaders to handle vessels from small river barges up to large ocean going vessels;
- pneumatic and mechanical technology, loaders and unloaders for grain and all agri-bulk cargoes; and
- full turnkey solutions for port grain terminals.

Machines recently installed by VIGAN include, among others:

- three pneumatic NIV 600tph in Yanbu port in Saudi Arabia, installed last November;
- two pneumatic unloaders and a loader currently in commissioning in Bangladesh for the Directorate for Food;
- one pneumatic NIV 600tph in the French port of Dunkerque, commissioned in January 2016;

- six pneumatic NIV 600s currently being commissioned for the new GSFMO port silo of Jazan, Jeddah and Dammam in Saudi Arabia;
- various unloaders in Iran, on the Caspian sea and on the Persian Gulf; and
- a loader for Cargill in Belgium commissioned end of 2015.

About VIGAN

VIGAN Engineering S.A is a Belgian company with its headquarters in Nivelles industrial area about 30km south of Brussels at the heart of the European Community.

VIGAN manufactures a complete range of pneumatic and mechanical conveying systems for products in bulk not only through the supply of equipment, but also by managing complete turnkey projects.

The city of Nivelles is easily accessible due to its proximity to European highways, and it is about one hour's drive to the Port of Antwerp which allows for excellent transport conditions for all of VIGAN's equipment to foreign countries.

All the company's activities take place on the same 10,000m² site, which enables easy and very quick exchange of information among all departments including sales, engineering, manufacturing, quality control and after-sales technical assistance. VIGAN's engineering department, boasts the latest software technologies (such as CAO – CAM types)

VIGAN prides itself on the range of its product offerings, and can supply equipment to handle bulk at capacities ranging from 100tph to 2,000tph. It provides bulk handling and storage in ports for any free flowing materials like cereals, grains, seeds, animal feed, alumina, petro coke, chemicals, industry raw materials, wood pellets, and more.

VIGAN's reputation precedes it, and its achievements have been regularly recognized by trade and official organizations such as the Belgian Foreign Trade Board in 1993 and twice by Walloon Region of Belgium in 1998 and 2010 (AWEX). It also won the 'Best loading/unloading system' award from *International Bulk Journal* in 2011. VIGAN's excellence is also recognized by hundreds of international references and repeat orders from existing customers.

As an affiliate company from VAN DE WIELE group (which has an annual turnover of about US$500 million and about 2,600 workers and employees in more than ten countries) and with more than 45 years of experience, VIGAN is a most reliable partner from project conception to completion.

VIGAN's pneumatic unloaders

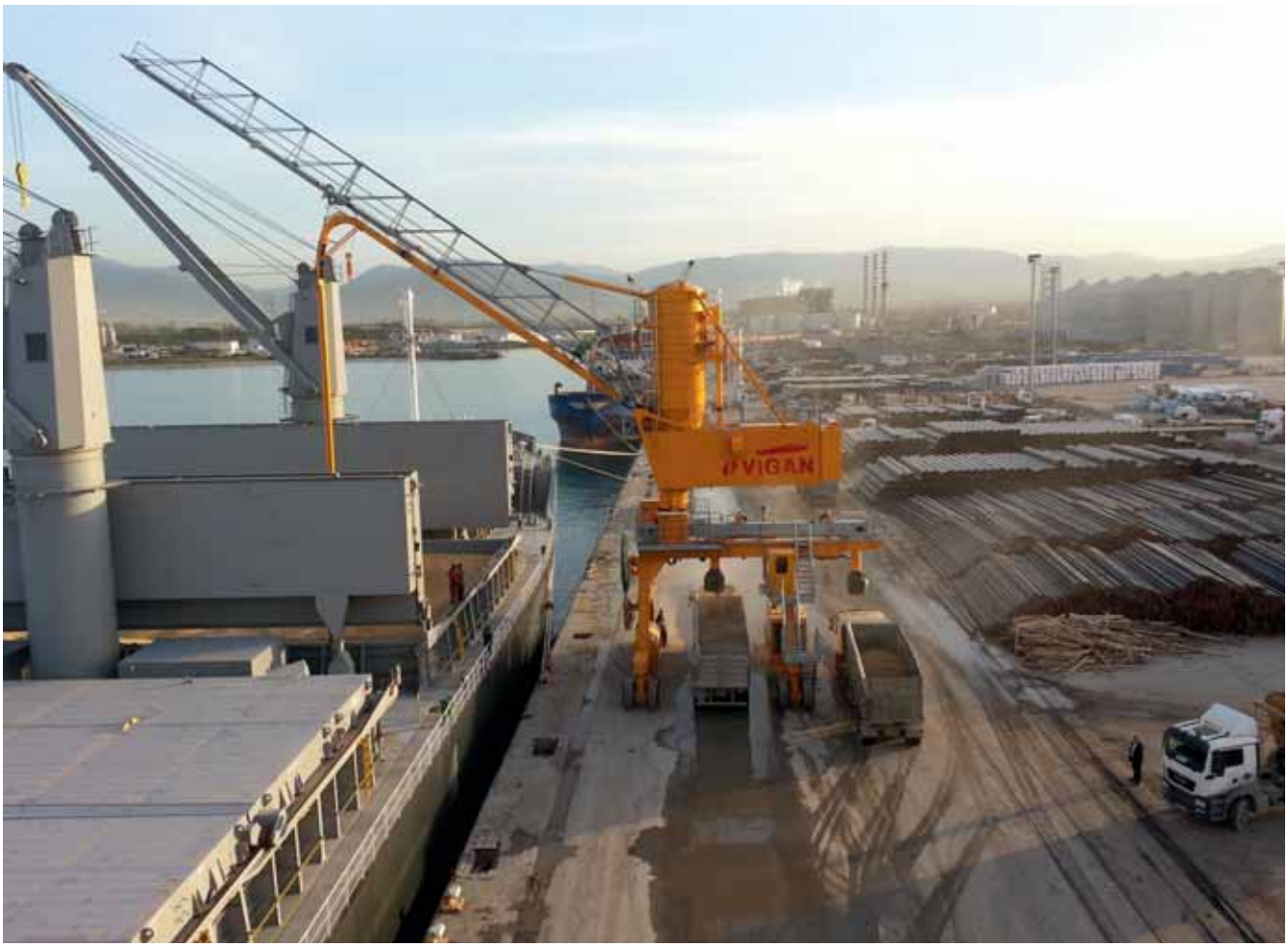
VIGAN's pneumatic equipment principle is based on conveying products using air which handles the product inside pipes and therefore behaves as the transport medium.

This means that, at the suction nozzle and thanks to the vacuum produced by the turbo blower(s), a certain amount of air is mixed with the free-flowing products. The sufficient air speed in the pipes will maintain the products into the air flow and therefore they will be conveyed in the same way as the air.

In the central part of the equipment at the arrival of the products inside the receiving cyclone or hopper, the air will be sucked upwards into the turbine — meanwhile the products will settle down into the hopper bottom or cyclone.

After being conveyed down by an airlock (rotary valve), the products are conveyed either pneumatically or mechanically to their final destination such as into trucks, railway cars, silos and/or storage warehouses.

VIGAN's equipment range makes it possible to unload any size of ship, because mobile machines can be put on the deck of



large vessels, and large models can have a boom with suction pipes that are up to 30 metres long, so can be used on post-Panamax vessels.

Making the right choice of equipment

It is important to ensure that the machine selected is the most appropriate for the job in hand, which can be a rather complex matter.

VIGAN's expert team asks questions, including:

- which product(s) will be discharged?
- how many tonnes will need to be unloaded per year?
- what is the target unloading rate?

VIGAN's equipment can handle most free-flowing products with densities between 0.5 and 1.5 and a natural angle of repose less than 40°. Suitable products include all kinds of cereals (corn, wheat, barleys, ….), oilseeds, nuts, raw materials for animal feeding, certain chemicals such as soda ash, alumina, and also slightly compacted products such as soy bean meal. VIGAN's equipment does not damage the products, as the handling process is very gentle.

As a rough guide, VIGAN recommends that operators needing to unload up to 250,000 metric tonnes per year should use small grain pumps. To unload up to 5mt (million tonnes) per year, one or two larger pneumatic unloader(s) on a gantry is advised. For higher unloading rates, VIGAN recommends a mix between NIV and SIMPORTER.

VIGAN's expert team is available to offer advice and support, to enable customers to make the appropriate decisions.

Small portable grain pumps

VIGAN's portable grain pumps Type 100, 120 and 200 have different conveying capacities depending on working conditions. The types 100 and 120 are able to work in three different modes: suck and blow, suck only, and blow only.

The higher-performance mobile unloader, the type 200, works only in suction mode and offers a conveying capacity of up to 250tph. All models are either electric or diesel-driven.

River barge pneumatic unloaders

These unloaders are available in types 160, 200, 300 and up to 600 tonnes per hour.

Those unloaders are specially adapted to small vessels and river barges, a boom up to 17–18 metres being usually sufficient to reach most of the hold openings area and to ensure efficient unloading operations.

NIV-type pneumatic unloaders

The NIV unloaders are available from 160 to 800tph. They are specially adapted to medium size ships up to post-Panamax, namely due to the boom length that can reach up to 30 metres, but can be also be used for small size vessels in some circumstances.

The main advantages of the pneumatic unloaders are efficiency, reliability and cost-effectiveness. Indeed, the pneumatic are offering:

- most efficient cleaning of the vessel or barge hold;
- low energy consumption: 0.6–0.8kW per unloaded tonne;
- very low breakage of the products;
- no spillage: totally enclosed design;
- no dust: filter with sleeves and automatic cleaning; and
- low noise thanks to acoustic insulation.

Each machine is customized and optimized according to the customer's technical requirements and financial resources: unloading capacity, boom length, stationary, movable (self-propelled or tractable), vessels, size, and so forth.

Most common are on rubber wheels or on rails but also on a stationary gantry.

Since its foundation in 1968, VIGAN has been continuously improving its own expertise with state-of-the-art design of major components of the suction, such as:

- **VIGAN turbo-blower(s):** VIGAN's high-pressure three- to four-stage centrifugal turbo-blower(s) have automatic air regulator or electronic speed variator (also called frequency inverter) for energy consumption optimization (power consumption reduction of around 25% compared to traditional systems).
- **Filter & airlock:** VIGAN's pneumatic unloaders are fitted with a self-cleaning filter which operates by jet pulse system (high pressure). VIGAN owns the manufacture of the airlock: different models are available to correspond to diverse applications.
- **VIGAN's telescopic piping system:** VIGAN has always focused on innovating about the wear-resistance of its piping, particularly on the Ni-Hard (nickel-chrome alloy) elbow which does not require any maintenance before 5 million tonnes.

NEUERO: over 100 years in business and still going strong

Neuero Industrietechnik für Förderanlagen GmbH (NEUERO) is headquartered in Melle, Germany, and operates globally. The company offers turnkey solutions in the bulk solids handling field, and has particular expertise in pneumatic handling of cargo.

NEUERO operates according to the 'Made in Germany' tradition, providing high quality, environmentally friendly and durable loading and unloading equipment for industrial plants, silo terminals, power plants, aluminium smelters, malting plants, feed mills, etc. The company has been in business for 100 years, during which time it has supplied reliable, high-quality equipment for crucial projects in industrial plants around the world.

NEUERO is a specialist in pneumatic and mechanical bulk material handling, and manufactures continuous ship unloaders (CSU), the most environmentally accepted solution in ship discharging activity, and shiploaders

NEUERO is global client oriented, and its equipment is flexible and cost effective. The company uses only state-of-the-art technology, and the reliability of its solutions has ensured the success of all realized projects.

NEUERO has its own 6,550m^2 manufacturing facility plus a new logistical area which was added beginning of 2013 in Melle. Equipped with its own machining shop, painting shop and laboratory, NEUERO is in a position to provide continuous engineering solutions to its customers.

Worldwide presence is assured with the operation of NEUERO Corporation in Chicago/USA as well as its partnership with Brazilian companies for grain and mineral handling — Maquinas Condor and Isomonte.

Using expert know how for upgrades, retrofits or complete new installations, NEUERO's goal is always the same — solving the tasks effectively on budget and on time. The result is quality solution engineering that respects and protects the environmental, health and safety (HSE) requirements of its customers' companies and their communities.

Neuero is an ISO 9001 certified company and received the OHSAS 18001 certification in 2013.

Neuero works together with well-known German sub-suppliers like SEW, Atlas Copco, Danfoss, Rothe Erde and others.

History

In 1914, NEUERO was founded as a manufacturer of agricultural machines and started with the production of machinery mainly used on farms.

After World War II, the production range was expanded to include mobile pneumatic conveyors which are still used in ports worldwide. In addition an important product line of radial turbo

Multiport M600

This Multiport M600 for truck loading is being used by Al Watania, one of the biggest providers of chicken feed in Saudi Arabia. Using this unloader, Al Watania has improved its animal feed import capacities significantly. The self-propelled pneumatic ship unloader is equipped with its own power source and is able to load trucks via its three loading bellows. The capacity, based on wheat, is 600tph. The unloader is also equipped with a 15-tonne pay-loader winch, cabin with SCADA system and a fully steerable bogie system.

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279-2016

fans, specially designed for pneumatic conveying of bulk material, was developed. An additional production plant for normal radial fans was built in Italy and operated under the brand name of Comefri.

In 1970, the production range of NEUERO expanded into defence infrastructure products.

In 1976, NEUERO Corporation was founded in West Chicago, USA.

In 1988, the NEUERO Group was divided into three independent companies and since then NEUERO Industrietechnik has been manufacturing mainly port equipment like ship unloaders and loaders.

Technologies and services

The company NEUERO has specialized in the pneumatic and mechanical unloading of vessels with unloading capacities from 20tph to 1,200tph and mechanical ship loaders for different commodities with capacities up to 3,000tph.

NEUERO's latest developments include the direct drives for its turbo fans. Furthermore, it is continually working to reduce the power consumption of its pneumatic conveying systems with the support of its frequency converter technology, by increasing the efficiency of pneumatic conveying systems and the optimization of the material flow in the conveying line.

Besides its projects within the food divisions, Neuero is also active in the non-food arena with, for example, pneumatic unloaders for alumina and pet coke and ship loaders for minerals and fertilizers.

Flexiport F500

In May 2014, the latest Flexiport F500 was commissioned and is ready in operation, unloading mainly non-free flowing bulk materials such as fish meal, soy bean meal, corn gluten, pellets, etc. The unloader has a discharge capacity of 500m³/h based on fish meal. NEUERO's client Marine Harvest has built a new plant for the production of fish feed near Trondheim and is producing up to 300,000 tonnes of fish pellets per year for its own fish farming.

NEUERO's portfolio

GSD: mobile pneumatic suction pressure machines with capacities from 20tph to 200tph, especially suitable for flexible ship unloading operations.

Multiport: single-line pneumatic ship unloader, either stationary, travelling on rails or on rubber tyres, for capacities up to 800tph, suitable for vessels up to post-Panamax.

Multiport AL: specially designed pneumatic unloader for unloading alumina and petrol coke for capacities up to 500tph and 800tph for tower solutions.

CombiPort: combined pneumatic ship unloader and mechanical loader, designed especially for oil and feed mills.

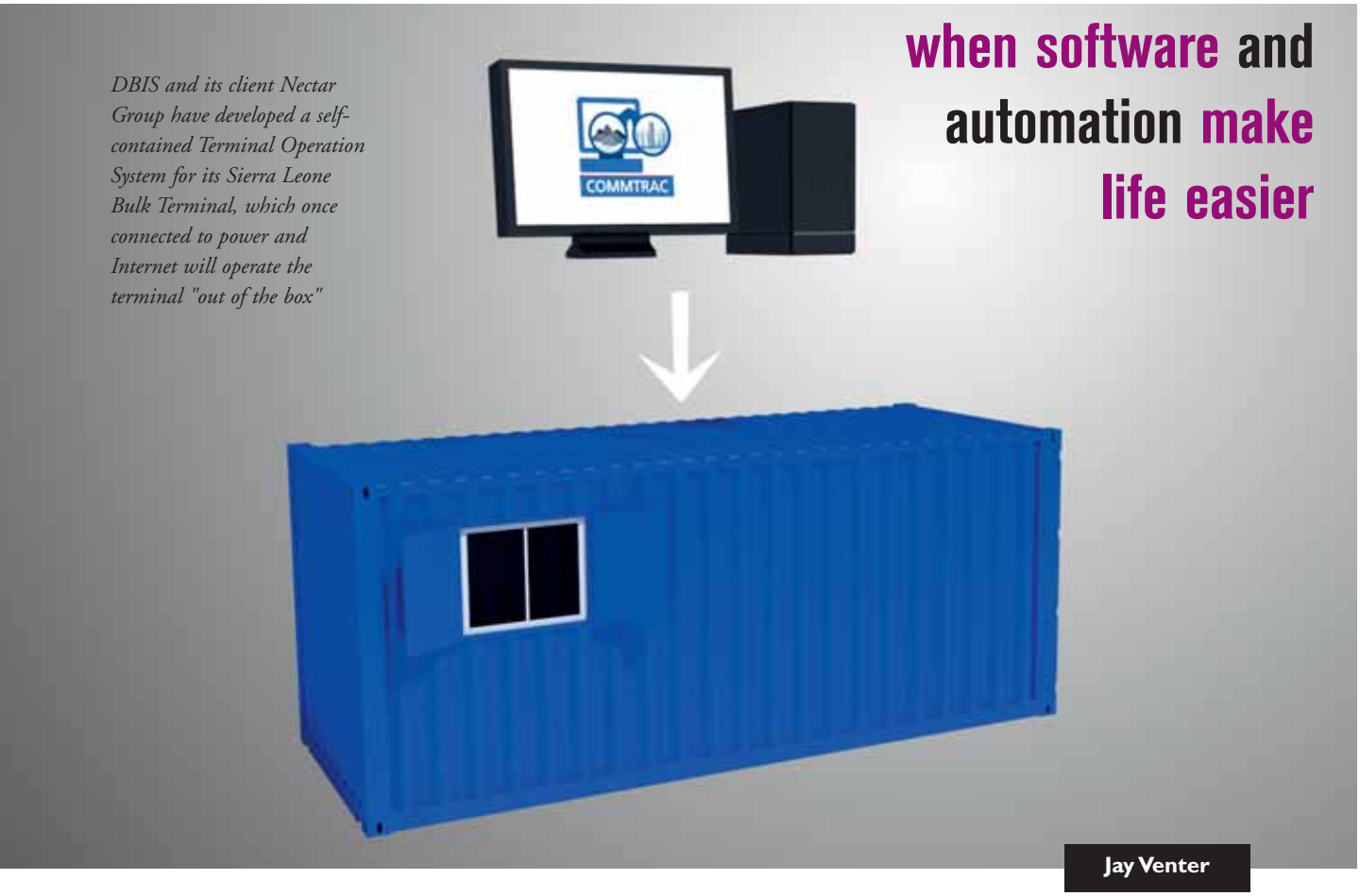
Tower: two-line ship unloader, if required with mechanical loading system, weighing system and bobcat hoist, unloading capacities up to 1,200tph for agricultural products as well as for alumina and petrol coke.

Flexiport: specially designed pneumatic unloader with feeding device for agricultural non-free-flowing products like soy bean meal, fish meal or pellets.

MultiLoad: stationary or travelling shiploading equipment, capacities up to 3,000tph. DCi

On automatic pilot?

when software and automation make life easier



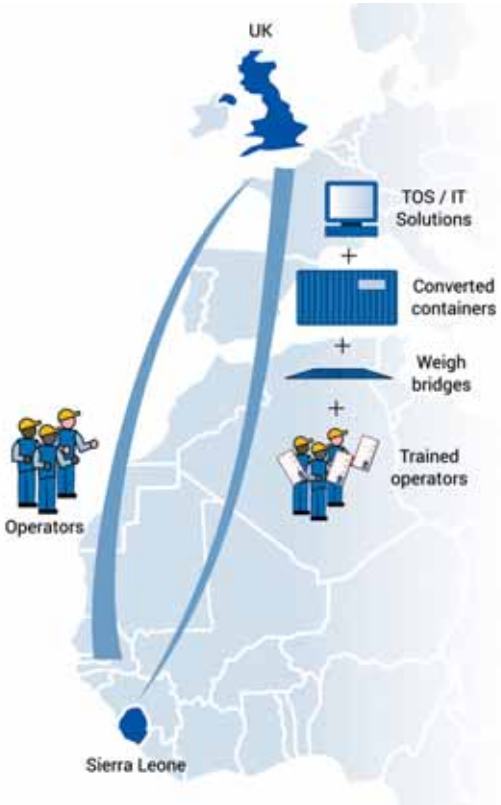
DBIS and its client Nectar Group have developed a self-contained Terminal Operation System for its Sierra Leone Bulk Terminal, which once connected to power and Internet will operate the terminal "out of the box"

Jay Venter

TOS in a box, Plug and Play all over the planet

Typically the delivery of TOS (Terminal Operation Systems) requires considerable effort both by the provider and the client to establish the infrastructure, train the users, test the functionality and integrate the software with other local systems. However this is not always easy or practicable, especially where local IT skills are limited or travel to a particular region is risky or difficult.

Nectar Group recently signed a ten-year agreement with the Government of Sierra Leone to manage and run the Bulk Terminal located at Queen Elizabeth II Quay, Freetown. To operate the terminal, which is known as Nectar Sierra Leone Bulk Terminal (NSBT), Nectar needed to implement a TOS system and weighbridges. To do so, it consulted with DBIS (Software and Automation) Ltd and in a sharing of ideas produced a blueprint for a self-contained TOS solution, which could be delivered to the terminal and once connected to the main electricity supply operate the terminal 'out of the box'.



The terminal required two weighbridges one on the in gate and one on the out gate so the decision was made to use standard 20' shipping containers as weighbridge offices and use the same containers as the administrative office and the server room. The two containers are fitted with internal linings to create an office environment with power and networks installed to the requirements of the users. The two containers have a network connection using Wi-Fi with the server in the main office container.

The weighbridges were manufactured in the UK and the weighbridge controllers were integrated with the IT environment for testing and training prior to the

containers being shipped.

Once the solution was built the operators travelled to the UK for training both on how to assemble and connect the weighbridges and how to use the software in their application. Training certificates were issued and on sign off of the software functionality the server and workstations were packaged for transport and the containers shipped to the site for deployment. DBIS is able to connect to the server via the web to handle any support issues in the future.

The solution has created a solution which meets all the requirements of the terminal without requiring any construction or local IT preparation. Deployment and training costs have been minimized and the system will be operational shortly after delivery to the terminal.

Foundation of the global port network ChainPORT

In the era of global networking, the Hamburg Port Authority (HPA) consistently pursues the digitization strategy for the Port of Hamburg. As host of the IAPH World Ports Conference in 2015, the HPA has implemented numerous innovative pilot projects as part of the SmartPORT concept. Based on these experiences, the thought of the future-oriented, intelligent port is further developed and an international network between ports called 'ChainPORT' has been initiated. The global platform will connect important information of the respective partner ports on the one hand and create a basis that allows the joined development of new, future-oriented and innovative solutions on the other.

In addition to the Port of Hamburg, the Ports of Busan, Singapore, Shenzhen, Los Angeles, Felixstowe and Antwerp are the partners in the future-oriented network. Senator Frank Horch: "The enormous increase of the international division of labour as well as the rapid growth of the global economy heavily depend on the international maritime transport. The world is getting smaller and it shows in world trade. It has never been more important to learn from one another. Even if we are competitors and rivals, we are dependent on exchanging information." Adds Jens Meier, Chairman of the Management Board HPA: "This is a great day. With today's event we are able to lay the foundation to further improve our network and to learn from each other so that we can create innovative ideas and solutions that provide added value to the global flow of goods and the ports."

With ChainPORT, the HPA wants to go beyond the traditional bilateral port partnerships. In order to face the changing competitive challenges, a small group of selected, leading ports is supposed to take on subject areas and develop innovations together. The idea is to establish a global chain of smartPORTS, the so-called ChainPORTS. The objective is to bring together the port managements and their stakeholders to share benchmarks and develop strategies together on how ports can and must work together in the future to reach common goals such as the globally necessary efficiency. The shared use of intelligent systems and data with other ports ensures sustainable growth.

In addition to digitalization and networking, the handling of the increasing container ship growth will be another important topic that presents a challenge to all ports.

A joint discussion and positioning in terms of advantages and disadvantages of the increasing vessel sizes is necessary. In the future, networking and data exchange should and must enable an even better planning of port calls.

An additional area for exchange and cooperation are environmental topics. Joined standards and the exchange of knowledge, i.e. regarding the reduction of emissions and other approaches towards greater sustainability, could be advanced further with the partners.

Considering that the first full container ship left New York for Europe in April 1966, thus starting the era of containerization, the time has come to look back on 50 years of globalization and use the impulses drawn for shaping the future. Standardization and rationalization of transports by means of containers were decisive prerequisite for globalization.

Korean Register releases 14th KR-CON with vital dangerous goods search function

Korean Register — an IACS member classification society — has announced the release of its latest KR-CON software. The essential software tool, now in its 14th edition includes a significantly enhanced and increasingly critical dangerous goods program, which has been developed in-house, as one of its key functions.

KR-CON offers a comprehensive electronic database of IMO (International Maritime Organization) instruments, providing all of the latest IMO Conventions, Codes, Resolutions and Circulars. By simply inputting a ships' particulars, KR-CON allows the user to find all of the regulations relevant to a specific task and helps to ensure that all of the IMO requirements are applied correctly.

KR-CON is used by surveyors, port state control inspectors, shipping companies, shipyards and design houses in more than 40 countries around the world today.

The 14th edition of KR-CON has been upgraded and enhanced through the inclusion of the cargo search programme. Developed in-house, the new program has enhanced functionality and adds significant value to the latest software. The programme was developed in accordance with the International Maritime Dangerous Goods code (IMDG Code) and enables users to quickly and easily identify critical details for the complicated transport requirements of dangerous goods.

The 14th version also has an improved search engine and enhanced user interface providing swifter and more precise search results and a more user-friendly product by strengthening the tracking function to trace amendments applied to IMO instruments.

On its launch, Dr. B S Park, Chairman and CEO of KR commented: "We are proud to present the 14th version of KR-CON which is loaded with our IMDG cargo search programme. Developed in-house by KR, this additional capability is a much valued and crucial aspect of this latest edition of KR-CON, offering a seriously competitive alternative to many higher priced products in the market. In addition, KR-CON's enhanced document search function, which has been developed in direct response to users' feedback, ensures that our customers have easy access and a clear understanding of all of the international conventions and regulations".

The most recent amendments adopted at the 29th IMO Assembly, the 95th MSC (Maritime Safety Committee) and the 68th MEPC (Maritime Environment Protection Committee) are included in this the 14th edition of KR-CON and the database is updated via the KR-CON website.

The Korean Register is an IACS member classification society established in 1960 with the purpose of promoting safety of life, property and the protection of the marine environment.

KR currently classes an international fleet of 2,981 vessels totalling 67 million GT. It is headquartered in Busan, South Korea and operates a network of 60 offices around the world. It is authorized to perform statutory and certification services in 71 countries.

Bureau Veritas slashes design review times with digital 3D model

International classification society Bureau Veritas has dramatically slashed structural computational and verification times.

The dramatic reduction in the time needed to check the structure, seakeeping and stability of new vessels and floating offshore units is being delivered through the use of a powerful 3D model which links directly to BV's entire VeriSTAR suite of calculation tools.

Philippe Donche-Gay, Executive Vice-President, Marine & Offshore Division, says, "The power and ease of use of our new modelling software enables us to build a detailed 3D model of the proposed vessel very quickly, much more quickly than has ever been achieved before. That model interfaces directly with all our tools, meaning no data has to be entered twice, saving time and improving accuracy. Ship designers, shipyards, ship owners and offshore operators are going to benefit from major time and cost savings as we move our entire design and plan approval onto this new digital platform."

Bureau Veritas' new system is based on a strategic partnership with France's Dassault Systèmes under which Bureau Veritas will use Dassault's 3DEXPERIENCE platform to dramatically speed the creation of detailed 3D models of ships and floating offshore units.

The model allows end-to-end calculation without data re-entry through all the analysis and design phases, then will facilitate construction by simplifying the order of steel cutting. It will then go on to form a digital twin of the vessel or unit and be maintained in an as-is state for the life of the unit. This will facilitate maintenance and repair or conversion decisions.

A pilot project with the well-known Chinese design institute SDARI has been completed. Two new Aframax and Suezmax tanker projects from this designer were modelled by using the new 3D platform. The models were then automatically transferred into BV's structural calculation software VeriSTAR Hull, in which the latest CSR Rules for oil tankers are fully integrated. The process enabled the designer to check compliance with the CSR Rules in a very quick, powerful and easy way.

Says Donche-Gay, "What's different about this new platform, and what creates the time and cost saving, is the power of the modelling software. We now only have to build one model and we do not have to create multiple data sets to use different tools for hull strength, stability and other vital calculations. We also improve traceability in-house as there is only one data entry."

Bureau Veritas Marine & Offshore Division is leading the digital transformation of the Bureau Veritas group and will be introducing a series of new apps and services during 2016 which will speed services and improve communication between clients and the classification society.

Bureau Veritas is a global provider of laboratory testing, inspection and certification services. Created in 1828, the Group has more than 66,000 employees in around 1,400 offices and laboratories located all across the globe. Bureau Veritas helps its clients to improve their performance by offering services and innovative solutions in order to ensure that their assets, products, infrastructure and processes meet standards and regulations in terms of quality, health and safety, environmental protection and social responsibility. Bureau Veritas is listed on Euronext Paris and belongs to the Next 20 index.

Autonomous trucks – NXP demonstrates the future of smart highways and freight transport using vehicle-to-vehicle communications

Kick off European Platooning Challenge at DAF factory Westerlo Belgium. From left to right, Christophe Leurident (Advisor Belgian mobility Minister Galant), Ron Borsboom (Director of Product Development DAF), Maurice Geraets (Director New Business NXP), Leo Kusters (Managing Director Urbanization TNO), Gert Liefting (Managing Director Ricardo Netherlands).

NXP Semiconductors N.V. and DAF Trucks have successfully demonstrated self-driving technologies in automated trucks. The demonstration was part of the European Truck Platooning Challenge, an event organized by the Dutch Ministry of Infrastructure and the Environment, that has trucks driving in columns (platooning) on public roads from several European cities to the Netherlands. The challenge was designed to bring autonomous platooning one step closer to implementation by showcasing economic, traffic management and safety advantages. It also addresses the need for legislation and standardization of Intelligent Transportation Systems (ITS) across Europe, as current rules and regulations regarding speed and distance vary between countries.

Under the EcoTwin consortium, NXP, DAF, TNO and Ricardo joined forces to make this demonstration possible. The core of the 'EcoTwin' technology setup is a sophisticated vehicle-to-vehicle (V2V) communications solution, RoadLINK, developed by NXP. It uses the wireless communications standard IEEE 802.11p combined with NXP radar technology to empower the trucks within the platoon to securely exchange information in real time and automatically brake and accelerate in response to the lead truck. The high speed of communication and responsiveness of NXP RoadLINK technology allows extremely tight distances and truly synchronous driving between the platooning DAF Trucks: to demonstrate autonomous acceleration and braking, the planned distance between the vehicles is slated for 0.5 seconds — which, when travelling at 80kph (50mph), translates to a distance of only 10 metres (30 feet). The responsiveness of the trailing truck within the platoon is estimated at 25 times faster than the average human reaction time of one second — saving critical time in case of emergency braking.

The RoadLINK communication system designed by NXP is built into the mirrors of the DAF Trucks participating in the platoon. The redundant NXP V2V system design with four secure channels ensures extremely reliable communication. In addition to providing the platooning commands, it provides real time video and bi-directional audio communication between the two vehicles. The audio allows the drivers to talk to each other without relying on other communication channels, such as cellular networks. Furthermore, the V2V powered camera in the lead truck streams what it 'sees' to the driver in the trailing truck, providing a clear look at the road ahead.

"We're honoured to be part of the European Truck Platooning Challenge as a key partner and provider of the secure vehicle-to-vehicle and radar technologies for the DAF trucks — DAF and other truck platoons will use our technology to complete their journey safely and effectively," said Torsten Lehmann, senior vice president of Car Infotainment and Driver Assistance for NXP. "As a clear industry leader in driving adoption of Vehicle-to-X technologies, NXP is helping to improve fuel efficiency, emissions, safety, and traffic flow in the European Union, while avoiding accidents and saving lives."

"It goes without saying that there is still a lot of continued development required before we can introduce platooning as a new technology on the market," says Ron Borsboom, member of DAF Trucks' Board of Management and responsible for product development. "This is definitely not a process that will be complete before 2020. There is still a great deal that has to be sorted out in terms of legislation, liability and acceptance. In conjunction with NXP, TNO, and Ricardo, we will be demonstrating during the European Truck Platooning Challenge that truck platooning is technically possible. This demonstration should pave the way for truck manufacturers to be allowed to carry out further testing of the technology on public roads in order to acquire even more experience. It is now up to politicians to make this possible."

NXP's radar solutions and RoadLINK technology are used in several of the truck platoons set to participate in the April 6 event in the Netherlands. NXP's vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) technology is essential for the continued development and advancement of self-driving cars and macro-traffic management.

It helps vehicles automatically exchange information on speed, position and direction with other automobiles in their vicinity and enables vehicles and infrastructure to communicate traffic management data or hazards such as localized speed limits, traffic signalling and road works warnings, hazardous locations and more. This can significantly improve traffic flow, decrease accidents and reduce fuel consumption and emissions. NXP is co-operating on V2X technologies with car OEMs and major industry players including Siemens, Harman, Delphi and Cohda Wireless. NXP's RoadLINK will be implemented in series cars starting this year as part of the Delphi V2X platform. NXP is also a leading supplier of radar technologies for advanced driver assistance systems, with more than 15 million units shipped to date.

About NXP Semiconductors

NXP Semiconductors N.V. (NASDAQ:NXPI) enables secure connections and infrastructure for a smarter world, advancing solutions that make lives easier, better and safer. As the world leader in secure connectivity solutions for embedded applications, NXP is driving innovation in the secure connected vehicle, end-to-end security and privacy and smart connected solutions markets. Built on more than 60 years of combined experience and expertise, the company has 45,000 employees in more than 35 countries and posted revenue of $6.1 billion in 2015.B.V.

Bag of tricks?

bulk bagging in the spotlight

Jay Venter

Take it easy with AD*STAR *carry

Good news for all who frequently have to carry heavy sacks: Starlinger's newly launched AD*STAR *carry sack comes with handles which makes it easy to carry products like cement, ready-mix concrete or fertilizer packaged in it. Made of polypropylene tape fabric and designed in the typical AD*STAR block bottom shape, the sack is equipped with a pair of punched handles on the bag top that lie flat but open easily to provide a comfortable grip for easy carrying.

The patented AD*STAR *carry sacks hold filling quantities from 10kg up to 50kg and can be used for packaging a wide range of dry bulk goods destined for wholesale and retail sale, e.g. construction materials, chemicals, or animal feed. The use of woven polypropylene offers important advantages: the sacks feature high strength at low package weight, provide excellent barrier properties and product protection, and allow attractive styling with print or OPP lamination. Packaging producers and suppliers of bulk goods benefit from the flexible design and the easy and economical production of AD*STAR *carry sacks. They can be produced in a large variety of sizes and styles, have low raw material consumption, and do not require reinforcing like paper bags.

AD*STAR *carry sacks are produced on the ad*starKON SX and SX+ conversion lines supplied by Austrian Starlinger & Co. Ges.m.b.H. The special handle patches are manufactured in a preparatory process and welded onto the sack top during the conversion process in the line — no adhesives or seams are required. Existing AD*STAR sack conversion lines can be easily adapted to the production of AD*STAR *carry sacks. Currently,

*Starlinger's newly launched AD*STAR *carry sack comes with handles and makes it easy to carry products like cement, ready-mix concrete or fertilizer packaged in it.*

6.2 billion AD*STAR sacks are produced every year on more than 300 conversion lines in 46 countries worldwide. With AD*STAR *carry, sack producers have a unique product that helps them to open new markets, while they provide an

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attractive and economic packaging alternative for bulk goods producers.

*Note: AD*STAR® is a registered trademark. AD*STAR® sacks are produced exclusively on Starlinger machines.*

About Starlinger & Co. Ges.m.b.H.:

Starlinger is a Vienna-based engineering company with production sites in Weissenbach and St. Martin, Austria, as well as Taicang, China. As a renowned supplier of machinery and complete lines for woven plastic bag production and PET recycling and refinement, Starlinger & Co. Ges.m.b.H. is a synonym for leadership in quality and technology in over 130 countries. Founded in 1835, the family-owned business has been exporting machines worldwide for more than 45 years with an export quota of over 99.5%.

Branches in Brazil, China, India, Indonesia, Russia, South Africa, USA and Uzbekistan ensure quick and professional technical support and service.

IC*STAR: New ways in woven sack production

*With the IC*STAR sack concept, developed and realized by Starlinger and STATEC BINDER, broken needles, stitch holes and traces of oil on the sack fabric are now destined to become obsolete.*

A stronger sack bottom, material savings, low maintenance requirement — woven polypropylene sacks welded with a sealing band instead of sewn at the bottom bring significant advantages for both producers and users and help protect the environment.

With the IC*STAR sack concept, developed and realized by Starlinger and STATEC BINDER, broken needles, stitch holes and traces of oil on the sack fabric are now destined to become obsolete. "Closure of sacks by welding is the solution of the future for standard woven sacks," Hermann Adrigan, Sales Director of Starlinger & Co. GmbH is convinced. "Compared to sewing, the IC*STAR process offers considerable material savings in sack production, consequently requiring less raw material — polypropylene, in this case. Sack producers profit from lower costs, and the reduced carbon footprint is good for the environment." Material is saved by the elimination of the seam allowance required for a sewn closure, as well as by the use of lighter fabric made possible by the greater sack bottom strength. Moreover, this type of closure makes IC*STAR sacks completely tight — an important advantage especially for packaging fine powdered goods which tend to sift through stitch holes and form dust, presenting a health hazard in some cases. The oil-free production process makes IC*STAR sacks ideal for packaging foodstuffs.

Welded sacks – the production concept of the future

IC*STAR sacks are produced on the Starlinger sack conversion line multiKON KX. This conversion line is equipped with the sealTEC bottom closure module, jointly developed by Starlinger and STATEC BINDER. Instead of a sewing unit, the IC*STAR concept features a welding device which, in a continuous process, welds a coated sealing band onto the sack bottom by means of hot air — no glue is required. The mouth of the sack remains open and can be closed, after filling on the filling line, either by welding with another sealing band or by sewing. The sealTEC module requires less maintenance than a sewing machine and needs considerably fewer replacements of spares and wearing parts. Both coated and uncoated IC*STAR sacks can be produced by this new method in an efficient and material-saving process.

About STATEC BINDER:

A specialist in packaging and palletizing machines, STATEC BINDER GmbH is a globally operating manufacturer of flexible solutions for the bagging and palletizing of bulk goods. The product portfolio ranges from bagging systems for polyethylene, polypropylene and paper sacks to high-level palletizing systems and robot palletizers, renowned for reliability and durability.

STATEC BINDER develops, designs and manufactures all machines in its own ISO 9001 certified plant in Gleisdorf, Austria. To date, approximately 1000 packaging lines have been supplied and installed worldwide.

From ship to shore, from shore to ship...

...for sure.

Nectar can say "for sure" with confidence.

We've been supplying market leading bulk handling solutions for over 40 years and encountered and overcome many difficult situations, scenarios and challenges,

Since inventing the first mobile bagging system in the 1970s we have become world leaders in all aspects of bulk handling. Nectar have worked hard to develop important strategic relationships and specialist knowledge of port infrastructures ensuring that the solution we provide delivers your product on time, intact and cost effectively anywhere around the world.

Whether it's the simple task of transporting your product from A to B overland or consulting on the design, build and management of a new port we will have all the answers...**for sure.**

Nectar

Global Bulk Handling Solutions

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Nectar's Compac bagging line used in almost any environment

Since 1972 Nectar Group has been providing specialist dry bulk handling services around the globe. Nectar pioneered the concept of quayside bagging in the 1980s in response to a growing demand from aid organizations to develop a more cost-efficient system for delivering relief cargo to drought stricken nations. Since this time Nectar has continued to develop the systems further, increasing speed, accuracy, and affordability over the years.

FIBC Bagging

Back in 2009 Nectar developed its Compac XL 120 containerized FIBC (flexible intermediate bulk container) bagging system. Built on the same principle as the Compac M140 (50kg machine) it is housed inside a single 20ft standard ISO container and comes with a variety of hopper options to suit every situation. The two bagging lines, each capable of filling a bag in under a minute, give a combined output of over 120tph (metric tonnes per hour) and make use of motorized roller tables to aid forklift takeaway. In the short time these machines have been around: they have seen use in Europe, Africa, Australia, and North America with demand for the equipment growing, particularly in the fertilizer industry. Their unique design makes them suitable for use in almost any environment with a single unit having the capability to work on the quayside, in a warehouse, in a storage yard, or even in an existing processing facility. The demand not only stems from the versatility and speed of the equipment but also from the cost savings and efficiencies they are able to add to supply chains through the following:

Lower labour requirements — each operation requires only a handful of personnel and a couple of experienced forklift drivers. The extra mechanization also helps remove factors such as human error and tiredness reducing delays to operations.

Reduced bag cost and plastic consumption — each FIBC can hold up to 1,000 times its own weight, this is far greater than many other smaller packaging equivalents and therefore drastically reduces plastic consumption. The bags are also suitable for multiple use if they are handled with care. Both of these points help bring about a lower packaging cost per tonne. The majority of plastics used to manufacture FIBCs are also recyclable adding to the packaging's green credentials.

Customizable designs — big bags are highly customizable, they can be built with a variety of different features to suit every operation. One of the most advantageous is a built in discharge system which is ideal for re-packaging or further blending down the supply chain. They are also available in a range of shapes making them suitable for storing, transporting and moving in a variety of ways.

Build quality — all the major components of Nectar machines are manufactured in ss304 stainless steel and the protective, specially adapted ISO container shells are coated with highly resistant 120 micron paint. This helps ensure the longevity of the units as well as ensuring spares consumption is minimized. The weighing systems are also fully enclosed leaving no room for product to escape and they are certified by the Dutch Weights and Measures Authority to an accuracy of 0.5% guaranteeing only the correct weight is ever packaged.

Advances in mobile bagging:

A further commitment to innovation Nectar has made in the field of mobile bagging is the implementation of a new generation of weighing controller across its entire bagging system range. These new 'Flex' controllers are far more advanced than their Minimate predecessors and utilize a user-friendly touch screen input and offer greater options in terms of connectivity having both Ethernet and USB interfaces. When combined with Nectar's specially designed software they are able to generate large amounts of information which can then be consolidated and processed to deliver easy to read KPIs (key performance indicators). These include average bag weights for a period, performance per shift, and performance per line all of which help to highlight operational bottlenecks which can then be worked out of processes.

Nectar continues to lead the advancement of mobile bagging technology, providing efficient and accurate bagging and bulk handling services over six continents.

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Innovation in packaging and shipping of commodities: moving bulk commodities in sea box containers

In today's competitive markets, innovation and optimization of every single process of the value chain has become a mantra and can be transformed into a crucial success factor.

CONSIDERING THE POSSIBLE ADVANTAGES OF LEVERAGING ON THE CONTAINERIZATION PROCESS TO OPTIMIZE THE SUPPLY CHAIN?

"When we talk about containers in many industries people still think about packed goods, palletized or bulk; more often than in the past somebody come out with the FIBC/big-bags" says Nicola Altobelli, Commercial Director, ECEPLAST SRL.

"But very rarely people know about the most efficient, safe and cost effective way of shipping bulk goods in container: the Linerbag."

This special packaging solution was first developed in the 1970s by the chemical industry logistic specialists, which were struggling with the high cost of packing millions of thousands of tonnes of plastic granulates to be shipped rapidly and efficiently around the world. The idea of transforming the whole sea box container, into a dry and clean means of transportation suitable for many possible commodities because it preserves the integrity and the value of the transported goods, was then pursued thanks to PE film and woven fabric combination.
For many years this concept remained bounded into the petrochemical supply chain, but driven by the economic crisis started in 2008, the need to search for more optimal logistic solution to reduce costs and increase export volumes increased, attracted different industries. In fact, many food commodities are being exported bulk with Linerbags in sea box containers (sugar, rice, wheat, grain etc..).

Due to the elimination of any intermediate packaging, it guarantees a reduction of 75% of the costs compared with the widely used and expensive filling process requested by the 25kg bags (FFS).

Still a massive saving is achieved (50%) when comparing it with the cost of FIBC/big bags (1 tonne). In fact allowing the shipment of 20–25 tonnes of bulk material directly into a sea box container is very attractive because it is sensibly reducing the direct cost of packaging materials and operation (see chart), while protecting and guaranteeing the quality until it reaches the customer's warehouse.

Of course, when talking about commodities' trading, one must take into consideration also the very traditional and conventional option of moving huge volumes of goods directly in

Filling operation uses integrated automation

National Bulk Equipment, Inc. (NBE) has developed a complete bulk bag filling process system, including: automated pallet introduction; automated metering of material supply; NTEP-certified, precision bag weighing; and automated, filled-bag accumulation conveyors, enabling a single operator to process up to 20, 4,500 lb.-capacity bulk bags per hour; or 90,000 lbs. of dry bulk material per hour.

NBE integrated automation uses a single, menu-driven HMI, designed and built by NBE, to centralize system-wide operations; including legacy, upstream material supply equipment. NBE integrated automation directs all equipment controls, communication, sensing, monitoring, and data reporting using UL listed panels built by NBE. NBE integrated automation reduces material loss, increases overall equipment effectiveness, and dramatically improves labour efficiency and safety.

Process line optimization begins immediately upon the introduction and staging of the first pallet. The NBE cantilevered fill head/bag hanger carriage uses pneumatic actions to bring the fill head and rear bag hooks to well within the operator's reach; no need for the operator to step or lean into the equipment. The 8 GPM hydraulic carriage easily and safely lifts bag capacities up to 4,500 lbs., far exceeding the lift speed and capacity of ball screw designs. This physical ergonomic design maintains optimal operator posture for safe and efficient operation. NBE NTEP-certified weigh systems provide valid, accurate, and repeatable weighing of the bulk bags to an accuracy of +/- 0.01% of the 4,500 lb bag weight. NBE, NTEP-certified, precision weighing improves total process efficiency by eliminating re-working of over- and under-filled bags, and reducing material loss. The NBE bag densification platform uses 3 Gs of high-speed, low-intensity vibration to settle material in the bag to a dense, stable, and safe load.

sea bulk vessels that nevertheless has a backside: capital intensity.

As testified by all the available statistics, the market of break bulk vessels was sensibly affected by the impact of the 2008 financial crisis. Many customers, still nowadays, are struggling with the lack of financial support from the banks and when trading commodities this is a crucial factor.

Definitively considering the possibility of shipping in containers at competitive costs, with the advantage of offering a higher quality of the logistic, but moreover preserving at best conditions the product, is an option that is gaining a lot of attraction from the traders and producers willing to reach the end customers with a cost effective solution.

At Eceplast, a team of experts is eager to evaluate and propose the best solution for any specific product in terms of ease-of-flow and behaviour at loading and discharge, to ensure the promised savings are absolutely achieved. The company believes it is time to consider the containerization with Linerbags as a concrete alternative to other more expensive or financially impactful traditional solution, looking at the innovation of the supply chain as a crucial competitiveness factor, instead of just an indirect cost to cut.

Alternative method of packing and shipping 20 tonnes of plastic granules

	n°	Direct cost of Packaging Material	Pallet and wrapping	Retention	€/ton	Wastes and Disposal [kg]	Filling time	Container Loading time	Warehouse space
25kg (FFS) sacks	800	€ 240,00	€ 120,00	-	€ 18,00	200	1h	30'	■
1Ton Big Bags	20	€ 200,00	€ 50,00	-	€ 12,50	30	1h	30'	■
20ft ECE Sea box Liner	1	€ 90,00	-	€ 60,00	€ 7,50	12	-	30'	-
20ft ECE Barless	1	€ 90,00	-	€ 30,00	€ 6,00	12	-	30'	-

BHA – innovation quality, and service excellence

Industrial packaging solutions

Bulk Handling Australia (BHA) is a fully Australian-owned company and is one of Australia's leading suppliers of industrial.

BHA provides a fast and efficient service with a record of achievement based on a strong commitment to customers. The company provides an extensive range of intermediate bulk containers and bulk bags, ensuring a solution for the transportation of solids or liquids.

For customers with specialized requirements, BHA can offer customized technical product improvements and cost-saving design improvements via its internal technical resources and via its supply partners.

BHA supplies customers throughout Australia, and New Zealand, with export customers in countries such as Indonesia and South Africa.

Extensive reach, range and experience

BHA began supplying industrial packaging in 1985 with bulk bags, expanding over time to the current range of intermediate bulk containers (IBCs), FIBCs (flexible IBCs), along with woven sacks and plastic pallets.

This range of bulk packaging products is available from its network of warehouses in each state throughout Australia and New Zealand.

BHA is fully accredited with ISO 9001:2008, constantly aiming to improve upon already high standards of customer service, product quality, innovation and service standards.

Products for every application

With a range of bulk bags, IBCs and other bulk packaging products, BHA has product options to suit a broad range of industries, in any product application — from horticulture supplies to food manufacturing, chemicals to truck parts, and dangerous goods to shampoo.

Customers also have access to technical experts who can design specific solutions for any bulk packaging requirements.

The BHA product range includes:

Bulk bags (FIBCs) — range of applications includes single- or multiple-trip bulk bags, various filling and decant configurations, and cubes/baffles bags. All BHA bulk bags are manufactured to stringent technical specifications and are designed to meet the performance requirements of the relevant standards.

Woven/PP & speciality sacks — a wide range of standard and speciality sacks suitable for most applications. This range includes laminated and unlaminated PP sacks, BOPP, aluminium foil sacks, Kraft sacks and valve sacks.

Intermediate Bulk Containers (IBCs) — collapsible packaging designed for maximum logistics and handling efficiency. Products can be used for liquid and solid applications (including hazardous substances).

Plastic pallets — single- or multi-trip plastic pallets for export, storage, local or interstate transport. Catering for various safe working load options, these are fully injection moulded from HDPE, making them lightweight and designed for strength and durability.

Slim line plastic export Bag Pallet — the BHA Bag Pallet,

BHA Bag Pallet.

Stack height comparison ten pallets.

which has been developed over the past two years is patented internationally and now provides bulk bag exporters a viable low cost alternative to export grade wooden and traditional plastic pallets.

The BHA Bag Pallet is injection moulded from high density polyethylene (HDPE) and is designed with four way entry, is stackable to save space, and fully recyclable.

Why BHA?

Customers benefit from:

- Access to the most experienced sales team in the industry, capable of providing advice and bulk packaging solutions for a range of industries and applications.
- Smarter products — a focus on innovation and a thorough understanding of a range of industry needs has led BHA to lightweight and more flexible solutions, allowing BHA to produce lower-cost products for cost-effective transportation.
- Customized solutions designed by BHA's technical department to meet specific design needs when standard products can't achieve the desired objectives.
- An international network, which allows BHA to source and produce products more cost effectively and develop and share industry knowledge, whilst still letting BHA provide fast and easy access to FIBCs, industrial packaging and more.

Mondi Industrial Bags: new generation of paper bags ideal for cement

In recent years, Mondi has made major efforts in innovation. That has led to more reliable industrial bags with reduced environmental impact and attractive added-value features, matching the customer's requirements. One of the key drivers behind this continuous innovation process is the fact that Mondi is a fully integrated supplier. All steps involved in producing an improved paper bag can be handled in close collaboration between paper mills and bag converting plants.

Initial steps towards innovation

Generally, the first step towards an improved industrial paper bag is to develop new or improved grades of sack kraft paper. As part of R&D activities at Mondi's R&D Innovation Centre in Frantschach, Austria, Mondi's sack kraft paper and industrial bag team members analyse and assess existing and proposed materials, including kraft pulp, with a view to improving paper strength, de-aeration properties and mechanical qualities of paper and bags. These R&D activities are often oriented to achieving steady improvement, with the overall goal of taking sack kraft paper and industrial bag solutions to a whole new level. Claudio Fedalto, Deputy COO, Mondi Industrial Bags, points out the importance of co-operation among business segments within the Group: "Being in direct proximity to our sack kraft paper colleagues helps the bag development process, as we can work closely together on each project." The launch of Mondi's Advantage Protect sack kraft paper and the recently introduced Splash Bag, a bag developed especially for the needs of the cement and building industry that shows a higher water-resistance than normal paper bags, is just the latest example of this close internal collaboration.

Rigorous testing

The next stage of the development process involves rigorous testing. Application engineers at Mondi's Bag Application Centre (BAC) analyse bag strength, de-aeration properties and behaviour during filling and under different storage conditions. To test bag construction, simulations of specific situations are performed using advanced technology, e.g. a high-speed camera (1,000 images per second) for observing behaviour during drop tests, and a climate chamber for measuring performance under hot, humid or other demanding conditions. In 2014, the Bag Application Centre performed drop tests for around 400 bags, the water vapour transmission rate was assessed for around 300 bags, and over 900 Mega Gurley tests were performed.

Customer focused — every day

Collaborating with customers and listening to feedback is also important. In keeping with the Mondi initiative 'IN TOUCH EVERY DAY', Mondi encourages customers with specific requirements — e.g. a bag needs to be developed or adapted — to collaborate closely during the development process. Recent examples include collaborations with cement producers: one bore fruit in the shape of the world's first biodegradable industrial bag, the Terra Bag®. Another resulted in the above- mentioned SplashBag, a bag that, thanks to the perfect combination of Mondi's sack kraft paper and industrial bag construction and know-how, is resistant to rain for two hours and can withstand moisture ingress for up to 12 hours.

Further progress in the evolution of industrial paper bags was the launch of a bag that offers uncompromising weather protection and significantly extended shelf life of its contents. Combining the best of two worlds — paper and PE — the HYBRIDPRO bag represents a whole new concept in industrial bag design. It is particularly suitable for building materials, including gypsum and cement, as well as many other moisture-sensitive products.

Like a hybrid drive in a car, the HYBRIDPRO bag is an excellent combination of the available options: the inner ply is made of 120g/m² Mondi Advantage ONE sack kraft paper; the outer ply is a 40µm-thick layer of high-density polyethylene (HDPE). The innovative step here is that the HDPE forms a protective layer on the outside of the paper. Other bags also use a combination of paper and plastic, but not in this way. This is a considerable technical achievement that brings a new dimension

to industrial bag design. paper ply is available in a bleached or an unbleached version.

The HYBRIDPRO bag allows high-speed filling, with de-aeration twice as fast as with a standard three-ply bag (35m³/h versus 18m³/h tested on Mega Gurley equipment at Mondi's R&D centre BAC in Austria).

Workplaces, such as construction sites, are cleaner with HYBRIDPRO, as less of the contents adhere to the outer layer — a benefit sure to appeal to end users.

HYBRIDPRO is an eco-friendly solution: the total grammage of material used is less than with standard three-ply designs used for the same purpose.

Last but not least, the plastic and paper components are easy to separate, for optimum recyclability. Since the bag can be filled on conventional paper bag filling systems, investment in FFS systems, which tend to be expensive, is not required.

The benefits of filling expertise

Mondi also recognizes the importance of having a filling equipment producer in house. It therefore owns Natro Tech, a company near Milan with a 90-year history of designing and building filling systems for granular and powder products. Natro Tech focuses mainly on filling equipment for industrial bags – valve bags as well as open mouth bags. This in-house filling equipment expertise is unique in the industrial bags market and is well received by customers, as Natro Tech's technicians visit fillers on site to provide input on how to optimize bag construction.

Sustainable — every day

Nowadays many companies have sustainability targets, either regulatory or voluntary. Suppliers such as Mondi which are fully integrated across the paper and packaging value chain — from the growing of wood and the production of pulp and paper to the conversion of the packaging paper into industrial bags — are well positioned to help their customers meet such targets. Accordingly, Mondi offers a comprehensive range of green solutions, which are optimized to save natural resources and reduce waste and have internationally recognized sustainability certifications.

In addition to the above-mentioned innovative products, Mondi has developed a number of important industrial bag innovations suitable for the food industry over the years. Its current industrial bags portfolio includes the following solutions:

- the Easy Seal valve is an optional feature developed by Mondi that can be applied to any valve bag and adapted to specific customer requirements. Easy Seal employs thermo-media technology to ensure strong, fast and leak-proof valve closure. A special coating on the inside of the valve reacts to the heat and pressure generated by ultrasonic welding. Since the coating is non-adhesive, the valve cannot get blocked before the filling process. Therefore, bags with Easy Seal valves are ideal for high-speed filling processes, as filling and sealing can be carried out with minimum downtime.
- Mondi's Effusion Bag combines precise dosing with optimal protection of the filling good. Thanks to this innovation, end users can better dose the filled good via a funnel-formed effusion opening. With a few quick hand movements, the opening can easily be formed. The sturdy bag and a handle on the bottom of the bag additionally facilitate a convenient and controlled discharging of the bags' content. The paper bag itself is designed for best product protection and encloses the filling material tightly. By using a PE-free film as a second ply, further protection against humidity and an extended storage life of the filled bags can be achieved. Not only do customers benefit from this innovation, industry experts have also recognized its value in numerous product competitions.

About Mondi Industrial Bags

Mondi Industrial Bags, a business segment of Mondi's Europe & International Division, is a major international producer of industrial paper bags, selling around 5 billion bags per year. Thanks to its broad range of bag specifications, Mondi Industrial Bags serves major industries including cement and building materials, chemicals, food, feed and seed. The business segment operates a dense sales and service network, the specialized filling equipment department Natro Tech, as well as its Bag Application Centre, where researchers develop and test innovative packaging solutions.

About Mondi Sack Kraft Paper

Mondi Sack Kraft Paper is a business segment of the business unit Packaging Paper and ranks among the leading European suppliers of both high-quality sack kraft papers and bleached and unbleached market pulp. It maintains five production sites that are focused on producing sack kraft paper with excellent runnability and printability ensuring optimized converting machine productivity.

Mondi Sack Kraft Paper fosters innovative research and cutting-edge technology. Its commitment is reflected in the work of its R&D and Bag Application Centres, the Print Competence Centre, where packaging and printing solutions are developed and tested in close cooperation with customers. In addition, the team of specialists at our Food Safety Laboratory develop optimized solutions that meet highest requirements for food contact and other sensitive applications. DCi

"A man who stops advertising to save money is like a man who stops a clock to save time"

– Henry Ford

Lower Mississippi bulk

regional developments

With the acquisition of St. James Stevedoring, Associated Terminals now has one of the largest fleets of Gottwald cranes in the world.

Associated Terminals team focuses on leading the Lower Mississippi River in logistics and customer services

Company overview

Associated Terminals offers dry bulk, breakbulk and project cargo shippers comprehensive logistical solutions for the import and export of cargo and commodities from ocean vessel to barge, rail and truck at locations across the Gulf of Mexico region. Founded in 1990, the company is the largest stevedore operating on the Lower Mississippi River. Since its beginning, the company has continually expanded its scope and offers project and general cargo handling, midstream transloading, terminal port operations, in-plant services and warehousing. Associated has a fleet of 14 floating Gottwald cranes that can handle bulk at capacities of up to 1,200tph (tonnes per hour) hour and steel and general cargo capacity in excess of 100 tonnes.

The company has operational bases in Louisiana at Myrtle Grove, Chalmette, Violet, Reserve, Convent and Port Allen. Between mile marker 56 and 229, the company operates 25 deep draught berths which includes 11 land-based docks and 14 midstream berths. The company can handle Capesize vessels in Myrtle Grove, Chalmette and Convent.

A year of growth

It has been an exciting year of growth at Associated Terminals. With the acquisition of St. James Stevedoring, the company now possesses one of the largest fleets of Gottwald cranes in the world which has allowed it to provide its customers with increased options for the movement of bulk cargo. In addition, the company accelerated its General Cargo division in the last year. In 2015, Associated continued its commitment to offering

customers the most efficient means to handle their products by upgrading its equipment. The additions include reach stackers, spreaders, specialized equipment attachments and expansion of its forklift fleet.

"While strategic locations and the most efficient equipment are key, growth cannot be possible without the commitment of a strong team. With this in mind, we have turned to our senior management and all team members and have asked them what steps we should take to maximize our ability to most efficiently handle our customer's cargo. What came out of this exercise was a decision to utilize technology and our experienced personnel to ensure that every project continues to receive a customized logistical plan. We have determined that centralization of our logistics and customer service teams to plan cargo movements at all of our locations is the best way to utilize our assets" stated Todd Fuller, President of Associated Terminals.

Strategic structure

The company has evaluated the structure of its Bulk and General Cargo Divisions and has made strategic changes in the company's organizational structure. Senior Vice President Zeljko Franks will oversee all Bulk and General Cargo operations. He will work closely with the logistics and customer service departments of each division to ensure that cargo is handled safely and efficiently across the company's operating footprint.

General Cargo logistics and customer service for all locations will be centralized at Associated Terminals of St. Bernard. Senior Vice President David Wilkins will oversee general cargo sales, logistics and customer service. Vice President Cy Hill will focus on business development with existing and potential general cargo, steel-based and project cargo customers. General cargo operations at all locations will be led by General Manager Don Zemo. Logistics and customer service of the division will be led by Blake Hebert.

Associated Terminals' new corporate headquarters in Convent, Louisiana will serve as the hub for bulk logistics and customer service for all the company's locations. Senior Vice President Terry May will co-ordinate the company's bulk sales, business development, logistics and customer service. Senior

Strategic changes in its organizational structure will strengthen Associated Terminals' overall co-ordination and customer service.

Vice President of Sales Glenn Schexnayder and Vice President David Ryan will continue to focus on growing Associated Terminals' bulk cargo portfolio. Vice President Bill Sullivan will be responsible for bulk logistics and customer service as well as sales for the grain division. Bulk operations will be led by Vice President of Operations Frankie Walker and Jerry Ryan.

Joe Noto has assumed the role of Terminal Manager for Associated Terminals of St. Bernard and the company's newly added Violet facility. In this role, he will oversee all terminal operations and coordination of all truck transfers, warehousing, storage and rail car transfers for both bulk and breakbulk at the two locations.

Downriver, General Manager Perry Becnel will continue to lead the operation of the Myrtle Grove Midstream Terminal at mile marker 56.8 AHP which focuses on the transfer of grain and grain byproducts. Up-river, Vice President Barry Hoth will continue to manage the company's operations at the Globalplex Intermodal Terminal at 138.5 AHP as well as the company's intermodal terminal in Baton Rouge, Louisiana.

The company's technology division led by Chief Technology Officer Matthew Magnuson, with input from Vice President of Financial Planning and Analysis Jeff Morton, has been instrumental in the development of programmes and procedures to increase productivity and co-ordination of Associated Terminals' assets.

"Our skilled and productive workforce continues to be the key factor to the success of the company. These staff changes and the decision to centralize the logistics and customer service of these two divisions will be positive for Associated Terminals and will strengthen our overall co-ordination and customer service. Thank you to everyone who has stepped up and will be working in this reorganized structure. I believe this will ultimately benefit our company and more importantly our customers," stated Fuller.

Associated Terminals operating at the Port of South Louisiana.

$20 million for efficiency in commerce and trade for Texas ports

Citing the continued contribution to the vitality of the state's economy by Texas ports, the Texas Transportation Commission approved US$20 million in funding for road improvements at Texas ports. Programme funds will directly benefit road improvement projects at Port Corpus Christi.

The port's construction project includes widening a portion of the Joe Fulton International Trade Corridor where it connects with Mike Carrell Road. Mike Carrell Road construction will improve the safety and access of traffic travelling to the new M&G Chemicals facility, and the new Port Corpus Christi Public Oil Dock 14. Approximately half of the cost for these road improvements are covered under the Texas Transportation Commission approved funding.

Nine Texas port projects will receive a share of the $20 million to use in combination with local and other funding sources. These projects are included in the Unified Transportation Program recently approved by the commission and funded from Rider 48 of the General Appropriations Bill of the 84th Legislative Session, which provides $20 million for port capital improvement projects recommended by the Port Authority Advisory Committee. Port Corpus Christi Executive Director, John LaRue, is Chairman of the Port Authority Advisory Committee.

"Each of the projects approved will have a benefit on its local region and contribute to the entire Texas Transportation system," said LaRue. "The Texas ports are pleased to partner with TxDOT to improve the movement of commerce and trade thereby creating additional economic opportunities for Texas."

"Texas ports are our gateway to international trade," said Texas Lt. Gov. Dan Patrick. "The facilities in our ports are crucial and so are the roads and bridges that connect them to the rest of our country. These projects address those links between the ports and our highways, and help maintain our prominence in worldwide commerce."

"Viewed individually, these nine projects are relatively small, but the impacts they have on our state's economic vitality are very significant for the ports that they serve and the state of Texas," said Jeff Moseley, vice chairman of the Texas Transportation Commission.

About Port Corpus Christi

As the primary economic engine of the Coastal Bend, Port Corpus Christi is the fifth-largest port in the United States in total tonnage. Its mission is: to "Leverage Commerce to Drive Prosperity." Its vision; "To be the energy port of the America's." Strategically located on the western Gulf of Mexico, with a straight, 45ft deep channel, Port Corpus Christi provides quick access to the Gulf and the entire United States inland waterway system. The port delivers outstanding access to overland transportation with on-site direct connections to three Class-1 railroads and uncongested interstate and state highways. Port Corpus Christi is protected by a state-of-the-art security department and an award-winning Environmental Management System. With outstanding management and operations staff, Port Corpus Christi is clearly "Moving America's Energy."

Port Corpus Christi is a member of START (South Texas Alliance for Regional Trade), a collaborative effort that highlights business opportunities in South Texas in the manufacturing, energy, aerospace, international trade, military, and other sectors and the related strategic support provided by Port San Antonio, Port Corpus Christi, and Port Laredo.

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Port of Brownsville achieves record year

Preliminary numbers indicate the Port of Brownsville achieved another record-breaking year in cargo movements in fiscal year 2015 ending 31 December 2015.

The port handled more than 10.1mt (million tonnes) of cargo, exceeding the 2014 record of 8.4mt. Some of the commodities moving internationally through the Port of Brownsville include steel, aluminium, lumber, minerals, gasoline, diesel and windmill components.

"This is a critically important milestone in the port's growth," said Brownsville Navigation District Chairman Ralph Cowen. "Not only does this performance recognize the strength of our customer base and the companies doing business here, but provides the port with an opportunity to continue its mission of creating jobs and a stronger tax base."

Port activity adds $926.7 million to the regional economy, and more than $2 billion to the state's economy. More than $134 million in state and local sales tax also is generated through port business. The Port of Brownsville also is responsible for the creation of 11,230 direct and indirect jobs at the regional level, and 21,590 jobs statewide, according to Martin & Associates in 2012.

A major centre for intermodal transportation and industrial development, the Port of Brownsville is the only deep water seaport directly on the US/Mexico border. Opened in 1936, at the southernmost tip of Texas and connected to the Gulf of Mexico by a 17-mile-long ship channel, the Port of Brownsville is also the largest land-owning public port authority in the nation with approximately 40,000 acres.

New lease on life for Port of Brownsville's grain elevator

Since beginning operations in 1965, the use of the Port of Brownsville's grain elevator was in high demand. Millions of tonnes of grains like sorghum, corn, seed meal and oats were shipped from the port all over the world.

In a deal that seeks to recapture those glory years, West Plains LLC signed an agreement with the Brownsville Navigation District to modernize and reactivate the grain elevator in support of grain farmers throughout South Texas.

During its meeting on Wednesday 4 May, the BND Board unanimously approved the lease, pumping new life into one of the port's most iconic buildings.

"Farming is part of the DNA of the people of the Rio Grande Valley and many of its residents remember when the port used to move millions of tonnes of sorghum, corn, and other grain commodities," stated BND Chairman Ralph Cowen. "We worked really hard to make this project become a reality and I am very pleased to have had the full support of the board as well as the support from the port's staff who worked diligently to achieve this objective.

"We need to make full use of all of the port's assets and the grain elevator is one of them. This agreement will be of tremendous benefit to local farmers who will now be able to move their crops via our port and ship it to the rest of the world," added Cowen.

The lease is structured in three phases, with the primary lease term of 10 years and two 15-year renewal options. The agreement also allows the option to purchase the grain elevator as long as the company fulfills certain requirements within the agreement, including job creation thresholds.

Paul Johnson, director of operations for West Plains, said his company is excited to bring the grain elevator back to business.

"We're very pleased to be a part of the Brownsville community and the Port of Brownsville," he said. "The grain elevator is kind of a landmark here at the port, it's one of the first things you see when you fly into town so we're very excited to bring it back into production."

West Plains owns and operates 24 grain elevators across four states: Nebraska, South Dakota, Colorado, and Wyoming. The grain elevator at the Port of Brownsville will be its first facility in Texas.

Johnson said the company looks to bring new markets to local growers, for crops like sorghum and corn. It plans to take full advantage of the port's strategic location, with direct access to Mexico and other international markets via ocean-going vessels.

"It will take a big undertaking to rehabilitate the facility. There's a lot of work to be done, but we have a goal set to be able to accept grains this year," Johnson added.

Port of Greater Baton Rouge

The Port of Greater Baton Rouge is located at the head of deepwater navigation on the Mississippi River, with a 45ft shipping channel to the mouth of the river maintained by the US Army Corps of Engineers. Its exceptional maritime infrastructure and connectivity provide direct access to ship, barge, truck and rail.

A strategic location

The port's facilities are situated at the convergence of the Mississippi River and the Gulf Intracoastal Waterway. It is linked to other major ports between Florida and Texas and throughout 15,000 miles of the Mississippi River inland waterway system as well as to the Gulf of Mexico and ocean trade lanes to the world.

The Port of Greater Baton Rouge offers a full range of maritime services and outstanding facilities, from a deepwater complex on the Mississippi River that can accommodate Panamax vessels to its Inland Rivers Marine Terminal on the Gulf Intracoastal Waterway.

Facilities overview

The Port of Greater Baton Rouge is known for a full menu of maritime services and outstanding facilities. From a deepwater complex on the Mississippi River that accommodates ocean-going vessels to the Inland Rivers Marine Terminal located off the Gulf Intracoastal Waterway, the Port of Greater Baton Rouge has extensive facilities to handle cargo.

Deepwater Docks

- 45ft deepwater access for ocean-going vessels;
- 3,000 continuous feet of wharf;
- unlimited turning basin for ocean-going vessels;

- 525,000ft^2 of warehouse space on the Mississippi River;
- 50,000 square feet of open shipside storage;
- rail and truck access to transit sheds;
- rail covered tracks between warehouses allow for all-weather operations;
- conveyor systems from landside to wharf; and
- 24-hour security.

Dry bulk terminals

The north Baton Rouge dry bulk terminal is located on the east bank of the Mississippi River (mile 235), a few miles from Louisiana's state capital. The facility includes a barge terminal, bulk transfer facilities, rail, warehouse, US Highway 61 access and a staging area for storing dry bulk materials. Several companies operate within this 30-acre port site, handling a variety of dry bulk commodities including: bauxite; petroleum and calcined coke; aggregates; aluminium hydrate; and scrap metals.

Companies located at the north Baton Rouge Dry Bulk Terminal include:

- Agway Systems, Inc.;
- Kanorado Terminals; and
- Kinder Morgan Terminals.

At the port's deepwater complex on the west bank of the Mississippi, two companies operate dry bulk facilities with access to 3,000 continuous feet of deepwater wharves.

- Drax Biomass International; and
- Louisiana Sugar Cane Products, Inc.

Export grain elevator

Louis Dreyfus Commodities, LLC is the operator of the export grain elevator located at the port. The facility has the capacity to handle more than 5 million metric tonnes of grain annually through barge, rail and local origination, supporting Louisiana's agriculture and maritime industries. Capabilities include:

- grain transfer and storage (barge loader and ship);
- USDA Grain Inspection Agency on site; and
- product transformation processes including cleaning, drying, mixing and loading.

Port of Mobile's Pinto Island Terminal can handle over 5mt of steel a year

Pinto Island Terminal.

The Port of Mobile is a deep-water port in Mobile, Alabama, United States. It is the only deep-water port in Alabama, and is located along the Mobile River where it empties into Mobile Bay. The Port of Mobile has public, deepwater terminals with direct access to 1,500 miles of inland and intracoastal waterways serving the Great Lakes, the Ohio and Tennessee river valleys (via the Tennessee-Tombigbee Waterway), and the Gulf of Mexico. The Alabama State Port Authority (ASPA) owns and operates the public terminals at the Port of Mobile. The public terminals handle containerized, bulk, break bulk, roll-on/roll-off, and heavy lift cargoes. The port is also home to private bulk terminal operators. The container, general cargo and bulk facilities have immediate access to two interstate systems and five Class I railroads. Additionally, the CG Railway operates from the port as a rail ferry service to Coatzacoalcos, Veracruz, in Mexico.

The Port of Mobile is the largest breakbulk forest products port in the United States, and the ASPA's McDuffie Terminal is one of the largest coal terminals in the United States and largest import coal terminal.

Pinto Island Terminal

Pinto Island Terminal is the Alabama State Port Authority's newest investment at the Port of Mobile. The $100 million import terminal is capable of handling annually in excess of 5mt (million tonnes) of semi-finished steel slab. The 20-acre terminal consists of 1000 ft. of deep water dock dredged to 45-feet, as well as an automated barge loading system positioned between the ship berth and the shoreline. The new terminal is equipped with three wide-span gantry cranes manufactured by Zhenhua Port Machinery Co. Ltd. (ZPMC). Each crane has an outreach of 150 feet and a back reach of 165 feet. The cranes are able to unload steel from ships to waiting barges or to the terminal storage yard possessing 150,000 metric tonnes of storage capacity. Each crane has a maximum lift capacity of 74 metric tonnes under hook. All three cranes and heavy lift machines utilize electro-permanent magnetic lifting beams to lift steel slabs.

New container shipping service to Asia

The ASPA and its partner, APM Terminals, have announced a new service to and from Asia for Alabama's containerized cargo shippers. Maersk and MSC jointly announced new service beginning 2 May this year, through the Port of Mobile serving major seaports in China and Korea.

Maersk and MSC will provide direct, weekly, all water service from the Port of Mobile to the ports of Qingdao, Ningbo, Shanghai, Xiamen and Yantian in China and the port of Busan in Korea. To date, the ASPA has invested over $200 million in container intermodal investments at its Choctaw Point Complex, including the new $50 million Intermodal Container Transfer Facility scheduled to open in May. The Port Authority's partner, APM Terminals, has also invested $150 million in the container terminal and recently announced an additional $47.5 million container terminal expansion to be completed by year end 2017.

Mobile's port investments are designed and constructed to serve post- and super post-Panamax vessels that will transit a newly expanded Panama Canal scheduled to open this summer. "Our investments, coupled with a year-round 45ft draught channel and a new Panama Canal, positions the Port of Mobile to capitalize on new service offerings between Asia and the US Gulf," said Lyons.

The ASPA owns and operates the public deep-water port facilities at the Port of Mobile handling over 26 million tonnes of cargo annually. Marine cargo activity through the Port Authority's terminals directly and indirectly employs over 124,000 Alabamians and contributes $19.4 billion in economic value to the State of Alabama.

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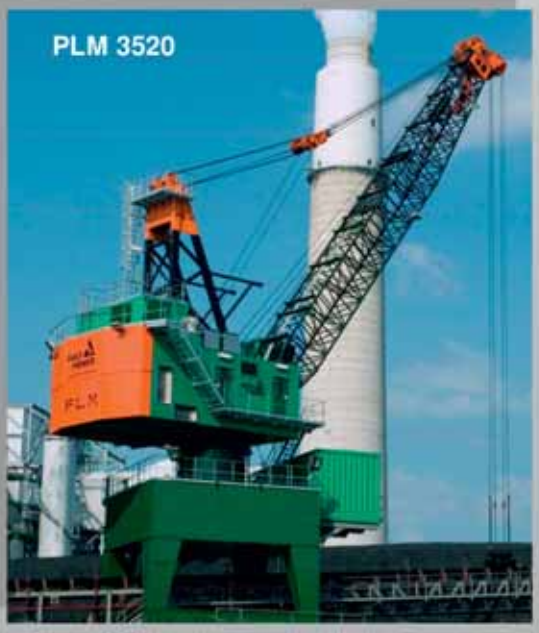

Purpose-built bulk handling, dredging and hoisting cranes.

Full-Portal Reclaimer

Moving stored bulk material from Stock-pile outbound with Conveyor Belts is easy with SMB Portal Reclaimers.

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best solution

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