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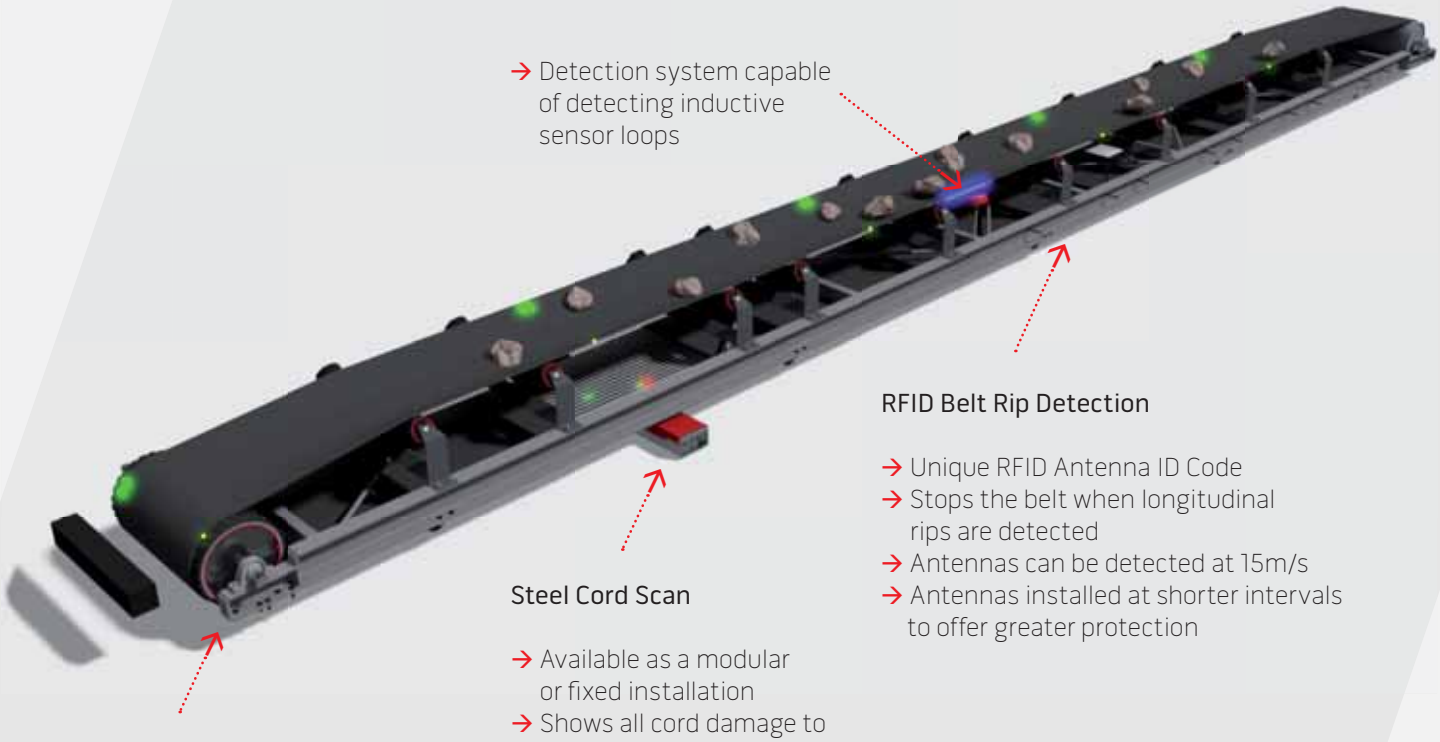

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VIGAN Engineering S.A.
Rue de l'Industrie, 16
BE – 1400 Nivelles
Belgium
T: + 32 67 89 50 41
F: + 32 67 89 50 60
E: info@vigan.com
W: www.vigan.com

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

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

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

CORRESPONDENTS
Brazil **Patrick Knight**
India **Kunal Bose**
Asia **David Hayes**
Europe **Barry Cross**
Malaysia **Wira Sulaiman**
Philippines **Fred Pundol**
South Africa **Iain McIntosh**
UK **Maria Cappuccio**
UK **Michael King**
UK **Richard Scott**
USA **Colby Haines**
USA **Walter Mitchell**

ADMINISTRATIVE OFFICE
Business Publishing International
Corporate Park, 11 Sinembe Crescent
La Lucia Ridge, South Africa, 4051
Tel: +27 31 583 4360
Fax: +27 31 566 4502
Email: info@dc-int.com
Twitter: twitter.com/drycargomag

HEAD OFFICE
Trade Publishing International Limited
Clover House, 24 Drury Road,
Colchester, Essex CO2 7UX, UK
Tel: +44 (0)1206 562560
Fax: +44 (0)1206 562566
Email: info@dc-int.com
Website: www.dc-int.com
Twitter: twitter.com/drycargomag
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NOVEMBER 2016 issue

featuring...

Adverse influences affecting coal trade

Signs of reduced commodity import volumes are clearly visible among dry bulk importing countries. But there are also signs of strengthening activity elsewhere, some of which have been unexpectedly vigorous this year. Consequently overall global seaborne dry bulk trade still appears to be growing slowly, and this pattern could continue.

The advantages provided by economic progress around the world are limited. One beneficial influence is China's economic growth which, although evidently in a longer term slowing trend, has not decelerated much during 2016 so far. Estimates for third quarter GDP in China revealed 6.7% growth, similar to previous quarters. However, there are worries about high credit expansion and debt, with potential for having unfavourable effects.

Coal

Recent forecasts by the Australian Government Department of Industry, Innovation and Science illustrate the subdued outlook for steam coal. Global trade, including overland movements but mostly seaborne, is expected to decrease marginally by 1% to 1,043mt (million tonnes) in 2016, after a 7% fall last year, followed by a flat total next year.

According to this forecast, lower steam coal imports into the European Union are likely to be one of the biggest negative influences in the current year, falling by 18mt (9%) to 176mt. The picture in Asia is mixed, resulting in an overall minimal 5mt or 1% increase to 714mt. China's imports may be higher, but India and South Korea are expected to see declines. However predictions vary, and table 1, based on various sources, indicates a possible marginal regional decrease.

Iron ore

Subdued steel production in raw materials importing countries recently has affected iron ore import demand adversely. In China, renewed acceleration of the imports trend reflects lower output from domestic iron ore mines. But elsewhere, steel industry downturns have weakened consumption of raw materials.

World Steel Association figures show that steel production growth among key iron ore importers is very limited. In Japan, crude steel output was marginally (by less than 1%) lower in the first nine months of 2016, at 78.4mt. South Korea's output was 2% lower at 51.0mt, while in the European Union a large 5% reduction to 121.3mt was seen. China's volume saw a minimal increase of well under 1%, to 603.8mt.

Grain

Prospects for global wheat and coarse grains trade, in the current 2016/17 crop year ending June, still suggest a lower volume than seen in the previous twelve months. The International Grains Council is forecasting a decrease of 7mt or 2%, to 337mt, mainly caused by lower imports into China and Europe.

In the EU, a sharply reduced domestic grain harvest was recorded this year. Wheat production, in particular was down by more than one-tenth due to adverse weather. Nevertheless, grain supplies seem to be adequate and imports are still expected to decline, falling by 12% to 18.8mt. In China excessive corn stocks are restraining foreign grain purchases, which are estimated to be down by 34%, at 15.7mt.

Minor bulks

A large part of minor bulks trade is comprised of agricultural and related commodities. This group's total seaborne trade is estimated to exceed 350mt annually, and seems to be continuing to grow. In the current year there signs pointing to increased movements of sugar and oilseed meal, especially soyameal.

Bulk carrier fleet

Among bulk carrier size groups, the Capesize sector (ships exceeding 100,000 deadweight capacity) is growing only very slowly, as shown in table 2. While there are still great uncertainties about the outcome for this year as a whole, fleet capacity looks set to rise by around 1%. A large volume of newbuilding deliveries from shipyards probably will be mostly offset by heavy scrapping of old or uneconomic vessels during 2016, similar to the pattern of changes seen in the previous twelve months.

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

	2011	2012	2013	2014	2015	2016*
Japan	106.6	113.7	114.5	114.2	120.1	118.0
South Korea	103.2	98.9	100.1	100.8	102.6	98.0
Taiwan	56.0	55.2	57.1	57.0	56.3	57.0
China	138.4	181.5	192.0	165.5	107.9	116.0
India	92.7	123.4	144.1	176.0	171.0	163.0
Total of above	**496.9**	**572.7**	**607.8**	**613.5**	**557.9**	**552.0**

source: various & BSA estimates **BSA forecast*

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

	2011	2012	2013	2014	2015	2016*
Newbuilding deliveries	45.6	41.9	22.0	18.5	16.9	20.0
Scrapping (sales)	10.5	11.7	7.9	4.2	15.4	15.0
Losses	0.0	0.0	0.2	0.0	0.0	0.0
Plus/minus adjustments	4.7	-0.2	0.1	0.0	-0.4	0.0
Fleet at end of year	**249.9**	**279.8**	**293.8**	**308.1**	**309.2**	**314.2**
% change from previous year-end	+19.0	+12.0	+5.0	+4.9	+0.4	+1.0

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

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

Sweet year ahead for sugar prices

Kunal Bose

Two things primarily move futures prices of raw sugar at Intercontinental Commodities Exchange (ICE) in New York. First, traders take the cue for either building long forward positions or shorting from intergovernmental agency International Sugar Organization (ISO) projection whether the world will have production deficit or surplus for a season which runs from October to September. Second, depending on the extent of production deficit or surplus, ISO will release stocks-to-use ratio for a season and that becomes an important mover of sugar prices. On both counts, sugar holds promise of doing well on ICE through the 2016/17 season.

In its first forecast for the season, the London headquartered ISO says the 2016/17 deficit will be 7.05mt (million tonnes) on the back of a 5.74mt shortfall in the sugar year ended September 2016. ISO has arrived at the deficit based on its estimate of global production growing year-on-year by 2.17mt to 168mt and consumption rising by about 3.5mt to 175.1mt. In case ISO projections come true, then the world sugar inventories will fall below 75mt by current season end. As a result, stocks-to-use ratio will be down by critical 4.9 points over the season to 43.2% of consumption, according to ISO. "This is the lowest since 2010/11. It is also below the seemingly critical level of 45% which eventually triggered a surge in raw sugar prices above 24 cents a pound," between 2009/10 and 2010/12. Being an agro commodity, it is always the case that forecasting agencies come up with different deficit estimates. Like Rabobank has made a substantial upgrade in its deficit estimate from the last one to now pitch at 7.90mt. Platts Kingsman has added an extra 570,000 tonnes to arrive at a higher deficit of 6.45mt.

Referring to the two major pricing metrics available from ISO, senior Indian industry official Om Prakash Dhanuka says: "ICE March raw sugar futures are trading at around 24 cents a pound. The projected stocks-to-use ratio to be down to the lowest since 2011-12 will be taken as a pointer to sugar prices advancing further in the coming days. Sugar badly needed to break away from low prices. Between May 2012 (monthly raw sugar average 20.81 cents a pound) and 2015 we saw monthly raw sugar price average at one point sinking to 11.50 cents a pound. Such prices caused big holes in sugar company balance sheets. Sickness in the industry became widespread irrespective of geographies." In the last nearly four years, factories in India, the world's second largest producer of sugar after Brazil suffered the most among all countries making the sweetener from cane.

"This happened because India remains the only country, which is yet to introduce the revenue sharing formula (RSF) under which proceeds from sale of sugar and cane by-products such as bagasse based electricity, ethanol and press mud are shared between farmers and factories based on the ratio of their relative costs. In this country much to the disadvantage of factories, the central government ahead of each season will fix fair and remunerative price (FRP) for cane. Factories are under compulsion to pay this cane price irrespective of prices at which sugar is sold. The ones located in states like Uttar Pradesh and Bihar pay even more where local governments arbitrarily add a premium to FRP," says Dhanuka.

The Indian industry can hopefully look forward to migration to RSF since a high powered committee headed by a former governor of the central bank and chairman of Economic Advisory Council C Rangarajan has strongly favoured introduction of RSF, which is working well to the satisfaction of all stakeholders in other producing countries. Sugarcane being a highly politicized issue in India because of engagement of 50m farmers in its cultivation, the government has given the message that migration will be possible only when a system is in place to guarantee FRP payment irrespective of revenue realizations from sugar and its by-products. The Commission for Agricultural Costs and Prices (CACP), therefore, favours creation of a price stabilization fund (PSF) from which whenever the occasion arises the government will draw money to pay cane growers the difference between FRP and RSF.

But how is this fund to be created? According to Indian Sugar Mills Association (ISMA) Director General Abinash Verma "this can easily be done from the extra cess on sugar being already










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collected by the government since February 2016." The last two sugar seasons proved excruciatingly difficult no less for factories than farmers. Low sugar prices that hardly covered cane cost, not to mention other elements of conversion costs, did not allow factories to settle cane bills of farmers. In April 2015, the industry had cane dues of around $3.2bn leading some farmers to take their lives. This forced the government to take a series of steps, including grant of interest free loans to factories to settle cane bills. Cane dues, as a result, are now down to $597m and factories are now speedily settling the remaining bills. Dhanuka says "when cane price payment arrears become large enough for growers drowned in debts commit suicide then in popular imagination the government looks anti-farmer. The government headed by Narendra Modi should try to avoid recurrences of situations of acute distresses to farmers and the only way factories and cane suppliers could be enabled to ride out bad times for sugar is for RSF to work in conjunction with PSF."

After experiencing extreme dry weather in some major cane growing states such as Maharashtra and Karnataka, India has had a near normal monsoon this year. But cane being a crop which takes anything between 18 and 24 months to mature, the impact of a two-year long drought will be felt this season when sugar production, according to Verma, will be down to 23.3mt from 25.1mt in 2015/16. The ISO has, however, forecast India making 24.5mt of sugar in 2016/17. India is braced for lowest sugar production since the beginning of this decade as the area under cane is down by nearly 5% to about 5m hectares. Impending major production setback, says Verma, will be largely on account of Maharashtra, traditionally the country's largest supplier of sugar. There because of land parched by severe drought in the past two years, the area under cane is down a whopping 23% that is likely to lead to a 25% year-on-year fall in production to 6.27mt.

Shortfall in production will not, however, create shortages at any point of the season since 2016/17 has opened with stocks of 7.5mt, says Dhanuka. The total supply during the season, including inventory on 1 October will be 30.8mt against demand expected to range from 25.6m to 25.8mt. But what about 2017/18 when the season will open with stocks of around 5mt? Ideally, India, which is the world's largest sugar consumer, should open with inventories that is good for two and a half months. The reason for this is sugar production starts in full throttle only in December. So the risk of tight supply sending sugar prices to politically incorrect levels will remain. Whatever producers may say, sugar is a sensitive commodity in India with the government always keeping an eye on its prices. The possibility of India importing some amount of sugar to reinforce supply in the first quarter of 2017/18 remains.

Dhanuka, however, says "a better course will be to offer excise duty waiver on incremental production of sugar in 2017 October and December over the corresponding months in 2016. This will encourage factories to get into the act of crushing early season varieties of cane as soon as new season kicks off." India imported 676,000 tonnes of sugar in 2012/13 and then a smaller quantity of 98,000 tonnes in the following year. An analyst with Rabobank Singapore says India is likely to import around 2mt of sugar as the current season progresses. Though there are not many takers of the proposition, any significant purchases of sugar in the world market by India could further support global prices trading near four-year highs.

The primary reason for upward revision of global sugar deficit during 2006/07 is fading of earlier expectations for bumper Brazilian sugar production. Earlier high optimism about Brazilian sugar output was linked to plenty of cane left in the field due to heavy rains last year interfering with crop harvesting and at the same time plenty of water allowing good growth of new cane. Dry weather from the start of this year facilitated rapid progress in field work as it meant higher sugar recovery from cane. But reports coming lately point to months of low rainfall could lead to an early end of the season. This may not, however, leave an impact on sugar production. Rabobank says in the event of reduced supply of cane, crushing factories might divert even more cane to sugar production from ethanol. Sugar prices at four-year highs with prospects of these appreciating further and crude oil prices being where these are will tilt the balance in favour of the sweetener vis a vis ethanol. Interestingly even then ISO says Brazilian sugar output on October to September basis (April to March is that country's season) will be down 1.25mt to 36.5mt. Farm consultancy Datagro has cut its forecast for Brazil's centre-south (this region accounts for over 90% of the country's production) sugarcane crush to 597mt, down 4.4% from its May projection of 625mt due to dry weather.

What about China? That country's raw sugar output in 2016/17 is likely to rise 8.1% from a year ago to 9.3mt. Beijing is also likely to release 1.8mt from its state reserves of 6.5mt. China could import 3.6mt of sugar in 2016-17 compared with 3.5mt a year ago. The Chinese strategy for principal agricultural, minerals and metals is to build reserves when their global prices are down and release these for internal use when prices rule high. Sugar is one such commodity.

Low stocks spell good news for Brazil's sugar prices

Brazil's giant sugar and ethanol industry bounces back, as world sugar prices rises.

The current high world price of sugar has come as a relief to Brazil's giant sugar and ethanol industry, hit hard by five years of low sugar prices, together with the artificially low price of gasoline, with which ethanol fuel distilled from sugar cane, has to compete, *writes Patrick Knight.*

The world sugar price is at its highest for four years, largely because up to 10mt (million tonnes) more tonnes of sugar will be used in the next 12 months than will be produced, causing stocks to fall. All the major sugar-producing countries, such as India and Thailand, as well as Brazil, are now using all their refining capacity, so are unable to make any more sugar. It had been hoped Brazil's 23016/17 cane crop would be a record 630mt, but it will now be only about 605mt.

Many companies in Brazil are heavily in debt as a result of a major mill building programme of a decade ago. Dozens of high-cost, elderly mills shut down in the past few years, and plantations have been neglected. The price of ethanol fuel has been held artificially low, all resulting in an extremely difficult five years for the industry.

With sugar now much more profitable than ethanol, mills are now giving priority to sugar. Forty-eight per cent of the juice squeezed from sugar cane this year, has been made into sugar, which compares with 42% of it being made into sugar in each of the past two years. The world sugar price is expected to remain

around the present level of US$ 20 cents per pound for the next few years, as neither India, or Thailand will be able to increase production either. This is encouraging many of the large new mills built in the past few years with the aim of producing all, or mainly ethanol, to add sugar refining capacity as soon as possible. The extra refining capacity will allow half of the cane to be available 2017/18 will be made into sugar, so a million tonnes more sugar will be exported 2017/18, than the 25mt to be exported this year.

Many mills have large debts, so their creditors are pressing companies to give priority to paying them back, rather than embarking on new investments. So far, no company seems to be making plans to build a brand new 'green field' mill, about 200 of which have come on stream in the past ten years. Any spare money will be spent on more maintenance, and upgrading existing equipment.

In the first part of this year, Brazil's congress decided to start action to push President Dilma Rousseff, elected two years ago for a second term, from power. Rousseff has now been impeached, largely because of suspicions that she was involved in the so called 'car wash' corruption scandal. This involved massive bribes being paid by directors of Petrobras, the giant state-controlled oil company, to politicians.

This impeachment has brought to an abrupt end a 14-year period during which Brazil was ruled by the left leaning 'Workers Party' the PT. The PT did not have much love for the sugar industry, which it accused of being a strong supporter of the military regimes which ruled Brazil for 20 years.

During a period when the world crude oil price was high, which pushed up Brazil's import bill to unsustainable levels, the industry decided to build numerous large new mills which would make billions of litres of ethanol fuel, which could replace petrol in cars. It was also expected that many other oil importing countries would queue up to buy Brazil's ethanol. During a visit to Brazil by US President George W Bush, the Brazilian president Luis Ignacio 'Lula' da Silva claimed that Brazil would soon become the Saudi Arabia of ethanol. He said this just months before huge reserves of crude oil were discovered deep down under the ocean bed far from the coast, were made. Following these finds, enthusiasm switched from ethanol to giving priority to the development of this new resource. Ethanol was relegated, if not forgotten.

The price motorists pay for their fuels in Brazil has rarely been left to market forces. The price of gasoline, with which about 20% of ethanol has been blended in recent years, was set well below the world price. This was done in an attempt to hold down inflation, always a worry in Brazil. The motor industry had perfected engines would run equally well on 100% gasoline, or 100% ethanol, with sensors allowing engines to adjust settings automatically to what fuel was in the tank. But this flexibility did not guarantee a new market for ethanol. With the gasoline price held low, ethanol was often sold for little or no profit, at a time when — because of overproduction — the world sugar price was falling. Although Brazil was able to sell some ethanol to the United States, where a government-sponsored programme allowed ethanol made from maize to be added to gasoline, no other country has imported much ethanol, as a substitute for gasoline. One fear was that there was no real way that supplies could continue to be guaranteed. The major investment needed to build costly new storage and distribution facilities for ethanol was done in Brazil, but not elsewhere.

This combination of events resulted in Brazil's sugar industry having several extremely difficult years. Only the advent of a more consistent pricing policy for the gasoline produced by Petrobras, coupled with the rise in the price of sugar, has enabled the sugar industry to start what should be a sustained recovery. Brazil has long felt that Thailand, the world's number three producer of sugar, was giving massive subsidies to the sugar industry, and has now asked the World Trade Organization (WTO) to look into this. 20 years ago, Brazil had successfully taken measures at the WTO which forced the EU to cut subsidies to sugar beet producers.

The sugar stocks in consuming countries around the world appear reasonably comfortable at the moment. But the prospect of demand exceeding supply for several years to come, means prices will remain high. China for example, has substantial stocks of sugar, and may sell some of these. But it will not risk them running out. Despite its large stocks, China was Brazil's largest single customer for sugar last year. Another surprise was that India, the world's number two producer, was in second place.

The difficulties for Brazil's sugar industry of the past few years, have been compounded by the fact that increasing concern with pollution caused the government to introduce measures aimed at halting the burning of ripe cane on the ten million hectares now planted to the crop.

The industry has therefore had to buy thousands of new harvesting machines, each one costing hundreds of thousands of dollars. The way cane is planted has also being altered as well. When cane was cut by hand, the main priority was to prevent erosion washing away top soil, so plantations were terraced. If a harvester is to operate at optimum efficiency, when each machine can substitute 20 manual cutters, the land must be level. Levelling land to allow machines to operate at full speed, has not yet been completed. Because of this, badly set blades mean substantial amounts of soil being taken to mills, along with the cane. The high level of impurities damages the machinery which squeezes the liquid from the cane. This contaminates the juice, making it more costly to process. All this means the amount of sugar equivalent produced from each tonne of cane, has gone down pushing up the cost of production. It will be many years before all plantations are level enough to allow for machines to operate as efficiently as they could.

Sugar has been identified as a major cause of obesity, leading perhaps to increased disease. But with millions of people moving from the countryside to cities each year, while the world population continues to grow, demand for sugar is still increasing by about 2% each year. This means several millions of tonnes more sugar will be needed each year for the forseeable future. The difficulties the industry in Brazil has experienced in recent years, has resulted in Brazil's share of all the sugar traded around the world each year falling from its previous average of about 50%, to about 45%.

Brazil is one of the few countries in the world which still has substantial areas of land which could be switched from others crop to growing cane. Areas now grazed by cattle could also be recycled. Higher yielding varieties of cane are being developed, with the result that up to 2% more cane could be grown each year on the same area as before.

All the 200 new mills built in Brazil have been equipped with the latest generation of boilers and generators needed to produce the steam and electric power needed to process the cane. The industry now sells a substantial surplus of electricity to the grid. Older mills are also adding new generating equipment. This has created an important new source of revenue in a country, which already produces a large proportion of its energy from renewable fuels than any other. DCi

Global fertilizer outlook

Stored fertilizer in a fabric building (photo: ©2016 Legacy Building Solutions, Inc)

Maria Cappuccio

In its latest assessment of the global economy, the International Monetary Fund (IMF) revised down their forecast for global growth to 3.1% in 2016, and to 3.4% in 2017, reflecting a more subdued outlook for advanced economies following the UK's vote in favour of leaving the EU (Brexit) and weaker-than-expected growth in the US. These developments put further downward pressure on global interest rates, with monetary policy expected to remain accommodative for longer. Financial sentiment toward emerging market economies improved with the prospect of lower interest rates, less concern about China's near-term outlook following policy support to growth and some firming of commodity prices. But prospects differ sharply with emerging Asia in general and India in particular showing robust growth and sub-Saharan Africa experiencing a sharp slowdown. In advanced economies, uncertainty about institutional and trade arrangements post Brexit and downside risks may fuel further political discontent, with anti-integration policy platforms in the EU and the US gaining more traction, while several emerging and developing economies face daunting policy challenges in adjusting to weaker commodity prices, making the need for a broad-based policy response to raise growth more urgent.

Record global harvest to increase pressure on crop prices

Despite low crop prices and challenging weather conditions, global wheat, rice, coarse grain and oilseed crops, are expected to produce a bumper global harvest of almost 3.1bn/t in 2016, over 100mt (million tonnes) more than last year reflecting strong gains in yields, especially US corn yields, boosting global stocks to record levels, and those in major exporting countries (except France where wheat output and quality, significantly downgraded), while exerting downward pressure on crop prices. The global stocks-to-use ratio is expected to remain relatively high for the main cereals, preventing crop prices from improving significantly in 2016/17. The UN's Food and Agricultural Organization (FAO), expects global food markets to remain "generally well balanced" in the year ahead, seeing prices for most internationally-traded agricultural commodities as relatively low and stable.

Sustainable agriculture key to improving food security

The eradication of hunger and the promotion of sustainable agriculture are the key objectives of the UN's 2030 Agenda, but higher temperatures and erratic weather patterns, are putting these goals at risk and undermining the health of soils, forests and oceans on which agricultural sectors and food security depend. The FAO, in recognizing that many of the World's poorest have been hit-hardest by higher temperatures and by the increasing frequency in weather-related disasters, raised the issue on World Food Day 2016 through the message, "Climate is changing. Food and agriculture must too." The FAO's Director-General, José Graziano da Silva, confirmed that the global food

system will need to adjust to feeding a growing population, expected to reach 9.6bn by 2050, and that food systems will not only, need to grow by 60%, but also to adapt to the adverse effects of climate change while becoming more resilient, productive and sustainable; adopting practices that produce more with less from the same area of land; using sparse natural resources wisely and reducing food losses. Currently there is enough food produced to feed the global population, but hundreds of millions of tonnes of food are squandered every year, which according to da Silva is indefensible, given that agriculture accounts for around 20% of total greenhouse gas emissions, and has great potential for limiting the rise of global average temperature as determined by the UN's Paris Agreement on Climate Change.

Poor farm profitability limits fertilizer uptake

Large nutrient supplies and weak global demand contribute to ongoing weakness with prices significantly below 2008 highs. Demand weakness stems from poor farmer profitability, low crop prices and weak currencies of key importing countries. Despite cuts in production, excess nutrient supply remains considerable due to falling costs, low feedstock prices and new low-cost capacity. The International Fertilizer Association (IFA) earlier in the year, forecast an improved outlook for 2016/17, by contrast to the sharp contraction last year, expecting demand to rise by 5mt to 186mt, with growth rates of relatively similar magnitude for all three nutrients, 3% increase for nitrogen and phosphates and 2.3% for potash, due to better political and economic situation in some sizable markets-almost unchanged in North America, firm growth in Eastern Europe and Central Asia (EECA) as grain exports are expected to benefit from the current weakness of regional currencies, and, to increase in South Asia and Latin America, especially in Argentina, with the removal of export taxes on corn, but unlikely to fully recover in Brazil.

GLOBAL FERTILIZER USE

1961–2020/21 mt nutrients

Year	Nitrogen	Phosphate	Potash	Total
1961/2	11.6	10.9	8.7	31.2
1970/1	31.8	21.1	16.4	69.3
1980/1	60.8	31.7	24.2	116.7
1990/1	77.6	36.0	24.6	137.8
2000/1	81.2	32.5	21.9	135.6
2001/2	82.9	33.4	23.0	139.3
2002/3	85.1	34.1	24.7	143.9
2003/4	87.1	35.2	25.5	147.8
2004/5	90.2	37.5	25.6	154.7
2005/6	93.2	37.0	26.3	156.5
2006/7	97.4	38.1	26.9	162.4
2007/8	100.5	38.4	28.9	167.9
2008/9	97.7	33.7	23.4	154.8
2009/10	102.2	37.6	23.7	163.5
2010/11	104.1	40.6	27.5	172.3
2011/12	107.9	41.4	28.0	177.2
2012/13	108.6	41.4	29.2	179.1
2013/14	109.9	40.5	30.4	180.7
2014/15e	110.3	41.1	32.0	183.4
2015/16f	108.0	41.0	32.0	181.0
2016/17f	111.0	42.0	33.0	186.0
2020/21	117.0	45.0	37.0	199.0

Source: International Fertilizer Association

FERTILIZER PRICES $ PER TONNE FOB 2009–2015

	2016 Oct Wk2 $	2015 Oct Wk2 $	2014 Oct Wk2 $	2013 Oct Wk2 $	2012 Oct Wk2 $
Urea					
Baltic	201	259	310	273	425
Persian Gulf	—	—	—	—	460
US Gulf	201	—	—	—	—
Ammonia	—	—	—	—	—
Yuzhny	189	248	—	410	650
Tampa CFR	220	440	650	490	715
Middle East	—	—	—	—	705
Ammonium sulphate					
FSU	—	—	—	—	220
Asia	114	142	—	—	—
Di—ammonium phosphate					
North Africa	—	—	—	—	573
US Gulf	306	460	464	373	—
China	—	—	—	—	—
Triple super phosphate					
North Africa	—	380	—	—	485
US Gulf	277	—	—	—	—
Muriate of Potash					
Baltic	221	—	—	—	—
Vancouver	215	300	310	345	490

Source: Bloomberg, FarmFutures, Fertilizer Week, Fertilizer Market Bulletin, Profercy/1 Monthly average—Sept

CEREALS AND OILSEEDS – PRODUCTION, USE & STOCKS 2015–2016/17 MT

	Prod 15/16	Prod 16/17	Use 15/16	Use 16/17	Stocks 15/16	Stocks 16/17
Wheat	735	744	711	736	240	248
Coarse grains	1248	1315	1248	1312	246	249
Rice	472	483	471	478	116	121
Total cereals	2455	2542	2430	2526	602	611
Oilseeds	520	548	447*	464*	87	88

*Source: USDA-mainly harvested Jul-Dec/ *oilseed meal/oil consumption*

Falling seed, chemical and fertilizer profits triggers mergers

With the downturn in the global economy, major players like Monsanto, Syngenta, Bayer, DuPont, Dow chemical and BASF, who control almost two-thirds of the global seed market, having bought-out a number of independent seed companies, find themselves caught-up in a wave of mergers and acquisitions, as a result of falling profits and lower sales to farmers. Dow chemical and DuPont announced a $130bn merger last year; while Bayer AG and Monsanto agreed to a $57bn merger; ChemChina is pursuing a $44bn take-over of Syngenta; the deal was approved by the US Committee on Foreign Investment, before it was known that ChemChina and Sinochem, China's leading fertilizer company were holding merger talks to create a chemical giant worth $100bn. Potash Corp the largest potash company in the world and its former smaller rival Agrium are expected to merge creating a $36bn fertilizer company and Vale SA plans to, dispose of its fertilizer assets to Mosaic and Yara International ASA. While, Louis Dreyfus like some of its trading peers, plans to sell its African fertilizer business and bolster fertilizer activities with joint venture partners, in South America and Australia.

Concerns raised about implications for agricultural markets

The sheer number of high profile mergers is causing concern in the EU and the US. Shares in Syngenta fell amid reports that the EU Commission could block its takeover by ChemChina, while Chuck Grassley chairman of the US Senate's Judiciary Committee has called a hearing so that federal regulators can consider the implications of the 'seismic shift' the proposed mergers are likely to have on agriculture, farmers and consumers. According to *Farm Journal* research, should the deals between Bayer/Monsanto, Dow/DuPont and Syngenta/ChemChina, receive approval, it would leave more of the market in even fewer hands, some 82% of the corn seed market and 76% of the soybean market.

Nutrient prices expected to increase over medium term

Nutrient application, which had been on a rising trend, remains constrained due to low farmers' profitability. But there has been a modest increase in some crop prices which, along with depreciating currencies in some key exporters, may provide some relief. While fertilizer prices are expected to decline by 22% in 2016 due to weak demand, high stocks, and rising supply capacity, they are generally expected to increase moderately over the medium term due to expected growth in demand and higher energy costs. Risks include weak demand and new production capacity, while higher agriculture prices or currency appreciation could boost fertilizer demand and prices.

Global wheat plantings undeterred by large grain stocks

In the northern hemisphere, planting of winter wheat, is well

CEREAL EXPORT PRICES US $ FOB PER TONNE 2008–2013

	2016 Oct Wk2 $	2015 Oct Wk2 $	2014 Oct Wk2 $	2013 Oct Wk2 $	2012 Oct Wk2 $
Wheat No 2 HRW	**194**	**221**	**289**	**327**	**368**
Corn No 3 Yellow (Gulf)	163	175	184	211	316
Sorghum (Nola)	175	198	229	233	311
Soybean No 2 (Gulf)	378	369	410	515	581
Brazil					
Soybean	411	—	—	—	—
Argentina (up river)					
Wheat	—	223*	248*	—	300*
Corn	174	161*	166*	—	294*
Soybean	381	360	414	527	584
Thailand					
Rice White 5% broken	350	375	435	—	618*
Vietnam					
Rice White 5% broken	331	—	—	—	—
India					
Rice White 25% broken	331	—	—	—	—

*Source: FAO IGC USDA – *Monthly avge – Sept; Rice prices based on indicative quotes*

GLOBAL NITROGEN SUPPLY/DEMAND 2015–2020 MT N

Fertilizer	2015	2016	2017	2018	2019	2020
Nitrogen capacity	209	—	—	—	—	230
Nitrogen supply*	—	158	—	—	—	177
Nitrogen demand	145	148	151	154	157	160

*Source: IFA—data N/t basis * effective capacity derived by capacity x by the highest achievable operating rate*

GLOBAL UREA SUPPLY/DEMAND 2019 MT UREA PRODUCT

Fertilizer	2015	2016	2017	2018	2019
Urea capacity	208	213	217	221	225	229
Urea supply	183	188	193	198	203	208
Urea demand	173	176	180	184	188	192
Fertilizer use	121	—	—	—	—	—
Urea Balance	**10**	**12**	**13**	**14**	**15**	**16**
% of supply	**—**	**—**	**—**	**—**	**—**	**8%**

Source: IFA—data M/t urea basis

advanced, on a similar area to last year, despite record-high global wheat stocks of 248mt and lower international prices. Overall conditions are reported by the International Grains Council (IGC) to be "mixed", with "dryness in parts of Europe, Ukraine and Russia contrasting with wet conditions across the US Plains". In the EU, plantings will be broadly unchanged and despite some concern of dry soil conditions in areas like the Black Sea, the planted area is unlikely to change, as grower margins are shielded by currency weakness of commodities, such as wheat, which are traded internationally in dollars. In the US there is some concern that hard wheat plantings will be reduced, but difficult to see global output of wheat lower in 2017, given the planted area, unless a significant weather disruption occurs. Mid-October wheat offers from major exporters included US $174/t, Russia $178/t, Romania $180/t. Average prices FOB Gulf US No 2 HRW $192/t (25 Oct '16).

Soybean plantings under way in Brazil

Soybean plantings are off to a better start In Brazil, compared to last year when hot and dry conditions delayed planting. The weather in southern Brazil became very wet in October, with more rain forecast, by contrast central Brazil, was hot and dry, generally dryer-than-normal. USDA's provisional estimate for Brazil's soybean output is forecast at 102mt.

While Brazil's farmers are slightly ahead with soy plantings they are off the pace in forward contracting. Farmers in Mato Grosso have forward contracted 27% of anticipated soybean production compared to 48% last year, in the hope of improved prices going forward. The real has appreciated against the dollar (R$3.12), the strongest the real has been since June 2015, and while reducing returns to growers and exporters it makes the cost of imported inputs more affordable. With a large South American crop in prospect and record US soybean crop being harvested, "Soybeans continue to rally…. on renewed buying interest from China, despite record [US] yields continuing to get reported" said Jason Roose, US Commodities grain analyst. CBOT Futures Nov soybean contract closed up at $9.755/bu (Oct 19 '16)

Brazil's corn plantings to rise by 3%

Tight domestic supplies of corn in Brazil, following last year's dismal harvest have supported an increase in values of 34% year-on-year, according to Cepea. "A shortage of corn has led to high prices," said Stefan Vogel, head of agri commodity markets research at Rabobank, meaning that farmers will "continue to plant corn". IGC forecast Brazil's corn plantings to rise by 3% for 2016/17, while USDA forecast the corn crop at 83.5mt.

Surge in Argentine's corn plantings

Argentine President, Maurico Macri made good on election pledges by scrapping export taxes on wheat and corn, which led to an increase in corn and wheat plantings last year at the expense of soybeans, which seems set to continue this year. Monsanto's surprise quarterly profit predicted rising earnings ahead, backed-up by a potential surge in Argentine corn sowings forecast to rise by 23% 2016/17. Dr Michael Cordonnier also expects corn plantings to rise by 25% and possibly higher by 100–200,000 acres, due to the government's change of view on the soybean export tax. While a 5% cut in the export tax down to 25% has been introduced, it will only apply to ten northern states, that produce less than 10% of Argentina's soy, disappointing farmers in other areas, who hoped lower tariffs, would boost exports. Buenos Aires Grain Exchange forecast soybean plantings to decline from 20.1m/ha to 19.6m/ha (48.4m/acre) in 2016/17, with production at 53mt, while USDA forecast Argentine soybean production at 57mt.

Informa forecasts US soybean acreage to soar in 2017

Private analysts Informa forecasts US soybean plantings at 88.5m/acres provisionally an all-time high, while US corn plantings were expected lower at just under 91m/acres in 2017. Last year US farmers planted 94.5 m/acres of corn and a record 83.7m/acres of soybeans, according to the USDA. The global corn crop forecast 1,026mt in 2016, includes a huge US corn crop of 383mt currently being harvested; despite large supplies corn futures rallied on firm US export sales data, CBOT Corn Futures Dec '16 closed up at $3.52/bu (21 Oct '16)-Corn 3YC FOB US Gulf $164/t (20 Oct '16).

Long term oversupply pressures nitrogen values

Norwegian based Yara International ASA, revealed in its third quarter results that weak fertilizer prices had hit profits but by less than investors had expected. But that long-term "oversupply" in the nitrogen sector, exacerbated by output increases in countries such as Algeria, Egypt and the US, resulted in steep falls in nitrogen values, that even some Chinese producers are struggling, increased coal prices adding to cost pressures. According to Yara's CEO Svein Tore Holsether, export prices of about $200/t "appear to represent a break-even level for high-cost Chinese producers," prices, as measured in the key Black Sea market, averaged $183/t in the July-to-September quarter, falling 32% year-on-year.

He confirmed that oversupply would be a permanent feature of the sector for some time, with ongoing urea capacity in the US and North Africa displacing Chinese urea exports leading to structurally lower prices in most locations, with more to come from fresh capacity, resulting from the fracking wave in North America, which has released large supplies of low-priced gas. New ammonia plants have come on stream in Russia, Saudi Arabia and in the US. The weak prices and large supply prospects underline the need for rationalization to respond to the changing dynamics.

GLOBAL POTASH SUPPLY/DEMAND 2015–2020 MT K_2O

Fertilizer	2015	2016	2017	2018	2019	2020
Potash capacity	52.9	—	—	—	—	64.5
Potash supply	44.1	—	—	—	—	51.6
Potash demand	38.5	39.3	40.4	41.2	42.1	43.0
Fertilizer use	—	—	—	—	—	—
Potash balance	**5.6**	**—**	**—**	**—**	**—**	**8.6**
% of supply	**13**	**—**	**—**		**—**	**17**

Source: IFA—Data K_20/t basis

GLOBAL PHOSPHORIC ACID SUPPLY/DEMAND 2015–2020 MT P_2O_5

Fertilizer	2015	2016	2017	2018	2019	2020
Phosphoric acid capacity	57.8	—	—	—	—	65.3
Phosphoric acid supply	46.2	47.3	48.4	49.6	50.7	51.9
Phosphoric acid demand	41	42	43	44.1	45.2	46.2
Fertilizer use	—	—	—	—	—	45.0
Phos. acid balance	**—**	**—**	**—**	**—**	**—**	**5.7**
% of supply	**—**	**—**	**—**	**—**	**—**	**—**

Source: IFA—Data P_2O_5 tonnes basis

China removes ammonia capacity

The IFA forecast global ammonia capacity to rise by 10% to 230mt NH3 in 2020, with large increases expected in Africa, North America and EECA. For the first time in ten years, capacity in East Asia will show virtually no net growth, due to the removal of almost 15mt of capacity in China. Elsewhere, new plants are expected to come on stream in Russia, Saudi Arabia and the US. Future nitrogen demand is anticipated in Latin America, South Asia and Oceania suggesting growing import demand for nitrogen products in all forms. With supply exceeding demand up to 2020, the IFA expect regional surpluses accumulating in Africa, EECA and to a lesser extent West Asia.

Deteriorating outlook results in CF Industries Inc downgrade

The average price of ammonia continued its downward trend. Commodity market slowdown, lower fertilizer use, and increased capacity triggered the decline. While it was anticipated that nitrogen fertilizer prices were expected to decline as new capacity expansions at CF Industries Inc and other producers come on line in 2016 and 2017, low prices over the past several months have persisted far longer than previously anticipated. Additionally, the retail market has reportedly greatly reduced inventories due to the potential price risk and likely to operate in a similar manner into the spring of 2017. The negative impact of weaker prices and volumes prompted Moody's Investors Service to downgrade CF Industries Inc ratings.

Africa, North America and EECA mostly responsible for growth in urea capacity

Urea capacity, with the exception of China, is expected to rise over the next five years, by 10% to 229mt with Africa, North America and EECA accounting for 70%, of the increase. Global supply is forecast to grow by 2.5% per annum to 208mt with demand for all uses to rise by 2% per annum to 192mt; Latin America and South Asia accounting for almost half of the increased demand, with large potential surpluses to persist reaching 8% of supply by 2020.

Urea finds some support from demand and outages

Urea prices dropped 8% in July, reaching the lowest level in 12 years before briefly rising in August, strong international demand especially in Brazil and supply outages helped support prices. At the Gulf spot urea prices have remained below $200/t since early June and following a brief rise in August near $200/t fell to $189/t in October. Without major improvement in crop prices growers around the world may be hard-pressed to justify expansion, but the strong dollar is weakening many currencies, raising local farm prices for foreign farmers though they will pay more for inputs. Urea fertilizers account for more than two-fifths of total global nutrient consumption. Its demand profile is more stable than other nutrients because it is typically applied every year at stable rates. The market continues to be impacted by new capacity and low input prices (natural gas globally, coal in China), although coal prices rose during the quarter following supply tightness. The urea market is expected to remain oversupplied and capacity to grow in a number of countries, including the US, where imports are likely to contract sharply and further bloat seaborne supply.

Indian and Chinese contracts support prices

Potash prices plunged 16% owing to weak demand, high stocks, and ample supply. Prices are improving in response to tighter supplies from Canadian producers, to stem the oversupply and help the market recovery from the nine-year low posted in August. Demand has been weak, in part because farmers can defer application without a significant loss to yield and quality, unlike nitrogen application. New contracts signed with India and China in June/July following sharply lower prices are expected to limit the downward trend, but global demand is due to contract this year.

Large brownfield projects and six new potash mines by 2020

The IFA forecast global potash capacity to expand by 22% to 64.5mt K_20 in 2020, due to a combination of less expensive brownfield projects in a number of countries and six new mines to come on stream with projects in Canada, Russia, Turkmenistan and Belarus to account for over two-thirds of the increase in supply rising to 51.6mt K_20. North America would account for 34 % of global supply, EECA 33%, East Asia 15%, and other regions 18%. Global demand for potassium for all uses would rise by 11% to 43mt K_20. The market is expected to remain over-supplied with new capacity coming online over the next few years, resulting in a growing surplus.

Agrium and Potash Corp to merge

Given the ongoing difficulties for fertilizer manufacturers, faced with weak demand and sharply lower prices-potash, nitrogen and phosphates, well below their five- and ten-year averages, prompted producers in several countries to undertake a activities to reduce costs and improve efficiency, across the nutrient sector. Recent merger talks between Canada's Potash Corp. of Saskatchewan the world's largest producer of the fertilizer by capacity and smaller rival Agrium, culminated in a deal expected to be put to the respective shareholders on 3 November. If approved, the new company, worth $36bn,

would be the world's largest potash producer and the third biggest nitrogen and phosphorus manufacturer. Potash price movement was broadly positive mid-October in the US Corn Belt region, average weekly granular potash prices rose to $221/t. Similarly, average weekly prices in Brazil rose 1.3% to $237/t, prices at Vancouver $215/t, while the standard MOP prices in Southeast Asia rose to $242/t. Recently positive moves in potash prices generated optimism about the outlook for potash producers including Intrepid Potash (IPI) and Israel Chemicals (ICL), that have faced severe weakness in the market this year.

ISS recommends fertilizer investors to support the merger

Institutional Shareholder Services (ISS) an investor advisory company recommended that investors in fertilizer producers Agrium Inc. and Potash Corp of Saskatchewan support the tie-up that would create a new company with significant leverage. The $36bn deal combines Potash Corp's large nutrient production capacity with Agrium's large North American farm retail network. PotashCorp's shareholders would own 52% of the new company.

Phosphate rock supply to grow by 25mt by 2020

Global phosphate rock supply would grow 11% compared with 2015, to reach 250mt of phosphate concentrate in 2020, with Africa, Saudi Arabia and China accounting for three-fifths of this 25mt increase.

Morocco, China and Saudi Arabia increase capacity

Global phosphoric acid capacity in 2020 is projected to expand by 13% to 65.3mt P_2O_5 in 2020. Large capacity additions would occur in Morocco, China and Saudi Arabia. The IFA forecast global supply of phosphoric acid would increase by 2.4% per annum to 51.9mt P_2O_5, while demand would grow at 2.5% per annum to 46.2mt P_2O_5 pointing to a stable potential surplus between 2015 and 2017 and moderate increase towards 2020.

Massive capacity expansion for major processed phosphate fertilizers

Over the next five years, global capacity for the key processed phosphate fertilizers (mainly export orientated), would grow by 7mt P_2O_5 to 52mt P_2O_5 by 2020. Three exporting countries (Morocco, Saudi Arabia and China) would account for the bulk of the increase.

Oversupply and weak Indian demand weigh on markets

During the third quarter DAP prices fell by 3% and TSP by less than 1% due to oversupply and weak demand in India, which continued to weigh on these markets. Although demand has been strong in South America this year, India's imports for the current fertilizer year, from April, are down by 25%. The reasons include high stocks, weaker than-expected monsoon, rising domestic production and government policy delays on nutrient subsidies and maximum retail prices. Markets are expected to remain oversupplied, with supply pressures as new capacity expected from Morocco in December and Saudi Arabia in 2017.

Keeping food affordable remains a priority for India's government

For India, which houses one-third of the world's poor, inflation control will always be accorded high priority, *writes Kunal Bose*. A major challenge for the government is to see that food prices even when production suffers due to adverse weather condition do not go out of the reach of common man. In a situation where out of 141m hectares of net cultivated area only 46% has the benefit of irrigation, the supply side dependence on the monsoon for food items remains perennially critical. Precisely because of the farm sector's dependence on monsoon rains, growth rates in Indian agriculture in the past three years fluctuated between 1.5% in 2012/13 and 1.1% in 2015/16. Thanks to severe drought in many parts of the country, farm and allied sector had a negative growth of 0.2% in 2014/15.

Fortunately, after two year of scanty rains left cultivable land parched in many parts of the country, India had normal north-west monsoon this time allowing farmers to grow monsoon food and cash crops such as rice, soybeans, sugarcane and cotton and jute in land that is nearly 4.5% more than last five year's average. The official first advanced estimate of monsoon foodgrains production is a record 135mt (million tonnes). It is also likely that because of the moisture left in growing fields and expectation of adequate precipitation during the winter, production of wheat and several oilseeds will too be good. Hopefully, adequately buffeted by rains India will have a farm growth rate of 4% in the current year.

The Planning Commission, which has now been replaced by Niti Aayog (National Institution for Transforming India) says the country will have food security only if agricultural production has a sustainable compound annual growth rate (CAGR) of 4%. For the administration, the formidability of challenge of providing food goes beyond short and medium term to 2030 and further when it will have to provide food, nutrition and water to more than 1.5bn people. India is already under considerable stress given the fact that though it has 17% of the world population it has ownership of only the globe's 2.4% of land, 4% water and 1% forest resources. In the face of pressure to produce food and other crops on a growing scale, India unfortunately has been found wanting in arresting depletion of soil quality.

This is happening because of highly skewed use of nitrogen (N) at the expense of phosphorous (P) and potassium (K). According to official sources, urea that is N dominates the fertilizer sector, it is having 86% share in the total production of all nutrients. It is also the most imported and most consumed with 74% share of all fertilizers in use. The kind of damage an ill-conceived subsidy on an agricultural input could do to the sector and the environment is best illustrated by urea, which alone accounts for nearly 70% of fertilizer subsidy.

Dwelling on the issue of high subsidy and the government fixing a controlled maximum retail price (MRP) leading farmers to overuse urea that in turn causes soil detriment, agricultural expert Om Prakash Dhanuka says: "For the sake of soil fertility, N, P and K should be ideally used in the ratio of 4:2:1. The government publication *Economic Survey 2015–16* says the overuse of urea in India is pronounced compared with the US, the world and many Asian countries. We may draw some comfort from China exceeding India in the overuse of urea. Most Indian states use almost twice more urea as compared to phosphorous than is recommended. The overuse of urea *vis-à-vis* potash is even more galling. Here a parallel may be drawn with Bangladesh where the use of N is about 5% more than K. In India the average use of N *vis-à-vis* K is more than 100%. Unbelievable it will sound, but it is 4,500% more in Rajasthan and 1,300% higher in Punjab and Haryana.

The big malaise in the farm sector linked to grossly

unscientific use of N, P and K is due to the way fertilizer subsidy is administered. For some strange reason, the government reform of the fertilizer sector has stopped at diammonium phosphate (DAP) and muriate of potash (MOP), which unlike urea receive subsidy based on a formula that determines the amount of N, P and K in a given amount of nutrient. DAP and MOP receive a fixed per kg subsidy which does not change at whatever prices these fertilizers are sold in the market. Imports of DAP and MOP are not controlled in any way and here also the government only gives a nutrient based subsidy. The subsidy for the two fertilizers amounts to roughly 35% of their production costs.

Urea remains the exception where government intervention comes in principally four ways: (i) Fixing a MRP at which the nutrient is to be sold to farmers. The domestic sale price is generally one-third the cost of imported fertilizer. (ii) Subsidy is given to 30-odd domestic producers on a unit specific cost plus basis. This means inefficient producers will not have the incentive to raise efficiency bar leading to cost cutting. (iii) Imports are canalized with only three agencies allowed to bring foreign origin urea. (iv) Finally, canalizing agencies are told by government agencies how much to import when and once imported urea arrives in which districts to sell.

Fertilizer subsidy accounts for 0.8% of the country's gross domestic product (GDP). The subsidy goals are: enabling poor and marginal farmers to use the nutrient in their fields and improve land productivity on a sustainable basis. Urea subsidy flies in the face of the principle of 'one product one price.' What the authors of urea subsidy have certainly not taken into account is that "products which are essentially the same should be charged the same price, else there will be incentives built in to divert the subsidized commodity from eligible to ineligible consumers." This is exactly what is happening with urea on a very large scale depriving the targeted beneficiaries of supply and sustaining black market in a critical farm input.

A comparison of urea allocation data with estimates of its actual use shows over 40% diversion of the nitrogenous fertilizer to chemical units and to markets beyond national boundaries. Two more occurrences should set the government seriously thinking about changing the urea subsidy formula without any loss of time. First, besides diversion to chemicals manufacturing units, much of the nutrient meant for small farmers and sharecroppers ends up with big landowners because of rampant unethical practices at retail points. Second, the operating subsidy formula is rewarding inefficient urea producers at the cost of the Exchequer.

Dhanuka says "the solution to large-scale black-marketing in urea lies in bringing this nitrogenous fertilizer to nutrient-based subsidy that is working well for DAP and MOP. Let the subsidy for urea be based on nutrient found in a given amount of this fertilizer. Imports of urea will also have to be decanalized. Once the subsidy is fixed on the basis of nutrient content, the government will not be required to fix MRP for urea. To ensure that subsidy reaches the target constituency in full, the government will have to start sending the subsidy directly to farmers' bank account." With the government aggressively pursuing that every citizen must have a unique identification card and a bank account, direct subsidy transfer is becoming easy. The *Economic Survey* conveys the message that the objective of making fertilizers affordable to farmers, particularly the small ones by providing substantial subsidy gets defeated when diversion to industry and foreign markets is as much as 41%. With its retail price fixed here, there is built in incentive to send

urea across the border to countries where premiums of over 100% on Indian MRP are available.

It goes against the grains of economics that the department of fertilizer will decide every season how much fertilizer is to be imported by canalizing agencies based on its estimate of domestic supply and demand. But fertilizer demand forecasting is a tricky business since it is linked not only to how the weather will behave but also to capacity of farmers to pay for farm inputs decided by their income from the previous season's crop output and sales. The *Survey* points out that it will be up to 70 days before urea imports make it to Indian shores once the fertilizer department gives sanctions to buying the material in the world market. This time-consuming practice is the reason why India finds urea shortages getting exacerbated by delayed arrivals of imported materials. The jinx can, however, be easily broken by decanalizing imports. It will be ideal to leave the volume and timing of urea imports to a much bigger number of participants than the present three. Let shortages not force farmers to procure urea in black market in high demand times.

The inefficient application of fertilizers over the past many decades has meant that the use of the input is not making commensurate growth in agricultural productivity. The *Survey* says: "Grain yield per kg use of NPK fertilizer has declined from 13.4kg per hectare in 1970 to 3.7kg grain per hectare in irrigated areas by 2005." Quite likely the situation has continued to worsen. A bane of Indian farming is that in state after state soils suffer from deficiencies of micro nutrients such as boron, zinc, iron and copper and organic fertilizers. The *Survey* recommends a "judicious" mix of chemical fertilizers, bio-fertilizers and locally available organic manures to improve and sustain soil fertility.

The new urea policies which ushered in uniform gas costs for all urea producers by pooling the prices of domestic and imported gas and extension of subsidy to production beyond reassessed capacity of manufacturing plants have done good to the industry with domestic production in 2015/16 up 8% and consequently urea imports were down 3% year on year to 8.47mt. As local production is expected to improve further to 25.5mt or even more in 2016-17 imports are likely to remain at last year's level. This is notwithstanding significant improvements in crop prospects in the current year.

Fertilizer imports increase in Brazil as industry sells to foreign companies

The majority of Brazil's fertilizer industry has been sold to foreign companies, and imports are rising as a result, *writes Patrick Knight.*

Twenty years ago, the Vale do Rio Doce company, now Vale, and the Brazilian oil giant Petrobras, were under government control. At that time, these two companies were important players in the fertilizer industry in Brazil, the world's fourth largest market for the product. Even then, however, more than half of the fertilizer used in Brazil, where the poor quality of soils means that above average quantities must be used if yields are to remain high, was imported. But both companies had plans to increase the production of nitrates and phosphates and so reduce the need for imports. Brazil has very small reserves of potassium, 90% of which would still have to be imported, but is has considerable potential for producing more phosphate and nitrates.

In the intervening years, the amount of soya, maize and sugar cane, among Brazil's leading export earners, has grown steadily. New areas of land have been opened up, and more rice, cotton and wheat having been grown as well. Demand for fertilizer has risen by an average of 3% a year to the present 30mt (million tonnes). But the amount produced locally has remained steady at about 9mt, falling to less than that in some recent years. Vale has been privatized, and government control of Petrobras has been loosened.

The companies were both hard hit by the fall in the world price of both crude oil and iron ore, and facing severe financial difficulties, both have been forced to sell their interests in fertilizer, along with numerous other assets.

The US controlled Mosaic company, the world's largest producer of phosphates, has recently bought Vale's assets, paying about $3 billion for them, while the Norwegian-owned Yara, has bought most of Petrobras's assets, which as well as phosphates, include nitrates. Petrobras is a large producer of natural gas, and with numerous deep sea fields being opened up, will soon have much more gas available. But the company itself will not be involved in processing the extra gas into urea and fertilizer.

The previously state owned companies are not the only ones to have been sold. The privately owned Anglo-American mining company, hard hit by the fall in ore prices, has sold its interests in fertilizer to the Chinese owned China Molybdenum company. An Indian company, United Phosphates, is to spend $1 billion on a new plant in Brazil.

The financial difficulties Brazil has experienced in the past few years have caused the currency, which three years ago, was greatly overvalued, to lose 30% of its previous value. Although this led to farmers getting less foreign currency for their soya beans, meal and oil, as well as their maize and sugar, the price in local currency, in which most costs are incurred, hardly fell at all. So farmers have continued to plant more of these three commodities, and the area planted to them, the leading users of fertilizer has grown by about 2% each year.

Although the weaker currency has caused demand for fertilizer to fall slightly in Brazil in the past two years, demand by several other important users of fertilizer has fallen as well, so prices have weakened.

In contrast to the state owned companies, the new owners of most of the fertilizer processing and distributing facilities in Brazil, have little interest in attempting to raise domestic production of nitrates, phosphates, or to intensify the search for potassium, large quantities of which are thought to exist in the Amazon region.

In common with all large multinational companies, the new owners prefer to import the extra quantities of fertilizer which will be needed by Brazil for the forseeable future. Much of the extra food which will be needed to feed the increasing number of inhabitants in the world, is expected to be grown in this country.

Imported fertilizer now costs Brazil about $12 billion a year, and after crude oil and refined oil products, fertilizer is the most costly import. As the economy starts to recover, some efforts may be made to increase local production, and cut the import bill. But this will only happen with government help and stimulus. For the time being, the authorities seem prepared to allow market forces to operate without any restrictions. This is prejudicing the important and influential farm sector, responsible for a major share of Brazil's export earnings.

At the moment, most of the 24mt of phosphates, nitrates and potassium imported by Brazil each year, are unloaded at the ports of Paranagua and Santos, where numerous processing and concentrating plants have been built. The reason for this is that until 25 years ago, the great majority of all the crops planted in Brazil were grown in the south east region. In recent years, however, most extra plantings have been done in the centre west and north east of the country. At the moment, most of the 30–40% of the fertilizer is used on farms in the centre west and north east, which are up to 2,000km from Santos and Paranagua. Most is taken to farms on the trucks which have brought the soya and maize to the ports. Fertilizer provides truckers with a useful 'return' cargo, which holds down their costs. But as waterways are opened up in the north of the country, and an increasing number of barges are used to transport soya and maize to ports, more fertilizer is being imported via ports such Vila do Conde and Itaqui. Itaqui is the terminus of the railway which carries iron ore from Vale's Carajas mines to the sea. But it also links with the 'north south' rail line, along which increasing amounts of grains are carried. The amount of fertilizer imported in the north is now growing steadily, and will continue to do so. Most of the extra soya and maize to be grown in Brazil in future years, will be planted in states of the centra west, notably Mato Gross, as well as this in the Matopiba region of the north east. This comprises the states of Maranhao, Tocantins, Piaui and Bahia, all of which have rail links to ports, as there is little or no spare land available in the south east. DCi

STATISTICS

Sales, domestic production and imports of fertilizer (million tonnes)

	Sold	National production	Imports
2016	30.0	8.6	24.1(est)
2015	30.2	9.1	21.1
2014	32.2	8.8	24.0
2013	30.7	9.3	21.6

National Association of fertilizer blenders, ANDA

Sustainable shipping moves a step closer

AkzoNobel launches biocide-free fouling control coating

Switching to more sustainable shipping has been made easier for ship owners and operators following the launch of Intersleek 1000, a new biocide-free fouling control coating developed by AkzoNobel's Marine Coatings business.

Offering fuel and CO_2 savings of up to 6%*, the new product — part of the company's International range — is the first fouling control coating to be based on Lanion technology. The patented technology incorporates bio-renewable raw material that helps to deliver enhanced vessel performance, so that hulls coated with Intersleek 1000 maintain an ultra-smooth surface, reducing drag and lowering fuel consumption and emissions.

"The launch of Intersleek 1000 acknowledges the need to provide choice and diversity to our customers by developing coatings that recognize the differing preferences and operational requirements of ship owners and operators looking to invest in more sustainable hull coatings," explained Robert Wong, Marketing Director at AkzoNobel Marine Coatings.

The long-term fouling control performance of Intersleek 1000 is equivalent to a self-polishing copolymer (SPC) coating. In addition, when compared with SPC coatings, Intersleek 1000 delivers smoother films upon application, leading to lower hull roughness and improved vessel efficiency. A further benefit is the product's eligibility to be included in AkzoNobel's award-winning carbon credits initiative.

Based on significant R&D, Intersleek1000 has delivered proven in-service performance on pure car carriers, container vessels and LNG ships. A Ro-Ro vessel coated with Intersleek 1000 generated 1,500 carbon credits during a five year in-service trial. The 1,500 carbon credits represent the removal of 1,500 tonnes of CO_2 from the atmosphere and were accrued through a 6% fuel saving that was independently validated and verified by RINA Services and the Gold Standard Foundation, as part of the carbon credits issuance process.

Continued Wong: "Thanks to Intersleek 1000's Lanion technology, we can offer an alternative sustainable coating option, which supports the widespread adoption of eco-efficiency technologies while meeting our commitment to developing innovative coatings in a sustainable way. This will boost the operational and environmental performance of the shipping industry, as well as improving efficiencies and profitability for ship owners and operators."

"As a tangible demonstration of our confidence in Intersleek1000, customers will be offered performance guarantees in their Performance Maintenance Agreements (PMA) for Intersleek1000. These include guaranteed degradation of no more than 4.5% for the full duration of the five-year docking cycle. More information on the exact operational, cost and environmental efficiencies delivered by Intersleek1000 on unique vessels and fleets can be accessed through our big data consultancy tool Intertrac Vision."

**In service trials showed vessels switching from a biocidal self-polishing copolymers (SPC) coating to Intersleek 1000 achieved 6% fuel savings. More information on the exact operational, cost and environmental efficiencies delivered by applying Intersleek 1000 to each unique vessel can be accessed via Intertrac Vision.*

About AkzoNobel

AkzoNobel is a leading global paints and coatings company and a major producer of speciality chemicals. It supplies essential ingredients, essential protection and essential colour to industries and consumers worldwide. Backed by a pioneering heritage, its innovative products and sustainable technologies are designed to meet the growing demands of our fast-changing planet, while making life easier. Headquartered in Amsterdam, the Netherlands, the company has approximately 45,000 people in around 80 countries, while its portfolio includes well-known brands such as Dulux, Sikkens, International, Interpon and Eka. Consistently ranked as a leader in sustainability, it is dedicated to energizing cities and communities while creating a protected, colourful world.

London P&I Club celebrates 150 years of operation

The London P&I Club is celebrating its 150th anniversary during 2016/17, and has published a history of the club to mark the occasion.

Nigel Watson, author of *150 years of The London P&I Club*, says, "When the London Club was founded in 1866, shipping was dominated by the British mercantile marine, and the general cargo steamer was developing as the major conduit for world trade. As the club reaches 150, the world's shipping fleet is much more disparately owned and huge vessels ship goods across the seas. One constant has been the prime importance of shipping to world trade and the way we live our lives in the modern world."

As well as illustrating the momentous shifts in shipping since 1866, the story of the London Club also highlights the crucial role played by mutual insurance clubs in sustaining the role of international shipping.

In a foreword to the book, Alderman The Lord Mountevans, Lord Mayor of London and a former shipbroker with Clarksons, says, "The history highlights foresight and planning, for example in the early establishment of the overseas club offices. It also highlights enduring principles such as a commitment to mutuality and the strong shipowner interest and engagement which clearly underpin the London Club's work."

Jotun lauds EU approval of copper antifoulings

EU ANTIFOULING COPPER APPROVAL WILL ENSURE CONTINUED EFFICIENCY, COST SAVINGS AND ENVIRONMENTAL PERFORMANCE, SAYS JOTUN

Jotun, a major supplier of marine antifouling coatings, believes the European Union's decision to approve the use of copper in marine antifoulings will ensure continued delivery of powerful benefits for both the shipping industry and environment.

Copper is a key ingredient of most antifouling coatings, valued for its ability to provide the best overall balance of environmental protection and cost savings.

By preventing the settling, growth and spread of a wide range of fouling species, copper plays a key role in ensuring clean vessel hulls. This minimizes frictional resistance, reducing speed loss, fuel consumption, emissions, and the spread of potentially invasive marine species.

"Copper's efficacy is second to none when it comes to delivering clean hulls," comments Alfie Ong, VP Jotun Marine Coatings. "And clean hulls are integral to enhancing the sustainability of the shipping industry, both commercially and environmentally.

"Measuring hull performance in line with the soon to be published ISO 19030, we see that copper — a key ingredient of Jotun's SeaQuantum X200 — performs well above competing alternatives. This means it provides not only the best ROI for ship owners, but also the best results for the environment.

"That's why it's excellent news for our customers that the EU, after an extensive review, has approved the use of copper in antifoulings through to 2026.

"At Jotun we're delighted to be able to continue supplying quality coatings to the region, meeting a very clear market demand for enhanced efficiency and vessel performance."

To prove the effectiveness of SeaQuantum X200, which has now been applied to over 400 vessels worldwide, Jotun has developed the Hull Performance Solutions (HPS) concept. This combines the coating with enhanced technical service and performance analysis according to the soon to be published ISO 19030. On top of that HPS guarantees the performance with a cash back promise which is unique in the market.

In the first ever five year dry-docking of a vessel treated with HPS (Gearbulk's Penguin Arrow, dry-docked in late 2015), recorded data demonstrated that the ship made a staggering fuel saving of US$1.5million, cutting CO_2 emissions by some 12,055 tonnes, across the 60-month period (compared to the previous five years).

"The results speak for themselves," Ong notes. "SeaQuantum X200 delivers proven ROI for shipowners, reducing operational costs and slashing emissions. Copper is a key component which enables that performance.

"The EU has made it clear that further steps are required to approve the use of copper in individual coatings, but this initial move is a critical first step forwards for the industry. We welcome this decision, as will everyone interested in better environmental performance, efficiency and sustainability in shipping."

Cargo liquefaction a problem for bulk terminals, warns ABTO chief

The Association of Bulk Terminal Operators (ABTO) has warned that cargo liquefaction — an issue commonly associated with the seaborne transportation of unprocessed mineral ores and concentrates — is also an issue which bulk terminals need to pay attention to.

Transportable Moisture Limits must be clearly established, or the transportation of cargoes such as bauxite can become extremely dangerous.

Speaking at the ICHCA ISP76 panel meeting in London in mid-September, ABTO chief executive Ian Adams, said: "The liquefaction of bulk commodities is a serious issue which can and should be managed effectively shoreside. However, allowing ship's crews access to stockpiles to assess solid bulk commodities such as bauxite and nickel ore is not the answer in view of the fact that stockpiles have been known to collapse. Tests should only be carried out when the cargo has been moved for loading onto the vessel."

At the 3rd session of IMO's Sub-Committee on Carriage of Cargoes and Containers (CCC), it was agreed to draft new IMSBC amendments classifying coal as a Group A&B cargo and to push through amendments specifying that the "shipper shall be responsible for ensuring that a test to determine the Transportable Moisture Limit [TML]... and that the shipper shall be responsible for ensuring the sampling and testing for moisture content".

Referring to the on-going amendments to the International Maritime Solid Bulk Cargoes (IMSBC) Code, Adams told ICHCA members: "There has been a significant amount of time at IMO debating the IMSBC Code and exploring the use of a modified Proctor/Fagerberg test for coal as a viable way of detecting and preventing cargo liquefaction. Australia, Brazil and China have done a tremendous amount of research into the test methodology and we are now nearing the point of conclusion."

Cargo liquefaction caused the sinking of the Bulk Jupiter.

This test procedure details the laboratory determination of TML for coals up to a nominal top size of 50mm. The procedure is based on a modification of the Proctor/Fagerberg test involving testing of a coal sample of up 170kg.

While the IMSBC Code applies primarily to the seaborne carriage of cargoes, Adams said there is a "definite crossover", but bulk terminal operators are often left behind during the regulatory decision-making process which, given that five billion tonnes of bulk commodities are transported annually, needs to change.

"There has to be greater representation at IMO. Liquefaction remains a serious concern for all sectors of industry but there is no international legislation governing the storage, segregation, handling and monitoring of such cargoes at the terminal — only guidelines," he said.

Turning to the issue of HME classification (cargoes harmful to the marine environment under Marpol Annex V), Adams pointed out that there is no definitive list of HME cargoes, and in his opinion, quite rightly so. "It remains the responsibility of the shipper to declare whether a cargo is HME and to source the necessary cargo residue and wash-water reception facilities," he said.

The certification of HME cargoes was also considered problematic, with ICHCA members commenting on a perceived increase in the number of falsified TML certificates. This, many agreed was due to the lack of mandatory procedures for carrying out TML tests and full depth sampling of stockpiles, which ports will restrict for obvious safety reasons.

Richard Brough, O.B.E., Technical Adviser to ICHCA, said: "The tragic loss of the *Bulk Jupiter*, which sank off the coast of Vung Tau, Vietnam, in 2015 carrying a 46,000t cargo of bauxite, highlighted the need for all those involved in the supply chain to take responsibility in assessing the solidity of bulk cargoes. But it should not take a tragic event like this to be the harbinger of much needed change."

Bodewes selects ACO MARINE'S Clarimar for new environmentally-sound EcoCoasters

Wastewater streams aboard the two state-of-the-art EcoCoasters Dutch shipyard Royal Bodewes is building for Finland's VG-Shipping will be managed by a bespoke treatment system designed by ACO Marine.

Both 4,700dwt EcoCoasters *Eeva VG* and *Mirva VG*, due to be delivered this autumn to VG-Shipping, the ship management arm of the Meriaura Group, feature MEPC.227(64)-compliant Clarimar MF-1 treatment plants.

Mark Beavis, Managing Director, ACO Marine, said: "These vessels have been designed and built to be the most environmentally-efficient coasters in their class, so we are delighted that the Clarimar MF units have also been specified amongst the array of environmentally-safe solutions designed to meet the owner's exacting requirements."

Sacha Uittenbogaart, Sales and Marketing Manager with Technisch Bureau Uittenbogaart, ACO Marine's Netherlands distributor, added: "Both vessels feature systems and technologies designed to reduce substantially the environmental impact of ship operations. As such, the Clarimar MF series is the ideal wastewater solution for operations in ecologically sensitive areas, since it is proven to treat wastewater streams well below the mandatory requirements."

The Clarimar MF-1 is amongst an array of environmentally-safe equipments specified for VG-Shipping's EcoCoasters Mirva VG *and* Eeva VG.

Fully type-approved by Bureau Veritas to meet MEPC 227(64) and EC MED module B, the ACO Clarimar MF can reduce Coliform bacteria to 25/100ml, TSS to <14mg/l, BOD to <3mg/l, and COD to <25mg/l.

"The unique properties of the ACO 'bio-sword' — a key component of the Clarimar system — allows operation with bio-mass concentrations in the activation chamber up to four times higher than those of conventional settling type sewage treatment plants," said Beavis. "By operating at such high concentrations, a greatly reduced activation tank volume is achieved with a significant reduction in both the footprint and maintenance envelope requirement."

The compact systems supplied to *Eeva VG* and *Mirva VG*, currently outfitting in Papenburg, Germany, each have a wet weight of just 1,640kg.

Like all ACO Marine products, the Clarimar MF is manufactured entirely in the EU from high performance materials which, unlike coated black steel, is completely corrosion resistant and light weight, the system's modular design affords simple installation and requires only one power connection. From an operational perspective it is has the lowest running costs of any sewage treatment plant on the market.

The new EcoCoasters designed by Foreship and Aker Arctic and built to BV's CLEANSHIP notation, cause considerably less environmental impact than conventional dry cargo vessels. Hull form and machinery have been optimized for slow steaming at 9kt, with each vessel powered by a single ABC 8DZC main engine running on MGO or biofuel produced at Meriaura Group's refinery in Uusikaupunki. Fuel consumption is almost halved compared to other dry cargo vessels of this size and class.

About ACO Marine

Established 15 years ago, ACO Marine is a member of the international German-headquartered ACO Group and a leading supplier of advanced wastewater treatment systems to the global commercial, naval, offshore and leisure marine sectors with a sales and service network world-wide. Its unique environmental solutions are used primarily in wastewater technology, wastewater management and drainage systems. The wide range of products includes advanced membrane bioreactor systems, conventional extended aeration with 'bio-sword' filtration sewage treatment plants, push-fit pipe systems in both stainless and galvanized steel and fully automated high capacity grease separators. ACO Marine develops in-house solutions from its ISO 9001 accredited production facilities, all of which are located entirely within the EU.

Huge changes ahead

BIMCO assesses the impact of the crisis on the future of the dry bulk market

On 6 October, BIMCO — the world's largest international shipping association, with more than 2,200 members globally — published the next in its series of reports looking at the 'road to recovery' for dry bulk shipping beyond the current market difficulties. The foundation for the new report follows the conclusion of BIMCO's previous analysis — that due to the severity of the current crisis the sector can only return to profitability in 2019 if shipowners deliver 'zero supply side growth', year on year. This is where ship demolition is equal to or greater than deliveries. This is not an easy task, as the dry bulk shipping industry has only achieved zero supply side growth in three of the last 35 years.

Total dry bulk trade has grown by 40% since 2007, largely driven by developing nations in Asia. The demand for dry bulk commodities has peaked in advanced economies, for instance demand from Europe, North America and Japan has not returned to pre-crisis levels and is unlikely to in the future. The question is: how close to the peak are the larger developing nations in Asia that have driven dry bulk demand over the last eight years? It is clear that the future potential for growth is focused on a few key countries.

Dry bulk shipping relies strongly on heavy industrial activity and the use of fossil fuels. The future growth of the related cargoes is uncertain. While China's economic growth has slowed, its focus is moving away from infrastructure, housing and heavy industry towards a consumer- and service-driven economy. This transition has already hit China's import of dry bulk commodities and will continue to play out in coming years.

Various countries have announced their will to end the use of fossil fuels and have started to close coal-fired power plants due to their declining political and social acceptability. It was recently reported that energy from coal hit zero for half a day in the UK for the first time since it opened its first coal-fired generator in 1882. Thermal coal imports to the UK were reported down 80% year on year in the first half of 2016.

As if this were not enough, the shipping industry as a whole is being required to invest heavily in equipment to satisfy up-coming environmental regulations on ballast water treatment, and NO_X, SO_X and greenhouse gas emissions. The new ballast water convention will enter into force in 2017 and will require more than 50,000 ships to be retrofitted with ballast water management systems costing up to US$5 million per ship. This will force many owners to scrap their ships prematurely. While this will have a negative financial impact for many individual owners, it will be a positive move towards rebalancing the supply side of the market and hasten freight rate recovery in general.

What changes will the current multi-year crisis bring around for the dry bulk shipping industry?

This prolonged crisis is likely to have a significant impact on how dry bulk shipping business is conducted in the future, and many of the changes are likely to spill over to other shipping sectors as well.

'Fragmented ownership': the current industry model for dry bulk shipping

The current industry model in dry bulk shipping is characterized by very fragmented ownership of the 10,800 ships in the global fleet. There are only four companies owning more than 100 dry bulk ships and on a DWT basis, the largest owned fleet represents less than 4% of the total fleet. So each individual owner has very little influence and bargaining power with its customers and is often reflected in low levels of mutual trust.

Many dry bulk shipowners have highly leveraged fleets and are focused on the asset play (buy low, sell high) rather than acting as logistics providers focused on return on capital employed. This is a high risk business model especially when it is combined with a high proportion of ships on the spot market.

Some more conservative owners, who had a strategy of running many of their ships on long-term charter, have been

caught out by the length and severity of the downturn with most, if not all, of their long-term charters now expired. Today, locking ships into loss-making time charters is not an attractive option for the owner.

There is consolidation going on amongst the dry bulk shipping customers, many of whom are already very large global players. So while the dry bulk shipowners remain highly fragmented, their customers are ever-increasing in their influence and bargaining power. Customers are spoilt for choice: there are too many ships to choose from and, as a result, freight rates are firmly in the gutter. Dry bulk shipping is in fact a good example of what economists call an oligopsony: a market with a limited number of buyers and a large number of sellers.

Due to the small size of many owners' businesses, today a very large part of dry bulk chartering continues to be done via brokers. This means that the relationship with the shipping customer is effectively owned by the broker, further weakening the negotiating capability of the owner.

Since 2011, 34 giant Valemax ships have been launched (380,000dwt or more). It was announced in March 2016 that a further 30 Valemax ships have been ordered for delivery in 2018 by three Chinese owners for a combined $2.5 billion with back-to-back 25+ year contract of affreightments (COA) with Brazilian mining giant Vale. Once these orders have been delivered, the Valemax fleet will be able to carry over 50% of Brazil's current iron ore export volume, eating into the business currently carried by the existing Capesize fleet.

Today the financing of ships comes largely from banks — with the bank able to dictate the terms to the small ship owner. European banks have cooled their interest in increasing their exposure to the shipping industry. At the same time, more finance is now entering the industry from Asian banks. Global ship financing was heavily reliant on banks before 2008 and, according to Petrofin Research, this reliance has dropped markedly since then as the proportion of non-bank finance sources has grown. The gap is made up by alternatives such as export credit agencies, bonds, public and private equity. Further declines in bank financing are likely as existing and future banking regulation will make lending to shipping more expensive.

There is far too much ship-building capacity. Government-backed export credit agencies financing new buildings has contributed to the unsustainable level of new ships hitting the water. State support for the yards could be for a number of diverse reasons, such as to create/retain employment in some countries and/or attain leadership in the global transport system.

Consolidation and risk management: the new industry model for dry bulk shipowners

Consolidation is the natural consequence of a prolonged and deep shipping recession. Less well capitalized owners will be forced to sell their ships, and some will wish to withdraw their capital from the dry bulk sector. Their ships will be bought at bargain prices by better capitalized competitors. While the existing business model is set up to service the requirements of the smaller shipowner, there are a number of significant benefits from size and scale for larger shipowning companies:

- Larger owners will seek to develop long-term direct relationships with major customers without the requirement of an intermediary or broker. They will have the resources and capability to deliver creative, flexible and value-adding logistics solutions. The larger owners will eventually develop more balanced and trusting long-term relationships with these customers and have more negotiating power.
- Major shipping customers will want to work directly with fewer shipowners, each of which can provide a significant part of their shipping transport requirements. This is seen in the Brazil China iron ore trade with Vale recently signing long-term COAs with Coscocs, China Merchant Group and ICBC.

The key stakeholders in large shipowning companies, both debt and equity providers, will require a more sophisticated business model with a greater focus on risk management. We will see them adopt risk management in a number of ways:

- Through the availability of better quality information — a deeper knowledge of the market and better forecasting. This will help companies achieve a deeper understanding of customers and the market, and ultimately support better resource allocation and asset purchase/disposal decisions.
- Putting a charter portfolio strategy in place. Owner companies will wish to have a large part of their fleet on longer-term charters to ensure a steady cash flow to maintain the business through down cycles. They will also want to avoid too large an exposure to any one single customer.
- Shipowners will seek to control their commercial risk better via forward freight agreements, currency and bunkers hedging, and counterpart checking among others.
- Larger owners may also wish to reduce risk and capital requirements by operating a fleet of pooled ships alongside their owned fleet.

What is the optimal size of a shipowning company?

A number of owners believe that running an efficient shipping company requires a certain number of ships under its control. Some said around 80 to 100 ships. It should be noted that on a pure ownership basis, there are only eleven companies that currently own 80 or more ships. In summary, in the future there will be many larger dry bulk shipowning companies whose business will be as logistics providers to the commodity giants with a focus on risk management and Return on Capital Employed (ROCE). The asset play will be a subsidiary benefit to these businesses rather than the number one business goal.

What will this mean for the dry bulk shipping sector as a whole?

It will be a demand-driven industry with most ships purchased against long-term charters by large businesses that are better able to forecast future market demand. This will ensure that supply and demand are much more closely linked in a mature market where large and unforeseen trade fluctuations are rare. Ultimately this will mean a less cyclical industry, leading to steadier and more predictable ROCE for the larger companies.

This is a real risk for the small shipowner, many of which are family-run businesses, as the business model will become less attractive over time for many reasons:

- Finance will be harder to find, requiring a higher proportion of equity, and be more expensive than their larger rivals who are able to demonstrate a lower risk business model.
- As a stand-alone company, small owners will not be able to participate on the major routes for the major commodity sectors. They will mostly be limited to niche trades arranged through brokers, alternatively they may place their ships in a pool operated by a larger shipowning company.
- The large and frequent shipping cycles that made the asset play so profitable in the past will be dampened in intensity and reduced in frequency. This will make the asset play a less attractive business model in the future.

Dry bulk shipping has the least sophisticated ships requiring low levels of crew specialization, so there is a low barrier to market entry and therefore small dry bulk shipowners generally struggle to benefit from their experience and reputation.

All these changes are not expected to happen overnight but will accelerate over time, particularly if the current recovery is delayed. There are already some larger shipowning companies acting as logistics providers to the commodity giants with a focus on risk management and ROCE.

Broader range of services: the new industry model for shipbrokers

Brokers are already facing challenging conditions due to the supply demand imbalance across almost all shipping sectors and the resultant low levels of charter rates, spot freight rates, resale values and newbuilding prices. Consolidation will mean bigger shipowners in all the major shipping sectors. Owners of big dry bulk fleets will want to deal directly with larger customers for major commodities on the major trade routes. They will want to own the customer relationship and reduce the cost of doing business by eliminating broking commissions. The larger organizations will have the scale and resources to manage their key customer relationships directly. Maybe these larger owners will also have the resources to deal directly with shipyards and ship breakers in the future too?

There is also pressure from the shipping customers to eliminate brokers from their supply chain with Vale having recently put in place very long-term COAs for over 50% of the Brazil China iron ore trade from 2018 onwards. It is only a matter of time before there will be similar moves to control the Australian iron ore and coking coal trades.

In summary, shipbrokers that add value to a deal will always be in demand in the shipping market and will continue to bring together shipowners and dry bulk shipping customers for niche trades and for minor trade routes. Shipbrokers are already broadening their commercial offering to what they describe as their full service client offer, seeing themselves more and more as advisers. Brokers are offering services such as consultancy and data provision to a broader range of clients and will need to continue to expand these offerings to survive. For example, a leading broker has recently announced a strategic investment in a company focused on leveraging knowledge.

Basel drives up the cost of finance for shipping

While banks are expected to continue to provide the majority of finance for ships across all the major shipping sectors in the coming years, there will be a need for alternatives such as export credit agencies, bonds, and both public and private equity.

The cost of finance for shipping from banks will undoubtedly continue to increase as a result of the raised quantity and quality of capital levels required by banks due to the Basel III regulations being phased in from 2013 through to 2019. There are further regulations being discussed by the Basel Committee, termed Basel IV. These proposed regulations focus on customer credit risk which, if adopted in their current form, will further increase the cost of bank finance for shipping.

Smaller ship owning companies without an established relationship with a bank will struggle to raise bank finance for the purchase of ships. If successful, the finance will be expensive and the owner will be required to fund a higher proportion of the purchase price with equity. Smaller owners may be forced to seek alternative forms of ship finance; private equity might be an ideal solution, both for shipping companies who need money, and for investors who need a return.

Diversification: the new industry model for shipyards

The fundamental business model for shipyards may not change as much as so many jobs are supported by ship building and therefore state sponsorship is unlikely to entirely go away. Overall capacity could be expected to be reduced as governments recognize that shipping across all sectors is forecast to grow at a much slower rate in the future.

Many yards will close. Others will seek alternative or specialist work. On a brighter note, there will be a need for substantial yard capacity to retro-fit equipment required by environmental regulations including ballast water systems, and possibly SO_X scrubbers once the global SO_X cap is enacted.

It is essential that shipowners and other investors shy away from 'early-bird discounts' and other 'attractive' offers from the shipyards — otherwise the road to recovery may never be found. The result will be a much reduced ship building capacity and a more consolidated industry with intense on-going competition between China, South Korea and Japan.

And then what?

This report focuses on what is likely to happen as a result of the prolonged and deep recession that is currently gripping the dry bulk shipping industry. The predicted outcomes are realistic and based on experience in other shipping related markets.

The underlying model for BIMCO's *Road to Recovery Report* returns the industry to profitability in 2019 assuming 2% per annum trade growth. This growth prediction may well be too optimistic meaning that the recovery could be delayed well into the 2020s. The shipping economist Olaf Merk, in his well-known blog, talks about the three reasons why global maritime trade will reach its peak. These are: 1. peak in consumption; 2. peak in trade; and 3. peak in fossil fuels. Merk summarizes: "Shipping and ports both live in a bubble: there is huge overcapacity of ships and terminal capacity. It might take a decade or more to reach a more balanced situation. The possibility of the three simultaneous peaks highlighted here should make anyone wary to add even more capacity."

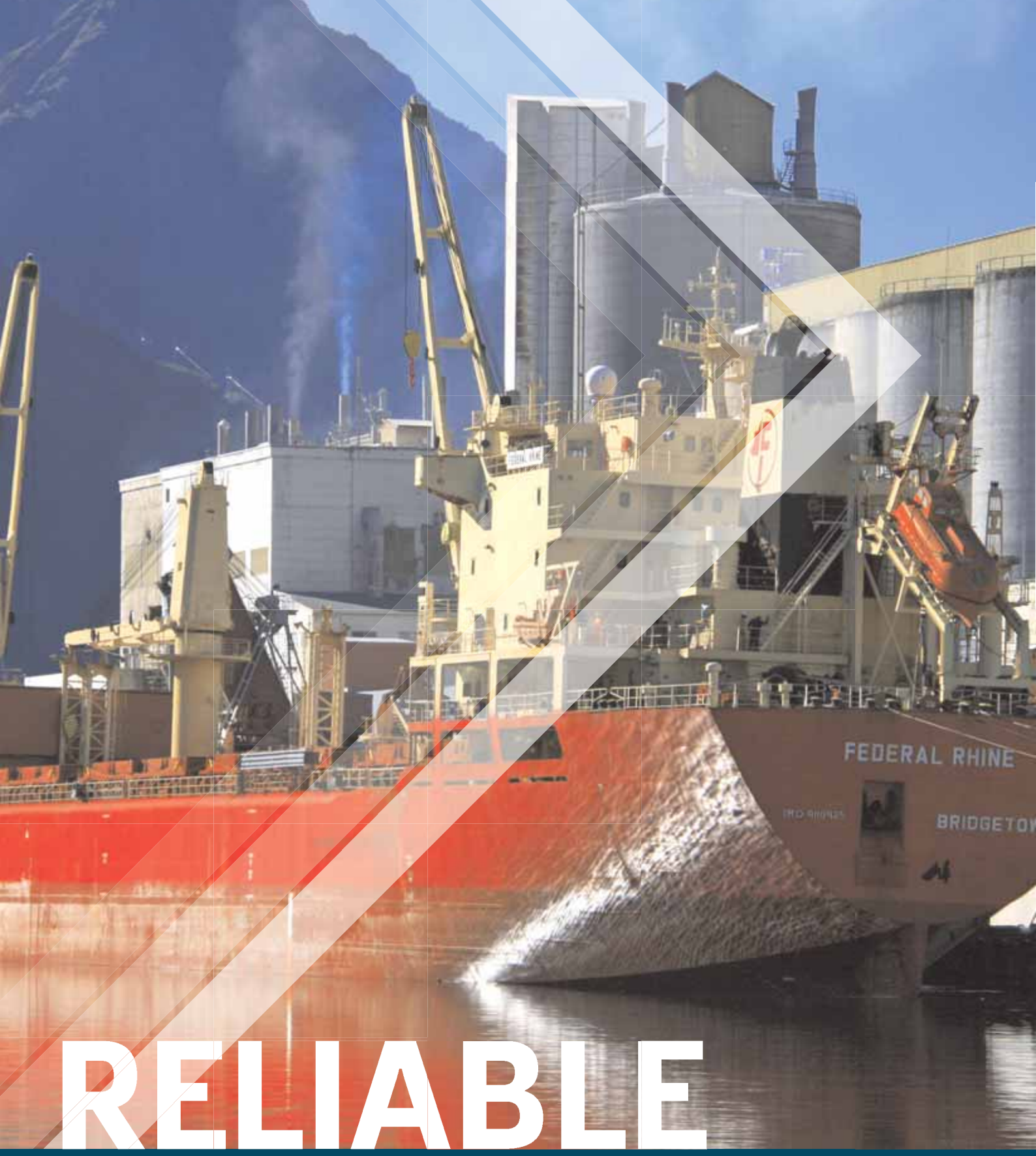
Even if trade growth of 2% is achieved, shipowners must scrap ships in far greater numbers than has been seen to date. The other key metric to the recovery in 2019 is 'zero supply side growth' which if not achieved will delay the recovery into the 2020s.

Danish Ship Finance in its recent shipping market review made a prophetic comment: "Based on past experience, some seem to view low secondhand prices as a good investment opportunity. In some segments, however, we argue that the low secondhand prices are just as likely to represent an industry in transition in which overcapacity needs to be addressed and value creation needs to be re-thought."

Conclusion

It is difficult to have an optimistic outlook for the coming years in dry bulk shipping. The industry is in charge of its own destiny, each and every shipowner must take tough decisions to help deliver, at a minimum, year on year 'zero supply side growth'.

Not only must the dry bulk shipowners resolve the supply situation, they must also face up to the substantial changes needed to their business in a rapidly evolving macro-economic environment affecting future demand. This may well be intimidating for those involved, and many may choose to take their dwindling capital elsewhere. DCi



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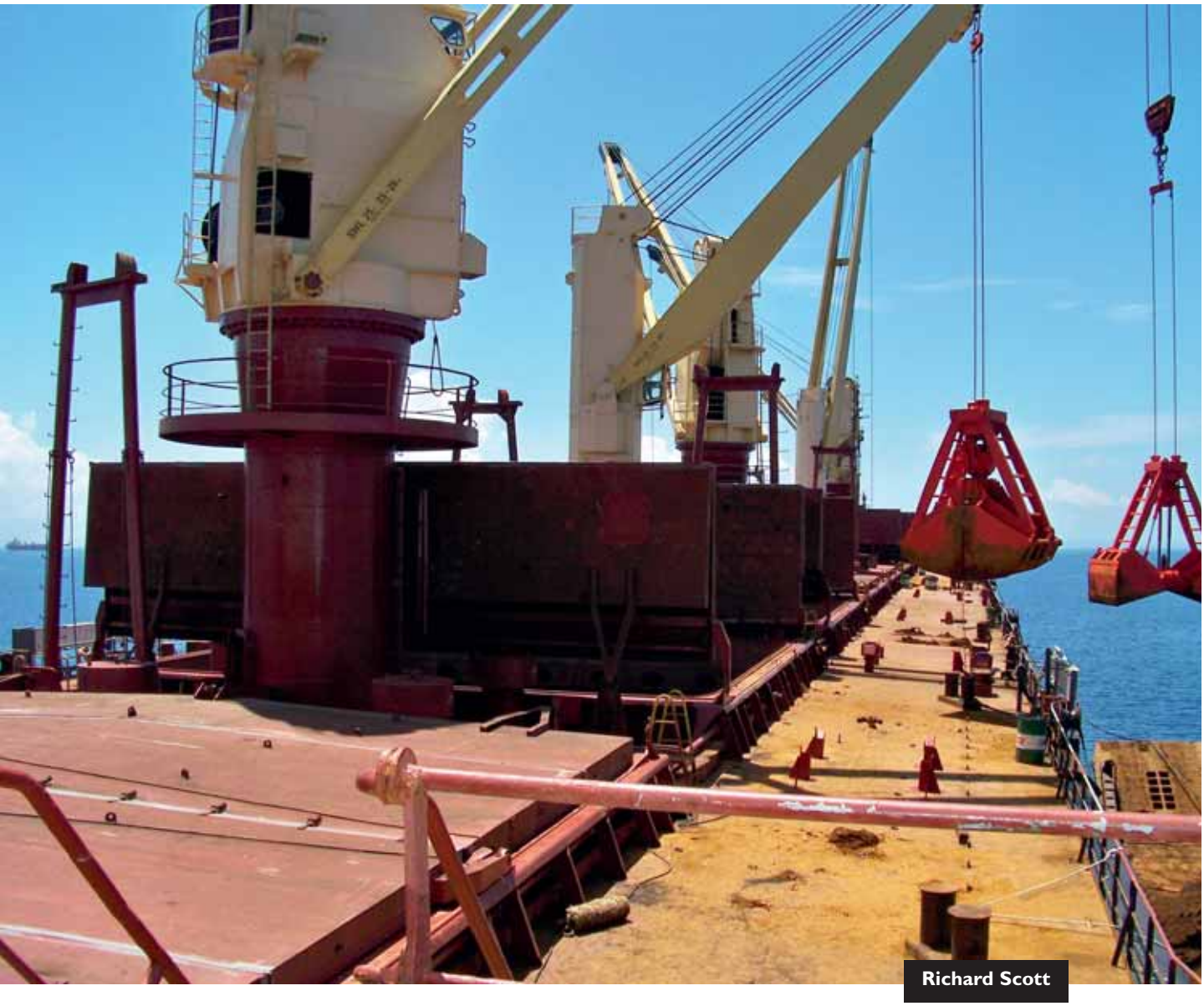
Tough market continues for Handymax bulkers



Richard Scott

Bulk carriers in the Handymax size group are enduring an extremely tough freight market, reflected in depressed rates and profitability. These medium-size vessels have a cargo-carrying capacity within a 40,000 to 65,000 deadweight tonnes range. Earnings from employment have been affected by surplus capacity, exacerbated by slowing growth of commodity trade in this sector combined with rapid fleet expansion.

In recent years Handymax bulk carriers have been a popular choice for shipowners investing in new tonnage. But this year's exceptionally weak freight market, following a long period of subdued conditions, and greater uncertainty about prospects for recovery, is having a devastating impact. New ships are no longer seen as desirable and, as a result, ordering of these and other sizes of bulk carrier has almost ceased.

Potential for further growth is still visible in some key commodity trades where Handymax bulkers are regularly employed. However, over-capacity in this sector and adjacent size groups, and the low freight rates prevailing, has greatly affected market sentiment. The timing and magnitude of a solid revival remains unclear, clouded by persisting robust fleet growth. Newbuilding deliveries from the huge Handymax orderbook assembled earlier are sustaining a strong flow of new ships on to the market.

Inherent attractions

The popularity of these ships as investment opportunities has

HANDYMAX (40–64,999DWT) BULK CARRIER FLEET (MILLION DEADWEIGHT TONNES)

	2011	2012	2013	2014	2015	2016*
Newbuilding deliveries	22.4	20.9	14.7	11.4	16.0	15.0
Scrapping (sales)	2.2	4.7	3.5	3.1	3.1	5.0
Losses	0.1	0.1	0.2	0.0	0.0	0.0
Plus/minus adjustments	0.1	0.2	–0.1	0.0	–0.2	0.0
Fleet at end of year	**131.3**	**147.6**	**158.5**	**166.8**	**179.5**	**189.5**
% change from previous year–end	+18.1	+12.2	+7.4	+5.2	+7.6	+5.6

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

been based on ideas about employment growth over many future years. Handymaxes are among the most flexible ships for operating around the world, given their versatility within a very broad range of dry bulk commodity trades. That view remains valid in the longer term, but ongoing weak market conditions have restrained enthusiasm.

Characteristics of Handymax bulk carriers demonstrate their inherent attractions. A typical ship is a 'geared' vessel (cargo-handling gear installed), with cranes and grabs for loading and discharging cargo. Sub-categories within the group are Supramax and Ultramax ships.

Cargo-handling equipment enables efficient operation in trades where shore based equipment is either unavailable or inadequate. Handling cargo offshore, from or into barges, at an anchorage is also facilitated. Larger bulk carriers in the Panamax and Capesize groups usually are 'gearless', and therefore are totally dependent on cargo-handling by port equipment.

Together with dimensions acceptable at a wide range of ports and berths, on most trade routes, while offering some economies of scale, the result is often an extremely varied Handymax employment pattern. These ships are frequently used in the coal, and grain and soya, trades and there is sometimes involvement in iron ore movements. Minor bulk commodity trades also provide numerous cargoes. Steel products, ores and minerals such as nickel ore, other industrial cargoes, fertilizers and various agricultural commodities including oilseeds and meals all feature prominently.

Robustly expanding fleet

Brisk growth in the world fleet of Handymax bulk carriers continues. Following a lengthy period of deceleration, fleet expansion picked up last year and, although a resumed slowing is likely in 2016, enlargement is still quite rapid, as shown in the table. Another sizeable increase could be seen in the next 12 months.

Over the past three years fleet growth averaged almost 7% annually, after previously growing much faster. According to figures compiled by information providers Clarksons Research, Handymax capacity reached 179.5 million deadweight tonnes at the end of 2015 (comprising 3,323 vessels), about 32m dwt higher than at end-2012. Last year's increase was 7.6%.

During the first nine months of this year, fleet deadweight capacity was augmented by 4%, boosting the total to 3,420 ships amounting to 186.7m dwt at end September. Within the entire world bulk carrier fleet of all ship sizes, now totalling 789m dwt, Handymax tonnage forms a large part, approaching one-quarter.

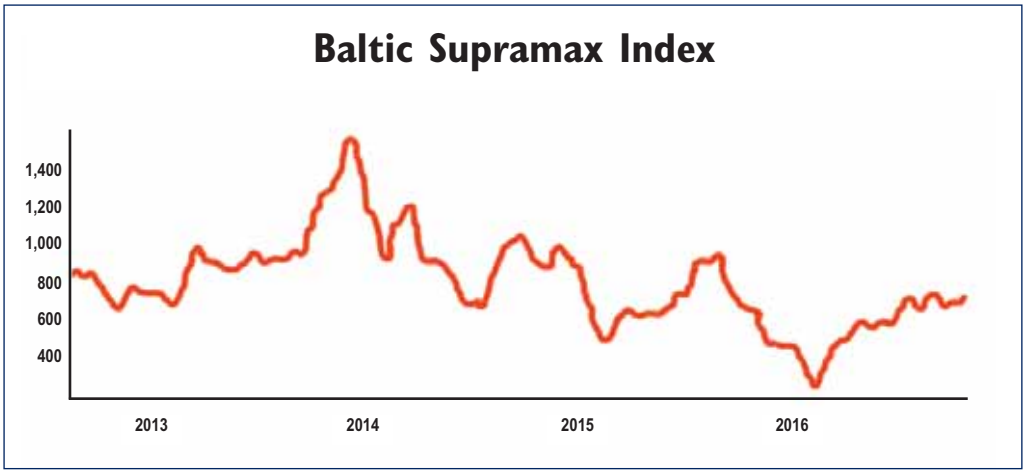
Among key influences affecting fleet capacity, Handymax newbuilding deliveries have remained very large, accompanied by substantial scrapping of older or uneconomical tonnage. Shipyards around the world completed 16m dwt of new vessels of this size in 2015, up from over 11m dwt in the preceding 12 months. Scrapping averaged just over 3m dwt annually in the past three years.

The number of new ships entering the Handymax fleet was much larger than the number exiting last year. A net 194 ships were added, resulting from 266 newbuilding deliveries partly offset by 71 scrappings (based on recorded demolition sales to scrap yards).

In 2016 as a whole the deadweight tonnage of new Handymax bulk carriers delivered looks set to decline, probably to 15m dwt or lower. This estimate is based on figures for the first nine months, showing 10.5m dwt already delivered (subject to revision), and ideas about the remaining period. Scrapping in the January–September period reached over 3m dwt and may approach 5m dwt in the full year, although scrapping forecasts are usually surrounded by great uncertainty. Consequently, fleet enlargement this year may be under 6%, about two percentage points below last year's growth rate.

Renewed deceleration ahead?

Next year a less rapid fleet capacity increase may be seen. There are signs that in 2017 the new vessels flow entering the world



fleet may slacken, while another period of substantial scrapping may occur. But both inflows and outflows will be affected by how freight market conditions evolve, and the linked market expectations and sentiment, much of which is difficult to predict.

Newbuilding order books at shipyards are an indicator providing a rough guide to future fleet capacity likely to be added. Following heavy ordering of new Handymaxes in 2013 and 2014 (especially for Ultramax designs of around 60,000 dwt), the order book soared. Subsequently in 2015 ordering fell back steeply, and was rapidly overtaken by actual deliveries, reducing the outstanding total. While new contracts placed this year have been minimal, many of the orders placed earlier have not yet been completed and will be delivered during 2017 and later.

The Ultramax sub-category of larger 60–65,000dwt size ships is now dominant within the global Handymax newbuilding orders. Previously Supramax 50–60,000dwt ships were the most popular type contracted. Currently, over four-fifths of the Handymax order book deadweight capacity is comprised of Ultramax vessels.

Changing perceptions about the outlook for the freight market and investment returns are illustrated dramatically by events over the past three years. The remarkable ordering spree for new Handymaxes in 2013 and 2014 was heavily influenced by suggestions that a freight market recovery might be on the horizon. Coupled with attractive prices quoted by shipbuilding yards, many shipowners saw a strong incentive to invest. During those two years 790 Handymax ships were ordered, totalling over 48m dwt, equivalent to about one-third of the fleet at the beginning of the period.

During the past 18 months a dramatic change in newbuilding contracting dynamics has been seen, one of the most striking in the modern era. A collapse in new orders placed has affected all bulk carrier size groups. Within the Handymax sector ordering is now minimal, just four ships in the 2016 first nine months, after a reduced 131 in the whole of last year, according to Clarksons Research.

Very low freight rates recently and modified, less optimistic views of potential for a market recovery are reflected in this collapse. There are signs that longer-term trade growth prospects have deteriorated, while the fleet continues to grow briskly. The changed attitudes will eventually affect capacity additions a couple of years ahead. In the meantime deliveries from the large order book, which is still equivalent overall to 14% of the current world Handymax operating fleet, will continue enlarging capacity.

Another influence may restrain fleet growth deceleration in the immediate future. There is apparently limited potential for scrapping of old tonnage. The Handymax fleet is relatively young. Only about 13% is over 14 years old, and within that volume less than half is over 19 years old, mostly in the 40–50,000dwt size sub-group. Thus it seems difficult to foresee a surge in scrapping emerging over the next 12 months.

Diversified employment patterns

Wide employability is assisted by the typical features offered by a Handymax bulk carrier. Varying proportions of all dry bulk commodity trade sectors are accessible and, in most, large parts. However, major proportions of iron ore and coal movements do not normally employ Handymaxes, because the bigger Panamax, Kamsarmax and Capesize bulk carriers can be accommodated on many routes. Preference for these larger sizes reflects greater economies of scale, usually providing cheaper transport.

Coal trading is among the most prominent employment sources for Handymaxes. While both main parts, steam coal and coking coal, often use bigger ships, Handymax size cargoes amount to huge volumes. Seaborne coal trade is, in total, the second-largest global dry bulk commodity trade after iron ore, amounting to a massive quantity exceeding 1,100mt (million tonnes) last year, comprising almost one-quarter of all global dry

Grieg Star and Gearbulk join forces to create 130+-strong fleet

Gearbulk and Grieg Star are entering into a joint venture to establish a highly versatile and customer-oriented, world wide dry bulk shipping company.

The joint venture (JV) will combine the companies' global resources and expertise to operate the parties' combined fleet of open hatch, semi open hatch and conventional bulk vessels. The JV will be jointly controlled by Gearbulk and Grieg Star, with Gearbulk owning 65% and Grieg Star owning 35%. The Board of Directors will be composed of five members; three appointed by Gearbulk and two appointed by Grieg Star. Chair of the Board of Directors will be Kristian Jebsen, with Grieg Star holding the vice chair.

"This agreement represents the firm intention of both companies to build an improved range of services for our customers. The combined number of vessels and trades will make it easier for our customers to find services that fit their needs," says Kristian Jebsen, Chairman/CEO of Gearbulk.

"The talks and co-operation throughout this process have built an invaluable trust and confidence between the parties. The two companies both have strong corporate cultures and values, and we aim to take the best from the two, and merge them into one strong, customer-oriented culture," says the Chair of Grieg Star, Elisabeth Grieg.

The JV will be established as an independent Norwegian company with headquarters in Bergen, Norway and with own resources and offices around the world. The Chief Executive Officer will be Rune Birkeland, and the Chief Commercial Officer will be Arthur English.

"We see our two operations as complementary, making this joint venture a natural next step for our companies. In an increasingly competitive market, we believe this new entity will have the size to build and sustain a versatile and independent shipping service," says Camilla Grieg, CEO of Grieg Star.

The total number of vessels operated by the joint venture will be over 130. The worldwide offices will provide a strong presence on every continent and ensure the JV is best placed to serve the customer's needs locally and globally. The obligations towards existing contracts shall remain fully in force and will be fulfilled by the JV, under the ultimate responsibility of its shareholders.

The two parties will retain their independent technical ship management and ownership in the vessels. Further, the scope of the JV excludes activities and vessels operated by Gearbulk in association with other third parties, as well as terminal business, transshipment activities, operation of liquid pitch tankers and caustic bulk vessels. For Grieg Star, their terminal businesses will also remain outside the scope of the new JV.

The new combined fleet will have a combined worth of US$814m, which includes Grieg Star's two Ultramax newbuilds at Dayang worth US$37.94m

For Gearbulk (which is 50% owned by Japanese owner MOL) the deal will give it a 65% stake in the venture and Grieg Star will receive a 35% stake.

The average age of the combined fleet will be 12.6 years (Gearbulk: 10.9 years; Grieg Star: 13.7 years).

The two owners each have a significant position in the open hatch/gantry market. The combined fleet will control 36% (by dwt) of the global open hatch/gantry fleet giving the JV a very strong position in that niche market.

PERCENTAGE OF WORLD OPEN HATCH/GANTRY FLEET OWNED BY GEARBULK/GRIEG STAR

Ship type	% of world fleet by dwt	% of world fleet by value
Handy BC (open hatch/gantry)	24%	15%
Handymax BC (open hatch/gantry)	36%	38%
Supramax BC (open hatch/gantry)	28%	8%
Ultramax BC (open hatch/gantry)	79%	81%
Grand Total	**36%**	**30%**

FLEET BREAKDOWN

GEARBULK				GRIEG STAR			
Ship type	**No. of vessels**	**Total dwt**	**Total value US$m**	**Ship type**	**No. of vessels**	**Total dwt**	**Total value US$m**
Small Handy BC	1	12,200	5				
Handy BC	2	65,600	7				
Handymax BC	16	720,900	59	Handymax BC	17	787,900	121
Supramax BC	11	578,000	53	Supramax BC	11	572,700	154
Ultramax BC	13	894,900	284	Ultramax BC	4	253,700	73
Small asphalt tanker	3	53,300	58				
Total	**46**	**2,324,900**	**466**	**Total**	**32**	**1,614,300**	**348**

Outperformance of geared vessels to continue, says Fearnleys

Fearnleys is a company specializing in shipbroking and financial services. The company was established in 1860 by Thomas Fearnley, with the initial line of business being shipping and agency. Over the next decades, the company gradually grew into a ship owning business, before moving towards the present line of activities. Today, the company employs around 330 people and is set up in 12 locations worldwide. Fearnleys is involved in most shipping segments, including crude tankers, products tankers, LPG, LNG, dry bulk and offshore. Dry bulk has been part of the company's line of business since its inception. Today, Fearnleys has a dry bulk team of 60 people seated in Oslo, Singapore, Shanghai, Hong Kong and Mumbai — covering both chartering and newbuilding/S&P. In addition to covering physical markets, Fearnleys also provides financial services and project financing for dry bulk companies and investors, activities based in Oslo and New York.

The current year is likely to be the worst in recorded history for dry bulk markets. The Baltic Dry Index averaged a mere 571 points by the end of the third quarter of the year. Thus, the last three months of the year would need to average 1,170 for 2016 to come second to 1986 — the previous record low year (average 716). In spite of what is normally a seasonally strong Q4, this scenario is highly unlikely to unfold given that the highest point on the index so far this year was 941.

Oversupply of tonnage is the main reason for the depressed market environment. This is shown by the fact that since 2009, the fleet has grown by 96% whereas demand has grown by 67%. How did this oversupply situation come about? In 2010 and in 2013/14, the ordering of vessels relative to market earnings was way out of proportion to what has historically been the case. In the 2000 to 2008 period, the correlation between ordering and earnings was 84%. However, in the 2009–2015 period, this correlation dropped to 47%. In 2010, the Baltic Dry Index only averaged slightly higher than in 2003, but the ordering volume in 2010 was three times higher than in 2003.

In 2013, the market average was almost the same as in 2001 — but the ordering was eight times higher in 2013 than in 2001. Finally, in 2014 the ordering volume was three times higher than in 2002, even though market earnings for those two years were similar. Record low interest rates prompting investors to chase yield further out on the risk curve along with a substantial increase in yard capacity have been the two main driving factors behind the ordering binge. The present year has seen almost a complete halt in ordering, however. The main reasons for this seems to be restrictive credit practices by banks along with bad market conditions in every shipping segment. This is positive from a longer-term perspective and should entail improving market fundamentals eventually.

In the presently depressed market conditions, owning/operating geared vessels have clearly shown to be an advantage. This is demonstrated by the fact that throughout the prolonged bear market seen since 2009, the previously established hierarchy of market earnings have increasingly broken down.

Usually, Capesizes always made more than Panamaxes, which always made more than Supramaxes, and so on. From 2004 to 2009, the average Panamax to Capesize earnings ratio was 0,53 and the average Supramax to Capesize earnings ratio was 0,45. The Supramax to Panamax earnings ratio averaged 0,85. However, from 2009 until the present, the change in these ratios has been pronounced. The Panamax to Capesize earnings ratio averaged 0,75 for this period, with the Supramax to Capesize ratio averaging 0,75 as well. The Supramax to Panamax ratio averaged 0,99.

In Fearnleys' view, this is mostly attributable to the diversity geared and flexible vessels offers. It greatly increases the variety of cargoes one can carry, which means increased trading opportunities. This entails being less dependent on a single commodity, which has the effect of diversifying risk. A Panamax is primarily a coal vessel, whereas Capesize is primarily an iron ore vessel. Coal demand been hit by policies aimed at substituting coal for cleaner sources of energy as well as a weaker market for industrial commodities in general. Seaborne iron ore demand is completely dependent on China for growth, and growth in these volumes have slowed down over the last couple of years.

Going forward, Fearnleys sees no immediate turn-around in the factors that have brought us to the present hierarchy in market earnings between the vessel sizes. Prospects for demand growth in both coal and iron ore do not look strong, whereas the Very Large Ore Carrier fleet is set to continue growing. Meanwhile, the smaller vessel segments is set to shrink which will make more room for Supramaxes. Consequently, Fearnleys expects the relative outperformance of geared vessels to continue.

bulk cargo movements.

After growing vigorously over many years, a significant change emerging is a much more pronounced impact from negative influences, affecting coal import demand in countries around the world. Global coal trade experienced a decline in 2015 and could see a further decrease this year. Movements are comprised of steam coal (used chiefly in power stations, and also in cement manufacturing and other industrial processes), and coking coal (used in the steel industry). Steam coal is the largest category, comprising over three-quarters of the total.

One coal trade employing Handymaxes extensively is shipments of mainly steam coal from Indonesia, which has risen to become the world's largest individual steam coal-exporting country. The top exporter position has been maintained, but shipments have fallen in the past two years by 7–8% annually, down to 327mt last year. That annual volume is the equivalent of about 5,800 Supramax cargoes, although many larger ships are employed. Short-haul shipments to China form a large part.

Weakness in China's coal import demand has adversely affected Handymax usage in the past two years, followed by signs of a pick up recently. In 2015 China's overall coal imports (including lignite), a major part of world trade in this commodity,

declined steeply by 87mt or 30%, to 204mt. This year an annual increase may be seen. In the first nine months of 2016, the total reportedly was up by 15% compared with last year's same period, at 180.3mt.

Extensive Handymax bulk carrier employment is also provided by the grain (including soya) trade. The most visible feature is highly variable and unpredictable changes in geographical patterns and quantities. During the past crop year ending mid-2016, global trade in wheat and coarse grains, and also in soyabeans and meal, increased robustly, but over the current year ending mid-2017 some negative factors are likely to weaken global import demand for grain.

Higher imports into numerous countries contributed to recent strength in grain and soya movements, facilitated by abundant export supplies around the world. According to International Grains Council calculations, global trade in wheat plus corn and other coarse grains increased by 21mt (7%) in crop year 2015/16 ending June, reaching 343mt. Global trade in soyabeans and meal was 11mt (6%) higher in marketing year 2015/16 ending September, at 195mt, based on US Dept of Agriculture estimates.

Handymax grain trade employment opportunities, over the past 12 months, benefited from larger imports into many Asian countries, Africa and Europe, while China and some other countries lowered their purchases. Soya sub-sector involvement was supported by China's continued upwards soyabeans import trend, as well as increased volumes into other parts of Asia, the European Union and elsewhere.

The upwards trajectory of world soya movements is expected to persist during the 2016/17 year ahead, supported by China and others buying additional cargoes. Global wheat and coarse grains trade, conversely, could be weakened in particular by lower feedgrains imports into China and the European Union.

Bulk carriers of Handymax size are widely employed carrying cargoes in the 'minor dry bulk' category. Many elements of this commodities group are actually large, collectively amounting to massive annual volumes. The commodity range is extensive and in 2015 the total appears to have reached over 1,800mt. However, growth has slowed in the past couple of years, and that slacker pace may continue.

The biggest individual minor bulk trade components are steel products (coil, sheet, plate and other items), and forest products, although not all quantities are carried by bulk carriers. Bauxite/alumina for the aluminium industry, fertilizer raw materials and semi-finished fertilizers and cement provide very big tonnages, accompanied by large quantities of ores and minerals such as nickel and manganese ore,.

One prominent example, steel products exports from China, is a huge trade frequently employing Handymaxes. This trade has expanded strongly, as a result of an intensified focus on foreign markets, amid surplus capacity in Chinese steel mills caused by slowing domestic consumption. The annual total of China's steel exports to all destinations has more than doubled in the past three years reaching 112mt in 2015, and could remain high. In the first nine months of 2016, the volume reportedly rose by 2%, to 85mt.

Ultramax focus

Recent investment interest has firmly shifted towards higher deadweight cargo capacity of 60–65,000dwt, at the top end of the Handymax size range, in the past few years. Previously the Supramax, typically 52–57,000 dwt, was the preferred unit and became ubiquitous, taking over from smaller Handymaxes below 50,000dwt.

In the Handymax ordering boom of 2013 and 2014, Ultramax 60–65,000 dwt bulk carriers were the principal focus of attention. During those two years Handymaxes ordered had an average capacity of over 61,000dwt, showing how the popularity of Ultramaxes raised average size. As a result of the heavy ordering seen then, Ultramaxes still continue to dominate the global order book and future delivery schedules.

A typical capacity provided by an Ultramax is 63,000dwt or 64,000dwt, and cargo-handling gear of cranes and grabs for loading and discharging at a berth or anchorage is standard equipment. Improved fuel efficiency usually is also a notable feature. Expectations of expanding cargo volumes in many trades, requiring Ultramax size bulkers, reinforced enthusiasm for these vessels.

Advantages gained by using an Ultramax are clearly seen in trades where a cargo of around 60,000 tonnes — often coal, or minor ores or other bulks — is lifted from barges at an offshore transshipment terminal and then discharged at a similar installation at the other end of the voyage. This employment pattern occurs in many shorter haul trades within the Asian region and elsewhere. Alternatively, if an older gearless vessel is used, such as a Panamax of similar capacity, a floating crane is required, significantly raising transportation costs.

Chinese shipbuilding yards in particular marketed standard Ultramax designs which have proved popular. The *Crown 63* of 63,000dwt and the *Dolphin 64* of 64,000dwt were seen by shipowners as likely to prove efficient and potentially profitable, resulting in the yards obtaining many orders.

Freight market weakness

Subdued freight rates for Handymax bulk carriers have been a continuing feature this year, reflecting persistent large surplus capacity in this and adjacent vessel size groups. Sustained expansion of the world Handymax fleet, at a fairly rapid rate, amid slower growth in some key bulk trades employing these ships, has not assisted in restoring a better market balance.

Weakness was especially evident in the first quarter of 2016. The Baltic Supramax Index (calculated by the Baltic Exchange), a useful indicator of the sector's freight market progress, fell to a very depressed low point of 243 in mid February, after retreating from a 2015 high point of 933 attained towards the end of August. But within six months it had recovered sharply to the 600–700 range in July 2016 where it remained into October.

How will this market sector evolve over the next 12 months or so? The Handymax segment is a distinct market sector, but it is not isolated from the bulk carrier market as a whole. Substantial over-capacity looks set to persist for some time across the bulk carrier size groups, delaying any move towards rebalancing. While growth in other size groups' fleet capacity has almost ceased, Handymax capacity remains in a fairly rapid expansion phase, which is a more difficult obstacle for trade and vessel demand increases to match or exceed.

Uncertainty about the future freight market trend has intensified. Sluggish recent global seaborne trade development, together with no clear signs of a strong pick up during the period ahead, have lowered expectations. But a further slackening of Handymax bulk carrier fleet growth looks quite likely in 2017 as the large newbuilding orderbook at shipyards rapidly diminishes. Although a sustainable solid improvement in freight rates may remain elusive in the near term future, an improvement in the market balance may become more achievable later.

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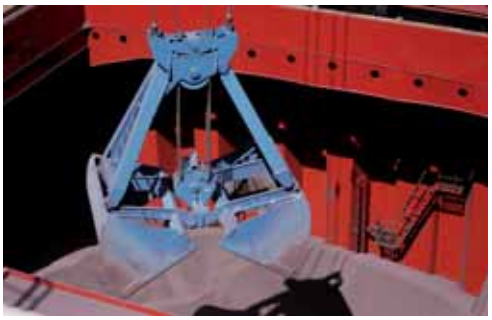

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Georgia Ports Authority hires former COO of CMA CGM America

The Georgia Ports Authority has named Ed McCarthy as its new COO. McCarthy comes to Georgia from his latest post in Norfolk, Va., as chief operating officer for CMA CGM America. Tuesday 6 September was his first day on the new job.

"We're thrilled to bring on someone with Ed's expertise to oversee port operations," said GPA Executive Director Griff Lynch. "His experience at major shipping lines and port terminals on both coasts will deliver important insights as we work to capture new opportunities in Savannah and Brunswick."

Ed McCarthy.

At CMA CGM, McCarthy oversaw an annual budget of $1.9 billion and led a team of 150 employees, managing more than 400 vendors in marine, rail, trucking and logistics.

"It's an honour to join the team at the GPA," he said. "Georgia's ports are known throughout the industry as models of efficiency, and I am excited for the opportunity to help grow that success."

Named CMA CGM America's senior vice president of operations in 2011, McCarthy was promoted to chief operating officer for the shipping line in 2013. Prior to his tenure with CMA CGM, McCarthy had served in senior management and operations positions at Sealand Services, APM Terminals and Virginia International Terminals.

As chief operating officer at the GPA, McCarthy will be responsible for sustaining the profitable growth and development of GPA's operations, while maintaining world-class operating standards. His direct reports include the directors of engineering and facilities maintenance; information technology; equipment maintenance and crane and ship operations; container operations; breakbulk and bulk operations; and the director of protective services, as well as the senior director of strategic operations and safety. A total staff of 973 employees will report to this position, which represents nearly 90% of the GPA's total workforce.

McCarthy obtained a Bachelor of Science from the Maritime College at the State University of New York, a diploma in terminal management at Lloyd's Maritime Academy at Kent College, Dartford UK, and a Masters in Business Administration from William & Mary University, Mason School of Business. He has served as chairman of the board for Consolidated Chassis Management Company and as a member of the board of directors for the Ocean Carrier Equipment and Maintenance Association.

McCarthy and his wife, Heather, have a daughter, 15, and two sons, aged 14 and 17. They will live in Savannah, Ga.

Italy's Istop Spamat serves the ports of Bari and Molfetta

Italian company Istop Spamat is a major force to be reckoned with in the ports of Bari and Molfetta in Italy, where it offers a range of services including: stevedoring; logistics; cargo handling; container handling with cargoes from around the world; loading and unloading of cargoes — including project cargo, palletized, bulk, containerized and liquid.

Istop Spamat works as a terminal operator, and provides services that satisfy the requirements of the law 84/94, which regulates harbour activities in Italy as well as activities related to stevedoring agencies which handle the cargoes on the dock and deliver them to the end customer.

Istop Spamat is constantly expanding its activities, buying new facilities and improving its efficiency. While it remains very active in the Port of Molfetta, the traffic at the port has reduced due to the increasing size of vessels — some of these vessels are now using the Port of Bari instead. Due to this development, Istop Spamat decided to offer its services also at the Port of Bari, and has invested in new equipment: cranes, including the Link Belt LS 120; elevator trucks; and other port equipment.

The increased traffic at the Port of Bari — including more containers — has led to Istop Spamat planning significant investments in terms of loading and unloading equipment, and equipment for on-dock handling of cargoes.

In recent years, reductions in imports has led Istop Spamat to widen its range of services to enable customers at the Port of Bari to expand their own dealings with other ports in the southern Adriatic.

In a historical context that is favourable to the relaunching of the south of Italy, Istop Spamat's well-organized business has meant that it has been able to turn to outside labour, thus increasing its efficiency and combining the speed of its services with its reasonable prices. The company now handles in excess of 1mt (million tonnes) of cargo a year, and the group aims to increase this turnover to 1.5mt every year.

Port of Vancouver USA welcomes 'Federal Iris' on her maiden voyage

On 30 August, the Port of Vancouver USA welcomed the *Federal Iris*, commanded by Capt. Donald Satsatin Nicolas from the Philippines, on her maiden voyage to the United States.

Capt. Nicolas, Chief Engineer Ronaldo Reyes Tolentino and the *Iris*'s 20-member Filipino crew were welcomed to Vancouver by Russ Lyzell with General Steamship Corp., and Steve Mickelson, Zachary Merrill, Abbi Russell, Angela Blake and Debbie Taylor with the Port of Vancouver.

The *Federal Iris* is operated by Federal Navigation of Montreal and owned by Forward Gloria Navigation. The vessel, which is 656 feet long with a deadweight capacity of 63,498 metric tonnes, was built in Japan and launched on 9 August.

The *Federal Iris* loaded approximately 6,700 metric tonnes of copper concentrate at the Port of Vancouver before sailing to Portland, Oregon, to load soda ash, and Vancouver, B.C., to load wheat.

Her next destinations after the North American West Coast are China and Indonesia.

Left to right: Russ Lyzell, General Steamship Corp.; Capt. Nicolas; Chief Engineer Tolentino; Steve Mickelson, Zachary Merrill, Abbi Russell and Angela Blake, Port of Vancouver USA

The Port of Vancouver USA is one of the major ports on the Pacific Coast, and its competitive strengths include available land, versatile cargo handling capabilities, vast transportation networks, a skilled labour force and an exceptional level of service to its customers and community.

France & Belgium

continental bulk handling

All photos: ©Antwerp Port Authority.

Jay Venter

Port of Antwerp unveils new headquarters

Antwerp inaugurates Port House on 22 September 2016

The new Port House in Antwerp repurposes, renovates and extends a derelict fire station into a new headquarters for the port — bringing together the port's 500 staff that previously worked in separate buildings around the city.

With 12km of docks, Antwerp is Europe's second-largest shipping port, serving 15,000 sea trade ships and 60,000 inland barges each year.

Antwerp handles 26% of Europe's container shipping, transporting more than 200 million tonnes of goods via the ocean-going vessels that call at the port and providing direct employment for over 60,000 people, including more than 8,000 port workers. Indirectly, the Port of Antwerp ensures about 150,000 jobs and has ambitious targets for future expansion to meet the continent's growth and development over the next century.

In 2007, when the former 1990s offices of the Port of Antwerp had become too small, the port determined that relocation would enable its technical and administrative services to be housed together, providing new accommodation for about 500 staff. The port required a sustainable and future-proof workplace for its employees, representing its ethos and values in an ever-expanding local and international arena.

As the threshold between the city and its vast port, Mexico Island in Antwerp's Kattendijk dock on Quay 63 was selected as the site for the new head office. The waterside site also offered significant sustainable construction benefits, allowing materials and building components to be transported by water, an important requirement to meet the port's ecological targets.

Following the construction of a new fire station with facilities needed to service the expanding port, the old fire station on the Mexico Island site — a listed replica of a Hanseatic residence — became redundant and relied on a change of use to ensure its preservation. This disused fire station had to be integrated into the new project. The Flemish government's department of architecture, together with the City and Port authorities organized the architectural competition for the new headquarters.

Zaha Hadid Architects' design is informed by detailed historical research and a thorough analysis of both the site and the existing building.

Marc Van Peel, president of the Port of Antwerp, said: "There was only one rule laid down in the architectural competition, namely that the original building had to be preserved. There were no other requirements imposed for the positioning of the new building. The jury was therefore pleasantly surprised when the five shortlisted candidates all opted for a modern structure above the original building. They all combined the new with the old, but the design by Zaha Hadid Architects was the most brilliant."

Working with Origin, leading heritage consultants in the restoration and renovation of historic monuments, ZHA's studies of the site's history and heritage are the foundations of the design which firstly emphasizes the north–south site axis parallel with the Kattendijkdok linking the city centre to the port. Secondly, due to its location surrounded by water, the building's four elevations are considered of equal importance with no principal facade. ZHA's design is an elevated extension, rather than a neighbouring volume which would have concealed at least one of the existing facades. ZHA and Origin's historic analysis of the old fire station also highlighted the role of its

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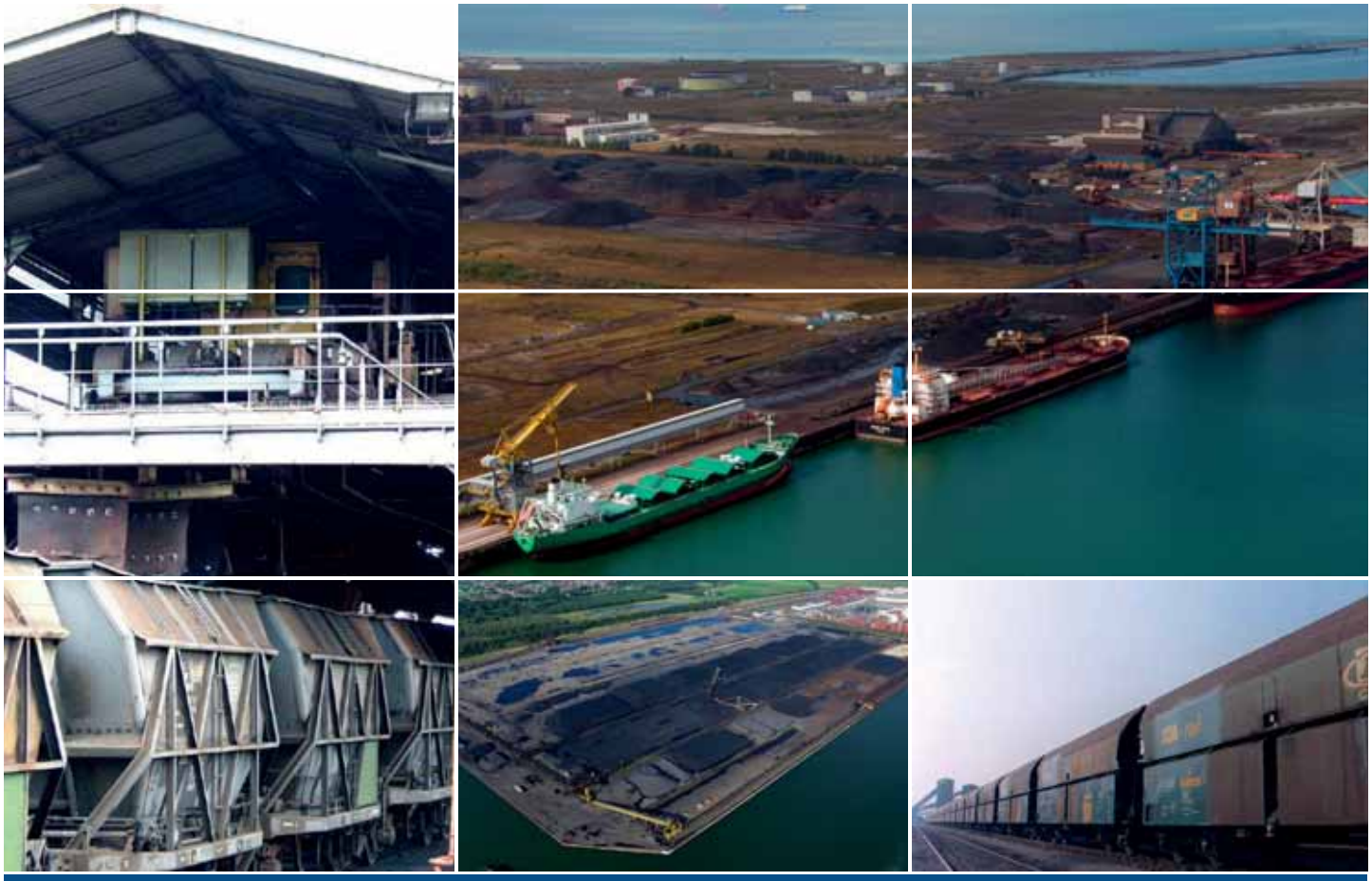

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originally intended tower — a grand, imposing component of the fire station's Hanseatic design. Its bold vertical statement, intended to crown the imposing volume of the building below, was never realized.

These three key principles define the design's composition of new and old: a new volume that 'floats' above the old building, respecting each of the old facades and completing the verticality of the original design's unrealized tower.

Like the bow of a ship, the new extension points towards the Scheldt, connecting the building with the river on which Antwerp was founded.

Surrounded by water, the new extension's façade is a glazed surface that ripples like waves and reflects the changing tones and colours of the city's sky. Triangular facets allow the apparently smooth curves at either end of the building to be formed with flat sheets of glass. They also facilitate the gradual transition from a flat façade at the south end of the building to a rippling surface at the north.

While most of the triangular facets are transparent, some are opaque. This calibrated mix ensures sufficient sunlight within the building, while also controlling solar load to guarantee optimal working conditions. At the same time, the alternation of transparent and opaque facade panels breaks down the volume of the new extension, giving panoramic views of the Scheldt, the city and the port as well as providing enclosure.

The façade's rippling quality is generated with flat facets to the south that gradually become more three-dimensional towards to the north. This perception of a transparent volume, cut to give the new building its sparkling appearance, reinterprets Antwerp's moniker as the city of diamonds. The new extension appears as a carefully cut form which changes its appearance with the shifting intensity of daylight. Like the ripples on the surface of the water in the surrounding port, the new façade reflects changing light conditions.

The old fire station's central courtyard has been enclosed with a glass roof and is transformed into the main reception area for the new Port House. From this central atrium, visitors access the historic public reading room and library within the disused fire truck hall which has been carefully restored and preserved. Panoramic lifts provide direct access to the new extension with an external bridge between the existing building and new extension giving panoramic views of the city and port.

The client requirements for an 'activity based office' are integrated within the design, with related areas such as the restaurant, meeting rooms and auditorium located at the centre of the upper levels of the existing building and the bottom floors of the new extension. The remaining floors more remote from the centre, comprise open plan offices.

Collaborating with services consultant Ingenium, ZHA developed a sustainable and energy-efficient design reaching a 'Very Good' BREEAM environmental rating. Despite the challenges of integrating with a protected historic building, high standards in sustainable design were achieved by implementing effective strategies at each stage of construction. A borehole energy system pumps water to a depth of 80m below grade in over 100 locations around the building to provide heating and cooling. In the existing building, this system uses chilled beams. In the new extension, it uses chilled ceilings. Waterless lavatory fittings and motion detectors minimize water consumption while building automation and optimal daylight controls minimize artificial lighting.

With constant references to the Scheldt, the city of Antwerp and the dynamics of its port, married with the successful renovation and reuse of a redundant fire station — integrating it as a fully-fledged part of its headquarters — the new Port House will serve the port well through its planned expansion over future generations.

Marc Van Peel said: "The architectural style of the original building, a replica of the former Hansa House, recalls the 16th century, Antwerp's 'golden century'. But now above this original, a contemporary structure in shining glass has been built, which I am sure, represents a new golden century for Antwerp."

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VIGAN: the Belgian agri-bulk handling giant

Created in 1968, the Belgian manufacturer VIGAN is a world-renowned supplier of pneumatic ship unloading equipment. The company's pre-eminent position is maintained not only thanks to the quality and reliability of its equipment, but also thanks to the expertise and know-how of the VIGAN team.

VIGAN started to build pneumatic evacuators around its unique turbine concept. Ever since, it has been exploring new materials and implementing state-of-the-art steering systems, thereby increasing the capacity and efficiency of its machines.

As customers consider it to be a solution provider, it has taken steps to not only diversify vertically but also horizontally. Thereby it aims to translate the needs of the customer into the appropriate machine concepts. At the same time, it consolidates

VIGAN factory.

the technical validity of the proposition.

VIGAN has further optimized its Simporters, its high-capacity twin belt mechanical unloaders, as a complementary solution to its evacuators. It builds loaders in challenging configurations. It is in the midst of its third large port turnkey project….

It is obvious that this sustained diversification has led to consistent growth, allowing it to propose ideal solutions to any project requirement, and maintain a leading position among the agri-bulk unloading solution providers.

Made in Belgium

VIGAN production remains Belgium-made. This guarantees that it maintains the highest controls over the entire machine manufacturing process, and enables an easier and faster response time with respect to its after-sales support. Moreover, VIGAN's central position in Europe makes its possible to enjoy the excellent network of top-quality suppliers in this region.

VIGAN's doubled capacity in four to five years required increased manufacturing capacity, both in space and people. It has learned over the years that profound insight is needed into the concept and functioning of its machines to be able to offer the best service to its customers. Some of its customers are using machines that were built 30 years ago. VIGAN's policy of in-house production enables it to follow up with all of its customers.

Therefore, VIGAN continuously invests in its factory, with new equipment to reduce production costs and to improve the final quality of its units.

All the company's activities take place on the same 10,000m² site, which enables easy exchange of information among all departments, including sales, engineering, manufacturing, quality

VIGAN pre-assembly.

control and after-sales technical assistance.

The value of pre-assembly

Each VIGAN large pneumatic unloader is pre-assembled and pre-tested in its factory in Nivelles before being disassembled for packing and shipment.

This pre-assembly in VIGAN's factory is possible thanks to the size and height of its premises that have been designed in accordance, with a height under hooks of more than 11 metres in its main hall.

This enables it to save costs and reduce assembly times to a minimum, thus respecting delivery times.

The VIGAN team.

A unique workforce

With an annual turnover of €30 million, VIGAN employs a staff of around 80 people in its factory in Nivelles.

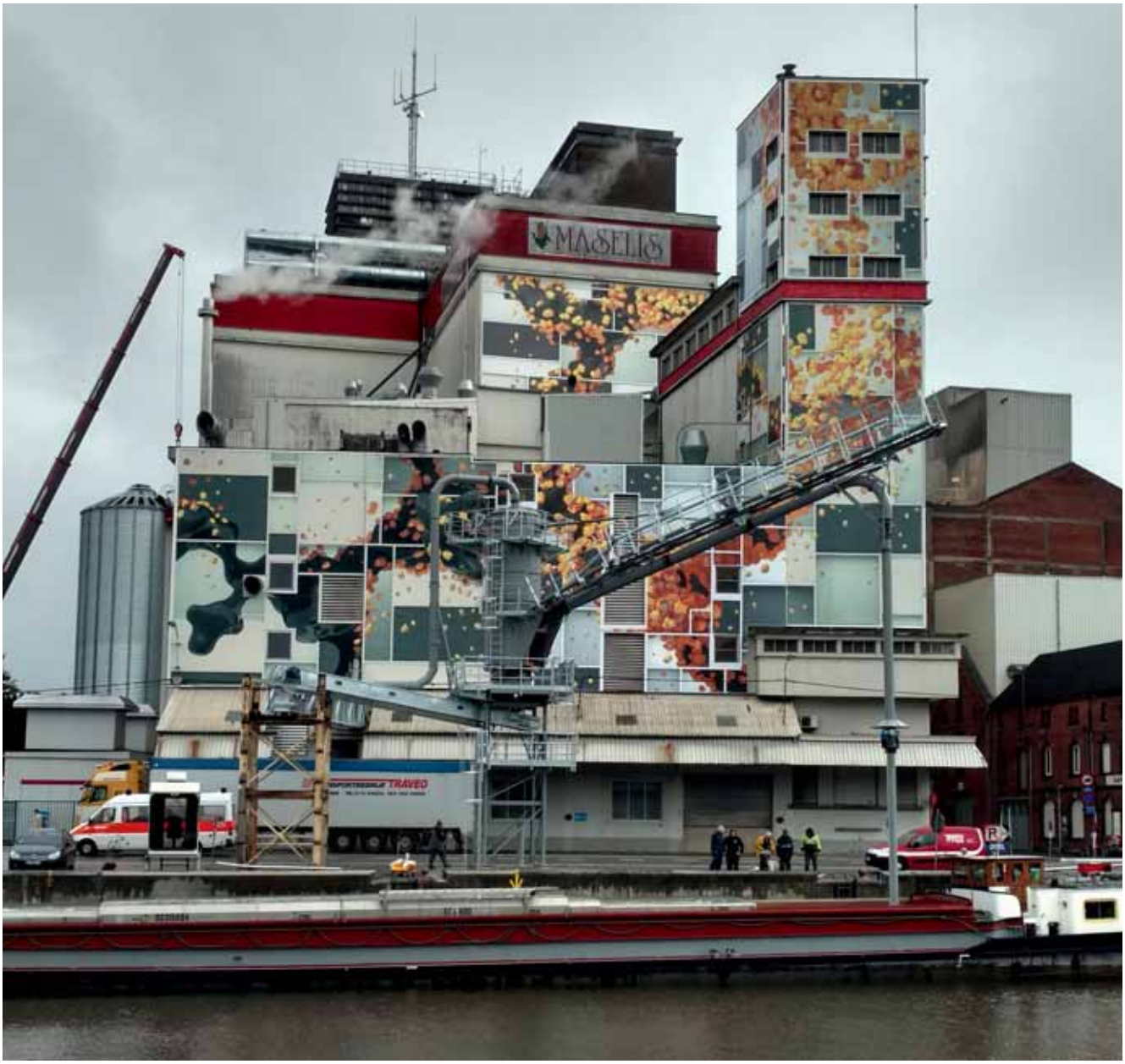
Its workforce has increased both in number and diversity.

Among others, its sales team was recently strengthened with a new sales person dedicated to serve Belgian and Latin American customers, but also with a senior sales support engineer.

International with Belgian roots

VIGAN is proud to export 98% of its machines designed and manufactured in its factory in Nivelles.

Emerging markets are without doubt to be found in countries with large and fast-growing populations. But concerns about carbon emissions over the last years, the carbon footprint of transport by road, etc. have also greatly opened up the market. A revival of fluvial transport in the EU has created excellent new opportunities where VIGAN has made the necessary efforts to acquire a major share.



With Belgium being VIGAN's 'home town' in this great world, it has consolidated important projects over the years with some major cereal utilizers:

- **Brabomills** and **Dossche Mills**, two important baking flour producers in Belgium;
- **Malteries Albert**, part of **Heineken** group, using VIGAN's equipment take in barley for the malting process; and
- **Cargill**, having soy, rapeseed and sunflower processing facilities in the ports of Ghent and Antwerp.

It goes without saying that VIGAN enjoys a leading position in its home market, where it has developed partnerships of great value, namely through repeat orders.

More recently, VIGAN installed a new barge pneumatic unloader at Maselis, in Roeselare. Equipped with an electrical motor of 132kW and a boom of 15.5 metres, the machine is designed to handle free-flowing grain at a capacity of 200 tonnes per hour.

Port of Dunkirk posts new grain record


© Jean Louis BURNOD / HAPPYDAY

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

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

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

While the modal share of transport by waterway is now 46%, rail is also a very popular transport mode, further extending the hinterland of Port of Dunkirk towards eastern France and Picardy. New traffic volumes have been carried by rail to the Port of Dunkirk since the beginning of 2015, representing 12% of supply. Five rail operators are active on the market and run full trains. The volume of grain carried by rail has now exceeded 385,000 tonnes.

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


© Port-Dunkerque

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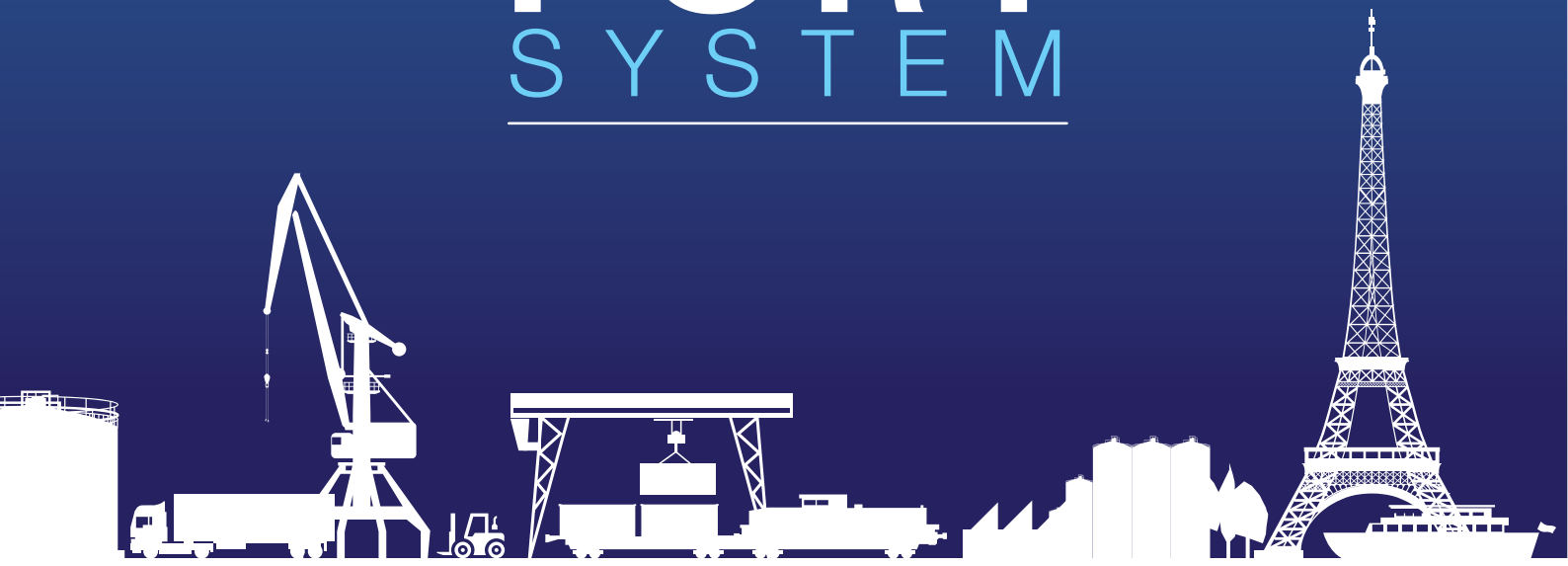
THE LEADING FRENCH PORT SYSTEM



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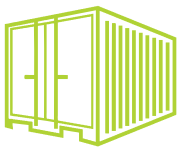


2 departures/Day to Asia

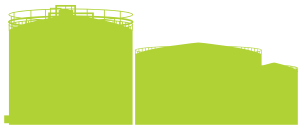
24/7 Reception of the

biggest ocean-going vessels

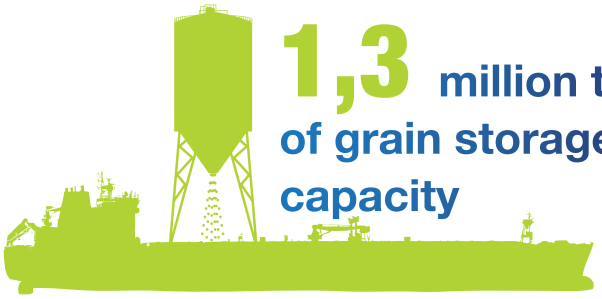
600 ports of call in the world

4'34" customs clearance

7



million cu. m. of storage capacity for bulk liquids



1,3 million tonnes of grain storage capacity

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AMECO revamps CSS system for woodchips at Visy Paper, Australia

AMECO, with it main engineering office in Illfurth, France, in March 2016 successfully assisted Visy Pulp with the replacement of the main slewing ring on one of the three AMECO circular storage systems handling woodchips at Visy Pulp's plant in Tumut, NSW – Australia. The three AMECO circular stacker/reclaimer machines located in Tumut, Australia, have been in continuous operation since they were commissioned in 2000. The central slewing ring is a critical part that allows the rotation of the reclaimer arm and due to it's position on the central column, supports the entire weight of the upper structure of the stacker/reclaimer, a total load of >40 tonnes.

The replacement of this slewing ring required disassembly of the stacker boom and the upper part of the central tower, which gave AMECO's technical specialists the opportunity to closely inspect and re-adjust all the elements of the machine.

AMECO's maintenance teams are always available to its clients for inspections of installed machines, and can often propose improvements that will benefit the daily operations of the plant and extend the life expectancy of AMECO systems.

About AMECO

AMECO specializes in three main products lines: stackers, reclaimers and shiploaders for a wide range of industries and materials handled.

AMECO offers the following products:

Longitudinal stockyards

When large volumes of bulk material need to be stored between individual plant process steps, AMECO's longitudinal stockyard solutions can be used.

These systems, which can be used for both indoor and outdoor applications.

Circular stockyards

To create a buffer storage AMECO's circular stockyard system offer the perfect solution when space is limited, and high reclaiming capacities are required.

AMECO's circular stockyard solutions can be used for both indoor and outdoor applications.

As part of its portfolio of circular stockyard systems, AMECO also offers circular bed blending storages. These allow for optimal blending or homogenization of the stored bulk material.

Shiploaders

Shiploaders are machines for loading solid materials — in bulk and/or in bags — into ships for transportation by sea. They are one of AMECO's star products.

Nowadays, bulk carriers namely make up 15% to 17% of the world's merchant fleets. Shiploaders provide the safest and most efficient way to load these carriers.

Rotary scrapers for prilling towers

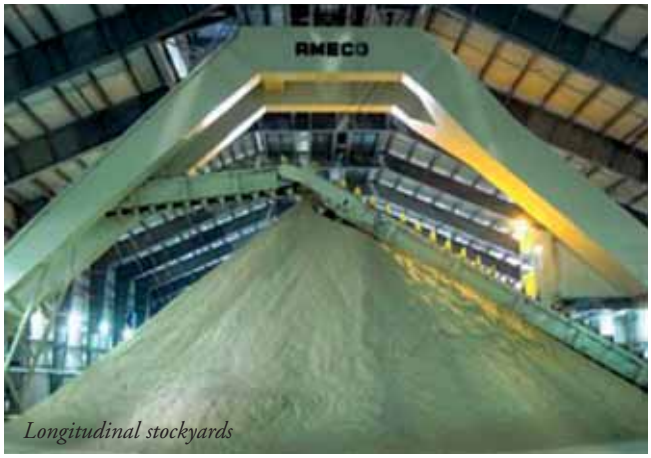
Fertilizers such as ammonium nitrate, urea and NPK are commonly manufactured as prills. Prills are formed by allowing drops of the melted prill substance to congeal or freeze in mid-air after being dripped from the top of a tall prilling tower.

AMECO's rotary scrapers are designed to efficiently reclaim fertilizer prills from the bottom of prilling towers.

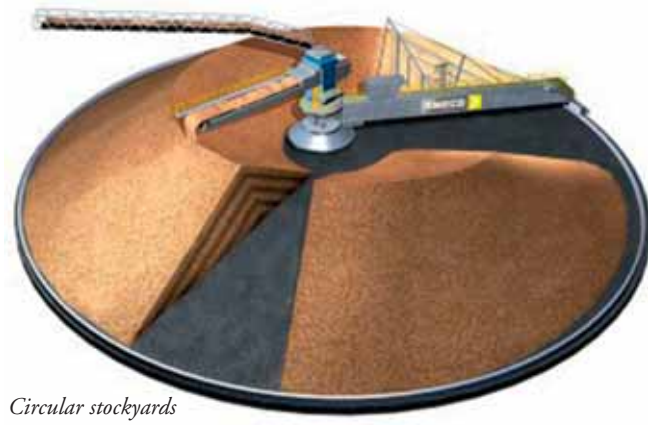
This type of scraper is composed of a structural boom with scraping blades that is rotating around a central point.

Rotation is active by wears of slewing drive, designed as a dual drive system. This system ensures that the scraper can continue to operate, even if one of the drives is on maintenance.

Following reclaiming, the material descends into a chute and is eventually discharged to a belt conveyor.



Longitudinal stockyards


Circular stockyards


Shiploaders are AMECO's star product


AMECO's rotary scrapers are designed to efficiently reclaim fertilizer prills from the bottom of prilling towers.

Record grain season at the Port of Rouen

With 9.1mt (million tonnes) grain exported, regardless of type, HAROPA – Port of Rouen achieves the best grain season of its history. The last record dated to 1999/2000 when the exported volumes in grain and protein crops reached 9.03mt.

For grain, the 2015/2016 season of HAROPA – Port of Rouen just ended on an excellent vintage with a total traffic of 8.83mt. This result is very close to the historic grain record of 8.9mt made in 1984/1985. Rouen has therefore further strengthened its rank as # 1 West-European grain port. "It is a very positive fiscal year as Rouen gets back market shares this year," said Manuel Gaborieau, sales representative of the agri-food sector of HAROPA. "It was also a very active season from the beginning to the end, without a break between the shipments, with a record month in March of more than one million tonnes exported."

The diversification of the destinations goes on

This grain season was marked by a high concentration of shipments to a few countries.

Thus, the top three destinations from the Port of Rouen — Algeria, Morocco and China — amount to a total volume of 6.8mt. Other regular destinations as Egypt or Saudi Arabia are also present this year. Furthermore, the diversification of destinations has continued with wheat volumes exported to Mexico, Thailand, Indonesia and even barley to Jordan.

Finally, it should be noted that the shipments to West Africa have increased by 44% to 386,000 tonnes, when those to the European Union only reached 113,000 tonnes, due to a good European crop in the summer 2015.

Four hundred grain vessels accommodated

By cargo: barley, with 2.374mt exported, reached the highest level ever achieved in Rouen; wheat totalled 6.43mt; and other grains represented less than 20,000t. For other grains, the figures have increased 51% for protein crops (183,000t) due to pea exports to India, and by 79% for rapeseed exports to 93,000t. In total, about 400 grain vessels called this year at all Rouen's terminals, including more than 50 Panamax.

The very high demand recorded throughout the season fully mobilized all the port silos of Rouen that were able to put in place the human and logistics means necessary to meet this demand, thus showing the responsiveness of the community of Rouen and confirming its effectiveness and competitiveness in terms of logistics. Besides, these same operators continued the development of mass transport modes via rail or river shuttles as well as investing into their equipment to prepare the future.

The main destinations of the season:

- Algeria: 3.5mt
- Morocco: 2.1mt
- China: 1.2mt
- Egypt: 285,000mt
- Saudi Arabia: 269,000mt
- Mexico: 212,000t
- Tunisia: 186,000t
- Thailand: 165,000t
- Jordan: 120,000t
- Gabon: 102,000t
- Senegal: 97,000t

About HAROPA

HAROPA, the fifth-largest port complex in Northern Europe, is a joint venture between the ports of Le Havre, Rouen and Paris. It is connected to every continent owing to a first-rate international shipping offer (linking 600 ports worldwide). It serves a vast hinterland whose core is in the Seine valley and the Paris region forming the biggest French consumer market area. With around ten Normandy and Paris area partner ports, the 'one-stop-hub' now forms in France a global transport and logistics system, capable of providing a comprehensive end-to-end service. HAROPA handles over 120 million tonnes of cargo by sea and waterway each year. HAROPA business represents 160,000 jobs. DCi

© *HAROPA – Port of Rouen.*

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Tom Noble, Department Supervisor, Powersouth Energy

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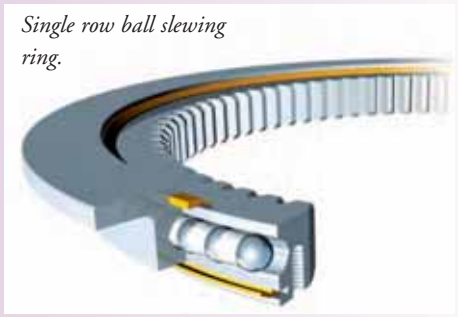
E-Crane sets things straight on its slewing rings

WHY SWING BEARING SELECTION IS CRUCIAL FOR LONG LIFE

It has been mentioned that E-Crane® uses 'single row ball slewing rings' by its friendly competition. Here, *Mark W. Osborne P.E.* of E-Crane sets the record straight and gives some genuine information on 'slewing rings' used by E-Crane®.



Single row ball slewing ring.

Three row roller slewing ring.

The single row ball configuration with four point contact raceways is a commonly employed slew bearing for cranes and some material handlers. This design does not meet the E-Crane® standards. Therefore E-Crane® only uses 'roller slewing rings' with a line contact between roller and raceway.

First of all, the slew bearing is the most fundamental mechanical element of a crane, excavator or material handler. It is also the most expensive.

E-Crane® slewing rings are manufactured by thyssenkrupp Rothe Erde GmbH, a leading global manufacturer of slewing rings and seamless rolled ring forgings for more than 100 years. The largest manufacturer of slewing rings in North America is Rotek Incorporated, a member of thyssenkrupp Components Technology Bearings. As a crane manufacturer, there are many type of large diameter slewing rings to choose from.

The single row ball configuration with four point contact raceways is a commonly employed slew bearing for cranes and some material handlers. It is also the least expensive design. This configuration is okay for light to medium duty applications and diameters up to 1,500mm.

This design does not meet the E-Crane® standards. E-Crane® uses a 'three row roller slewing ring configuration'. This design is built with three independent rows of rollers. The three row roller design offers more capacity per unit size than any other slewing bearing available. It is also the stiffest style of construction and is more expensive to produce and employ.

All loading is transmitted directly to raceway surfaces perpendicular to the load direction. The capacity of each rolling element is utilized in the most efficient manner possible. This type of bearing is available for diameters up to 4,500mm or larger and is built to handle extremely heavy loads.

E-Crane® has used this design successfully for over 25 years. E-Crane® understands full well that this high load carrying capability requires a companion mounting surface that is sufficiently uniform in stiffness and very flat to distribute the load around the ring.

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e-mail: rulmeca@rulmeca.com

RULMECA - EUROPE
Denmark
RULMECA A/S
e-mail: dk@rulmeca.com

Finland
RULMECA OY
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France
RULMECA FRANCE S.A.S.
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Germany
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e-mail: **sales-id@rulmeca.com**

Thailand
RULMECA (THAILAND) CO., LTD.
e-mail: **sales-th@rulmeca.com**

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MELCO Conveyor Equipment
e-mail: **conveyors-za@rulmeca.com**

AUMUND conveyor for 750°C hot DRI sold to Algeria

AUMUND Hot DRI conveyor (f. ex. Hadeed: Saudi Arabian Iron & Steel Company).

The market share of the Metallurgy Division of AUMUND Fördertechnik GmbH is growing. A new specialized conveyor for HDRI (hot direct reduced iron), a 116m-long BZB-H-I 900/400 designed for a capacity of 323tph (tonnes per hour) hot DRI at 750 °C, has just been supplied to Tosyali's new steel plant in Algeria.

The decisive factor in the award of the order to AUMUND Fördertechnik was the technical solution. AUMUND is putting its patented bucket conveyor into operation in Algeria. The improved sealing of this conveyor protects the material from environmental influences; the inert system prevents the re-oxidization of the highly reactive bulk material and permits the transportation of the DRI without great losses in the level of metallization.

"In order to produce the same amount of steel, a far smaller energy input into the electric arc furnace is required. Therefore the tap-to-tap cycles are reduced and productivity can increase by up to 20%", explains AUMUND Project Manager, Christian Niedzwiedz.

The AUMUND specialized conveyor for HDRI will be used as the connection between the Midrex shaft furnace and an electric arc furnace.

Tosyali is currently building the world's largest DRI plant, located in Bethioua, Algeria, with Midrex technology. The new direct reduction plant will have a production capacity of 2.5mt (million tonnes) of DRI and have the option to produce either hot or cold DRI (HDRI or CDRI).

The latest generation specialized conveyor was first implemented at one of the largest steel production plants in India in 2013, and has since been patented. This BZB-H-I conveyor has a capacity of 165 t/h. In this application the material also comes from a Midrex shaft furnace.

Advantages of hot charging

The conveying of hot DRI (HDRI) to the electric arc furnace has considerable advantages. The requirement for electrical energy per tonne of molten steel is significantly reduced. The energy reduction is achieved because the input material retains the heat that it already has when it comes out of the DRI production process.

Therefore less energy is needed to melt it down, and automatically the melting process takes less time. Because the material is filled directly into the furnace, the lid does not need to be opened, so even more time and energy is saved.

"Compared with cold charging, the conveying of HDRI saves up to 6% on electrode consumption. The tap-to-tap times and primary energy source carbon requirements are reduced, so this in turn reduces the CO_2 emissions", according to Christian Niedzwiedz. When HDRI enters the furnace at approximately 600°C, the energy saving is more than 120kW per tonne of molten raw steel.

About the AUMUND Group

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

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LIEBHERR

Hopper trucks use portable vibration to quickly evacuate stubborn loads

A Midwest seed production and transportation company is using pneumatic vibrators with an innovative vacuum mounting base that allows the units to be located wherever needed on a given truck or load. The result is improved productivity and safety on its hopper trucks. Noeske Seed Farm and sister company NSF Transport were having problems with compacted material clogging hopper bottoms and clinging to hopper surfaces. This required the drivers to pound on the hopper with hammers, with unloading times occasionally as long as four to five hours. By utilizing Martin® MT-FAST™ Hopper Trailer Vibrators, operators are able to move the units to virtually any point on the hopper bottom trailers to free up adhered material. The result is faster unloading — with reduced risk — leading to more loads per day.

The innovative vacuum mount allows the vibrator to be located wherever needed on a given truck.

Started in 1991 by three brothers, Noeske Seed Farm grows and conditions seeds, and is a dealer/distributor of seed products. During busy harvest periods in the fall, the company requires reliable access to 1,968ft^3 double-axle hopper bottom trailers. To ensure consistent availability of this essential service, the brothers formed NSF Transport, with four trucks running year-round, hauling seed, distiller's dried grains (DDGs), chicken byproducts and pelletized feed throughout the Midwest in the summer and Southeast in the winter.

"A consistent and frustrating problem we ran into was clogging issues on the hopper trucks," Bill Noeske explained. "Whether it was seed or any other cargo, the road vibration caused the material to compact at the chute mouth, so during offloading our drivers would spend hours completely emptying the trailer. They would have to get under the truck to poke at the plug or get on the truck and pound at the wall, and it would still not dislodge all of the material that clung to the sides. It was unsafe, frustrating and costly."

Seeking a solution, the Noeskes reviewed various options, including permanently mounted vibration units. "One of our trailers already had dealer-mounted vibrators at the slope, which worked okay, but we needed more versatility," Noeske pointed out. "To access all parts of the trailer we purchased one MT-FAST Vibrator from Martin® Vibration Systems, and it worked so well that we bought two more for the remaining trucks that weren't equipped with vibration."

Powered by a rig's onboard compressor, the vibrator suctions securely to any flat surface of the trailer using a patented vacuum mounting system. Requiring less than 15CFM for effective operation, the lightweight unit delivers 200 lbs of linear force. Well suited to large particle sizes and low bulk density materials, such as grain, meal and other agricultural products, the low-frequency, non-impacting energy loosens stubborn loads without damaging the hopper. Weighing in at only 8 lbs, the units are explosion-proof and washdown-safe.

With fast spot-to-spot mobility, operators are able to apply the proper vibrational force at any point on the trailer to dislodge bridged or clinging material. All hoses and connectors are supplied with the unit. No assembly is required.

Since they're not limited to a bracket on the knock rails, the units can be positioned at corners, valleys or other problem areas where material flow tends to stall. And because they are affixed directly to the hopper wall, energy is transferred more efficiently than with a permanently-mounted vibrator on a bracket.

"Our drivers tell me they're asked about the vibrators all the time by other drivers who are stuck pounding and poking their loads, while our people are unloading and driving away within a few minutes," Noeske said. "There are some friendly disputes within our crew over who gets which truck, because the Martin units work a lot better than the permanently-mounted vibrators."

The units facilitate faster, safer unloading, while allowing more loads per day.

With improved safety and a considerable increase in productivity on the trucks, Noeske said that employees are a lot happier. "I'm glad we found the MT-FAST," he concluded. "I would recommend it to anyone."

Martin® Vibration Systems Solutions is a leading innovator and supplier of industrial vibrators, compaction tables, feeders, hoppers and other material handling products for a wide range of industries, including chemicals, food, pharmaceuticals and foundries. The firm supplies both electric and pneumatic models. MVS has built its reputation on developing the quietest and most energy-efficient designs available, engineered and built to deliver precise energy transmission, long service life and low maintenance.

Mantsinen moves closer to customers by establishing subsidiary in Sweden

Mantsinen Group has established a subsidiary in Sweden. The aim is to serve local customers more efficiently and to improve the service experience of customers.

"For 15 years Sweden has been one of our largest markets, and we want to keep it as a 'domestic market' by getting closer to our customers. The trust of customers in our machines and services has been earned by doing our work well over these years," says Mia Mantsinen, Vice President of the Material Handling Machinery unit.

Mantsinen AB will be headquartered in the Gothenburg region. In late autumn, a service engineer will begin work in the company, and more employees will be hired next year.

This year Mantsinen has already delivered four machines to Sweden, the latest of which is the Mantsinen 120M to be delivered to the port of Kalmar in October.

"Mantsinen's presence in Sweden with its own organization is a significant long-term step in the development of our company. Mantsinen is also playing a major role in terms of the constantly increasing efficiency requirements at our bulk harbour," says Mats Gustafsson, CEO of the Port of Kalmar.

Founded in 1974, Mantsinen currently employs 450 people and present operations are divided into two business units: Logistic Services and Material Handling Machinery.

Mantsinen also has a subsidiary in Russia, which employs more than 200 people.

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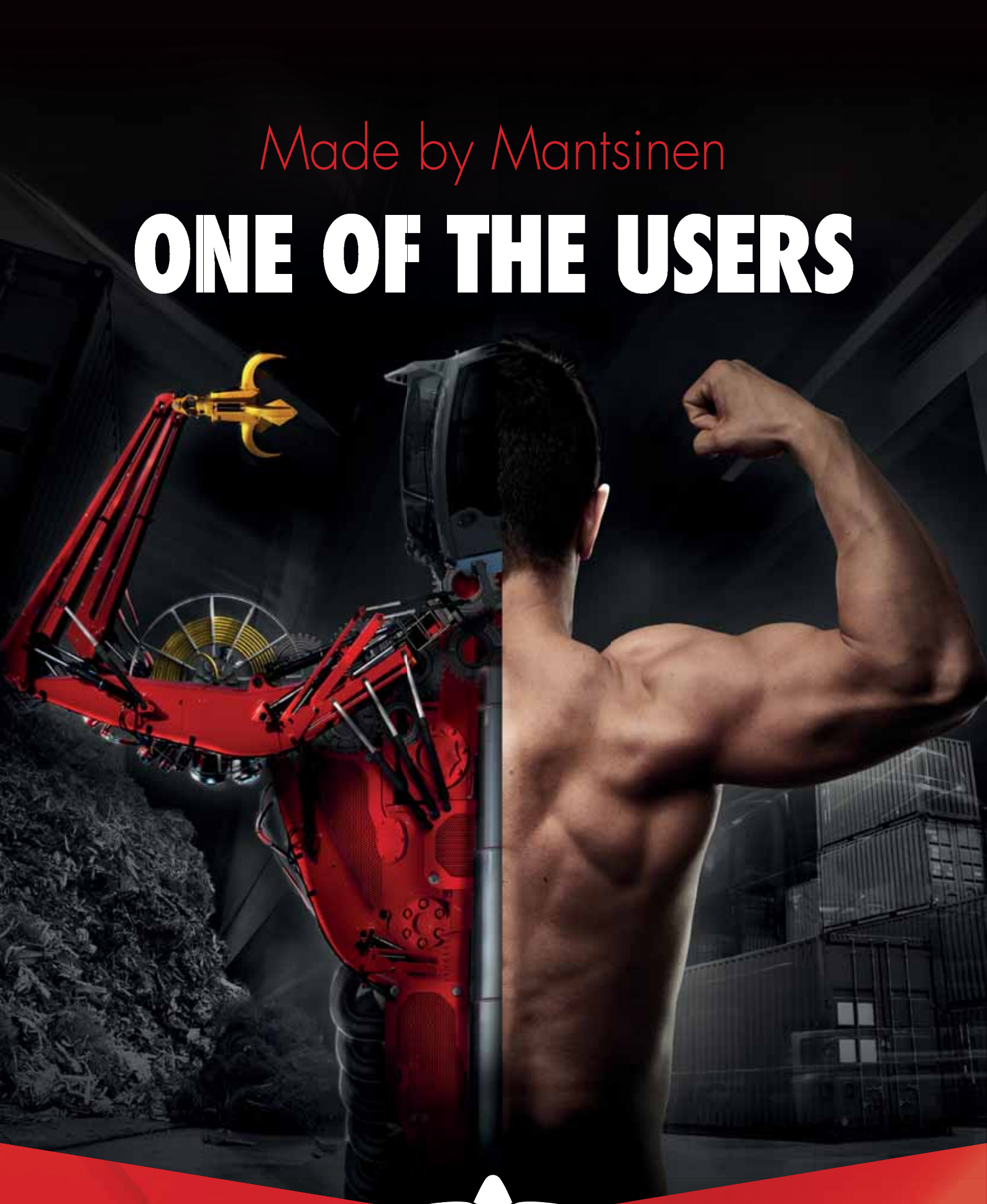

MANTSINEN

www.mantsinen.com

CASE appoints new Brand President

CASE Construction Equipment has announced the appointment of Carl Gustaf Göransson as Brand President for CNH Industrial's Construction Equipment businesses and President, Construction Equipment Products Segment. Göransson will also become a member of the Group Executive Council (GEC), the highest executive decision-making body within CNH Industrial outside of its Board of Directors.

Göransson takes over in these roles from Richard Tobin, CEO of CNH Industrial, who has been managing the company's construction equipment businesses ad interim.

Carl Gustaf Göransson joins CNH Industrial with more than 25 years' experience in the construction equipment industry, in roles of increasing importance within Volvo Construction Equipment and most recently Cargotec Corporation, where he served as Senior Vice President Sales, Markets and Services for the Hiab brand.

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

CASE Construction Equipment is a brand of CNH Industrial N.V., a major provider of capital goods listed on the New York Stock Exchange and on the Mercato Telematico Azionario of the Borsa Italiana.

AUMUND and SWEIDAN open spare parts warehouse in Saudi

As part of their valued partnership, AUMUND Fördertechnik GmbH, Germany, and SWEIDAN Industrial Services, Riyadh, have opened a new spare parts facility in Riyadh, Saudi Arabia. This will ensure that spare parts are available immediately, which is particularly important in the case of an emergency when it is vital to get a machine running again. A local AUMUND supervisor will be available to support customers.

AUMUND ensures a high level of After-Sales Service along with top quality products. For onsite services local AUMUND supervisors are at any time ready to assist the customers for whatever reason: troubleshooting, technical advice, installation supervision, preventative maintenance service PREMAS® and equipment inspection.

The new SWEIDAN and AUMUND warehouse at Riyadh.

About AUMUND GROUP

The conveying and storage specialist has special expertise at its disposal when dealing with bulk materials. With their high degree of individuality, both its technically sophisticated as well as innovative products have contributed to the AUMUND Group today being a market leader in many areas of conveying and storage technology.

About SWEIDAN

Sweidan Industrial Services is a focused service company that provides innovative solutions to achieve customer satisfaction by meeting and exceeding their expectations; utilizing the latest available technologies with the best practices. Sweidan provide the best products and solutions to a significant number of industries, ranging from cement to petro-chemicals.

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Superior Industries launches standard designs for Patriot™ Cone Plants

Superior Industries Inc., a US-based manufacturer and global supplier of bulk material processing and handling systems, expands its portable plant product lineup with the release of new standard designs for the Patriot™ Cone Crusher Plant. According to the manufacturer, the Patriot™ Cone Crusher Plant delivers portable crushing capabilities unique in the market by providing options like Vantage™ Automation™ and Level Assist that are exclusive to Superior.

New and patent pending, Superior's Level Assist technology automatically levels a plant once the machinery is raised to a desired height. Normally, the task requires 20–30 minutes with two workers to complete. With Level Assist, one worker can get the job done in less than five minutes.

Designed for simple, straightforward operation, the Vantage Automation System monitors all of the vital functions of the Patriot Cone Crusher. The system allows the crusher to maintain optimum production without operator intervention, constantly adjusting for harmful conditions. All of the software designed for the Vantage Automation System is designed in-house. Another key option on the Patriot Cone Plant is the removable feed conveyor cartridge, which has a roller track design that gives the conveyor mobility, allowing feeding to happen at any angle.

Superior designs and builds its new Patriot Cone Plant for the P200, P300, and P400 models of the Patriot Cone Crusher. Each unit undergoes a rigorous testing procedure before delivery and is backed by an industry first two year equipment warranty and one year parts coverage.

About Superior Industries, Inc.

Superior Industries engineers and manufactures groundbreaking, bulk material handling equipment and cutting-edge components. From its headquarters in Morris, Minnesota, USA, the manufacturing firm supplies bulk crushing, screening, washing and conveying systems for industries including construction aggregates, mining, bulk terminals, agriculture, power and biomass. In addition to its home plant in Minnesota, the 43-year-old Superior operates from additional engineering and manufacturing plants in Alberta, Canada; Arizona, USA; Georgia, USA; Michigan, USA; Nebraska, USA; and New Brunswick, Canada.

CASE Wichita plant achieves Silver Level designation in World Class Manufacturing

CASE Construction Equipment, global construction equipment brand of CNH Industrial N.V., has received a Silver Level World Class Manufacturing (WCM) certification for the company's skid steer loader and compact track loader manufacturing plant in Wichita, Kansas, United States.

Established in 1974, the Wichita site covers 46,000m², housing both skid steer loader and compact track loader product manufacturing and dedicated research & development. The site employs over 400 people and exports to national and international markets in the NAFTA, EMEA, LATAM and APAC regions.

WCM is one of the global manufacturing industry's highest standards for the integrated management of manufacturing plants and processes. It is a pillar-structured system based on continuous improvement, designed to eliminate waste and loss from the production process by identifying objectives such as zero injuries, zero defects, zero breakdowns and zero waste. To certify improvements, a system of periodic audits evaluates a selection of WCM pillars, forming an overall score for each plant that is the basis for three achievement levels: Gold, Silver and Bronze.

Determining factors for this latest achievement were due to a series of category improvements including Professional Maintenance, Level of Detail and Motivation of Operators.

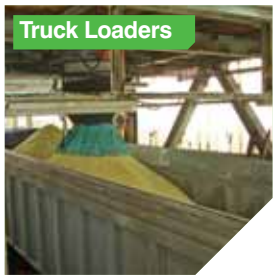
CASE Construction Equipment

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

CASE Construction Equipment is a brand of CNH Industrial N.V., a World leader in Capital Goods listed on the New York Stock Exchange and on the Mercato Telematico Azionario of the Borsa Italiana.

Cleveland Cascades Ltd

Global leader in bespoke dry bulk loading chutes



Cleveland Cascades are Specialists in the design and manufacture of bespoke dry bulk loading chutes.

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The product is conveyed completely free of dust at a height of six metres. (All photos: BEUMER Group GmbH & Co. KG.)

Safeguarding the environment with BEUMER Group's pipe conveyor

Dust-free transportation of ore concentrates

Transportadora Callao S.A., the logistics operator of a special cargo terminal in the port of Callao/Peru, relies on a BEUMER Group pipe conveyor for the transportation of zinc, copper and lead concentrates of different mining companies from the warehouse to the terminal. With its ability to navigate curves in three dimensions, the conveyor can be optimally adapted to its routing course of approximately 3,000 metres. Of even greater importance: the conveying system prevents the concentrates from coming into contact with the environment and ensures dust-free transport to the ship's holds. BEUMER Group was responsible for engineering and supply, including the steel structure, supervision of the installation and putting the pipe conveyor into operation.

Callao is located directly on the Pacific Ocean. With 877,000 inhabitants, it is one of the largest cities in Peru, with the largest airport in the country and one of the most important fishing and commercial ports in South America. A modern shiploading terminal for ore concentrates was built in this port and it is operated by Transportadora Callao S.A.

About 75% of the imports and exports of Peru, one of the most important mining countries worldwide, are handled in Callao. In order to satisfy the increasing demand for these valuable materials, the Peruvian government decided to expand the port. Besides additional storehouses, the plans also foresaw the largest, most modern shiploading terminal in the country. Peru also wanted to change the way the raw materials were transported to the shiploading areas. Before the construction of the special terminal, trucks were used to transport the concentrates from the warehouses to the port terminal. "Since Transportadora Callao started its operation, they could reduce the truck drives by 130,000 per year," explains Victor Sam, CEO at Transportadora Callao S.A. The company, a consortium comprising five enterprises from the mining and port industries (manufacturers and warehouse logistics operators), obtained a licence from the state of Peru for building and operating the necessary infrastructure.

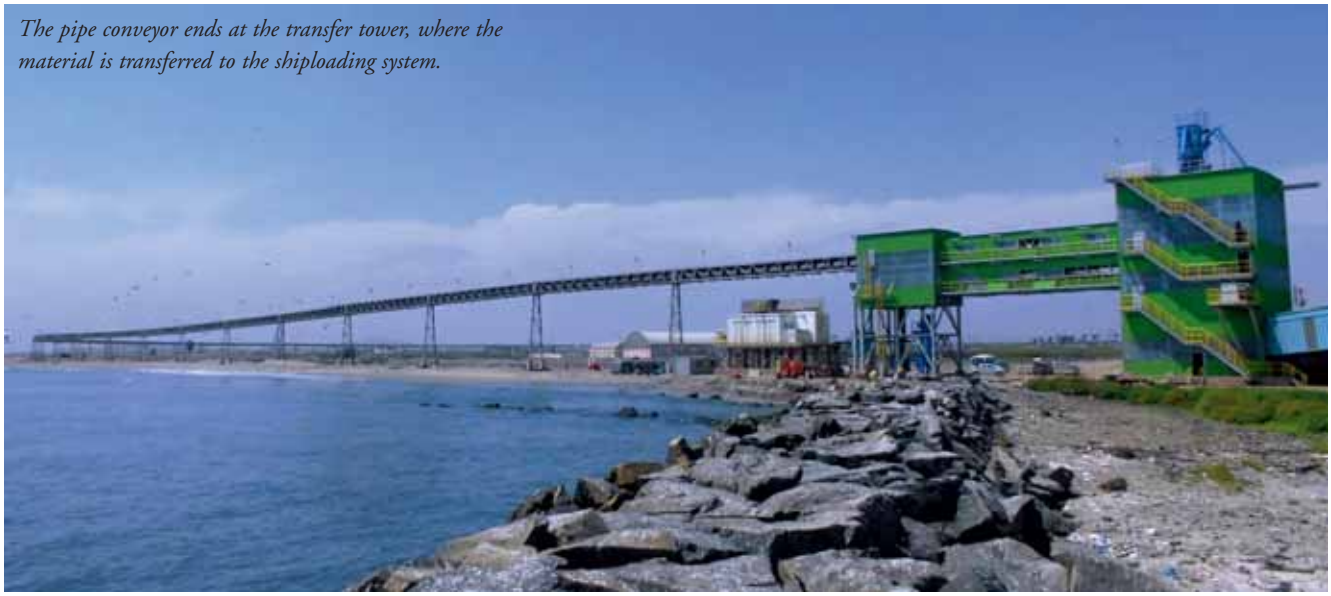
Pipe conveyor: dust-free conveying

The mines in central Peru transport their concentrates to the warehouses, approximately 3km from the port. This required an absolutely protected method for the transportation of material, to prevent particle emission into the atmosphere. Transportadora Callao opted for the BEUMER Group pipe conveyor. The direct contact person and project partner was Helmut Wolf from BEUMER Group Austria GmbH: "Together with the responsible persons from the customer, we developed a solution that is perfectly adapted to the routing and the ambient conditions."

Due to its enclosed transport, the pipe conveyor not only protects the environment against harmful impacts during the transport of the lead concentrate, it also allows conveying over long distances and navigation through tight curve radii. Due to its ability to navigate curves, this belt conveyor requires a lot less or no transfer towers at all, depending on its length and the available curve radii. This results in substantial cost savings for the customer, and allows BEUMER Group to easily customize the system to the individual routing. Durable conveyor belts guaranteeing tensile strength are used. The engineers use different dimensioning programmes to determine the ideal belt design. They use them to calculate tractive forces and forces that arise during acceleration and deceleration and also to determine possible curve radii. BEUMER Group provides tailor-made feasibility studies for each project. Another advantage is the reduced noise emission that the system provides. This is ensured by special idlers, as well as low-noise bearings and selecting the right conveying speed. "This improves the quality of the employees' day-to-day work environment," says BEUMER engineer Wolf. Sam adds that the "noise measurements along the pipe conveyor resulted in values that are consistently far below the permitted limit values."

Conveying capacity: 2,300 tonnes per hour

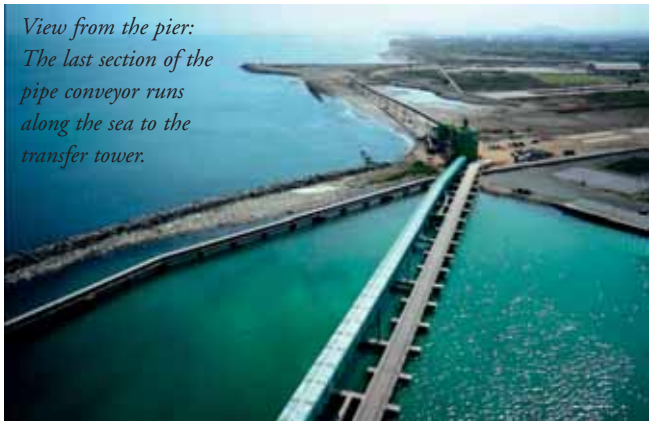
BEUMER Group supplied and installed a pipe conveyor with a



The pipe conveyor ends at the transfer tower, where the material is transferred to the shiploading system.

centre distance of 3,195 metres. "Due to the system design and the required system capacity, we designed it with a diameter of 400 millimetres," explains Wolf. "The conveyor transports 2,300tph [tonnes per hour], at a speed of 4.5m/s and is driven by three motors with a capacity of 650kW each. We equipped the system with filters, strippers, a dedusting unit and a control system." BEUMER Group was responsible for engineering and automation, and supplied the steel structure and the necessary components. The site managers supervised the installation and put the system into operation.

The process is practically free of faults and, above all, safe: trucks or trains transport the mining commodities from the mines to the ore storages, from where they are transported to the open access station. Here, the concentrates are received by a feeding 43m belt conveyor that transfers it to the pipe conveyor at a height of six metres. A dedusting unit ensures that no material is emitted during this process. "We equipped the feeding belt conveyor with a metal detector and an electric magnet," explains Wolf. "This prevents damage of the downstream pipe conveyor by metal parts." At the end of the route, the conveying system runs along the seaside in the naval port of Callao to the transfer tower. Here, the belt opens



View from the pier: The last section of the pipe conveyor runs along the sea to the transfer tower.

The conveyor line of the pipe conveyor starts at the Open Access station and shortly after, the conveying system crosses the refinery area, where the systems had to be equipped with fire-proof covers.

The feeding belt conveyor transports the ore concentrate to the BEUMER Group pipe conveyor. A magnetic separator ensures that metal parts are rejected, and a metal detector provides additional safety to prevent damages.

automatically. It transfers the material to another belt conveyor that conveys the ore to the shiploading system.

Sam: "This modern system, in operation now for 17 months, caused a significant increase in speed by 500 % for loading concentrates and reduced the ship's waiting time until loading by more than 80 %. These advantages lead to savings for the exporters and improve the competitiveness of the country's mining industry."

Trouble-free integration, challenges mastered

"A big challenge for us was integrating the pipe conveyor into the existing environment," says Wolf. The BEUMER system is the connection between the individual belt conveyors from various manufacturers. "When managing the project we had to meet several official requirements," reports Wolf. The project represents a concession by the state of Peru given to Transportadora Callao S.A., who commissioned Odebrecht Perú Ingeniería y Construcción with the execution, and Buenaventura Ingenieros S.A. with the supervision. Odebrecht commissioned BEUMER Group with the design of the entire line section onshore.

The pipe conveyor passes the naval port of Callao: this is the last curve section before the transfer tower towards the port terminal.

The onshore section starts at the 'Open Access', where the concentrate is transferred from the warehouses. The pipe conveyor then passes a refinery and a military area. "That was the specified routing that we had to observe," explains Wolf. In the area of the refinery, the systems had to additionally be equipped with fire-proof covers. Due to this impressive engineering work, Transportadora Callao is now able to handle ships for bulk products of up to 60,000dwt without obstructing the work in the other terminals of the Callao port.

World-wide connected and brought to one point

BEUMER Group has bundled its comprehensive expertise spanning various industries and established different Centers of Competence in order to offer optimal support of their single-source solutions for companies like Odebrecht and Transportadora Callao. The pipe conveyor segment is one such Center of Competence. This centre is responsible for sales and project management worldwide. It collects and prepares the know-how of each regional group company and passes it on to the group company's global experts, such as Wolf and his team. "BEUMER's technical team has proven its professionalism and stand-by duty, during construction and operation, and after 1.5 years in operation and more than four million tonnes of transported concentrates, we can attest that the set goals have been reached," explains Sam.

BEUMER Group's extensive Customer Support ensures a high level of system availability after commissioning. Transportadora Callao just signed a teleservice contract with BEUMER Group, so that BEUMER specialists can eliminate possible malfunctions in the system. If necessary, the BEUMER Group service staff will go to Callao in order to make the necessary adjustments and prevent malfunctions and machine breakdowns, which would lead to long downtimes. DCi





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Terex implements new corporate strategies

Fuchs material handlers aligned with Terex Materials Processing segment

Terex Materials Processing continues to implement a series of strategic moves and investments to better position its purpose-built Fuchs material handler business for global expansion and sales growth. Recently, the business was rebranded 'Fuchs – A Terex Brand' in key markets for consistent global brand recognition. The Fuchs line also transitioned to the Terex Material Processing segment, which is a better strategic fit for the business within the broader Terex portfolio. Additionally, multiple new machine introductions were made at key international trade shows during the first two quarters of 2016, including the ISRI 2016 Convention in Las Vegas, Nev., USA and Bauma and IFAT 2016 held in Munich, Germany.

"The purpose-built Fuchs material handlers are integral to the long-term Terex business strategy and a natural fit in the Materials Processing segment," states Kieran Hegarty, President of Terex Materials Processing. "We intend to grow and expand the Fuchs business globally beyond the line's traditional scrap markets into such markets as timber, recycling and ports."

Commenting on several recent strategic sales and support actions taken to increase material handler customer support, Ron de Vries, General Manager for the Fuchs business globally, said, "In conjunction with the transition to Materials Processing, we appointed Jon Van Ruitenbeek as the new Business Line Director for Fuchs in North America, and we have announced several key sales and support management appointments for key North American and European markets, which will give Fuchs more interaction with customers during the sales process and provide customers with a higher level support from the factory.

Additionally, we are continuing to focus on growing distribution globally, so customers will experience more responsive service and parts support locally."

Accelerated investment in Fuchs' new product development with a number of new initiatives has resulted in multiple announcements of new models and model upgrades. Two completely new model class designs recently introduced — the Fuchs® MHL390 F and MHL370 F — give customers more material handling options to fill a wider variety of application needs.

Designed to deliver the long reach and high lift capacities required in port applications globally, the new Fuchs MHL390 F handler boasts operating weights ranging from 76.2–87 metric tonnes (168,000 to 191,800 lb). It features a broad outrigger

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base to provide excellent stability when lifting heavy loads at extended reaches of up to 24.5m (80.4ft). An available banana boom configuration enables the handler to effectively reach deep into a vessel's hull for port applications.

The new 55-tonne (120,000 lb) class high-capacity Fuchs® MHL370 F handler boasts a reach of up to 18 m (59.9ft), giving the North American market a much needed machine to fill the production demands of large, high-volume scrap operations processing material with mega shredders. The MHL370 F delivers increased lift capacity over the smaller Fuchs® MHL360 F material handler, while an elevating cab provides a maximum eye-level operation of 6.1m (20ft) and independent cab forward movement of 2.2m (7.2ft), which is critical for port applications.

Fuchs also introduced to a global audience at IFAT upgrades to its wildly popular MHL320 F handler, designed as the perfect entry level unit for recycling, solid waste and small scrap operations who need the high lift capacities at extended reaches, efficient sorting capabilities and fast trailer loading/unloading only delivered by purpose-built handlers. Additionally, the business segment unveiled the new purpose-built Fuchs cab design at ISRI

that will hit the market in the fourth quarter of 2016. The sleek new cab design incorporates more glass to advance visibility, new joystick steering control for improved manoeuvrability and a revised interior for more space and greater operator comfort.

Busy Application Center

Another cornerstone to the Terex growth strategy for the material handler product line is to make more use out of the Fuchs Application Center at the machine manufacturing facility in Germany. It's here where Fuchs team members work closely with customers to design one-off handling solutions to meet specific application needs.

Beyond the standard product line offering, Fuchs gives customers the opportunity to optimize and adapt the material handlers to meet the specific needs of the application. A complete team consisting of Fuchs distributors, sales representatives, engineers and technicians works closely with the customer with one common goal in mind: custom design a machine for the best fit to a specific niche need of the customer.

Fuchs material handlers are built with standardized components as the foundation of a modular system that allows engineers to design a wide variety of machines that offer the same durable and efficient operation that customers have come to expect from standard Fuchs machines. In addition to the model's standard options, the Application Center can build a machine with either a wheeled or crawler undercarriage. The diesel engine can be replaced by an electric engine with cord length adapted to the customer's needs. A pylon riser of varying lengths — popular for port applications — can be added between the machine's upper and lower carriages for enhanced visibility. Additionally, if a stationary model is the best fit for the customer, the upper carriage of a handler can be adapted for stationary applications through the Application Center.

"These are exciting times for the Fuchs business," comments de Vries on the Fuchs expansion and growth strategy backed by Terex. "We are significantly strengthening the Fuchs team, increasing local support by growing our distribution network, broadening and updating our purpose-built handler line for the market, and customizing our equipment to meet specific application needs for our customers. It's a good time to be a Fuchs material handler customer." DCi

The challenges of handling cement and clinker

Louise Dodds-Ely

Carthage Cement's storage buildings from Geometrica – a case study

Overview

Carthage Cement is Tunisia's largest and most technologically advanced cement plant — originally designed to produce clinker at a rate of 5,800tph (tonnes per day). Located approximately 25km southeast of Tunis, the plant was planned and built near an existing quarry. The greenfield project began to take shape in late 2010 and was completed in 2013.

"We paid particular attention to adopting the latest technology, high economy of energy consumption and great respect for the environment," said Lazhar Sta, co-founder of Carthage Cement. Coexisting near a nature preserve, olive orchards, and Tunisia's most important wine region (Mornag) created a great deal of environmental concerns.

Design selection

Carthage Cement's civil and structural contractor, EKON drafted a performance specification that included all dimensional and loading requirements for three stockpile covers. Each would have to allow ample clearance for the stacker-reclaimer system; provide openings for multiple incoming conveyors as well as multiple entrances for off-road vehicles. For the circular dome, there would have to be space for traffic lanes around the ring rail for the reclaimer.

During the supplier selection process, EKON examined a

CARTHAGE CEMENT STORAGE

Owner:	Carthage Cement
Contractor:	EKON, Ankara, Turkey
Location:	Djebel Ressas, Tunisia
Highlights:	❑ 298m longitudinal dome for additives storage ❑ 208m longitudinal dome for coal storage ❑ 94m circular dome for limestone storage

GEOMETRICA'S DOMES FOR ADDITIVES, COAL AND LIMESTONE

	Additives — longitudinal	Coal — longitudinal	Limestone — circular
Plan dimensions (m)	53 x 298	53 x 209	94
Height (m)	23.7	23.7	29.2
Material	Galvanized steel	Galvanized steel	Galvanized steel
Openings	3 conveyor, 3 vehicle	3 conveyor, 4 vehicle	1 conveyor, 1 vehicle
Structural bars (qty)	38,500	29,000	21,000
Hubs (qty)	16,600	11,800	7,900
Covered area (m^2)	15,800	11,100	7,000
Cladding area (m^2)	24,000	16,800	9,700

DJEBEL RESSAS — LIMESTONE STORAGE

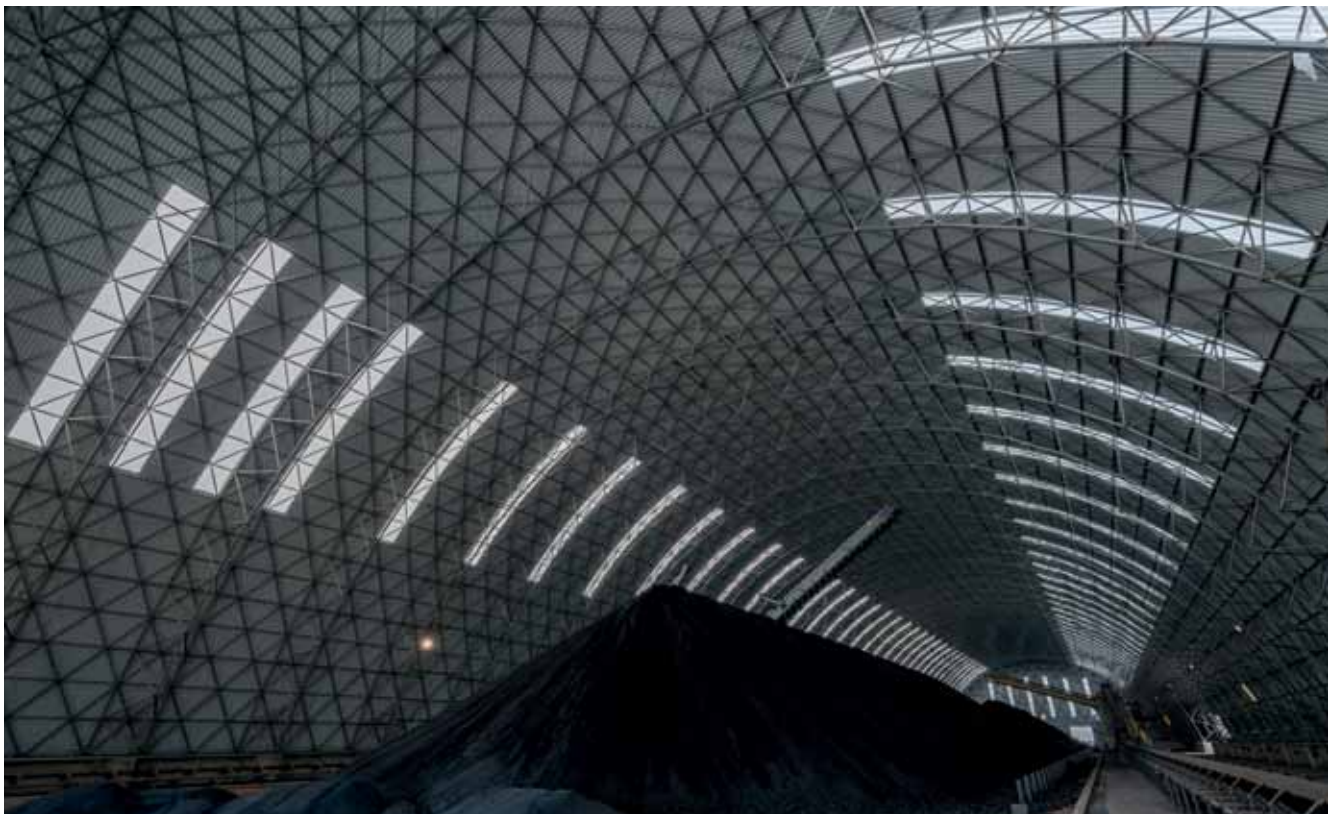
	Conventional steel dome	Geometrica's light steel dome
Dimensions (m)	94	94
Steel structure (t)	754	135

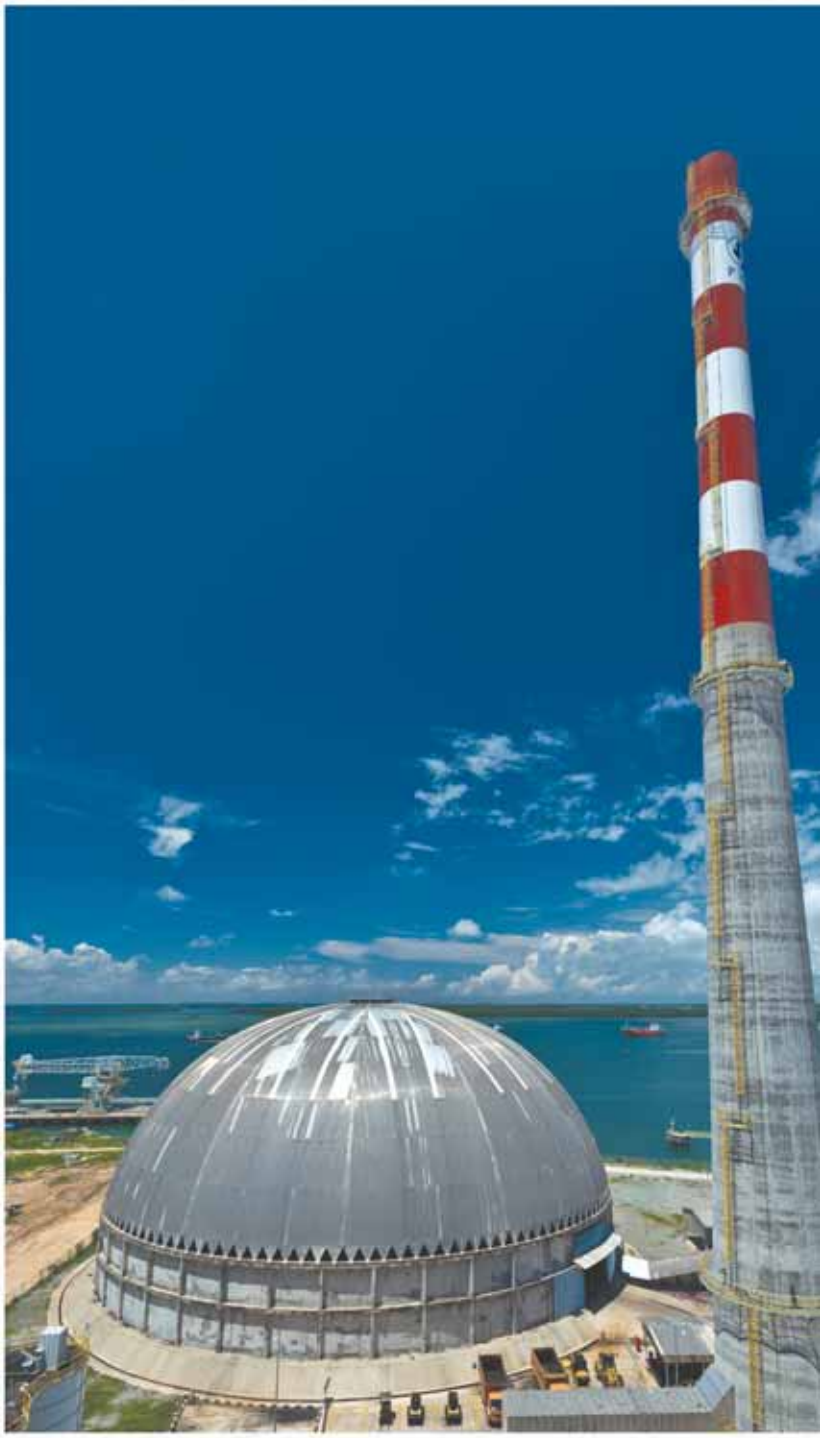
number of parameters before deciding on Geometrica. The table above compares the final two, short-listed alternatives for the limestone stockpile cover.

As illustrated in the table, the structure weight for a conventional-steel dome would have been over five times that of Geometrica's light-steel dome. Not only were the weights considered, but all the associated initial and lifetime costs were also evaluated.

"We learned about Geometrica through an international cement trade magazine and the Internet," said EKON Project Manager, A. Cem Sevük. "We chose Geometrica because, compared to their competitors, they gave us a better price and speedier delivery."

Ultimately, Geometrica's lightweight galvanized steel solution was selected. Galvanized steel provides corrosion resistance for years of worry-free storage with minimal maintenance. This additional advantage made the light-steel solution even more compelling.





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www.geometrica.com/bulk-storage

Geometrica's domes

Geometrica supplied three bulk storage structures for additives, coal, and limestone.

The domes were pre-fabricated in its plant located in Monterrey, Mexico with a quality- and computer-controlled process. Every single component was custom-made, marked, and then sorted into substructures in the exact order that the structures needed to get built. The modules were packaged into two-tonne crates, then containerized and shipped to site.

> **"Geometrica's professional and co-operative approach, not only through the project's execution but also after, is extremely satisfying", said EKON Project Manager, A. Cem Sevük "Geometrica will always be at the top of our list for upcoming projects."**

Construction

All domes were reinforced with arch ribs. "We assembled the domes in half-arch segments on the ground. Then we lifted the arches into place, and stitched them to the growing structure. This minimized the amount of time spent working at heights," said Fernando Gracia, Geometrica's lead engineer for the project. "Oval hubs in the bottom chord of the domes' ribs allowed us to use two rectangular bars in parallel, reducing the overall arch count, and increasing structural efficiency," Gracia explained.

Construction was carried out entirely with locally sourced labour and supported with a site-consultant from Geometrica. No welding was required since all of the structure's connections were joined with Geometrica's efficient, mechanical hubs.

"Their structures are light and easy to install — like Lego®!," said EKON Project Manager, A. Cem Sevük. "Because the components are so light — and are packaged so efficiently — we saved money on transportation as well. Those savings in time and money, combined with their cooperative and professional approach, confirmed that we'd made the right decision in choosing Geometrica."

Results

Carthage Cement has continued to grow and improve its position in the cement sector. Currently, the rate of production is approximately 7,000tpd of clinker and Carthage Cement is supplying 50% of Tunisian demand.

The bulk storage structures contain the dust from stacking and blending of raw materials and fuel, helping meet the plant's environmental goals. "The new buildings are, aesthetically, very nice, and we definitely will consider Geometrica for future structures," Sevük said.

The environment, including its olive orchards, livestock and nature preserve, are protected by Geometrica's structures. This three-structure project exemplifies the ability to promote environmental responsibility in an industrial setting.

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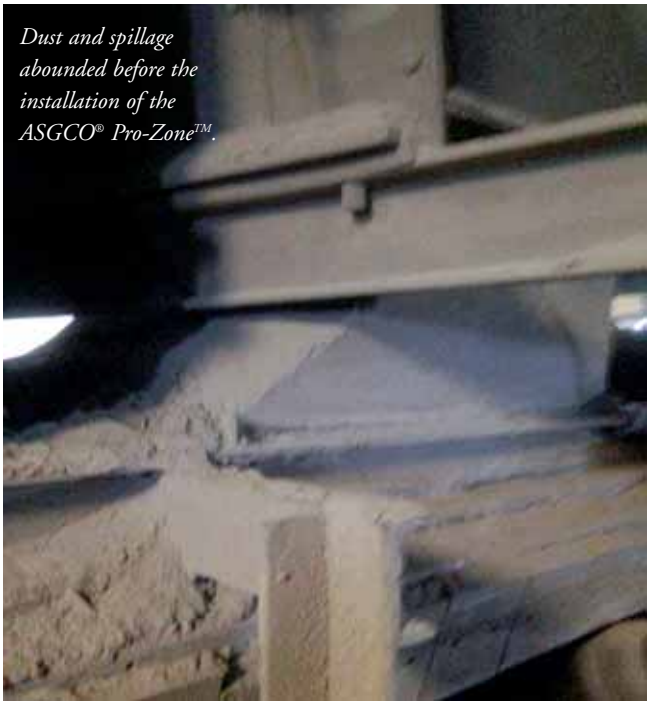
Focusing on dust control and belt alignment with ASGCO®

For as long as there has been a need for cement, there has been the ever-present problem of dust in its manufacturing process, *writes Andy Dopson, Territory Manager*. The nature of the materials used in the cement industry creates unique challenges for the bulk handling systems in ports, mining and manufacturing facilities. The minimization of dust and spillage has been a special area of focus for the engineering team at ASGCO®. With stricter regulations regarding the containment of dust, there has never been a more critical time to invest in dust containing improvements for bulk handling conveyor systems.



Dust and spillage abounded before the installation of the ASGCO® Pro-Zone™.

After the installation of the Pro-Zone™.

Before.

Before.

After.

Case study 1: dust control

Theoretical solutions are always a good conversation starter when discussing ways to minimize dust and spillage, but far more important are proven case studies, such as a major Southeastern US cement plant's wasteful dust and spillage problem.

This particular customer receives barges several times a month, and sometimes more frequently depending on the demand. The raw material travels on top to feed the silos. The powder travelling along the belt with the material has extremely fine particles that were escaping and filling the structure surrounding the conveyor with thick dust and debris. This

airborne particulate would then settle throughout the room, sometimes in upwards of several feet. The floor of the facility would become layered with this expensive material that once exposed, became useless in the cement manufacturing process, as well as becoming an expensive burden to clean up and a major safety hazard.

The plant operator's challenge was to eliminate the fugitive dust and spillage and the additional costs incurred for the time and effort taken in the removal of the material, plus any disposal fees. Access was also needed to ensure proper operation and allow for serviceability of the load zone.

ASGCO® engineers worked closely with ASGCO®'s trained servicing distributor and designed a specific, self-contained system based on the parameters of this particular conveyor. Belt speed, material weight, size and air flow, were among the many factors that were taken into consideration when designing the system. CEMA design standards of 20° transition idlers before and 35° troughing idlers after the Pro-Zone™ were also addressed.

The Pro-Zone™ system was designed around the existing chute and dust collection system. It creates a sealed belt support system with quick access for monitoring and easy adjustments. The placement of the new custom designed baffles and expansion pieces tied the new load zone system together seamlessly.

After completing the installation, the powdered particulate carried by the raw materials no longer plumes into the room. Prior to the installation, the staff would kick up this material and breathe the fugitive dust, just to provide basic maintenance. The improved dust containment has significantly increased efficiency, but has also improved the working conditions and lifted the morale of the maintenance staff. The cost of removing the wasted product has been virtually eliminated by the cement facility. The ASGCO® Pro-Zone™ System removed a costly obstacle in the company's procedure and has allowed for greatly increased production throughout.

Major issues confronting cement manufacturing industry are not limited to dust control. Belt damage and alignment problems are far too common and lead to expensive repairs and costly down time.

Case study 2: tracking and load centreing improvements

Due to its sharp and rugged nature, aggregate material involved in the cement manufacturing process is notoriously harsh on conveyor belts. The wide variations in material size make centreing the load extremely important to all bulk handling operators. One major cement processing facility was experiencing severe belt damage and ongoing maintenance issues requiring expensive and frequent repairs. ASGCO®'s engineering team was called to provide further assessment and provide a long-term, cost-effective solution.

A major cement processing facility in was experiencing severe belt tracking and alignment problems, leading to regular costly repairs and maintenance. This plant was using traditional training idlers in an attempt to control the mis-tracking, however the nature of the aggregate material on the belt led to continual build up around the pivot point, yielding it ineffective. In addition, the rubber disk return idlers were preventing the belt from re-centreing, defeating their purpose.

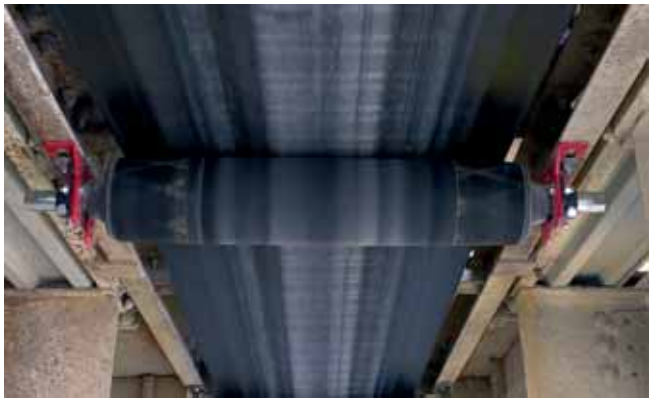
On several occasions, the belt became so severely mis-aligned, that it came in contact with the tail section of the support structure, leading to catastrophic damage to the belt, and causing extended downtime for the plant's operations. The problem persisted upon installation of a new belt, and within 12 months, it needed to be completely replaced a second time.

The manufacturer's challenge was to eliminate the constant tracking problems that caused belt damage and expensive down time. In addition, they needed to improve load centreing while eliminating build up that was contributing to the belt tracking problems.

ASGCO®'s technicians performed a complete survey of the conveyor system, identifying the problem issues. It was recommended that ASGCO® Tru-Trainer® be installed on the return side of the conveyor, 30 feet before the tail pulley. This position would allow the belt to run straight around the tail pulley and also be centred on the conveyor in the load point, reducing spillage and costly material loss. In addition, the rubber disk return idlers were replaced with flat return idlers, eliminating resistance to centreing.

After installing the ASGCO® Tru-Trainer® on the return side of the conveyor, the belt is now continually running straight in the frame of the conveyor and reacts immediately if the belt begins to steer off centre. Due to the sealed design, interference from material buildup has been eliminated. Furthermore, because it does not rely on contact with the belt edge in order to guide the belt, belt edge damage, which frequently occurs with conventional tracking systems, is avoided. The plant's output has greatly increased due to the significantly reduced maintenance and repair issues and productivity is at an all time high.

ASGCO® 'Complete Conveyor Solutions' has been a leading global manufacturer and provider of conveyor products and services since 1971, offering unique and innovative solutions to maintain conveyor systems in the most efficient manner, while reducing costly down time. ASGCO® is a diversified and innovative company with six major divisions that serve specific targets of the material handling industry. These innovative products and services are marketed through selected distributors, joint ventures, and representatives worldwide.



Above: before the installation of the ASGCO® Tru-Trainer® and, below: after the installation.

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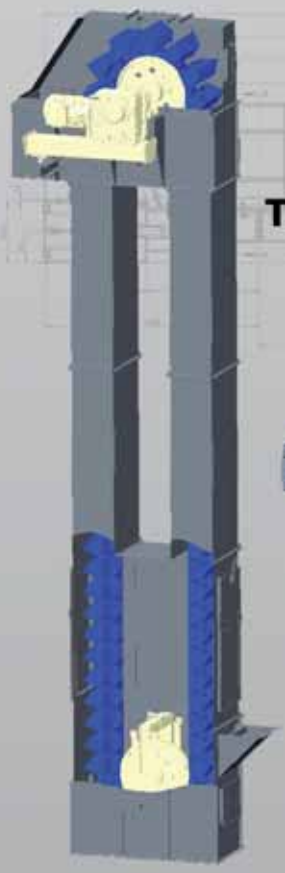

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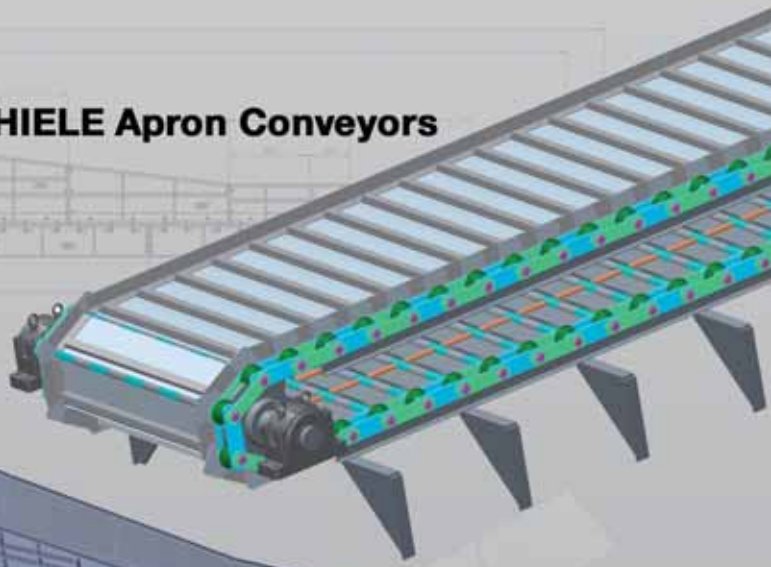

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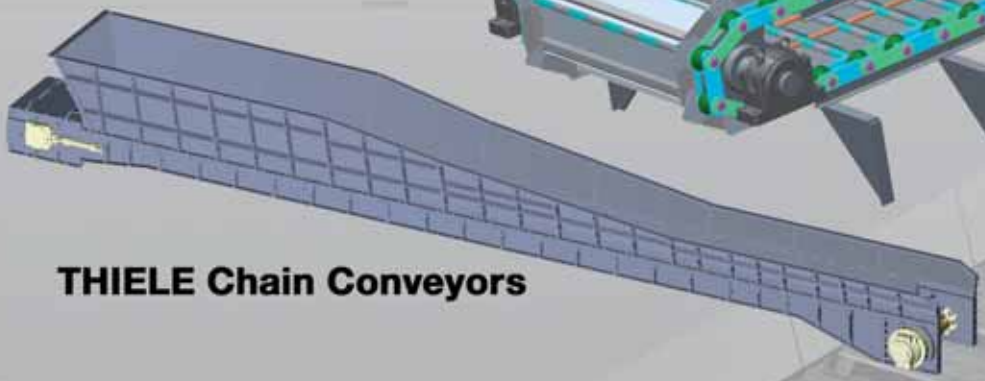
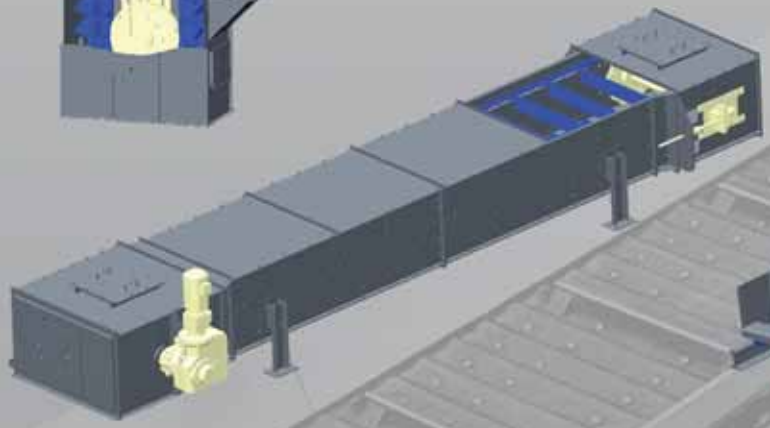
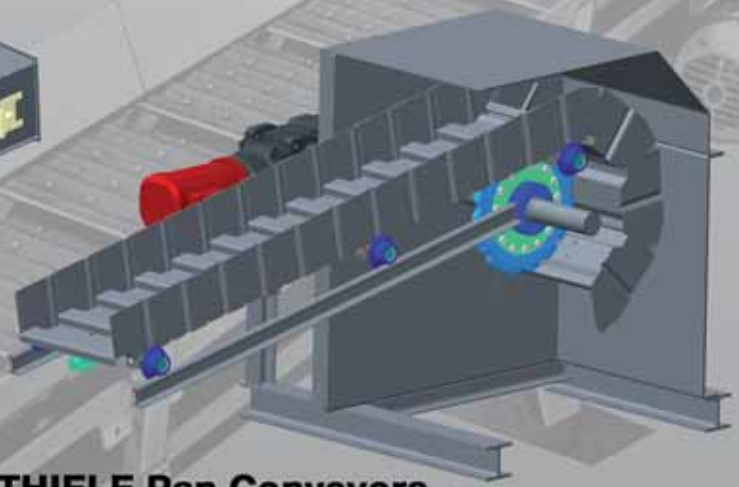


THIELE Chain Conveyors



THIELE Trough Chain Conveyors



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Domes help size up cement-storage options

Storing cement is a heavy matter, *writes Rebecca Long Pyper for Dome Technology*. High density often requires soil improvements or deep foundations. Moisture damages product quality. Poor handling can result in compromised or unusable cement.

These were some of the concerns facing St. Marys Cement as it planned for a storage facility in Chicago. A dome, with its versatile reclaim options, was selected for an existing St. Marys transload facility on Lake Michigan that received via ship cement made at the company's Charlevoix, Michigan, plant and elsewhere, temporarily stored it, then loaded it onto trucks for transport.

"[St. Marys] was looking for additional storage capacity and an economical solution; domes provide both," plant manager Randy Pryor said. The project wrapped in January 2016.

Until the new dome was built, the Chicago facility did not have the capacity to store the volume shipped from the Charlevoix plant. The completed dome is allowing St. Marys "to get the dome filled before the lakes freeze over and [they] can't get ships down there," Dome Technology operations manager Brent Hardy said.

Total reclaim was another must, and rather than opting for a traditional cement-handling system, St. Marys chose a hybrid system of airslides paired with a Laidig reclaim screw.

"The fluidized screw … will provide a more mechanically reliable solution, as compared to other mechanical reclaim systems. It will also provide for more complete reclaim of stored product compared to other mechanical systems or aerated floors," Pryor said.

Employees are safer and operations more efficient with the reclaim system St. Marys selected. "The Laidig system greatly reduces [the safety] risk by providing inherent redundancy associated with having two different reclaim methods. Hard-pack areas or dead zones that are not reclaimed by the air-gravity conveyors are broken down and reclaimed by the screw conveyor without putting personnel at risk," Pryor said.

Increased storage means St. Marys can deliver cement — and cost savings — to customers year round.

"St. Marys has in the past run low on product in the Chicago area and relied on trucks to get them the material needed to supply their customers through the winter months when the lake was frozen over and they were unable to bring it by ship," Hardy said. "The additional 50,000 tonnes of storage provided by the dome at Chicago will help them serve their customer base better through the winter and to help pass on the savings to their customers [since] the cost of bulk transport by ship is fractional to the cost of hauling it over the road by trucks."

Here are some specific ways cement companies tackle cement-storage concerns by selecting a dome:

- **more storage, smaller footprint:** cement is heavier than many stored materials, and for customers hoping to store 10,000 tonnes or more, domes beat silos, space- and moneywise. Warehouses and flat-storage structures can only be built so tall before their strength is compromised; with domes, customers can store more product in a smaller footprint, stacking it deeper and taking up less property at the site. While some businesses require three to five buildings for flat storage, one dome will likely accommodate the same amount of material in one structure. The double curvature of a dome lends itself to strength and the ability to build up, rather than out.
- **firm foundations:** no matter how heavy the load, Dome Technology can customize a foundation system to support it. Based on geotechnical analysis and an understanding of cement's properties, an engineering team provides a variety of foundation options in addition to driving piles, sometimes minimizing the need for a deep foundation.
- **waterproof membrane and insulation:** Dome Technology's domes are completely waterproof, and the domes' insulated nature also prevents heating and cooling of the walls and air inside, thus preventing condensation that could damage the integrity of the product.
- **material-handling solutions:** how fast product can be moved translates into how fast a company makes money. In addition to dome construction, Dome Technology specializes in and has pioneered cost-competitive handling systems — not just those moving product within the structure, but loading and reclaim systems too.
- **strong from the top down:** the dome's double curvature lends strength to the entire surface, and the apex can support especially large loads efficiently, ideal even for a multiple-level headhouse and complex conveyer system.

Dome Technology has extensive experience providing cement storage in the United States.

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Rexnord: manufacturer of critical system components within the cement industry

Rexnord is a $2 billion multi-platform, industrial company that employs approximately 8,000 associates worldwide. In its Process & Motion Control platform, Rexnord designs, manufactures, markets and services the critical wear and power transmission components for drag conveyors, apron feeders, belt conveyors and chain bucket elevators, including chain, traction wheels, gear reducers, bearings, couplings and idlers. Rexnord has provided engineered solutions for cement mills since 1905 when it introduced its first conveyor system. From hot clinker handling and grinding to high-volume air movement, Rexnord engineered products are designed for the rigorous demands of continuous operation to help avoid unplanned kiln outages and increase production uptime.

Key products for elevator and conveyor systems

"Rexnord understands that cement production can be corrosive, abrasive and thermally aggressive, and designs its products with this in mind," says Frank Brauner, Strategic Account Manager. Couplings, bearings, gear drives, heavy-duty elevator chain, idlers, keyless locking assemblies, pan assembly rollers, and bucket elevator components are among the organization's product lines that support conveying efforts. Among the company's trusted bearing, gear, and industrial chain brands are Rex®, Rexnord®, Link-Belt®, Planetgear™, Falk®, Ultramite®, Quadrive®, and Falk V-Class™. Its wide array of disc, elastomeric, grid, and gear coupling offerings include tested brand names such as Omega®, Steelflex®, Lifelign®, and Thomas®.

New offerings

In September, Rexnord introduced two new sizes to its Falk® Ultramite Gearmotors offering to service a wider array of applications. The addition increases the product's ability to serve higher torque applications, including conveyors, dryers, elevators, aerators/separators, and stackers/reclaimers for the cement industry.

Online resources

Rexnord has kept materials moving through cement mills for more than a century. The Rexnord website showcases its years of experience with industry-specific resources, such as the cement interactive process map that allows cement producers to visually experience where and how Rexnord products fit within their operations. Visitors can also utilize an online Disc Coupling Selector tool that allows users to input application data and receive disc coupling recommendations. Additionally, the Rexnord Corporation YouTube channel is continually updated with industry overview, how-to and product overview videos.

Bucket elevator and drag conveyor components

Chain solutions

- **heavy-duty cement elevator chain:** designed specifically for cement applications, the SJM984 Sealed Joint Chain offers an average of 30% more wear life than standard chain;
- **welded steel chain:** 18 standard sizes and various attachment configurations are offered in both narrow- and wide-mill chain; and
- **roller chain:** standard sizes are available for rapid delivery; offering superior heat treatment and hardness depth of all components.

Conveying equipment components

- **idlers:** factory sealed or re-greasable bearing area options

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make up a convenient, patented, one-point greasing system;

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- **backstops:** NRT and NRTH designs suit low-speed and semi-high speed applications or heavy-duty, high-torque applications;
- **keyless locking assemblies:** feature a wide range of options, including internal locking assemblies, locking elements, shrink discs, and rigid couplings;
- **torque limiters:** adjustable, accurate, and repeatable torque settings, mechanical torque limiters protect equipment by instantly and completely disengaging the drive during unexpected overloads; and
- **segmental sprockets and traction wheels:** segmental design offer ease of installation and replacement without body, chain or shaft disassembly.

Gear drives

- **shaft-mounted speed reducers:** designed for extreme-duty applications, the Shaft-Mounted Planetgear (SMP) Speed Reducers offer custom output flanges and splined output shafts. Self-aligning planet carriers provide improved drive train alignment;

- **parallel and right-angle gear drives:** the Falk V-Class Gear Drive is engineered to deliver power, durability and reliability under the toughest conditions; and
- **gearmotors:** C-face and solid inputs, solid or hollow outputs with TA Taper Bushings make Falk Ultramite Gearmotors a solution for cement operations. Available for speeds up to 300hp and ratios up to 10,000:1.

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Heila Cranes Nederland and Van Aalst Bulk Handling sign exclusive distribution contract

Heila Cranes and Van Aalst Bulk Handling — producer of pneumatic ship unloaders — have reached an exclusive co-operation agreement for the cement handling product group. The contract for the exclusive worldwide distribution of this type of crane was officially signed on 27 May of this year. This contract follows the successful co-operation between Heila Cranes and Van Aalst Bulk Handling that started more than 20 years ago.

Both organizations are convinced that their renewed co-operation will ensure that even better service is offered to the customers. It will allow Heila Cranes and Van Aalst Bulk Handling to cooperate even better on innovation in this specific market to retain their technical lead. It will also improve the entire service and create clarity for the customers.

Giampiero Traetta, CEO of Heila Cranes: "We are delighted to further strengthen our co-operation. In recent years, Heila has invested heavily in improving the manipulators. We reviewed and improved the structure and the control system, giving our product an advanced lead. We consider it important that our customers have the best solutions available always and everywhere. Moreover, Van Aalst Bulk Handling represents an excellent example of the service that we wish to provide the end customers. We also benefit technically from the contribution and suggestions made by Van Aalst Bulk Handling.

Arno van Aalst, Managing Director of Van Aalst Bulk Handling: "We are extremely pleased that we have been able to make our co-operation with Heila Cranes official. The distribution contract is a logical step that follows on from the good relations between the two companies. Heila supports the worldwide service and the delivery of spare parts. The customers will benefit from this enormously. Heila has succeeded in developing a manipulator that meets the high demands of our customers. We look forward to extending our co-operation."

During the contract signing ceremony, Arno van Aalst and Giampiero Traetta expressed their confidence in each other.

Knauf trusts in AUMUND Technology for gypsum plant expansion

Six years after the commissioning of its first Samson® Feeder, Knauf has placed an order with AUMUND Fördertechnik for a second conveyor for its plant in Immingham, Lincolnshire, England.

The 100tph (tonnes per hour) Samson® Feeder to be supplied in October 2017 has a centre distance of 11.7m. Knauf is extending an existing raw materials reception area, where products arriving by truck are transferred directly by the Samson® to an ongoing conveyor to the production facility.

Knauf is a world leader in manufacturing of modern insulation materials, drywall gypsum boards, plasters and accessories, as well as building machinery and tools. The Knauf Group is among the big players in the market with 220 production facilities in more than 80 countries, generating a turnover of around €6.4bn in 2014.

Key strategies to avoid storage and handling mistakes with cement

Having been active in engineering projects at cement plants for over two decades, I have observed some material handling successes, but in the majority of cases, I continue to see many handling and storage mistakes with cement, *writes Eric Maynard Director, Senior Consultant at Jenike & Johanson*. Isn't it ironic that the critical material needed for construction of a concrete storage silo designed to hold cement goes through a tortuous process from the cement mill, to a separator, to a silo, into a delivery vessel (e.g., truck, rail car, ship), and then into a concrete batching plant? One would think that it would be easy to handle and transport this important building material, yet, routinely basic engineering design mistakes are made and the consequences are increased costs due to lost/out-of-spec. material, reduced efficiency, and increased maintenance.

Ratholing.

Arching.

So, what are you to do if you are in charge of a project to implement a new storage and material handling system for cement? The answer is quite simple…pay a little more now instead of paying a lot more later. In my experience in troubleshooting cement handling problems at more than 50 plants around the globe, most of the problems have been due to up-front engineering mistakes and not due to operating errors. In fact, what is often viewed as a 10% to 20% savings on the capital project to implement proper cement handling equipment usually results in long-term operating costs that can be ten times or greater than what was initially perceived to have been 'saved'.

I offer the following advice regarding key cement material storage and handling equipment.

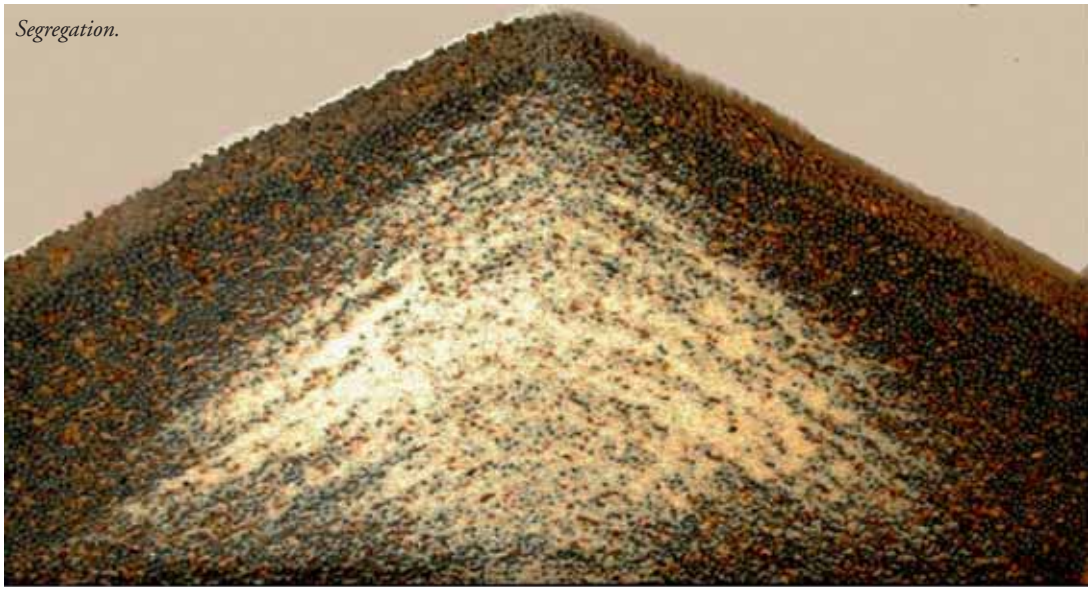
Material flow problems

I can't say enough how easy it is to 'store' a bulk material; anyone with a basic understanding of geometry and bulk density can design a silo to 'hold' cement at a certain tonnage. The technical skill lies within achieving reliable discharge of the cement at the necessary flow rate. There are many impediments to reliable cement flow, including:

- **arching or bridging:** a no-flow condition in which material forms a stable arch-shaped obstruction over the outlet of a hopper;
- **ratholing:** a no-flow condition in which material forms a stable open channel within the silo. Ratholing in cement silos is extremely common, and can be fully prevented;
- **flooding or flushing:** condition where aerated cement behaves like a fluid and flows uncontrollably through an outlet or feeder; and
- **segregation:** separation of particles by size, shape, density, etc. Segregation of cement can cause out-of-spec. product, affect set time, and concrete strength.

There are many consequences of flow problems. Limited live (i.e., useable) capacity will occur in a silo experiencing ratholing, where the active volume may be at most 20% of the silo's rated storage capacity. Additionally, stagnation in a poorly designed silo can lead to cement caking and lump formation. Collapsing arches, ratholes, and non-uniform loading contribute to localized, and at times catastrophic, silo failures.

Many of these flow problems are the result of a hopper discharging material in an undesirable flow pattern. The type of flow pattern you choose for your silo can directly influence the type of cement discharge performance you will achieve.



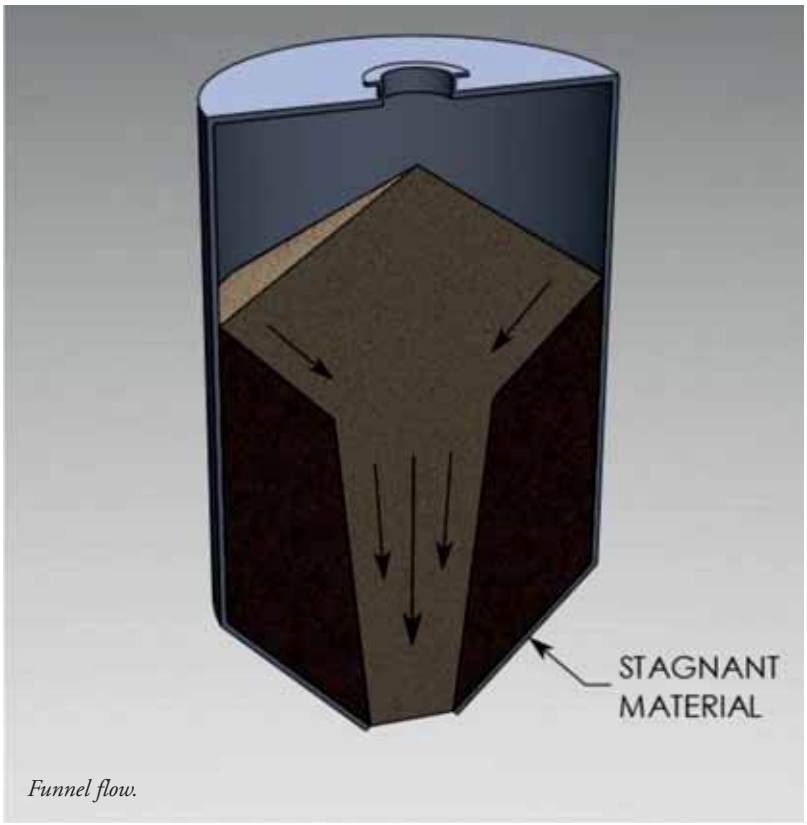
Segregation.

Silo flow patterns

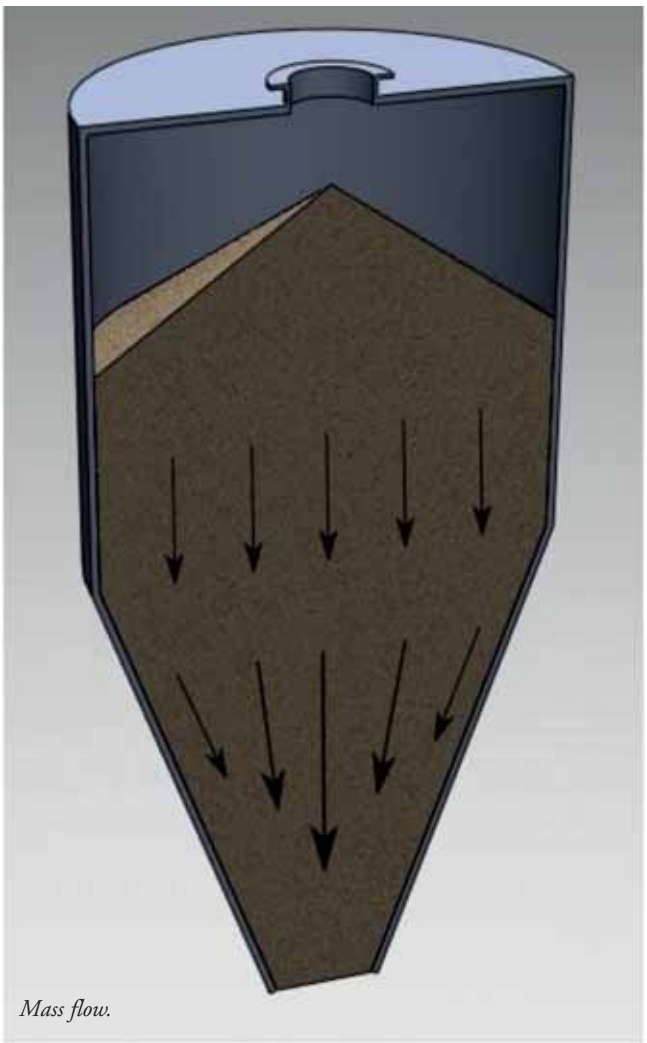
Most storage silos discharge cement in a funnel flow pattern. With funnel flow, some of the cement moves while the rest remains stationary. This first-in/last-out sequence would be acceptable if the cement were coarse, free-flowing, non-degradable, and if segregation during silo discharge were not an issue; essentially, the cement would have to be like dry sand. Though funnel flow can be an economical storage choice from a capital expense (CAPEX) basis, it can in the operating costs (OPEX) basis result in huge financial loses.

The flow problems above can be prevented with storage silos specifically designed to move cement in a mass flow pattern. With mass flow, all material moves whenever any is withdrawn. Flow is uniform and reliable; feed density is independent of head of solids in the silo; there are no stagnant regions, so cement will not cake, and level indicators work reliably; and segregation of the discharge stream is minimized by a first-in/first-out flow sequence.

To achieve mass flow discharge from a silo, the cement must flow along the walls of the hopper; this requires the hopper surface to be steep enough and sufficiently low in friction to allow flow against the walls. Furthermore, the walls are likely required to be abrasion resistant as cement can erosive causing wall thickness loss over time.



Funnel flow.



Mass flow.

The silo feeder must be properly designed to enforce uniform withdrawal of cement through the entire cross-section of the hopper's discharge outlet to be effective. An obstructed hopper outlet, such as due to a poorly designed feeder, partially closed slide gate, or improperly operating or designed aeration system will result in funnel flow regardless of the hopper design.

With cement, dry air injection is usually required to increase the cement flow rate to required unloading rates to trucks, rail cars, and ships. The air injection is usually done with air slides; however, the typically layout of the slides result in sub-optimal performance. Usually, the air slides are arranged in a radial array in the hopper or silo floor; think of the radial array as 'spokes on a bicycle wheel'. In this situation, air is really only effective at activating cement discharge in the centre of the hopper or silo. Far improved aeration methods are available, along with use of more restricted air consumption rates, which helps to reduce construction and compressed air costs.

Final thoughts

Taking the time to properly engineer silos to reliably handle cement will provide major operational cost savings and will yield an impactful return-on-investment.

Biography

Eric Maynard is the director of education and a senior consultant at Jenike & Johanson, Inc. The firm specializes in the storage, flow, mixing/blending, conveying, and processing of powders and bulk solids. During his 20 years at J&J, Maynard has worked on more than 750 projects and has designed handling systems for bulk solids including cement, chemicals, plastics, foods, pharmaceuticals, coal, and other materials. He is the principal instructor for the AIChE courses 'Flow of solids in bins, hoppers, chutes, and feeders' and 'Pneumatic conveying of bulk solids'. He received his BS in mechanical engineering from Villanova University and an MS in mechanical engineering from Worcester Polytechnic Institute.

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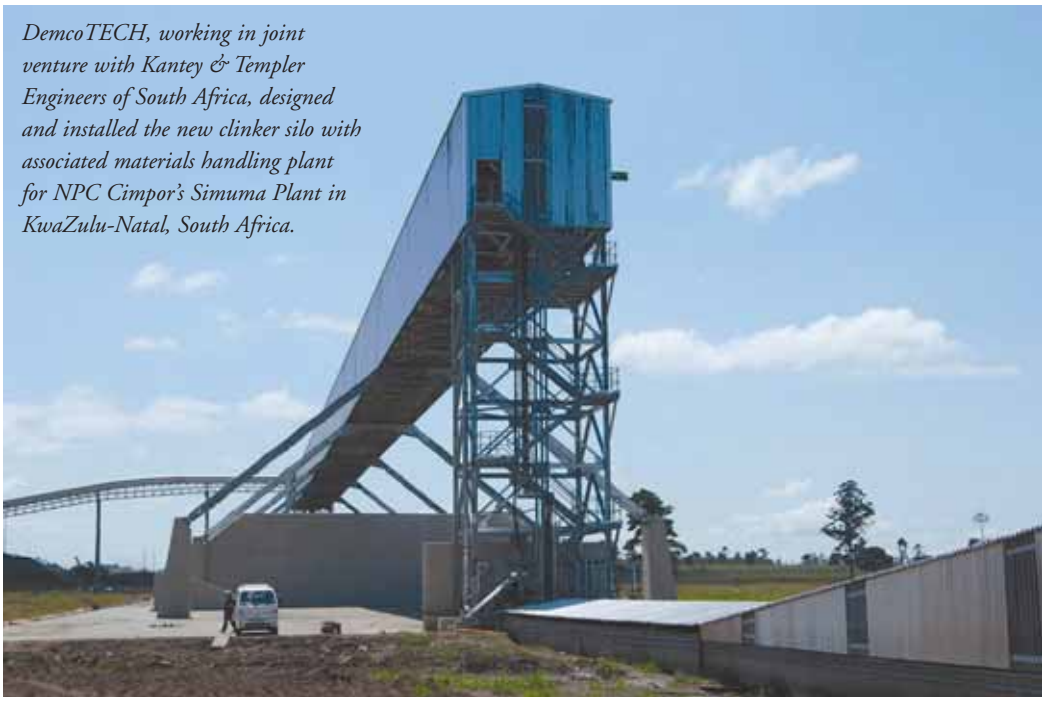
DemcoTECH Engineering: servicing the cement industry across the process chain

Despite the fact that the medium term outlook for the South African cement industry remains bullish, locally based engineering houses such as DemcoTECH Engineering need more than ever to think and stay ahead of trends and developments globally, says materials handling and niche process plant specialist, DemcoTECH GM Paul van de Vyver.



DemcoTECH, working in joint venture with Kantey & Templer Engineers of South Africa, designed and installed the new clinker silo with associated materials handling plant for NPC Cimpor's Simuma Plant in KwaZulu-Natal, South Africa.

In Africa, particularly, the cement market has entered an exciting and dynamic phase seeing a number of shifts as new major geographical cement markets emerge on the continent.

For example, Ethiopia, something of a junior league player in the past, has emerged as one of Africa's largest markets for the cement industry, competing with Nigeria, Tanzania and South Africa, adds van de Vyver. "Adding to the growth of the market across Africa is that many companies have announced plans to expand their cement capacity, such as Dangote who plans to double its cement capacity in Tanzania by 2019. "But," cautions van de Vyver, "the entry of international players, particularly the Chinese who are playing an ever more critical role in funding Africa's largest infrastructure projects, means that, while opportunities are increasing, so is competition."

Having been established in Johannesburg, South Africa more than a decade ago to service predominantly the local mining and minerals and general industrial sectors, DemcoTECH has in recent years successfully expanded into the international market.

"Today, our international work is the bulk of our order book," says van de Vyver. "Project awards, particularly from Asia for our materials handling expertise, have more than compensated for any fall off in work from South Africa, particularly from the local mining industry which is yet to recover from the recent commodity downturn."

DemcoTECH's cement track record in Africa is well-established ranging from supply of a 150tph (tonnes per hour) pneumatic transport system for Nova Cimangola's cement plant in Luanda, Angola and of travelling maintenance trolleys for various projects, to a new 40,000-tonne capacity, multi-discharge clinker silo for NPC-Cimpor in South Africa. DemcoTECH has also supplied pipe conveyors to a number of cement producers, not only in Africa but also in India.

Its well-established materials handling expertise and advanced technologies are supported by a network of partnerships with leading consultants to the cement industry. "As a result, DemcoTECH is ideally placed to provide the cement industry with a full solution from collecting, through conveying, storage and conditioning, to classification and outloading," comments van de Vyver.

For example, the 40,000-tonne clinker silo for NPC Cimpor's Simuma Plant in KwaZulu-Natal, South Africa was carried out in conjunction with Kantey & Templer which was responsible for the civil and structural design, engineering and project execution of the concrete silo. DemcoTECH provided the materials handling expertise for the project, which included the mechanical and electrical design, engineering and project execution of the system.

"The cement manufacturing and handling process is a complex process," says van de Vyver, "and cement and clinker can be difficult material to handle, as well as being very abrasive and dusty. As a result, DemcoTECH's ability to provide a total solution for the materials handling system from concept development, feasibility studies and audits through to project

DemcoTECH provided four travelling maintenance trolleys, fully equipped with maintenance tools and maintenance power sockets, to NOVA Cimangola for the pipe conveyor at its Luanda plant. The maintenance trolleys have to negotiate an incline of up to 15°, which presented a number of design challenges.

execution, promotes seamless integration between the various stages of what is more often than not a multi-million dollar project," says van de Vyver.

"While work we have carried out includes major project execution projects, such as that for the NPC Cimpor silo, we are also as in demand for the smaller-scale work, such as design audits, which are as important to a sustainable and healthy cement sector. For example, DemcoTECH carried out a design audit on a dump disposal system for ash, an important component in the production of cement, for a 6 × 600MW power station.

"Disposing and utilizing power station fly ash is a major consideration in the infrastructure of a power plant, offering enormous savings both for the producing power stations and in concrete materials costs as pulverized fly ash (PFA) is an important supplement in the production of Portland cement concrete. Fly ash is also an environmentally-friendly solution that meets and can also exceed performance specifications for cement.

"The design study for the power station was comprehensive, involving a design review of plant and components, plant performance testing, mass and water balances, simulation modelling of the processes, CAPEX and OPEX cost analysis and preparation of process flow diagrams [PFDs]."

"For an operation to be profitable, the entire system must be optimized and reliable, minimizing problems related to material flow and storage along the complete system," adds van de Vyver. "This is particularly so with the dusty, very abrasive and 'sticky' materials involved in the production of cement that are prone to wear and spillage," explains van de Vyver.

"In addition to access to the latest technologies that we offer, which includes AeroConveyors™, pipe conveyors and pneumatic conveying systems, advanced testing and modelling/simulation tools are critical in designing efficient cement plants. Such plants must be based on a thorough understanding of the properties of the material, particularly for the worst likely flow conditions expected to occur in practice. Important elements include providing a flow pattern with acceptable characteristics, ensuring that discharge is reliable and predictable, and thorough design and detailing of the plant including the structure and equipment.

"In addition, at any point where material is moved or transferred, dust is generated. Effective dust control systems are therefore also critical in a cement plant, particularly in view of the increasing legislative and social pressure to reduce the impact on the environment.

"All equipment we design and install complies with international environmental and safety standards."

About DemcoTECH

DemcoTECH Engineering is a specialist bulk materials handling and niche process plant company, offering services from concept design through to project completion to the power generation, cement, mining, metallurgical, manufacturing and port handling industries. Services include conceptual design, feasibility studies, design, engineering, procurement, expediting, construction and commissioning. Plant supplied by DemcoTECH includes troughed conveyors, air-supported conveyors, pipe conveyors, rail-mounted slewing boom stackers, pivot boom conveyors and mobile conveyors. After-sales services include spares, maintenance, refurbishments and operational readiness packages covering procedures, systems and workplace tools required to successfully operate and maintain a new or upgraded plant.

Sunstate Cement makes the move to PE bags: high-performance packaging

Left: Cameron Weir Maintenance Manager, right: Michael Fullelove, Operations Manager.

Waterproof, UV resistant and clean; the advantages of packaging powder-type products in Polyethylene (PE) plastic using Form, Fill and Seal (FFS) technology are providing companies around the world with the opportunity to gain a competitive edge.

Recognizing the benefits of using PE especially for its clients, Sunstate Cement Ltd, one of Australia's leading manufacturers and suppliers of high quality cementitious products, made the decision to invest in new packaging equipment at its Port of Brisbane manufacturing facility. We wanted to offer our customers a superior type of packaging," says Michael Fullelove, Operations Manager at Sunstate. "And PE offers a number of additional significant benefits. One huge advantage is that customers can store product outside all year long which means increased storage capacity and the ability to optimize overall logistic expenses."

PE bags are also dust free which creates safer and cleaner working conditions, and an essential advantage at point of sale: "The bags are cleaner and we are able to print high-quality, eye-catching and individual branding," says Fullelove.

Following its decision to implement PE bags, Sunstate sought out a highly efficient PE packing solution, selecting HAVER & BOECKER as its technology partner. The decision to partner with HAVER & BOECKER was based on the company's full suite of solutions, ability to scale high efficient equipment and high level of support.

"HAVER & BOECKER had a number of advantages over the other companies," says Cameron Weir, Maintenance Manager at Sunstate. "It's a 'one-stop shop' so we were able to buy all the equipment we needed from the one company. The total footprint of the equipment was a lot less than the competitor's and the capacity can be expanded more easily and for less cost compared to the alternatives. HAVER & BOECKER, with its local team of experts here in Australia, also has great customer support."

Sunstate's complete technology solution comprises:

- **packaging machine:** HAVER & BOECKER ROTO-PACKER® ADAMS® 4;
- **drymix mixer:** HAVER & BOECKER IBAU Storage Technology;
- **palletizer:** HAVER & BOECKER Newtec Palletizing Technology; and
- **stretch hood machine** made by Lachenmeier.

Alan Arbotante, Area Sales Manager for Packaging Technology at HAVER & BOECKER Australia, believes Sunstate's solution will give the company a distinct edge in the market. "With the uptrend of the Do-It-Yourself market in Australia, the attractive and clean design of PE packaging will provide a competitive advantage to drymix manufacturers. "Sunstate is positioning itself as a leader in this market by offering innovative products in PE, efficiently packaged using the high speed HAVER & BOECKER ADAMS® technology."

About HAVER & BOECKER

HAVER & BOECKER is a family-managed, midsize company with headquarters in Oelde, Westphalia, Germany. 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 HAVER & BOECKER operates worldwide with more than 3,000 employees and 150 representatives. In 2015 the company posted a sales turnover of €456.5 million.

The Wire Weaving Division produces woven wire cloth 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 and its technology brands HAVER & BOECKER, HAVER + TYLER, IBAU HAMBURG, SOMMER, BEHN + BATES, FEIGE FILLING and NEWTEC BAG PALLETIZING is specialized in processing, transport, storage, mixing, filling, packing, palletizing and loading of bulk materials. The product range includes single machines and complete systems for the handling of powder-type and granulated materials, liquid and pasty products, food and animal feed, as well as ship loading and unloading equipment. HAVER Automation ensures the linking of the individual technologies for a transparent and effective process. HAVER Engineering develops processes and technologies for processing mineral raw materials, offers apprenticeship and in-service training and creates operator models.

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CFS Handling supplies three grabs for the handling of clay

CFS Handling delivered three bucket units for the handling of clay soil — and a very sticky material — to a client in Italy.

The electro hydraulic buckets are fitted with scrapers to keep the valves clean from the very sticky material.

Because the material to be handled has a density of 1.8/2Tm^3, the size of the machines is not very large.

CFS's 23m^3 buckets for handling sticky materials, such as nickel ore and clay, are always equipped with scrapers and heat exchangers.

About CFS Handling

CFS Handling operates in the design and construction of equipment for material handling. The new company has a management team that offers 30 years of combined experience, which are brought to reinforce CFS Handling's principles of Innovation, Quality and Efficiency.

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

Introducing fire retardant anti-static (FRAS) roller seal cartridges in Melco rollers

Melco, in close collaboration with the Rulmeca Group R and D department, made a decision to develop and offer to the market a standardized seal cartridge that complies with the highest possible fire retardant (FR) and anti-static (AS) ratings in the industry. This FRAS seal cartridge can be fitted to both steel and HDPE rollers, depending on customer requirements.

Rollers fitted with FRAS seal cartridges will be highly sought after by companies operating conveyors in fiery conditions and/or the underground environment. In particular, underground coal mines will find the FRAS sealing system extremely attractive.

Melco has announced that the Rulmeca 6205 – 25 series 52 bore seal cartridge and back seal (both contactless and hermetic versions) is immediately available in FRAS execution from Melco.

The Rulmeca 6306 – 30 series 72 bore seal cartridge and back seal (both contactless and hermetic versions) became available in FRAS execution from Melco from 1 September this year.

The Rulmeca 6305 – 25 series 62 bore seal cartridge and back seal (both contactless and hermetic versions) became available in FRAS execution from Melco from 1 October this year.

The Rulmeca 6308 – 40 series 90 bore cartridge and back seal (only in contactless version) is available in FR execution from Rulmeca immediately.

Other sizes will be offered in FRAS execution by Melco in future according to customer demand.

SAMMI supplies belt conveyor type 'S' to lime plant in Iran

SAMMI srl was commissioned by a leading supplier of kilns for limestone and dolomite calcinations to supply a new belt conveyor for its new lime and dololime production plant in Iran. The order was placed early October 2015, delivered in January 2016 and started operation in June 2016.

Main characteristics of the belt conveyor:

- N.3 belt conveyor type 'S' (bandebord) for lime plant
- Dimensions: width 1,000mm; length over 50m
- Capacity: from 60 to 200 lime tonnes per hour
- Conveyed materials' maximum temperature: 120°C/248°F

About SAMMI

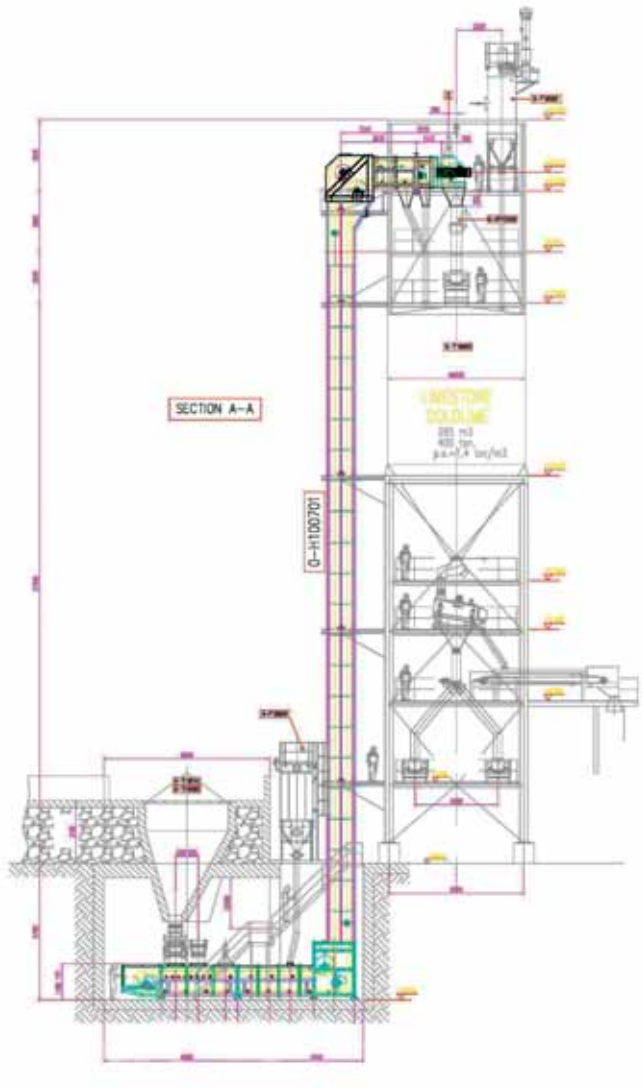
SAMMI srl, located in Narni Scalo (Italy) approximately 80km north of Rome and 200km south of Florence, was founded in 1976. After its initial experience in mechanical assemblies and plant maintenance, SAMMI perfected and expanded its production sectors, becoming involved in structural construction and triggering a growth process not only in terms of the size of the company but also in terms of managerial and technical skills.

Application fields:

- mines and quarries;
- cement works;
- off-shore plants;
- dock plant;
- glass production plants;
- foundries and steel plants;
- spoil-removal plants;
- plants for the agrifood industry; and
- waste-treatment/power/biomass plants.

Machines and equipment

- belt conveyors;
- dust-tight belt conveyors;
- gallery bridge belt conveyors;
- belt conveyors with a free-standing structure to span roads and/or rivers;
- belt conveyors for spoil-removal systems;
- belt conveyors for extraction from stock pile;
- bucket elevators;
- edged bucket belt conveyor;
- extractors;
- vibrating hoppers;
- tripper cars;
- belt conveyors for stacking (stackers);
- movable dock machinery for loading ships;
- ship loaders and unloaders; and
- mechanical structures.



Nilfisk centralized vacuum systems and high power vacuums for heavy industry

The centralized vacuum systems with fixed pipelines can quickly collect big quantities of waste in large plants, even on more floors. The material is temporarily collected in a silo and can be continuously discharged in a big bag or on a belt or screw conveyor, in case materials have to be brought back to the production process. Nilfisk systems can be composed of more than one suction unit featuring different suction technologies according to the type of material to be collected. Each suction unit can recover up to 1,000kg per hour. Different discharging devices are available, according to the application.

Mobile or fixed high-power vacuums have been designed for the recovery of big quantities of heavy material and are therefore appreciated for the use in cement plants, foundries, incinerators, glass production plants etc. The HPV series is powerful, from 20 to 45kW, 1,700m^3 per hour of collected material, extremely robust and reliable and are suitable for different applications.

For example, in cement plants they are used for the recovery of waste in the bagging areas to 'save' tonnes of spilt material in a short amount of time.

In foundries, thanks to the high performance, they are used for example in the stripping areas, where large quantities of earth are dumped on conveyor belts. A lot of the earth transported drops from the belt, and thanks to the Nilfisk vacuums, these large amounts of wasted material can be recovered quickly and at low cost.

The cleaning under preparation towers, cleaning around rollers used to recover earth and iron cast slags, the cleaning of the sand moulds and steel granule jet bays are some of the

applications where Nilfisk high power vacuums can support the plants.

The advantages of using Nilfisk High Power Vacuums and Centralized Vacuum Systems are significant:

- save material;
- save time (and money);
- work in a healthier and safer environment; and
- increase efficiency.

Nilfisk provides different solutions for the cleaning of the working environment. Centralized vacuum systems and high power vacuum systems are the best solution whenever large amounts of waste, both light or heavy, abrasive or not, have to be recovered in wide working areas.

About Nilfisk

Nilfisk Industrial Vacuum Solutions produces industrial vacuums, centralized vacuum systems, pneumatic conveyors and high-power vacuums. Thanks to the global presence the wide range of products is accompanied by a far reaching client-oriented pre- and post-sales service. Safety is an integral component of Nilfisk IVS philosophy. An extensive and effective range of industrial vacuum solutions are provided to meet safety requirements in environments where there is a risk of explosion (ATEX), and in those where dust is a real hazard for human health and the environment.

Bedeschi never stops growing: new challenge in the cereals sector

Bedeschi has remained faithful to the approach that it has adopted throughout its long experience in the worldwide market, which started with brick manufacturing equipment and developed to gas filtration, bulk handling and marine installations. The company has now announced the latest addition to its range of bulk material handling equipment. Bedeschi has just secured an order in Italy for a CSU 800/29,5 rail-mounted continuous mechanical ship-unloader to handle soya beans.

The equipment will have a rated capacity of 800tph (tonnes per hour) and will unload ships up to Panamax size. It will be built and tested in Bedeschi's Italian workshop, which offers the latest technologies tools and facilities for the perfect machining and testing of these special items.

The unloading technology is based on the proven chain elevator technology, which grants lowest power consumption, gentle handling of the material, compliance to most stringent environmental regulations, and simple and inexpensive maintenance.

The chain elevator features a hydraulic kick-in kick-out system to optimize the coverage of hold volume, increasing total unloading efficiency. Considering the abrasiveness of the material handled, a chain elevators, boom chain conveyor and a chain conveyor connecting to quay belt conveyor have been specifically designed to prevent wearing using high hardness special steel and easy-to-replace wearing plates.

Bedeschi offers a complete line of mechanical continuous ship unloaders for cereals and other materials ranging from 300tph to 1,500tph, that can operate on rails or rubber tyres on any quay or jetty, and to unload vessels of up to 150,000dwt.

STM belt conveyors used for extensive range of materials

STM specializes in the engineering and supply of belt conveyor systems for bulk materials handling facilities. Since 1975, starting as a family business, STM has provided worldwide innovative integrated solutions in order to increase efficiency, reliability and cost savings for the customers' production processes.

Today STM is able to offer its customers a full range of project services: engineering, fabrication, commissioning and carries out every step by developing flexible, individual and effective solution to find the ideal implementation for each customer: this is one of the greater innovations to keep competitiveness in such aggressive market, with differentiated competitors in every different field or market area.

In the STM factory the quality and the continuous improvement in line, with the best industry practices and standards are the drivers to meet and even exceed Customer expectations.

STM usually performs complete installations in a wide range of industry fields such for example:

Mining

Based on a modular concept that greatly facilitates relocation or expansion as the mine develops, STM's systems can expedite, optimize and economize the process of overburden removal, processing (crushing/screening), redistribution and stacking. Conveyors for this kind of application are designed for a time-life greater than 30 years, with solutions to minimize extraordinary maintenance and downtime risk. The mine is even more approached as a 24h production plant so STM is committed to deliver high-value performance and meet customers' needs for:

- excellent reliability;
- investment cost;
- delivery time;
- lower operating costs; and
- high standards of safety and sustainability.

STM's flexibility makes it possible to manage a wide range of different plant configurations, both for sizes and for typology, including the mobile plants. This configuration is one of the latest trends in a sector in which the plant owner wants the freedom to move the plant after a limited time usage in determined area.

Concrete placing (RCC conveyors)

STM developed a specific system for the concrete placement, both for conventional concrete both for RCC concrete. Roller-compacted concrete, or RCC, is placed with conventional or high-density asphalt paving equipment, then compacted with rollers. RCC has the same basic ingredients as conventional concrete: cement, water, and aggregates, such as gravel or

crushed stone. But unlike conventional concrete, it's a drier mix — stiff enough to be compacted by vibratory rollers. Typically, RCC is constructed without joints. It needs neither forms nor finishing, nor does it contain dowels or steel reinforcing. RCC concrete is mainly employed for gravity dams. To reduce the entire duration of the construction site, to meet operative, financial, environmental benefit and to deliver as soon as possible such important infrastructure to the local community, contractors are increasingly looking for equipment able to guarantee them continuous feeding with flexible use mode. This application in fact provide a conveyor line able to follow the dam growing, with special devices as elevation tools for conveyors and distribution devices as swingers, crawler placers, tripper conveyors.

STM is ready to share its experience in the dam market, thanks to the great expertise gained operating in many world projects (Canada, Namibia, Malaysia, Ethiopia, Morocco, Turkey, Sudan), to develop even more innovative solutions for bulk material handling in order to meet the needs of all its Customers. In particular, in the RCC Dam's field, STM developed the whole material handling process, both for the aggregates to cooling and batching plant, both for RCC concrete from batching plant to dam site.

Batching plants

Often belt conveyors are employed in the handling of inert materials such as gravel, sand and mixed granules for the preparation of concrete. The belt conveyors allow the extraction and the automatic weighing of granules needed for the preparation of concrete mix. The installation plan usually includes a silo for storage and segregation of inert materials as well as a system belt conveyors system for dosing and feeding the inert materials to the concrete mixing plant. Based on customer needs, STM designs and realizes the specific handling system for automatic flows management in the concrete mixing plant.

Thermoelectric

Thermal power generation plant is the most conventional source of electric power. Conventional plants produce electricity by burning fossil fuels, such as coal, in order to have pressurized high temperature steam and to use it to rotate a turbine, with consequent electricity production. Biomass is biological material widely used as an alternative energy source in thermal power generation. The main advantage of using is that the CO_2 produced during the process is the same gas that the material has absorbed from the atmosphere in previous years. This avoids any release of new CO_2 into the atmosphere, with consequent benefits for the environment. To handle those kind of materials in a complex power plant impose to design a system

with exceptional reliability in order to avoid any kind of shutdown for tens of years. STM provides a complete engineering including specific back-up solutions, limited maintenance devices, best-in-class components manufacturers.

Waste to energy

Belt conveyors are usually inserted into a complex and articulated system in which every single element is fundamental for the overall functioning of the whole industrial plant. In a plant for electricity production from waste, STM usually carries out the complete engineering for flows exchanges, paths for personnel, access points, maintenance areas, load bearing structures, pylon towers, conveyor switching. Even if the material in this case is not so difficult to process or to transport, the low density imposes to change the design approach to handle a high material volume but at same time to guarantee high values of tonnage throughputs to feed adequately the processing machines.

Other fields in which STM has increased its expertise in conveying systems are, heavy clay, refining, tunneling, bitumen plants.

Materials

Working in such range of fields, the variety of materials transported is even broader: coal, petroleum coke, RCC, gravel, sand, pellet, hot ash, clinker, municipal solid waste, each one with its particular behavioural characteristics along the process. STM has the expertise to handle each material in the most effective way. DCi

Baltic focus

bulk activity under the spotlight

The Port of Fredericia has dedicated dry bulk areas with large warehouse facilities.

The Danish Port of Fredericia: hub for dry bulk connections to rest of Europe

With a central location and easy access to the Baltic Sea, the Port of Fredericia in Denmark is ideal for connecting the Baltic countries to the rest of Europe.

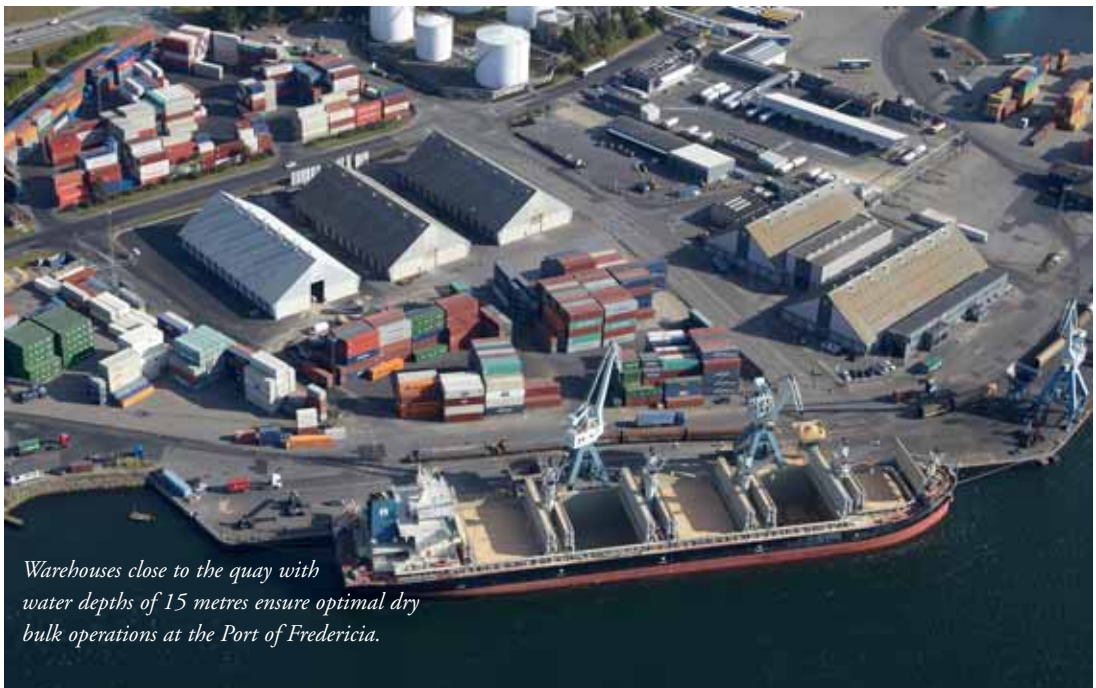
ADP A/S owns and operates the port of Fredericia and with large investments in the optimization and development of port areas and warehouse capacity, ADP meets the increased demand from dry bulk customers.

Dedicated dry bulk facilities

In September 2016, a new warehouse with a capacity of 10,000 tonnes for dry bulk opened, located right next to two existing warehouses.

"We have dry bulk facilities in two major port areas and a total warehouse capacity of over 114,000 tonnes. Combined with our efficient crane operations, we use our knowhow to meet customer requirements for efficient dry bulk operations", says Jacob Gerdes, COO at ADP A/S. "The close dialogue that we have with our customers confirms that the Port of Fredericia is an attractive port for handling both small and large volumes of dry bulk to and from the Baltic countries. Consequently, we make solid investments in the facilities for this type of goods," concludes Jacob Gerdes.

As part of a strategic development plan for the Port of Fredericia, a large container area between ADP warehouses and the quay will be available for dry bulk activities in the near future.



Warehouses close to the quay with water depths of 15 metres ensure optimal dry bulk operations at the Port of Fredericia.

Indexator launches strong new light-weight rotator

Indexator is now expanding its leading range of rotators and swing dampers with the launch of a strong light-weight rotator and a swing damper especially adapted to small and medium-sized machines . "There has been considerable demand for a fine-tuned package in the lighter class and since we continuously work to meet our customers' needs, this was a natural step to take," says Lennart Eriksson, Area Sales Manager.

In recent years, Indexator has conducted field tests of the new light-weight rotator H112 and associated swing damper MPBT at some customers where it was very well received.

"Our customers and test operators say that they have now got a special package where the weight of the crane tip was reduced, making the whole machine more agile and improving the operating experience," says Lennart Eriksson. "The end-users have wanted a package for thinning where they work with a long reach and a lighter head."

The product development of the light-weight rotator H112 was based on the larger H122 model, reducing the size and combining lower weight with the same torque as the H122. Together with the newly developed MPBT swing damper, where the braking effect was adjusted for smaller harvesters, the package becomes a perfect comprehensive solution for small and medium-sized machines.

About Indexator

Indexator Rotator Systems AB is a major manufacturer of rotators and now sells to more than 40 markets all over the world.

It invests significant resources in product development and works closely with the world's leading manufacturers of base machines and equipment, including for forestry, material handling, recycling and transport. Indexator has concentrated all its knowledge, resources and experience in its development and production facility in Vindeln, approximately 45 minutes northwest of Umeå, Sweden.

Quality is an important guiding principle at Indexator Rotator Systems. With its leading-edge expertise, experience and modern production facilities, it guarantees that every constituent component and the finished product achieve a high level of quality. All its products are individually tested to ensure that it always supplies reliable, precision-made products.

Lennart Eriksson, Area Sales Manager, Indexator Rotator Systems.

Advancing development and quality

The strong family tradition in the company has created a long-term focus when it comes to product development. Indexator Rotator Systems has worked in a targeted manner to produce safe, durable, strong products.

High-quality production facility

To satisfy the stringent demands for quality, flexibility and delivery reliability, Indexator has invested in an ultra-modern production facility in Vindeln, where all its production takes place. The company works with modern production technology, including the advanced FMS system (Flexible Machine System) for the efficient supply of materials.

World-class research and development

Indexator's test lab, spread over three floors, ensures the durability and efficiency of its products. Using advanced measurement equipment, it is possible to test real-life, tough working conditions. International machine manufacturers turn to Indexator to develop new products or functions, often on the basis of a specific requirement specification. The company's material experts, designers and production technicians work side by side. This fact, and Indexator's proximity to full-scale test-operation facilities, create applied research in the literal sense, where results are immediately put into practice.

Ultra-modern, automated production

The FMS facility is an automated storage and retrieval system that, using a robotic crane and an integrated computer system, supplies materials to the processing machines. This generates a flexible production system with regard to retooling, capacity and processes. To ensure the quality of the complex designs, Indexator works exclusively in advanced 3D-CAD.

Strong brand and worldwide sales

Indexator Rotator Systems is now an extremely strong brand within the forestry industry all over the world. It has taken this long experience and applied it to the material handling and recycling sectors. Its products are characterized by leading-edge expertise within both design as well as materials engineering and manufacture.

Indexator now has 130 employees and a turnover of approximately SEK230 million. A high proportion of its sales go to export, with around 80% of production being sold to more than 40 markets around the world.

Gdansk moves up in the ranking of Baltic Sea ports

New railway access to the Port of Gdansk now available

In September 2016, one of the most important investments for the future of the Port of Gdansk — the modernization of railway line no. 226 and the construction of a railway bridge over the Martwa Wisla river — came to an end.

Both undertakings were long-awaited projects which changed the face of the port's railway accessibility and undoubtedly constitute a milestone in the further development of the port on the logistics map of the country and East-Central Europe.

Line no. 226 and the railway bridge over the Martwa Wisla — the only line providing railway traffic access to the right-bank side of the Port of Gdansk, including the deepwater part with the greatest potential for development — are elements of the port's access infrastructure used annually by as much as 95% of all the trains directed to/from the port. Last year, average traffic on this route reached as high as 500 railway wagons a day. Among them, the majority (46%) were hopper wagons transporting coal; 37% were wagons with general cargo, mainly containers. Another 15% of traffic was trains with other bulk cargo, including chemicals and aggregates.

THROUGHPUT AT THE PORT OF GDANSK (TONNES)

Port Gdansk	I-VIII 2015	I-VIII 2016	change %
Liquid bulk	**10,074,994**	**8,517,097**	**84.54**
General cargo	**7,376,229**	**9,512,808**	**128.97**
Dry bulk	**6,020,282**	**6,554,772**	**108.88**
Cereals	*974,320*	*687,829*	*70.60*
Fodder/oilseeds	*41,151*	*19,356*	*47.04*
Coal	*2,955,457*	*3,379,240*	*114.34*
Ores	*5,031*	*202,394*	*4,022.94*
Fertilizer	*170,145*	*163,958*	*96.36*
Other dry bulk (scrap iron, steel, etc)	*1,874,178*	*2,101,995*	*112.16*
TOTAL	**23,471,505**	**24,584,677**	**104.74**

The huge dynamics of railway transport at the Port of Gdansk — which increased by +41% in 2015, in terms of tonnage of goods transported from/to the port by rail, and +46%, when it comes to the number of railway wagons handled at the port — are clear indications that railway transport is increasingly important in port operations. Last year alone, the rail sector's share in the handling of cargo at the port totalled 28% and, apart from pipeline transport, it was the most frequently used mode of transport in Gdansk. If we were to exclude pipeline transport of fuels from the entirety of cargo handling on land at the port, the rail sector's share in the inward and outward transport of cargo to/from the port would reach 54%.

Rail today is the optimal mode of long-haul freight, and has been increasing at the Port of Gdansk each year. Goods transported most frequently by rail include bulk cargo, mainly coal. Recently, coal has been handled more and more often at the port's quays in Gdansk. As a reminder, 4.5 million tonnes of coal was handled at the Port of Gdansk last year, which was the second-best result in the last decade.

In the light of such realities at the port, the new railway access infrastructure that has come into service, along with the recently completed road investments, including the road tunnel below the Martwa Wisla which went into service last April, constitutes a very important element complementing the port's offer, and reinforces its competitive position on the market.

After eight months of this year, Gdansk moved up the ranking of the largest Baltic ports to sixth. This is a result never before achieved by any Polish port. It should not come as a surprise then that the port's efficient access infrastructure was one of the most eagerly awaited investments of late, as in the coming years, the Port of Gdansk will aspire to further strengthen its position in the Baltic Sea and within the entire area of East-Central Europe. Without its new access infrastructure, such plans would definitely not be possible.

Skipping intermediate storage facility with tilting spreaders for unloading dry cargo containers

Latvia-based engineering company NK TEHNOLOGIJA has developed, manufactured and delivered a specialized shiploading system that uses tilting spreaders for tipping containers over the ship's hold, *writes Deputy Technical Director Andrejs Kirpicovs*. Back in 2013, four such spreaders were delivered for a bulk handling customer at port of Ust-Luga, Russia. Currently, the system is being put into operation by a modern bulk terminal capable of handling vessels ranging in size from 5,000dwt to 50,000dwt.

It was the cutting-edge technology adapted specifically for this terminal that brought forward its investment efficiency and significantly lowered expected investment level needed for developing standard facilities with similar bulk handling volume. The terminal implements specialized tilting spreaders that allows handling up to 15,000 tonnes per day. Four delivered spreaders brought total cargo turnover to 2 million tonnes per annum.

Unloading dry fertilizers from rail hoppers into specialized containers is done on spot, skipping an intermediary storage unit. Dry fertilizers are stored in specialized containers as future shiploads. Therefore, containers are turned into storage elements, which allows stacking and accumulating shiploads of various types of fertilizers and ensures high preservation of product. Containers are then transported into the ship-loading zone by standard port loading equipment.

Further, NK TEHNOLOGIJA developed tilting spreader is used for unloading containers by inverting them over the ship hold. Current spreader model is developed so that the tilting angle ensures the entire cargo is unloaded from the container.

Experience accumulated over the years as well as corresponding technological infrastructure guarantees our ability to provide solutions according to highly individual criteria within new and current bulk handling technological workflow.

This unique system that combines

specialized containers and tilting spreaders allows to maximize speed of ship loading process. Benchmark technical solutions of the tilting spreader design broaden the scope of implementation and allows to adapt it for standard handling equipment according to the customer's needs. Tilting spreaders can be adapted for both mobile and STS cranes.

NK TEHNOLOGIJA specializes in developing bulk handling equipment since 2001. The company supplies integrated and unified systems by allocating technological equipment and maximizing capacity of already existing systems. Being an industrial exporter, the company delivers projects in the Baltic States, Russia, European and Scandinavian countries.

Ice-free Port of Klaipeda: fastest-growing Baltic port

Klaipeda Port is the northernmost ice–free port on the Eastern coast of the Baltic Sea. It is the most important and biggest Lithuanian transport hub, connecting sea, land and railway routes from East to West. Klaipeda is a multipurpose, universal, deep-water port, providing high quality services. Fourteen big stevedoring companies, ship repair and ship building yards operate within the port.

The annual port cargo handling capacity is up to 60 million tonnes.

Advantages of Klaipeda Port:

- deep-water: –15.5m;
- convenient geographical location: northernmost ice-free port on the Eastern Baltic Sea Coast;
- the fastest growing port: annual average turnover growth 6.6%;
- attractive for investors: Free Economic Zone, Baltic Logistics Center;
- competitive: flexible cargo handling rates and port dues;
- multipurpose: 33 specialized terminals;
- fully electronic data exchange;
- railways: Lithuanian rail system is the same standard as in Russia, Belarus and other CIS countries;
- opportunities: Lithuanian market is larger than of the other Baltic states; and
- LNG bunkering services since 2017.

BULK STATISTICS

Annual throughput (million tonnes)	
2013	14.03
2014	17.03
2015	17.23

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Port of Kokkola: Finland's powerhouse port provider

The Port of Kokkola is Finland's largest bulk port and the country's third-largest overall. Although there has been a busy seaport in Kokkola since the 13th century, it was not until 1825 that it formally came under municipal management, setting the foundations for the record-breaking maritime gateway that is in operation today.

The Port of Kokkola has invested significant sums during the last decade in expanding and upgrading facilities, and acquiring state-of-the-art equipment to handle the demands of customers both present and future.

Located in Central Ostrobothnia, the powerhouse province of western Finland and on the coast of the Gulf of Bothnia, Kokkola is one of about 50 seaports scattered along Finland's 1,000km coastline.

In Central Ostrobothnia, local expertise, entrepreneurship and internationalization are deeply rooted in its maritime history. Thanks to tar production and shipbuilding, Ostrobothnia's coastal areas developed in the early 19th century into one of Finland's most advanced and prosperous regions. At that time, Kokkola was said to be the second-richest town in the country.

Small in size and population, yet big in entrepreneurship, expertise and exports, the region today outperforms many larger players. Central Ostrobothnia reaches out to world markets and has entered into co-operation agreements with a wide range of international companies engaged in similar business areas as its own. The port also acts as a springboard for goods originating in neighbouring Russia and thanks to the compatibility of the two countries' rail networks — the rail gauge is identical — the port has witnessed rapid growth.

Central Ostrobothnia has also succeeded in striking a fine balance between large, export-driven companies and a strong base of small to medium-sized commercial organizations dependent on the port for getting raw materials and finished products to world markets. Goods originating or passing through Kokkola can easily be shipped onwards by sea to the rest of Europe, the United States, Africa, Asia and Australia. Thankfully, the Port of Kokkola and Central Ostrobothnia have weathered recent economic recessions better than others and outside of Finland, while hardships experienced by specific sectors have not upset its regional economy.

The port provides a wide range of professional services for the handling of dry bulk products, including zinc concentrates, iron ore pellets plus breakbulk shipments, sawn timber, liquid bulk and containers. Contrary to normal practice, ancillary services at the port have remained the responsibility of the port authority working closely with local partners. The port consequently guarantees access to a wide range of services.

Kokkola's port sits rights in the centre of the region's commercial activity. Its core businesses are:

- the efficient handling of dry bulk cargo;
- providing quality facilities for handling breakbulk;
- providing the necessary infrastructure for handling liquids; and
- investing in creating multipurpose warehousing and terminal space solutions plus sufficient and adequate field areas for storage.

The port comprises three separate connecting harbours: the General Port, Deep Port and the Silverstone Port were created to provide customers with value-added transport services. Although the Port of Kokkola's harbours handle different commodities. they function together as a single port entity. Once all port expansion areas are complete, the combined three harbours will cover 547 hectares including water areas.

The efficient handling of containers, breakbulk and light bulk — such as limestone. alumina clay. fertilizers and chemicals in big bags — is carried out in the General Port. Kokkola has become a valuable link in the European short-sea network through regular services between the port and Antwerp, from where goods are transhipped onwards to international destinations.

When handling light bulk — such as limestone and raw

materials for fertilizers — the most important factor is to demonstrate due care. Dark and light bulk loads are carefully kept apart. Light bulk is handled at both the General Port and Silverstone Port.

An important part of Kokkola's General Port operations revolves around northern Europe's first covered All Weather Terminal, opened in 2005 at a cost of €16 million and playing an important part in customer distribution channels. guaranteeing professional, continuous, efficient and economical 'undercover' cargo handling whatever the climate outside.

The General Port covers a 35 hectare site with a further 192 hectares currently under development. Total covered and open sided warehouse area throughout the entire port is 80,000m², which Port Director Torbjérn Witting admits "is more than we need but it's important to always have something to offer as warehouses at the port of Kokkola never remain empty for very long."

The Deep Port offers potential capacity for over 7mt (million tonnes) a year, and specializes in handling bulk shipments including raw materials for the world's leading mining and metal industries including concentrates, iron pellets, coal. peat. pyrite and iron oxide. It is Finland's largest single bulk cargo harbour thanks to the volumes handled and represents around 70% of all freight travelling through the port of Kokkola. Panamax-class vessels can be loaded in less than 48 hours in the Deep Port. Advanced conveyor systems and warehousing facilities ensure sufficient capacity can be handled or expanded when necessary.

The Deep Port covers 65 hectares and a further 71 hectares is under a three- stage further development programme costing nearly €80 million. Investments in new quays and creating a deeper access channel have resulted in considerable savings for clients in the form of lower freight costs per tonne when travelling on Panamax and Capesize class vessels.

Efficient 40- and 50-tonne cranes and Finland's first Rail Wagon Tippler Terminal — opened in 2008 and built at a cost of over €4 million — provide speedy handling in the Deep Port, making daily loading and discharging rates of up to 1,500 tonnes of bulk cargo per hour possible when travelling into the port on 400 daily wagons. The tippler is housed in a unique terminal, which mitigates the environmental impact by reducing dust during handling. A second rail tippler terminal is currently on the drawing board and if it goes ahead, the second tippler terminal will be ready in 2016/17.

Around 1,100m of new quays, 26 hectares of additional field areas, 35,000m² of new covered warehousing and a covered transport system have been constructed in the harbour in the last few years. Seven additional cranes — of which the largest are 50-tonne Capesize cranes — have been installed to load and discharge vessels.

The Silverstone Port is the latest part of the port to be developed and is being expanded into an area designed to complement the Deep Port. Overall capacity of the Silverstone Port has been improved following construction of new embankments and by lengthening the quay to 317m.

The Silverstone Port area covers 4 hectares and a further 28 hectares is being added. A new 158 m-long quay costing €25 million was recently completed adjacent to the existing 160m-long quay. There is an option to extend the quay by a further 90m on demand. Depth alongside the new quay is 11m.

The Silverstone Port offers specialized handling of light dry bulk shipments including calcium phosphate, ammonia and potassium salt.

NORDEN wins two new contracts to transport US wood pellets to Europe

NORDEN has unveiled details of two new contracts which, because they run for more than 15 years and cover the transportation of 11mt (million tonnes) of wood pellets, are among the largest in the company's history.

Increased focus on CO_2 emissions and pollution — together with low gas prices — are the reasons why coal consumption for the generation of heat and electricity is declining. In Europe alone, imports dropped by 20% in the second quarter of this year, as a result of competition from low gas prices and a continued environmental focus.

On the other hand, global demand for the eco-friendly wood pellets as fuel for the generation of heat and electricity is on the rise — especially in Europe, but also increasingly in Asia.

While the demand for wood pellets in 2015 amounted to 13mt, the British consultancy on the area Hawkins Wright expects that in 2020 it will have reached 27mt. This means a yearly growth of 16%.

NORDEN therefore has a strong focus on the transportation of wood pellets and biomass in general. Even though the transportation of forest products on the whole only took up 2% of NORDEN's cargo book in 2015, the company is today one of the world's largest carriers of wood pellets.

Most recently, NORDEN has entered into two contracts with the American company Enviva for the transportation of 11mt of wood pellets from the US to Europe over a period of 15 years.

The contracts are among the largest in the history of NORDEN.

Benefits of wood pellets as fuel

- low carbon content;
- energy dense;
- easy to store and transport; and
- efficient, reliable and scalable combustion.

Wood pellets must increase in NORDEN's cargo book

It is NORDEN's ambition that wood pellets will take up more space in the Dry Cargo Department's cargo book going forward.

The starting point is promising. Not only is annual growth in global demand until 2020 predicted to be 16%. It is also expected that new large importing countries will enter the market.

In 2015, British power plants took 46% of the global production of wood pellets for power plants. Sweden, Denmark, Belgium and the rest of the EU followed with 13%, 12%, 9% and 7%, respectively.

According to the British consultancy Hawkins Wright, these countries will continue to increase their consumption of wood pellets as fuel for generation of heat and electricity. But also in Japan and South Korea, demand will increase significantly. In 2030, it is predicted that Japanese demand will be about 10mt (million tonnes), corresponding to two-thirds of global demand in 2015. South Korea is expected to take 2.9mt of wood pellets for the country's power plants in 2020.

"Even though it is part of the history of the wood pellet that growth comes from a low starting point, it is a really interesting market for NORDEN. The wood pellet market is one of the few dry cargo markets which is experiencing growth — considerable growth even — and which matches NORDEN's strategy.

"NORDEN is therefore focusing on the area, and we will do so increasingly. For us, it is obviously also interesting to see new large importing countries such as Japan and South Korea," says head of Industrial Bulk Vice President Michael Boetius.

NORDEN PROUD TO HAVE BEEN CHOSEN

"Enviva is the world's largest producer of wood pellets, and we are proud that they have chosen us to be in charge of transporting even more of their products across the Atlantic to their European customers. Because of its successful collaboration with Enviva, NORDEN has achieved an attractive position in this market," says CEO Jan Rindbo.

The deal with Enviva concerns two separate contracts for transportation of wood pellets from Enviva's production facilities in the southeastern part of the US to power plants in Europe. One contract starts in 2018, and runs for nine years with six to seven shipments a year. The second starts in 2019 and runs for 15 years with 12 shipments a year.

A TOTAL OF 15.3MT OF WOOD PELLETS

The contracts follow the contract with Enviva which NORDEN entered into in 2012 and which runs for nine years. It covers transportation of 4.3mt of wood pellets from the US to European power plants with Great Britain in the lead, with ten shipments a year.

This brings the total amount of wood pellets which NORDEN is to carry on behalf of Enviva to 15.3mt.

The wood pellets will be transported on Supramax vessels, of which NORDEN operates about 90. A Supramax vessel can carry up to 62,000 tonnes, but transports about 47,000 to 50,000 tonnes of wood pellets on each voyage.

GOOD FUTURE PROOFING

According to the head of Industrial Bulk Vice President Michael Boetius, who has been responsible for the negotiations of the Enviva contracts, there are several reasons why the contracts are important and fit NORDEN well.

"First of all, the contracts provide good and long-term coverage and therefore activity for the Supramax vessels, which are NORDEN's primary vessel type together with our Panamax vessels. In addition, the contracts fit well into our trading patterns — i.e. the way in which we push our Supramax vessels around in order to find suitable employment at all times," says Boetius, who also points out that the contracts contribute to extending NORDEN's position within transportation of wood pellets.

"Over the years, we have built up extensive operational experience and expertise regarding the handling of wood pellets and other kinds of biomass, and this experience and expertise we can pass on to our customers, so that they receive a good and safe transport solution," says Boetius.

"We have an ongoing and close dialogue with the customer," says Vice President Michael Boetius, head of Industrial Bulk.

RISKS AND CHALLENGES

With regard to safety, wood pellets and other wood products such as pulpwood, roundwood, timber and logs are classified as Group B cargoes. The greatest risks associated with Group B cargoes are spontaneous combustion, explosion, release of toxic gasses and corrosion. This is prevented by leading CCO_2O2 into the cargo during the voyage. Furthermore, as with most other cargoes, the holds must also always be clean, and not least you have to ensure timely arrival to not ruin the customer's planning and logistic.

ONGOING AND CLOSE DIALOGUE WITH THE CUSTOMER

"NORDEN's operators and port captains are familiar with these risks and challenges, and know how they must be handled and prevented, so that the crew, the cargo and the vessel have a safe voyage from loading port to discharge port. During this time, we have an ongoing and close dialogue with the customer," says Boetius.

Grain is NORDEN's second-largest cargo type

The world population is growing especially in Asia and Africa, which have to import a large share of their food products. Concurrently with this increase in world population, NORDEN expects its number of grain transportations to grow and not just to these two continents but in total.

The world population figure is growing rapidly. Today, there are roughly 7.5 billion people in the world, and estimates suggest that the population figure will grow to 9.5 billion before 2040–2050. As the greatest population growth is expected in Africa and Asia, which are not self-sufficient in food, these continents have to import large volumes of food products which must be carried there by sea.

Together with the growing population figure, many people are eating more meat as a direct result of their improved financial wealth. This provides more demand for soya as animal feed, which must also be transported to the importing countries.

NORDEN is performing a growing share of the world's grain transportations which is a result from a significantly increased focus on this particular market.

Grain transportations are largely carried out by Supramax and Panamax vessels, which are NORDEN's primary vessel types. But grain is also transported on board Handysize vessels of which NORDEN operates a considerable fleet.

In 2015, grain products as a commodity accounted for 12% of the total dry cargo market. But for NORDEN, grain accounted for a total of 27% — or nearly just as much as coal (30%), which traditionally has been the dominant dry cargo product for NORDEN. This makes NORDEN one of the large global

transporters of grain which is a key product in food production — both directly as food and indirectly as animal feed for livestock that eventually end on our dining table.

NORDEN HAS A STRONG POSITION

During 2015, NORDEN's dry cargo vessels carried a total of 18,405,970 tonnes of grain. And the Dry Cargo Department anticipates that, along with the population growth and changing eating habits, NORDEN's grain cargoes will continue to increase in coming years.

"Grain, of which soya bean constitutes a fair share, is a market in considerable growth, and this makes it very interesting to NORDEN. We have succeeded in establishing a strong position within this market, and naturally, we will work on developing this position," says Vice President Thomas Jarde, commercially responsible for NORDEN's fleet of geared dry cargo vessels, i.e. Handysize and Supramax.

NORDEN'S DRY CARGO TRANSPORTS IN 2015

Commodity	Tonnes	%
Coal	20,368,596	30
Grain	18,405,970	27
Iron ore	9,388,829	14
Fertilizer	3,776,309	6
Cement products	3,426,100	5
Forest products	1,298,416	2
Steel products	1,069,154	1
Other	10,603,649	15
Total	**68,337,023**	

25 billion loaves

If all of the 18,405,970 tonnes of grain transported by NORDEN in 2015 were all bread grain and used to make regular bread loves, there would be enough flour for almost 25 billion loaves!

SIGNIFICANT FLEET AND EXPERIENCE

Most of NORDEN's grain transportations are soya bean. Hereafter comes wheat and corn. But NORDEN transports all types of grain, also e.g. unprocessed barley and malt for beer production.

"We offer both old and new customers extensive expertise, reliability and flexibility to match the customers' individual needs best possibly. As we are developing our position in the grain market on an ongoing basis, this suggests that we often succeed in matching the customers' needs — also on price," says Vice President Thomas Kobbel, who has the commercial responsibility for NORDEN's gearless dry cargo fleet, i.e. Panamax, Post-

Annual increases of 1.5–5.5%

The international organization International Grains Council expects that world trade in the most essential grain products such as wheat, corn, barley and soya bean from now and until the harvest year of 2020/2021 will increase annually by 1.5–5.5%, with corn as the commodity that will grow the most within the global grain trade.

The largest grain-producing and grain-exporting countries are located in North and South America with the USA, Brazil and Argentina at the top. Australia is also an important player together with the EU and the CIS countries, the former Soviet Republics. These countries ensure deliveries of vital food and feed to the countries in Asia and Africa with rapidly growing population figures, and the International Grains Council expects that these deliveries will continue at a growing scale.

"Today, we have a good feel for what cargoes there will be and where they will be," says Vice President Thomas Jarde, who has the commercial responsibility for NORDEN's fleet of geared dry cargo vessels, i.e. Handysize and Supramax

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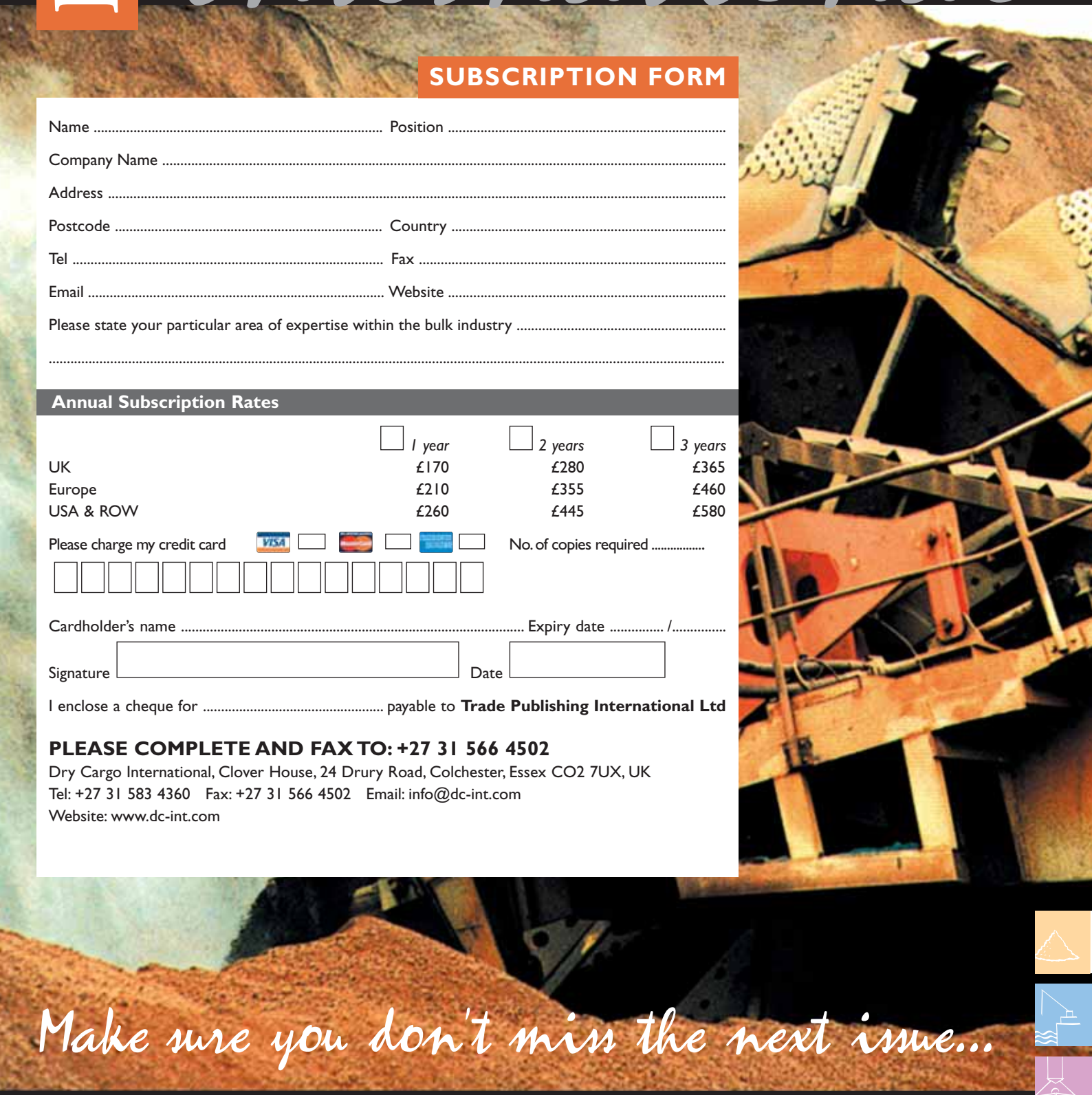
DC: DRY CARGO international



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Soya bean: the complete protein

The soya bean rightly plays an important role to both people and livestock that most often end as human food. The soya bean is composed of up to 40% protein and is therefore called a complete protein. The plant belongs in the pea flowering family and is grown especially in the USA, Argentina, Brazil and China. The protein in soya bean is very similar to animal protein. Soya bean is an inexpensive protein source, and it is the most important legume plant in the world. In the western world, soya bean is primarily used as an ingredient in animal feed, while the soya bean, boiled or raw, has always been an important ingredient in Chinese, Japanese and Vietnamese cooking. The International Grains Council expects that global trade in soya bean will increase by more than 2% annually until the harvest year 2020/2021 as two-thirds of all ship cargoes will go to China.

Panamax and Capesize.

The majority of NORDEN's grain cargoes are transported from North and South America to Asia with most discharges — when it comes to soya bean — at Chinese ports. But overall, NORDEN transports grain to a great number of grain-importing countries in North Africa, in South East Asia, in North East Asia and surrounding the Indian Ocean.

Unique market overview

The large volumes of grain in NORDEN's cargo book have provided the company with a unique and valuable market overview.

"Today, we have a good feel for what cargoes there will be and where they will be — and how we find the best suited and most profitable tonnage to carry the cargoes. We also always have an idea of how much a cargo will cost and are ready to take positions going forward — and hopefully we can make

"We offer both old and new customers extensive expertise, reliability and flexibility", says Vice President Thomas Kobbel, who has the commercial responsibility for NORDEN's gearless dry cargo fleet, i.e. Panamax, Post-Panamax and Capesize.

money on this. In the current dry cargo market with historically poor rates, it is of great importance to know the market in every detail in order to use the opportunities, which are after all there, best possibly," says Jarde.

Seasonal market

Kobbel and Jarde say that part of why the grain market is interesting to NORDEN is that it is seasonal.

In the second quarter, the grain is shipped from the southern hemisphere where Brazil and Argentina are the main exporters. In Brazil, the major loading ports are Santos, Paranaguá, Rio Grande and São Francisco do Sul. In Argentina, loading typically occurs at the ports on Rio Plata and Bahía Blanca.

In the fourth quarter, it is the northern hemisphere's turn where the USA is the largest exporter. Here the major loading ports are in the Gulf of Mexico or surrounding area — typically on the Mississippi River — or in Houston, Galveston, Beaumont and Corpus Christi. Great volumes of grain are also shipped from the North American west coast concentrated around the Columbia River and Vancouver in Canada.

Northern Europe, the Baltic States and the Black Sea also contribute substantially to the global grain export.

"The seasonal element means that in the first and third quarters, where the harvesting takes place but no grain is exported from North and South America, we can benefit from

Grain market's watchdog

The International Grains Council was established in 1949 at the initiative of the American government headed by President Harry S. Truman. The purpose was to ensure equal distribution of wheat to countries in need. Today, the purpose has broadened to promote international co-operation within grain trade. The purpose is also to promote openness and fairness within the grain industry and to contribute to market stability and, in doing so, increase global security of supply. The intergovernmental organization attempts to reach these goals by improving market transparency. This is for example done through information sharing, market analyses and daily market monitoring.

the fact that there are many available vessels. We can often charter these vessels at reasonable rates and position us best possibly for the grain shipments in the coming quarters. This is especially true for Panamax vessels, and we are often lucky to find the right vessels at the right price," says Kobbel.

Grain market is a swing factor

The grain market is also known as a swing factor meaning that the volumes to be exported and thereby transported at sea go up and down. The greatest deciding factor is weather conditions determining the harvest size. But when it comes to the size of the exported volumes, it also matters a lot what is to be done with the harvest. How much is to be exported? How much is to be used domestically? How much is to be stocked — and where? How much is to be food for human consumption? And how much is to be animal feed? And so on.

"These conditions change from one harvest season to the next and from one production land to the other. It creates great rate fluctuations within grain transportation. And this is something that we as a shipping company — or as merchants, which is basically what we are — are trying to make use of so that we will profit from the transportation," says Kobbel.

Finnish logistics expertise from Oy M. Rauanheimo Ab

Finnish company Oy M. Rauanheimo Ab is a major player in stevedoring, forwarding and shipping as well as transit traffic to and from Russia. It offers high-quality and extensive logistics services. The continuing, long term development of strategic competency and logistics processes — combined with modern information technology — are the cornerstones to its success.

With a history spanning 130 years, Rauanheimo has gained extensive knowledge of stevedoring, forwarding and shipping activities. Rauanheimo is active in Kokkola and the Port of HaminaKotka.

Using its ability to adapt to change and chase new challenges, Rauanheimo has grown significantly in size and strength to become a supplier of total logistics solutions.

In Rauanheimo is a reliable partner, and this is due to the company's three basic principles that have remained unchanged for the last 130 years: family culture, the expertise of employees at every operational level, and its focus on the customer.

Rauanheimo's thorough knowledge of stevedoring, forwarding and shipping activities is the result of 130 years of experience. Its diversified customer base — from trade to industry and wide domestic and international network — enable it to offer comprehensive, competitive and tailor-made service solutions that add genuine value to its customers' logistics chains.

As an effective link in the chain of trade between sea and land transport, Rauanheimo provides professional port and mill-site services and, if needed, door-to-door deliveries all over the world. Rauanheimo offers: stevedoring; forwarding; ship agency services; transit services; customs services; container services; bulk handling; general cargo handling; added-value services; documents; and traffic information, among others.

Bulk handling

The infrastructure for bulk handling at the Port of Kokkola includes a 13m fairway, tippler terminal and conveyors linked to the railway site, large storage areas and warehouses, scales, wheel loaders, dumpers, conveyors and trucks etc. of all sizes. Equipment for handling bulk includes: dump trucks; reach stackers; railway wagon tippler; loaders; tractors; forklift trucks; and excavators.

Stevedoring

Rauanheimo offers a unique, independent stevedoring and forwarding service. Flexible working hours allow its professional and experienced workforce to increase efficiency, maximize productivity, and minimize costs. In order to be competitive in today's market, rapid vessel turnaround times are essential. Rauanheimo's services are geared to ensure swift port throughput and fast, efficient forwarding of its customers' cargo.

Rauanheimo's stevedores are professionally trained, experienced and skilled in handling almost any bulk commodity that arrives in its facility. The following is a list of some of the products it has handled: ; iron ore; iron oxide; pyrites; zinc and other metal concentrate; limestone, quicklime, alumina clay and cement; salt and soda; fertilizers; and coal.

Warehousing

Rauanheimo offers close to 80,000m^2 of covered warehouse space. The high-quality storage facilities can be reserved for dedicated or common usage. Sophisticated conveyor systems can be used to transport cargo from railway wagons into some of the warehouses and the ship's holds.

Transit services

Rauanheimo is the major dry bulk transit forwarder and stevedore operator in Finland. Thanks to the functional rail connections to the Russian railways and its close customer relations, Kokkola is a gateway to the Russian market.

Rauanheimo's transit department offers forwarding, warehousing, goods handling and an extensive service network with other providers of logistics services. Its uses its knowledge of the Russian language and experience with local business customs to provide a comprehensive service for its Russian customers. Rauanheimo provides a unique service to all its transit customers based on their individual transportation needs. Rauanheimo, the Finnish railways and the Port of Kokkola have invested heavily, and have created a very efficient and flexible service for Russian transit.

General cargo handling

Both in small and in large consignments, general cargo is a regular feature of Rauanheimo's handling capabilities. Almost all types and all sizes of general cargo can be accommodated, including heavy machinery, out-of-gauge and unusual project cargoes. Rauanheimo's flexible service makes all the necessary arrangements to handle exceptional loads, including those that require unique permits and specialist handling expertise. It currently has approximately 80 different specially designed machines to handle customers' cargo; and it also has possibilities to invest in new machinery to meet the long-term needs of its customers.

In Kokkola, the handling of this cargo is concentrated in the general port area where Rauanheimo can take advantage of one of the largest covered terminals in Europe. The Port of Kokkola's All Weather Terminal ensures the timetables and quality of goods are maintained — in all weather conditions.

Oy M. Rauanheimo Ab extends activities to Vuosaari Harbour at Port of Helsinki

Oy M. Rauanheimo Ab and VR Transpoint have signed an agreement on a comprehensive export logistics solution for pulp products, where VR Transpoint will be responsible for the rail transport of the goods and Oy M. Rauanheimo Ab for the port operations.

Metsä Group is constructing the world's first next-generation bioproduct mill, which will produce 1.3 million tonnes of pulp per year as well as other bioproducts and bioenergy. According to the plan, production will start in the third quarter of 2017.

Pulp will be transported by railway to Vuosaari Harbour for further shipments to Europe and Asia. "The agreement is very important for us and is part of the growth strategy of Rauanheimo, both for handled volumes but also as a new concept in a new port, where efficiency of logistics is gained through smoothly combining railway transports, forwarding and stevedoring operations," CEO of Rauanheimo Joakim Laxåback states.

The new contract is an important opening for Rauanheimo in providing forwarding and stevedoring services at Vuosaari, which will become a significant port for Rauanheimo's services along with the Ports of Kokkola and Hamina-Kotka.

Rauanheimo plans to provide customized logistical solutions also to other customers in Vuosaari Harbour.

The new contract will employ about 30–35 people within Rauanheimo, and it requires investments of approximately €7 million in machinery and equipment.

Bulk? We've got it in the bag

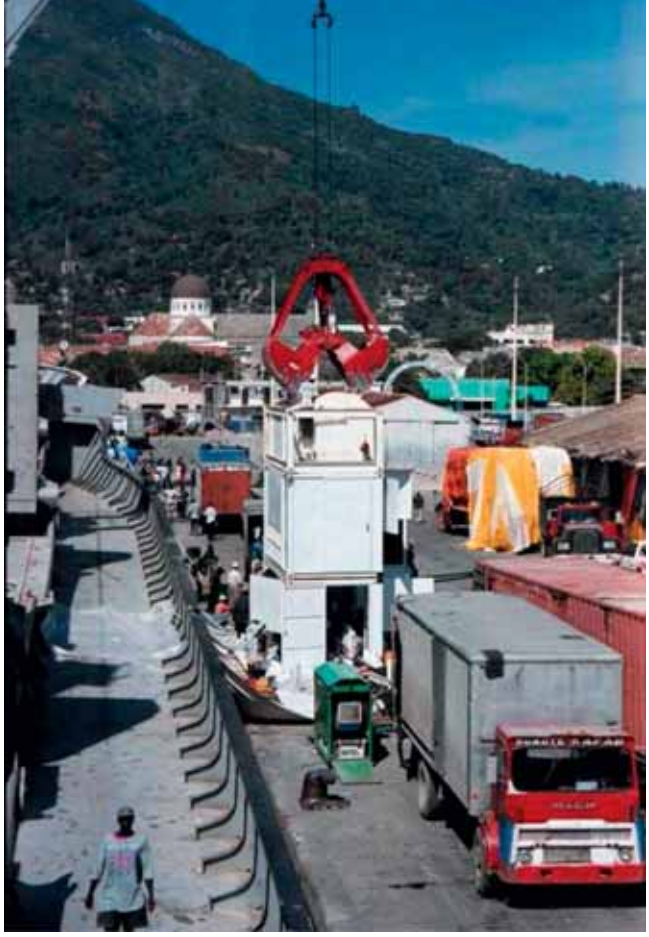
bagging, packaging and FIBCs

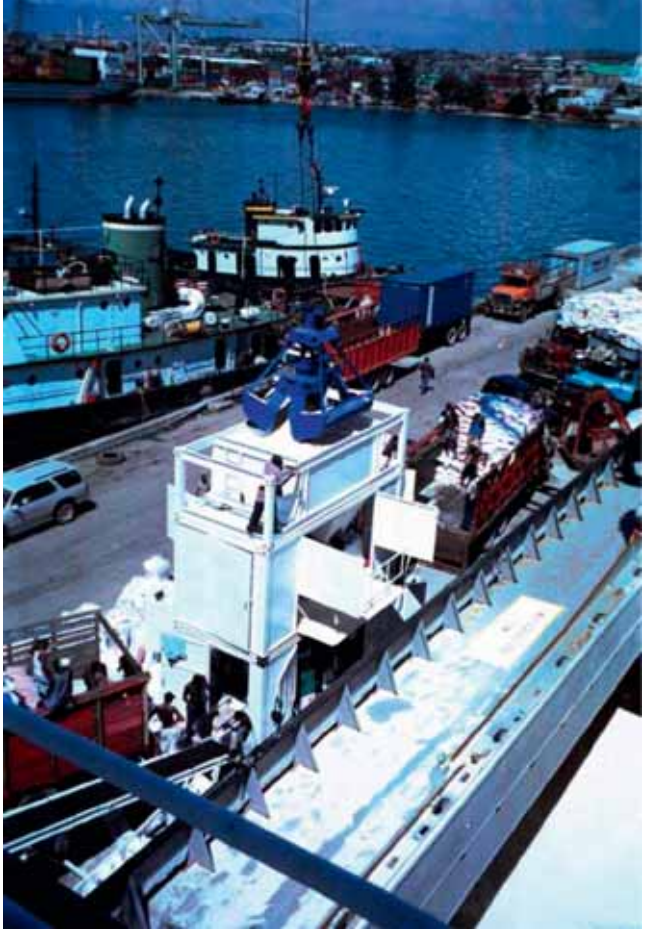
JEM International: special expertise in on-dock bagging systems

JEM International, Inc. has been manufacturing packaging lines for dry, bulk solid materials for over 30 years. It has complete packaging lines in operation in all 50 states in the United States and 55 countries worldwide. Its product lines range from single operator, mechanical systems to fully automatic packaging lines with robotic palletizing.

JEM International also manufactures a Self-Contained Portable Bag Plant designed for use directly at a ship's port. The dual line, duplex system will produce 100–120 metric tonnes per hour based on a 50kg bag weight.

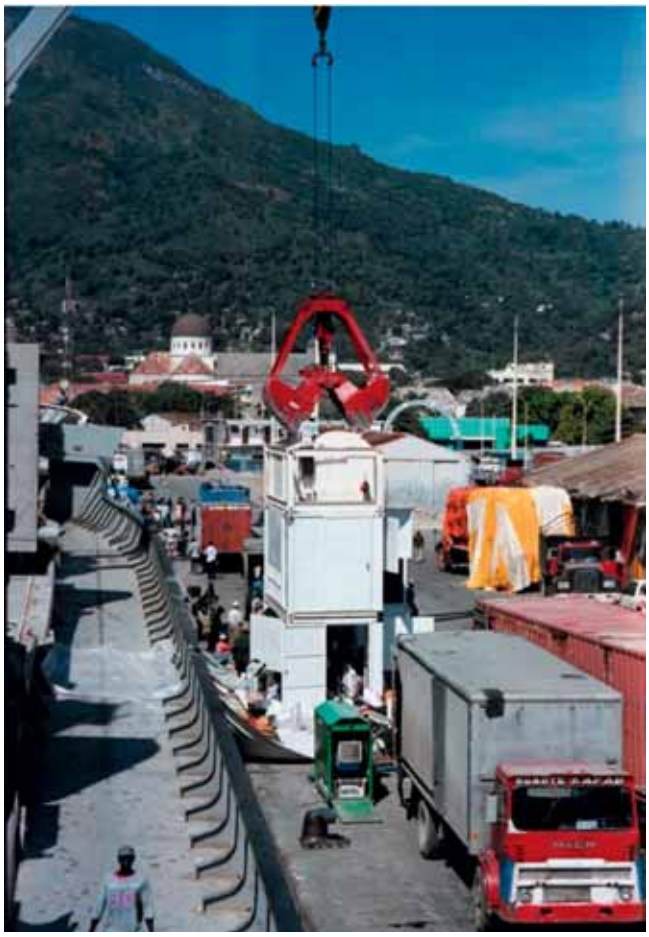
The portable bag plant systems are typically loaded directly from the ocean vessel with the ship's grab and JEM provides an





inlet surge hopper. The middle section contains the net weigh bagging scales and an air compressor. The lower section will house the bag spouts with lower transitions, bag closing conveyors with sewing pedestals and all control panels. The system is designed to be set up or taken down in less than 30 minutes. This allows for vessels to be unloaded and bagged in the shortest amount of time possible, which eliminates additional fees from the ocean liner.

All of JEM International's packaging lines are designed for its customer's specific products and available labourers. The digital controllers provided with the systems will record every bag weight with a time and date stamp and include options for customer traceability. JEM also has the ability to remotely access all systems via a free TeamViewer app and JEM Opti-Link cable. It has provided packaging lines for weights as low as 6 ounces or as large as 2 metric tonnes.



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FROM BOTTLE TO BIG BAG

rPET FIBCs – the sustainable solution for bulk material logistics!

Made from 100 % recycled PET bottle flakes or pellets, rPET FIBCs feature **high creep resistance, long-term form stability, less bulging,** excellent **abrasion resistance.** Perfect for **hot-fill** and **food-grade** applications, rPET FIBCs can be used as **high-performance big bags** and are a cost-cutting alternative to FIBCs such as octabins or drums. **Fully recyclable and reusable.**

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textile packaging | consumer bags | recycling technology | viscotec

Starlinger: bundled expertise on PET at the K 2016 trade fair

PET is the only plastic material which can be recycled into high-quality form for reuse. Taking that fact into account, at the end of October, Austria's Starlinger & Co. Ges.m.b.H. attended this years K trade fair for plastics and rubber, where there was a major focus on PET (polyethylene terephthalate) treatment and the processing of rPET (recycled PET) in innovative packaging solutions. "Over the last two decades, Starlinger has acquired a great deal of know-how relating to PET. Now we are able to draw on this, with new packaging applications that benefit from the outstanding properties of PET and rPET," explains Hermann Adrigan, sales director at Starlinger.

From PET bottle to high-performance fabric

Since the presentation at K 2013 of the first FIBC made of 100% woven PET, and based on many years of company experience in PET recycling, Starlinger textile packaging has developed proprietary technology for the production of woven tape fabric from up to 100% rPET flakes. Since the properties of rPET match those of virgin material, fabric woven from rPET has exceptionally high tensile strength coupled with a high creep modulus. It is extremely resistant and retains shape stability over a long period of time even under the effects of load and temperature exposure — advantages which make PET fabric the material of choice for a wide range of new applications.

Food-safe and suitable for attractive designs, PET fabric also lends itself ideally to packaging food products and consumer goods. For the first time, Starlinger exhibited a 'PET pet food sack' at the trade fair — a sack for dog food made of 100% rPET flakes. The pinch bottom sack from the PP*STAR product family consists of rPET tape fabric laminated with printed OPET film, offering all necessary barrier properties for the safe packaging of sensitive contents such as dog food or fertilizer.

Also in keeping with the focus on PET are the viscoSTAR SSP reactor and the viscoSHEET line from Starlinger viscotec. With the viscoSTAR SSP reactor, PET pellets or flakes are decontaminated and rendered suitable for use in applications with food contact while increasing the intrinsic viscosity (IV) of the material. viscoSHEET lines produce sheet from up to 100% rPET — out of flakes from production waste, skeleton waste, or edge trims. Along with the viscoSTAR SSP reactor, individual components of the viscoSHEET line such as calender and winder were on display at K.

A sack for every purpose

A milestone in Starlinger's history enjoyed a prominent place at K 2016: the AD*STAR sack. The all-rounder, first launched in 1995, now serves the building, chemical, agricultural and food product industries with over 7.5 billion sacks per year. The block bottom valve sacks made of coated PP tape fabric are a safe and — as a life-cycle analysis has recently shown — very environment-friendly means of packaging for dry bulk goods such as cement, gypsum, chemicals, as well as flour, rice or sugar. AD*STAR sacks can be produced in many variations: with valve or open mouth, BOPP coated, as small and handy AD*STAR *mini sack, as AD*STAR *carry sack with welded-on handles, or even as a shopping bag.

Another packaging product being featured is the IC*STAR sack which is welded at the bottom instead of sewn. This new process makes for a stronger sack bottom as well as material savings and lower maintenance during production.

Industry 4.0 was also be on the agenda: for the first time, at K 2016, Starlinger showed how the integration of the latest information and communications technology into woven sack production can be realized.

Focus on film recycling – and two world premieres

Starlinger recycling technology was showcased, with a recoSTAR dynamic recycling line seen in operation, reprocessing heavily printed in-house film waste. The SMART feeder, one of the line's most important components, prepares the input material: Its automatic temperature control makes it possible to achieve uniform high product quality even when processing materials with varying moisture levels and fluctuating bulk density. Also, all recoSTAR dynamic lines are equipped with the 'Dynamic Automation Package' DAP and the rECO energy concept. Continuous process adjustment, the use of motors of the highest energy efficiency class, and energy recuperation at various process steps make this one of the most efficient plastics recycling lines on the market, in terms of both production and energy efficiency.

In addition, Starlinger recycling technology presented two world 'firsts' at K 2016: new technology for processing polyester, and a pioneering process for refinement of pellet material.

In-house exhibition with all innovations, recycling of tape waste

Starlinger also showcased the latest technological developments in the fields of woven sack production and plastics reprocessing in-house, with an exhibition at its own premises. Among the highlights was the conversion line multiKON KX, on which IC*STAR sacks are closed by welding, the new starEX 1600 tape line for PP and HDPE tapes with a production speed of 550m/min, and the newest winding technology for PP and PE tapes. Another focal point was, as always, AD*STAR production technology.

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

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

Mondi Industrial Bags showcases sustainable packaging at FachPack 2016

At this year's FachPack, which took place in Nuremberg, Germany, at the end of September, Mondi Industrial Bags showcased solutions for a wide range of industries. Of note for the bulk industry is the company's HYBRID^{PRO}, one of Mondi's paper-based solution. These bags are part of the continuing trend towards more sustainable industrial bags.

HYBRID^{PRO}: AWARD-WINNING HIGH-QUALITY BAG FOR HIGH-QUALITY CONTENTS

The HYBRID^{PRO} celebrated its first birthday at FachPack. Since its launch in 2015, this water-repellent paper bag has received several industry awards and accolades:

- the Limiting Environmental Impact at the 2016 Saint-Gobain Construction Products UK Supplier Conference and Awards;
- a PART (Packaging: Art, Research, Technology) Award at the 2016 RosUpack packaging trade show in Moscow;
- shortlisted for a EUROSAC Grand Prix Award; and
- shortlisted by RISI (forestry industry information provider) for its Pulp and Paper International Awards in November 2016.

Mondi's next generation of water-repellent paper bags has been developed as part of the company's focus on exciting new solutions achieved through ongoing R&D work and collaboration with customers.

The HYBRID^{PRO} combines the best of both worlds: it offers all the protective advantages of a plastic bag, yet is fillable on conventional paper bag filling systems. Moreover, it is an eco-friendly solution as the total weight of material used is less than with standard three-ply designs serving the same purpose. The plastic and paper components are easy to separate, which ensures optimum recyclability.

About Mondi Industrial Bags

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

Mondi is an international packaging and paper Group, employing around 25,000 people across more than 30 countries. Its key operations are located in central Europe, Russia, North America and South Africa. It offers over 100 packaging and paper products, customized into more than 100,000 different solutions for customers, end consumers and industrial end uses — touching the lives of millions of people every day. In 2015, Mondi had revenues of €6.8 billion and a return on capital employed of 20.5%.

The Mondi Group is fully integrated across the packaging and paper value chain — from managing forests and producing pulp, paper and compound plastics, to developing effective and innovative industrial and consumer packaging solutions. Its innovative technologies and products can be found in a variety of applications including hygiene components, stand-up pouches, super-strong cement bags, clever retail boxes and office paper. Its key customers are in industries such as automotive; building and construction; chemicals; food and beverage; home and personal care; medical and pharmaceutical; packaging and paper converting; pet care; and office and professional printing.

Mondi has a dual listed company structure, with a primary listing on the JSE Limited for Mondi Limited and a premium listing on the London Stock Exchange for Mondi plc.

For Mondi, acting sustainably makes good business sense and is part of the way it work every day. It has been included in the FTSE4Good Index Series since 2008 and the JSE's Socially Responsible Investment (SRI) Index since 2007.

Precision-weight, large-package filling with high stability from HAVER & BOECKER

HAVER & BOECKER PRESENTS THE OPTIMIZED ELEMENTRA® EGF BIG BAG FILLING SYSTEM

HAVER & BOECKER has completely revamped its large bag weighers. The result is a maintenance-free system that has a new drive technology for clean filling with high weight precision. Its modular design offers a high degree of flexibility. The new big bag system is especially suited for loose, bulk materials of every type, especially for the construction, chemicals and foodstuffs industries.

This report at a glance:

- modularity for customized solutions;
- cleanliness and occupational safety;
- revamped drive technology;
- enhanced work flow; and
- standard MEC 4.0 control unit.

ELEMENTRA®: The new HAVER & BOECKER FIBC filling system.

HAVER & BOECKER engineers have analysed the existing weighing system and incorporated the requests and wishes of the customer into the new concept.

This new machine system combines all developed functions and allows individual solutions through its flexible modular design. The newly introduced EGF series stands for an ELEMENTRA® for large package units filled by a variety of dosing systems.

Modular system for a customized solution

One feature of the revamped system is its new modularity. The carefully thought-out modular principle allows different dosing units and an ideal integration with existing production and packing lines. The machine can be expanded and equipped with different components.

The following options can be added:

- filling spouts that can be swivelled;
- different dosing units;
- inflatable sleeves;
- hooks: rigid, rotatable or replaceable, instead of a carrying arm;
- moveable filling head or conveyor unit;
- vibration base; and
- conveying system.

This allows smaller or newly founded companies to acquire a HAVER & BOECKER machine and to later outfit it so that it may fulfil additional requirements. Thus the revamped system covers everything, from the starter model to the high performance system for all applications.

Maintenance-free belt drive

The greatest technical innovation for improving safety and preventing machine stoppages is the double-belt drive. Moreover this new drive fulfills explosion protection requirements. And because of its special plastic material, it is suited for use in the food industry and in dusty environments. Thus the belt-drive system replaces the maintenance-intensive chain drive.

Clean and operator friendly

With this filling system HAVER & BOECKER also puts special emphasis on cleanliness and operator friendliness. For clean filling without product loss, the filling spout can be sealed with an inflatable sleeve and a counter-pressure ring — thus providing a completely sealed-off product path. Through the operator platform, the rotatable hooks, or other optional additions, the system can be expanded to eliminate hard physical labour.

Sure operation and intelligent networking

The heart of the ELEMENTRA® is the standard MEC 4.0 weigher electronics that control the weigher and networks for all individual modules for a weight-precise filling. To provide optimum, intuitive operation the system is equipped with a large touchscreen panel for displaying all functions and diagnostics with just a touch of the finger. The system can be equipped with the HAVERquattro Monitoring System for constant online transmission of performance data.

Approved HAVER & BOECKER technology

HAVER & BOECKER has responded to the demands of the market with its optimized large bag weigher and filling system. All variants of the new filling technology were tested by machine builders and have also exceptionally proven themselves in dusty and harsh operating conditions. The ELEMENTRA® EGF big bag filling system can fill all large packages — independent of size, material and design.

The new lifting device of the HAVER & BOECKER ELEMENTRA® EGF.

Double-walled filling spout with inflatable sleeve of the ELEMENTRA® EGF.

The automatic hook system.

About HAVER & BOECKER

HAVER & BOECKER is a family-managed, mid-size company with headquarters in Oelde, Westphalia, Germany. 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 HAVER & BOECKER operates worldwide with more than 3,000 employees and 150 representatives. In 2015 the company posted a sales turnover of €456.5 million.

The Wire Weaving Division produces woven wire cloth 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 and its technology brands HAVER & BOECKER, HAVER + TYLER, IBAU HAMBURG, SOMMER, BEHN + BATES, FEIGE FILLING and NEWTEC BAG PALLETIZING is specialized in processing, transport, storage, mixing, filling, packing, palletizing and loading of bulk materials. The product range includes single machines and complete systems for the handling of powder-type and granulated materials, liquid and pasty products, food and animal feed, as well as shiploading and unloading equipment. HAVER Automation ensures the linking of the individual technologies for a transparent and effective process. HAVER Engineering develops processes and technologies for processing mineral raw materials, offers apprenticeship and in-service training and creates operator models.

The designation ® indicates a registered trademark of HAVER & BOECKER oHG in Germany. Several indicated designations are protected trademarks also in other countries worldwide.

Coaltrans Conferences

17th Coaltrans USA™

February 2 – 3, 2017 | The Four Seasons Miami

Coaltrans USA 2017 returns to kick-start your year and enhance your strategy making

Changes in H2 2016 are so pivotal to the course of direction for the US coal industry that they need talking about. Major coal producers are now emerging from Chapter 11 as new entrants to the market, and a change in president could change the coal industry's course of direction entirely. As US LNG exports start sailing and hiking gas prices are anticipated, what will happen to coal burn?

Every year has posed as 'the bottom' of the down cycle, but 2016 has proved to be it! Which export opportunities have opened up with the level of price improvements we've already seen and how can your company cement a place as a contributor to the seaborne industry? How long could these prices last?

Learn more about the latest changes in the industry and the opportunities it offers at the 17th Coaltrans USA in Miami on 2 - 3 February 2017.





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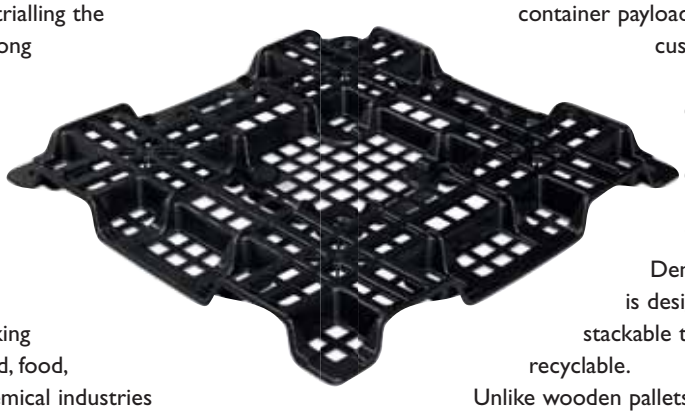
Bulk Handling Australia's wins favour at home: targeting offshore market

BULK HANDLING AUSTRALIA EXPORT PALLET CUTS THROUGH DOMESTICALLY AND SETS ITS SIGHTS OFFSHORE

Bulk Handling Australia's (BHA) new export pallet is continuing its strong sales growth in Australia and New Zealand, with a number of companies currently trialling the revolutionary new pallet, and strong interest from the USA, Europe and Asia.



BHA Managing Director Ian Shaw said early indications are that there is a strong demand both in Australia and New Zealand as well as in overseas markets.

"The domestic market is looking strong with orders from the seed, food, minerals, pharmaceutical and chemical industries exporting FIBC packed products to the USA, Japan, Middle East and Europe," he said.

"In many instances this has allowed for improved container efficiency by optimizing the Bulk Bag design along with the low profile and lower weight of the BHA Bag Pallet to increase the material payload."

The BHA Bag Pallet, which has been developed over the past two years is patented internationally, and now provides Bulk Bag exporters a viable low cost alternative to export grade wooden and traditional plastic pallets.

Shaw says: "The BHA Bag Pallet is already proving to be a real innovation in the bulk bag export market for the food and beverage manufacturing industries.

"The slimline design translates to a ten-stack measuring just 280mm in height which gives manufacturers far greater container payload efficiency. This means customers can develop a closed loop with end users for a cost-effective return freight of 2,100 BHA Bag Pallets per 40 foot container load."

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

Unlike wooden pallets, the new BHA Bag Pallet is water proof and won't chatter, chip or splinter, which is an important issue for food manufacturing companies.

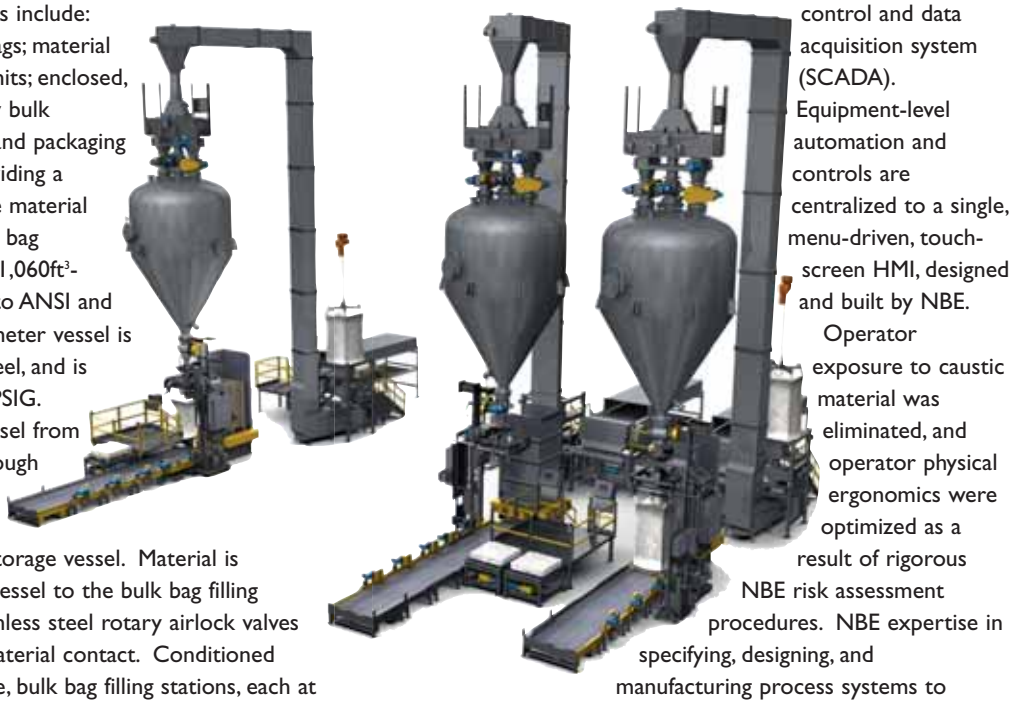
From an OH&S perspective the new pallet also ticks all the right boxes weighing in at just 4.7kg compared with 15–20kg for export wood; this despite its three tonne dynamic load rating.

As well the BHA Bag pallet doesn't require slip sheets to be used with filled Bulk Bags.

Bulk Handling Australia (BHA) is a fully Australian-owned company and is one of Australia's leading suppliers of industrial packaging solutions including intermediate bulk containers and bulk bags for transporting solids and liquids.

Bulk material packaging operation uses three, high-capacity storage vessels to ensure 50,000 lb/hour process rate

A self-contained, high-volume bulk material packaging system from National Bulk Equipment, Inc. (NBE) processes up to 50,000 pounds/hour of combustible materials of varied physical characteristics, including: interlocking flakes and free-flowing, friable rods. Process operations include: material discharge from bulk bags; material introduction from belt flaker units; enclosed, vertical conveying; high-capacity bulk storage; material conditioning; and packaging into bulk bags. Integral to providing a reliable, consistent, high-volume material supply to the downstream bulk bag packaging operation are three, 1,060ft^3-capacity storage vessels. Built to ANSI and ASME standards, each 12ft-diameter vessel is constructed of 304 stainless steel, and is internal pressure rated to 116PSIG. Material is supplied to each vessel from a 50ft-tall bucket conveyor through a three-way flange inlet that directs material to size reduction units then into the storage vessel. Material is discharged from each storage vessel to the bulk bag filling systems using 12-inch, cast stainless steel rotary airlock valves rated to 150PSIG and 400°F material contact. Conditioned material is packaged using three, bulk bag filling stations, each at a process rate of 17,000 lb/hour. Integrated, NTEP-certified hang-weigh scale systems (Cert. No. 07-108) ensure each filled bulk bag package weighs accurate to ±.01% of total bag capacity, up to 4,500 pounds.



System-wide process automation and controls communication are managed from the facility's supervisory control and data acquisition system (SCADA). Equipment-level automation and controls are centralized to a single, menu-driven, touch-screen HMI, designed and built by NBE. Operator exposure to caustic material was eliminated, and operator physical ergonomics were optimized as a result of rigorous NBE risk assessment procedures. NBE expertise in specifying, designing, and manufacturing process systems to application-appropriate codes, standards, and regulations ensured system compliance at start-up.

Protective Packaging Ltd: barrier foil FIBC liners to safeguard cargo

Barrier foils are a flexible barrier laminate with the lowest known water vapour and oxygen transmission rates. Polythene liners let water vapour and aggressive gases seep through, allowing deterioration of product to occur but this can be eliminated by the use of a barrier foil liner.

Barrier foil liners manufactured by Protective Packaging Limited are designed to provide total protection for dried products that have sensitivity to moisture, oxygen and other climatic and biological volatile. These barrier foil liners can also prevent odour transfer either into or out of the product.

Combined with a barrier foil liner, FIBCs (flexible intermediate bulk containers) can be used to pack bulk products which previously had to be shipped in sealed containers such as steel, plastic or fibreboard drums. This is due to the FIBC's inability to provide complete climatic protection for very hygroscopic and oxygen sensitive materials. Not only does the barrier foil liner with FIBC offer a material cost saving, but shipping space efficiency can be improved by up to 40% over drums.

All liners are tailor-made to suit the dimensions and style of the FIBC. They can be made open topped with flat base, or with filling and/or discharge spouts, thus ensuring safe filling and emptying of the FIBC. These liners can also be fitted with valves that facilitate gas flushing of the liner allowing residual oxygen to be displaced, vacuuming of the liner and taking samples of the residual air in the liners for analysis, all without the need to open up the hermetically sealed liner. Liners are suitable for food contact, and hot fill products up to 170°C.

Industries include pharmaceuticals, foodstuffs, chemicals and polymers, or any product which may be susceptible to moisture.

UK company Protective Packaging Limited has invested substantially to automate the liner manufacturing process and this has increased production efficiency to produce up to 80,000 liners per week. Protective Packaging has also recently opened a US manufacturing facility in Orlando, Florida to cater for the North American Market.

Assuring electrostatic discharge safety in FIBCs with Bekaert

Flexible intermediate bulk containers (FIBCs) or big bags are a popular packaging solution for powder, granular, and flake products. A concern with transferring and storing dry bulk materials is that these products can create dust clouds that can be very flammable and easy to ignite in combination with electrostatic charging. In flammable and explosive atmospheres, an electrostatic discharge (ESD) can lead to gas or dust explosions. The best solution to prevent ESD is to integrate highly conductive yarns into the fabric of the bags and keeping them grounded at all times.

Causes of electrostatic charging

FIBCs are generally made from woven polypropylene fabric, lined with plastic. These materials have very high insulating properties, which prevent the dissipation of electrostatic charges. When the bags are being filled or emptied, the product is typically transferred through a duct. During this process, particles collide and rub against each other as well as the duct surfaces, causing the product to become charged; this process is called tribocharging.

As the charged product enters the FIBC, the surface of the insulated container becomes charged as well. This is caused by a combination of more tribocharging, as the bag is being filled, by electrical induction, as the container comes in the electric field of the charged product and by corona charging. The latter occurs when the charged product in the container bulks up into a cone shape. The charge field of the product at the tip of the cone is more concentrated and might reach the breakdown value for air. Charges released in the air are repelled from the cone and might build up on the surface of the container.

Discharges from FIBCs

When a conductor reaches a voltage of over 300V and approaches (or touches) a large or earthed conductor, the excess charges will be neutralized by transferring to their surrounding. This process is called electrostatic discharge and it usually manifests in a spark. Seemingly innocent in most cases, sparks can lead to explosions if they occur near a flammable agent. If the voltage rises above 1,500V, the energy in the spark can ignite hydrogen gas. A spark caused by a voltage of about 4,000 to 5,000V can ignite most solvent vapours. If you consider that contact, induction or corona charging can create voltages on the surface of FIBCs of several thousand volts, gas or dust explosions become a very real possibility.

Measures and solutions

To prevent any type of electrostatic discharge, bags have antistatic yarns woven into the material and are kept grounded (e.g. by the lifting loops of the bags). These bags are called type C bags.

In order to develop a solution that eliminates the risk of electrostatic discharges from FIBCs, international producer of steel wire products, Bekaert invested many years in researching the phenomenon. The result of their investigation is a range of highly conductive yarns; Bekinox® yarns consist of a blend of stainless steel and polypropylene fibres or other polymer fibres.

When integrated into FIBCs, either parallel or in grit structure, Bekinox® yarns are able to divert static electricity safely and efficiently to the earth without causing a dangerous electrostatic discharge. One important condition with all type C bags is that they are grounded at all times. This is essential to enable a smooth flow of excess charges to the ground.

Standards and regulations

To make sure FIBCs meet the safety requirements of each industry, several standards and regulations were brought to life. Bekinox® yarns apply to the IEC 61340-4-4 norm which describes the procedures for evaluating the ignition risk presented by electrostatic discharges from FIBC to flammable or explosive environments. Bekinox® yarns also conform to EU 10/2011 and EG 1935/2004, which means it's suitable for use in the food processing industry.

Conclusion

Integrating electro-conductive yarns into FIBC can significantly reduce the risk of electrostatic discharges and related consequences, provided that the bags remain grounded. Bekinox® stainless steel yarns create a conductive network over the entire surface of the grounded FIBC, dissipating all electrostatic charge to the ground and guaranteeing the safety of the work environment.

About Bekaert

Bekaert is a world market and technology leader in steel wire transformation and coating technologies. To be a preferred supplier of steel wire products and solutions, the company consistently delivers superior value to its customers worldwide. Bekaert was established in 1880 and is a global company with approximately 30,000 employees worldwide. DCi

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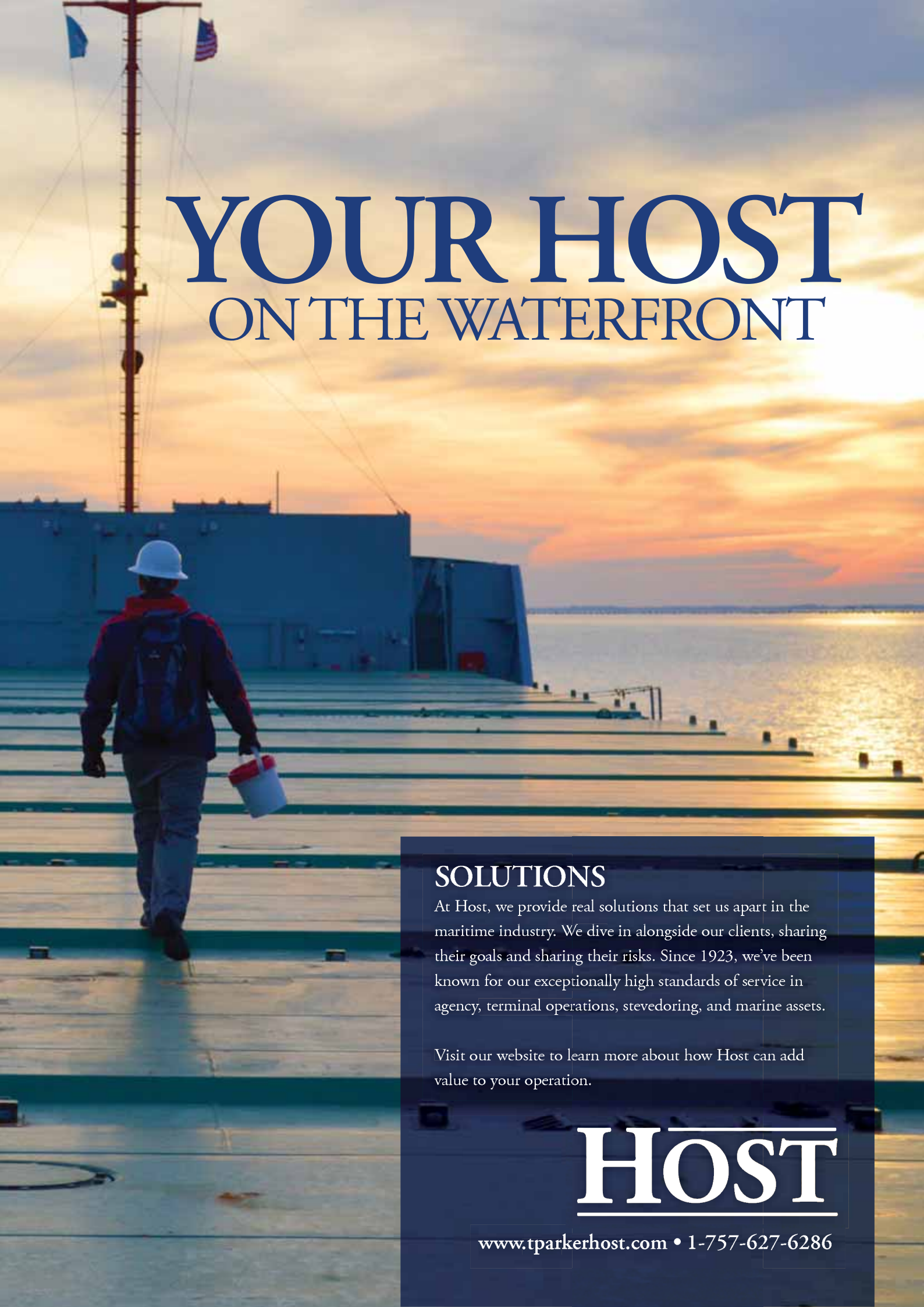

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