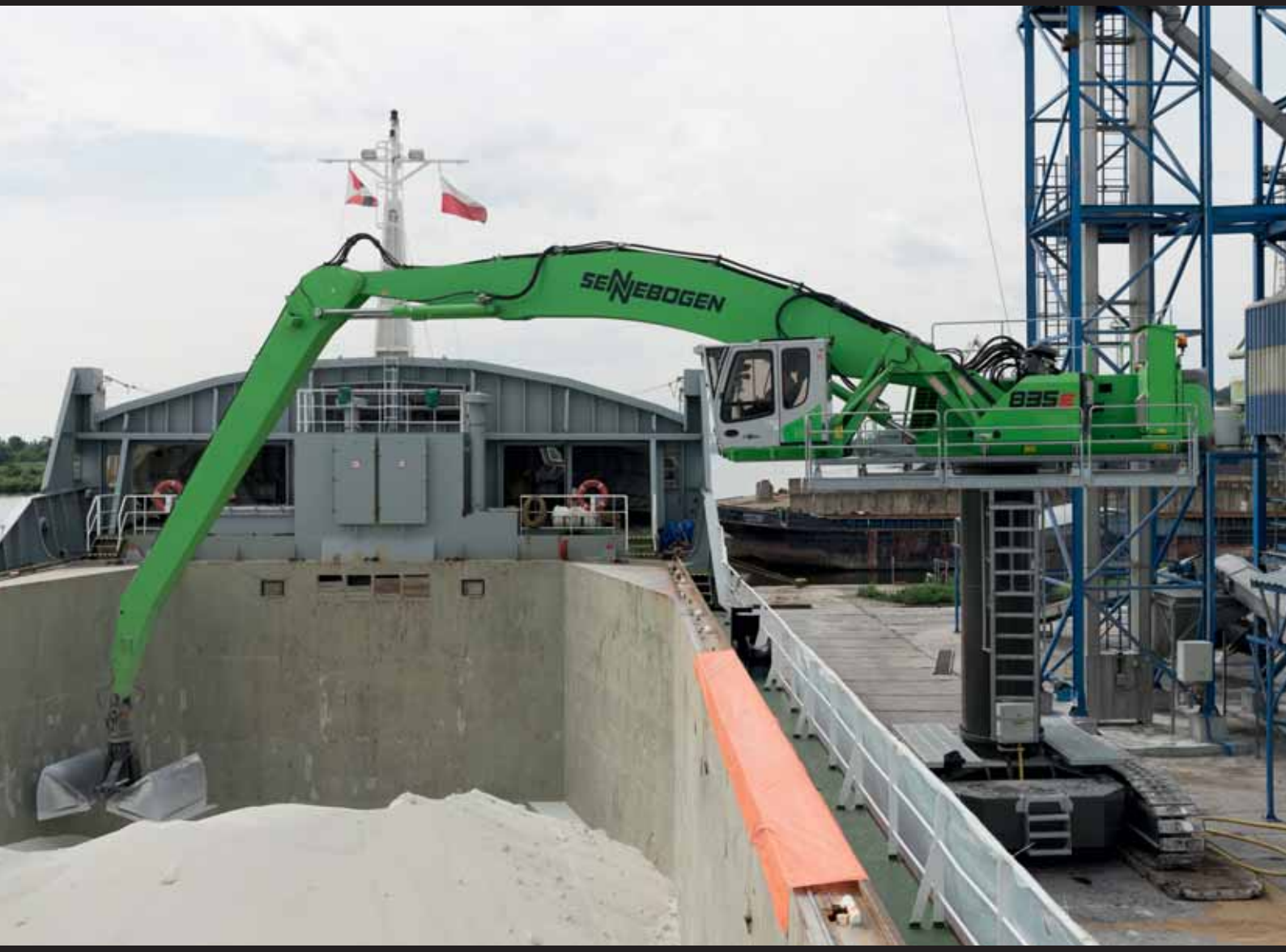
DC DRY CARGO international

ISSUE NO.187 JANUARY 2016



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ISSN 1466-3643

JANUARY 2016 issue

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Grain and soya trade outlook uneven

Over the past twelve months, signs pointed to weaker growth in commodity import demand in a number of countries, or actual reductions. Provisional figures suggest that overall growth in global seaborne dry bulk trade during 2015 was minimal or nil. Confidence in predicting a solid increase this year has receded.

One influence which may assist a return to a more healthy rate of trade expansion is strengthening growth in economic activity. The latest OECD forecasts published in mid-November seem plausible. GDP in the advanced countries group (USA, Japan, EU and Korea) could edge upwards to 2.2% in 2016, from an estimated 2.0% last year. But China's economy is still expected to continue slowing.

Grain

A small 2% reduction in grain trade (wheat, plus corn and other coarse grains) during the current 2015/16 crop year seems likely. As shown by table 1, lower imports into Asia, mainly caused by a downturn in China, and into the Middle East area probably will not be fully offset by additional imports elsewhere, including higher volumes in the European Union. International Grains Council estimates suggest that the total could decline to 314.4mt (million tonnes).

Conversely, related soya trade is still expected to increase. US Dept of Agriculture calculations show global soyabeans and meal movements expanding at a fairly rapid 5% rate in the 2015/16 marketing year ending September. This 8.3mt forecast rise to 190.4mt more than offsets the reduction in grain trade predicted, although the time periods do not exactly match.

Iron ore

An upbeat outlook published in late December by the Australian Government Dept of Industry, Innovation and Science indicated that global iron ore trade in 2016 could expand by 4.4%, after a slow 1.6% increase last year. The total, which includes land movements but is mostly seaborne, could rise from an estimated 1,381mt in 2015 to 1,442mt this year.

Although this forecast shows a decline in iron ore imports into the EU and Japan, other importers are predicted to raise their purchases. China's imports may increase by over 2% to 951mt this year, despite an estimated fall in crude steel production. More replacement of Chinese domestic iron ore production with imports is foreseen. Other importers as a group also may see a substantial advance.

Coal

Estimates of coal trade prepared by the same forecaster, AGDIIS, are also positive, indicating resumed growth in both steam and coking coal categories. One crucial assumption is that China's dramatic downturn in imports will not be extended further in 2016, when a flattening of the trend will evolve. Figures, again, are based on all trade, most of which is seaborne.

Global steam coal trade could see a 2% increase in 2016 to 1059mt, after last year's sharp fall. China's imports of this coal type could rise by almost 2% to 160mt, accompanied by larger volumes in India (up by 7% to 204mt), contrasting with lower volumes into Japan and Europe. Global metallurgical coal trade in 2016 may be 1% higher at 302mt, mainly benefiting from 7% growth in India, importing 61mt.

Minor bulks

World seaborne fertilizer trade, comprising raw materials and semi-finished products, amounts to large volumes which may have totalled well over 140mt last year. Recent reports suggest that the international market may strengthen over the next twelve months, amid greater import demand in a number of Asian countries.

Bulk carrier fleet

During 2015 the world fleet of Handysize (10–40,000dwt) bulk carriers saw a slight increase of about 2%, resulting from higher newbuilding deliveries accompanied by higher scrapping, as shown by table 2. Prospects for this size group in the next twelve months point to a similar rate of growth, based on very tentative assumptions about the main influences.

TABLE 1: GLOBAL WHEAT & COARSE GRAINS IMPORTS (MILLION TONNES)

	2010/11	2011/12	2012/13	2013/14	2014/15*	2015/16*
Asia (excluding Japan)	55.5	58.4	58.6	73.4	87.9	83.0
Japan	24.7	23.0	24.3	23.4	22.0	22.5
Middle East	34.9	46.0	48.4	54.0	57.1	50.8
Africa	53.3	59.0	56.3	65.4	67.4	68.8
Others	74.3	84.6	83.1	93.9	87.3	89.3
World total	**242.7**	**271.0**	**270.7**	**310.1**	**321.7**	**314.4**

source: International Grains Council, 19 November 2015 **forecast* *July/June crop years*

TABLE 2: HANDYSIZE 10-39,999 DWT BULK CARRIER FLEET (MILLION DEADWEIGHT TONNES)

	2010	2011	2012	2013	2014	2015*
Newbuilding deliveries	8.9	10.3	10.4	6.2	5.3	6.5
Scrapping (sales)	2.7	5.3	8.3	6.7	4.2	4.5
Losses	0.0	0.2	0.1	0.1	0.0	0.0
Plus/minus adjustments	0.2	-0.6	-0.6	0.1	0.0	0.0
World fleet at end of year	**84.1**	**88.3**	**89.7**	**89.2**	**90.3**	**92.3**
% change from previous year-end		+4.6	+1.6	-0.6	+1.2	+2.2

source: Clarksons (historical data) & Bulk Shipping Analysis 2015 forecast **forecast*

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How to secure your coal supply

Whether the coal market is booming or softening, coal contracts underpin much of the world's supply of electricity, and long-term coal agreements are not going away. In his latest report for the IEA Clean Coal Centre, Coal contracts and long-term supplies, Paul Baruya examines long-term fuel supply contracts, where they are used and the features that make them attractive to many utilities.

Regardless of the uncertainty of the current coal market, contracts still form an essential basis of every trade deal. In 2014, the National Development and Reform Commission (NDRC) of China published guidelines for coal miners and utilities to agree medium- to long-term contracts. This would replace the traditional process of annual negotiation and agreement of one year contracts. Such a change could instigate a major shift in coal buying in the world's largest coal market. This is in stark contrast to OECD Europe where hard coal purchases for UK and German utilities are agreed almost entirely on a spot basis.

However, a number of countries and companies use long term contracts to varying degrees, including: Czech Republic, India, Indonesia, Japan, Korea, Malaysia, South Africa, and USA. Independent power developers cannot secure finance without securing both long-term power purchase agreements and similar arrangements for coal supply contracts. These latter contracts could be an essential component to the expansion of electricity supplies in many industrializing economies seeking least cost and reliable electricity. Mine-mouth power stations may not require the same level of contractual sophistication and detail in their supply agreements due to the short supply chain. Where longer distances are involved an intermediary with expertise in haulage and handling may be included in the contract along with a greater degree of quality checks and auditing to ensure the delivery is prompt and to the prescribed standard.

Term agreements have many advantages compared to spot purchases, especially for power plants operating under baseload. Probably the primary reasons for adopting long-term agreements are certainties in the required volume of coal of the right quality, and better predictability in the price, whether it is geared to a fixed or a variable formula. Long-term planning becomes easier, and allows producers (and end users) to plan mine advancements and investments and enhancements in equipment, methods and land planning. It also provides an incentive to explore future blocks of resources when long-term volumes are coupled with long-term prices. While the agreement secures tonnage over the long term, variations on a monthly or quarterly basis are inevitable. Despite the apparent locked-in nature of a long-term agreement, flexibility in these contracts can be put in place to enable the buyer to take more tonnage in some periods and perhaps less in others. Pricing is an essential aspect of any coal contract. Market conditions can alter prices every hour but long-term contracts stabilize prices, albeit with varying degrees of fluctuation depending on the price formula. For most term contracts, price renegotiation can occur annually or every three years, which reduces the need to repeat the tendering process, but ensures that both parties are aware of current market conditions and so steers them to cost competitiveness.

Long-term agreements can lead to strategic business interests and co-operation to suit both buyer and seller. Both parties can benefit if one owns part or all of the other's assets. Sellers can also enter into strategic long-term contracts with rail and port to ensure a continuity and robust supply chain for many years, offering buyers confidence that the producer has access to sufficient capacity to deliver the coal when needed.

While price, volume and quality are the main criteria for any agreement, a number of assurances must be made by both parties which will fall under the terms and conditions of most contracts. The timeliness of delivery, payment and communication between parties is usually stipulated. Other ancillary services and requirements such as sampling and auditing volumes throughout the supply chain will be common for international shipments and must all be considered when drafting contracts. So, under certain circumstances long-term contracts serve as a useful and often indispensable instrument for coal procurement for some buyers. Flexibility can be built in, in terms of volume, price, and quality, while providing greater confidence in the long-term operation of a both new and existing power plants. This report introduces the reader to the basic structure and terms for fuel commodity agreements, and provides examples of contracts, their variations, as well as possible disputes and remedies.

The IEA Clean Coal Centre is a renowned provider of information on the clean and efficient use of coal, particularly clean coal technologies, in a balanced and objective way, without political or commercial bias. Its products include in-depth topical reports, literature reviews and online databases. It also provides advice, facilitates R&D networks and organizes workshops and conferences. It is funded by member countries and industrial sponsors, so its analysis remains impartial.

Dry bulk trade confronted by strong headwinds

Richard Scott, Bulk Shipping Analysis

Reflecting last year's dry bulk trade growth setback, doubts about future expansion have multiplied. Some influences resulting in global seaborne dry bulk commodity movements ceasing to grow in 2015 may persist over the twelve months ahead. Confidence in a solid longer-term upwards trend has receded, at least temporarily.

Although a slackening dry bulk trade advance last year was widely expected, it was not generally foreseen that growth would fade away entirely. Based on provisional estimates, which could be revised noticeably, it seems quite possible that overall trade was flat in 2015. Not actually reduced by any meaningful volume, but not visibly increasing either.

This performance contrasted sharply with about 3.5% growth in the previous year which, in turn, had been preceded by several 6–7% annual rises. Currently also, a return to similar expansion rates is difficult to foresee. The factors enabling rapid trade advances have retreated and may not revive, while new sources of large additional volumes are still awaited. So any rise in 2016 seems likely to be small.

Remarkably, the sharp deceleration in the past twelve months was not caused by a severe global economic downturn. More specific factors shaping individual commodity trades were influential, although China's continuing economic slowdown was an underlying reason. Other economies having most impact on dry bulk import demand — USA, European Union, Japan and Korea — mostly performed slightly better than in the preceding year and may continue improving in 2016.

A large reduction in seaborne coal movements last year, after many years of growth, greatly weakened the overall dry bulk trade trend. Coupled with little or no further increase in iron ore trade, and only sluggish rises among other commodities, the result was the weakest achievement since the 2008/09 global economic crisis.

World economy perspective

During the past year it became possible to discern an improving economic growth trend evolving among the main advanced countries. Although this strengthening was somewhat patchy, it nevertheless contrasted with slowing growth in emerging economies as a group. China's sustained deceleration was a feature.

Estimates of Gross Domestic Product (GDP), representing goods and services output, published recently by the OECD organization and summarized in table 1, suggested that the

annual increase in 2015 for the entire OECD group (mainly USA, EU, Japan and Korea) would edge upwards to 2.0%. This progress reflected more momentum among the main countries. The forecast for 2016 indicated further limited progress to an average 2.2%, based on positive signs for all the principal areas.

Despite a beneficial impact in many countries from much lower oil prices, and support from macroeconomic policies, the OECD organization remains cautious about economic activity acceleration. Slowing emerging market economies including China is one restraining influence. Another factor is subdued investment and productivity growth in the advanced countries. As a consequence "global growth prospects have clouded" according to the OECD's economists.

In Europe tangible evidence of an economic revival under way began to unfold last year. Expectations of GDP growth picking up seem to have proved correct, although it was a fairly modest achievement. Limited credit availability and further deleveraging (paying down loans) have been identified as contributory factors restraining activity, but these features are not expected to prevent a continued improvement to 1.8% GDP growth in 2016.

Japan's economy faltered in the second quarter of last year, when a minimal decline in GDP occurred, and seemed to be heading for another 'technical recession' (two consecutive quarters of negative change). However, this outcome was avoided when momentum was regained later, and the annual growth rate may have been above the previous year's very slow advance. More monetary stimulus has been applied, and may result in a higher 1% GDP growth rate this year.

The sustained slowing in China is consistent with many expectations and is also an intentional consequence of government policy aims. A concern for the international community though, is whether the official statistics are correctly measuring what is portrayed as a gradual and controlled process, or whether the slowdown is much steeper. Shifting the economy's balance away from investment spending and exports, towards consumer spending, is widely expected to cause further slackening in the 2016 GDP growth rate to 6.5%.

Steel raw materials

Patterns of spending contributing to economic activity affect demand for steel and production volumes. Changes in the steel production trend, in turn, influence raw materials consumption and also determine import demand, mainly for iron ore and coking coal, in countries depending on foreign supplies. A large proportion of global seaborne dry bulk trade is comprised of these commodities.

In the past twelve months, steel demand and production in most of the main countries importing raw materials — China, European Union members, Japan and South Korea — experienced weaker market conditions. Developments were reflected in the World Steel Association's recent estimated steel demand changes, which do not always exactly match actual production variations.

Demand for steel in 2015 as a whole was expected by the WSA to prove marginally higher within the EU, growing by 1.3% compared with the previous twelve months. But elsewhere negative changes were foreseen. In Korea a 1.3% decline was estimated, accompanied by much larger reductions in China (–3.5%) and in Japan (–5.4%).

Indications for 2016 suggested that Japan's sharp decline could be partially reversed with a 3.1% increase while, in Europe, an improved 2.2% growth rate could be seen. Korea's steel demand was forecast to return to marginal 0.7% growth. By contrast with these positive signs, in China a continued downtrend was indicated this year, albeit at a slightly less negative –2.2% rate of contraction.

Iron ore and coking coal movements comprise about one-third of all global seaborne dry bulk commodity trade. Last year iron ore trade apparently was about 1% higher, based on tentative calculations, reaching around 1,360mt (million tonnes,) as shown by table 2. Coking coal trade may have been 4% lower at around 305mt.

Prospects for steel industry raw materials global import demand over the twelve months ahead seem rather subdued at present. Although some improvement in several countries' economic performance may be achievable, benefits for steel demand and production are likely to prove limited. Moreover, expectations for a continued rapid pace of substituting domestic iron ore output in China with foreign supplies have receded.

Most attention in the iron ore trades is focused on China's imports, because these comprise over two-thirds of the global total. The estimated 2015 China volume was close to the previous year's 933mt, after rising very strongly over the preceding decade. Until 2014 the upwards trend was driven by expanding steel production, coupled with an enlarging proportion of foreign iron ore consumed, boosted by an advantageous steep fall in international ore prices.

Some potential for global iron ore trade to be strengthened by low iron ore prices is still evident. If more high-cost Chinese domestic mines, many of which produce relatively low-quality material, are eventually forced to cut back output, additional supplies from Australia and Brazil may be required. This substitution could boost imports even when steel production is declining. But uncertainties are prominent.

Unlike iron ore trade, global coking coal trade is not dominated by China. Another contrast is that the total world volume is less than a quarter of the iron ore quantity. Although Chinese imports are a sizeable component, Japan, Indian and European countries as a group are bigger coking coal buyers.

According to provisional calculations, both Japan and China saw declines in coking coal imports last year, amid lower steel production volumes. Meanwhile the EU's purchases from foreign origins may have been flat or reduced. Conversely, India's imports appear to have strengthened, reaching an estimated

TABLE 1: GDP GROWTH IN KEY ECONOMIES (% CHANGE FROM PREVIOUS YEAR)

	2011	2012	2013	2014	2015*	2016*
USA	1.6	2.2	1.5	2.4	2.4	2.5
Eurozone	1.6	–0.8	–0.3	0.9	1.5	1.8
Japan	–0.5	1.7	1.6	–0.1	0.6	1.0
OECD area#	1.9	1.3	1.2	1.9	2.0	2.2
China	9.3	7.7	7.7	7.3	6.8	6.5

source: OECD Economic Outlook, 9 November 2015 ** forecast* *# mainly USA, Europe, Japan and Korea*

TABLE 2: WORLD SEABORNE DRY BULK COMMODITY TRADE (MILLION TONNES)

	2010	2011	2012	2013	2014	2015*
Iron ore	1,005	1,069	1,124	1,210	1,346	1,360
Coal	954	1,014	1,111	1,191	1,172	1,125
Grain (including soyabeans)	297	313	329	355	385	390
Other dry bulk commodities	1,283	1,374	1,425	1,505	1,510	1,530
Total dry bulk trade	**3,539**	**3,770**	**3,989**	**4,261**	**4,413**	**4,405**
% growth from previous year		6.5	5.8	6.8	3.6	–0.2

source: Bulk Shipping Analysis **estimate*

51mt, as a result of rising steel production and an intensifying requirement for high quality foreign grades of this coal type.

Currently, signs pointing to growth in this sector during 2016 are limited. India is the main focus, because an upwards trend in steel production seems set to continue, assisted by a robustly performing economy. Although India has large domestic coal resources, the coking coal quality available is generally inferior and quantity is inadequate, ensuring greater dependence on external supplies.

Power generation fuel

Seaborne steam (or thermal) coal trade is a much large part of the global coal picture than coking coal movements. Power stations in many countries are the principal importers, but cement producers and other industrial users are also prominent.

In 2015 an unusual change apparently occurred: a lower world steam coal trade total compared with the previous year, down by about 5% at an estimated 820mt, following an extended upwards trend. The principal cause was a steep fall in China's imports, accompanied by weaker European import demand. A small rise in India's purchases, together with increases elsewhere, were insufficient to offset the negative events.

Pressure to cease, or at least curtail, coal burning for environmental reasons has become a key influence on coal trade evolution and is having a major impact. In many importing countries, especially China and within Europe, a trend of switching towards cleaner fuels or renewable energy sources, or both, is well under way. This pattern is not universal however, and, in a number of other countries mostly in Asia, the compelling economic advantages of coal are likely to persist.

Sustained support for steam coal consumption and trade is resulting from several factors. In some countries, long-term plans indicate that rapidly rising electricity demand is likely to be satisfied by coal-fired power plants, based on construction programmes to increase generation capacity which are advancing solidly. Growing reliance on imported supplies of coal is often envisaged, even where there is domestic material available.

In the Pacific area there is uncertainty about steam coal imports into Japan, one of the principal buyers, mainly for different reasons. Nuclear generation in Japan, which previously provided almost one-third of electricity requirements, has been virtually suspended since the Fukushima-Daiichi power plant disaster a few years ago. But a process of gradually allowing these power stations to operate again implies some negative effects on coal import demand, which benefited from nuclear closures.

India has become the world's number one steam coal importer, overtaking China last year, although growth apparently slowed sharply. Estimates suggest that in 2015 India may have received only a slightly higher volume than seen in the previous year, when about 173mt was recorded. A huge coal-fired power plant building programme is progressing, amid a strong upwards power usage trend. Together with effects from difficulties in sourcing sufficient domestic coal, further imports growth is predicted.

China's steam coal import patterns now present a starkly contrasting picture. After decreasing in 2014, the downwards trend accelerated last year when the previous total of about 190mt may have been reduced by about 30%, taking a massive quantity out of the global market. Slowing energy requirements, a sustained emphasis on cleaner energy sources, and specific measures to curb coal consumption and imports had a dramatic impact, creating much greater uncertainty about future import needs.

Cereals and oilseeds

For global seaborne trade in grain, soya, plus other oilseeds and meals, changes are often greatly influenced, at least in the short term, by the impact of varying weather patterns. Weather variations affect both domestic crops in importing countries (with implications for import volumes) and also determine harvests in exporting countries. Changes in consumption trends are influential as well.

Agricultural commodity trade statistics are usually

compiled on a 'split year' basis, labelled as crop, marketing or trade years. This is a device used to reflect the pattern of harvests around the world, recognizing the nature of production which occurs in 'lumps' at set times rather than as a continuous process throughout any period.

Figures for grain (wheat plus corn and other coarse grains), calculated by the International Grains Council, show that global trade in the 2014/15 crop year ending June 2015 grew solidly by 4%, reaching 322mt, a record high total. Larger imports by China, other Asian countries, the Middle East area and North Africa were partly offset by reduced EU purchases.

During the current 2015/16 year now past its mid point, world wheat and coarse grains trade is expected to be about 2% below the previous year's volume at 314mt, according to recent IGC estimates. Reduced imports into China, and also Iran and other Middle East countries, may contrast with higher shipments into Europe.

The evolution envisaged in the current year illustrates how changes in weather patterns affecting harvests result in short-term import increases or decreases. Forecast weaker imports into China reflect a sequence of good domestic grain crops in the past few years and a build up of stocks (particularly corn). Abundant production in the Middle East is expected to cause a similar imports decrease while, conversely, a corn harvest shortfall in Southern Europe could raise foreign purchases.

Within the soya sub-sector, which has been growing very strongly, different patterns are often evident. Using a marketing year ending in September, global soyabeans and meal trade in 2014/15 expanded by 7%, reaching 182mt, based on US Department of Agriculture data. In the current 2015/16 marketing year a further 5% increase is forecast, raising the annual total to 190mt.

Rapidly expanding soyabeans imports into China have provided the main impetus for the upwards global soya trade trend during the past decade. These imports, which totalled 78mt in 2014/15, now comprise over two-fifths of the world volume and are the dominant influence. Purchases by other Asian countries and elsewhere have also grown vigorously.

In the present year, a slower 3% increase in China's soyabeans imports is envisaged by USDA analysts, resulting in the volume totalling over 80mt. Dependence on foreign supplies reflects relatively low domestic soyabeans production by Chinese farmers, coupled with strongly increasing consumption of soya meal and oil. Soyameal is a key ingredient of livestock feed, while soyaoil is used extensively in food manufacturing and domestic cooking.

Looking further ahead to the second half of calendar year 2016, prospects for grain and soya trade are, as usual, very hazy. Current forecasts are largely guesses, as predictions of changing and inherently unpredictable weather patterns and their effects on grain and soya production and import demand are not yet plausible. When a more accurate picture is available of mid-2016 domestic harvests in northern hemisphere grain importing countries, forecasting will become more useful.

Voluminous minor bulks

Trade in many commodities, some of which are not minor but very voluminous, is included in the minor bulks sector. Consequently this category is extensive and amounts to huge quantities. The diverse range comprises cargoes related to industrial and construction activity, and also agricultural commodity movements. Altogether this group contributes over one-third of global seaborne dry bulk trade.

Within the 'industrial' sub-group, steel products and forest products are the most prominent individual elements. Other large components are bauxite/alumina, iron and steel scrap, cement, salt, petcoke plus nickel and other ores. Among 'agricultural' minor bulk commodities are sugar, rice, oilseed meals, phosphate rock, other fertilizer raw materials and semi-processed fertilizer products.

Tentative calculations based on very incomplete data suggest that, last year, growth in the entire minor bulks group was marginal at about 1%, raising the total to around 1,530mt, as shown in table 2. At present there is an absence of clear signs pointing to a stronger growth performance during 2016.

Import demand for a number of industrial minor bulk commodities appears to have been restricted by slowing economic activity. Economic growth in emerging market countries has slackened, affecting imports for manufacturing and construction. Other more specific factors also explain changes.

China's imports of minor bulk commodities comprise a large proportion of the world total. Over the past twelve months, some have experienced negative effects from a continued economic slowdown and its ramifications for many industries and construction activity. For example, nickel ore imports, which totalled 48mt in 2014, appear to have fallen sharply last year, partly reflecting limited availability of foreign supplies, and the weaker trend could continue.

Limited growth ahead

This overview of global seaborne dry bulk trade's recent progress and future prospects indicates that a flattening of the preceding robust upwards trend occurred last year. Weak growth in some individual commodity trades and downturns in others were visible. Signs of changes in 2016 point to overall growth resuming, but there are no indications at present suggesting a briskly accelerating performance.

Dry bulk prospects for Brazil in 2016

The collapse of Brazil's currency is helping to compensate for the sharp fall in the price of many commodities, *writes Patrick Knight*. This state of affairs will persist in 2016.

Reflecting the country's very poor economic performance of recent years, as well as the political turbulance of the past few months, the Brazilian currency has fallen by almost 50% against the US dollar and other currencies in the past year.

The weaker currency means that Brazilian goods of all types are much more competitive in world markets than a year ago. This is compensating, at least in part, for the impact caused by the fall in the price of most of the hard and soft commodities whose export now generates three quarters of Brazil's export earnings.

China is now the leading destination for many of Brazil's exports, notably iron ore and soya beans, as well as pig iron, pulp, leather and wood. But although China's need for iron ore has weakened, along with the country's economic growth, this has not affected the sale of most other goods imported by China.

Although a boom in building infrastructure and housing has slowed, so fewer minerals and the metals which China does not produce are being imported, consumer demand for foodstuffs and most other goods has slowed far less, if at all, as wages continue to rise.

Demand for soya beans by China, the destination of three quarters of the more than 50mt (million tonnes) of soya beans exported by Brazil each year, has not fallen at all. It also seems likely that China will soon join the many countries which import Brazilian maize, of which an all-time record 30mt has been exported 2015/16. Until five years ago, Brazil often imported some of the maize used to feed chickens and pigs. But more maize is now planted as a second crop to soya in the winter months than is in the summer. This trend will continue so long as more soya is planted in the north of the country, which seems inevitable, as demand grows.

Farmers growing grains are amongst those benefiting most from the devaluation. But production costs, which includes imported fertilizer, and equally important, the cost of transport, have risen greatly as well. Many farmers in the frontier areas have large debts set in US dollars, so are aprehensive.

Should the Brazilian economy start to grow again soon, rather than only after several more years of stagnation, something considered more likely, this would cause the currency to strengthen once again. If that happened, and world grain prices did not rise, the financial situation for many farmers would become very precarious. Many farmers would plant less, so less grains would be available for export.

The year 2014 saw significantly more of the soya and the maize grown in the centre west being exported from ports in the north and north east of the country. This followed the building of new terminals alongside the Tapajos and other rivers and the availability of many more barges and tugs to carry them. A few of the roads used to take soya and maize to ports have been improved, but not fast enough to keep pace with increasing output. The cost of road transport will rise even further if the world price of oil starts to rise once again, as seems likely in the long term at least.

Anxious to encourage a switch from road to rail transport, and so ensure Brazil's crucial soya industry remains competitive, the government wants to attract investors, notably some from China. Finance is needed to build a new line which would link the tracks which now carry Vale's Carajas ore to the deep water port of Itaqui on the Atlantic, to ports close to the mouth of the Amazon river. This is now a main destination of the barges taking grains north.

Four of Brazil's largest trading companies, Bunge, Cargill, Dreyfus and Maggi, have also announced plans to build a 900km railway to link the main soya growing regions of Mato Grosso state, to the fast growing riverside port of Miritituba, now the limit of navigation on the Tapajos river, and also close to the Port of Santarem. Fed up with the slow progress being made to make roads in the region usable all year round, this consortium wants the planned railway, which could cut transport costs by up to 40%, to be completed by 2022/23.

Vale has been hit not only by the sharp drop in the price of ore, which has now fallen below the $40 per tonne mark, but by the possibility that it will be called on to pay up to $5 billion in compensation for the damage caused by the collapse of a dam at the Samarco mine in Minas Gerais. The company has slashed investment planned for 2016, but still expects to start mining ore at its new 90mt a year capacity workings in the Carajas province, in the second half of 2016. The reason for going ahead there is simple. The first ore to come from Vale's new Carajas workings will cost less than $13 per tonne to mine, and the cost should fall to $10 a tonne a year or two later. Nobody expects the world ore price to fall to anywhere near that level. Even at $40 per tonne, only Vale and the largest companies with mines in Australia, make a profit. Many high-cost mines in China, India, and elsewhere are being closed, many probably for good. Only the very largest are surviving. Vale's new mine has sufficient reserves to last for many decades.

If prospects for Vale are reasonable, the same cannot be said for Brazil's steel companies which are now utilizing only about 60% of their 35mt capacity. The industry is facing a crisis which officials describe as "the most serious in its history". Two large blast furnaces have already been closed down, others will follow, and a dozen mills and lamination plants have shut. Twenty-five per cent fewer cars were sold in 2015 than the previous year, the sale of capital goods fell by a similar amount, with those of white goods not far behind. Construction has slowed as well.

The devaluation has meant that imported steel is now more expensive, so less is coming in. But because there is a world steel surplus estimated at 700mt, some countries, notably China, are continuing to export steel to Brazil, even at large losses. Because of this, Brazil's steel companies have called on the government to increase import tariffs from the present 8% to 20%. In the past few years, several steel companies with reserves of ore of their own, had boosted their meagre profits by exporting iron ore. But their ore usually costs much more to mine than that produced by Vale, so many have now exited the ore business.

While steel mills are being shut down and farmers are watching the exchange rate closely, the makers of market pulp, most of which is exported, have seen demand remain buoyant. This industry is bucking the trend and is starting a major new round of investments. China is an important market for Brazilian pulp and consumer demand there for all types of goods, including paper remains strong. The devaluation has restored the competitiveness of this industry, while numerous mills in countries where production costs are high, have been closed down. The usually cautious Fibria company, owner of the mills in the Aracruz complex, and also those previously bearing

Samarco dam collapses set to cost owners dear

Vale and BHP-Billiton, joint owners of the Samarco iron ore company in Minas Gerais, are bracing themselves for massive bills for the damage caused by the escape of millions of cubic metres of waste, following the collapse of two dams at a large mine.

The collapse occurred in mid November, and it took two weeks for up to 50 million cubic metres of waste, some of it accumulated over 40 years of mine operations, to reach the Atlantic ocean, 550km downstream. The water supply of dozens of towns and cities has been contaminated and vegetation damaged, while millions of fish, dolphins and a rare type of turtle have been destroyed.

The 25mt (million tonnes) of ore mined by Samarco each year, is taken to the port of Uba, in Espirito Santo state, along a 400km slurry pipeline, with the ore concentrated into high value pellets at four mills there.

Pellets, rather than unprocessed ore, are preferred by many mills, notably those in urban areas in United States and Europe, as pellets cause less pollution. Most of the pellets traded worldwide come from Brazil and the product is made by Vale as well as Samarco.

It could take up to four years for two dams holding back the lakes into which waste from treatment plants was pumped, to be re-built. The damaged dam was being raised to keep pace with a surge in output of ore when the collapse occurred. The treatment plant was badly damaged when the dam collapsed, as were several conveyor belts, although the mine itself is intact, as is the pipeline, the port installations and the pelletization plants.

Anxious to re-start production as soon as possible, engineers are considering pumping waste into old mine workings from now on, rather than allowing it to settle in lakes.

Samarco has already been ordered to pay stiff fines to the environmental authorities for allowing the burst to happen and towards compensation for damage, both to the environment and to water treatment plants, as waste continues to escape from the mine workings.

As well as forcing numerous towns to seek alternative sources of drinking water, the Cenibra pulp mill, some 200km downstream, which makes 1.3mt of market pulp a year, most exported to Japan, was forced to halt for a week. A group of Indians, whose reserve straddles the Doce river, where the waste is now passing on its way to the sea, has halted trains carrying ore from Vale's mines in Minas Gerais state, to the Tubarao terminal and Vale's own pelletization plants there. The Indians claim they have no water to drink and that fishing has become impossible.

Between them, Samarco and Vale make up to a third of the 200mt of pellets traded worldwide each year, and stand to make substantial losses as the result of the accident.

Brazil's long-delayed new minerals law, which has been awaiting approval by congress for the past two years, is likely to be considerably tougher than had been expected. Mining companies will have to take out insurance against damage to the environment from now on, a measure which could make mining significantly more expensive in Brazil in future.

Vale and other mining companies have started inspecting the hundreds of dams they own at their mines, many in a dangerous state. There are some 15,000 dams of all types in Brazil, and 16 dams burst their banks just during 2014.

More than 20 people lost their lives during the recent incident at the Samarco mine, virtually all of them apparently men working on the dam itself, who were swept away, along with equipment. Some villages downstream were destroyed, but residents had time to flee.

the Votorantim name, is moving ahead with the duplication of its Tres Lagoas mill in Mato Grosso. This will add 2.5mt to output there in three years time. Suzano is also embarking on a major de-bottlenecking. The industry was set to export more than nine million tonnes of pulp in 2015, 13% more as in 2014. The Klabin company, the country's leading producer and exporter of packaging materials and which is part way though a major expansion of pulp making capacity of its own, is not doing so well as the specialized pulp makers. Demand for consumer and other goods in Brazil is weak at the moment after a decade of strong growth, so Klabin is suffering. Brazil has never been able to export paper as successfully as it has pulp, mainly because most paper continues to be made close to where it is consumed.

In 2016, there is likely to be less sugar produced around the world than is consumed for the first time in four years, and the world price has risen slightly to reflect this. But very large stocks still overhang the market, so Brazil's sugar mills, which almost uniquely are able to make either sugar or ethanol from cane, are facing a dilemma. It is not clear whether some mills will opt to convert more cane into sugar in 2016 than in recent years, or whether they will continue to make fuel instead. Fuel can be sold more easily and quickly than sugar, and with many mills still nursing losses, maintaining a flow of cash continues a priority. By converting more cane into fuel in the past few years, Brazil has exported at least 5mt less sugar than it otherwise would have. This helped prevent prices falling even more than they did.

Amongst the numerous difficulties Brazil has faced in the past couple of years, has been a severe and prolonged drought. Water levels in the reservoirs containing drinking water and generating hydro-electrical power, have fallen to critical levels. This has forced the generating companies to start up high cost gas fired power stations, and even to use elderly stations using fuel oil, or diesel. Although industry has been using less electricity in recent years than it did earlier, the higher incomes enjoyed by millions of Brazilians in the past few years encouraged many to buy air conditioning units. This has resulted in demand for electricity increasing much faster than had been expected.

The price of electricity has been increased sharply to slow demand, and one of the leading users, the aluminium industry, has been hard hit by this. Smelters in Brazil already paid much more for their power than producers elsewhere, notably in the Arab world, where new smelters have been built. China has also invested massively in new smelting facilities, often disregarding market forces in the process. Several of Brazil's smelters have been mothballed in the past few years and more may shut in the near future. On the other hand, Brazil continues to be one of the world's lowest cost sources of both bauxite and alumina, so the aluminium industry as a whole in not doing too badly. Even though the future for primary aluminium in the country does not look good.

Sugar cyclicality

coping with the fluctuations in demand

Kunal Bose

Cyclicality in sugar is a global phenomenon. Sugar is a dominant commodity in the world seaborne trade. As a result of cyclicality, the fortunes of the industry in all producing countries from Brazil to India, the world's two leading producers of sugar, fluctuate from year to year depending largely upon global surplus or deficit of sugar and built up inventory at any point of time. The last sugar season ended September in a major break from the established cycle routine saw bumper global sugar supply five years in a row. No wonder then, the sweetener prices moved in a range that went on pushing sugar cane crushing factories deeper and deeper in the red. Under the weight of sustained high production, raw sugar futures in New York sank to a seven-year low of 10.13 cents a pound on 24 August 2015. In some good rallies since, prices rose to 15.20 cents, triggered by sugar deficit forecasts by more than one research and consulting firm for the current season that began in October 2015.

The deficit is to occur for the first time in five years. Sugar prices posted an annual drop in each of the five years ended 2015, a record slump at a stretch, some improvements in the few weeks preceding last December excepted. Om Prakash Dhanuka, a former president of Indian Sugar Mills Association (ISMA) says "we learn from various sources that unusually low prices over a long period has taken a major toll of the Brazilian sugar industry by way of shutdown of nearly 30% of the country's 300 cane crushing factories forcing many owners to consider the option of disposal. If anything, the industry in India finds itself in a situation much worse than its Brazilian counterpart. For one, irrespective of crushing capacity, downstream facilities up to power generation and ethanol and operational efficiency, every single factory in India continues to lose heavily. At the last count, the debt burden of the industry here is around Rs500bn ($7.528bn). In about five years, our debt burden is up three times."

According to the immediate past president of ISMA A Vellayan, "hit by the worst financial crisis ever... a lot of sugar mills have become sick and several others have become NPA (non-performing assets)" for banks. In the past couple of months, sugar prices in India have perked up from about Rs2,000

a quintal to close to Rs2,700 a quintal. Even then, the factory realization falls short of production cost by Rs500 to Rs700 a quintal. In a situation like this the inevitable result will be more and more factories will find themselves in the sick bay making the banks wary of giving any further loans to the sugar industry. Besides banks, the industry owes a good amount of money to the government which earlier extended loans to factories to clear their dues to farmers on account of supplies of cane.

The new 2015/16 season production has begun in full swing and the law requires of factories to pay growers within two weeks of receiving cane supplies. But the factories find themselves on the horns of a dilemma: if they are to service loans and start paying back the borrowed capital when sugar prices fail to cover production costs by a long margin, then they are not able to clear cane bills. Mountains of cane dues in all growing centres seen in regular frequency create undesirable animus between the industry and farming community for no fault of loss making factories. But the local and federal governments are not spared the impact of the crisis emanating from unpaid cane bills either. Denied payments in time by factories and with debts on their heads, growers in some hundreds committed suicides in the past two years exposing all that is wrong with the Indian sugar economy. This smeared the reputation of the government.

Dhanuka says the agro-based industry is the source of sustenance for "50m farmers and jobs for up to 2m people in factories and tertiary areas." Cane growers and the large number of people making a living out of various points in the value chain of sugar and its distribution make an important constituency for all political parties. Therefore, every time unpaid cane bills are to become a major political issue in rural centres, the federal government will extend loans to factories to settle dues of farmers. These are, however, only temporary palliatives. What the industry needs, says Vellayan, is for it to be put in a "sustainable growth platform." For this, there has to be a "sugar vision" spanning five years and to be addressed through a series of short and long-term measures. The all-important long-term step should concern enabling factories to pay 'fair and remunerative price (FRP)' to farmers at all times irrespective of behaviour of sugar prices.

The government has dispensed with many controls on the industry such as regulated releases of sugar and appropriation of 10% of sugar output at significantly below production cost for distribution through ration shops. But it will not as yet risk cane price to be decided by forces of demand and supply and invite the wrath of millions of growers in times like the past few years. Therefore, the Commission for Agricultural Cost and Prices will recommend ahead of every sugar season FRP for cane taking into consideration input cost rises and fair return to growers. Nothing wrong in that except that the finished product, in this case sugar prices, are subject to market forces. The FRP is up about 70% in the past five years and as a consequence, says Vellayan, "cane price as a percentage of sugar price in India is over 90% while it is 60% to 65% in Brazil, Australia and Thailand." This is no longer a tenable situation. At the same time, protecting the interest of farmers is of paramount importance.

"Thanks to FRP, sugarcane has emerged among the most profitable crops fetching better returns for farmers than wheat, cotton and soybean. But in order to ensure timely payments for cane supplies in the present condition of the industry, a price stabilization fund (PSF) along with a revenue sharing formula (RSF) in the ratio of 75:25 of total collection from sugar and its by-products sale between growers and factories has to be in place," says Dhanuka. Release of funds from PSF will be automatic whenever revenues from sugar and its by-products sink to a level which will not allow factories to pay FRP. RSF is not going to be something unique to India. In more than one sugarcane producing nation, government help to farmers in bad times for sugar is automatic. Here too, a high powered committee headed by former governor of Reserve Bank of India C Rangarajan said the only way to underline long-term viability of the industry and create condition of its growth was to activate RSF.

With harvesting in the current season now in full swing, factories want the government to "restructure all their outstanding loans from banks, financial institutions, government administered Sugar Development Fund, etcetera for payment in the next 12 years, including a moratorium of up to three years." Moreover, a portion of working capital loans to factories should ideally be converted into medium-term loans with immediate effect to regularize their accounts. India's leading research organization ICRA has said in a report, the crying need of the hour is "restructuring and rehabilitation" of sugar and steel industries which have an important bearing on the economy and "affect the lives of millions of people." Citing the case of a single steel group which managed to secure "flexible repayment schedule" of 25 years for its loans liability of Rs240bn, Dhanuka says the "sugar industry has no less a compelling case for getting a favourable dispensation from banks."

Exports to the rescue

The country's sugar inventory rose for five years on the trot because of high production. Between 2010–11 and last season, Indian sugar output was up from 24.4mt (million tonnes) to 28.3mt. The opening stock for the current season is 9.1mt compared with 7.5mt in 2014/15. The only way to spare the industry the pain of financing such a big inventory is to export between 3mt and 4mt of sugar. Being a now-on, now-off exporter of sugar, India — unlike Brazil and Thailand — does not have established global outlets for the commodity. Moreover, high sugar production cost solely on cane account makes export a loss making proposition at current prices without government subvention.

Last year, New Delhi sanctioned export of 1.4mt of raws with the government agreeing to compensate factories for the loss to some extent. But since the announcement was made quite late in the season on February 27, raws exports during 2014/15 season were restricted to 500,000 tonnes. This year, however, realizing that the situation was getting out of hand, New Delhi was quick to allot export quotas among factories totalling 3.2mt. In a break with the established practice, the government is letting exports of sugar of all types — raws, whites and refined. Maybe in order not to invite scrutiny by WTO, New Delhi is not giving any subsidy to factories to fulfil export quota. What it is on offer instead is the government directly to pay farmers Rs4.50 a quintal of cane in captive areas of factories, which execute export as per quota. Dhanuka says the condition will be difficult for mills far away from ports like in Uttar Pradesh, Bihar and Punjab to fulfil because of cost involved in transferring cargoes from factory gate to ships. "What I fail to understand is why should farmers be penalized for non-port based factories not able to export. Moreover, when our neighbour Pakistan is giving a fairly large subsidy for export, New Delhi can certainly find ways to make export a viable proposition for all mills irrespective of their location without violating WTO norms," says Dhanuka.

‘Cyber disruption’ discussed at BIMCO conference

In mid-November last year, attendees of BIMCO’s Annual Conference in Hamburg heard the very latest findings on the potential vulnerabilities of ships to cyber attacks. In a session dedicated to the topic, BIMCO and industry experts showed three scenarios showing the possible risks and the methods of prevention for a cyber attack on ships’ systems. The session was designed for corporate management but also focused on the safety of seafarers and ships.

BIMCO delegates heard from Andrew Fitzmaurice, CEO of Templar Executives, and a long-standing thought leader in the global information assurance and cyber security community. Fitzmaurice commented: “The maritime industry, with an increasing reliance on technology and diverse human elements, must be prepared to rigorously protect its business, people, vessels and reputation from a determined and rapidly evolving cyber threat.”

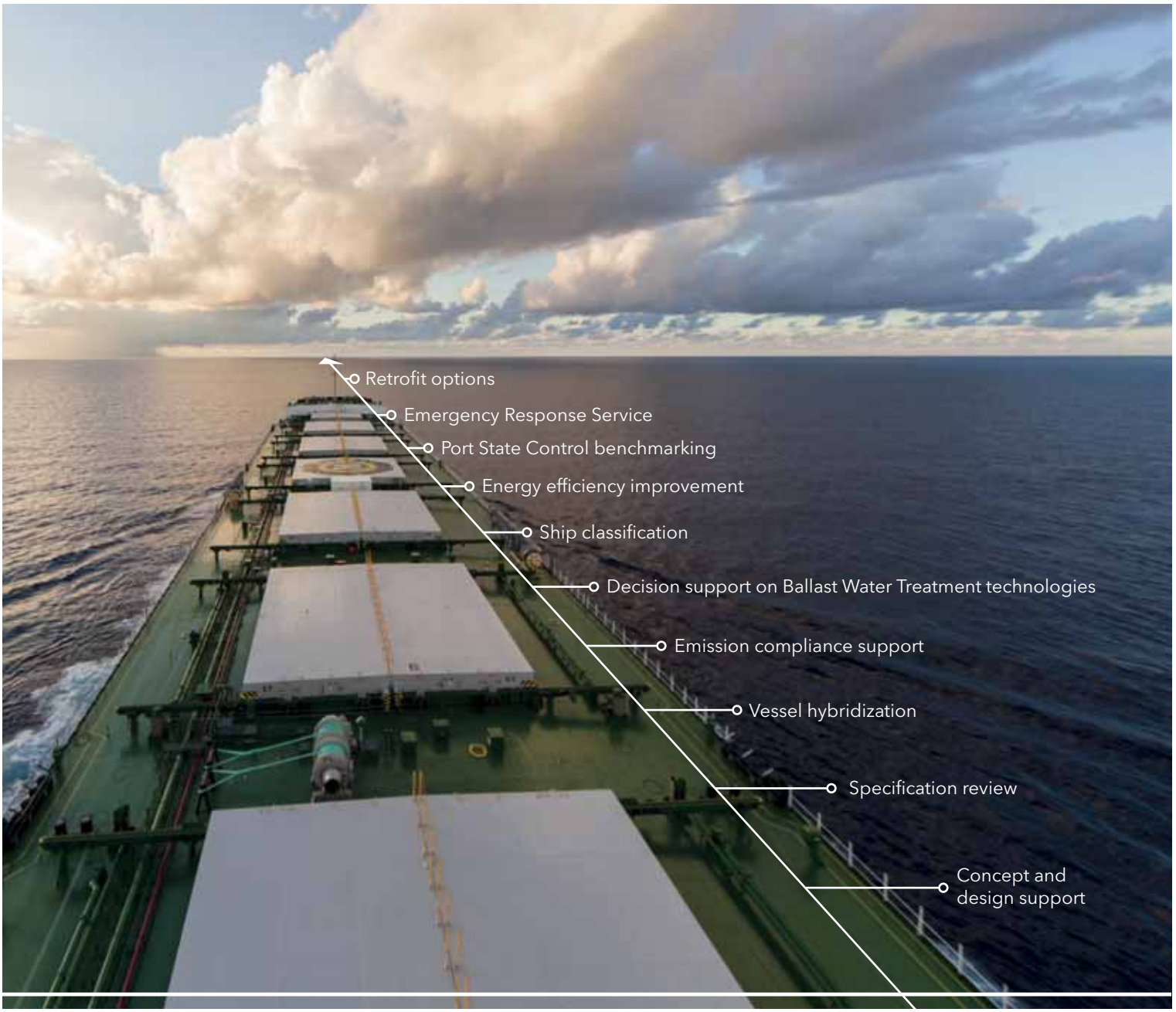
In addition, fellow speaker Captain Alexander Soukhanov from the US Maritime Resource Center (USMRC), commented on recent research carried out by his organization: “Our initial [research] findings show significant potential for cyber disruption, including malicious takeover of engineering controls, widespread exposure of critical data and systems, and corrupted electronic navigation charts, to name a few.”

The conference session followed a decision by BIMCO back in 2013 to engage in the issue of cyber security for ships — with the goal of being able to best inform and give guidance to its members. Since then, BIMCO has focused on the development of guidance that can be used across the global industry.

Soon, BIMCO — alongside other industry associations — will launch guidelines on cyber safety and security to provide clear information and support to the shipping industry on how to avoid being vulnerable to cyber attacks — and so protect their businesses.

BIMCO President, Philippe Louis-Dreyfus said of this development: “Maybe cyber security does not yet get sufficient attention by everyone in our industry — BIMCO is leading on the analysis of information and on producing guidance in this new area. It would be very unlikely to see a widespread cyber attack on shipping because ships across the world use so many different IT systems. Also, because all parties involved — such as shipowners, classification societies, equipment-makers, and so on — will do their ‘homework’.

“Nevertheless, a cyber attack could have serious consequences — not just for your ship but for the reputation of your business. BIMCO is doing its job to increase industry awareness of the risk.”



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GE keeping rail operation on the right track for reliable and efficient power supply

GE has been chosen to provide the Static Frequency Converter (SFC) solution for two of DB Energie GmbH's converter stations, Bützow and Schwerin.

Maximized system reliability, reduced failure time and maintenance over the entire system lifecycle makes GE a perfect partner for this project.

GE enables rail operators to connect different power grids and optimize rail system operations.

On 5 November, GE and Deutsche Bahn Energie GmbH (DB Energie) announced they are partnering to optimize Deutsche Bahn's rail network's power supply. Working with DB Energie, GE Energy Management will bring the technology and expertise that will couple energy fed from utility grid to the rail grid ensuring a more efficient and constant power supply. The solution ensures efficient power conversion and high power quality, optimizing rail system operations.

Scheduled for delivery between 2017 and 2018, the converter station built by GE will convert power from the public utility grid, operating at a frequency of 110kV/50Hz, to feed into the de-central rail network 15kV/16.7Hz. This solution aims to maximize efficiency through reducing the power consumption in the railway system on the two sites in Bützow and Schwerin in northern Germany. GE Power Conversion's static frequency converter (SFC) solution ensures a reliable electrical conversion at a high efficiency rate.

GE's power quality solutions are not only applicable for 16.7Hz railway systems. These solutions can enable 50Hz rail operators worldwide to avoid unbalanced utility grid loads and the resulting costs from it, as well as reduce complexity in the

system by bringing down the number of feeder stations required and by eliminating the 'dead zone' in overhead catenary lines. It helps optimize rail system operation and the solution will ultimately reduce failure time and maintenance needed.

"With our power quality solution, we offer flexibility to connect rail grid to power grids at different locations or from different providers. The continuous partnership with DB Energie shows GE's solution stands the test of time and the reliable solution for rail operators." says John Chatwin, Power & Industry Segment Leader, GE Power Conversion.

Huschke Diekmann, GE Key Account Director Deutsche Bahn said, "GE is committed to providing top quality power conversion technology to DB Energie who is our valued customer. After the success of the Lohsa substation, we are confident that this project would be another positive chapter in our relationship with DB Energie."

iCOlube® wins 'Technical Innovation Award' at Seatrade Maritime Awards

On the 19 October 2015, individuals, organizations and companies from across the Middle East, Africa and the Indian Subcontinent maritime and shipping industry, gathered at the Joharah Ballroom at Madinat Jumeirah, Dubai to see LUKOIL Marine Lubricants announced as the winner of the 'Technical Innovation Award' for its iCOlube® system. This was made even more rewarding as it is the first time that a lubricant supplier has won an award at this prestigious event.

The award was presented by Tarik Al Junaidi, acting CEO, Oman Shipping Company to Victor Zhuravskiy, CEO and June Manoharan, Regional Director, Middle East, Asia & Africa, both of LUKOIL Marine Lubricants in attendance.

Victor Zhuravskiy says "We are very pleased to accept the 'Technical Innovation Award ' for our iCOlube® system and believe it demonstrates LUKOIL's commitment to developing environmentally friendly, innovative and cost-effective solutions for the marine industry."

The ceremony was held under the patronage of His Excellency Sultan bin Sulayem, Chairman of Dubai Ports, Customs and Free Zone Corporation and Chairman of Dubai Maritime City Authority and was attended by more than 700 guests to celebrate and recognize excellence in all areas of maritime activity across the Middle East region and beyond.

About iCOlube®

This intelligent cylinder oil lubrication unit tailors the alkalinity reserve of the cylinder oil in use to engine load and fuel. The feed rate does not have to be adjusted. It always stays at optimum level while only the fuel sulphur content needs to be entered. This maintains the engine in best condition, reduces oil costs, saves fuel, is environmentally friendly and ensures easy and time-saving engine operation.

About LUKOIL and LUKOIL Marine Lubricants

Russian company LUKOIL is an expert in exploring, producing, refining and marketing petroleum products. LUKOIL was established in 1991 through the merger of a group of oil-and-gas production companies located in the western Siberian cities Langepas, Urai and Kogalym, whose initials form the acronym LUK. In 2007 LUKOIL decided to bring its expertise in lubricants technology to the marine industry. LUKOIL Marine Lubricants was founded as a global sales and marketing business focusing on the production and sales of marine lubricants worldwide. Since then the company gained a strong reputation, with the introduction of the first 100 BN cylinder oil as the answer to severe corrosive wear issues of modern engines and the development of iCOlube®, an on-board unit for intelligent cylinder oil lubrication.

I-Tech seals market acceptance for SELEKTOPE®

Final sign-off of the antifouling active substance Selektope® by the European Commission has coincided with the first disclosure of a commercial application in Asia. The first publicly-disclosed commercial application for a marine coating featuring Selektope started on 1 November last year in Singapore, swiftly after developer I-Tech secured European Commission sign-off that the revolutionary antifouling substance can also be used by yards anywhere in Europe.

Formal EC adoption of the approval regulation has been signed by EC President Jean-Claude Juncker, meaning that Selektope is permitted for use under the EU Biocidal Products Directive in professional and non-professional antifouling products throughout the EU from 1 January this year.

Selektope deters barnacles from settling on ship hulls by stimulating the swimming action of larvae. It is included as a 0.1% constituent of antifouling coatings — a fraction of the active substance needed to achieve comparable performance

The Selektope coating prevents barnacles from settling.

if traditional copper biocides are used.

"We are delighted to receive sign-off from the EC," said Philip Chaabane, Managing Director, I-Tech. "Now all antifouling coatings suppliers are at liberty to offer innovation by deploying Selektope, safe in the knowledge that they are fully approved in Japan, Korea, China and Europe."

I-Tech reached a non-exclusive commercial agreement covering the use of Selektope in 2014 with Chugoku Marine Paints (CMP). The first publicly-disclosed project will see a new copper-free product from CMP applied to the side-walls of the vessel Calypso for Swedish operator Laurin Maritime. The IMO II tanker is undergoing its first five year survey at Singapore yard Sembcorp. No special provisions are required beyond normal preparation work.

The project comes after several years of strong performance trial results, according to Mikael Laurin, Chief Executive Officer, Laurin Maritime. Selektope's characteristics closely align with Laurin's sustainability commitments, which extend to all aspects of shipboard operations, he said.

"We first took note of Selektope in 2010. Antifouling coatings have a major impact on fuel efficiency. Our ships operate in South East Asia and South America; port congestion can lead to vessels idling in tropical waters, bringing heavy fouling. I-Tech's technology represents a major

Barnacles are a major problem for vessel operators.

step in delivering an antifouling that performs the way we want, comparable to the performance achieved by antifouling coatings before the TBT ban in 2002."

Masaya Hata, CMP General Manager (Sales), commented: "The extensive test applications we have made including Selektope have led us to plan for this coating to perform as a five-year period antifouling coating. We are convinced that our customers will save fuel using this coating; our plan is to evaluate performance on a working ship and position the new antifouling coating in the market over the coming three years."

Selektope is patent-protected in antifouling applications in all key shipbuilding and repair countries until 2026. Chaabane points out that a second safeguard against imitation is provided by the protection of original data by EU law, as well as the extensive documentation required to support acceptance of active substances under the EU Biocidal Products Directive.

Selektope® — further improving antifouling paints

Selektope introduces for the first time ever a pharmacological mode of action to combat barnacle settlement. By temporarily stimulating the octopamine receptor, the barnacle larvae's swimming behaviour is activated and the organisms are deterred from the hull. These ground-breaking discoveries enable unrivalled power at very low concentrations, yet within the limits of rigorous risk assessments. Selektope is an organic, non-metal compound with efficacy proven at 0.1% w/w.

About I-Tech

I-Tech is a Gothenburg based bio-tech company with global reach, holding all IP and regulatory rights to its all new antifouling agent Selektope (generic name, medetomidine).

The company is privately held and is supported by Swedish Energy Association, the European Innovation Initiative Eco-Innovation and FP7 SeaFront. The company is a member of the Astra Zeneca BioVentureHub.

UK P&I Club advises on actions shipowners can take in the event of stowaways

Stowaways onboard ships can often be a cause of significant costs for shipowners. Amanda Hastings, UK P&I Club Claims Executive, reviews shipowners' liabilities and advises on the relevant actions to take to reduce incidents of stowaways:

"With the migrant crisis in the Mediterranean and the media attention this continues to receive, it is often easy to forget that the problem of stowaways is still a very real problem for shipowners. The majority of these stowaways are finding more creative ways in which to board ships. In addition to conducting thorough stowaway searches in accordance with the ship's ISPS Code compliant security plan, and being vigilant whilst in port, additional precautions may need to be taken due to ship design:

- Ships with a design that leaves the rudder trunk exposed should consider retrofitting bars across the rudder trunk. This will help deter stowaways from entering the ship, as it will block the access route.
- When a stowaway is discovered, their presence must be made known to the owners, port agents and the UK Club. The stowaway and the area where he or she was discovered should be searched and findings noted/photographed. Stowaways should be questioned and a stowaway questionnaire filled out.
- The Master should also produce a statement of the incident, confirming whether or not preventative procedures were followed. Some jurisdictions, like Brazil, will require a sworn translation of this document in advance of the ship's arrival.

"Although there is currently no international regime dealing exclusively with stowaways, there are several international instruments that apply. These include the UN Declaration on Human Rights, the European Convention on Human Rights and the FAL Convention.

"Shipowners should take care to ensure that stowaways are not subject to degrading or inhumane treatment whilst on board, and should be provided with water, food, clothing, medical treatment (if required) and accommodation.

"Shipowners should also be aware of the potential costs of disembarking stowaways, for example in Brazil, a straightforward repatriation can cost upwards of US$30,000 per stowaway. This figure can quickly increase if the stowaway is detained for any particular length of time. Costs for shipowners can also be incurred, depending on the jurisdiction, through immigration fines, medical testing, police escorts, cost of travel documents, detention costs and repatriation expenses such as flights and additional clothes.

"Stowaways can often result in unexpected expenses for shipowners and the issue is unlikely to go away. As ship security improves, stowaways will find more creative ways of boarding ships. If a stowaway is discovered once the ship has left port, dependent on location, shipowners may find it more cost effective to return to port and disembark the stowaway there, rather than risk higher costs in other jurisdictions, such as Brazil."

ClassNK grants AIP to LNG-fuelled vessel

Leading classification society ClassNK (Chairman and President: Noboru Ueda) has granted Approval in Principle (AIP) to a 98,000dwt LNG-fuelled bulk carrier design developed by Maritime Innovation Japan Corporation (MIJAC).

Utilizing its extensive knowledge and experience in R&D for LNG-fuelled vessels, ClassNK carried out the safety evaluation of the vessel and approved the concept design based on the International Code of Safety for Ships using Gases or other Low flashpoint Fuels (IGF Code), which will come into effect from 1 January 2017, and ClassNK's Guidelines for Gas Fueled Ships.

The vessel will be fitted with a 2,000m^3-capacity LNG tank (IMO Type B) and an LNG fuel supply system. The main engine and main generator engines will all operate on dual fuel.

Compared with diesel fuel, natural gas is a clean energy source that emits less carbon dioxide (CO_2) and greenhouse gases (GHG), and no sulphur oxides (SO_X). It is expected that the future use of natural gas as a ship's fuel will continue to increase.

ClassNK has the world's top share of bulk carriers on its register and through granting AIP to this LNG-fuelled bulk carrier, it is contributing to the spread of environmentally friendly shipping practices.

Performance optimization through fuel efficiency

Fuel efficiency is a key to decreased operational costs in the marine business. Improved efficiency is of special interest for many cruise and ferry as well as merchant companies. Fuel efficiency solutions offer an opportunity to improve long-term competitiveness and sustainability.

Larger and more fuel-efficient vessels have entered the market but with an asset lifespan of 20–30 years, the key to competitiveness for many marine operators is the existing fleet. Since June 2014, crude oil prices have decreased by more than 50%. Prices are expected to increase only slightly, if at all, in 2016 with a recovery starting in late 2016 or early 2017. Even though competition in the marine market remains strong, decreased fuel prices might offer some flexibility for strategic investment decisions.

How to improve fuel efficiency?

Safety, reliability and efficiency can be achieved through upgrades to meet modern standards. Modernization also brings a second benefit. It helps to comply with many of the upcoming environmental requirements.

"In the cruise and ferry business, operating with modern and more fuel-efficient fleet not only affects the vessel's performance but also has an impact in the environment and reputation. The environmental awareness of consumers is increasing, especially in industries as visible as the cruise and ferry business. That awareness is a driver for how people choose to spend their money. Fuel efficiency brings along smaller environmental footprint, which is appreciated by consumers. Being a front runner gives an advantage to operators to attract customers", says Tomas Hakala, Vice President, 4-Stroke Services, Wärtsilä.

It is crucial to look into the vessels' full lifecycle. The design and condition of the engine and propulsion systems and how they are operated have a direct connection to fuel consumption. Proper maintenance is also among the main areas where fuel efficiency can be improved.

"In the merchant business, fuel efficiency is the most significant factor affecting operational performance. The choice of fuel matters, of course, but regardless of what fuel is used, knowing the true condition of the vessel is always the starting point", says Andreas Wiesmann, General Manager, Sales & Innovation, 2-Stroke Services, Wärtsilä.

Based on the feedback received by Wärtsilä, for example propeller modifications and propulsion upgrades are among the solutions that are appreciated by marine operators. From cruise and ferry market perspective turbocharger upgrades improving the speed margin of vessels raise interest. For merchant vessels slow steaming continues to be a crucial topic. Slow steaming without modifications increases risk of engine fouling and out-of-range component temperatures, which highlights importance of upgrade solutions.

Digitalization taking maintenance to the next level

Digitalization is fundamentally changing the way maintenance services are conducted as the utilization of data and analytics are providing enormous opportunities to meet current challenges. Available information can help secure and optimize operations as well as predict the maintenance need well in advance.

As the latest development in digital solutions, Wärtsilä has launched Wärtsilä Genius services. Those consist of solutions and services which are designed to optimize, for example, an installation's energy efficiency, or even the management of an entire fleet. This will be done by integrating advanced dynamic voyage planning, ship efficiency advisory services and energy analysis, as well as extensive condition monitoring of the main equipment into one consolidated solution.

Wärtsilä Services in brief

Wärtsilä Services creates lifecycle services for its customers, enhancing their business — whenever, wherever. It provides a broad range of services for both shipping and power generation. Its solutions range from spare parts and basic support to ensuring maximized lifetime, increased efficiency and guaranteed performance of customer's equipment or installation — in a safe, reliable, and environmentally sustainable way.

Wärtsilä in brief

Wärtsilä is a provider of complete lifecycle power solutions for the marine and energy markets. By emphasizing technological innovation and total efficiency, Wärtsilä maximizes the environmental and economic performance of the vessels and power plants of its customers. In 2014, Wärtsilä's net sales totalled €4.8 billion with approximately 17,700 employees. The company has operations in more than 200 locations in nearly 70 countries around the world.

Bulk carrier market

more rough seas ahead

Richard Scott, Bulk Shipping Analysis

It has been a painful period for shipowners operating bulk carriers. Growth in dry bulk trade slowed sharply last year and seems to have almost halted, adversely affecting vessel demand. Despite decelerating fleet capacity expansion, freight market rates plummeted, with great advantages for charterers. Will the 2016 market trend be any less excruciating for owners?

Some cautious optimism was expressed at the beginning of 2015. At that time growth in the world bulk carrier fleet was moderating, while global dry bulk trade seemed likely to continue growing at a healthy pace. Although these indicators are not always accurate guides to the balance between ship supply and demand, a possible move towards an improved freight market balance could be detected.

Events did not unfold according to these expectations, unfortunately for shipowners. The bulk carrier fleet trend evolved broadly in accordance with predictions. The fleet growth slowdown foreseen was confirmed by clear signs of a lower annual newbuildings delivery total and higher scrapping. But instead of further moderate trade expansion assisting a market revival, it became progressively more obvious that the global trade growth rate was falling steeply.

The result was, for much of 2015 and for all bulk carrier size groups, very low or even greatly depressed freight market rate levels, sometimes not even covering operating costs for economical ships. Currently, a better balance between the key drivers is still awaited; it remains difficult to predict the timing of a fundamental and sustainable improvement in the market pattern.

Fleet growth decelerates

An extended decelerating fleet growth trend continued in the past twelve months. The very fast bulk carrier capacity expansion seen in the years up to and including 2012, when annual percentages were in double digits, has moderated. Last year's increase appears to have been under 3%, compared with a 4.4% rise in 2014.

Figures compiled by Clarksons Research show that, at the end of 2014, the world bulk carrier fleet of vessels from 10,000dwt upwards amounted to 758 million deadweight tonnes, comprised of 10,400 ships. At the end of 2015 this fleet probably reached around 780m dwt, based on tentative figures for newbuilding deliveries and scrapping.

Newbuilding deliveries last year apparently were slightly above the total seen in the previous twelve months. This indication is subject to revision, possibly substantial, as more complete information becomes available. At an estimated 50m dwt, new bulk carriers delivered in 2015 were roughly 4% higher. But demolition sales for scrapping rose strongly, exceeding 28m dwt, a jump of over 75% from the preceding year. Consequently net deadweight capacity (newbuildings minus scrapping) added to the fleet last year was much smaller, reducing the growth rate.

Among the main bulk carrier size groups — Capesize, Panamax, Handymax and Handysize — some remarkable fleet growth contrasts were seen over the past year. In the Capesize vessels segment (100,000dwt and larger), expansion almost

ceased, with a marginal 0.5% estimated rise. By contrast, in the Handymax (40–65,000dwt) group, growth accelerated to a rapid rate of around 8%. In the Panamax (65–100,000dwt) and Handysize (10–40,000dwt) categories, restrained 2–2.5% expansion occurred.

What is not always so clear is how these deadweight growth figures translate into changes in actual transportation capacity available. Increases or decreases in capacity to move cargoes, within any period, depend greatly on how productively ships are employed. Factors such as ship speed, ballast voyage patterns, and duration of port visits including any delays, are crucial when calculating the supply of transport services. This statistical data is hard to obtain and usually not comprehensive.

Slow-steaming, an operating speed lower than 'normal' progress at sea, continued to be a feature of bulk carrier employment last year. Greatly reduced bunker fuel costs eased the pressure to proceed at the most economical speed. But low freight rates and charter revenues, depressing and often eliminating profits, resulted in continuation of slow-steaming which, by lengthening voyage duration, effectively removes a significant amount of transport capacity in any given time period.

Trade growth setback

Global seaborne dry bulk commodity trade's advance slowed markedly in the past twelve months, based on provisional calculations. Growth may have ceased altogether. A separate article ('Dry bulk trade confronted by strong headwinds,' starting on p5 of this issue of *Dry Cargo International*) provides more detail, so only a brief overview is included here.

In 2015 the upwards world dry bulk trade trend apparently decelerated to a sluggish increase, or may have completely stalled. Consequently the annual total volume probably was similar to the 4,700mt (million tonnes) recorded in the previous year. Annual growth remained remarkably strong over a period of five years through 2014, so the weakness now visible is a very recent feature.

During 2014, while weakness was evident in some of the minor bulk trades, the three majors — iron ore, coal and grain/soya — together grew rapidly, supporting overall robust dry bulk trade enlargement. That pattern changed noticeably in 2015. Minor bulks picked up a little, but iron ore movements ceased expanding rapidly and grain trade growth faltered. Coal trade actually shrank last year, with what appears to have been a sizeable fall of about 4–5%, after many years of uninterrupted expansion at varying rates.

Changes in the pace of China's imports have been a common factor heavily influencing global movements in most commodity trades. The massive increase of 120mt in iron ore imports into China in 2014 comprised around 55% of that year's entire increase in all world dry bulk trade. In 2015 an estimated 70mt fall in China's coal imports apparently offset all or most growth in other dry bulk trade movements.

Trade volume changes are a useful indicator of demand for ships' transportation capacity, but are not necessarily an accurate one. Another factor, as is well known, greatly determines the deadweight capacity required: transport distance. For example, when voyage distances carrying cargo lengthen and therefore take longer in time to complete (assuming unchanged speed), demand for shipping capacity rises even when there is no change in the commodity volume being transported.

The tonne-mile unit reflects both influences, but statistics compiled on this basis involve complex calculations and assumptions and are not (usually) readily available or up-to-date. So cargo volumes shipped are still often the most useful guide.

Ship demand/supply balance

Comparing annual deadweight capacity growth in the bulk carrier fleet with annual growth in the volume of dry bulk cargo moved provides a partial explanation, and sometimes most of the explanation, for changes in freight market rates. When these indicators are compared for 2015, a deterioration in the market supply/demand balance is clearly emphasized.

Substantial surplus capacity, principally due to excessive fleet growth (compared with trade volume expansion) has been a feature of the bulk carrier market for many years, reflected in the subdued freight market. In 2015 the balance was affected adversely by a fleet growing by around 3%, while trade was flat or only minimally increasing.

Many other influences, in addition to these 'underlying' fundamentals, are instrumental in driving short-term freight rate changes.

Cargo volumes loaded are continuously varying from week-to-week, or month-to-month, within broader trends while geographical patterns also alter, partly for seasonal reasons. In some trades inventory building or destocking by importers has a noticeable impact. Port congestion and delays disrupt cargo flows. On a behavioural level, market sentiment and expectations as well as derivatives trading also contribute to short term fluctuations in physical market rates.

The Baltic Dry Index (BDI) reflects these changes. This index, compiled by the Baltic Exchange, is based on current bulk carrier freight rates (mostly time charter hire rates) for a wide variety of ship sizes and employments. It therefore can be regarded as a useful very broad indicator for the entire bulk carrier market.

After beginning 2015 at a low 771 points, the BDI declined further to just over 500 in mid-February. Following a slight pick up, the index stayed mainly within a depressed 550–600 range for three months from early March to early June. The next two months saw a doubling, which peaked at 1,222 in early August, but then a downtrend started. The decline continued for the remainder of 2015, with a couple of short rallies, and by late December the BDI was at 475, near an all-time low point of 471 reached a week earlier. Overall, it was a very weak year for the bulk carrier freight market.

Freight market prospects

As the new year begins, are there any signs of a change in the bulk carrier market's trajectory resulting in higher freight rates? A pickup in trade volume growth would assist, especially if coupled with additional steps towards bringing fleet enlargement down further. But how likely are such events?

Despite last year's unexpected rapid reduction of global seaborne dry bulk trade growth, arguably a second consecutive year with a similar outcome is not inevitable. Much depends upon China's commodity imports, especially coal and iron ore. These are now seen as key uncertainties, with both the direction and magnitude of changes, possibly large, becoming more difficult to forecast. If these commodities continue to plummet (coal), or cease expanding (iron ore), it will be harder for global trade to evolve positively. An optimistic view might suggest that world dry bulk trade could see 1–2% expansion, or possibly more, in 2016.

Bulk carrier fleet growth seemingly is heading for a growth rate of at least 3% this year. Given the extent of the newbuilding deliveries schedule for 2016, exceeding last year's scheduled figure, actual deadweight deliveries may be larger unless delays and postponements increase. Nevertheless, it is now perhaps looking more likely that scrapping will remain high, possibly reaching or attaining the volume seen in the past twelve months, and preventing any substantial acceleration in fleet expansion.

Shipowners' collective decisions affecting bulk carrier fleet carrying capacity have a more certain impact than a focus on waiting for trade expansion, over which the shipping industry has only quite limited influence. During the year ahead, a combination of accelerated scrapping, newbuilding delivery postponements (or cancellation of orders/conversion to other vessel types, although this action applies mainly to orders for later delivery) and possibly laying-up ships, could greatly alter market dynamics.

Changes in other influences will affect the result. For example, even a small change such as half a knot in the average speed of the entire world fleet would have a sizeable impact on carrying capacity over a whole year. Trading distance and port congestion variations are other visible factors affecting capacity available. Neither is easy to predict. But the foregoing broad indications of trade and fleet evolution point to limited scope for an upwards trend in bulk carrier market rates to persist through the next twelve months.

Several analysts agree that the bulk carrier market outlook is challenging. A recent report by Clarksons Research said that "the pressure on the dry bulk market is likely to be sustained in 2016 given expectations of slim trade growth…the outlook for the near future remains difficult". Drewry Shipping Consultants recently offered the opinion that "the gloomy outlook for the dry bulk shipping market continues…the market is not expected to return to profitability before 2017." DCi

Quequén implementing southern Argentina's largest bulk terminal

Mario Goicoechea, president of Quequén port authority in Argentina, says that upgrading work will lead to the port being the largest and most modern port in southern Argentina.

Berth 0 is currently being expanded, including construction of four 12,000-tonne grain silos, and will open in January 2016. It will be fed by up to six truck hoppers, which are located underground, from where consignments will be transported to the silos by conveyors.

Eventually, the new berth will have capacity to handle 230,000 tonnes and be able to operate two vessels simultaneously. In the future, it's also hoped to increase storage to 500,000 tonnes of grain for export. *Barry Cross*

TGM to cost $100 million

Montevideo Bulk Terminal (TGM) is being built at a cost of $100 million. The facility, which will open in December, will incorporate 12, 10,000-tonne silos.

The project promoters say that TGM will complement existing facilities at the port of Nueva Palmira, which encounters severe bottlenecks during the peak of the harvest season. For its part, TGM will mainly channel grain from eastern Uruguay and from producers located along Route 5.

TGM will mostly be targeting soya, but will also handle export wheat, barley, malt and rice. *BC*

Closed border prompts Colombia to use inland ports to ship coal

The recent diplomatic spat between Colombia and Venezuela has seen some dry bulk consignments switching ports. The closure of the border, effectively trapped around 120,000 tonnes of coal in Northern Santander, resulted in consignment being diverted to the port of Compas in Barranquilla, from where they were exported.

The coal was sent by road from Sardinata to Puerto Capulco, where it was loaded on barges for transport along the Magdalena River, this being the first ever such shipment from Northern Santander to use the inland waterway network to send coal to Barranquilla.

The coal belonged to CI Interamerican Conminas SA, which has been exporting coal from Northern Santander through Venezuelan port's for the last 20 years, with traffic amounting to 600,000–800,000 tonnes per year. This is now being handled by Coal Corps Port Company, which is the concessionaire and operator of facilities at Puerto Capulco, in Gamarra.

This change in the use of ports should see around 1.5 million tonnes of thermal and coking coal from northern Santander shipped to Barranquilla this year, in addition to another 500,000 tonnes of other dry bulk. *BC*

Santarém to have fertilizer terminal

The Brazilian government is to issue a tender for the construction of a fertilizer terminal at the port of Santarém, in the state of Pará. This is scheduled for release in either October or November. The project is being supported by a consortium of local companies that are already present in ports across the North of Brazil.

It is hoped that the new terminal will help to optimize investment in the region whose ports exported around 15,000,000 tonnes of dry bulk in 2015, which was 3,000,000 tonnes more than the previous year.

Northern Brazilian ports do not levy demurrage charges, in contrast to ports in the South and South East of the country, where demand currently outstrips supply. As a result, Northern ports are expected to handle much of the country's increase in fertilizer production in the near future. *BC*

Odessa increases grain handling capacity

In Ukraine, the port of Odessa has revealed its development strategy in respect of grain transshipment. Up to 2038, it expects to increase volumes handled from 8.8mt (million tonnes) at present to 12.5–13mt.

In total, five terminal operators handling grain in the ports are involved in the implementation of this policy. *BC*

Sohar to become agribulk hub

A new $170 million agribulk terminal is taking shape in the port of Sohar, in Oman. The aim is to create a strategic food harbour, serving Oman and the wider Gulf Cooperation Community, as well as the Middle East in general.

Once completed, the facility will be able to handle 700,000 tonnes of grain and 1.5mt (million tonnes) of raw sugar imports annually. The latter commodity will benefit from the opening of the Sultanate's first sugar refinery, which has a capacity to produce 1mt per annum and therefore obviates the need to import 120,000 tonnes of refined sugar as currently happens. *BC*

Paradip coal berths to be mechanized

In India, the Cabinet Committee on Economic Affairs has given its approval for the mechanization of three dry bulk berths at East Quay, in the port of Paradip. The work will be undertaken as a public–private partnership. The berths will handle exported thermal coal.

Work will cost $222 million, of which the port developer will be responsible for $218 million, with Paradip Port Trust finding the balance to fund dredging.

Upgrading work, which will affect berths EQ1, 2 and 3, will boost capacity from 7.85mt (million tonnes) to 30mt. *BC*

New bulk river terminal in India

A plan has been put forward to build a bulk cargo terminal on the Ganga River at Sahibgunj, in Jharkhand, close to Coal India's Rajmahal coal terminal. This will be financed as part of the World Bank's $648 million programme to promote use of the National Waterway 1, which stretches 1,620km from Allahabad to Kolkata.

The new terminal will mainly handle coal and potentially be able to serve NTPC power plants at Farakka, Kahalgaon, Sagardighi and Kolaghat. At present, Sagardighi receives coal via a combination of both road and rail, so costs would be cut dramatically were inland waterways to be used. *BC*

Mormugao receives largest ever wood chip bulk carrier

Mormugao Port Trust has revealed that one of its terminals handled one of the world's largest dedicated wood chip carriers. The *Global Explorer,* which was inbound from Richards Bay in South Africa, conveyed 44,126 tonnes of chips on behalf of West Coast Paper Mills.

The geared vessel is 210 metres in length and among the 24 largest wood chip carriers now in service. Once in port, discharge rates of around 11,000 tons per day were achieved.

West Coast Paper Mills was among India's first companies to import wood chip, shipping its first consignment in through Mormugao in June 2013. The commodity is used at the company's plants in Dandeli, the extracted wood pulp then being made into paper.

The company is expected to import around 550,000 tonnes of wood pulp by the end of the financial year. *BC*

Gdansk improvements expand dry bulk handling capacity

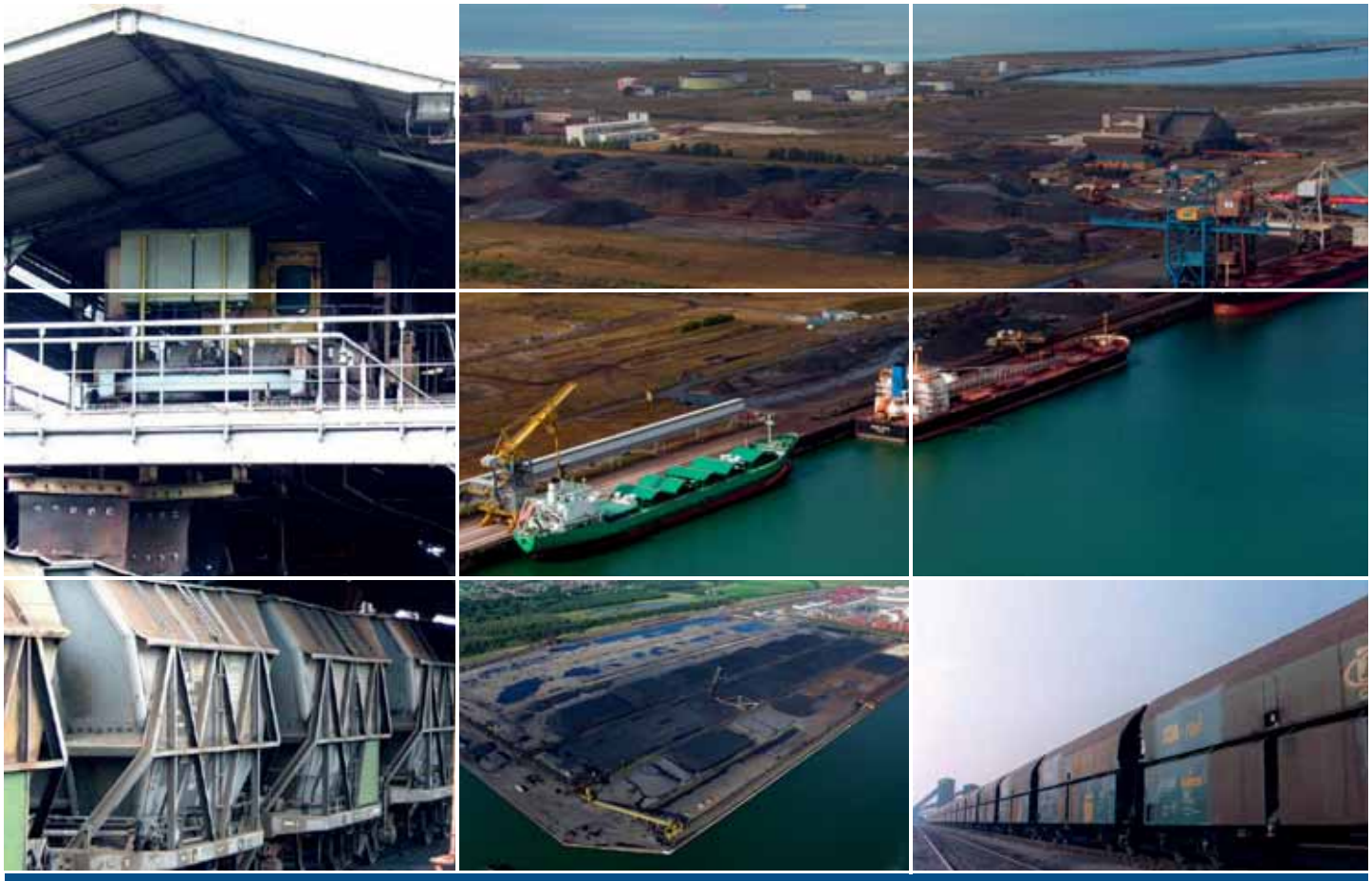
Gdansk Bulk Terminal has extended the berthing line at Bytomskie Quay 290 metres and deepened alongside draught to 7.9 metres, thereby allowing it to handle 15,000dwt vessels, in addition to those 25,000dwt vessels not conveying full loads.

As a result, the facility has been able to handle a 19,000dwt vessel, transporting a load of 13,500 tonnes of barley.

The terminal is equipped with a fully automated flat warehouse and a further 10 silos, giving it a capacity of 55,000 tonnes. It has the ability to offer grain drying in cleaning, too.

Last year, Gdansk handled 1.6 million tonnes of grain, which was the best result in its history. *BC*

SEA-invest



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Fednav vessel calls at Antwerp

(All photos: copyright Gemeentelijk Havenbedrijf Antwerpen)

Fednav celebrates arrival of 'Federal Bering' at Port of Antwerp

In mid-November last year, Fednav (Belgium) N.V., welcomed its next-generation vessel, the *Federal Bering* at the Port of Antwerp. A reception was held on board to celebrate its maiden voyage to the largest Belgian port.

Best known in Antwerp for its FALLine liner service from Europe to the Great Lakes, Fednav currently has a newbuilding programme that will see 19 new Handysize Lakers specially designed for the St. Lawrence Seaway and Great Lakes delivered between 2015 and 2018. With 52 Handysize Lakers, Fednav, which operates one of the most modern fleets of bulk carriers

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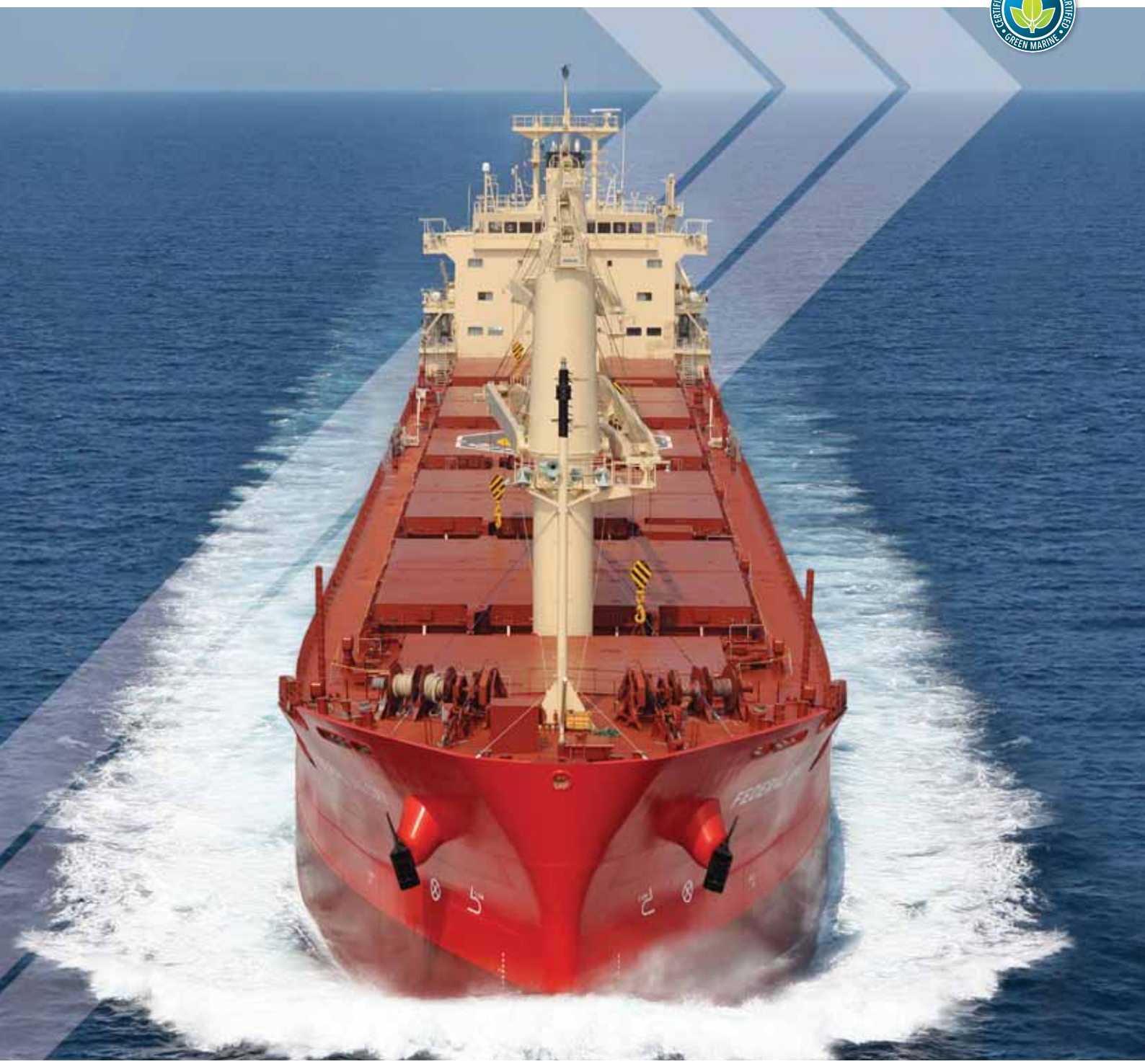

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www.fednav.com

in the world, will continue to offer customers a regular and reliable service from Europe to North America.

Built at the Oshima shipyard in Japan, the *Federal Bering* and its sister-ships have box-shaped holds in order to facilitate the handling of general cargo.

The company's activities are by no means restricted to the St Lawrence Seaway. With a combination of Handysize, Supramax and Ultramax vessels, Fednav also owns and operates two of the most powerful bulk-carrying icebreakers along with the largest ice-class bulker fleet in the world.

"By continuing to expand our fleet and operations, our fleet will be one of the most modern, efficient, and environmentally friendly trading between Europe and North America, especially in the Great Lakes and St. Lawrence Seaway System," said Etienne De Vel, Commercial Manager of European operations.

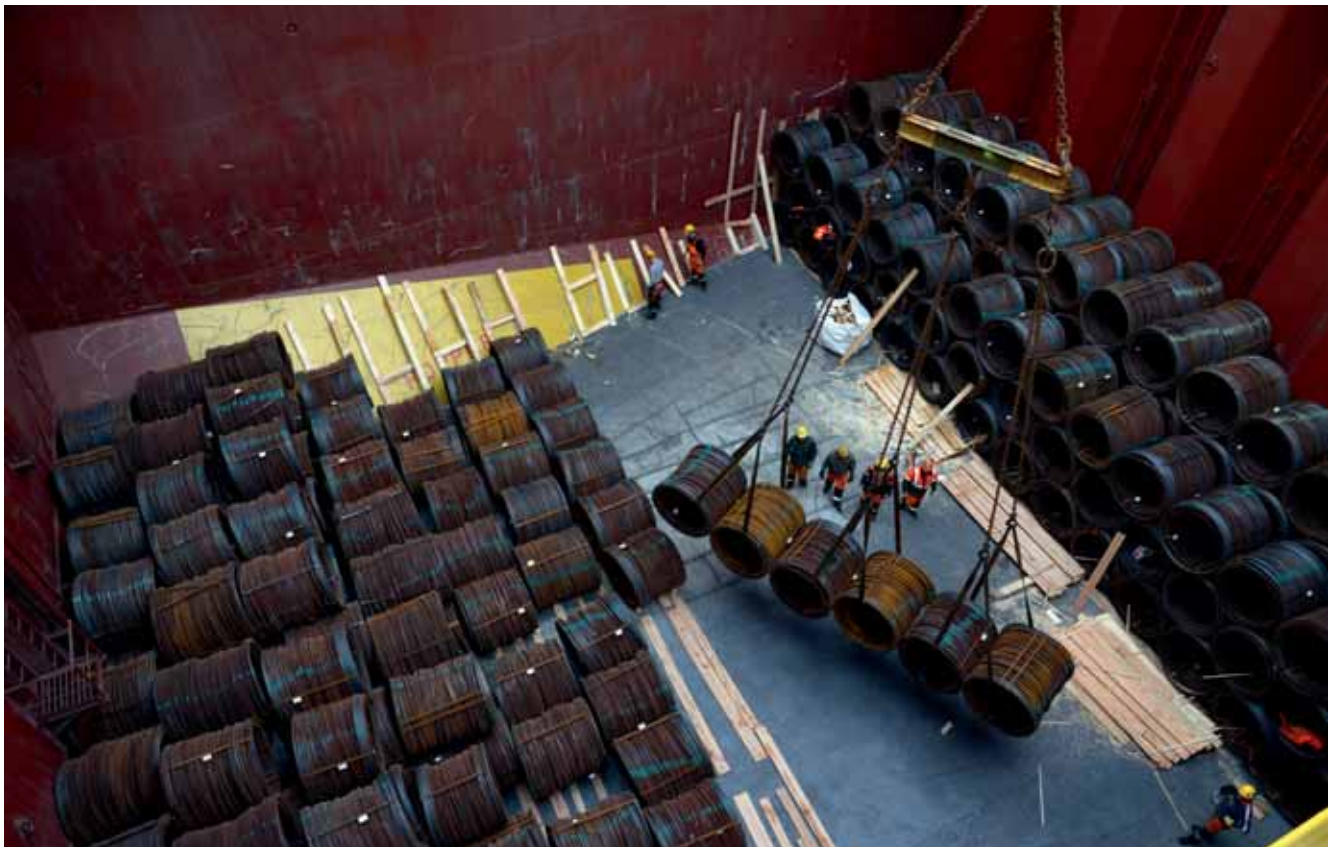
The outstanding environmental characteristics of these vessels include:

- 25% fewer greenhouse gas emissions than similar vessels built less than 15 years ago;
- a decrease of over 15% nitrogen oxide emissions;
- a B+ rating from shippingefficiency.org; and
- a CLEAN notation from the DNV/GL classification society.

On the vessel's maiden voyage, the *Federal Bering* departed the Port of Antwerp transporting mainly steel products and some project cargoes on its way to Chicago and Burns Harbor, Indiana.

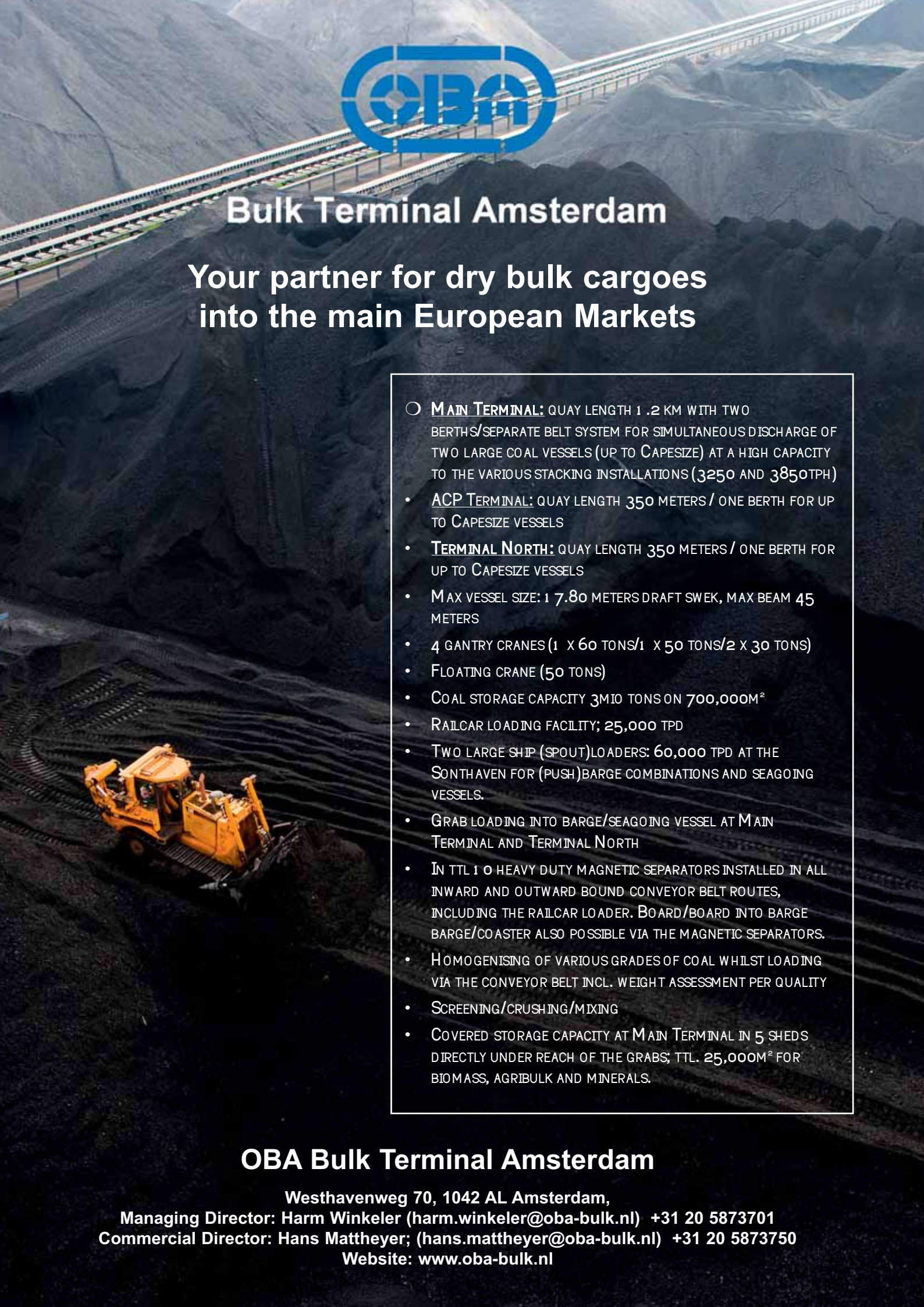
Fednav Limited

Fednav is an international ship-owning company headquartered in Montreal, Canada. Its principal activities include the transport of bulk and general cargo worldwide. The company has offices in Antwerp, Barbados, Hamburg, Rio de Janeiro, London, Singapore, and Tokyo and regional offices in Canada and the United States. Fednav also has terminal, logistics, ice analysis, and shipping agency services and divisions. It employs 280 people and nearly 2,000 crew members and stevedores. DCi



Bulk Terminal Amsterdam

Your partner for dry bulk cargoes into the main European Markets



- **Main Terminal:** quay length 1.2 km with two berths/separate belt system for simultaneous discharge of two large coal vessels (up to Capesize) at a high capacity to the various stacking installations (3250 and 3850tph)
- ACP Terminal: quay length 350 meters / one berth for up to Capesize vessels
- **Terminal North:** quay length 350 meters / one berth for up to Capesize vessels
- Max vessel size: 17.80 meters draft SWEK, max beam 45 meters
- 4 gantry cranes (1 x 60 tons/1 x 50 tons/2 x 30 tons)
- Floating crane (50 tons)
- Coal storage capacity 3mio tons on 700,000m²
- Railcar loading facility; 25,000 tpd
- Two large ship (spout)loaders: 60,000 tpd at the Sonthaven for (push)barge combinations and seagoing vessels.
- 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 biomass, agribulk and minerals.

OBA Bulk Terminal Amsterdam

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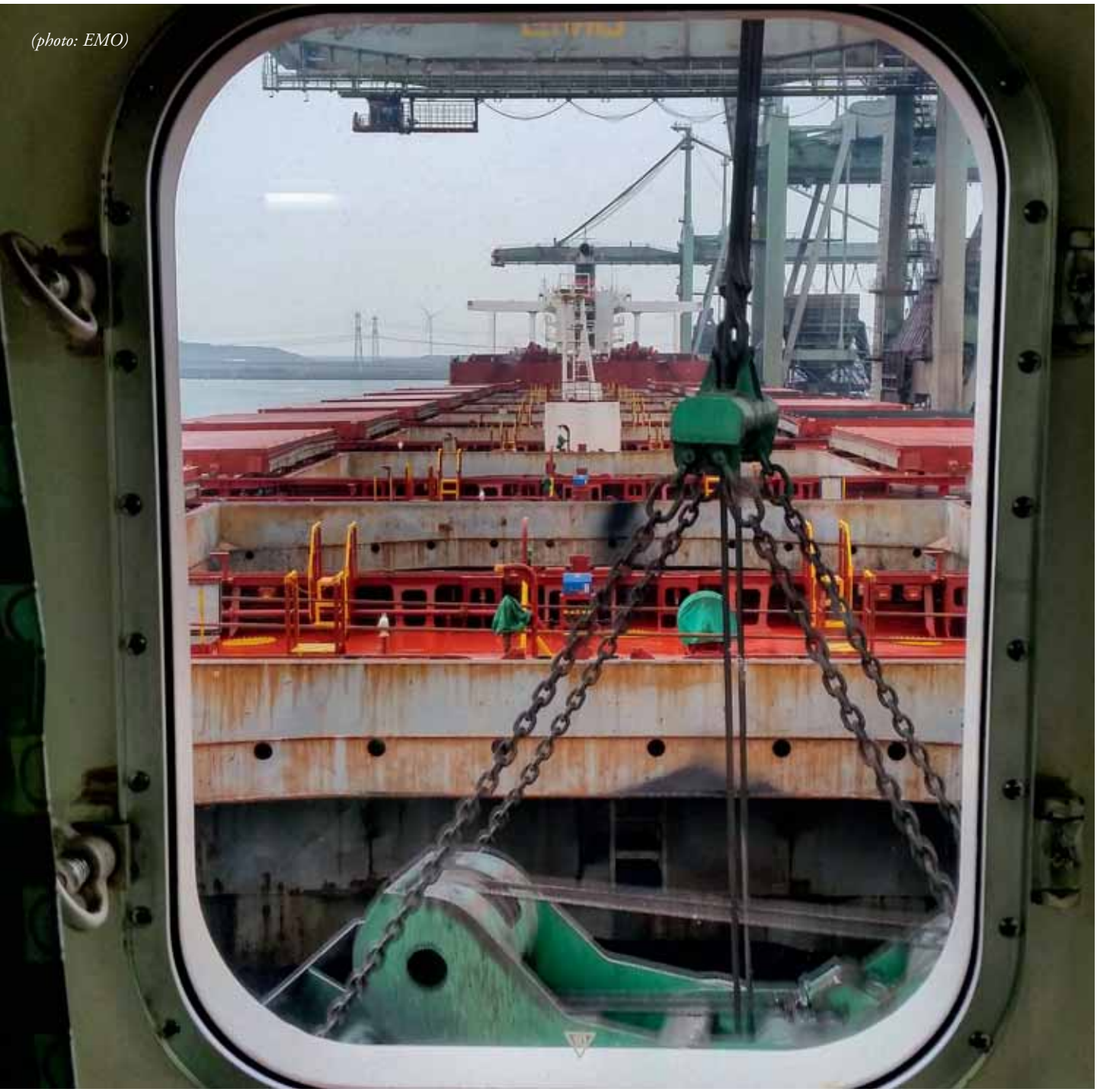
Managing Director: Harm Winkeler (harm.winkeler@oba-bulk.nl) +31 20 5873701
Commercial Director: Hans Mattheyer; (hans.mattheyer@oba-bulk.nl) +31 20 5873750
Website: www.oba-bulk.nl

Looking into bulk in the Netherlands



(photo: EMO)

Port of Rotterdam aims to bounce back from slightly disappointing 2015

The year 2015 was a bit disappointing for dry bulk throughput in the Port of Rotterdam (PoR) in the Netherlands. With an estimated 87.8mt (million tonnes), throughput declined by 1% compared with 2014.

With the exception of coal, all dry bulk commodities handled in the port were below 2014 results.

Rotterdam is the largest dry bulk port in Europe, and has a strong position especially in iron ore and coal.

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shorecranes up to 208 tons

(photo: EMO)

DRY BULK THROUGHPUT PORT OF ROTTERDAM 2015

	million metric tonnes		
Agribulk	10.8	11.3	–3.8%
Iron ore and scrap	33.9	34.1	–0.6%
Coal	31.0	30.4	1.0%
Other dry bulk	12.3	12.8	–2.3%
Total dry bulk	**87.7**	**88.6**	**–1.0%**

Source: Port of Rotterdam Authority

Iron ore

- oversupply of iron ore, ore price <$50. Beneficial to steel industry in north west Europe, which is completely dependent on imports;
- but only modest growth in EU steel consumption, and competition from Chinese steel exports (dumping);
- and still, overcapacity in EU steel industry (70% occupancy rate); and
- positive is the investment by ThyssenKruppSteel in retrofitting of the blast furnaces in Duisburg.

Coal

- despite the pressure on coal (COP 21 Paris, public opinion, financial institutions divesting coal assets etc.) coal imports in NL and Germany have increased;
- coal market is oversupplied, resulting in very low prices and making coal competitive with gas;
- two new coal-fired power plants (E.ON and Engie) started operations at the Maasvlakte in Rotterdam; and
- although hard coal is squeezed between sustainable energy and lignite in Germany, coal imports still increased, because domestic coal mining and sales declined.

Investments

Companies

- the EECV terminal (dedicated iron ore and coal terminal of ThyssenKrupp) has approval from its owner to invest in modernizing and upgrading of the ore terminal. A possible lengthening of the iron ore quay wall has not yet been decided. A longer quay would make it possible to accommodate Valemax vessels;
- at the EMO terminal work is continuing on automation of the terminal. EMO already has fully automated it's stacker-reclaimers and coal wagon loaders, as well as all the conveyor

(photo: EMO)

Rotterdam Bulk Terminal, your dry Bulk Cargo Specialist

Operating around-the-clock, RBT has a wide knowledge of dry bulk commodities and is continually expanding its specialization to understand and provide the right answer to all your challenges. Our future lies in serving our clients not only with effective transhipment and storage, but also by being a solution thinking partner.

R·B·T

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Agricultural & Fertilizers

Industrial minerals

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Biomass

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belts and the associated routes. Now EMO is working on the automation of the unloaders for sea-going vessels, and the first crane will be operational in early 2016;

- also at the EMO terminal, a biomass torrefaction plant is being built by River Based Energy. This demo plant will produce bio-coal. The project also involves the development of a prototype large scale biomass logistics hub using existing coal assets of EMO;
- EBS completed the new 'south jetty' at Europoort Terminal in December 2014. This is the second berth which will be suitable for Panamax and post Panamax vessels. The new berth has dolphins for a floating crane. These are situated at the north part of the existing jetty which was completed and operational at the beginning of 2014. During 2015 EBS also invested in a hopper with weighing functionality and a conveyor belt system on the new jetty;
- BSR Van Uden on the north bank, has invested in a second floating crane, which will be operational during next year (2016).

(photo: EMO)

Port Authority

- an ongoing project is the deepening of the waterway and port basins in the Botlek area of the port. This will improve the nautical accessibility of the terminals and industrial sites in this part of the port for large Panamax vessels.
- in the Caland Canal and the Botlek, the Port of Rotterdam Authority has worked hard on the expansion and replacement of buoy berths and dolphin configurations. And at the Maasvlakte 2 new dolphins (no. 90 and 91) were positioned. In the first half of 2015, transhipment (of dry and liquid bulk) at buoys and dolphins rose by 21% from 8.3mt (million tonnes) to 10.1mt compared to the same period of 2014. The increase was related mainly to the transhipment of fuel oil. The positioning of dolphin configurations and the replacement of buoy berths with dolphins is in line with the Port Authority policy to further modernize the existing port area and to use it as intensively as possible. Larger vessels can moor at the dolphins. The replacement of buoys with dolphins is also an improvement in terms of safety. The Port Authority is investing a total of around €32 million in this project.


(photo: EMO)

It's in our character

The port is our life. Hands-on mentality, hard work and accessible people, that's our character. Anyone who gets to know Zeeland Seaports becomes acquainted with professionals who are proud of their ports. We understand that your interests are also our interests. Clients come first. Always. We know what's important to your company. That's all in our character, and one of our many strengths:

- **location on open sea**
- **draft of 16.5 metres**
- **congestion-free connections with the hinterland**
- **no nine-to-five mentality**
- **accessible ports and people**
- **dedicated terminals for a broad range of cargo**
- **you can reach us 24/7 at +31 115 647400**






ports of vlissingen and terneuzen
www.zeelandseaports.com

driven by dedication

zeeland seaports

Zeeland Seaports: driven by dedication

Zeeland Seaports — the ports of Vlissingen (Flushing) and Terneuzen in the Netherlands — offers many advantages when it comes to handling various types of cargo: its location on the open sea; a draught of 16.5 metres; the congestion-free hinterland connections; and its specialized terminals. However, it is the people who really make Zeeland Seaports unique. Everyone who does business with the Zeeland Seaports becomes acquainted with professionals who take pride in their work and their ports. This pride is what fuels motivation — and this is important to the customers, and it is that extra step that makes all the difference.

Zeeland Seaports offers excellent access from the Northsea. Also it has congestion-free links to the hinterland by rail, road, inland waterway, shortsea shipping and pipeline.

The port company of Zeeland Seaports is responsible for the economic development, management, running and promotion of this port area. About 80 people work at Zeeland Seaports on:

- attracting new businesses and allocating land;
- the construction, management and maintenance of all infrastructure; and
- ensuring safety in general, and safe shipping traffic in particular.

Zeeland Seaports is responsible for the sustainable development of logistics and industry in the Zeeland seaports in a dedicated and respectful manner. The company's core values are reliability, focus on results, co-operation, respect and dedication.

Zeeland Seaports handles a wide variety of cargoes, including: dry bulk, breakbulk, ro/ro cargoes, liquid bulk, and containerized cargoes. It is also very active in the offshore and food sectors.

Dry bulk

Zeeland Seaports offers an excellent service in the handling of dry bulk commodities. This includes spacious: docks with direct access to the open sea; stevedores and storage companies specializing in specific cargo flows such as coal, raw minerals and fertilizers; and rapid transport connections with the hinterland by rail, motorway and inland shipping.

> "From coal to the smallest grains: when it comes to dry bulk, Zeeland Seaports can handle all commodities without a problem"

New boosts

Work is also constantly under way, with the aim of optimizing accessibility and infrastructure. The opening of the Kaloothaven means that dry bulk carriers with a draught of up to 16.5 metres can access Vlissingen. A new loading station is a real boost for the rail connection to the German hinterland. The arrival of the Sluiskil Tunnel will speed up road traffic heading south.

Possibilities for growth

The storage of dry bulk generally requires a lot of space. Zeeland Seaports has this space. It also has the capability to guide the growth or establishment of production and

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stevedoring companies along short lines. All of this makes dry bulk and Zeeland Seaports a trusted combination with a future.

Terminals dedicated to dry bulk

- Ovet B.V.;
- Verbrugge Terminals B.V.; and
- Sagro.

Breakbulk

Breakbulk plays a key role in commercial activity within the Zeeland ports. Zeeland Seaports offers the flexibility to process a wide range of breakbulk cargo quickly, efficiently and at optimum costs. This is due not only to unhindered access from the sea and a trimodal connection to the hinterland, but definitely also due to the presence of specialist logistics service providers. Zeeland Seaports offers the flexibility to process a wide range of breakbulk cargo quickly, efficiently and at optimum costs. This is not only thanks to unhindered access from the sea and a trimodal connection to the hinterland, but definitely also due to the presence of specialist logistics service providers.

Strong clusters

Within Europe, Zeeland Seaports has earned a leading role as a storage and handling location for wood pulp and aluminium, for example. Partly as a result of this, the clusters forest products and metals are very well represented in the Zeeland ports. These clusters are only growing stronger because companies in the port dare to invest in expanding and modernizing their capacity.

Room for growth

Zeeland Seaports sees opportunities for growth when it comes to breakbulk. The leading role it already occupies in a number of market sectors serves as an example of how the Zeeland port can grow further in the storage and handling of other types of cargo, such as metals.

The developments in world trade and the changing logistical concepts demand more space in seaports. This also applies to a seaport that has efficient access by inland shipping, coastal shipping, rail and road transport. Zeeland Seaports can offer this space and these distribution possibilities. Furthermore, the shipping companies benefit from Zeeland's central location and the shorter sailing times.

Terminals dedicated to breakbulk:

- Mammoet Multipurpose Terminal Terneuzen;
- Pacorini Metals Vlissingen;
- Supermaritime Nederland;
- Verbrugge Terminals; and
- BOW Terminal.

Containers

Goods are increasingly being transported by container throughout the world. This growth is also expected to continue into the future. Naturally, Zeeland Seaports is responding to this trend. There are already container-handling facilities in the port. Thanks partly to the good connections by inland shipping, rail, short sea shipping and road, containers quickly find their way to the hinterland.

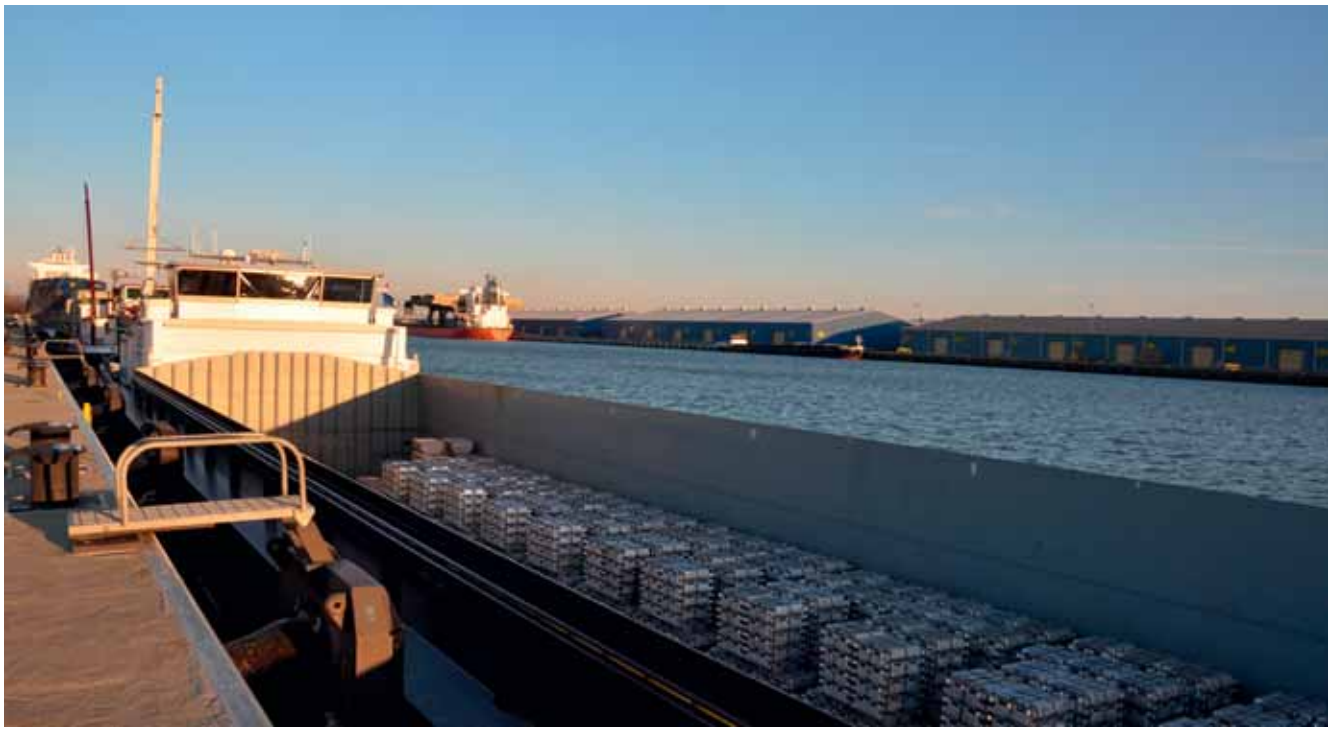
In the coming years, the facilities for handling containers in the Zeeland ports will expand considerably. Zeeland Seaports has plans for the arrival of modern, specialized container terminals, among other things. That offers plenty of opportunities for shipping companies, carriers, receivers and many other parties in the logistical chain to share in this growth.

Central location

Vlissingen is close to international sailing routes for container transport. The port lends itself very well to the import and export of containers without any form of congestion. It is logical, therefore, that Zeeland Seaports aims to grow into an important player in Northwest Europe when it comes to containers.

Liquid bulk

Liquid bulk continues to play an important role in the ports of Zeeland. That is apparent from, among other things, the investments various companies have made in the liquid bulk sector in recent times. Despite the adverse economic climate, they chose precisely this period to build on the future.



Ro/ro (roll-on/roll-off)

Ro/ro transshipment without encountering any form of congestion en route? That sounds almost impossible, but it can be done at Zeeland Seaports, thanks to the favourable location at the mouth of the Western Scheldt, the rapid handling of vessels and the congestion-free hinterland connections. These factors combine to make Zeeland Seaports a logical choice as a vital link in the ro/ro supply chain.

Offshore

Within the offshore market, Zeeland Seaports has been a reliable and sizeable player for many years, thanks to its strategic location *vis-à-vis* many offshore oil and gas rigs and wind farms in the North Sea, and also thanks to the excellent nautical access for installation vessels: no locks and hardly any waiting times. And all of this is combined with excellent access via inland shipping.

Food

Onions, potatoes, fruit, fruit juices, dairy produce, meat and fish: examples of food products which are shipped in and out of the Zeeland port all the time. Bananas also travel via Zeeland nowadays. As up-and-coming player in the food market, Zeeland Seaports is profiling itself more strongly all the time.

Industry

More than 250 logistics and industrial businesses together form the Zeeland ports. What spearheads Zeeland Seaports is the idea that companies can benefit from each other's strengths as much as possible. One way in which this occurs is through the formation of clusters. Valuepark Terneuzen, a successful cluster of companies in the chemical industry, has already been a good example of this for ten years.

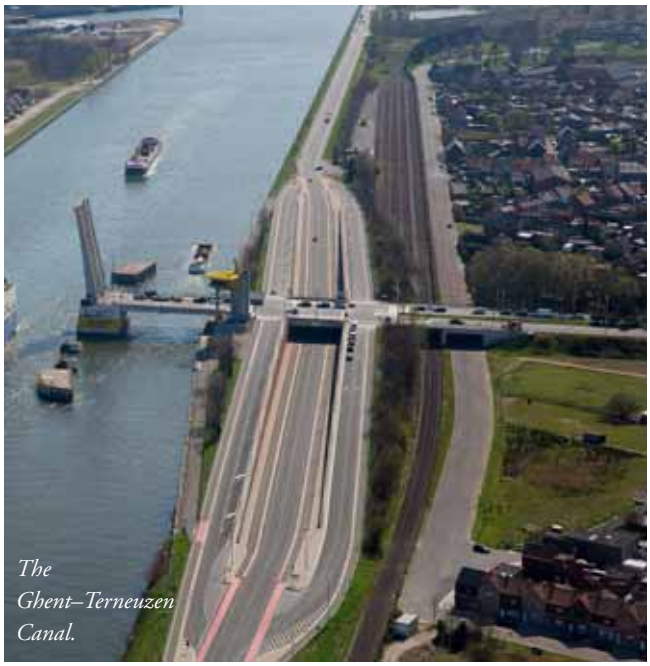
Port of Ghent and Zeeland Seaports win international award for joint cross-border port information system

Port of Ghent and Zeeland Seaports have won the award for 'Best IT solution' issued by the *International Bulk Journal* for their cross-border port information system ENIGMA+. Both ports are accessible through the same gateway to the Ghent–Terneuzen Canal. Since the beginning of 2015, vessels as well as companies only have to use one single cross-border port information system for all arrivals at and departures from the ports of Ghent and Terneuzen.

Until 2015 the Flemish port of Ghent and the Dutch Zeeland Seaports each had their own port information system. For vessels that had to sail on the Ghent–Terneuzen Canal, all vessel and maritime information had to be entered into two port information systems. In order to have this done in a more efficient way, the ports decided to jointly offer one single port information system. Ghent's ENIGMA (Electronic Network for Information in the Ghent Maritime Area) system was extended in order to meet the needs of Zeeland Seaports. For example, it can also be linked to the Port Base port information system that is used by different Dutch ports.

ENIGMA+ for maritime information and service rendering

The extended port information system ENIGMA+ (Electronic Network for Information in the Ghent–Zeeland Maritime Area) comprises among other things the follow-up of arrivals and departures, vessel berths in both ports and a view of the vessels that are on their way. ENIGMA+ is also linked with information systems of other maritime service providers. Moreover, it is also a communication platform for the various port users for ordering services like dockworkers for the loading and unloading of ships, boatmen for fastening ships and for tugs. Users can safely and smoothly log on to the system from around the world.



The Ghent–Terneuzen Canal.

Unique cooperation: cross-border shipping assistance

One single and joint port information system for two ports situated along the border between Flanders and the Netherlands forms part of the unique cooperation between the ports of Ghent and Zeeland Seaports. In this way, the ports are already preparing themselves for the taking into use in 2021 of the larger new lock in the lock complex of the Dutch port of Terneuzen.

Ghent-Terneuzen Canal: one border-crossing economic area

The Flemish port of Ghent and the Dutch Zeeland Seaports are situated at the Ghent–Terneuzen Canal. This border-crossing economic zone is good for 60 million tonnes of cargo traffic by seagoing vessels, with which the ports together would from the seventh biggest port in Western Europe. The 32km-long canal (17km in the Netherlands and 15km in Flanders) represents 100,000 jobs, 425 companies and 80,000 inhabitants. The canal is not only important as gateway to both seaports but it also forms a major link in the European network of inland navigation between the Netherlands, Germany, Belgium and France.

IBJ Awards

The award was presented in mid-November last year at the gala of the *International Bulk Journal* in Antwerp. The IBJ Awards are a recognition of the realizations of companies from the bulk sector to improve efficiency, safety and environmental protection. Also on the list of the selected candidates for the 'Best IT solution Award' were ports from Great Britain, Germany and the United States.

The Port of Ghent and Zeeland Seaports had already won IBJ Awards before. This is the first time that they jointly carried off an IBJ Award.

Port of Amsterdam reports on recent bulk trends

Port of Amsterdam (photo: Ed Seeder).

Port of Amsterdam is a top player as regards to dry bulk goods, such as coal, agribulk and cocoa. During the past few years, Amsterdam has grown to become one of the world's leading ports for coal. Amsterdam is the second-largest coal transshipment port in Europe. Dry bulk throughput accounts for 35% of the port's total annual throughput.

The seaports in the North Sea Canal Area, which includes the ports of Amsterdam, IJmuiden, Beverwijk and Zaanstad, saw transshipment decrease in 2015 for the first time in years. The decrease amounted to 1%, with a total of 97mt (million tonnes) in 2015 compared to 97.8mt in 2014. Port of Amsterdam is the largest port in the region and saw its transshipment edged down by 1.8% to 78.4mt (2014: 79.8mt). The above transshipment figures are tentative, with definitive figures expected in the next few weeks. Transshipment in IJmuiden rose to 17.9mt (+2%). Zaanstad and Beverwijk saw transshipment increase to 340,000 tonnes (+47%) and 343,000 tonnes (+44%) respectively.

Decrease in dry bulk cargo

The decrease in Amsterdam has been caused primarily by lower transhipment in dry bulk cargo. The transshipment of coal fell by 11% to 17.3mt. The transshipment of agribulk also decreased by 6% to 7.4mt. In contrast, other dry bulk cargo, including ores and fertilizers, rose by 9% to 8mt.

Other cargo flows remained either approximately the same or increased slightly in 2015. The transshipment of oil products totalled 39.4mt in 2015, compared to 38.9mt in 2014 (+1%). Other liquid bulk cargo rose by 11% to 3.4mt. The transshipment of containers decreased slightly from 633,000 tonnes in 2014 to 615,000 tonnes (=51,634 TEU) in 2015. Ro/Ro, automobiles and other mixed cargo fell by 8% to 2.3mt in 2015.

Leased out land

Approximately 18.5 hectares of land was leased out to companies in 2015. This trend is expected to continue.

Imports and exports

Imports in Port of Amsterdam decreased by 4% to 50.8mt in 2015. Exports conversely grew by 3% to 27.6mt.

Cruise calls

A total of 134 sea cruise ships and more than 1,768 river cruise ships called in Amsterdam in 2015. This equals a respective increase of 8 and 83 compared to 2014. A total of 44 sea cruise ships called in Ijmuiden. This brings the total at 178 sea cruise ships in the North Sea Canal Area.

Port of Amsterdam CEO Dertje Meijer: "We had a record level of transshipment in the first six months of 2015. Transshipment in the second six months of 2015 did, however, lag behind expectations. This relates to the extremely mild winter weather, which meant less coal was needed for power plants. This is not a trend. While we expect to return to growth in 2016, as an international port we are dependent upon volatile energy markets and geopolitical developments. PRODOCK will open in 2016 and we will also further shape our ambitions for a circular and bio-based economy."

Gans Cargo Operations has been established in 1907 and is a typical Shipping & Forwarding company located in the Rotterdam port area. We are specialized in dry bulk logistics (a.o. Petroleum coke, Coal, Agri, Fertilizer and Biomass).

With a highly skilled and motivated team we can offer tailor made solutions for transporting the customer's product on a door to door basis. We are securing timely delivery of the cargoes against competitive rates, terms and conditions including the ability to offer owned and / or long term leased covered and non-covered storage capacity in the Rotterdam port area, alongside the river Rhine, the German canals and France (Supply Chain Concept).

Our head office is located in Rhoon (Rotterdam Port area), we have subsidiaries in Ghent, Belgium (more than 25 years) and Alexandria, Egypt (since March 1st, 2015 in JV with a local, strong partner).

Gans is member of the Hudig & Veder Group, a traditional, family owned company existing since 1795 through which all other transport modalities can be offered as well (containers, RO/RO, Reefer, Expo, bulk minerals), including a fleet of 10 coastal vessels (box-shaped) between 2000 and 8000 ton and the same number of break-bulk / project coastal vessels.

Gans can cover the whole Supply Chain (Logistics) globally on a 24/7 - 365 days a year basis.

If you have any questions and / or inquiries, please contact:

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ZHD Stevedores: set firm on a course of self-improvement

In order to further strengthen its position in the Rotterdam Rijnmond area and keep on serving its customers in a modern and professional way, there has been an extensive investment programme at ZHD Stevedores in the last decade. The Rotterdam based (family owned) private company with almost 50 years of stevedoring experience, is still investing in new equipment, new terminal-areas and further professionalizing its company and services.

Every day the customer should experience new developments, improved efficiency and customer-based solutions. This approach has been company policy since the beginning. ZHD Stevedores handles a wide range of commodities, varying from coal (up to Capesize), grains and minerals to niche markets like scrap, biomass and waste (recycling) products. The long-term vision and continuity of the company — the fourth generation in the family will succeed the third in 2016 — gives it a healthy base for further expansion and developments. The ability to supply and invest in flexible solutions for its customers on the various terminals of ZHD and/or on the buoys/dolphins in the port of Rotterdam, has been the key to the growth of ZHD in the last decade.

Although some of the major commodities of ZHD have shown a major decrease due to market circumstances, like biomass (Dutch subsidy schemes) and steel scrap (decreased exports), ZHD still has been able to reach a level of around 7mt (million tonnes) on transshipment at the various locations. This means that ZHD has continued and maintained its transshipment level of 2014. Furthermore, ZHD is currently finalizing the development of its new terminal in The Port of Moerdijk (Roode Vaart). Here, there will be about 75,000m³ of high-standard storage capacity, suitable for all kind of products (agricultural, GMP+, minerals, biomass, etc.).

Milestones, as from 2012 were:

- a new 50-tonne self-propelled floating crane, which became operational in July 2012;
- GMP+ certification — December 2012.
- new-building of covered warehouses, with a capacity of 50,000m³ in total — operational from August 2013;
- acquisition of a new terminal in the Port of Moerdijk (Roode Vaart) — July 2014;
- acquisition of two additional self propelled floating cranes (formerly owned by Port of Antwerp) — May 2015;
- investment in own environmental (dust prevention) team and equipment — August 2015; and
- the development of additional bulk warehousing capacity in Moerdijk — projected for completion mid 2016.

Apart from handling dry bulk products like minerals, coal, petcokes and seasonal products like salt and fertilizers, ZHD Stevedores has been focusing on handling and storage in niche markets such as steel-scrap, biomass (wood pellets) and waste materials. As environmentally friendly operations are an important priority of ZHD, the company has invested in its own dust prevention systems, operated by specialized personnel. This enables ZHD to guarantee customers storage and transshipment in a sustainable way.

From the 1st of January 2013 ZHD has been GMP+ certified, which — in combination with the projected warehouses in Moerdijk — will enable it to play a (modest) role in this market. The growing demand for bulk warehousing for further distribution (a.o. by truck) to the feed industry at a more inland locations, will enable ZHD to develop the Roode Vaart terminal into an interesting alternative for this industry outside the Rotterdam Port periphery.

Special services are offered in the fields of breakbulk and the handling of bulk in/from containers (a.o. minerals, scrap, agribulk) — a global trend which will grow in the future — is not unfamiliar to ZHD Stevedores and completes the handling portfolio of the stevedore. With its steel terminal in Moerdijk, ZHD performs handling of coils as well as other steel products, such as wire-rods, steel bundles, etc.

Rotterdam-based ZHD Stevedoring is a family owned, private company with almost 50 years of stevedoring experience. ZHD is active in the total so-called Rotterdam-Rijnmond area, with terminals in Dordrecht and Moerdijk, but also with its (self-propelled) floating cranes in Rotterdam. The company offers services in bulk, neo bulk, steel products, coils and container handling, including warehousing and storage (open, covered and floating). ZHD has both road mobile and floating equipment and is able to handle all kinds of product. All ZHD terminals are able to work round the clock (24/7) and are ISO and ISPS certified. Furthermore, ZHD also has water-related sites available for further (industrial) development.

European Bulk Services Rotterdam

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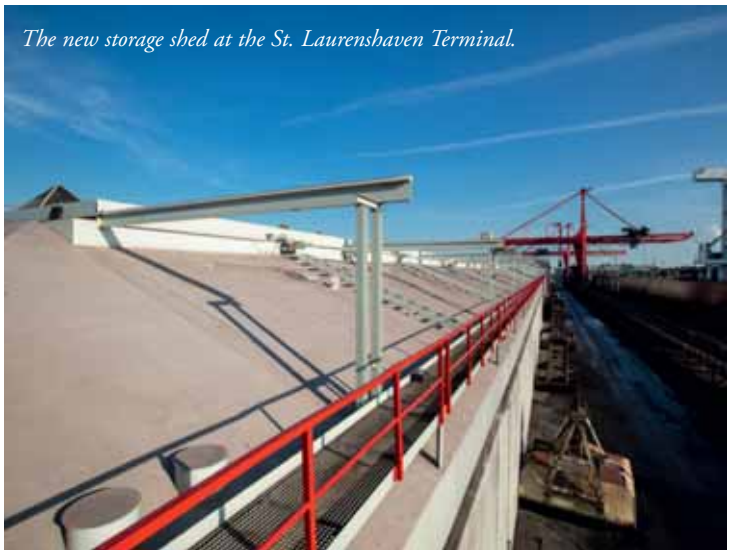
EBS continues to improve and expand its facilities to serve bulk customers

European Bulk Services (EBS) B.V. is an internationally respected stevedoring company with a focus on the storage and transshipment of dry bulk goods. EBS operates from two strategically located terminals in the Port of Rotterdam and has its own fleet of crane vessels. Approximately 180 full-time employees work for EBS, generating approximately € 45 million in revenues per year.

The St. Laurenshaven Terminal.

Terminals

European Bulk Services (EBS) B.V. conducts its business operations from two strategically located areas in the Rotterdam port area, namely the EBS Europoort terminal (at the Capesize dolphins), and the EBS St. Laurenshaven terminal, a Panamax terminal. The terminals have excellent connections to deep seaways, hinterland by inland waters, railways and trucks by highways. The terminals can be reached without having to pass a single lock. All types of ships can be handled at these terminals, from Capesize to coastal and river barge. The Europoort terminal is one-and-a-half-hours' sailing time to/from the pilot station and the Laurenshaven terminal is three hours' sailing time to/from the pilot station.



The new storage shed at the St. Laurenshaven Terminal.

Laurenshaven Terminal

This site, a Panamax terminal, mainly handles minerals, coal, biomass and agribulk products.

EBS offers various open and covered storage facilities. The new storage shed, with a net volume of 30,000m³, consists of three compartments of 10,000m³ each. This storage facility is suitable for dry bulk products of all kinds. The roof has movable steel hatches which can be opened and closed remotely by the crane operator. Due to an advanced security system, the grab cannot cause any damage to the walls of the shed. The two existing sheds of each 32,000m³ have been fully refurbished.

Magnetic separators of iron parts of coal

In order to meet the special requirements of the coal import market, EBS has invested in several (electro) magnet systems for cleaning contaminated coal with iron parts. The Laurenshaven terminal, with a depth of 13.85m, is perfectly equipped to handle and store, amongst others, coal from Russian load ports. These load ports have a similar maximum draught to the St. Laurenshaven. Receivers of Russian coals can be extra sure of the quality of their coal if their product is cleaned for metals via the EBS de-ironing installation. The electro magnets are installed in such a way that the coal can be cleaned either via storage or via board to board discharge operations.

Europoort Terminal

European Bulk Services has built a 65,000m³ storage shed at its Europoort Agri Terminal. The existing deep-water jetty is extended by the Port of Rotterdam. On this new jetty, which will accommodate vessels with a draught of up to 16 metres, EBS will install a new hopper and a new conveyor system linked to the existing conveyors. The existing train/truck loading station is completely modified and extended. Completion of the conveyors on the jetty is expected in January 2016.

The Europoort Terminal





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German bulk in focus

Jay Venter

A clean sweep? Vacuum cleaning solutions for cement plants

Keeping a cement plant clean is a major challenge.

Basically, a cement plant is divided into the areas of raw material processing (raw mill), storage hall, kiln, clinker storage, cement mill and cement storage (silos) and the packing plant.

One supplier of cleaning equipment for such facilities is Wieland Lufttechnik. Since 1959 Wieland Lufttechnik has been one of the leading manufacturers of industrial vacuum units, truck mounted vacuum loaders and stationary vacuum cleaning, vacuum conveying and dust extraction units. Its vacuum units are used in many different sectors of industry. For a large number of special applications, Wieland has developed tailored solutions, including for the cement industry.

Cement plant cleaning equipment from Wieland Lufttechnik

To clean most areas in the cement plant as much as possible, many Wieland customers decide from the outset to buy a 'BlowVac' vacuum truck model. This can easily be connected to a suction pipeline which is installed inside a production building and after completion of the cleaning job it can drive to another place which should be cleaned afterwards.

Stationary (KS) vacuum systems are installed mainly in the cement mill and in the silos or everywhere when the vacuum system should be connected to a long suction pipework. If there is not so much spillage in the packing plant, a portable vacuum unit like the MaxVac Compact 110 could be sufficient. Sometimes this is also connected to a small suction pipeline of, for example, 20 metres length along the conveyor belts.

Due to the larger quantity of spilled material in a cement plant, a mobile suction system with a collection of more than 5m^3 should be recommended. This is not only because of the larger collection capacity, but also due to the larger hose diameter and longer suction distances. The power of the airflow may actually not fall below 3,200m^3/h.

The smaller BlowVac model 3200 and 3700 is often supplied on an in-plant trailer. Of course road trailers are also possible. Most flexible are the BlowVacs if they are mounted on a truck.

Big companies like HOLCIM/LaFarge Cement mostly use the large BlowVac SL 8200 TG. This also makes sense because it has all the important advantages, such as large collection capacity, large airflow of 8,200m³ and vacuum performance of 800mbar. Additionally these vacuum system can be equipped with a blowing device, which is required when transferring the cement dust to and from cement silos.

In some cement plants, the rotary kiln is heated with coal or fluff made from waste material. The coal is crushed in a mill to coal dust. Therefore the vacuum cleaner must be explosion-proof. Piping is always required because the coal mill has several floors. It is possible to use the smallest unit, the MaxVac 110 Atex 3 D in this situation. Larger systems are equipped with vacuum pump KS and a filter separator with pressure relief valve (EVN). Fluff material consists of plastic waste and other debris which is highly inflammable. Most of the fluff is classified as explosive, which in turn makes explosion protection required.

For a cement plant, a vacuum suction system for cleaning purposes is always a wise investment. Often, the collected material can be re-used again as raw material in the process.

Wieland Lufttechnik GmbH

Wieland is continuing to expand its market reach. Currently, Africa is a growing user of its products. For example, in the last two years, it has received orders from Dangote Cement in Nigeria for nine vacuum trucks and seven large stationary vacuum systems for its packing stations. Further, after years of absence, Wieland has found new representation in the BME group in Johannesburg, South Africa, which will cover most of the sub-Saharan area. West Africa is covered by Proxima in Nigeria.

Wieland closely co-operates with its customers in order to optimize its vacuum solutions for each application. The company has two modern production sites in Erlangen and Sulzbach-Rosenberg, Germany. Currently, it has approximately 140 employees in Germany. It has an owned sales organization in France, and a licence partner covering Australia. Long-standing agents and partners in most countries ensure a world wide presence.

As well as its products for the cement industry, Wieland Lufttechnik supplies equipment for the following sectors:

- **Shipyards:** maintenance work for ships.
- **Power plants, waste incineration plants:** maintenance of an electro filter; and vacuum cleaning in a power plant.

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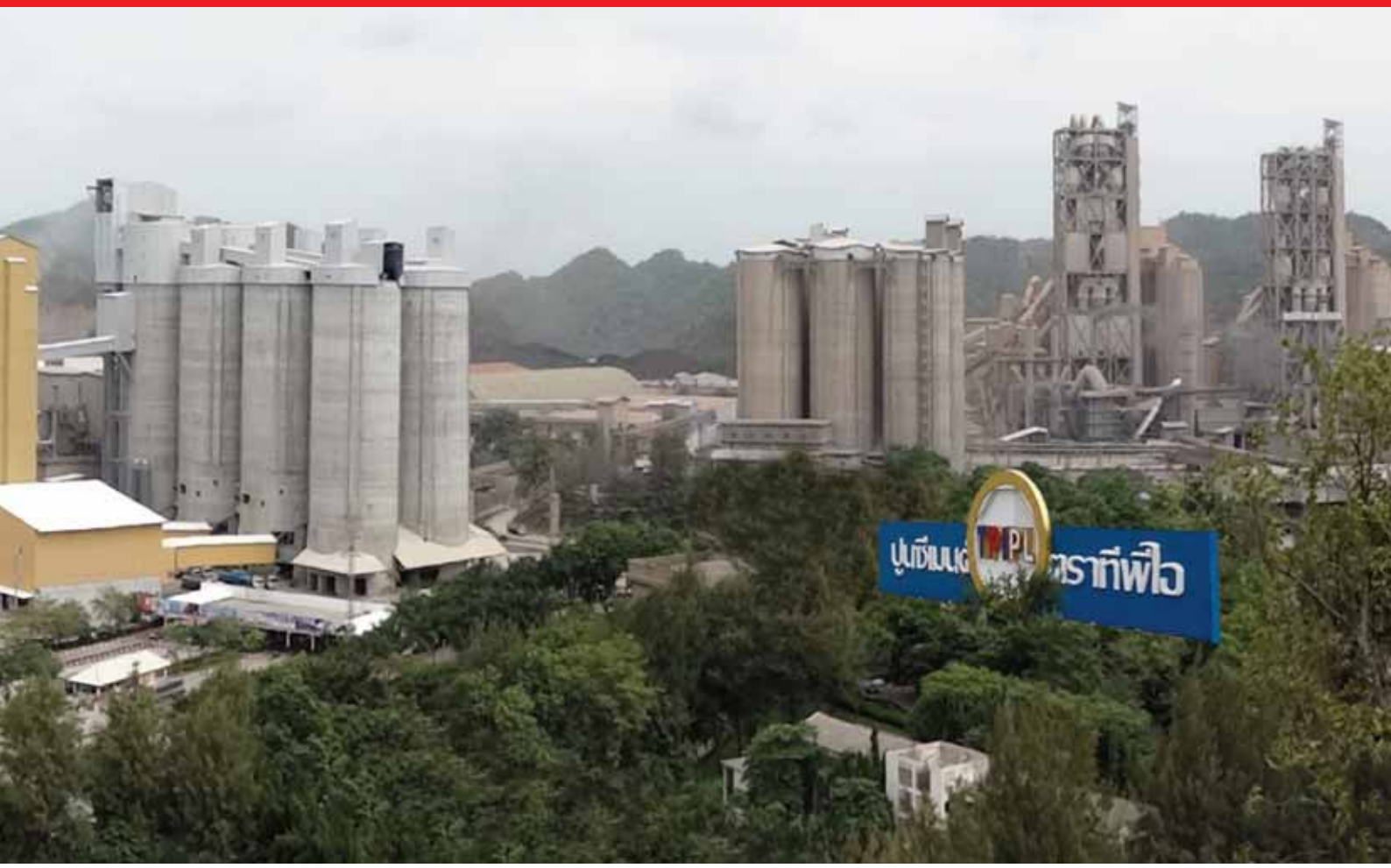

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- **Corn silos and corn mills:** floor and plant cleaning in a corn mill; and vacuum cleaning in a corn silo.
- **Construction industry:** vacuum extraction of gravel from roofs; vacuum extraction of ballast; and vacuum digging around a hot water pipeline.
- **Steel plants and metal smelters:** vacuum cleaning in steel plants; and extraction of large amounts of suction material in steel plants.
- **Metal working industry:** cleaning of machine-tools; vacuum extraction of chips and coolant from a metal working machine; and vacuum cleaning of a machining centre.
- **Cleaning of machines for gear components:** cleaning of pallets after the machining cycle.
- **Building material industry:** cleaning of processing equipment in a cement plant; and vacuum extraction of large amounts of chalk dust.
- **Raw materials:** extraction of ceramic (raw material); vacuum extraction in underground mines; and cleaning of conveying equipment in a gravel plant.
- **Foundries:** vacuum extraction of foundry sand from forms for ship propellers; factory cleaning in foundries; and vacuum extraction of foundry sand.
- **Paper industry:** cleaning of machines for paper bags; and cleaning of machines making decoration paper.
- **Chemical industry and minerals:** industrial cleaning; and cleaning of processing equipment in a salt plant.
- **Printing industry:** cleaning of offset printing machines.
- **Car industry:** vacuum cleaning of a machining centre for brake callipers.
- **Glass production and glass processing industry:** vacuum extraction of large amounts of quartz sand and broken glass; and vacuum cleaning in a glass plant.
- **Craft:** extraction of quartz dust created by stone-mason work.
- **Wood working industry:** vacuum cleaning of a painting plant; and vacuum extraction of wood dust and chips.
- **Cleaning contractors:** industrial vacuum cleaners and mobile vacuum units.
- **Plastics industry:** extraction of plastic chips from a broaching machine; dust extraction from a conveyor belt; and vacuum cleaning of an extruder.
- **Food industry:** vacuum cleaning in a corn mill; extraction of dried herbs; and vacuum cleaning in an industrial bakery.
- **China ware and ceramic industry:** vacuum extraction of ceramic raw material; and vacuum extraction of large amounts of kaolin.
- **Sand blasting:** vacuum cleaning of a blasting cabin'
- **Textile industry:** manual cleaning of machines and plant.
- **Public transport:** vacuum cleaning of buses; and stationary vacuum system for the cleaning of regional trains.

Electric material handler with guaranteed mobility

A SENNEBOGEN 821 M WITH AN INTEGRATED POWERPACK

The advantages of an electric material handler, combined with the flexibility of a mobile machine, is what the new SENNEBOGEN 821 offers with its integrated Powerpack.

At first glance, the new SENNEBOGEN 821 M "E" appears to be an ordinary material handler. However, as soon as the operator turns the key, you hear the difference. Or, rather, you don't — the quiet 90kW electric motor starts up and goes to work. It's only then you notice the cable plugged into the undercarriage.

Since the new SENNEBOGEN 821 now working at the MEAB waste recycling centre is primarily used indoors, the site's decision-makers had quickly opted for electric drive. In addition to low operating and service costs, the electric machine eliminates any need for exhaust treatment and particulate filters in the work zone. The electrical power itself is environmentally friendly, generated just a few metres away using landfill gas.

On-board Powerpack: just unplug and go

The advantages of electric drive are widely known, but the next notable feature of this unit is more of a surprise. MEAB requires the machine to be driven quickly out of the recycling bay and relocated for other duties. When it's time to move, the operator simply removes the large plug, rolls the power cable up on the drum and starts the diesel powerpack that's built into the 821's counterweight. Then he just switches the motor to diesel mode and the waste handler is ready to roll.

An operator plugs into the 821 M E-Series unit when it operates on electrical power.

A better return on recycling investment

According to the president of SENNEBOGEN LLC, Constantino Lannes, the plug-in 821 can look forward to a warm welcome from American waste-processing facilities. "Electric drive machines are increasingly popular throughout the industry," he explains. "But many centres require the versatility of a mobile machine to support operations in different areas of the facility — loading trucks at one time, sorting piles or feeding grinders at another. With an integrated Powerpack, the 821 Electric increases the utilization of the machine, which increases the ROI."

This unique concept that combines the greatest mobility with the advantages of an electric drive was developed by SENNEBOGEN. Instead of a counterweight, the rear of the material handler contains a powerful diesel Powerpack. This provides the power to the motor. As well, it has been designed to allow all of the hydraulic functions to be operated when on the Powerpack mode. With just a few steps, the electric machine can be driven anywhere without having to worry about being tethered to its power supply.

Thanks to the integration of the Powerpack into the counterweight, the 821 remains exceptionally manoeuvrable and compact, and fully utilizes its strengths as an expert recycler.

ABOUT SENNEBOGEN

SENNEBOGEN has been a renowned company in the global material handling industry for over 60 years. Based in Stanley, North Carolina, within the greater Charlotte region, SENNEBOGEN LLC offers a complete range of purpose-built machines to suit virtually any material handling application. Established in America in the year 2000, SENNEBOGEN LLC has quickly become a leading provider of specialized equipment solutions for recycling and scrap metal yards, demolition, barge and port operations, log-handling, transfer stations and waste facilities from coast to coast. A growing network of distributors supports SENNEBOGEN LLC sales and service across the Americas, ensuring the highest standard of professional machine support and parts availability.

SENNEBOGEN's new 821 Mobile Electric material handler combines an energy-saving electric drive with extreme flexibility and mobility.

Muhr Bulk Loading Technologies: components for efficient bulk material handling

For more than 50 years the Muhr family company has stood for quality in hydro-power, process water and bulk handling technology. Its specialized experience for the functional interaction of hydro-power and mechanical process technology is founded in the roots of mill construction.

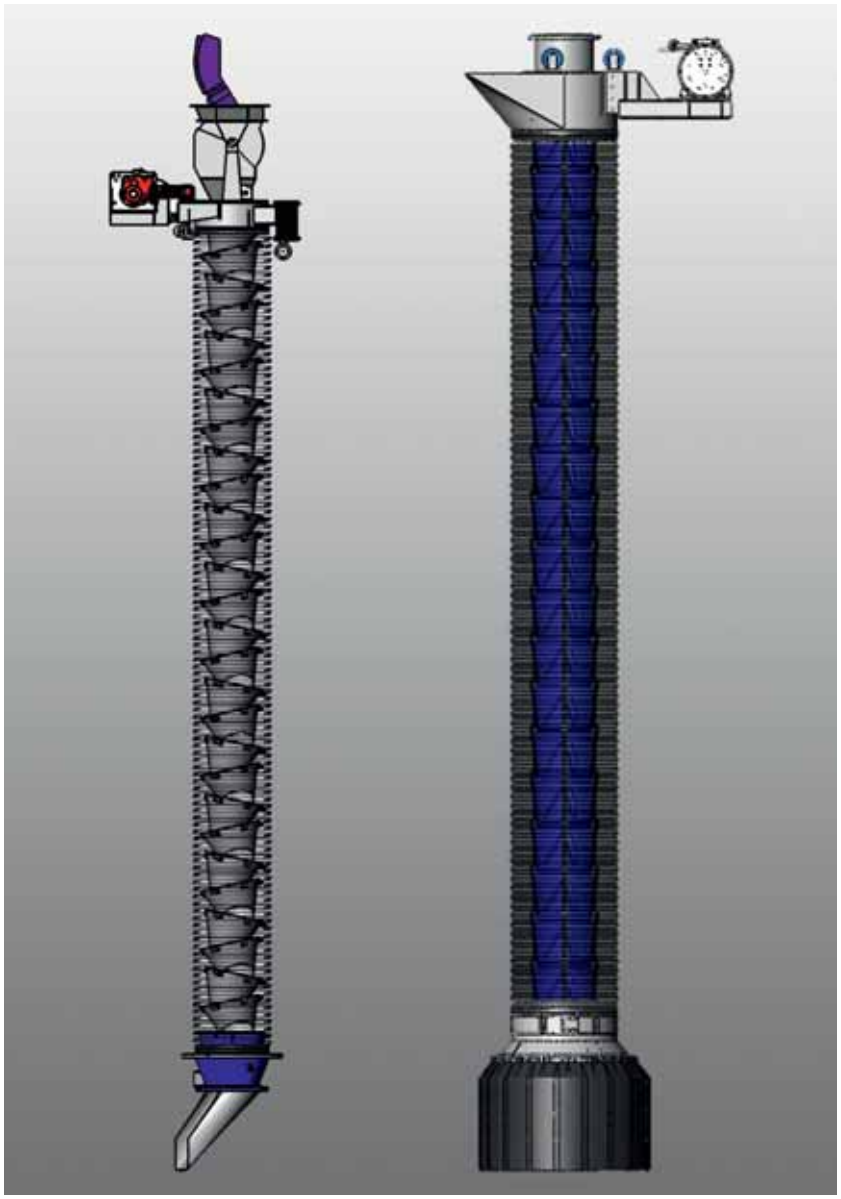
Building on the experience from this traditional technology of grain processing by means of water power, Muhr has continually developed new solutions in the associated areas of hydro-mechanical equipment, mechanical water treatment and bulk handling technology.

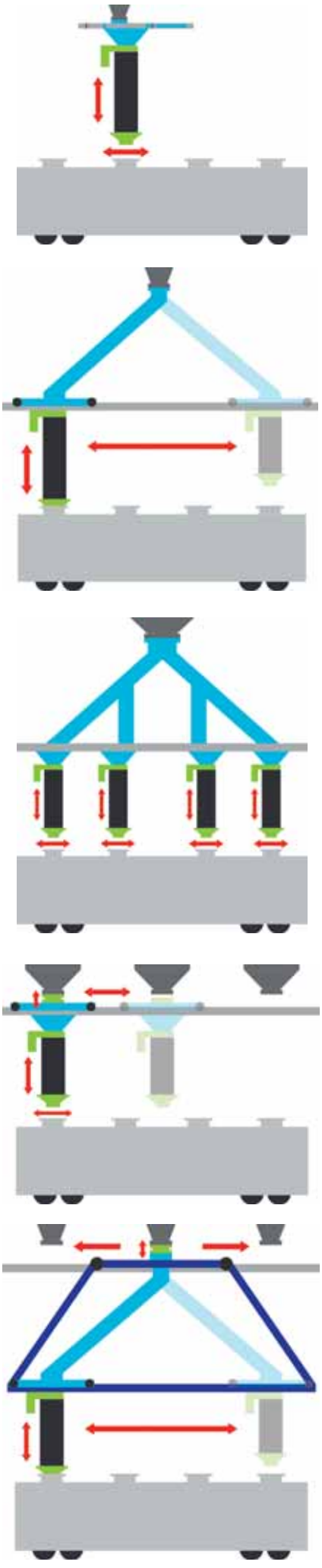
Today Muhr supplies worldwide leading companies from the most diverse of areas, such as energy, chemicals, foodstuffs, cement/chalk/plaster, system construction and mill operations, of course.

An essential part of the Muhr philosophy has always been efficiency in all respects: maximum loading performance, optimized interaction between every process component, highest reliability, dust-free loading for protection of environment and operating personnel. For this reason Muhr has successively developed a lot of innovative details which culminates in an impressive range of bulk loading systems and bulk loading technology in general.

Muhr Bulk Loading technology starts with any kind of docking devices, mainly pneumatically operated, leads to loading spouts both for open and closed or even combined loading and ends in complete loading plants for highly efficient railcar- and truck-loading.

Muhr loading spouts for closed loading are fitted either with the rubberized MBG loading cone or the Muhr-exclusive MVS pneumatic sealing collar which grants 100%





dust-free loading. By using foodstuff-approved materials and replacing the conventional bellows with telescopic tubes in stainless steel (also sealed with Muhr MVS-TD sealing collars), the loadings spouts are perfectly suited for loading of hygienically sensitive materials.

For open loading operations, Muhr offers the MBO loading spouts series. These systems are fitted with exterior bellows for open loading of powdery granular and very dusty products, or with telescopic tubes for coarse bulk and low-dust products. All spouts are optimized for highest loading performance with minimum dust emissions. For this reason the outlet is equipped with the reliable Muhr dust hood with energy brake. In cases of extremely dusty materials, the spouts can be equipped with the FSR Flow-Speed-Retarder or — which is the latest option within the Muhr bulk programme — the Muhr Cascade System CSR (Cascade Speed Retarder). Both systems care for absorbing the fall energy of the loading material and eliminating dust.

As a third possibility Muhr combines both the MVS and MBG loading spout with the MBO dust-hood and creates a loading spout which can be used for open and closed loading — simple and without compromise, efficient and dust-free. Different solutions for lifting and lowering the dust-hood (for closed or open loading) enable perfect customization to any loading facility.

Apart from these main types any component of this selection can be optionally equipped with various modules for additional adaption to customer demands and increase of loading quality and efficiency.

By using one of the innovative product spreader systems the tank filling can be increased to up to 30%. A sealing cone seals the outlet of the loading nozzle after the end of the loading process and eliminates out-falling product during lifting of the loading spout. Additionally the can be chosen different lifting systems, level indicators, vibrating units and many other details. And if it is not possible or economical to connect the loading equipment to existing extraction systems, a Muhr loading system with integrated filter unit IF might be the ideal and economical solution.

But the real highlight is the intelligent module concept of Muhr which allows for the combination of all these features in almost any composition.

With rising demands on loading performance, flexibility in loading position and economic efficiency in general Muhr started to design a loading spout positioning concept. The concept is based on the positive experiences with modular configuration and flexibility in design which makes it possible to create an intelligent loading facility for every customer. With optimal configuration of all components and perfect integration Muhr railcar- and truck-loading systems gain maximum output of the resources used.

The flexibility in design allows free and exact positioning of one, four or more loading spouts in any direction (x-, y-, z-axis) and discharging different feeding systems by flexible positioning of inlet docking device.

In conclusion: Muhr Bulk Loading Technologies stands for intelligent loading facilities from a single source. No matter if a single component is needed, an existing loading facility has to be refurbished or a modern, sustainable loading solution has to be developed – the experience of more than 5,000 successfully realized projects worldwide grants for reliable products and professional project handling.

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Claudius Peters: company profile

Claudius Peters Projects GmbH, Germany and Claudius Peters Technologies SAS, France are part of the Technologies Division of Claudius Peters Group GmbH, headquartered in Buxtehude, near Hamburg in Germany. The group offers technologies in the field of materials handling and processing and provides turnkey or semi-turnkey systems to a wide range of industries.

Claudius Peters Group GmbH is a wholly owned subsidiary of Langley Holdings plc, a privately controlled UK engineering group, with regional offices in the Americas, Europe, China and the Far East.

In the past century, Claudius Peters has grown from having its foundations in the cement industry to being one of the world's most renowned engineering companies. From conception to installation, through commissioning, after-sales support and facilities management, Claudius Peters provides world-class service to world-class clients.

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Claudius Peters offers a wide range of equipment and is an ideal partner in bulk materials handling.

- raw material storage and blending beds;
- storage and homogenization of raw meal;
- raw meal feeding to the pre-heater;
- coal grinding, storage, conveying and dosing systems;
- clinker coolers;
- cement conveying and storage systems;
- cement mixing systems;
- cement loading and unloading systems;
- cement bagging and palletizing plants;
- cement carrier and terminal equipment;
- mineral grinding;
- gypsum calcining plants; and
- alumina handling.

Stockyards

Claudius Peters' customers have to face the challenge of delivering a consistent cement quality to a variety of clients and buildings sites. Claudius Peters' expertise provides these clients with the equipment to produce an optimum, homogeneous raw material for processing. Acting as a one-stop supplier, Claudius Peters can provide everything for stockyards and blending beds, and mixing silos for raw meal.

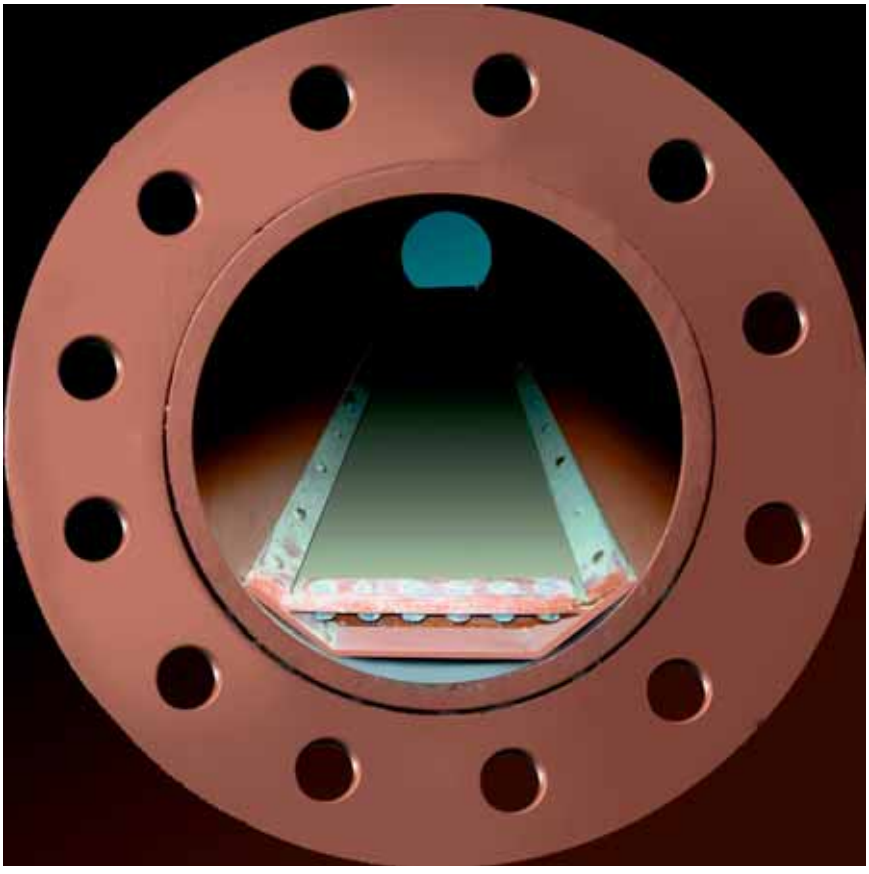
Cement carriers

The transport of cement or other bulk materials by ship is a very important factor for the growth of the worldwide economy.

Claudius Peters offers the equipment to load and unload ships. It has great expertise in self-unloading ships, where it can provide a range of tailor-made solutions to fit the client's needs.

Pneumatic conveying

Claudius Peters can deliver a wide range of pneumatic conveying solutions including the examination of bulk solids, selection of the



conveying system and the surrounding auxiliary components. With more than one hundred years' experience and continuous development of pneumatic conveying technology, Claudius Peters is an ideal partner for pneumatic conveying systems handling any type of material from primary or secondary raw materials to fuels or cement of any kind.

Silos & mixing silos

With a long tradition in bulk material handling and minerals storage, Claudius Peters is an ideal partner for all bulk storage solutions. With its Technikum (technical centre) and laboratory, Claudius Peters can evaluate all types of bulk materials and find the best silo design for the application in question.

Used in the homogenization of raw meal, Claudius Peters mixing silos (MCSilos) are characterized by a high blending factor achieved by a unique mixing chamber with overflow pipe. The silos' capacities can be optimized in combination with the stockyard equipment from a capacity of 2,500 tonnes to 60,000 tonnes.

Packing and palletizing

Cement dispatch has to fit seamlessly into process operations without any disruption to production. Whether dealing with bulk or bagged cement, Claudius Peters has the complete solution. By taking its

customers' complete plants into account and considering the equipment as well as the technical concept, Claudius Peters can develop a customized packing and palletizing system that perfectly meets all requirements.

Loading & unloading

Cement trading is becoming increasingly important in the world and cement has to be carried more and more into emerging markets or conurbations. For these requirements Claudius Peters can offer the full package for dispatch terminals including storage silos, truck, wagon or stationary ship loading. It can also offer solutions for the receiving terminal with truck or wagon unloading and the necessary cement distribution equipment like silos, truck loading, packing and palletizing equipment.

Grinding

Claudius Peters is an ideal partner for plant operators requiring materials handling with stockyard equipment, mechanical transport to the grinding plant, grinding of fuels (e.g. hard coal, pet coal, sewage sludge, etc.), or minerals storage, pneumatic conveying, dosing of the fines and to the burners of the combustion process.

Coolers

The Claudius Peters clinker cooler can be combined with any kiln system on the market. The cooler's reliable operation can easily be adapted to the kiln line's requirements. This not only applies to new cooler installations, but also to conversions and capacity increases of existing kiln cooler systems. Its clinker coolers do the job they are designed for.

Recent development in bulk materials handling for mines, terminals and stockyards from thyssenkrupp Industrial Solutions

As a supplier of materials handling equipment, the Germany based Division Materials Handling of thyssenkrupp Industrial Solutions (TKIS-MH) has developed a complete range of products for mines, bulk terminals, stockyards and fertilizer, steel and cement plants. With more than 100 years' experience, TKIS-MH today supplies a complete range of products for bulk materials handling, including:

TK's high performance CSU, similar to that to be installed at Baolihua's Jiahuwan Power Plant, in unloading operation at Huilai Power Plant, China.

Ship unloading and loading equipment, like:

- grab type ship unloaders of different designs;
- continuous ship unloaders;
- shiploaders of different designs for bulk and bagged goods;
- combined shiploaders and unloaders; and
- pontoon based floating transshipment.

Stockyard equipment, like:

- slew type or bridge type bucketwheel machines of different designs;
- drum (barrel) type reclaimer;
- longitudinal and circular stockyard with stacker and scraper reclaimer;
- homogenization/blending bed with stacker and bridge type scraper reclaimer, both as circular or longitudinal stockyard;
- combined portal scraper reclaimer with both stacking and reclaiming functions.

Other materials handling equipment like

- railway car tipplers;
- truck dumper and unloading station; and
- belt conveyor, curved conveyors and pipe conveyors.

TKIS-MH's new development of full-line materials handling equipment has focused on:

- being a global supplier with its own subsidiaries throughout the world;
- a full range of products and designs;
- multipurpose applications;
- suitability of machines for diverse materials with significantly different characteristics;
- design suitable for upgrading to either fully automatic operation or unmanned remote controlled operation.

Recent technical achievements and contracts highlight TKIS-H's development work for the coal handling in terminals and stockyards include:

1. Follow-up order from Guangdong, Baolihua New Energy Power Co., Ltd China

Further to the success of two units continuous ship unloaders for Zhujiang Power Plant China, which have been in commercial operation since April 2014, TKIS-MH won a new contract through an international tender for the new chain bucket elevator continuous ship unloader, for the power plant development of Baolihua New Energy Co. Ltd. Of Guangdong, China. The order was placed in September 2015.

This CSU will be designed for an unloading rate of 2,000–2,200tph (tonnes per hour) and ship sizes up to 100,000dwt, representing the third largest CSU for coal in China, while the others supplied to Huayang PP in China in 2007 and Huilai PP in China in 2012.

For thyssenkrupp, this follow-up order not only a means of being awarded a further order, but also represents continuity with respect to design, supply, construction and management and demonstrates the client's appreciation of and satisfaction with TKIS-MH's performance to date.

The delivery to site and commissioning of the new CSU is schedule for April 2017. The commercial operation can start from June 2017.

The decision of Baolihua New Energy Power Co., Ltd to choose TKIS-MH as supplier for all of their important ship unloaders has been made with the confidences in the TKIS-MH's advanced technology, capability of execution of large scale projects and first-class technical service, as one of the decision makers said, the choice went in favour of TKIS-MH after accurate comparisons of several competitors on the evidence of world wide and extensive experiences in the development of coal ship unloader technology; excellent performance of CSU already built; high availability and long service lifetime without intensive repairs; reliable technical services during construction, commissioning and operation period; good relationship with Chinese partners for manufacturing and erection

With this contract, TKIS-MH, has once again contributed to the development of China's coal ports and power plants, among with other equipment of more than 60 machines for car dumpers, ship unloaders, shiploaders, stacker-reclaimers, etc. in the past five years.

2. Drum reclaimer for ore blending yard of Voest Alpine Steel Plant Linz

In December 2014 thyssenkrupp Industrial Solutions AG received an order for the turnkey supply of a new drum reclaimer for voestalpine AG in Linz, Austria.

The machine is scheduled to start commercial operation in May 2016 and will replace a more than 40 years old drum

Pic. 2. The drum reclaimer built by TKIS-MH working at Ilva's Steel plants of Taranto, Italy

reclaimer supplied by former Weserhütte AG which is today integrated in thyssenkrupp Industrial Solutions AG.

Due to its design the drum reclaimer ensures a homogenized material composition at a continuous reclaiming of the iron ore fines-mix stored in the stockpile. The machine feeds the subsequent sinter plant with a steady flow of blended product which is uniform in respect of quality and quantity, thus ensuring that the sinter plant is working under constant load and most economically.

The blending stockyard consists of four parallel stockpiles. The drum reclaimer is designed to operate variably on each of the four stockpiles and can be transferred from one stockpile to the other by a transfer car which operates in cross direction to the reclaimer runway. By receiving this order, the thyssenkrupp Industrial Solutions AG reference list for drum reclaimers counts now 65 machines with the first one having been supplied in 1967.

Pic. 3 TK's tandem rail car dumpers operating at Ust Luga Coal Terminal since 2005.

3. Third car dumper for Ust Luga Coal Terminal Russia

Ust Luga is the largest port project to be built in Russia in the last 20 years and it is in this mostly ice-free port on the Baltic Sea, St. Petersburg region, that Russian coal from Siberia and other regions of Russia is handled and loaded, most of it destined for export to Western Europe.

A key feature for the successful operation of this coal terminal are the two rail car dumpers, supplied and commissioned by TKIS-MH, which enables the port operating company to achieve a capacity of 7,000tph for unloading coal from rail freight cars. When the terminal is operating at full capacity, 700 rail freight cars can be automatically unloaded each day and an annual throughput of > 14 million tonnes coal achieved.

The successful commissioning and operation of the rail car dumpers built between 2005 and 2009 is an important milestone for TKIS-MH in Russia. Combined with recently putting into operation a terminal in Posjet, Pacific Coast of Far-eastern Russia, which is situated > 8,000km away from Baltic sea, TKI-MH's success in Ust Luga is a good basis for development of future increasing requirements for materials handling equipment.

In September 2015 German based Materials Handling Division of TKIS-MH was awarded a third contract for engineering, supply and commissioning of one car dumper. For TKIS-MH, this follow-up order not only means a further order, but also represents continuity with respect to design, manufacturing and management for high capacity handling system and demonstrates the client's appreciation of and satisfaction with TKIS-MH's performance to date.

The new wagon unloader comprises a tandem car dumper for handling two 100t railway wagons, one positioner to move the 36 wagons in the rake and one transfer car to return the empty wagons back to the rail track. With this design the railway facility can be kept to the minimum and an automatic operation of moving and unloading of coal wagons from arriving of the train up to pick-up of the empty rake is realized.

4. Full portal reclaimers to four phosphate fertilizer DAP plants in Morocco

In July 2012, ThyssenKrupp Resource Technologies GmbH, Business Unit Materials Handling has been contracted by OCP S.A. (Office Chérifien des Phosphates, S.A.), the leading phosphate producer of Morocco, to supply eight Full Portal Reclaimers to be operated within the Morocco Phosphorous III & IV Complex at Jorf Lasfar, Morocco where, as part of the strategic development plan, OCP S.A. will establish four new ODI (Owner Direct Investment) integrated DAP granular

Pic. 4 Portal scraper reclaimers installed at Jaorf Lasfar.

fertilizer manufacturing plants on green-field plots. These machines shall be delivered and erected in sequences within two to three years from the beginning of 2014.

The eight identical A-frame full portal reclaimers are running on a 45.50m rail gauge and designed for a nominal reclaiming rate of 2,000tph.

Thanks to TKRT's proven new technology of high speed / high rate portal reclaimers for which the weak element — the roller chain — has been replaced by a track link chain which permits higher chain speed the portal reclaimer itself could be designed with only two scraper booms i.e. one arrangement of one main and one auxiliary scraper boom mounted laterally to the portal structure and connected together by a knuckle arrangement instead of 3 scraper booms which are normally required for such a high handling rate.

5. New shiploader for Narvik, Norway

In 2015 a new thyssenkrupp shiploader arrived in Narvik, Norway, to service LKAB Norge AS, Europe's biggest iron ore supplier. The deep-draught, ice-free port is the biggest export

harbour for LKAB in northern Norway, with a capacity of almost 20 million tonnes per annum of iron ore/pellets.

LKAB's requirements called for a new linear shiploader, to be installed on a new pier, but with identical main dimensions to the existing shiploader, so that a second shiploader of the same design could be installed later on the old pier.

Pic. 5.1 The fully assembled shiploader going on board for departure.

thyssenkrupp Industrial Solutions' contract comprised the design, manufacturing, protection, packing, assembly, delivery to site, installation, commissioning and testing of one shiploader, with the option for a second unit at a later stage.

The new shiploader has a loading capacity of 11,000tph for iron ore and 9,000tph for pellets. The main dimensions are a maximum length of 144m from pivot point to loading chute in extended position, and a maximum height of 50m. The shiploader is designed to load ships between 5,000 to 180,000dwt, and its deadweight is 1,700t.

The shiploader has a special design with the rear side supported on a fix point on land and the front side supported on a travel gear on the pier. The main beam is equipped with a driving shuttle and a liftable discharge boom.

New STARCLEAN® belt-cleaning system from Schulte Strathaus

New STARCLEAN® Automatic tensioning device type 830-E with electric linear drive unit from Schulte Strathaus

The modular set-up of Schulte Strathaus' new STARCLEAN® belt-cleaning system offers solutions for numerous applications from a range of standardized components. This modular principle guarantees fast delivery times for both complete systems and spare parts, regardless of belt width, belt speeds or type of material conveyed.

- For use in reversible conveyor systems and time interval-based cleaning.
- Enables non reversible scraper blades in reversible conveyor systems, by automatic retraction when the belt direction is changing.
- Optionally as autonomous system with a preconfigured control unit incl. display and keypad or without control unit, for integration into existing belt conveyor control systems.
- Quick tensioning device for easiest tension adjustment.
- Durable drive unit for reliable operation.
- Retrofit into existing systems type 830. Can be combined with primary or secondary belt scrapers.

Today, Schulte Strathaus and its subsidiary Cyrus are a multinational production, engineering and service company certified according to ISO 9001:2008 and holding the BGH quality symbol 'Safety with System' as a member of VDMA, the German Association of Plant and Machinery Manufacturers.

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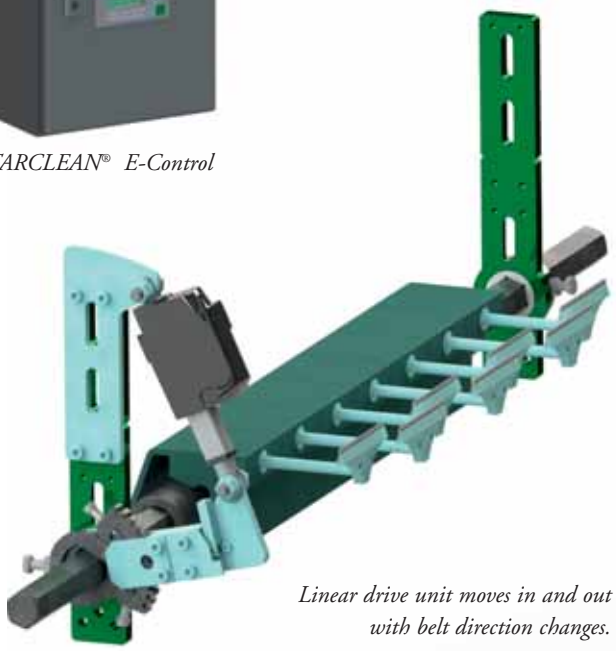

Linear drive unit moves in and out with belt direction changes.

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Terex Port solutions strengthens its position in the Asia Pacific Region with four more mobile harbour cranes

The very first Terex QuaymateTM M50 mobile harbour crane will start operation at the beginning of 2016 in Australia.

Terex Port Solutions (TPS), part of the Material Handling & Port Solutions business segment of Terex Corporation, continues to systematically strengthen its position in the Asia Pacific region with four new mobile harbour cranes. Two additional Terex® Gottwald Model 6 mobile harbour cranes from the large crane family, ordered earlier in 2015, have been in use in the Port of Napier on New Zealand's North Island since November. On 4 December 2015, Northport Ltd. (Northport) not only officially launched its container hardstand area, but also a Terex Gottwald Model 4 mobile harbour crane from the medium-sized crane family at Marsden Point, also situated on the North Island. Finally, the world's first Terex QuaymateTM M50 mobile harbour crane from the small crane family of TPS, which has been developed with German and international engineering expertise and is manufactured in China, will be delivered to Australia at the start of 2016.

Three new Terex® Gottwald mobile harbour cranes on New Zealand's North Island

For the order from Northport, TPS worked with TLL, which has now become a distributor of TPS in New Zealand. The crane most recently delivered in the G HMK 4406 variant has a maximum lifting capacity of 100 tonnes, a working radius of up to 46m and maximum hoisting speeds of 120m/min, and now also enables Northport to load and unload container ships. Ross Easton, owner of TLL: "Northport is a major player in international maritime trade and previously specialized in handling predominantly forest and agricultural products. With the mobile harbour crane, the customer is now ideally equipped to handle containers and heavy general cargo." Maurizio Altieri, Vice President Sales and Service Asia & ANZ Region and General Manager of the TPS facility in Xiamen, PR China, added: "We are delighted that we were able to help a major terminal continue to strengthen its position in the dynamic New Zealand market. Northport is a new customer, whereas the relationship with Napier Port has already existed for many years. A total of eight machines, including the two most recent Model 6 cranes, have been delivered to Napier Port up to now."

First Terex QuaymateTM M50 mobile harbour crane goes to Australia

A first for Australia: At the beginning of 2016, the world's first Terex QuaymateTM M50 mobile harbour crane will be shipped to Australia. As a distributor of TPS and a rental company for port technology products, Tehmar Group PTY Ltd (Tehmar) based in Perth, will include the machine in its rental fleet and lease it to customers in the region. Andrew Fox, owner of Tehmar: "With the QuaymateTM M50, we will be able to offer our customers a genuine compact mobile harbour crane that handles a variety of cargo considerably more productively than non-port equipment like e.g. crawler cranes." Altieri adds: "The QuaymateTM M50 appeals to smaller sea and river ports in Asia and beyond and enables them to enter into professional cargo handling. The concept of making proven Terex Gottwald mobile harbour crane technology also available to terminal operators with limited budgets is interesting for other markets, too, as the order from Australia shows."

New Regional Manager Asia Pacific Mike Green: even greater customer proximity

Mike Green, since November 2015 new Regional Manager Asia Pacific TPS, sees the positive business development as a validation of the diversified product range of TPS in the area of mobile harbour cranes: "The Asia Pacific area is one of the most dynamic economic regions in the world and is marked by a diverse structure. Our customers here include both established terminals and startups. This results in a wide variety of demand." Mike Green continues: "The most recent orders and development demonstrates how the proximity of TPS to the market enables us to better serve our customers. We will further develop our capabilities in the region and adapt our global expertise to suit regional demand even better."

Handing over of the Key For Success at Northport: F.l.t.r.: Bill Shepherd, Chairman Northland Regional Council, Sir John Goulter, Chairman Northport, Mike Green, Regional Director Sales & Service TPS; Ross Easton, TLL, Distributor for TPS in New Zealand and Jon Moore, CEO Northport. 280 guests attended the inauguration of the new Terex Gottwald Model 4 mobile harbour crane.

ContiTech Steel cord belts meet NCIG's port requirements

ContiTech has supported the expansion of the Newcastle Coal Infrastructure Group's coal export terminal with several kilometres of steel cord belting. (Photo: ContiTech)

The supplied steel cord belts also include energy-optimized conveyor belts. Thanks to special rubber compound, energy consumption during transport can be lowered by up to 25%, allowing a reduction of energy costs and CO_2 emissions overall. (Photo: ContiTech)

ContiTech conveyor belts are also in use during the interim storage on the platform. (Photo: ContiTech)

Coal mining plays a major role in the Australian economy. Ten per cent of all coal deposits worldwide are 'Down Under', making Australia the biggest coal exporter. Large deposits are found in the state of New South Wales, where the Newcastle Coal Infrastructure Group (NCIG) is based. It operates one of the most important export terminals at the port of Newcastle. A complex infrastructure is required to ship the coal from there to destinations all over the world. For the NCIG transport system, the ContiTech has produced and supplied several steel cord belts in recent years, helping to set up a total of three platforms.

After completion of the third terminal at the end of 2013, NCIG's transport system will be capable of delivering around 66mt (million metric tonnes) of coal per year. A total of 20 conveyor belts are used to handle incoming and outgoing coal as well as for interim storage on the platform. They make for handling capacities of 8,500tph (metric tonnes per hour) in the loading stations and storage areas, with that figure rising to as much as 10,500tph in the wharf and ship loader area. "Thanks to their robust and durable design, steel cord belts from ContiTech are up to meeting the challenges of transporting coal within a coal terminal," reports Eric Van Leeuwarden, National Sales Manager at ContiTech Australia. "In addition, our conveyor belts represent energy-saving solutions that significantly reduce transport costs and thus help to improve the cost efficiency of the system."

Via the project company Aurecon Hatch, NCIG awarded ContiTech Australia (formerly M.I.R.S.), the order to set up the first platform in 2008. ContiTech in Northeim, Germany, produced an approximate length of 10,000 metres of ST 1400 steel cord belt with a width of 2,500mm. It is made of an energy-saving rubber compound that has made it possible to significantly improve visco-elastic properties, thereby minimizing indentation rolling resistance on the conveyor belt system. As a result, energy consumption during transport can be lowered by up to 25%, allowing for a reduction in energy costs and CO_2 emissions overall. ContiTech additionally produced steel cord belting type ST2500 for this stage of the project. It is used to transport the coal onto the freight ships. In order to ensure that the individually delivered sectional lengths were correctly spliced on-site to form a conveyor belt, ContiTech arranged a training course in Northeim in 2009. At it is, the Australian installation partner received instruction as to the correct procedures for splicing the sections. "By doing this, we were able to ensure the best possible outcome," says Van Leeuwarden.

In the spring of 2010, an order then came in to set up the second platform. A further 8,000 metres of steel cord belting of the same belt types were used here. To help the team connect

the individual conveyor belt lengths, ContiTech service staff members were on hand locally to set up the required vulcanization presses and further optimize the process. In 2012, thanks to the successful implementation of the first two subprojects, M.I.R.S. and ContiTech also received the order for the third and final stage of the project — another 8,000-metre-long steel cord belt — which was delivered in several stages by September 2012.

"Thanks to the close global cooperation with the experts from ContiTech, we have been able to perfectly monitor and accompany the construction of the transport terminal in Newcastle during the last four years," says Van Leeuwarden. "This project has further strengthened our position in Australia and is an important reference project on this market."

About Continental

Continental develops intelligent technologies for transporting people and their goods. As a reliable partner, the international automotive supplier, tyre manufacturer, and industrial partner provides sustainable, safe, comfortable, individual, and affordable solutions. In 2015, the corporation generated preliminary sales of approximately €39.2 billion with its five divisions, Chassis & Safety, Interior, Powertrain, Tires, and ContiTech. Continental employs more than 208,000 people in 53 countries.

The ContiTech division is one of the world's leading suppliers of technical elastomer products and is a specialist in plastics technology. It develops and produces functional parts, components, and systems for machine and plant engineering, mining, the automotive industry, and other important industries. Together with US company Veyance Technologies Inc., which was acquired at the beginning of 2015, ContiTech generated sales of approximately €5.4 billion (pro forma basis) in 2014 and currently employs approximately 43,000 people in 43 countries worldwide.

VSR Industrietechnik GmbH provides solutions to airborne dust problems

German company VSR Industrietechnik GmbH has been supplying reliable and cost-saving solutions related to bulk solids handling since 1975. Among others, the product programme of VSR consist of:

- VSR BLASTER® air cannons that disperse cakings, bridgings in silos and cloggings by a straight compressed air impulse;
- VIBREX® conveyor belt cleaner for keeping conveyor belt plants clean; and
- DUSTEX® dust suppression systems for the reduction of dust emissions.

It is well known, that dust is not only disturbing, but even dangerous to health. For this reason, there are legal rules in most countries for a reduction of dust emissions.

The degree of effectiveness of dust suppression with water depends on many parameters. Beside the affinity of the material to generate dust, the plant conditions such as conveying speed, fall height of the material, as well as ambient conditions have a considerable influence on the effectiveness of a dust suppression system.

When designing a dust suppression system, this means far more than just putting some water on some material. The expertise of the supplier of such solutions is the crucial factor for the effectiveness of the dust suppression system. Nevertheless, sometimes the easy solutions are the best ones, particular if we look at the ways of reducing dust emissions on unmade roads. One way of reducing dust emissions as they appear by the transport of bulk goods on unmade roads is the use of sprinkler systems. The throwing range of those sprinklers is up to 50m, depending on the water pressure. So they are a good solution to keep unmade roads moist and free from dust. The disadvantage of those systems is that water consumption is too high. But this can be solved by a control system which ensures, that the sprinkler works only if the streets are dry. The big advantage is that they can raise moisture levels within a very short time.

A limestone producing company in south Germany had trouble with airborne dust emissions at various points in the plant. Because of its wide range of dust suppression solutions, VSR was able to offer the customer a tailor-made solution to minimize the airborne dust emissions in his plant. One part of the solution was a sprinkler system for the dust suppression for internal transport on unmade roads. The sprinklers with

electrical valve in a stainless steel cabinet were placed primarily at traffic-intensive sites and crossroads. By selecting sprinklers with matching throwing-ranges and a targeted placement of the sprinkler with overlapping irrigation radii complete coverage of the surfaces could be achieved.

In addition to the sprinklers the company has chosen a DUSTEX fog blower for various changing points needing dust suppression.

Dry bulk cargo experts: The Seaports of Niedersachsen

The Seaports of Niedersachsen Brake, Cuxhaven, Emden, Leer, Nordenham, Oldenburg, Papenburg, Stade and Wilhelmshaven are specialists for the transshipment, handling and warehousing of bulk cargo. This fact is also confirmed by the strong dry bulk cargo handling volumes:

With a total of around 14.6mt (million tonnes) in 2014 (maritime traffic) the handling of dry bulk cargo in the seaports of Niedersachsen is one of the main business areas. The handling of coal and coke (4.4mt in maritime traffic) as well as the handling of grain and feet stuff (3.4mt in maritime traffic) are representing the biggest shares.

Approximately 3.05mt of ores/iron and lead have been handled in the nine seaports of Niedersachsen in 2014 in maritime traffic.

Source: EVAG/ELAG

Source: J. Müller

Furthermore, around 2.82mt of building materials, 0.52mt of chemical products and 0.41mt of other types of dry cargo have been handled from January until December 2014 (maritime traffic).

Both the federal state of Niedersachsen as well as the private port operating companies within the seaports

Source: Rhenus Midgard

of Niedersachsen are investing continuously in new infrastructures, port facilities and handling equipment to be able to follow the growing demands of the customers.

An example for the high performance in dry bulk handling gives the port of Brake respectively the local operator J. Müller Group.

The port is ideally suited for handling and storage of grains, feedstuffs, oilseeds, fertilizers, renewable natural resources, biomass products, sugar, food-related products as well as other suitable bulk and agricultural goods and also offers a wide range of processing services such as aspirating, milling, rough-grinding, mixing, crushing and drying.

As the division of dry bulk is a very important business field for the J. Müller Group the company is striving to expand in this business. So the J. Müller Agri + Breakbulk Terminals GmbH & Co. KG and the Brake based transport services provider L.I.T. Cargo have pooled their skills and founded the new truck transport company B-Log Bulk Logistik GmbH mainly specializing in the transportation of grain, animal feed and bulk goods. J. Müller has been running handling at the seaport of Brake since 1821. The L.I.T. Group, which was founded in 1988, offers a wide range of services along the entire logistics chain.

Source: J. Müller

Barge-loading systems from SMB: loading under difficult circumstances

It's all about flexibility

In many cases transporting goods by river going vessels is a cost-efficient alternative compared with other means of transport. In some areas, it even provides the only viable method to reach remote areas. Reliable barge-loading systems hence offer time and cost saving solutions. They ensure the optimal and efficient loading of vessels.

The German company SMB International GmbH is a specialist in loading systems, conveyor technology and material handling and has been developing individual shiploading and barge-loading systems for more than 20 years. The company has implemented more than 80 loading systems for customers in Asia, Africa, South America and Europe and is therefore well aware that short docking times represent an essential criteria in designing loading systems. The faster a vessel is loaded with bulk or bagged goods such as grain, fertilizer or cement bags, the shorter the docking times and the more efficient transport becomes. SMB therefore uses a two-step production method: Loading systems are first designed directly at the Quickborn site near Hamburg. Here, all mechanical and electronic modules are individually developed and produced according to the requirements. They form the basis for custom-made implementation of projects and their subsequent installation at site. SMB can also draw on many years of experience for upgrading an existing facility or increasing an existing capacity.

Requirements differ significantly

The design of shiploaders is adapted to their future requirements and tasks. The range extends from systems for vessels of 5,000dwt up to 120,000dwt, providing a loading capacity of up to 2,500tph (tonnes per hour). The systems are designed for stationary or mobile use on rail, depending on the requirements. Three versions have evolved with regard to the various types of loads. The first version is intended for bulk goods: it uses dust suppression type chutes to optimize the loading. This leaves the material handled with minimal degradation whilst encapsulated dust extraction units help collect dust generated. The extent of degradation is significantly reduced by using contoured chutes. A further version is bag loading. A cantilever beam combined with a conveyor belt swivels over the ship. The bags slide along a spiral chute into the loading area. A rotary loading head that can be turned by 180° is attached at the end of the spiral chute. The loading head carries a telescopic conveyor belt with two extension options. This allows positioning of the bags in the furthest corner of the hatch with an accuracy range of centimeters. This system may be optionally equipped with a central rotating plate for even alignment, a

telescopic loading head or even a telescoping spiral chute. The third version includes a spiral chute and freefall chutes mounted on the same cantilever beam for combined loading of bags and bulk goods. The loading is then determined by the goods.

Customers benefit from high-performance solutions

"We base each of our systems on the specific requirements of the customer to create an individual solution," explains Andreas Heckel, Managing Director of SMB International GmbH. "Many systems handle up to 1,500tph — but much higher throughput is possible." Quickborn shiploading systems have proven their performance over many years of service. Long-term economic efficiency is another, obvious goal for the designers. Lower handling and operating costs, in addition to the shorter docking times, allow customers to make optimal use of waterways. "Systems must adapt to the circumstances, not the other way around, particularly when the infrastructure conditions are not optimal," explains Heckel. This company philosophy distinguishes the German company from its competitors. Its success has encouraged SMB to continue along this route. "We have deliberately chosen a high manufacturing focus at our own site. This allows us to ensure excellent quality and guarantee reliability. Naturally, we want to do this to comply with customer requirements. However, our growing demands also act as a continuous incentive," Heckel sums up the situation.

SMB International and MBA instruments: two brands — one idea

The two companies SMB and MBA focus upon the material handling segment. The planning, development, manufacture, global distribution and servicing of highly complex, automated loading systems, filling systems, measurement technology for fill levels and conductivity, palletizers and shiploading systems form the comprehensive product portfolio. The SMB Group has consciously opted for a high degree of in-house manufacturing at its site in Quickborn near Hamburg. This enables customers' requests to be implemented in a spontaneous, targeted and rapid manner, whilst retaining the same high quality. A high-end mechanical and electrical manufacturing facility coupled with the focus on pre-assembly allows the assurance of qualitative and delivery reliability. Highly qualified installation and service teams work on domestic and global projects. The distribution network, which has operations worldwide, ensures swift and effective information-sharing and co-ordination.

Enhancing the efficiency of production processes in times of Industry 4.0

Strengthening Electrical Engineering + Automation as Technology: HAVER & BOECKER founds HAVER Automation

In order to give more importance to the sector Electrical Engineering + Automation and to strengthen it as independent technology, HAVER & BOECKER has founded the company HAVER Automation GmbH & Co. KG located in Münster (Westphalia/Germany) becoming effective as of 1 January 2016. The foundation of HAVER Automation is an important step towards the future for HAVER & BOECKER as experts for packaging, palletizing and loading technology, particularly because process optimizations and efficiency increases in machine and plant engineering are driven by the terms Industry 4.0, Smart Factory and Internet of Things, says Wolfgang Schlüpmann, managing director of HAVER Automation. In co-operation with its customers, the company develops customer-specific and industry-specific automation solutions for the cement, building products, chemical, mining and food industries.

Within the HAVER & BOECKER company, HAVER Automation will act as independent technology company. In implementing the 'Time to Chain' motto, the close integration of the technologies into the whole company plays a decisive role. 'Time to Chain' symbolizes the linking of all process steps comprising transport, storage, mixing, filling, packaging, palletizing, and loading of bulk materials and fluids. By linking these process steps to build an overall system and with the help of innovative automation solutions, all systems, machines and components are integrated into the customers' logistic processes and thus processes are optimized and made more efficient. This leads to an intelligent production and to new business models.

HAVER Automation has expertise in the sectors:

- Engineering, project management, commissioning, service
- Process control engineering, dispatch automation, batch management, OEE and web/cloud solutions, condition monitoring
- PLC programming, switching and control cabinets, MCC (motor control centre), energy distribution, electrical engineering

On HAVER & BOECKER

HAVER & BOECKER is a tradition-conscious, family-run, mid-sized company headquartered in Oelde, Westphalia. Under the umbrella of HAVER & BOECKER OHG, one finds the Wire Weaving and Machinery Divisions. Together with over 50 subsidiary companies on all five continents, they make up the HAVER company which has 2,972 employees and 150 representatives.

In 2014 the HAVER company posted a sales turnover of €428 million. The Wire Weaving Division produces woven wire mesh and processes it into engineered woven wire products. They are used for screening and filtration by the chemical, plastics, automotive, aviation, aerospace, electronics, foodstuffs and feed industries, as well as for architectural applications and analysis sieves.

The Machinery Division specializes in packing and weighing technology. It develops, produces and markets systems and plants for filling and processing loose, bulk materials of every type. The product range includes packing and loading systems for powder-type and granulated materials, packing machines for filling food and animal feed, as well as filling stations and complete filling lines for liquid and pasty products.

The product range is supplemented by screening machines, machines for washing, pelletizing plates, agitators, mixers, palletizing and loading systems, silos, shiploading and unloading equipment.

New Sennebogen 880 mobile port material handler joins the fleet at Shoreham

A new SENNEBOGEN 880 has been delivered by Sales & Service partner E.H. Hassell and Sons to Shoreham Port.

Shoreham Port has recently taken delivery of a new SENNEBOGEN 880M 'special' port material handler; this new addition has increased its fleet to five SENNEBOGEN port material handlers, with 2 x 870 M specials, 1 x 880 EQ and now 2 x 880 M specials.

"We have been using SENNEBOGEN port material handlers at Shoreham Port for almost ten years now. We started with the 870 M specials which back then were the largest machines available, as our port has grown the requirement for larger machines has grown also. Our operators and engineers are more than happy with the SENNEBOGEN machines, and from an operational side, we like the fact that within reason what we need on a new machine is what we get, as SENNEBOGEN and E.H. Hassell do their utmost to put the customer first — if it can be done they will do it. As an example on this most recent machine we needed additional lifting duties for a specific contract, we put forward our request, the engineers at SENNEBOGEN looked at it and approved it, we placed the order, then we witnessed a physical load test at the factory once the machine has been built so we could all approve it."

Ian Hassell, Managing Director of E.H. Hassell and Sons commented "We are very proud of our ten-year relationship with Shoreham Port. The supply of this new machine is further proof that we provide Shoreham Port with the perfect solution for their special requirements and application, helping to support their continued growth."

In summary this SENNEBOGEN 880 is fitted with a 26m straight boom, four-axle wide-gauge mobile undercarriage, 2-metre pylon, spacious port cab (with additional trainer's seat), special sea climate paint, cylinder protection and quick-release coupler with built-in rotator.

Robert Aumüller, Sales Manager Northern Europe for SENNEBOGEN commented, "Everyone within SENNEBOGEN is aware of Shoreham Port and our continued relationship. Along with our dealer (E.H. Hassell and Sons) we project managed the new machine from the initial discussions through to delivery on site, once again we would like to thank Shoreham Port for their business."

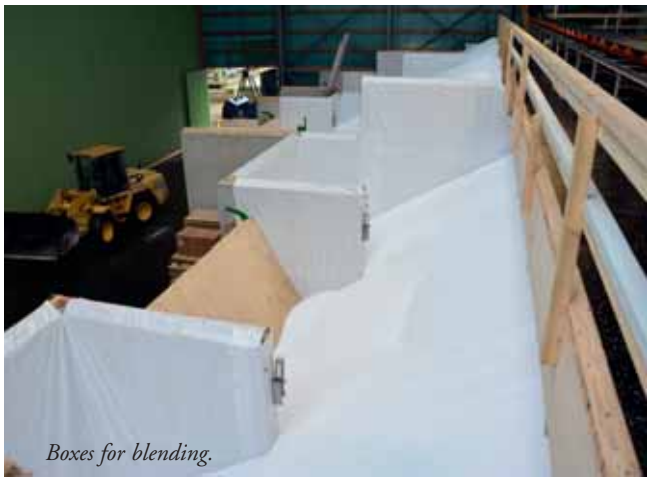
Terminal Louis Hagel's expanded logistics services includes fertilizer blending

The Terminal Louis Hagel.

Since January 2014, the Terminal Louis Hagel in Hamburg, which specializes in the transloading and storage of high-quality fertilizer, has been offering the option of blending fertilizers. To this end, Louis Hagel installed custom-made boxes in an existing silo and adapted the conveyor lines accordingly. The result is an expansion in the portfolio of logistics services in the bulk cargo segment offered by the traditional Hamburg company established as far back as 1878. The company SKW Stickstoffwerke Piesteritz, a subsidiary of the Czech Agrofert group, responded to growing demand for their innovative mineral fertilizers by installing a blending facility at the Hamburg location. By utilizing this group-owned facility, SKW Piesteritz is able to boost the capacities of ALZON 40S fertilizer, for which there is a high demand on the market. The blended product consists of environmentally friendly, nitrogen-stabilized urea and nitrogen-sulphur fertilizer and has been developed especially to provide cereal crops with nutrients.

In September 2014 in time for the fertilizer season a new job luffing crane from Kirow Ardelt was installed. Now vessels with a draught up to 11 metres and a length up to 200 metres are able to be processed here. Hagel offers the possibility to load and discharge vessels and barges from/into trains, trucks or storage in the most flexible and reliable way. Barges with a breadth up to 11m can be moored parallel to the vessel at the inner side of the crane platform for direct transshipment.

The possibility to load vessels with these dimensions exists likewise. With a modern loader, dry bulk cargoes are loaded into the vessel — either directly from trains or trucks or after interim storage. Via a closed pipe system with integrated conveyor belts the cargo is forwarded to the ship. The performance ranges from 600–800 tonnes per hour depending on the cargo.


Boxes for blending.

"Since the reunification, we have gradually expanded our portfolio. In doing so, we adapted our operations to the changing market requirements. In the 1990s, the focus was on the export of standard fertilizers, whereas today we additionally load containers with speciality products for the world market and handle import fertilizers from all over the world. This calls for enormous flexibility on the part of a cargo-handling operation," says the owner Horst Hagel. DCi

TRAMCO

- TRAMCO has been involved in the design, application, engineering and manufacturing of the world's most extensive line of chain conveyors, enclosed belt conveyors, specially designed conveyors and conveyor conversions since 1967.

- Our products are robust, reliable and designed to handle severe processing applications. Our variety of designs allows flexibility to specify the size of conveyor for your capacity, at the best value.

- Since 2000, we have had a design and manufacturing facility in Hull. We employ local people with a diverse range of skills, including bespoke product design, fabrication, welding, machining, assembly and painting.

- TRAMCO conveyors offer solutions for delivering product for various industries such as chemical, coal, food and grain, mining, plastic, pulp, rubber and paper, or solid waste and recycling.

- Our philosophy is to produce high quality, reliable equipment that meets specific customer needs. Our production facility offers cutting, machining equipment and robotics which allows for complete in-house production.

- When you buy from TRAMCO, you get customer dedicated design, world class expertise and a manufacturer that knows how achieve on a global platform. With TRAMCO, you can rely on conveyor systems that deliver.

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BUCKET ELEVATORS

igus® celebrates 25 years of chainflex®

igus® is celebrating 25 years since the launch of its chainflex® range of cables developed specifically for moving applications in energy chains. With 1,040 cables available from stock, the chainflex® range includes motor, control and data cables. As provider of e-chains®, igus® tests and offers both energy chains and chainflex® cables as a system solution with a 36-month guarantee upon request. "The degree of automation in companies is continuously increasing, particularly on the journey towards Industry 4.0," says Frank Blase, CEO, igus®. "At the same time, it is necessary to guarantee uninterrupted flow of data, media and energy. With business in this area exceeding € 100 million in revenue this year for igus®, this really motivates us to invest significant resources in innovation, product reliability and fast, worldwide availability, to ensure that our customers receive the best possible ratio of price to reliability."

Considerable investments are being made at the igus® test laboratory in Cologne. Here, there are more than 70 cable test machines performing more than two billion test cycles per year. On average, 650 cable tests are being conducted simultaneously. New test rigs enable fast acceleration speeds of 15m/s² on a travel of 50 metres; a new cryo-chamber has been installed, which allows tests down to –40°C. Thanks to new torsion attachments and the expansion of the outdoor installation for long travel distances, cable use can be simulated under even more real conditions. The overall area of the test laboratory has increased by 1,000m² to a current total area of 2,750m².

Thanks to a multitude of tests, igus® is the only manufacturer able to offer a 36-month guarantee for all chainflex® cables, including torsion cables such as the world's first CAT7 cable for robotic applications. These tests also allow igus® to make exact statements in its catalogue regarding bend radii, temperature ranges and service life for special use in the e-chain, in addition to the standard norms.

The results from the test laboratory are also used in the five online configurator tools for chainflex® and three online tools for readycable® harnessed solutions. igus® has invested significantly in its online capabilities to allow customers to quickly determine the service life in moving applications and find, configure and order the most suitable cables for their particular application.

igus® has also expanded its production and storage capacity in North America, Asia and Europe — this ensures even faster delivery to its customers in local markets. With cable production on three continents and 14 storage and assembly centres worldwide, customers receive the exact cable needed for their production system from stock: single, individually cut cables, reeled cables, fabricated cables or ready-to-install energy chain systems. Complementing this offering, igus® provides an on-site system installation service.

Blase concludes: "Now and in the future, affordable pricing will not be the sole concern of customers. Their primary concern is the quality and reliability of cables when working in an energy chain. We consider ourselves the first point of contact for finding a solution for our customers and our 36-month guarantee makes it clear that chainflex® lasts."

Martin Engineering forms business unit focused on cleaning pollution control systems

Martin Engineering has announced the formation of a new global business unit, which will focus specifically on the powerhouse, and products designed to clean the boiler and all air pollution control components, SCR reactors, heat exchangers, economizers, bag houses, ductwork, ID fans and electrostatic precipitators. In addition to the power industry, the new business unit within Martin Engineering is targeting a number of applications, including biomass, pulp & paper, cement manufacturing and other industrial operations that use large-scale boilers. The new Power Generation Solutions group is structured around a series of technologies that work in tandem to reduce ash build-up, boosting system throughput, regulatory compliance and energy efficiency.

Sonic horns energize bonded particles, and ash sweepers return the particles back into the high-velocity zone.

"Virtually all large-scale boilers have pollution control devices," explained Managing Director Mark Stern. "The components need to be relatively clean for the units to function properly, but they all collect deposits over time. It's been demonstrated that ash build-up can cost some facilities more than a million dollars per year in reduced thermal efficiency, maintenance, system downtime and replacement catalyst."

The issues include a host of problems caused by ash build-up, such as a loss of de-NO_x potential, increased pressure differential, decreased catalyst life from plugging, poisoning and erosion, loss of heat transfer or excessive build-up on bags, collector plates and ducting. In many operations, the problem can be severe enough to require periodic shutdown and manual cleaning.

Martin Engineering has found that combining acoustic cleaning with ash sweepers delivers better results than either technology alone.

According to North American Sales Manager Mark Dornoff, "Sonic horns have been used in these applications for some time, dislodging fly ash so that gas flow and gravity will move particulates back into the exhaust stream. Acoustic cleaning is very effective with fuels that have a low ash content, but Western coals and some other fuels tend to produce more ash," he said. "Low operating loads and associated reduced gas velocities also contribute to excessive ash build-up."

To address the problem, Martin Engineering has found through extensive testing (both in the lab and on-site) that combining acoustic cleaning with ash sweepers delivers better results than either technology used alone. "The horns are still used to energize the bonded particles, and a timed release of pressurized air from the ash sweepers re-entrain the particles back into the high-velocity zone," Dornoff observed.

Team of experts

The new business unit is a way for Martin Engineering to bring together experts in cleaning technology for power generation stakeholders, to deliver solutions that improve process control and increase profit. One of the distinguishing characteristics of the new global team at Martin Engineering is the range of disciplines and expertise that the members have. While other equipment suppliers offer experience in bulk materials handling and mechanical engineering, the new business unit is taking a broader approach by assembling a group that also includes power generation experts.

"There's some crossover between conventional material handling and these powerhouse applications, but we've learned that these are very specialized operating environments, with some unique requirements," said Stern. "Whether it's a retrofit or a new plant, we have the team members who really understand the power generation side and the material handling, which helps us develop customized solutions tailored for each individual customer process."

In building the Power Generation Solutions team, Martin Engineering has also partnered with SCR-Tech, a respected worldwide provider of SCR catalyst management and regeneration technologies. With the firm's unique knowledge of coal fired boilers — from burners to stack — and its patented catalyst regeneration process, customers benefit from engineered solutions that deliver significant savings in operating and capital costs. SCR-Tech is the only American-owned and -operated catalyst management and regeneration company in the world.

"By helping plant operators maximize their pollution control system performance and efficiency, we assist them in reducing operating and maintenance costs, lowering risk and maintaining cost-effective compliance with increasingly-stringent environmental regulations," Stern added. "With this combined cleaning approach, boiler operators no longer have to accept sacrificial catalyst as part of the cost of doing business."

In addition to marketing existing Martin Engineering sonic horns and ash sweepers, the business unit will be developing new products engineered specifically for power generation applications. These include such designs as the company's Martin® Mega 75 Acoustic Cleaner, which has demonstrated superior particle displacement over conventional sonic horn designs. More than 1,000 units were sold in its first year of availability. The firm will also focus on products to further increase worker efficiency and safety, such as high temperature access doors which combine outstanding sealing performance with quick removal, yet can withstand temperatures up to 1,000°F (538°C).

Managing open-stored commodities effectively

There are various methods to store hard and soft bulk commodities, each with their own challenges. The majority of hard bulk is stored in the open. The constant movement of stock is the foremost challenge associated with managing bulk inventory stored in this manner. Mines, power stations and bulk handlers however still employ this storage method due to the flexibility, functionality and cost saving that it affords.

Moment-in-time volume surveys are often commissioned to obtain accurate moment in time inventory volume data to aid with the management of bulk stored in the open. Ronin's AIMS® survey is a highly accurate independent survey service that delivers a moment in time snap shot of bulk commodity inventory in storage. An AIMS® surveys report offers important information such as volumes, densities and mass . Though effective and highly advantageous for collateral management and independent reporting required by brokers and financial institutions, this method is limited by cost, duration and frequency of surveys. Therefore the AIMS® solution and other moment-in-time methods such as aerial surveys and drive through scans are not effective as a daily management tools and will prove cost prohibitive if a bulk handler, manager or trader requires an elevated level of control over bulk inventory that can only be achieved by obtaining daily volume reports.

Enter the ARTEMIS® 300 solution. An industry revolutionizing system that arguably represents the most cost effective and accurate, permanently installed daily quantification solution available on the market today. The ARTEMIS® 300 is an hardware and software solution that requires minimal operator input to ensure accurate daily reporting of bulk inventory volumes. The ARTEMIS® 300 hardware element is a multi-axis 3D surface scanning, non-ignition laser architecture, that is capable of sourcing 3D spatial data up to 300m in high saturation environments. Ronin's proprietary software, AIMS® & ART®, provide the processing crunch required to interpret and accurately report sourced volume data on a daily basis.

AIMS® software lies at the core of the ARTEMIS 300 solution. The application shares its name with the company's survey solution, for which it was originally developed, and acts as middleware to inform the ARTEMIS's® front end reporting element (ART®) with highly accurate volume data. These high levels of accuracy are made possible without requiring manual editing of scans thanks to the years of development, field trailing and operations that Ronin® invested into it's ART®, ART+®, AIMS® and ARTEMIS® 40 bulk quantification solutions.

Over a decade of experience has been distilled into the apex solution that is ARTEMIS® 300 to ensure that your valuable bulk inventory receives the attention required to mitigate losses associated with open air storage by delivering the elevated level of control that only daily volume reporting can offer.

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Cavotec wins major port equipment orders around the globe

Global engineering group Cavotec has won five separate orders with a combined value of more than €9 million for some of its key innovative technologies, including the Group's MoorMaster™ automated mooring system and the new Automatic Plug-in System (APS), highlighting the strength and diversity of Cavotec's portfolio.

"These orders demonstrate how Cavotec continues to expand its presence in the global port equipment sector. MoorMaster™ is one of our leading technologies and its continuing success at the Port of Salalah in Oman, and at other ports around world, underlines the great potential of the system," says Ottonel Popesco, Cavotec CEO.

Existing MoorMaster™ units in situ at the Port of Salalah in Oman.

The largest of these orders is for a number of MoorMaster™ MM400E automated mooring units at the Port of Salalah in Oman, which are to be installed at one of the port's container berths. The order is the latest in a long series of MoorMaster™ projects at the Port of Salalah, where the technology first went into operation in 2006.

MoorMaster™ is a vacuum-based automated mooring technology that eliminates the need for conventional mooring lines. Remote-controlled vacuum pads recessed in, or mounted on the quayside or pontoons, moor and release vessels in seconds.

To date, some 200 MoorMaster™ units have been installed at 28 locations worldwide and have completed more than 130,000 mooring operations at ro/ro, container and bulk handling, and lock applications.

Elsewhere, a major crane manufacturer has placed a substantial order for Cavotec's APS units for installation on 16 Electric Rubber Tyred Gantry (ERTG) cranes, and a large number of yard connection points for a port in India. In addition to the manufacture and supply of this equipment, Cavotec will also be supporting the customer with on site supervision and commissioning.

"We're especially pleased about the APS project: APS is one of our newer technologies, and this order indicates the potential it, and our other innovations, have in the market place," says Luciano Corbetta, Group Market Unit Manager, Ports & Maritime.

APS automates the connection of cranes, ships and other mobile equipment to the power grid using cable reels. The technology promises to make an important contribution to many ports and terminals in terms of safety, environmental performance and operational efficiency.

In a separate development, Cavotec has also been awarded contracts to supply its MoorMaster systems for applications in Australia, Canada and the United States, with a combined value of approximately €6.5 million.

"The MoorMaster™ technology continues to gain traction and acceptance in the market place. These orders — from new and existing customers — demonstrate the considerable potential of this unique technology in the global maritime sector," says Popesco.

In the largest of these projects, Cavotec is to supply six MoorMaster™ units for the two locks on the US side of the St. Lawrence Seaway. The units are scheduled for delivery for the first lock in July 2016, and the second lock in April the following year.

MoorMaster™ units have been in operation at the Seaway for a number of years, and Cavotec is currently completing installation of 39 MoorMaster™ MM400L (Lock) units in all 13 of the locks on the Canadian side of the waterway. These specially adapted units hold vessels securely through variations in water level of up to 14m.

The St. Lawrence is the world's first inland waterway to introduce automated mooring. Work began on installing the first MoorMaster™ units at the St. Lawrence, on a trial basis, at two locks in 2007.

"We have worked closely with the St. Lawrence Seaway for many years, and together we have been able to realize substantial operational efficiencies through the implementation of MoorMaster™," says Marcelo Gonzalez, Managing Director of Cavotec Canada.

Considered to be one of the greatest engineering feats of the 20th century, the 3,700km-long Seaway is an essential trade link between the Atlantic Ocean and the Great Lakes at the heart of North America.

And in Newfoundland, eastern Canada, Cavotec has won a contract for four MoorMaster™ MM400E10 units for the Portugal Cove – Bell Island passenger ferry service. Two units will be installed at the Portugal Cove Dock and two at the Bell Island Dock.

The third order has been placed by SeaRoad Holdings a leading Australian transport and logistics provider. SeaRoad Holdings has purchased two additional MoorMaster™ MM400A10 units to supplement their existing installations in Devonport in Melbourne.

This brings the mooring capacity to five MM400s at each berth to cater for a larger ro/ro vessel being introduced on the route between Melbourne and Tasmania.

Additionally, SeaRoad is working with Cavotec's After Sales and Service department to project manage and overhaul the existing units without disruption to operations. These existing units have been in continuous service since 2003 and have accumulated more than 35,000 hours of mooring at each berth.

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"WHITE is the New Green"

Blue Fuchs appointed dealer for E-Crane in the UK

The Blue Group is a specialist provider of materials processing equipment for the quarrying, waste recycling, scrap, port and wood handling industries in the UK & Ireland and E-Crane has announced that Blue Group Company, Blue Fuchs, as the dealer for E-Crane in the UK.

Blue offers complete solutions from single equipment specification and supply, to the bespoke design and installation of complete integrated processing systems. With an extensive but focused portfolio of world leading brands in the materials processing sector, Blue is able to combine the very best in proven equipment with the latest innovative technologies to give a winning and competitive edge to your business.

As an exclusive dealer of TEREX Fuchs material handlers for the UK & Ireland, Blue Fuchs was quick to identify a need to offer larger capacity and longer reach solutions to larger port and scrap handling clients, and after an extensive global search for a suitable partner, identified E-Crane as the perfect manufacturer for Blue Fuchs to supplement the TEREX Fuchs programme.

Blue Fuchs Managing Director, Terry Hughes, commented "E-Crane offers Cranes with a reach from 25 metres and up and the company as a whole marries in well to the Blue philosophy of only partnering with high quality, global leading brands. Our new partners have especially proven themselves in the harsh working environments of steel mills, ports and recycling facilities globally, and are designed for 24/7 operation. E-Crane machines with over 60,000 operating hours are quite a common sight throughout the world and they are recognized for having the lowest operating costs in the industry. We are delighted to have reached agreement to represent this world-leading brand in the UK."

By working closely together, Blue Fuchs and E-Crane will now look to successfully expand the reach of Balance Cranes throughout the UK.

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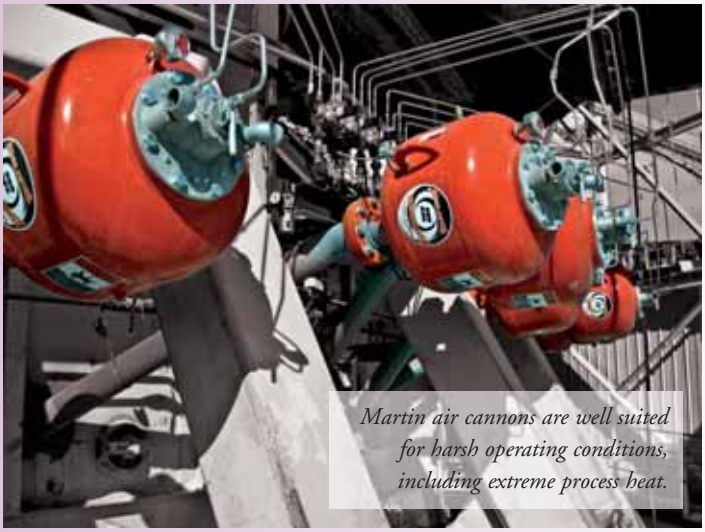
Martin Engineering announces EAC certification

Major bulk material handling solutions Martin Engineering has gained the EAC Mark of Conformity (aka, Eurasian Conformity Mark) for the export of conveyor products and material flow aids, including the company's full line of impact cradles, belt cleaners, sealing systems, air cannons and sonic horns. The important certification allows the Martin Engineering business units in Germany and Russia to offer the company's extensive product family to the Customs Union (Russia, Belarus and Kazakhstan) and assures that the equipment is compliant with the EAC's strict safety and quality standards. This will provide companies in the region with safe and efficient components for improving productivity, controlling fugitive material and clearing accumulation in chutes, silos, kilns and ductwork in a variety of material handling applications such as mining, coal, cement, biomass, aggregate and fly ash.

The EAC approval is in accordance with the February 2013 agreement between the member states of the Customs Union that unified certification requirements for machinery and equipment. According to Russian Division Branch Manager Oleg Meister, "The EAC Mark of Conformity is essential in order to sell and install bulk material handling components in the three member countries. It will be instrumental in assuring ready availability and reasonable lead times."



Martin air cannons are well suited for harsh operating conditions, including extreme process heat.

Belt cleaners help prevent carryback and fugitive material, even on heavy-tonnage conveyors moving at high speeds.

Martin Engineering has built its line of conveyor products with a commitment to making bulk handling equipment cleaner, safer and more productive. The company specializes in solutions for difficult applications, such as today's longer, faster and more heavily-loaded belts. Components are designed to mitigate severe impacts and direct the energy of a fast-moving load to control spillage and minimize dust, reducing risks and wasted clean-up time while improving overall system efficiency.

Also designed for durability under extreme conditions are flow aids such as Martin Air Cannons, which are becoming the technology of choice for industries across the six continents the company serves. Powerful shots of air dislodge adhered solids and fines from vessel walls, ductwork and components, introducing the material back into the process flow. The rugged construction of the air cannons is well suited for harsh operating conditions, including extreme process heat and ambient temperatures as low as –50°C (–58°F).

To facilitate set-up and use, Martin Engineering has confirmed that all certifications and documentation will be provided in the Russian language. Customers will be able to purchase air cannons from Martin Engineering Europe, allowing export to Russia.

Martin Engineering products previously achieved TR CU (formerly GOST) certification (technical standards for products marketed in the three countries, similar to UL in the United States or CE in Europe). "Throughout the region, companies are seeking more efficient, safe and profitable ways to run their operations," Meister observed. "Technical advances that improve productivity and reduce risks have been of particular interest."

Reducing workplace risk is a focus of the EAC Mark of Conformity, assuring the "safety of machinery and equipment," particularly when "used in an explosive atmosphere," such as the many types of cramped spaces filled with volatile dust found in bulk handling systems. Preventing clogs and piling by keeping material flowing is a key to safe operation and to avoiding the need for workers to enter chutes to perform unpleasant and potentially dangerous maintenance.

"Effective flow systems are essential to the work of trying to improve the operations of bulk material handling," Meister concluded. "This certification allows us to offer more complete and versatile solutions that could help make systems across the region safer, while at the same time reducing operating costs."

Components are designed to contain fast-moving loads to control spillage and minimize dust.

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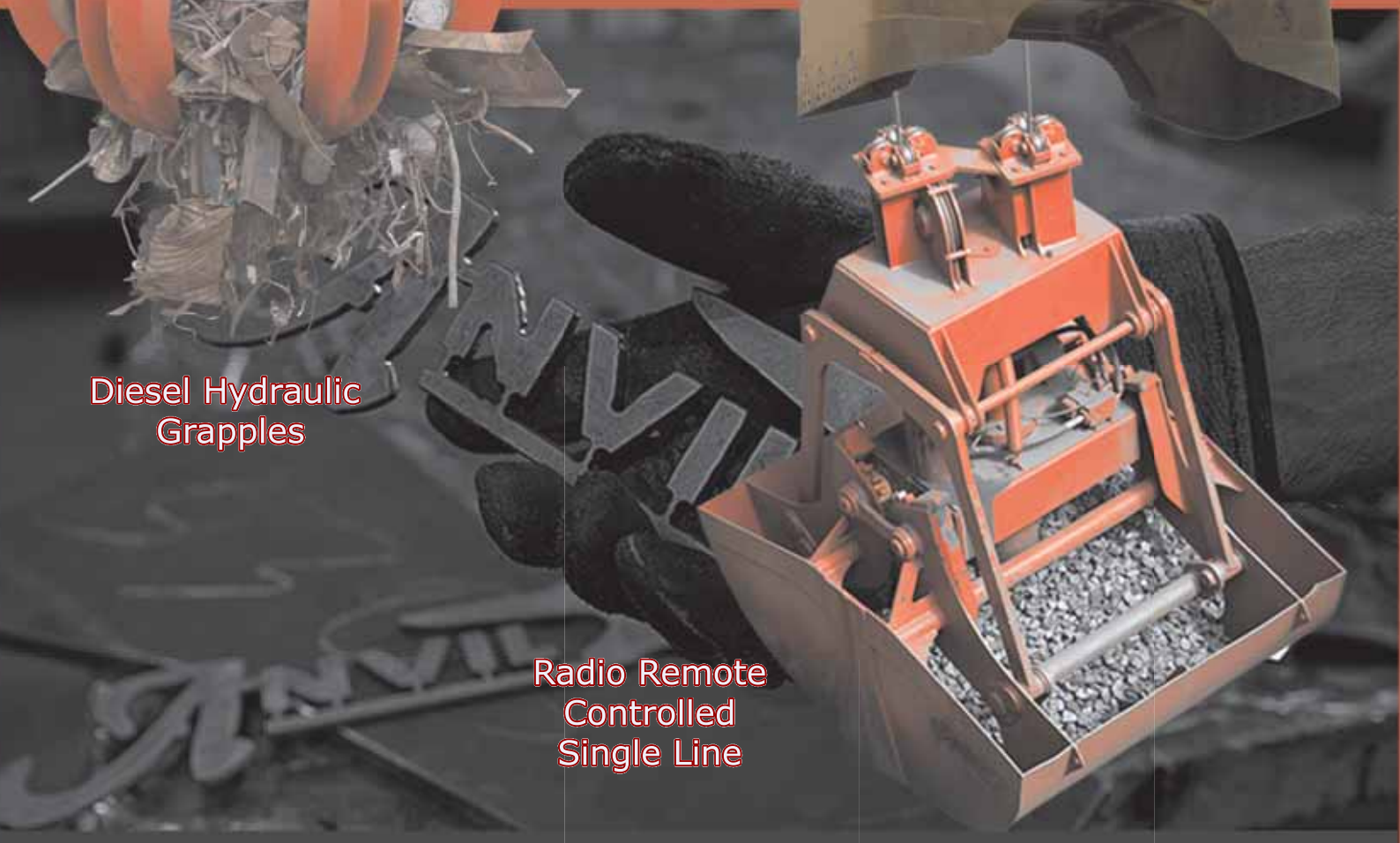

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Redhead Equipment takes over SENNEBOGEN sales and service in Saskatchewan in Canada

One of the largest heavy equipment dealers in Saskatchewan, Redhead Equipment, now offers sales, parts, service, and financing on SENNEBOGEN material handling equipment.

In November last year, Constantino Lannes, President of SENNEBOGEN LLC, announced Redhead's appointment as the latest addition to the SENNEBOGEN distributor family. "With seven locations from Lloydminster to Swift Current and more than 100 technicians in the province, Redhead can provide fast, reliable service for SENNEBOGEN customers," says Lannes.

"As a matter of fact, they have already scheduled a number of their techs to come to Stanley for training before Christmas — that's commitment," adds Lannes.

"What sets us apart is our long history of parts and service support in Saskatchewan," says Gary Redhead, President and CEO of Redhead Equipment. "We're well respected in the industry. We have a reputation for getting the job done."

Redhead views SENNEBOGEN's strong reputation for quality as a good fit for his business. "I talked to a lot of dealers, and I never heard a bad thing about SENNEBOGEN anywhere. That's the kind of partner you want." He adds that Redhead employees "are definitely very pumped" about extending their line-up with SENNEBOGEN material handlers.

Redhead also likes the fact that SENNEBOGEN has a culture of problem solving for its customers. "SENNEBOGEN is willing to build equipment to solve a particular problem. That means our customers' choices are truly unlimited," he says.

SENNEBOGEN applications in mining, steel mills, scrap, forestry & waste

By adding SENNEBOGEN to its product line-up, Redhead can now offer its existing customers a purpose-built choice for their material handling applications. The change will help Redhead staff build on their existing customer relationships in a variety of industries. Redhead also identified applications for SENNEBOGEN equipment within the scrap, steel and forestry industries. With a forestry specialist on staff, he plans to begin demonstrating SENNEBOGEN forestry equipment soon.

The power of choice

As an award-winning Saskatchewan dealer, Redhead prides itself on its customer service.

Over more than 65 years of business, Redhead has earned a stellar reputation in the province. *SaskBusiness Magazine* has named Redhead Equipment as one of the Top 100 Companies in Saskatchewan for 19 consecutive years.

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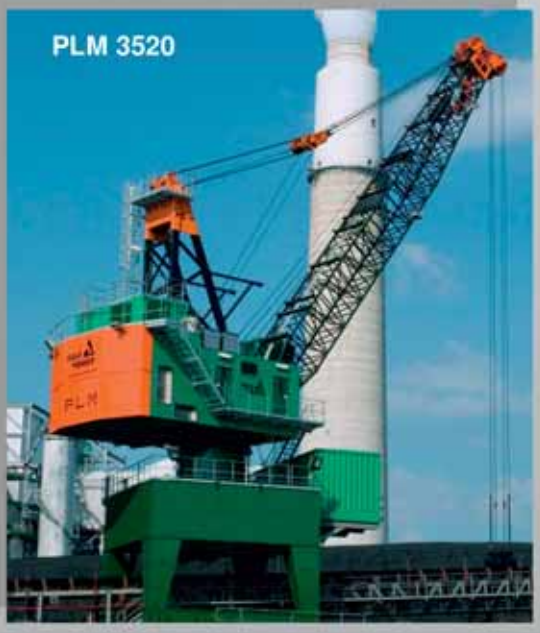

Purpose-built bulk handling, dredging and hoisting cranes.

Why clean air is important

Kieron P. O'Connell

It is useful to remind ourselves why we clean the air. I encourage people to remember the 4Ps.

- **product protection:** product quality can be severely impacted by contaminated air with resultant wastage and cost;
- **plant and equipment protection:** removal of airborne contaminants can provide significant reductions in maintenance and replacement costs, from protection of surface coatings to mechanical equipment and electrical components;
- **personnel protection:** it is critical to protect employees and contractors on ethical and moral grounds alone, nevertheless, the savings in terms of reduced absenteeism, healthcare costs, and replacement staff training can be significant; and
- **public and environmental protection:** once again, we have an ethical and moral obligation not to damage the environment in which we operate and live. In addition, there is the necessity to comply with laws and regulations, the avoidance of fines or sanctions, and the maintenance of public goodwill.

Understanding and defining the contaminant

To properly capture, transport, and collect airborne contaminants, the nature of the contamination and the air in which it is entrained must be understood. Beyond the simple measureable parameters such as air temperature and humidity there are many other questions that need to be addressed. Parameters can include, but are not limited to:

The material, or combination of materials, that comprise the dust; the specific gravity of these materials; the shape of the dust particles, e.g. compact, smooth, angular, fibrous; the electrostatic characteristics of the dust; the agglomerating characteristics of the dust; the average and maximum mass of dust in the air at any time; time-dependent variations in the dust load; a particle size distribution analysis; entrained sensible moisture in the air; oils, fats or grease entrained in the air; dust having adhesive properties (is it 'sticky'?); dust presenting an explosive hazard; and seasonal factors that may result in system changes such as internal condensation.

A typical client will normally not have answers to all of these questions and the cost of testing to obtain them can be time

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consuming and expensive. Fortunately, the experienced air filtration specialist will have designed for the same or similar applications and based on that knowledge and on the answers to at least some of these questions, will be able to guide the client to the best dust collection solution.

Factors to be considered before selecting a dust collection system:

The buyer can expect to be operating the dust collector chosen for many years to come so it is important to ask all of the questions beforehand that will ultimately result in a satisfactory selection. The following list covers many of these:

- size, based on space available;
- indoor or outdoor location;
- continuous or intermittent operation;
- local structural requirements, wind and seismic;
- suitability to the application;
- availability and costs of utilities such as power, compressed air, water;
- handling and disposal of collected material;
- legislative and code requirements;
- support and maintenance capabilities;
- particulate removal efficiency required;
- is the material to be collected explosive?
- materials of construction and finishes, is the material to be collected corrosive?
- installed cost, including peripherals and accessories;
- ease of operation and operating cost;
- ease of maintenance and expected maintenance costs;
- availability of replacement parts;
- expected operating life; and
- warranty and guarantees.

Types of dust collection equipment

Dust collectors can be separated into a number of general categories as follows:

- continuous duty self-cleaning dry media dust collectors;
- intermittent duty self-cleaning dry media dust collectors;
- wet hydrostatic precipitators;
- wet centrifugal dust collectors;
- high pressure wet venturi dust collectors;
- electrostatic precipitators; and
- cyclones and drop-out boxes.

Continuous duty self-cleaning dry media dust collectors are required to operate continuously and clean on-line, with minimal down-time required for maintenance, usually only during scheduled outages. The self-cleaning style dry dust collector uses pulses of compressed air, or high pressure airflows, to reverse the airflow through the filter material displacing the collected dust to a collection hopper for removal. The cleaning mechanism can operate at normal airflow conditions.

These collectors are available in two general types: baghouses and cartridge collectors. Baghouses are preferred for high inlet dust load applications up to 20 grains per ft^3 (45.767 grams per m^3) whereas most cartridge collectors are suitable for moderate dust loads up to 3 grains per ft^3 (6.865 grams per m^3).

Intermittent duty self-cleaning dry media dust collectors must shut down regularly for cleaning off-line and lend themselves to intermittent manufacturing processes where dust is not produced continuously. The intermittent style dry dust collector cleans by means of a shaking mechanism that vibrates the filter material displacing the collected dust to a collection hopper for removal. The cleaning mechanism is only effective without airflow. This type of product is ideal for venting work stations in wood, metal, plastics and ceramic dust applications.

Intermittent duty collectors are generally lower in cost than continuous duty collectors.

Wet hydrostatic precipitators use a combination of induced aerodynamic and hydrostatic forces to transfer particulate in the airstream into a water bath from where it settles out into a hopper from where it can be removed automatically or manually. Such collectors can also be operated continuously. The hydrostatic precipitator is less efficient than a dry media collector for the collection of very small (submicron) particles, however it does offer a significant advantage:

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It is an ideal collector for the collection of highly explosive dusts since it removes the dust from the oxygen rich airborne environment, the water eliminates any sources of combustion, and the encapsulation of the dust in the water prevents the formation of a dispersed explosive dust cloud.

These are the collectors of choice for collecting the explosive dust formed when working light metals such as aluminium, titanium and magnesium. While there are ways to handle some explosive dusts in dry fabric dust collectors (but not light metals), the solutions required often cost more than the original dust collector.

Wet hydrostatic precipitators can handle heavy inlet air dust loads (up to 10 grains per cubic foot).

Wet centrifugal dust collectors inject controlled sprays of water into the air entering the device and through a combination of mixing, impaction and centrifugal force, cause the particulate and water to mix and then be separated from the airstream. Such collectors use specially designed blades to enhance this process and increase efficiency.

An important feature of the wet centrifugal dust collector is that it is both an air moving device AND a dust collector. This negates the need for a separate fan with all the attendant cost savings. It also means that the product has a small footprint and will fit into spaces where other types of dust collector will not.

Wet centrifugal dust collectors are designed to handle inlet air dust loads up to 2 grains per cubic foot.

High pressure wet venturi dust collectors are the preferred wet collector for difficult wet, sticky, oily or self-combusting dusts when very high efficiencies on small and sub-micron particulate are desired. The contaminated air is forced through a narrow venturi throat at very high velocity where it is mixed with a water spray. The resultant water-particulate mixture is then removed using a cyclonic separator.

The disadvantages of the wet venturi dust collector are the quantities of water required and the high energy needed to force the air through the venturi. However, it is often the only dust collector that can be effectively used for some applications.

Electrostatic precipitators use electrostatic forces to collect the particulate contained in an airstream. There are two main types: high-voltage single state precipitators (Cottrell type) which use high voltage (40,000–70,000 volts) DC discharge electrodes; and low-voltage dual state precipitators (Penny type) which use a much lower voltage (a 13,000-15,000 volt DC supply with intermediate supply of 7,500).

The large Cottrell-style collectors are typically used in large power plant applications but have been losing ground in recent times to media collectors due to high initial cost. The smaller Penny style collectors are excellent for removing smoke and oily particulate from the airstream in industrial applications but have also lost ground to media filters, again because of higher initial cost.

The advantages of electrostatic precipitators are their high removal efficiency and low energy usage because the open plate design presents almost no barrier to airflow.

Cyclones and drop-out boxes are often used as pre-cleaners to eliminate the larger particulate and much of the mass from an airstream ahead of a high efficiency dust collector. Cyclones induce a rotational centrifugal force into the airstream which causes the heavier particulate to separate from the lighter air. Drop out boxes use change of direction and slowing of the air velocity to cause the heavier particulate to drop out of the airstream.

Cyclones may remove between 70% and 80% of the mass of particulate in the airstream. They are ineffective in removing small size particulate.

Summary

Regardless of your needs, there is an emissions control system that can meet them. Be prepared to reflect on why you are cleaning the air and know and understand the technologies available that are specifically suitable to your particular application.

Keiron O'Connell, BSc (1st Class Hons), MBA, is a 35 year professional in the air cleaning industry and has spent his entire air pollution control career with AAF International. He has developed, designed, applied, marketed, promoted and sold air cleaning products to all sectors of the air cleaning market including commercial, industrial, power, pharmaceutical and nuclear industries.

AAF International offers a comprehensive range of air filtration solutions. From its world headquarters in Louisville, Kentucky, AAF maintains operations in 22 countries with more than 3,000 employees worldwide. AAF is supported in its international ventures through the resources of its parent company Daikin Industries, Ltd., based in Osaka, Japan, a diversified international manufacturing company and a global leader in air conditioning.

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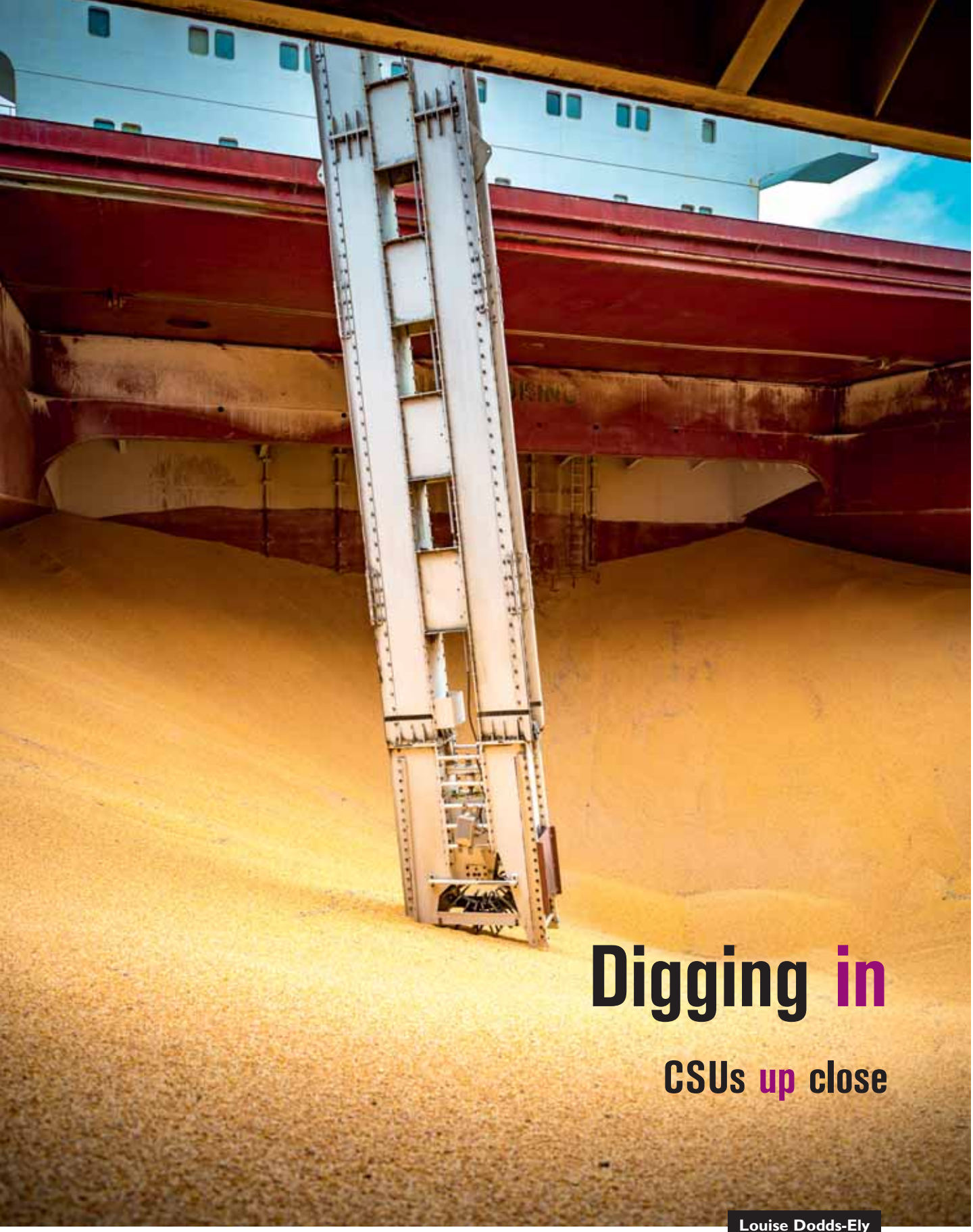

Digging in

CSUs up close

Louise Dodds-Ely

Bühler enables efficient grain import and export in South Africa

South African Bulk Terminal (SABT), a major customer of Bühler located in Durban, South Africa, in 2005 decided to invest in a large overhaul of its first grain import terminal in the port of Durban, DBS, *writes Vincent van der Wijk, Product Manager, Bühler*. At the time, not only the existing silo has been upgraded, but SABT has also invested in a state-of-the-art mechanical ship unloader, the Portalink 800 from Bühler, which was successfully commissioned in 2006. Since 2006, SABT has been using the Portalink continuously over the years and has during that time unloaded more than 20mt (million tonnes) with constant high and reliable unloading capacity.

SABT, at its second grain terminal, RBS, is currently

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undertaking an extensive plan to upgrade not only the silo installation, but also install a new unloader and loader. Based on the excellent experiences with the mechanical unloader from Bühler installed already at the first site of SABT and the long-term relationship between the two companies, Bühler was the logical choice for the new investment.

To be ready for the future enabling larger vessels to be unloaded at the DBS site, both the mechanical unloader Portalink and the loader mobile Portaload are capable of handling vessels up to 80,000dwt. The Portalink, having a nominal unloading capacity of 800tph (tonnes per hour), in line with the previously installed Portalink at the first location of SABT. The mobile Portaload has a nominal loading capacity of 1,000tph. The additional capacity is enabling SABT with its strategic location in Durban to be an important role player in grain imports and export in the port of Durban.

The main technical reasons for SABT to invest both times in the mechanical unloader from Bühler are the low energy costs per unloaded tonne, which are between 0.35 and 0.4 kWh per unloaded tonne, but also the low maintenance costs. Especially important for the operation and consequent efficiency of the unloader is the ease of operating the unloading installation. With the experiences gained by SABT with the first Portalink, confidence in high efficiency unloading through the use of the automatic sink-in

Bühler's Portalink mechanical CSU.

Dust suppression is an integral part of Bühler's product offering.

Mobile Portaload from Bühler.

function has been placed.

SABT not only chose Bühler for its strong reputation in the market regarding equipment, but also because it has great confidence in the professional project management executed by Bühler, and the expert knowledge to complete complex projects and "get it done". SABT is also placing great value and trust on the long history of Bühler as a competent partner with good after-sales service.

One example regarding the excellent knowledge during the project management has been the assembly concept. SABT has continued to use the existing equipment on the quay and requested minimum downtime for on-site installation. In addition, the quay on which the loader and unloader have been installed is standing in the water with two access points. Bühler, together with SABT, has made an assembly concept by which the main components have been assembled at a site in the Port of Durban in large parts specially divided on the maximum weight of available cranes. After pre-assembly in the Port of Durban, the Portalink has been assembled on site after being transported by floating crane, followed by the Portaload. With this option, an optimal combination from on-site installation and total costs has been achieved.

Overview of SABT's operations.

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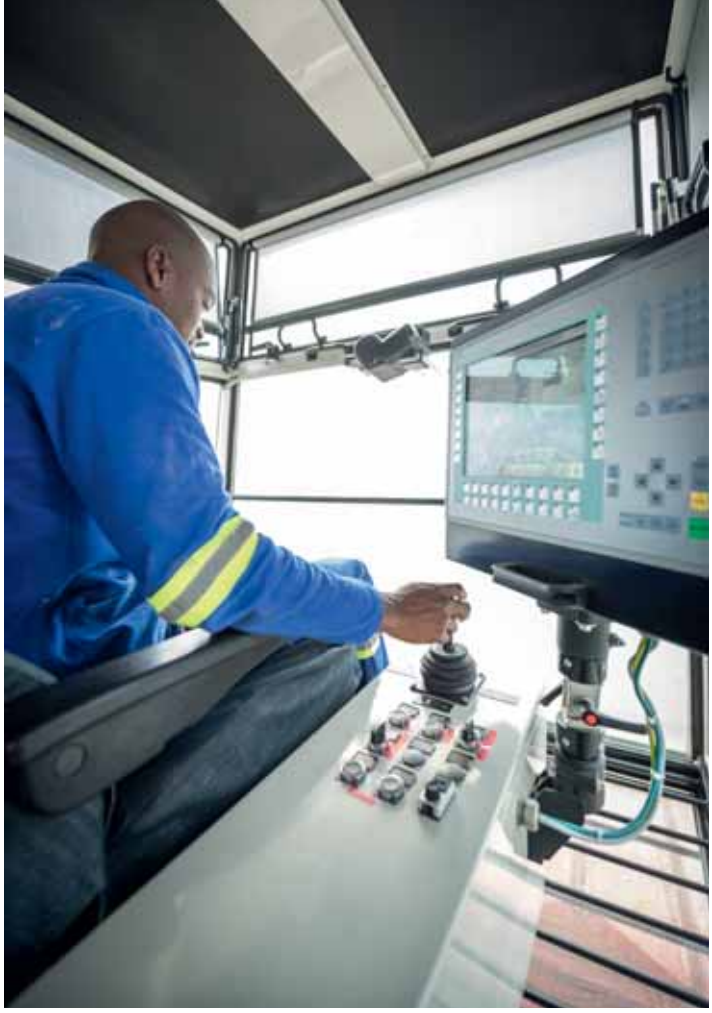
To enable optimal working conditions for the operating crew of SABT, both the Portalink and Portaload have been equipped with an operating cabin in addition to the remote control. The operating cabin enables the operator to have full control and information about not only the installation but also the loading or unloading procedure in a secure and strategic place through which a complete overview of the quay is given. To improve even further the view of the operator, the Portalink is additionally equipped with cameras having a 360° view received of the end of the horizontal boom.

Ehe energy costs are rising, and environmental regulations getting more strict every year. The existing loader without specialized loading head emits considerable amounts of dust during loading operations. This is not only to the detriment of the direct surroundings, but it also means that valuable cargo is blown out into the air. With this upgrade, SABT has invested in the dust suppressor of Bühler enabling loading with minimal dust emission, or to quote Managing Director, Mr Lourens "the dust suppressor works damn well".



About Bühler

Bühler is a global technology leader which specializes in the supply of equipment, systems and services for the conversion of renewable resources derived from food and synthetic substances into top quality functional products and materials. Bühler operates in over 140 countries and has some 10,600 employees worldwide. In fiscal year 2014, the Group generated sales revenue of CHF 2.3 billion.

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Neuero CSUs: an unloader for every need

Neuero Industrietechnik für Förderanlagen GmbH, based in Melle, Germany, offers turnkey solutions for bulk material handling. A major part of its portfolio relates to CSUs (continuous ship unloaders).

All Neuero equipment is manufactured according to the 'Made in Germany' tradition, ensuring high quality, environmentally friendly and durable loading and unloading equipment for industrial plants, silo terminals, power plants, aluminium smelters, malting plants, feed mills, etc.

Below are details of some of the most popular CSU types produced by Neuero. On all of these models, ATEX directives are supported and explosion protected equipment is used. The use of the latest blower technology with additional equipment for sound absorption is supplied, also taking into account local regulations.

Another facet that is common to all the models below is the suction nozzle. This is characterized by an automatic electrical air bypass control which makes it possible to adapt the discharge power perfectly to the geometric conditions, the conveying product and the environmental conditions.

In addition, an automatic nozzle dipping device can be delivered. This controls the depth of immersion of the nozzle in response to the vacuum, thus ensuring a continuous operation with high average capacity.

The auxiliary winch on the boom of the CSUs is very popular. With this winch, a small front-end loader (e.g. Bobcat) or larger excavators with up to 15 tonnes in weight can be lifted into the ship's hold to support the cleaning operation. The winch works at two speeds and is secured via load measuring axles.

Tower

- stationary or on rails;
- loading and unloading capacity: up to 1,500tph (tonnes per hour) based on wheat with 0.75t/m³ or up to 1,000tph based on alumina with 1,000t/m³;
- pay loader winch up to 15 tonnes;
- power source via external power supply or diesel generators;
- unloading of ship sizes up to Capesize;
- pneumatic conveying and loading onto on-site belt conveyors, trucks or rail cars;
- low energy consumption;
- simple operation with automatic mode;
- low dust and noise emissions;
- consideration of the ATEX regulations; and
- easy access with low maintenance.

Neuero's Tower CSUs are especially used in the aluminium industry or in bigger grain terminals. They travel on rails and are equipped with two separate pneumatic conveying lines each covering for 50% of the total capacity. The design of the Tower allows for the integration of various conveying elements such as hopper scales and additional ship, truck or rail car loading equipment.

Special features

Payloader winch on both booms

As a separate winch is mounted on each boom, the unloading operation does not have to be completely interrupted when lowering a front-end loader, such as a Bobcat, into the hold — operations can continue with the second boom.

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Flexiport for biomass

- for unloading of non-free flowing bulk material like soy bean meal, corn gluten, fish meal, wood pellets, etc.;
- stationary, mobile on rubber wheels or on rails;
- special feeder for loosening the compacted bulk material;
- discharge capacity: up to 600tph based on wheat with 0.75t/m³;
- power source via external power supply or diesel generators;
- unloading of ship sizes from Europe II to Panamax;
- loading onto on-site belt conveyors, trucks or rail cars;
- low energy consumption;
- simple operation with automatic mode;
- low dust and noise emissions;
- consideration of the ATEX regulations; and
- easy access with low maintenance.

The Flexiport's unloading operation is carried out with a pneumatic suction conveying system with a vertical and horizontal conveying pipe incorporated in a slewable and liftable boom. This allows for the unloading of non-free flowing materials. The unloading suction line is equipped with a feeding system at the inlet, feeding the material to the suction nozzle. This mechanical reclaim system consists of a electrical rotating feeder, which loosens the material and feeds it to the suction nozzle.

The Flexiport can be used in particular for the discharge of bulk materials like soy meal, corn gluten, fish meal, feed pellets, wood pellets, etc.

Unloading of all kinds of inland or ocean-going vessels with discharge directly onto conveyors, trucks or rail cars. This happens almost dust-free through the use of closed conveying systems and aspiration systems.

Flexiport unloaders have discharge capacities of up to 600tph based on wheat. By Kick-movements of the rigid vertical boom it can reach any place inside the hatch and even below ship covers.

Feeder

Feeding device for loosening and feeding the material to the suction nozzle, with:

- upper slewing device with axial bearing with outer teething and slewing gear drive with hydraulic motor, slewing range approximately 300°;
- kick-in/kick-out device with cylindrical joint and hydraulic kick cylinder up to 60°;
- lower suction portion with axial bearing and outer rotating pipe system incl. outer paddles, slewing gear with 2 x 11kW electrical slewing drive and bypass valve for the suction line;
- with adjustable speed control of the feeder for better material flow control; and
- including a special clean up nozzle for the feeder.

Multiport

- stationary, mobile on rubber wheels or on rails;
- discharge capacity: up to 800tph based on wheat with 0.75t/m³;
- power source via external power supply or diesel generators;
- unloading of ship sizes from Europe II to post-Panamax or Capesize;
- pneumatic conveying and loading onto on-site belt conveyors, trucks or rail cars;
- low energy consumption;
- simple operation with automatic mode;
- low dust and noise emissions;
- consideration of the ATEX regulations; and
- easy access with low maintenance.

The Multiport is suitable for discharge of many kinds of bulk materials especially from the food sector but also for products from the power plant and aluminium industries. These systems are usually customized developments and adapt to the existing geometric conditions.

Unloading of all types of inland or ocean-going vessels and discharging directly onto conveyors, trucks or wagons. This happens almost dust free through the use of closed conveyor and aspiration systems.

Multiport ship unloaders have, depending on the geometry, bulk discharge capacities of up to 800tph based on wheat, with an energy consumption of 1.0kW per discharged tonne. They are powered either directly by low voltage or medium voltage with on-board transformers to get the corresponding voltages. If this is not possible, diesel generators can be used. Such type of


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machines are usually equipped with their own rubber-tyred chassis, which makes it possible to use the unloader at different locations in the port.

With the use of horizontal and vertical telescopic pipes a large surface can be reached within the ship's hatches. With a so-called auxiliary winch on the boom, a small front-end loader (e.g. Bobcat) or larger chain excavator with up to 15.0 tonnes in weight are lifted into the ship's hold for cleaning operation.

The Multiport ship unloader is equipped with the latest filter technology. The main filter with the special filter cleaning system has proven to be the best while simple and maintenance free. A purge air fan draws the air from the clean gas chamber of the filter, compresses the air and thus cleans the filter bags via an integrated nozzle system. Moisture condensation is prevented in the filter media and the use of a compressor is not necessary. Emission levels below 20mg/Nm³ are easily achieved.

Special explosion-protection concepts can be developed and in the event of an explosion special equipment can be supplied to prevent penetration of flames in both directions.

Special facilities

Boom on the ground

The ability to lower the boom to the ground offers a special advantage in maintenance and possible replacement of individual parts, e.g. wear plates in the elbow, cable for winches, pulleys, etc. In consequence work at height — sometimes dangerous — can be avoided.

Auxiliary winch for excavators & Bobcats

With the auxiliary winch on the boom, a small front-end loader (e.g. Bobcat) or larger chain excavators with up to 15 tonnes in weight can be lifted into the ship's hold to support the cleaning operation. The winch works at two speeds and is secured via load measuring axles.

COMBIPORT

- stationary or on rails;
- loading and unloading capacity: up to 800tph based on wheat with 0.75t/m³;
- pay loader winch up to 15 tonnes;
- power source via external power supply or diesel generators;
- unloading of ship sizes from Europe II to post-Panamax or Capesize;
- pneumatic conveying and loading onto on-site belt conveyors, trucks or rail cars;
- low energy consumption;
- simple operation with automatic mode;
- low dust and noise emissions;
- consideration of the ATEX regulations; and
- easy access with low maintenance.

The COMBIPORT is suitable to discharge many kinds of bulk materials especially from the food sector but as well as bulk materials from the power or aluminium industries. These systems are usually customized developments and adapt to the existing local conditions.

Unloading of all type of inland or ocean-going vessels and discharging directly onto conveyors, trucks or wagons. The loading operation take place most of the time with smaller ship sizes. This occurs almost dust free through the use of closed conveyors and aspiration systems.

COMBIPORT ship unloaders have, depending on the design, bulk discharge capacities of up to 800tph based on wheat, with an energy consumption of much less than 1.0kW per discharged tonne. They are powered either directly by low voltage or medium voltage with on-board transformers to produce corresponding voltages. If this is not possible, diesel generators are used.

With the use of horizontal and vertical telescopic pipes a big surface can be covered within the ship's hatches. With a so-called auxiliary winch on the boom, a small front-end loader (e.g. Bobcat) or larger chain excavator with up to 15.0 tonnes in weight are lifted into the ship's hold for cleaning operation.

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PSR returns to Siwertell for second road-mobile unloader

Siwertell, part of Cargotec, secured a second order for a road-mobile ship unloader from Russian company PSR Primstroyresource, based in Vladivostok. The latest contract is for a next-generation, diesel-powered, trailer-based Siwertell 10 000 S unloader, fitted with a double bellows system and dust filter. It will be used to unload cement on the Island of Sakhalin at a rated capacity of 300tph (tonnes per hour). The order was received in September 2015 and the delivery is planned for March 2016.

"Siwertell received this order with great pride and considers it an acknowledgement of the success of PSR's previous delivery," says Jörgen Ojeda, Director, Siwertell Mobile Unloaders.

Siwertell road-mobile unloaders offer capacities of 150–500tph for 5,000–15,000dwt ships and barges.

"Siwertell's road-mobile unloaders were originally developed for handling cement, and so are ideally suited to this commodity.

"Our road-mobile unloaders are among the most reliable and environmentally friendly systems available for cement-handling operations. As there is no need for any preparatory civil engineering works, they can commence operations as soon as they arrive on site.

"PSR chose Siwertell again mainly because of its experience with its first road-mobile Siwertell unloader," says Ojeda. "Other important factors were our reputation for quality and service, the unit's flexibility and high capacity and its low operational and maintenance costs."

In 2009, PSR needed an unloader to discharge cement directly into trucks and train wagons at a city centre location. Therefore quiet, dust-free operations were essential and it identified a Siwertell 5 000 S road-mobile unloader as the ideal solution.

The new unit has all the well proven attributes of PSR's first unloader. However as one of the 'New Generation' units it benefits from a number of advances including a major upgrade of the hydraulic system, completely new and future-proof electrical system, PLC control system and radio equipment, and upgraded EBS system on trailer.

With more than 100 mobile unloading systems operating worldwide, Siwertell has achieved an enviable reputation for market-leading flexible unloading equipment. "This contract from PSR adds to the growing list of follow up orders for mobile units from satisfied customers," says Ojeda. "It further establishes Siwertell as the preferred choice of customers looking for flexible, reliable, high-quality mobile unloading systems."

Siwertell ship unloaders and loaders are based on unique screw conveyor technology, in combination with belt conveyors and aeroslides, and can handle virtually any dry bulk cargo, such as alumina, biomass, cement, coal, fertilizers, grain and sulphur. Siwertell's product portfolio includes ship unloaders, mobile ship unloaders, shiploaders, conveying systems and complete bulk terminal solutions, all of which are designed to ensure environmentally-friendly and efficient cargo operations.

Siwertell is part of Cargotec. Cargotec's sales totalled approximately €3.4 billion in 2014 and it employs approximately 11,000 people. Cargotec's class B shares are quoted on NASDAQ OMX Helsinki Ltd under symbol CGCBV.

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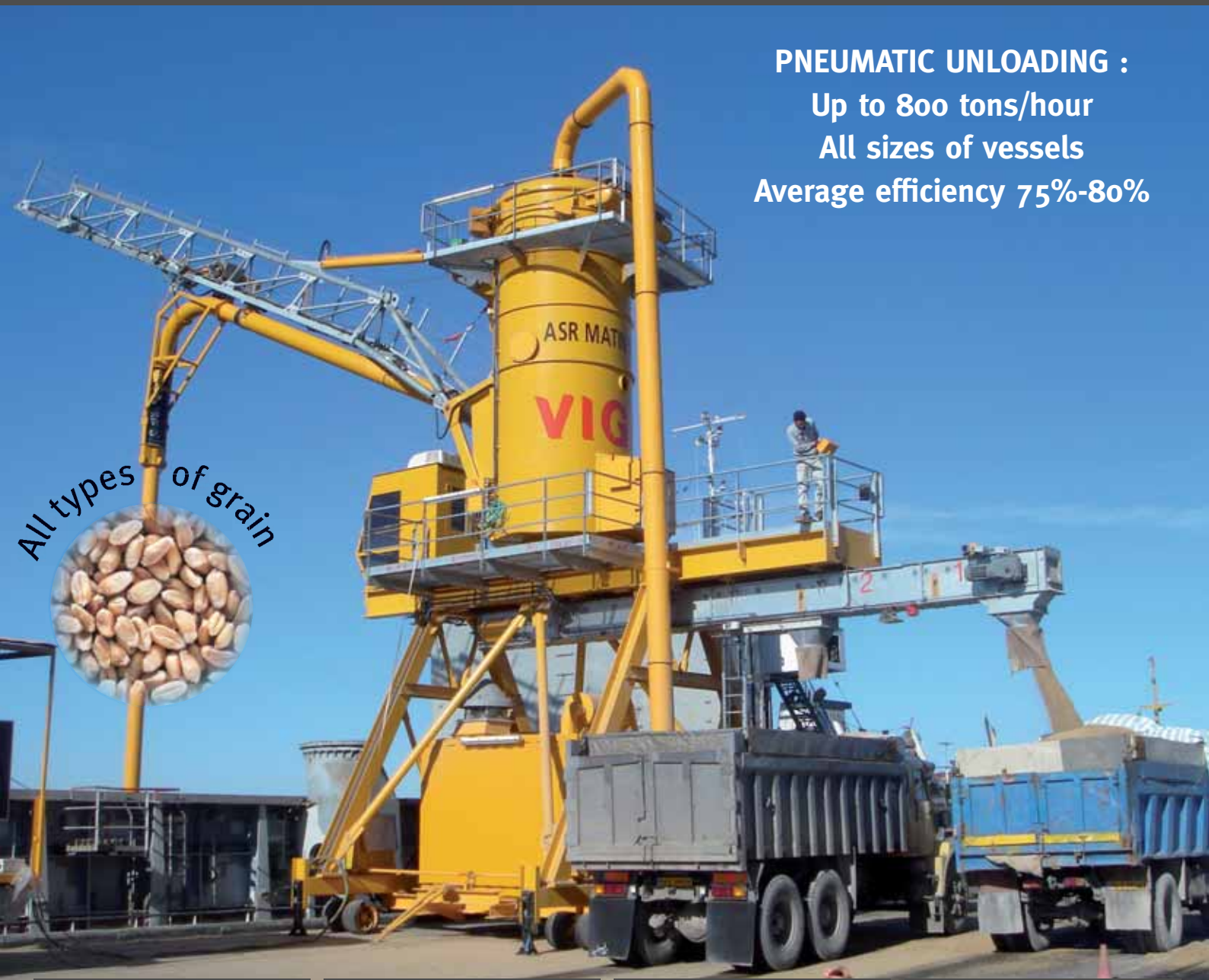

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VIGAN installs high capacity unloaders for large importers

Unlike the minerals and mining sectors, where capacity investments are currently reduced because of the sharp drop in commodity prices, investment in grain activities remains buoyant so far.

It is estimated that 600mt (million tonnes) of grains, seeds and cereals are moved by sea every year. The top three bulk products included in these commodities are wheat, corn and soyabeans, year after year. Will this investment trend continue in 2016?

From its point of view as a focused manufacturer, VIGAN has confirmed that over the last three to four years, it has benefited from increased demand, driven by two trends:

- the increased transport of grain on European rivers, removing thousands of trucks from congested highways; and
- the continuing investment in high-capacity unloaders and grain terminals in importing countries.

400tph pneumatic unloader installed in Rouen in 2014.

River transport in Europe

Public authorities have apparently grasped the concept that using a small 1,250dwt barge to transport commodities removes 60 trucks from the roads. Road congestion is increasing all over Western Europe; in addition to high fuel costs, other factors to consider include CO_2 emissions and the risk of road accidents. It is therefore no surprise that wheat and corn are increasingly transported by barge. Unfortunately, public financial incentives are still to low to really fix this trend.

VIGAN has recently sold unloaders dedicated to handling river barges in its home country of Belgium (Albert Maltings of Heineken Group, Dossche Mills, Cargill in Ghent), as well as in Dunkerque and Rouen in France, in Hamburg Germany and in Switzerland on the Rhine river. For this range of unloaders, VIGAN is focusing its continuous investment in R&D on reducing power consumption. Pneumatic ship-unloaders are already known as the most efficient for unloading barges (i.e. the quickest to empty a vessel); VIGAN's unloaders are combining this positive element with a power consumption not higher than 0.6KWh per tonne. In this case, there is no need for high capacity unloaders when barges are only 250dwt to 3,000dwt. Industrials are focusing more on reliability and total cost of ownership than high capacity.

Large importing countries

Overseas, large importing countries are still the main investors for the grain ship-unloaders, and VIGAN naturally sees a higher demand for machines with higher capacities to unload increasingly large vessels.

Next to the traditional markets of Algeria, Saudi Arabia, Iran and so forth, VIGAN has just commissioned a second NIV 600tph in Taiwan. VIGAN is present in the main two ports of the island, Kaoshiung and Taichung, and is the loyal supplier to EMI, the largest grain importer of the country. This is yet another example of high capacity unloaders for large importers.

There are fears however that, in the coming years, oil exporting countries — some of which are also the traditional grain importers — might reduce their global budget for investment due to lower oil revenues.

600tph VIGAN NIV installed in Taiwan (EMI) in 2015.

Equipment offering the best mix of 'quality-price-efficiency' will remain attractive. Customers require long-term reliability and a strong after-sales service. VIGAN fits those needs: the company offers full service with the projects it carries out, from initial drawings rights up to the manufacture and installation of its machines. Its NIV pneumatic unloaders have been shown to be reliable for more than 30 years, and VIGAN offers a continuous after sales service. There is no better reward than receiving a new order from an existing customer that wants to increase capacity or to equip another site.

VIGAN plans to continue working, and looks forward to what 2016 will bring.

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TAKRAF Tenova successfully tests CSU installed at Taranto Iron & Steel Plant

TAKRAF Tenova has recently and successfully accomplished the performance tests on the CSU (continuous ship unloader) for iron ore and coal installed in Taranto Iron & Steel Plant, Italy. This plant is the largest of its kind in Europe.

The turnkey contract — awarded in September 2013 — came after constant dialogue between TAKRAF Tenova and ILVA S.p.A., the leading Italian steel producer, and was built on a long-standing business association with this prestigious customer of 40 plus years.

The new CSU has been designed to have an operating

capacity of 4,000tph (tonnes per hour) for iron ore and 2,240tph for coal and is able to unload vessels of up to 150,000dwt. The CSU has been erected on the existing runways of the ILVA plant's Pier II to feed, together with the other machines at the plant, the entire steel plant with coal and iron ore and pellets. The CSU has been almost entirely manufactured by Italian companies.

During November last year, TAKRAF Tenova successfully ran the performance tests on both materials, greatly exceeding the contractual parameters.

Only a few companies in the world are able to supply this type of technology and TAKRAF Tenova offers many successful references since, to date; 16 CSUs have been supplied worldwide. TAKRAF Tenova developed the bucket chain CSU technology in the 1980s and subsequent years have seen ongoing enhancements to the technology, with the most sophisticated part being the digging foot for which the company holds the patent.

Modern bucket chain CSU significantly reduce dust emission during the unloading cycle and is for this reason that ILVA — which in recent years has initiated a plan for the environmental rehabilitation of the steel industry in Taranto, very close to the city area — chose TAKRAF Tenova as a reliable partner at this stage of the plan: the CSU's low environmental impact was in fact a major deciding factor.

In addition to the ability to design these kinds of equipment, the company philosophy also aims to support its clients after handover and, upon request, TAKRAF Tenova team is able to give technical assistance both for maintenance and service on an ongoing basis. A fine illustration of this approach is the two service contracts awarded by the leading Italian power generation company, ENEL S.p.A., for the four bucket chain CSUs, previously supplied by TAKRAF Tenova, and located respectively at Civitavecchia and Brindisi to feed coal to two of the largest power plants in Italy. Both contracts are 24-month duration extensions of previous contracts.

Following this experience, ILVA decided to award TAKRAF Tenova with the maintenance contract for the CSU that has just been delivered.

TAKRAF Tenova is a key supplier of equipment and systems for open pit mining and underground solutions and bulk handling, having provided hundreds of complete systems, as well as individual machines to clients all over the world in all climatic conditions. Leading-edge comminution systems for milling and crushing requirements in mining and mineral processing are based on a track record in mill supply dating back to the 1920s. Globally sourced air pollution control, specialized handling equipment, and technology for the cement and fly ash industries ensure selection of optimal processing options.

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Eco ship/barge unloader technology from ThyssenKrupp Industrial Solutions

ThyssenKrupp Industrial Solutions AG, BU Resource Technologies (TKRT, formerly ThyssenKrupp Fördertechnik), one of the world's leading companies in the field of bulk materials handling equipment and systems, is active in the design, manufacture, installation and commissioning of complete materials handling equipment and systems, as well as individual machines, such as stackers, reclaimers, shiploaders, ship-unloaders and wagon tipplers, crushing and screening equipment and opencast mining plant and systems.

Recently, the company's Bulk Materials Handling Business Unit based at Rohrbach in Germany has experienced considerable success with the award of new contracts and the construction of individual machines for continuous barge unloading facilities. Some examples of machines recently installed or currently in design or under construction as well as the new development of continuous ship-unloading technology are described in the following article.

SECOND HIGH-CAPACITY CONTINUOUS BARGE UNLOADER FOR INDONESIA

2012 is the year for Indonesian CBU, besides the installation of a CBU at Bontang, another order was received for a 3,000tph (tonnes per hour) continuous barge unloader (CBU) for coal; destined for Kalimantan on Borneo. It will be the third CBU operating in Indonesia, designed and built by TKF.

The Arutmin North Pulau Laut Coal Terminal, PT Nusa Tambang Pratama, a company of the well-known Bakrie Group, recently placed the order with TKF. One deciding factor for this decision was, amongst others, TKFs' excellent track record of more that 50 continuous ship and barge unloaders in operation worldwide; some of these have been in service for more than 25 years.

This latest CBU is designed for unloading 8,000dwt to 10,000dwt open coal barges at a rate of 3,000tph or 3,500m³/h. TKF received in 2008 the order for a CBU with an unloading capacity of 4,000tph. This unloader, operated by PT Indominco Mandiri, has now been successfully in operation at Bontang, also in Kalimantan, since the beginning of 2010. Seeing the satisfactory performance of this machine in operation was perhaps what finally convinced the client that the TKF type of CBU design was the right choice. However, not only their high unloading capacity, travelling mobility, low maintenance and installed power and energy consumption (compared for example with the screw-type ship unloader or a conventional grab unloader), but also the efficiency of emptying the hull right down to the bottom of the barges without the use of a Bobcat, and thus making 'sweeping' of the barges practically superfluous, are a special advantage of the TKF type of continuous barge unloader.

TKRT, Business Unit Materials Handling, better known in former days as PHB or PWH, first developed the bucket elevator type of continuous ship unloader (CSU) at the beginning of the 1970s. Its first CSU, designed to unload asbestos, was commissioned in 1974. It took some years before customers, who until then had been working with conventional grab-type ship unloaders, saw the advantages of a CSU compared with the conventional grab type used mostly in those days. Since then however, the TKF type of CSU has made its mark in the field of dry bulk ship unloading. Today TKRT CSUs are designed for handling such products as coal, iron ore, phosphate, urea, sand unloading bulk carriers of up to 250,000dwt. In recent years, in particular in countries which depend heavily on importing their fossil fuels, coal fired power plants are invariably built directly at deep water sea locations with the convenience of having their own coal unloading terminal facilities. Two such coal-fired power plants for example, are the Tanjung Bin and Jimah power stations in Malaysia. Here four TKF CSUs are in operation. Another prime example is the Hou Shi Power Plant in Fujian Province, P.R.of China, where three TKF CSUs are in operation. However, also large coal import terminals, for example in China, have in the last ten years turned more and more to using CSUs. To date, TKF has already supplied in total 15 CSUs to China. In South Korea there are already nine TKF-designed CSUs in operation in coal-fired power plants.

2. FOLLOW-UP ORDER FROM BAOLIHUA NEW ENERGY POWER CO., LTD, GUANGDONG, CHINA

In 2012, the Zhu Jiang Power Plant began the expansion project of Phase II for the other 1,000MW block. For that expansion, and in favour of the environmental protection and high unloading efficiency, the client placed an order to TKRT for two chain bucket elevator CSUs.

The contract was awarded in June 2012 for the supply and installation of two CSUs. These unloaders were designed for an unloading rate of 1,500–1,650tph, with ship sizes up to 70,000dwt, and in the future for 100,000dwt representing outstanding success of TKF in China by covering >75% of market share.

Since April 2014 these two CSUs have been operating successfully for coal unloading.

Further to this success story, TKRT won a new contract through an international tender for the new chain bucket

A CBU in operation at Bontang Coal Terminal, Indonesia. This unit is similar to the one ordered for Kalimantan in Borneo.










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Completion of installation of the CBU at Arutmin Coal Terminal, North Pulau Laut, Indonesia.

elevator CSU, for the power plant development of Baolihua New Energy Co. Ltd. Of Guangdong, China. The order was placed in September 2015.

This CSU will be designed for an unloading rate of 2,000–2,200tph and ship sizes up to 100,000dwt representing the third-largest CSU for coal in China, while the others supplied to Huayang PP in China in 2007 and Huilai PP in China in 2010.

For ThyssenKrupp, this follow-up order not only means being awarded a further order, but also represents continuity with respect to design, supply, construction and management and demonstrates the client's appreciation of and satisfaction with TKF's performance to date.

The delivery to site and commissioning of the new CSU is schedule for April 2017. Commercial operations can start from June 2017.

TK's three CSUs, similar to those for Baolihua's Jiahuwan Power Plant, in unloading operation at Huayang Power Plant, China.

The decision of Baolihua New Energy Power Co., Ltd to choose TKRT as supplier for all of its important ship unloaders has been made with confidence in TKF's advanced technology, capability of execution of large scale projects and first-class technical service, as one of the decision makers said, the choice went in favour to TKRT after accurate comparisons of several competitors on the evidence of:

- ❖ worldwide and extensive experiences in the development of coal ship unloader technology;
- ❖ excellent performance of CSUs already built;
- ❖ high availability and long service lifetime without intensive repairs;
- ❖ reliable technical services during construction, commissioning and operation period; and
- ❖ good relationship with Chinese partners for manufacturing and erection

With this contract, TKRT, one of the world's leading designers and manufacturers of CSUs, has once again contributed to the development of China's coal ports and power plants along with other equipment of more than 60 machines for car dumpers, ship unloaders, shiploaders, stacker-reclaimers, etc. DCi

TK's high-performance CSU installed at Zhu Jiang Power Plant China.

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Reeling it in?

successful reel replacement solves CN cable dilemma

The new reel, supplied by Conductix-Wampfler.

Conductix-Wampfler helps CN extend the life of its equipment and achieve operational efficiencies

The operation of every bulk terminal is ruled by the simple principle 'time is money'. To stay competitive, terminals must find ways to minimize revenue losses due to equipment failure. One trend that is gaining momentum is that bulk material handling operators are dedicating more resources towards extending the life of their capital equipment in an effort to reduce disruptions from unscheduled downtime.

The Duluth Ore Dock, part of CN which transloads billions of dollars' worth of taconite and limestone to steel mills throughout the Great Lakes region, is a prime example. At its Duluth and Two Harbor facilities, CN operates some of the largest conveying systems, moving iron ore pellets at a rate of 3,000tph (tonnes per hour) and 6,000tph. CN operates a combination of stackers, trippers, and iron ore bridges, all of which are electrically powered. As it works to move Minnesota's iron ore resource before the cold season hits, equipment issues and maintenance can severely impact the success of the season.

The problem

In the spring of 2014, CN Duluth was experiencing issues with a 51-year-old cable reel that supplied the power to the tripper. The old cable reel was unreliable and required supervision during each move to keep it functioning properly. Failures in the cable reel's operation were known to result in up to five-hour downtimes while the cable was manually readjusted. This was not only extremely inefficient, but a potential safety hazard as well.

Recognizing the need to upgrade its equipment, CN consulted with Conductix-Wampfler, a global leader in electrification, and a trusted partner in several prior CN Duluth projects. CN successfully operated a Conductix-Wampfler monospiral cable reel for 20 years and was very familiar with the high performance and low maintenance design of the magnetic coupler drive. According to Mark Zuroske, Market Development Manager for Mining and Bulk Material Handling in the Americas,

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The 51-year-old reel was in urgent need of replacement.

"during difficult economic times and limited CAPEX budgets, Conductix-Wampfler is working closely with customers to help them extend the life of their equipment."

Factors increasing the complexity of the job were the increase in the size and length of the cable required, and a tight timeline for installation given the need to have the new cable reel operational prior to the onset of winter.

The solution

Placing its confidence in Conductix's ability to meet the deadline and needs for performance, Conductix and CN's engineering teams worked together on the technical specifications of the project. The new cable reel would have to accommodate an active travel distance of 1,600 feet and manage a 4/0 AWG 3 Conductor SHD-GC 5kV All-Temp Industrite cable manufactured by Draka (Prysmian Group). CN settled on Conductix's new Level Wind Reel (LWR). The LWR design, originally developed by Conductix-Wampfler France, incorporates a unique skeleton spool with an internal support design that strengthens the spool, while maintaining maximum rigidity and an overall lighter reel-weight package.

With a total weight of 11,000 pounds, the LWR offers easy accessibility for technicians to get inside the unit. The reel design also helps with the ventilation of the cable, thus lowering the operating temperature, the de-rating factor, and ultimately the size of the cable. The LWR is powered by Conductix-Wampfler's permanent magnetic coupler drive which offers numerous advantages such as smooth constant torque, no friction, no loss of cable tension, and low inertia even when cable tension is high. Flexibility in this type of heavy-duty application is key to minimizing downtime and achieving long equipment life.

The new LWR cable reel was adapted and manufactured by Conductix-Wampfler USA in Omaha, Nebraska. It was ordered in July of 2014 and delivered to CN's Duluth facility in mid-September of that year. This enabled CN to have the new reel installed and operational before the 2014/15 winter season. "This application is a testament to Conductix-Wampfler's ability to respond quickly to the need for a customized, highly engineered solution to meet our customer's requirements" says Mark Schechinger, Engineered Product Specialist at Conductix-Wampfler.

Nearly one year after installing the LWR cable reel, CN is already well on its way to achieving higher degrees of operational safety, increased productivity and cost savings.

Conductix-Wampfler is the largest global producer of systems and equipment for transferring energy and data for applications such as cranes and other material handling equipment, people movers, light rail systems, amusement rides, and many types of automated machines. The company has one critical mission: to provide energy and data transmission systems that keep vital operations running 24/7/365. Its rugged, low-maintenance products have been proven over time in the most demanding industrial environments and are backed by a combined worldwide sales and service network unmatched in the industry.

In business for nearly 100 years, CN is a world-class transportation leader. CN offers the only North American Railroad service that extends to three coasts. The company has regional assets in Duluth, Proctor, and Two Harbors. With strategically located Intermodal Terminals, CN has access to 75% of the US population and all major Canadian markets. Well known as an indispensable link in the supply chain for natural resources like grain, coal and forest products, CN is also a prime mover of consumer goods and industrial products.

Duluth Ore Dock.

The Duluth Ore Dock (formerly part of the Duluth Missabe Iron Range Railroad – DM&IR) is one of the longest iron ore docks in the world at over a half mile long. At the Duluth intermodal facility, taconite and limestone are loaded from the railcar to the vessel and vice versa. DMIR Dock 6 first started in 1918 as a gravity-feed dock. In 1965, an adjacent pellet storage area was built that now covers nearly 45 acres. A 1981 renovation added a conveyor loading system, and a receiving hopper was added in the early 1990s to handle inbound bulk material vessel cargoes.

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ABHS: personalized solutions

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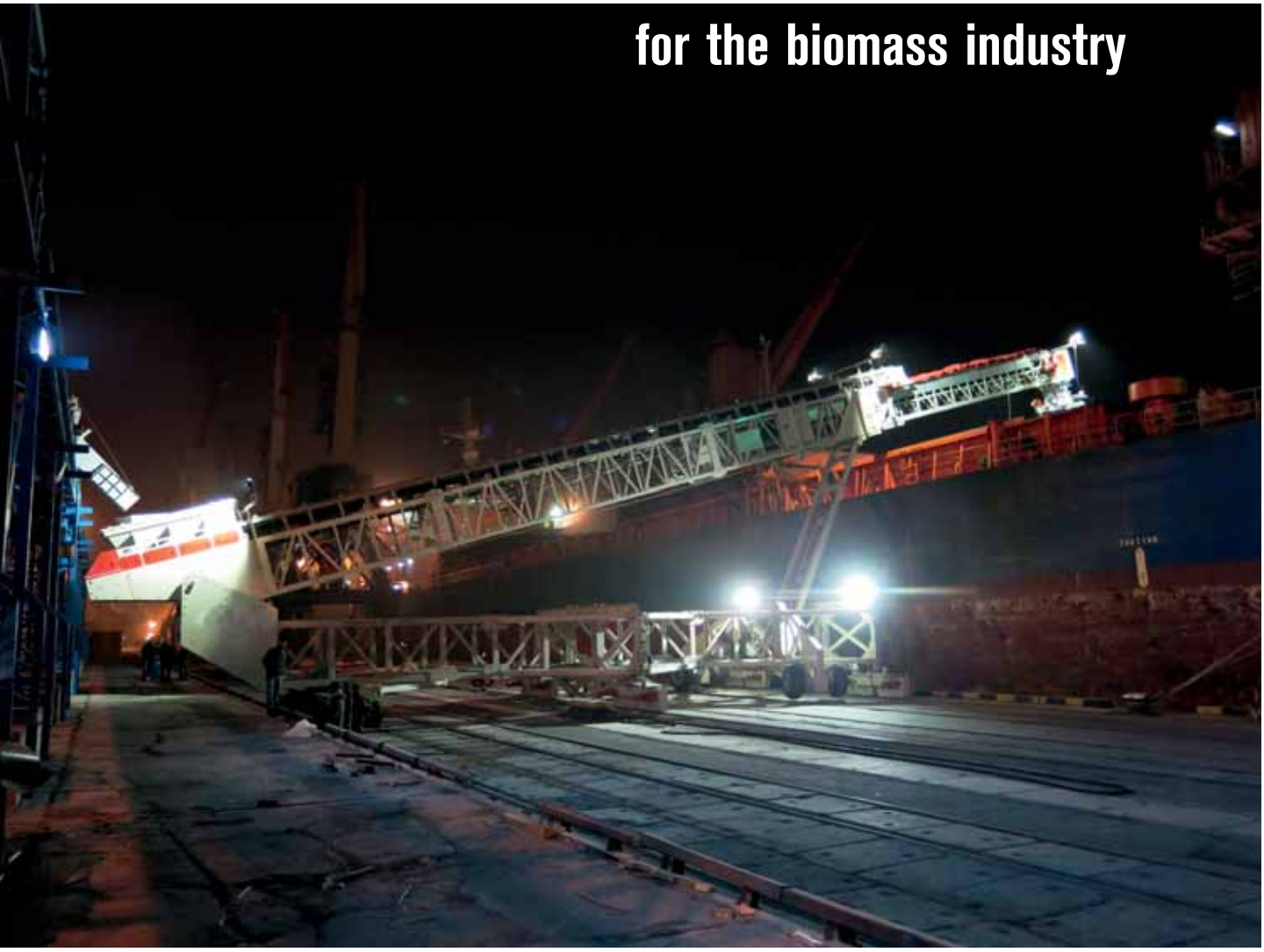


It is without doubt that the energy sector has undergone some transformation in the last number years with increasingly restrictive legislative measures and associated fluctuations in demand for certain fuel sources. The industry has been forced to pursue alternative fuel sources and when the demand for certain biomass products increased as an alternative energy source, it took with it a new set of challenges and a greater emphasis on the material quality and environmental regulations.

Astec Bulk Handling Solutions (ABHS), a subsidiary of the American giant Astec Industries, has extensive experience in the handling of specialist dry bulk products around the world. ABHS offer a wide range of products including mobile and static truck unloaders and mobile telescopic/cambered boom ship and barge loaders and unloaders designed to handle specialist products, such as wood pellets and wood chips.

Conor Brogan, Technical Sales Manager for Astec Bulk Handling Solutions, explains "There are many considerations when handling biomass products. 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. We understand the need to reduce the number of times the product should be handled."

Minimal double handling of material and material degradation

The truck unloaders and telescopic/cambered boom ship/barge loaders range from ABHS are perfect for this type of application. The reduction in the number of times that the product is handled is imperative in order to maintain the sizing of the product but also to avoid contamination. The ABHS range ensures that there is minimal double handling of material, hence minimal material degradation. This all needs to be considered when outlining the specification of handling a biomass product.

The fact that the units are also mobile ensures flexibility of use. The mobile nature ensures that less is required in terms of planning/environmental requirements as well as reduced set up costs. The systems are easy to operate and maintain and are multi-purpose in that they can be used to stockpile in a warehouse or stockyard when not feeding the shiploader. ABHS also offers electrical options for full anti-explosion compliance as well as a full range of dust containment measures to address products with the potential for highly explosive airborne particles. Integrated dust extraction and fully sealed conveyors are options often selected for these applications.

The telescopic and cambered boom ship/barge loading range offer fully customized transfer and discharge points for 'soft loading' of material. The low angle of discharge and low impact force on the belt limits the degradation of the pellets. The telescopic cascade chute option also minimizes impact and regulates the flow of material at the discharge point into the vessel helping to reduce degradation.

The ABHS products are fully customizable to suit the customer's current infrastructure and can be integrated with existing and new fixed systems.

ABHS success is in providing customizable products for excellent production rates

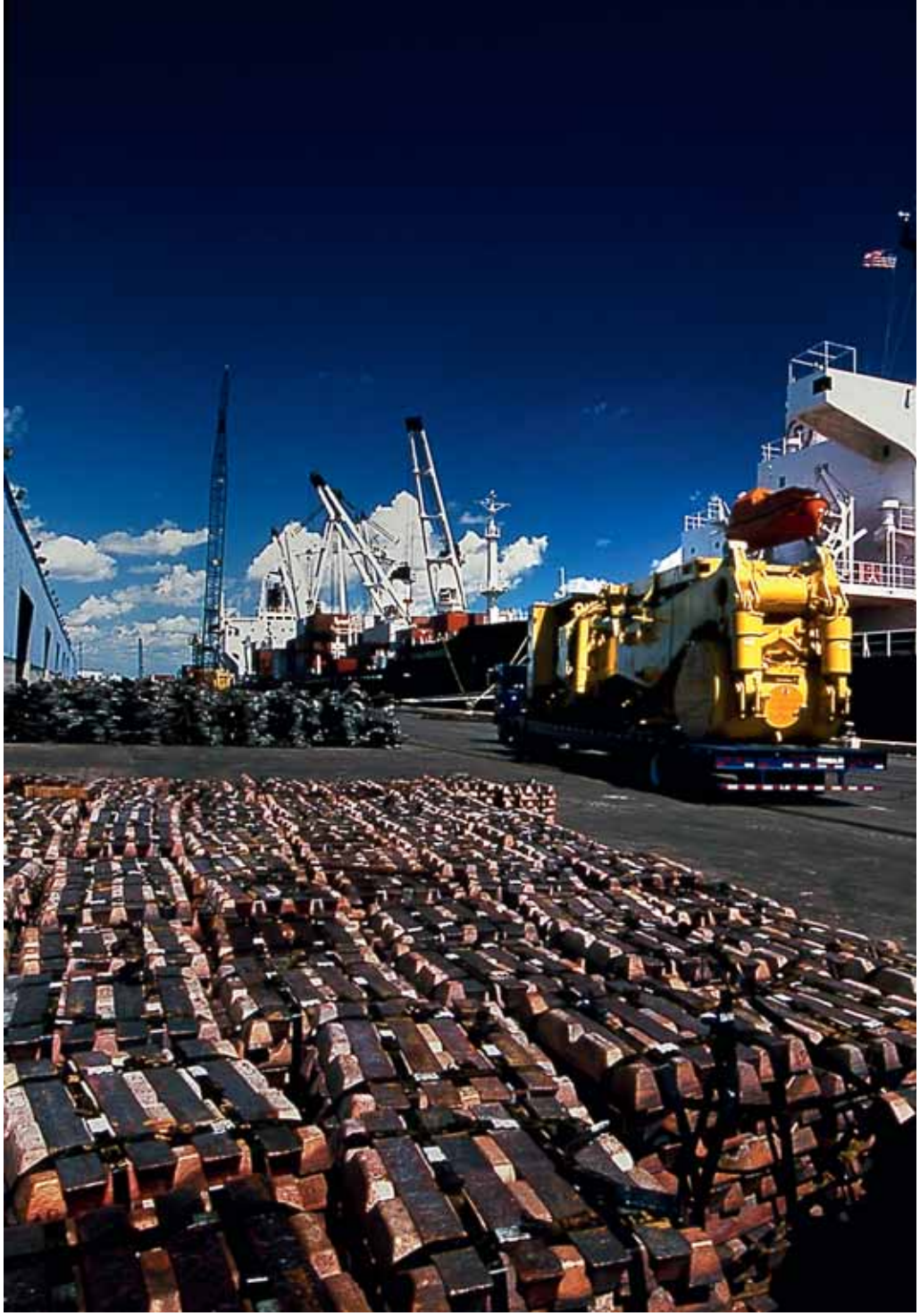
Conor continues, "Our success is in providing customizable, reliable and responsible products that ensure excellent production rates but have the design features incorporated to ensure the composition of the material. Our success is working with the customer and understanding where extra care and attention is needed throughout the process from producer to port. We design bespoke systems — no two projects are the same and we don't apply a broad brush approach. We work with the customer and build in design features specific to that job and it is one of the reasons why we continue to win reoccurring contracts across the globe. Part of this process, often involves visits to the customer's site, meeting their operational team and then making a proposal which can often have a number of revisions before a final proposal is agreed."

As part of the Astec Industries group of companies, ABHS demonstrates the same enthusiasm to apply creative thinking and state of the art technology in order to delight each and every customer.

ABHS: Bulk handling solutions for the bioenergy industry

Astec Bulk Handling Solutions is part of the Astec Inc. family of companies. Astec Industries Inc. a NASDAQ-listed US Corporation based in Chattanooga, Tennessee, has a turnover of $1 billion. Being part of the Astec Industries family of Companies ensure that ABHS delivers around the clock service, around the world.

Astec, Inc. will continue to strive for new ways and better solutions. It will serve its customers of today and tomorrow with innovative products and excellent service, around the clock service, around the world. DCi



US Gulf

regional cargo activities

Awards aplenty for the Port of New Orleans

Port of New Orleans Earns 'Green Port' Certification from Green Marine

Green Marine, a North American environmental certification programme for the marine, port and terminal industry, officially recognized the Port of New Orleans recently as a certified Green Port.

The Port of New Orleans is the eighth US Port to reach certification in the voluntary environmental certification programme, which was created for the North American Maritime Industry.

"Green Marine provided us with an action plan to help the Port reach the high environmental standards we set for ourselves," said Gary LaGrange, Port President and CEO. "While we are proud of the certification, we will continue to work diligently to be a more environmentally friendly organization."

Green Marine certification is a rigorous, transparent and inclusive initiative that addresses nine key environmental issues. Participants are ship owners, ports, terminals, Seaway corporations and shipyards based in Canada and the United States. The programme encourages its participants to reduce their environmental footprint by taking concrete actions. To receive certification, participants must benchmark their annual environmental performance through Green Marine's environmental programme's exhaustive self-evaluation guides. They also must have their results reviewed by an accredited independent verifier and agree to publication of their individual results.

"The Port of New Orleans is recognized internationally as a leader in cargo and cruise operations," said Amelia Pellegrin, the port's environmental manager. "As we continue to grow, we want to do so in an environmentally friendly way and serve as a leader in green initiatives and programmes within our jurisdiction and beyond."

Port of Greater Baton Rouge

The Port of Great Baton Rouge is located at the head of deepwater navigation on the Mississippi River, with a 45-foot 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.

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. Property is currently available for development.

Bulk facilities at the Port of Greater Baton Rouge include its Export Grain Elevator. In June 2011 Louis Dreyfus Commodities, LLC became 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);
- U.S.D.A. Grain Inspection Agency on site; and
- product transformation processes including cleaning, drying, mixing and loading.

The 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;
- Kinder Morgan Terminals; and

The Port of Greater Baton Rouge also has a deepwater complex on the West Bank of the Mississippi River. Here, 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. .

Port of New Orleans President and CEO Gary LaGrange Named 'Logistics Executive of the Year' by NITL

In November last year, Port of New Orleans President and CEO Gary LaGrange received the 2015 McCullough Award at the National Industrial Transportation League's 108th annual meeting, which was held in New Orleans for the first time since 1985. The award is presented annually by the League's Board of Directors and *Logistics Management* magazine to the 'Logistics Executive of the Year" and is named after John T. McCullough, a former chief editor of *Distribution* magazine, a predecessor to Logistics Management.

"I first met Gary LaGrange right after Hurricane Katrina, certainly a historically challenging moment for the Port and the City of New Orleans," said Bruce Carlton, President and CEO of the NITL. "I knew then that if there was going to be a successful recovery from the hurricane's devastation, it was going to come from Gary's single-minded determination to get the port up and running again quickly. It's that same urgent focus that has propelled the Port of New Orleans forward ever since."

Nominations for the McCullough Award are submitted by League members and voted upon by its Board of Directors.

"Gary has an outstanding reputation in the transportation industry and we are extremely pleased to be able to single him out for this recognition and his many accomplishments," said League Board Chairman Doug Kratzberg.

"It's certainly an honor to be recognized by this esteemed group, because they represent our shippers, customers and valued partners that contribute directly to our success," LaGrange said.

Founded in 1907, the National Industrial Transportation League is the nation's oldest association representing shippers' interests in both domestic and international commerce in all modes of transportation. League members include shippers and receivers of goods, carriers, brokers, third-party intermediaries, logistics companies and other service providers. As "The Shippers," the League's mission is to advance the views of shippers on freight transportation issues and enhance their professional development.

The Port of New Orleans is a deep-draught multipurpose port at the centre of the world's busiest port system — Louisiana's Lower Mississippi River. Connected to major inland markets and Canada via 14,500 miles of waterways, six class-1 railroads and the interstate highway system, the port is the ideal gateway for steel, project cargo, containers, coffee, natural rubber, chemicals, forest products, manufactured goods and cruising. An extensive network of ocean carrier services, along with added-value services like transloading of bulk into containers, make the Port of New Orleans a superior logistics solution for many types of cargo. To stay ahead of market demand, the port has invested more than $100 million in capital improvement projects since 2012 and has a Master Plan to expand the Napoleon Avenue Container Terminal to an annual capacity of 1.6 million TEUs.

Metro Ports appoints new VP Business Development

Brent Mahana has accepted the position of Metro Ports vice president – business development, with a special emphasis on growth in the US Gulf Region.

Mahana joined the Metro Ports organization on 16 November last year, and will have nationwide responsibility for business development, acquisitions and development of strategic alliances with Metro's stakeholders. Mahana's strong background in the US Gulf Region will allow Metro Ports to continue its growth in the U.S. Gulf markets through the development of stevedoring, logistics and general cargo operations.

Mahana brings more than 20 years of experience in various business development and logistics positions with several high-profile companies, including director of sales and marketing for Consolidated Terminals and Logistics Co. and Cooper/Consolidated; vice president of sales and marketing for Grillot Land & Marine, LLC; and general sales manager for The Ohio River Co. Also, he has served as chief mate and port captain for Dixie Offshore Transportation Co.

Mahana is a graduate of the Maine Maritime Academy, earning a Bachelor of Science degree in Nautical Science. Brent continued his education in marketing at the Harvard Business School and the Wharton Executive Education Program.

About Metro Ports:

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

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

Port of Galveston: close to the open sea

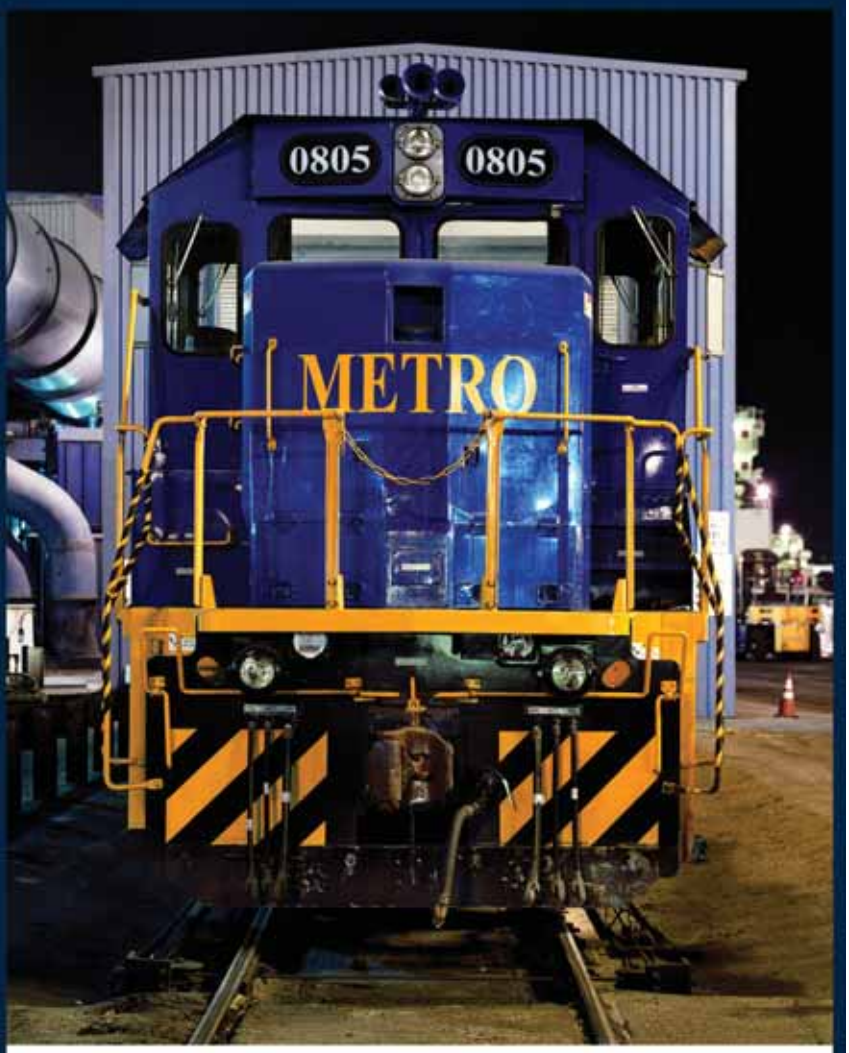
The Port of Galveston is located on the upper Texas coast at the mouth of beautiful Galveston Bay, just 30 minutes steaming time from the open sea.

What began as not much more than a trading post in 1825 has grown to over 850 acres of port facilities today. Established by a proclamation issued by the Congress of Mexico on 17 October 1825, while the land known as Texas still belonged to Mexico, the Port of Galveston became the oldest port in the Gulf of Mexico west of New Orleans.

Galveston and its port have always been intertwined. Galveston was founded to take advantage of a prime natural location. In reports, Galveston was called the best natural harbour that the colony of Texas had to offer.

The Port of Galveston is:

- 9.3 miles from the open sea, or 30 minutes' sailing time;
- alongside the Gulf Intracoastal Waterway;
- at the entrance to Galveston Bay;
- on the north side of Galveston Island, with property and The Galveston Channel:
- has an authorized minimum depth of 45 feet;
- is 1,200 feet wide at its narrowest point; and
- provides direct access to the open Gulf of Mexico



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Port Corpus Christi: investing in South Texas and the US Gulf

Corpus Christi sits on the mid US Gulf Coast of Texas and offers nine beaches, waterfront restaurants, hunting, fishing, and outdoor recreation to fill one's heart. Nestled in this beach city is Port Corpus Christi, the fifth-largest US port in total tonnage and part of the largest industrial development region of the United States.

In 2009, Port Corpus Christi received the federal funding needed to extend and widen the La Quinta Channel, opening up 1,100 acres of waterfront property on the US Gulf at its La Quinta Trade Gateway Project. Tianjin Pipe Corporation America (TPCO) chose Gregory, Texas — adjacent to the La Quinta property — to build a $1 billion seamless steel pipe facility, the largest single investment by a Chinese company in North America. In 2012, M&G Resins, an Italian-owned company, purchased land on the port's Inner Harbor and is building the largest PET/PTA facility in the world on the Corpus Christi Ship Channel. In 2013, voestalpine, an Austrian company, announced a $740 million hot-briquetted iron facility on the La Quinta property and broke ground in April 2014, just after the La Quinta Channel Extension officially opened. Additionally, Cheniere Energy is constructing a $13 billion liquefied natural gas (LNG) export terminal on the La Quinta Channel with operations expected to begin in 2020.

The Texas Gulf of Mexico is bustling with new investment. So what's in store for Port Corpus Christi?

Port Corpus Christi is investing in infrastructure and working to bring federal funding for landside infrastructure improvements. In September 2015, the American Association of Port Authorities (AAPA) launched a campaign called Freight: Keep it Moving (#keepitmoving) to stress the importance of federal funding for road, rail, bridge and tunnel connectivity, vital for the nation's seaports to handle the estimated freight volumes in 2025. AAPA estimates each port needs a minimum of $100 million in upgrades. Port Corpus Christi leadership has been innovative and pushed projects through that keep the port in competition. In 2007, Port Corpus Christi opened the Joe Fulton International Trade Corridor, consisting of 12 miles of new and existing roadway and seven miles of new rail line. The project provided 630 acres of real estate served by a –45' channel and connected the port to Interstate Highway 37 and Highway 181. This year the port completed Phase I of the Nueces River Rail Yard, consisting of four parallel ladder tracks for a total yard capacity of 15,400 feet and 223 railcars. Phase II is currently under construction and will increase the rail yard to eight, 8,000-foot-long unit train sidings. The Nueces River Rail Yard utilizes $32 million in TIGER (Transportation Investment Generating Economic Recovery) grants and $23.8 million cost-share from Port Corpus Christi, Union Pacific, Kansas City Southern, Burlington Northern Santa Fe, and Genesse Wyoming railroads. These two projects were key factors in the decision for M&G Resins, which sits adjacent to both, to choose Port Corpus Christi.

What's next on the investment horizon? A Texas Department of Transportation Environmental Impact Study determined the 57-year old Harbor Bridge, which connects the Port's Inner Harbor to the La Quinta Trade Gateway, requires major rehabilitation to improve safety standards. The City of Corpus Christi and Port Corpus Christi leadership have worked toward a replacement bridge plan, to provide a safe transportation route and ensure growth opportunities for the port and its customers. The newly planned suspension bridge will have a 205-foot vertical clearance, allowing for some of the world's largest ships to call on Port Corpus Christi.

Not only do the larger ships need a higher vertical clearance, but they also need a deeper draught and wider channel. The Corpus Christi Ship Channel Improvement Project includes widening the open bay crossing from 400' to 530' and adding 200' barge shelves. The channel will be deepened from –45' to –52' and the channel entrance will be extended approximately 10,000 feet and deepened to –54'. The total

project cost is $300 million. The project is approved and authorized and awaits Congressional appropriation for the 50% federal cost share. "The Channel Improvement Project is the most critical infrastructure investment of the next decade for the Coastal Bend. The days of federal earmarks are gone. Industry and community leaders, along with elected officials, will need to use their collective political muscle to secure the federal funding match for the port's 50% cost share — hopefully this next year" says Judy Hawley, former Port Corpus Christi Commission Chair and devoted Texas transportation advocate.

With 46 industries directly connected to Port Corpus Christi, it is imperative that the port runs a clean operation. The port is overseen by an Environmental Management System (EMS), which sets the standards for port operations and works with port customers to improve efficiencies. The US Environmental Protection Agency is seeking to lower the allowable ozone parts per billion from 75 to a possible 65PPB. Port Corpus Christi customers have taken voluntary measures to reduce ozone emissions and, as a result, Corpus Christi's three-year average is 62PPB. The port's Bulk Materials Terminal received the Industry Environmental Stewardship Award in December 2015 from the Coastal Bend Bays Foundation. The award recognizes leadership in conservation and protection of the Coastal Bend's natural resources, and for placing high priority on environmental stewardship. The EMS continues to work to keep the port and the region in excellent standings.

Port Corpus Christi will celebrate 90 years of people, progress and passion for economic prosperity in South Texas. Port Corpus Christi's clean air, clean water, rail, highway, labour force and strong regional unity make it the ideal location for operations. People have been the catalyst for growth in the region, from port leadership to city and county officials, and port employees who move the port.

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