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FEATURES

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- Geared Bulk Carriers
- Belgium Regional Report
- Fertilizer Handling
- Cement Handling & Storage Equipment

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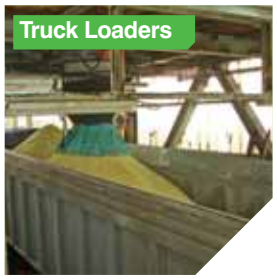

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Coal trade support still visible

Restraints affecting commodity imports into numerous countries are becoming more prominent, yet positive drivers providing support are also clearly visible. Although the upwards trend in world seaborne dry bulk trade is still apparently intact, it seems to be slowing and there is greater uncertainty about prospects.

The International Monetary Fund's latest forecast published last month emphasized downside risks facing the world economy, one of which specifically affecting trade is the mounting tensions unfolding. World GDP growth in 2018 is no longer expected to be higher than the 3.7% achieved in the preceding twelve months. Also, the outlook for 2019 is similar, with a possibility of a downwards revision.

Coal

Some forecasters expect both coking and steam coal global trade during this year as a whole to be moderately higher than seen last year. Despite the well—known adverse developments affecting this sector, movements are holding up well. There is evidence of additional import demand in India, China and other Asian countries.

Among Asian importers of steam coal extra volumes in 2018 are foreseen, as shown by table 1. However not all estimates of world growth in this sector are optimistic. A recent calculation by Australia's Department of Industry, Innovation and Science predicted only a 1% rise in the world total to 1,100mt (million tonnes) — including land movements, but mostly seaborne — this year, followed by a 1% decrease in 2019.

Iron ore

Prospects for further global iron ore trade expansion during the current year have faded amid signs that China's imports, which comprise well over two—thirds of the sector, are not contributing. Nevertheless the latest AGDIIS analysis still suggests that a 3% rise in worldwide movements to 1,605mt in 2018 is a foreseeable result.

Iron ore imports into China in this year's first nine months totalled 803mt, down by almost 2% compared with the same period a year ago. Stronger steel output was supportive, but a continued boost from mills increasing the proportion of high quality foreign iron ore in preference to low—quality domestic ore has not yet provided the boost expected. Higher use of scrap steel, substituting for ore, has been noted.

Grain & soya

A revised International Grains Council forecast for world trade in wheat plus corn and other coarse grains points to an almost flat 369mt total in the current 2018/19 crop year ending June. Among the main importing areas, estimates for Asia, the Middle East, North Africa and European Union show relatively small rises and falls.

Notable changes in individual countries are not prominent features. China's grain imports could be 7% lower in 2018/19, at 20.0mt, while a 3% decrease in Egypt to 22.0mt is expected. By contrast, Mexico's volume may increase by 13% to 23.8mt, the EU could see a small 2% increase to 25.5mt, and in Japan an almost unchanged 23.8mt is likely. In these countries and elsewhere, changes in usage and domestic harvests have not been enough to cause large import variations.

Minor bulks

Estimates of global trade in one sizeable part of the minor bulk sector, agricultural cargoes, suggest that the total could remain flat in 2018 at around 175mt after an increase last year. Commodities including are sugar, soyameal and other oilseed meals, and rice. Some signs of weakness in sugar trade have been seen, but offsetting growth in the other elements is envisaged.

Bulk carrier fleet

The world bulk carrier fleet's biggest segment, Capesize ships of 100,000 deadweight tonnes and over, is likely to grow relatively rapidly this year at about 3.5%. Lower newbuilding deliveries are predicted, but a sharp reduction in scrapping, as shown in table 2, probably will result in a larger net addition to capacity than seen last year.

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

	2013	2014	2015	2016	2017	2018*
Japan	114.5	114.2	120.1	115.8	121.0	119.0
South Korea	100.1	100.8	102.6	102.5	116.0	118.0
Taiwan	57.1	57.0	56.3	55.0	58.2	58.0
China	192.0	165.5	107.9	124.2	118.7	130.0
India	144.1	176.0	170.0	147.3	152.7	160.0
Total of above	**607.8**	**613.5**	**556.9**	**544.8**	**566.6**	**585.0**

source: various & BSA estimates **BSA forecast*

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

	2013	2014	2015	2016	2017	2018*
Newbuilding deliveries	22.0	18.5	16.9	20.0	15.3	14.0
Scrapping (sales)	7.9	4.2	15.4	13.3	6.4	3.0
Losses	0.2	0.0	0.0	0.2	0.3	0.0
Plus/minus adjustments	0.1	0.0	–0.4	–0.5	0.1	0.0
Fleet at end of year	**293.8**	**308.1**	**309.2**	**315.2**	**323.9**	**334.9**
% change from previous year—end	+5.0	+4.9	+0.4	+1.9	+2.8	+3.4

source: Clarksons (historical data) & BSA 2018 forecasts **BSA forecast*

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Near-term outlook for fertilizers improves

Maria Cappuccio

The International Monetary Fund (IMF) cut its latest global growth forecast to 3.7% for this year and next, confirming that risks are tilted to the downside due to heightened trade tensions between the US and other countries including China and a sharper-than-expected rise in interest rates, accelerating the capital flight from emerging markets. While the global economy is still on-track to match last year's pace, the new outlook suggests there is an unseen divergence with mounting weakness in emerging markets from Brazil to Turkey.

The escalating trade dispute between the US and China (Beijing imposed 25% tariffs on $34bn of US products including soybeans on July 6, in retaliation to US tariffs on Chinese goods) is having an impact on global trade in agriculture and in other sectors. The loss of soybean sales to China leaves a glut of newly harvested beans in US storage bins, while Brazil ramps up production to satisfy Chinese demand. An increase in Brazil's soybean acreage, US corn acreage and an increase in global wheat acreage, contributed to improvements in demand and values for major crop nutrients in the second half of the year, as farmers replenish depleted soils.

Tighter grain stocks after difficult growing season

Global output, of cereals, coarse grains and oilseeds, is on track to produce a 3.1bn/t harvest in 2018/19, after a challenging growing season in a number of regions, resulting in lower grain inventories, for the second year. Grain prices have improved as the projected ending stocks-to-use ratio at 82 days of consumption is down nine days from the start of the season. Wheat production at 731mt is lower, due to reduced prospects in EU, Russia, Australia and Canada. Near-record coarse grain output of 1,343mt (million tonnes) on increased acreage and better than expected yields, especially for corn in the US, and in other countries including China, Ukraine, Brazil and Argentina; while the global barley harvest will be the smallest in six years. The global oilseed crop is anticipated to reach a record 604mt with larger crops in the US, Brazil and Argentina, the gains in oilseeds mainly led by soybeans 369mt.

FAO confirms world hunger is rising

After a period of decline, world hunger is rising, according to the UN's Food and Agricultural Organization (FAO), prompting the theme for this year's World Food Day, 'Zero Hunger is possible by 2030'. In a keynote address to representatives attending the biennial meeting of FAO's Committee on Agriculture, the Director General José Graziano da Silva drew attention to current farming practices and how they have contributed to deforestation, water scarcity, soil depletion and high levels of greenhouse gas emissions without solving the problem for over 820m people who remain undernourished, despite there

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being enough food produced to feed the world's entire population. To implement change FAO's Director General called for sustainable practices that reduce the use of pesticide and chemicals, increase crop diversification and improve land conservation among other measures.

Modest rise in fertilizer demand to 2022/23

With the significant rationalization and consolidation that has taken place within the industry, the International Fertilizer Association (IFA), expects fertilizer demand to continue to grow modestly by 10mt to over 199mt in 2022/23, supported by a moderate growth in prices for most agricultural commodities.

More sustainable approach supports reduced fertilizer use

Governments around the world are being challenged to support a more sustainable approach to agriculture. This has led to important policy developments occurring in some large fertilizer-consuming markets, like China, where more environment-friendly policies are in place to reduce chemicals, likely to lead to a progressive contraction of domestic fertilizer demand; while successive reforms of India's national fertilizer strategy are impacting growth in demand. Even with robust demand in Latin America and Sub-Saharan Africa, the current outlook over the next five years, suggests a modest expansion of global fertilizers, with potash to grow firmly by 2.1%, phosphates by 1.5% and nitrogen by 1.2% each year.

GLOBAL FERTILIZER USE

1961–2022/23 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
2015/16	108.0	41.0	32.0	181.0
2016/17	111.0	42.0	33.0	186.0
2017/18	111.5	41.9	33.7	187.1
2018/19	112.6	42.9	33.5	189.0
2022/23	115.6	45.3	38.7	199.6

Source:FAO, IFA

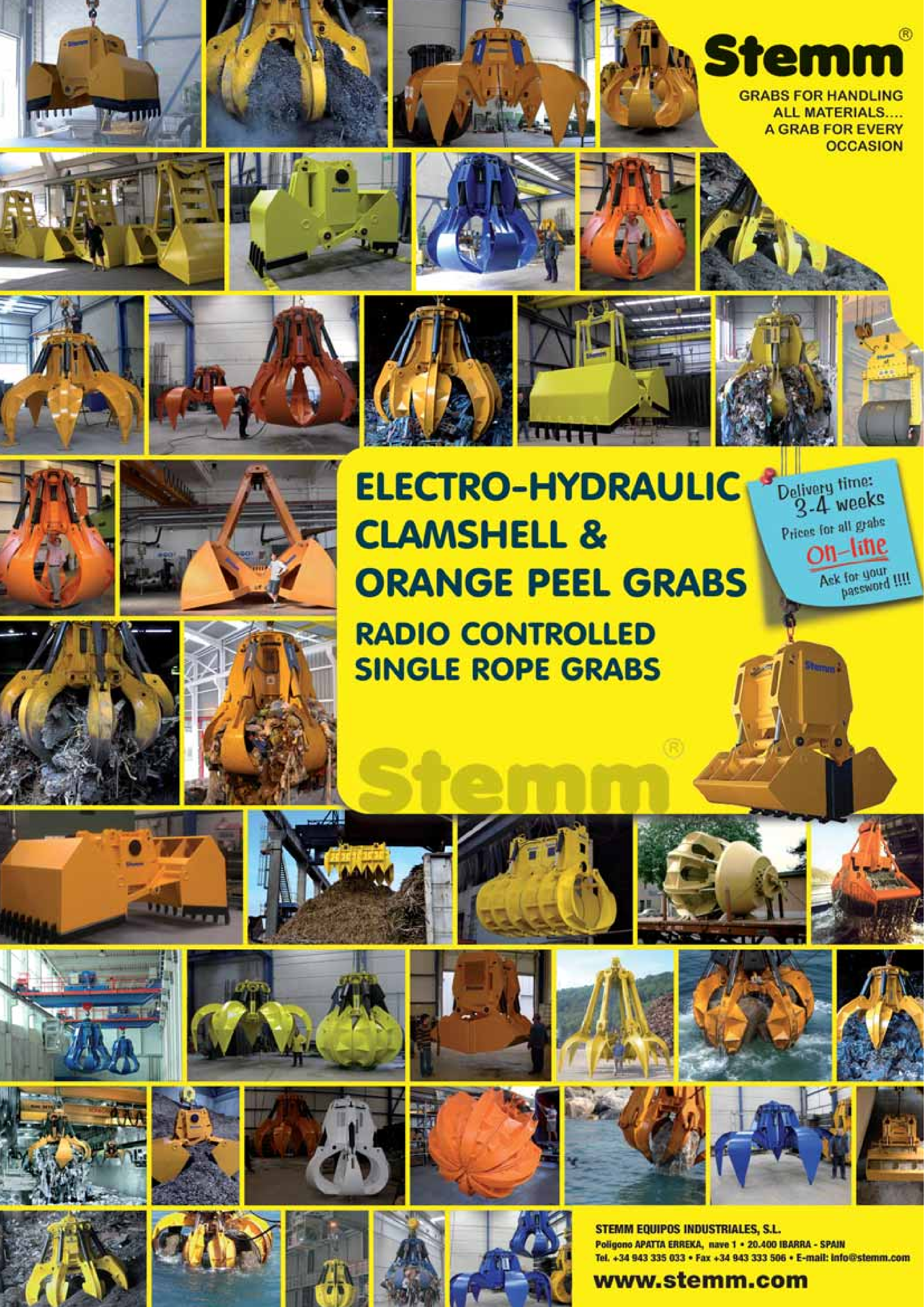
FERTILIZER PRICES $ PER TONNE FOB 2014–2018

	2014	2015	2016	2017	2018
	Oct Wk2	Oct Wk2	Oct Wk2	Oct Wk2	Oct Wk2
	$	$	$	$	$
Urea					
Baltic	310	259	201	270	260
Persian Gulf	—	—		215–275	320
US Gulf	—	—	201	265	350–296
Ammonia					
Yuzhny	—	248	189	210–215	320–322
Tampa CFR	650	440	220	245	330
Middle East	—	—	—	—	359–369
Ammonium sulphate					
FSU	—	—	—	—	118
Asia	—	142	114	—	142.50
Di-ammonium phosphate					
North Africa	—	—	—	360–365	409
US Gulf	464	460	306	345	421.50
China	—	—	—	360	414
Baltic					426
Triple Super phosphate					
North Africa	—	380		—	358
US Gulf			277	—	346
Muriate of Potash					
Baltic	—	—	221	—	290
Vancouver	310	300	215	—	215.5
US Gulf	—	—	—	220–228	268

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

Global warming and the effect on major crops

Farming food crops of all kinds is likely to become more difficult depressing yields for staple crops like corn, soybeans, rice and wheat, if global temperatures currently at 1°Celsius (1.8°Fahrenheit) continue to warm to 3° by the end of the century. That is the conclusion set-out by the UN's Intergovernmental Panel on Climate Change (IPPC). The Special Report on Global Warming will be a key scientific input into the Katowice Climate Change Conference in Poland in December, when governments review the Paris Agreement to tackle climate change. Scientists involved in reviewing the impact of climate change, confirmed that previous assessments may have underestimated how sensitive natural and human systems are to climate change. The report's key recommendation include carbon dioxide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emissions to be cut 45% by 2030 from 2010 levels and reduced to zero by 2050.

Fertilizer prospects improve

Fertilizer producers are poised to gain from favourable nutrient demand and pricing in the near term. Healthy global demand along with reduced supply, especially from China, provided support to global prices of nitrogen, a major crop input. Prices of phosphate and potash have also gained strength this year on the back of strong global demand.

Urea values reflect demand, sanctions and tariffs

US sanctions stymied shipments of Iranian urea to Europe, Latin America and elsewhere over several months, with large quantities at a reduced price finding a home in India. But due to impending US sanctions, India's large tender for urea in October did not proceed. And, with India's return to the global market, offers from origins, other than Iran, were nearly $80/t more than those in the summer. The higher prices bolstered by US sanctions and an increase in prospective cereal plantings in the US and in other countries. At the Persian Gulf, spot urea prices FOB rose to over $324/t, not seen since 2015. Potash followed the rest of the fertilizer market, continuing to move higher — Midwest terminals were up $299/t with the Gulf at $268/t. Israel Chemicals reported new contracts for the supply of 905,000/t potash with an option of further sales to China, by June '19 at $290/t, $6/t higher than in previous contracts.

CEREALS AND OILSEEDS – PRODUCTION, USE & STOCKS 2017–2018/19 MT

	Prod 17/18	Prod 18/19	Use 17/18	Use 18/19	Stocks 17/18	Stocks 18/19
Wheat	759	731	741	746	275	260
Coarse grains	1,315	1,343	1,350	1,385	227	186
Rice	480	488	483	488	146	145
Total Cereals	2,554	2,562	2,574	2,619	648	591
Oilseeds	575	604	484*	500*	112	124

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

Cereal output outstripped by demand

The large global harvest is forecast at 3.1bn/t in 2018/19 and includes a smaller wheat crop of 731mt, with near record coarse grain output 1,343mt, especially corn (1,078mt). Demand for cereals, mainly driven by feed and industrial use of corn, set to increase by 45mt to over 2.6bn/t, outstripping supply and reducing stocks. Feed use of corn is to increase due to reduced availability of wheat and barley. Longer term, wheat for both feed and industrial use is expected to decline slightly, while increasing for food consumption in line with population growth.

Robust demand, low stocks support corn

Feed use of corn in 2018/19 is projected at 677mt, an increase of 28mt on the previous year. The USDA forecasts a significant drop in global corn supplies down 20% to 159mt (excluding China — 101mt). Robust demand, low stocks and news of President Trump's proposal to raise the ethanol blend in US gasoline from 10–15% triggered a rally, with CBOT Corn Futures Dec '18 closed up $3.73 3/4 (Oct 12); Corn 3YC FOB US Gulf $167/t (Oct 11).

CEREAL EXPORT PRICES US $ FOB PER TONNE 2014–2018

	2014 Oct Wk2 $	2015 Oct Wk2 $	2016 Oct Wk2 $	2017 Oct Wk2 $	2018 Oct Wk2 $
Wheat No 2 HRW	**289**	**221**	**194**	**217**	**237**
Corn No 3 Yellow (Gulf)	184	175	163	157	167
Sorghum (Nola)	229	198	175	191	191
Soybean No 2 (Gulf)	410	369	378	375	324
Brazil (Paranagua)					
Soybean					
Argentina (up river)	**—**	**—**	**411**	**386**	**416**
Wheat	248*	223*	—	—	232
Corn	166*	161*	174	148	164
Soybean	414	360	381	372	397
Thailand					
Rice White 5% broken	435	375	350	383	390
Vietnam					
Rice White 5% broken	—	—	331	400	407
India					
Rice White 25% broken	—	—	331	366	340

*Source: FAO IGC USDA — *Monthly average — Sept; rice prices based on indicative quotes.*

Surging exports lift soy plantings in Brazil

Strong fertilizer sales and farmers keen to plant at least 61m/ha (150m/acres) support, a record harvest c.120mt, weather permitting and exports expected to reach 75mt. With US soybeans locked out of the lucrative Chinese market, domestic soybean prices have been very good in Brazil in recent months bolstered by surging exports to China, heavily reliant on soybeans to feed its large pig population. Some farmers have been keen to forward contract their crops, leaving domestic livestock farmers and feed manufacturers, having to pay more for scarce domestic supplies. The Mato Grosso Institute of Agronomic Economics (Imea) reported that state-wide, farmers have forward contracted 34% of their anticipated 2018/19 soybean production at an average price of R$ 67.09 per sack (c.7.65/bu).

Global wheat sowings to rise in 2019/20

The International Grains Council expects the global wheat area to rise next season encouraged by higher prices. With sowings increased in the US and the EU where the shift toward wheat could be reinforced by loss of the rapeseed area. With the global stock-to-use ratio for wheat tighter, futures markets closed higher — CBOT Wheat contract Dec '18 closed at $5.17 1/4, up 9.25 cents (Oct 12); FOB offers, for Russian wheat have risen to c.$233–236/t, US Hard Red Winter Wheat $237/t, Soft Red Winter Wheat $213/t and French Grade 1 Rouen $239/t (Oct 11).

US corn acres to expand in 2019/20

Private analytics firm Informa Economics projected US corn plantings to rise by 4.4% in 2019/20 to over 93m/acres, with a corn crop of c.388mt (15.26bn/bu) based on a yield of 178/bpa; while US soybean plantings due to the loss of the market in

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GLOBAL NITROGEN SUPPLY/DEMAND 2017–2022/23 MT N

Fertilizer	2017	2018	2022
Nitrogen capacity	185.2	186.3	190.7
Nitrogen supply*	166.4	167.4	171.4
Nitrogen demand	147.6	150.0	153.6
Fertilizer use	111.5	112.6	115.6
Other	36.1	37.4	38.0
Nitrogen balance	**18.8**	**17.4**	**17.8**

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

GLOBAL POTASH SUPPLY/DEMAND 2016–2021/22 MT K_2O

Fertilizer	2017	2018	2022
Potash capacity	58.1	61.6	64.6
Potash supply	46.2	47.9	54.2
Potash demand	41.7	42.6	46.2
Fertilizer	34.0	34.9	38.3
Potash balance	**4.5**	**5.3**	**8.0**

Source: IFA-Data K20/t basis

GLOBAL UREA SUPPLY/DEMAND 2017–2022/23 MT UREA PRODUCT

Fertilizer	2017	2018	2022
Urea capacity	217.0	221.0	226.0
Urea supply	187.5	190.5	197.0
Urea demand all uses	176.0	178.7	188.0
Urea balance	**11.5**	**11.8**	**9.0**

Source: FAO/ IFA—Data mt Urea basis

GLOBAL PHOSPHORIC ACID SUPPLY/DEMAND 2016–2021/22 MT P_2O_5

Fertilizer	2017	2018	2022
Phosphoric acid capacity	58.5	59.9	64.3
Phosphoric acid supply	48.0	49.1	53.6
Phosphoric acid demand	43.1	44.1	47.6
Fertilizer	41.9	42.9	45.3
Phosphoric acid balance	**4.9**	**5.0**	**6.6**

Source: FAO/IFA-Data P_2O_5 tonnes basis

China, are expected to fall from 89m/acres to just over 82m/acres in 2019, with a soybean crop of c.113mt (4.16bn/bu) on yields of 51/bpa.

Fertilizer makers adjust to changing environment

Regulatory requirements to secure mining permits for potash and phosphate and safety measures for nitrogen plants are becoming more stringent in many countries. Earlier this year the combination of low crop and fertilizer prices, large exportable capacity and subdued prospects for demand created pressures on domestic fertilizer producers and led to an increase in quality requirements for fertilizer products.

China's plant closures to reduce nitrogen capacity

The International Fertilizer Association (IFA) forecast a dramatic reduction of nitrogen capacity in the next five years owing to massive plant closures in China. Nitrogen supply is expected to grow more slowly at 0.6% with demand to grow at 1.2% each year; the surplus to peak in 2019 before declining due to reduced availability in China. During the latter part of this year nitrogen fertilizer values have recovered to three-year highs as Chinese exports dwindled.

Urea demand to rise by 10mt

Global urea capacity is projected to expand by 9mt to 226mt by 2022. Most of the growth will occur mainly in North America, EECA, South Asia regions and Africa, while declining in China. The IFA expects urea supply to grow to 197mt with demand for all uses increasing to188mt in 2022, and in almost every region, with the surplus supply to decrease by 2022.

From being in a surplus situation for the first half of the year, the global urea balance, excluding China, returned to a deficit for the third quarter, driven by stronger demand. Granular urea prices fob Egypt averaged US$293/t for third quarter, up $59/t, increasing sharply towards the end of the quarter, with demand lifted by public tenders in India, Pakistan, Bangladesh and Ethiopia and from private markets. Urea prices increased to a level where Chinese exports again became attractive to cover the deficit in the global market. But, instead, higher global prices pulled local Chinese urea prices higher, forcing producers to focus on the domestic market. The short-term price volatility in the global market is high, due to the global urea supply; excluding China it operates a modest surplus or deficit.

India pays a high price for urea

With exports from Iran capped due to US sanctions, India turned to Chinese and Arab Gulf suppliers to meet a 750,000/t, import demand at significantly higher prices. Up to six cargoes or over 250,000/t, are expected to be supplied out of the Arab Gulf, with two 50,000/t cargoes from Egypt, the remaining 400,000/t made up with product from China and a possible cargo of urea from Indonesia. The lowest offer for the west coast was $352.88/t CFR and $356/t CFR for the east coast, $78/t above those in the tender (August 1'19), where almost all the volume was secured from Iran.

Potash values improve on good demand and idled capacity

Nutrien (formerly PotashCorp and Agrium) confirmed global potash demand in major spot markets strengthened, helped by efforts to idle capacity to maintain tight supply and providing support for potash values. Global potash shipments are projected at 65–67mt in 2018, with key exporters sold out to the end of the last quarter in 2018.

Increased potential for potash

The global potash fertilizer market is expanding with considerable growth potential during the next five years. Potassium capacity is forecast to grow to 64.6mt K_2O in 2022, mostly in EECA, North America and China while declining in the EU. Potash supply would increase by 8mt K_2O to 54.2mt K_2O in 2022, a 17% increase over 2017. North America will be the region with the largest potential supply, followed by EECA, East Asia and other regions

Strong demand in Brazil and North America

Global demand for potassium for all uses would grow at 2% pa to 46.2 Mt K_2O in 2022. Global potash supply/demand conditions show the potential annual

surplus doubling to 8mt by 2022. Nutrien expects strong demand for summer fill in North America suggests application rates will be high in the fall; solid agricultural fundamentals in Brazil, with soybean prices driving a larger soybean area, to result in a strong application season.

Improved potash prices

Potash prices have improved year-on-year with strong pace of shipments through the first half of 2018. With both the China and India contracts settled at $290/t CFR, concerns are growing for availability in other regions. In South East Asia, a lack of fresh MOP arrivals is restricting business — although producers' local agents are increasing offers for almost every enquiry. In the wake of the China settlement, one European major was considering offers at $320/t CFR for standard-grade MOP to Indonesia in the last quarter, well above the current $285–305/t CFR range for the region. BPC is also believed to have sold small standard-grade cargoes to Korea, the Philippines and Japan at $310/t CFR for November loading. Elsewhere, granular potash prices have risen in Brazil, the US Corn belt by 5% year-on-year and in the South East Asia region.

Phosphate demand to continue in 2019

Mosaic forecast global phosphate demand to reach a new record with shipments of 70–72mt, with new supply expected to gradually come on stream without overwhelming growing demand. As a result, they expect the phosphate market momentum to continue into 2019. They see opportunities in two key regions, Brazil where soybean economics are highly profitable due to weaker reals and strong demand and North America where farmers are expected to harvest another large crop earlier than normal, allowing ample time to replenish record amounts of P&K taken out of the fields this fall.

The global phosphate rock supply is projected to grow by 9% to 250mt by 2022. Africa and West Asia would together account for 80% of the net increase. Phosphoric acid capacity to increase by 6% to 64.3mt P_2O_5 in 2022, with supply to increase by 1.9% pa compared with 2017, while demand would grow at 1.7% pa. The potential surplus would increase marginally until 2019 and then plateau until 2022.

Global processed phosphates capacity is projected to increase by 14mt to 112mt products in 2022, with Morocco responsible for one-third of the increase. The global supply of phosphoric acid would increase by 1.9% pa compared with 2017, while demand would grow at 1.7% pa. The potential surplus would increase marginally until 2019 and then plateau until 2022.

China's phosphate exports decline

This year Chinese phosphate exports have fallen, in part because of new environmental restrictions on industrial facilities in China. But as market prices and margins rise and the Chinese currency weaken this could encourage producers to resume exports. Mosaic continues to expect high-cost Chinese producers to balance the market. DCi

Damen Shiprepair Curaçao floating dock operational

On 2 November, Damen Shiprepair Curaçao (DSCu) commissioned its large floating C dock. After the final tests had been carried out in the morning, the C Dock was submerged onto the equalized seabed. DSCu Nautical department, with the help of local KTK pilots and tugs subsequently docked the first commercial ship, a 63,400dwt bulk carrier, thus putting the C dock into service.

"This marks a special milestone and we are very proud of this," Lodewijk Franken, DSCu's managing director commented about the 230 x 45 metres Panamax-class dock. "It is highly rewarding to see the yard's infrastructure today, following an intensive period of improvements, and to have the first ship in our C dock." It is one of two floating docks in which Damen has invested. Both docks arrived jointly at the Caribbean island of Curaçao on 30 April 2018 and are part of a wider investment programme for DSCu since its takeover by Damen in 2017.

Franken: "Many on the island still vividly remember the moment when the heavy lift ship Xin Guang Hua arrived at the Sint Anna Bay with our two floating docks on board and passed the Queen Juliana Bridge on April 30. This was a breathtaking moment which the staff at the yard relived when watching the first commercial docking on November 2. Docking the large bulk carrier went smoothly."

The smaller D dock — which had been docked inside the C dock since their Atlantic crossing — has been floated-out late October to be moored alongside the repair quayside. It is currently having electric power connected after which the pumps and valves can be tested. It is expected to be put into service in November also.

Damen Shipyards Group

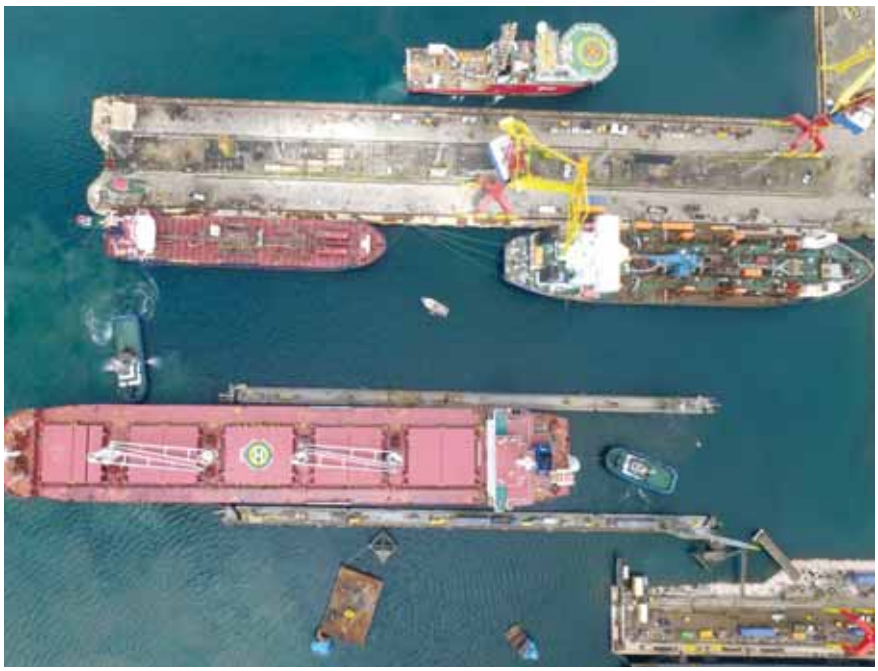
Damen Shipyards Group operates 35 shipbuilding and repair yards, employing 12,000 people worldwide. Damen has delivered more than 6,000 vessels in more than 100 countries and delivers some 180 vessels annually to customers worldwide. Based on its unique, standardized ship-design concept Damen is able to guarantee consistent quality.

Damen's focus on standardization, modular construction and keeping vessels in stock leads to short delivery times, low 'total cost of ownership', high resale values and reliable performance. Furthermore, Damen vessels are based on thorough R&D and proven technology.

Damen offers a wide range of products, including tugs, workboats, naval and patrol vessels, high speed craft, cargo vessels, dredgers, vessels for the offshore industry, ferries, pontoons and superyachts.

For nearly all vessel types Damen offers a broad range of services, including maintenance, spare parts delivery, training and the transfer of (shipbuilding) know-how. Damen also offers a variety of marine components, such as nozzles, rudders, anchors, anchor chains and steel works.

Damen Shiprepair & Conversion (DSC) has a worldwide network of 16 repair and conversion yards of which 12 are located in North West Europe. Facilities at the yards include more than 50 floating and (covered) drydocks, the largest of which is 420 x 90 metres, as well as slopes, ship lifts and indoor halls. Projects range from the smallest simple repairs through Class' maintenance to complex refits and the complete conversion of large offshore structures. DSC completes around 1,300 repair and maintenance jobs annually, both at yards as well as in ports and during voyage.



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Setting the standards for the future of shipping

DNV GL releases autonomous and remotely operated ship guideline

As digitalization continues to reshape the maritime industry, the first commercial autonomous vessels are due to launch in the next several years. To help build a safety culture around these new technologies, DNV GL has released a new class guideline covering autonomous and remotely operated ships.

"A new set of sensor, connectivity, analysis, and control functions in maritime technologies is laying the foundation for remote and autonomous operations in shipping," says Knut Ørbeck-Nilssen, CEO of DNV GL – Maritime. "Increased automation, whether in the form of decision support, remote operation, or autonomy, has the potential to improve the safety, efficiency and environmental performance of shipping. To reach this potential, the industry needs a robust set of standards that enables new systems to reach the market and ensure that these technologies are safely implemented."

The guideline covers new operational concepts that do not fit within existing regulations, and technologies that control functions that would normally be performed by humans. In terms of new operational concepts, the guideline helps those who would like to implement new concepts with a process towards obtaining approval under the alternative design requirements by the flag state. For novel technologies, suppliers can use the guideline to obtain an approval in principle.

The guideline covers navigation, vessel engineering, remote control centres, and communications. Particular emphasis is given in two key areas that emerge from the reliance of autonomous and remote concepts on software and communications systems: cyber-security and software testing. Both the concept qualification process and the technology qualification process include cyber security aspects in the risk analysis.

The first commercial autonomous vessels are due to launch in the next several years.

Not only the systems themselves, but the associated infrastructure and network components, servers, operator stations, and other endpoints should all take cyber security into account, incorporating multiple layers of defence where possible. In terms of software, quality assurance of software-based systems is essential, and well established development processes and a multifaceted end-product testing strategy should be used to ensure safe operation.

"This is a first step in the process to fully realize these technologies," says Ørbeck-Nilssen. "But we continue to develop experience from several projects currently underway. In some areas, such as navigation systems and engineering functions we can already offer technical guidance based on our current class rules and as we progress new guides and rules will follow."

About DNV GL

DNV GL is a global quality assurance and risk management company. Driven by its purpose of safeguarding life, property and the environment, it enables its customers to advance the safety and sustainability of their business.

Operating in more than 100 countries, DNV GL's professionals are dedicated to helping customers in the maritime, oil & gas, power and renewables and other industries to make the world safer, smarter and greener

About DNV GL – Maritime

DNV GL is a major global classification society and a recognized advisor for the maritime industry. It enhances safety, quality, energy efficiency and environmental performance of the global shipping industry — across all vessel types and offshore structures. The company invests heavily in research and development to find solutions, together with the industry, that address strategic, operational or regulatory challenges.

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Scrubbers – the retrofit wave is coming

With the IMO 2020 deadline looming, shipowners around the globe are faced with a difficult choice.

The time for hoping the enforcement of emissions regulations will be delayed has passed, and owners are now forced to decide on how they will comply. Until 1 January 2020, only those operating in the Emissions Control Areas (ECAs) are challenged by the lower sulphur limits, but after that date there are really only two choices: operate using emissions compliant fuels, or ensure that emissions are cleaned using an exhaust gas scrubber.

Goltens COO Roy Strand believes scrubbers will be the clear choice for many: "When emissions regulations are applied globally, the investment in exhaust cleaning will make more sense to many operators. There will be more customers who choose to invest in scrubber technologies due to the clear payback." At the same time, he is aware that the decision to invest may take time to catalyze.

Scrubber retrofits start slow, but momentum is building

"Prior to 2018, Goltens Green Technologies had been involved in many emissions control projects evaluating the retrofit of scrubbers, but most of these projects involved cruise and ferry operators and other vessels that spend large amounts of time in the ECAs," Strand reports. "For other operators, the retrofit projects involved lower cost piping system modifications and fuel oil cooler installations to allow vessels to periodically operate on LSGO as required."

However, he has observed a major uptick in interest since the beginning of 2018, with a much broader range of companies actually pushing to retrofit with scrubbers.

"This has resulted in longer lead times for scrubber delivery and increasing competition for the attention of some of the leading scrubber manufacturers. That said, it still does not appear to be the decision most owners are making."

In Skandinaviska Enskilda Banken AB's (SEB) IMO 2020 Report, they estimate that fewer than 2,000 vessels will have been fitted with scrubbers by the implementation date, and further project a significant price delta between LSGO and HFO providing the scrubber installed vessels with a significant short-term advantage post 2020.

So why aren't more owners rushing to install scrubbers?

The fuel-compliant majority sets the price, but the scrubber-installed minority will benefit

The SEB report highlights that this "wait and see" approach is compounded by the fact that owners pay for scrubbers (CAPEX) and charterers pay for fuel (OPEX), and that if most vessels are operating without scrubbers, the market prices will largely be set by those vessels factoring in higher fuel costs without a competitive disadvantage. The analysis further highlights that those moving to install scrubbers now will be at a competitive advantage compared to their non-scrubber counterparts in the first few years after the implementation. These first movers will likely be able to charge significant "freight rate premiums" to account for the savings on fuel associated with operating the vessel. These premiums are projected to allow for a quick payback on the initial investment as others move more gradually to scrubbers.

At that point, SEB contends that "it will be too profitable and too tempting not to install a scrubber in 2020". Roy Strand concurs, but adds that the likely question for late adopters will be: "How long is the wait?"

About Goltens

Goltens is truly global, providing comprehensive *in-situ* machining, diesel engine expertise and green technologies retrofit services from 25 locations in 14 countries across the globe, serving more than 3,000 clients each year.

Indian Register of Shipping to boost Middle Eastern and African presence

Indian Register of Shipping (IRClass) plans to further boost its presence in Middle East & Africa with new offices

Indian Register of Shipping (IRClass), a leading international classification society, plans to further expand its operations into the Middle East and Africa (MEA) region with new offices in Saudi Arabia, Qatar, Egypt, Lebanon and Nigeria.

The expansion plan underlines its commitment towards the growing number of customers from this region and enhances the classification society's proximity to flag administrations, ship owners, shipyards and other stake-holders in the MEA region.

Managing Director, Mr. Suresh Sinha, said : "The Middle East continues to be a key region for us with its high growth potential. With existing offices in Abu Dhabi, Dubai, Fujairah and RO authorization from UAE, Qatar & Oman flag administrations, our focus for this region will be to further extend our reach and gain recognition from other key flag administrations in the Middle East region.

Suresh Sinha.

"We are also looking to engage with the region's major oil companies to supplement our growth and the proposed new offices will further improve our service levels."

About Indian Register of Shipping

Indian Register of Shipping (IRClass) is an independent ship classification society providing ship classification and certification as well as technical inspection services. IRClass is also a Member of the International Association of Classification Societies (IACS).

Covering a wide range of shipping, offshore and industrial projects, its team of dedicated professionals has brought international standardization and assurance to the doorstep.

Newport Shipping purchases 100 scrubbers for turnkey retrofit services

Newport Shipping Group has purchased 100 scrubbers with options for an additional 100 units from Chinese scrubber manufacturer Weihai Puyi Marine Environmental Technology Co (Puyier).

The bulk purchase of scrubbers, which aims to safeguard shipowners against any price hikes or production bottlenecks as demand increases, coincides with the signing of co-operation agreements with engineering services providers Harris-Pye and Goltens.

Newport Shipping Chief Executive Officer Erol Sarikaya said: "Together with our existing global network of drydocks, we can now offer the marine industry its first-ever turnkey scrubber retrofit solution. We are providing shipowners with a true one-stop-shop for equipment procurement, engineering, guaranteed retrofit slots, and attractive deferred payment plans covering up to 60% of the total contract cover over 18 months subsequent to retrofit completion.

"Having secured an eight-month lead-time for scrubbers ordered by the end of October, we can guarantee shipowners that their retrofits will be completed well in advance of the 2020 Sulphur Cap implementation date."

Engineering will be facilitated by Harris Pye and Goltens, both established marine engineering companies with histories dating back to 1976 and 1940, respectively. These companies will provide 3D scanning and engineering services, including basic and detailed design, prefabrication and, where and when required, riding squads to facilitate partial or full in-service retrofits.

Goltens VP Sandeep Seth said: "The market is gathering pace as more and more shipowners opt for the scrubber solution as the way to comply with the global sulphur cap rule. With the agreement we have reached with Newport Shipping, shipowners benefit not only from our Green Technologies' service offering, but drydock availability, a cost-effective means of financing their scrubber retrofits and a scrubber technology that is proven with more than 50 installations."

Puyier manufactures open, closed and hybrid scrubber systems in both I-type and U-type configuration. It has more than 70 references and 100 units on order

Harris-Pye COO Chris David said: "With the global emissions regulation due to enter into force in just over one year, shipowners and operators are realizing that exhaust cleaning makes more commercial sense due to the clear payback. Harris-Pye further enhances Newport Shipping offerings by providing a significant scope of in-service work which reduces off-hire time at the shipyard for a more rapid retrofit re-delivery."

Roy Yap, Newport Shipping's COO, said: "Having vetted numerous scrubber manufacturers over the past year, including new entrants to the market; we selected Puyier because of its ten-year track record in exhaust gas cleaning technology. Together with our professional network of partners, Newport makes scrubbers accessible for retrofits in service or at the shipyard."

Puyier General Manager Ryan Gao said: "With Newport's bulk purchase of 100+100 scrubbers we are able to pass on any savings to the shipowner while locking in favourable delivery slots. With major scrubber manufacturers offering lead-times of between 16 to 20 months; our established design, supply chain and manufacturing base provide timely eight-month deliveries for Newport customers."

Puyier manufactures open, closed and hybrid scrubber systems in both I-type and U-type configuration. It has more than 70 references including major operators as TRF and RCL and another 100 units on order. The system received approval from all the major classification societies following its installation aboard the containership *COSCO Binghe* in 2013

Newport currently has a pipeline of owners across all major vessel classes for projects totalling 87 of the 100 scrubbers purchased with binding LOIs and contracts.

Newport Shipping's COO Roy Yap (seated left) and Puyier General Manager Ryan Gao sign a partnership agreement for the supply Puyier's marine exhaust cleaning systems.

About Newport Shipping:

Newport Shipping UK LLP, registered and headquartered in London, UK, began operations in 2013 providing comprehensive technical and commercial ship management services to the shipping industry. In 2016, Newport began focusing operations on providing comprehensive drydocking services ranging from ship-repair works, equipment purchases and the timely delivery of spare parts, paint supply, as well as specialized retrofits and equipment upgrades

Newport operates a global strategic network of 13 drydocks capable of handling vessels of all sizes operating across the Atlantic and Pacific trading zones.

Handymax bulk carrier market

an upwards trend

Richard Scott

An upwards trend has continued in the past twelve months, but will it prove sustainable during the year ahead? Freight market rates in the Handymax bulk carrier sector have extended the recovery seen last year from very low levels, but the pace and extent of future improvement has become more questionable. A cautiously positive view of prospects for a further tightening in the global balance between vessel demand and supply is becoming more tentative.

Currently the market for Handymax bulk carriers, which are medium-size dry cargo vessels with a carrying capacity ranging from 40,000 deadweight tonnes up to 65,000dwt, reflects two beneficial trends. Many commodity trades employing these ships are buoyant while fleet expansion has decelerated sharply, reducing overcapacity and, consequently, tightening the market balance.

Handymax bulkers with their highly flexible employment potential proved excessively popular, leading to over-investment. As newbuilding deliveries surged the fleet expanded rapidly. This pattern was reflected in orders for new ships plummeting. Trade growth had initially prompted a freight market upturn and then, this year, the carrying-capacity slowdown has aided the return to strengthening freight market rates.

Slower fleet growth provides a solider foundation for demand enlargement to support the freight market trend. Despite the pickup, from low levels, in vessel orders placed over the past eighteen months, newbuilding deliveries could remain relatively moderate through 2019, partly offset by scrapping of older tonnage. But there are doubts about the growth outlook for future global trade movements relevant to this segment, magnified by recent international trade tensions.

Attractive flexibility

The popularity of these ships as investment opportunities has been underpinned by positive ideas about employment growth potential. Handymax bulk carriers are among the most flexible ship types for operating globally, providing versatility within a very broad range of dry bulk commodity trades. Although this characteristic remains attractive, it is still essential to calibrate supply with envisaged demand, to achieve a balanced market.

Inherent Handymax attractions are emphasized by design features. A typical ship is a 'geared' vessel (cargo-handling gear installed on board), equipped with cranes and grabs for loading and discharging cargo. Sub-categories of larger ships within the group are Supramax and Ultramax.

Efficient operation in trades where shore-based equipment is either unavailable or inadequate is enabled by the Handymax's installed cargo-handling gear. This equipment also facilitates handling cargo offshore, from or into barges, at an anchorage. By contrast bigger bulk carriers in the Panamax and Capesize groups usually are 'gearless', and therefore are totally dependent on cargo-handling by port equipment.

At a wide range of ports, on most trade routes, Handymax dimensions are acceptable while this vessel size offers some economies of scale. Often, an extremely varied employment pattern

results. Involvement in the coal, and grain and soya, trades is frequent and there is sometimes involvement in iron ore. Minor bulk commodity trades 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.

In recent years investment interest firmly shifted towards higher capacity 60–65,000dwt vessels, 'Ultramax' bulk carrier designs at the top end of the Handymax size range. Previously the 'Supramax', typically 52–57,000dwt, was the preferred unit and became ubiquitous, taking over from smaller Handymaxes below 50,000dwt.

Fleet growth weakens

A decelerating pace of world Handymax bulk carrier fleet growth is now under way. As shown by the table, deadweight capacity expansion slowed to 4% last year, after averaging 6% annually in the previous three years. In 2018 a halved rate of increase to just over 2% seems likely, and next year may see a similar modest advance.

According to figures compiled by Clarksons Research, Handymax capacity reached 196.0 million deadweight tonnes at the end of 2017. There were 3,553 vessels within the size group. This total comprised 24% of the entire 817.3m dwt world fleet of all sizes of bulk carrier. Over a five years' period Handymax capacity had increased by about one-third.

During the 2018 first eight months, fleet deadweight capacity was augmented by almost 2%, boosting the total to 3,609 ships amounting to 199.7m dwt at end August. Newbuilding deliveries diminished sharply from last year's pace, but scrapping also receded.

Shipyards around the world completed between about 11m and 16m dwt of new Handymaxes annually in the past five years, including 10.8m dwt in 2017. Only one-quarter to one-third was offset by sales for demolition. Scrapping in the past few years remained quite modest, within a fairly tight 3–4m dwt range, including 3.1m dwt in 2017, equivalent to about 2% of the fleet recycled in each year.

Noticeably there was a large difference between the average newbuilding vessel size delivered into the fleet, and the average size of those sold for demolition. Last year deliveries averaged 60,700dwt, confirming popularity of Ultramaxes at the top end of the Handymax range. Ships sold for scrapping averaged 46,300dwt, representing an earlier era when the 40–50,000dwt size was seen as most valuable.

In 2018 as a whole newbuilding Handymax deliveries look set to fall well below last year's volume. A 50% reduction could be seen, based upon the pace so far, coupled with expectations for the year's remaining months. It is still difficult to estimate a figure precisely because orderbook slippage and delays are hard to assess.

The scrapping volume this year seems likely to decrease, possibly by two-thirds, although it also is not easy to predict. Any unforeseen sharp change in freight market rates, secondhand vessel values and market sentiment in the year's final weeks could have a large impact on the outcome.

Modestly growing fleet ahead?

Expectations for fleet capacity in 2019 suggest that another limited expansion is quite likely. The global orderbook schedule for new Handymax bulk carrier deliveries in the next twelve months or more is low, restricting the foreseeable inflow of additional capacity. Scrapping will be a partial offset. However, both flows will be affected by evolving freight market patterns, and by changing market views and sentiment.

Reported newbuilding orderbooks at shipyards provide a rough guide to the amount of future fleet capacity likely to be added. The pickup in contracting for new Handymaxes last year from a minimal volume in the previous twelve months did not prevent the overall orderbook declining (as incoming new orders were exceeded by outgoing deliveries), but the total is still sizeable. Well over four-fifths of the Handymax orderbook's deadweight

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

	2013	2014	2015	2016	2017	2018
Newbuilding deliveries	14.7	11.4	15.9	13.2	10.8	5.5
Scrapping (sales)	3.5	3.2	3.1	4.3	3.1	1.0
Losses	0.2	0.0	0.1	0.0	0.1	0.1
Plus/minus adjustments	0.0	0.0	0.0	0.1	0.0	0.0
Fleet at end of year	**158.6**	**166.8**	**179.5**	**188.4**	**196.0**	**200.5**
% change from previous year-end	+7.4	+5.2	+7.6	+4.9	+4.0	+2.3

source: Clarksons (historical data) & BSA 2018 forecasts **forecast*

capacity currently is comprised of Ultramax vessels.

Over the past couple of years changed perceptions, about the outlook for the freight market and investment returns, affected incentives to invest in new ships. Two years ago during 2016 one of the most striking changes in the modern era of newbuilding contract dynamics unfolded, with collapsing orders seen in all bulk carrier size groups. Following a massive reduction in orders in the preceding year, annual new Handymax orders in 2016 declined again to below 1% of the existing fleet, just 11 ships, according to Clarksons Research. During the following year, 2017, a revival saw 84 added, while in the current year's first eight months the total was 39.

Shipowners' views of potential for market recovery became more cautious, after the prolonged period of depressed freight rates and only moderate signs of an upwards trend. Limited confidence has since returned. Overcapacity in the Handymax and other bulk carrier segments is still apparent, and an extended adjustment period seems to be necessary before a more balanced market is fully restored.

Although still contributing to enlarging fleet capacity, the Handymax orderbook for all delivery years is now down to a low 12m dwt total or 6% of the existing world Handymax fleet. A large proportion is scheduled for completion in the relatively short period up to the end of 2019.

Any substantial change in recycling activity also will affect fleet growth, a key imponderable for the immediate future and further ahead. Vessel age aspects alone indicate limited potential for scrapping old tonnage.

The Handymax fleet is relatively young. Only 7% (about 14m dwt) is over 19 years old, mostly in the 40–50,000 dwt size sub-group. Nevertheless, tightening regulations and compliance costs progressively could encourage more scrapping.

The Ultra Progression *Supramax vessel.*

Extensive employment

Typical features offered by Handymax bulk carriers ensure wide employability. Voyage patterns show that almost all dry bulk commodity trades are accessible, with only a few limitations. But major parts of global 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.

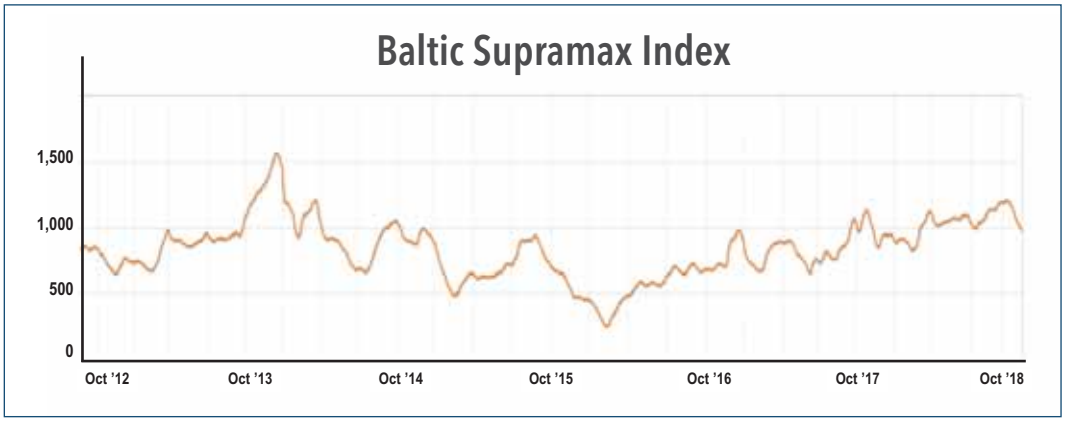
Recent research suggests that the iron ore and coal trades each contribute about one-tenth of employment for Handymax bulkers in the 40–65,000dwt size group. Grain and soya trade contributes roughly 20%, while the remaining and dominant category of employment for these ships contributing around 60% is the extensive minor bulk trades, including a variety of cargoes.

Many coal trades are prominent among Handymax users. Movements often employ bigger ships, but Handymax size cargoes amount to huge volumes. In total, seaborne coal trade is the second largest global dry bulk commodity trade after iron ore, amounting to a massive quantity reaching 1,200mt (million tonnes) last year, approaching one-quarter of all global dry bulk cargo movements.

Despite negative influences restraining growth in recent years, coal trade saw an upturn in 2017 after previous weakness. In the preceding period reduced volumes had pointed to a possible downwards trend emerging. There are signs of further growth in 2018. Movements consist of steam coal (used chiefly in power stations, and also in other industries), and coking coal (used in the steel industry). Steam coal is the largest category, comprising over three-quarters.

One trade utilizing Handymaxes extensively is shipments from Indonesia, mainly steam coal. Indonesia is the world's

largest exporter of this coal type, with a total estimated at over 380mt last year. Short-haul shipments to China comprise much of this trade, however, limiting the vessel employment duration on a single voyage and therefore restricting overall demand.



Huge steam and coking coal imports into China further regained momentum in 2017 after a sharp downturn, and seem to be strengthening again this year, benefiting Handymax involvement. Coal imports (including lignite) rose by 6% to reach 271mt last year. In India, also one of the world's largest importers, annual volumes were slightly higher last year after previously weakening. A 2% increase to 203mt was reported in 2017 and another rise may follow in the current period, with positive implications for bulk carrier employment.

Numerous cargoes for Handymaxes are provided by global trade in grain and soya. This market segment is characterized by a continuously changing pattern of trade routes and quantities which is highly variable and unpredictable. During the past crop year ending mid-2018 global trade in wheat and coarse grains, and also in soyabeans and meal, increased solidly. The current 2018/19 year ending mid-2019 could see further, albeit possibly smaller, increases.

World trade in wheat plus corn and other coarse grains was 14mt or 4% higher in crop year 2017/18 ending June, compared with the previous twelve months, reaching 368mt, according to International Grains Council calculations. In the soyabeans and meal segment, world trade was 7mt (4%) higher in marketing year 2017/18 ending September, at 212mt, based on US Dept of Agriculture estimates. Additional grain and soya imports into a wide range of countries around the world were seen in the recent period.

Suitability for carrying grain cargoes is enhanced by the versatility of Handymax bulk carriers. Utilization of these vessels benefits from the constantly changing global trade pattern which necessitates flexibility. Large increases or decreases from year to year in volumes available in exporting countries, and in quantities required in importing countries, often reflect harvest output fluctuations. Port and storage limitations in many countries also provide opportunities.

During the period ahead, wheat and coarse grains imports into many countries and areas are expected to be similar to volumes seen in the past twelve months. At present changes, upwards or downwards, seem likely to be mostly minor. Among soya importers some growth is foreseen. But China's imports of soyabeans, which previously had been predicted to approach the 100mt annual level, are now surrounded by uncertainty as a result of the trade dispute, indicating that the previous annual 94mt may not be exceeded.

Within the 'minor dry bulk trade' category, Handymaxes are widely employed carrying varied cargoes. Many individual elements of this commodities group are not actually minor but large, collectively amounting to massive annual volumes. The commodity range is extensive and in 2017 the overall total appears to have been over 1,900mt. Last year trade picked up after apparently minimal growth previously.

The biggest minor bulk trade components are steel products (coil, sheet, plate and other items), and forest products, although not all these quantities are carried by bulk carriers. Big volumes are contributed by the bauxite/alumina (aluminium raw materials), fertilizer raw materials and semi-finished fertilizers, and cement trades, accompanied by large quantities of ores and minerals such as nickel and manganese ore.

An especially prominent example is exports of steel products from China, a huge trade frequently employing Handymaxes. Unlike many other minor bulk trades which increased last year, China's steel exports fell steeply by 30% to 76mt, amid a strengthening domestic market. Another decrease seems likely in the current year.

Firming freight market

Freight market rates for Handymax bulk carriers have maintained a strengthening trend this year, reflecting signs of surplus capacity diminishing both in this size group and elsewhere. Amid slowing growth in the world fleet of Handymaxes, together with a positive performance in commodity trades employing these ships, the market balance has improved.

During last year's final months and into the early months of 2018 there was a distinct slackening in the freight rates trend. The Baltic Supramax Index calculated by the Baltic Exchange is a useful indicator of the sector's progress. Soon after reaching a low (within the past twelve months) of 817 index points in mid-February this year there was a solid pick up, resulting in the BSI remaining within a 1,000–1,200 range for most of the period since then. In early October the highest point in that range was being recorded.

This firming trend has provided encouragement for shipowners who have experienced a return to more remunerative activities. Is this pattern likely to persist over the next twelve months or so?

While the Handymax size group is a distinct market segment, it is not isolated from the bulk carrier market as a whole. Overcapacity in the broader market remains a prominent feature even though a better balance has evolved across the bulk carrier size groups. Slower fleet growth may assist in ensuring that trade and vessel demand expansion matches or exceeds capacity growth in the period ahead.

But escalating international trade tensions overshadow the outlook, which has become less predictable. Partly as a result, many forecasters have become more cautious about prospects for global economic growth and trade in 2019. It seems clear that greater headwinds are emerging, potentially affecting adversely numerous commodity trades where Handymax bulk carriers participate. In such circumstances fleet capacity expansion restraints may be insufficient to sustain the improving market balance and freight rates trends seen recently. DCi

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Investing in the future

Maximizing operational efficiency is the new normal in the shipping industry and is being driven by environmental and economic imperatives, *writes Andreas Glud, Group Segment Manager, Dry Dock, Hempel A/S*. Each day we are made aware of the impact our activities have on the natural environment and shipping, despite being regarded as the most environmentally sustainable form of mass transport for cargo, is a major source of carbon emissions and other pollutants.

This has pushed the International Maritime Organization (IMO) to embark on a pathway to reduce the industry's annual global carbon emissions by 50% by 2050. At the same time, the IMO 2020 global sulphur cap comes into force shortly and the Ballast Water Management Convention is already changing the way ship operators dispose of waste water — environmental concerns are very definitely at the top of the maritime agenda.

The second driver is economic. Individually shipowners and operators are seeking new methods and solutions to maximize their operational efficiency to improve their bottom line. In the dry cargo sector specifically, some bulk operators have benefited from an improvement in freight rates, particularly since the lows of 2015 and 2016, but survival for the long-term means making intelligent investments today.

Step by step

Complying with this raft of environmental regulations requires big changes, but shipping tends to move relatively slowly. To meet the new sulphur cap, a ship will need to burn low sulphur fuel, which can be up to 50% more expensive than traditional fuels, or fit a scrubber to its exhaust system — again a costly process, taking time to install.

Similarly, to meet the 2050 carbon emission targets shipowners will need to burn alternative fuels such as LNG or hydrogen and the technology to achieve this is still being developed. Successfully monitoring and controlling fuelling requirements, maximizing energy consumption and improving operational performance is rapidly becoming a top priority for dry cargo operators.

Perhaps a first, and more manageable, step is to look below the waterline, where an optimized hull design can improve the hydrodynamics of a ship. But design advantages can be countered all too easily by the sea's natural flora and fauna, where fouling accumulation on the hull of a vessel will creating frictional resistance and increase fuel consumption.

Untreated hard fouling can lead to a dramatic 18% drop in efficiency (on average over five years) as the ship burns more and more fuel just to maintain a given speed. This is where investing in the right hull coating can make a real and meaningful difference.

Unsurprisingly, not all hull coatings are the same. When it comes to choosing a coating, it should be selected based on the performance aspects of each individual vessel. The current extremely competitive dry bulk market means that operators must maintain flexibility in their trading patterns and should select a hull coating that retains its characteristics in all environments.

Hempel's Hempaguard® range is such a solution. This unique coating delivers a six per cent fuel saving across the entire docking interval with a maximum speed loss of just 1.4% over five years. Unlike regular hull coatings that are usually specified according to the vessel's speed and activity level, Hempaguard remains effective when switching between slow and fast steaming — perfectly suited to a tramp vessel which needs to vary its sailing routes and trading patterns without losing performance.

In the dry bulk sector, where vessels often move between warm and cold waters and routinely switching between slow and regular speeds — this coating is a good fit. Since it provides outstanding resistance to fouling growth during idle periods (of up to 120 days), protection is also delivered when the vessel is off-hire. With 95% less biocide than traditional

antifoulings, Hempaguard is also significantly kinder to the environment. Uniquely, it is the only hull coating to combine the low surface friction of silicone with super-efficient fouling preventing biocides, in a single coat — this is Hempel's patented Actiguard® fusion technology.

Taking it one step further

Selecting and applying the paint is only part of the protection process. Hempel also offers an exceptional level of data gathering and analysis using intelligent software to identify long-term trends. From this, tailored in-service KPIs can be developed to deliver further valuable operational efficiencies.

Dry bulk operators are increasingly using these new hull performance monitoring systems to gain unrivalled insight into how their vessel is performing, allowing them to assess exactly how their coating solutions are measuring up.

By using the intelligent data monitoring system that comes with Hempel's SHAPE (Systems for Hull and Propeller Efficiency) operators can make informed data-based decisions on how to optimize their efficiency. Based on the ISO 19030 framework, SHAPE defines a methodology to measure changes in hull and propeller performance and using the resulting data, provides a set of bespoke performance indicators for hull and propeller maintenance, for each vessel.

The process is simple and there are six key stages to gathering the data. First, the vessel's individual speed power reference curves are established. This is followed by the collection of in-service data which is then cleansed and purified to eliminate extreme operating conditions and the effects of environmental factors. Next, a precise speed loss calculation is performed. This is a critical measure for understanding vessel performance and fuel efficiency as the power increase and speed loss are directly related. From this, the four vital KPIs can be calculated:

- **Dry docking performance:** calculates the changes in hull and propeller performance over drydocking periods.
- **In-service performance:** calculates the effectiveness of the vessel's hull and propeller solutions.
- **Maintenance trigger:** calculates the change in hull and propeller performance over a given period between drydocking and in-service use.
- **Maintenance effect:** calculates the change in hull and propeller performance before and after a maintenance event.

Once this in-depth analysis has been completed, Hempel can provide solid advice to the ship operator, outlining the actions they can take to positively impact their fuel efficiency and develop best practice. Unsurprisingly as an industry expert in hull coatings, this includes identifying and applying the right coating solution to optimize the vessel's performance, ensuring the coating properties are fully aligned with the trading requirements of each individual vessel.

By utilizing systems such as SHAPE, ship operators can make informed, performance-based and data-driven decisions. Using SHAPE in conjunction with advanced hull coatings such as Hempaguard X7 means that even greater fuel savings can be achieved.

Given the anticipated increase in fuel costs from 2020, and the continued debate around the viability and sustainability of the full range of fuel compliance options available, the focus on harnessing operational efficiencies remains paramount.

By selecting a performance enhancing coating such as Hempaguard X7, a shipowner can support their fleet, both in the short-term and in the long-term regardless of the fuelling solution they adopt. This will provide, an additional buffer against market uncertainty and increased fuelling costs. Importantly, they can achieve this while delivering a cleaner future for the entire industry. DCi

Aerodynamics in rail haulage?

Ecofab has got it covered

Ecofab's rail wagon covers improve fuel efficiency and cut the cost of rail haulage

Ecofab Cover Systems Inc., a well-regarded provider of solutions covering rail hauled bulk commodities, has been very busy in expanding its business throughout several countries including the United States, Canada, Australia, Africa and the Middle East. This expansion has led it to increasing its research and development (R&D) department. Ecofab's R&D team has successfully developed some new custom wagon cover systems to suit its ever-growing clients' requirements.

Ecofab is having ongoing success in providing automatic and semi-automatic wagon covers to ex-coal hopper wagons to enable these wagons to haul agricultural products. This has been a cost-effective solution to the industry, especially with the downturn in coal markets resulting in surplus redundant coal wagons.

Ecofab has undertaken a number of aerodynamic studies with NASA, the University of British Columbia and aerodynamic engineering consultants. These studies have been aimed at reducing the aerodynamic drag on trains, which leads to improved fuel efficiencies. This is a field of great interest to all of the company's existing and future clients. In the past, with lower fuel prices, railways were not that interested in fuel-reduction technologies. There has been a generational change and Ecofab has found that railways are now heavily focused on reducing fuel costs. It has a number of clients that have reported they use approximately the same amount of fuel if they are hauling either a loaded or empty freight train on similar terrain at similar speeds. Fuel costs are generally the second-highest expense to railways, second only to labour costs. Consequently there are determined efforts throughout the railways to reduced fuel costs using new technologies. Ecofab wagon covers can reduce aerodynamic drag on an open top freight train (travelling at 80km/hr on level terrain) by up to 43%. This drag reduction produces significant fuel savings. Ecofab is also working on further drag-reduction technology for freight trains that will provide increased fuel efficiencies, a critical factor going forward with ever-increasing fuels costs.

The fuel savings generated also provide another benefit that has not normally been considered within the railway industry, and that is reduced CO_2 emissions. Nearly all railways now have a strong corporate message about reducing CO_2 emissions. The environmental departments within railways are actively engaged in a host of programmes aimed at reducing these emissions. There is a direct correlation between fuel consumption and CO_2 emissions; Ecofab's wagon covers provide an immediate benefit in both these areas.

Since commencing business over 40 years ago covering wood chip wagons, Ecofab has seen an expanding market

where it has or is now covering a diverse range of commodities such as fertilizer, ore concentrates, lithium concentrate, wood chips, iron pellets, coke, fly ash/flue ash, coiled steel, finished steel, hazardous waste/contaminated soil, and radioactive materials. These vary from the agricultural and mining industries to contaminated wastes including radioactive materials. Environmental groups and the community are actively lobbying governments to demand industries accept their environmental responsibilities. These lobbying efforts are now being reinforced by litigation in many jurisdictions throughout the world. Ecofab can not only assist industries in meeting environmental responsibilities but provide a host of other operational benefits to its customers.

Benefits

Covering of bulk hauled products with Ecofab covers provides many benefits such as:

- significant fuel savings through reduced aerodynamic drag;
- avoiding ballast contamination;
- elimination of product losses from both loaded and empty rail wagons;
- rail wagons kept free from contamination;
- back-haulage possibilities;
- faster and safer loading and unloading;
- enhanced corporate environmental image;
- less track maintenance, increased system capacity;
- low tare covering system;
- nil or minimal rail wagon modifications;
- eliminates moisture pick up;
- no added maintenance task;
- financially attractive leasing package; and
- proven safety record.

Ecofab is well respected for its systems of protecting rail hauled bulk commodities in the markets it currently serves. DCi

Port of Longview handles wide range of bulk cargoes, including fertilizer

The USA's Port of Longview is the first full-service operating port with strategic transportation connections on the deep-draught Columbia River shipping channel in southwest Washington state. The port is located just 66 river miles from the Pacific Ocean, 120 driving miles from Seattle, Washington, and 40 driving miles from Portland, Oregon. Port facilities include eight marine terminals and waterfront industrial property with direct connections to main-line rail and interstate highway.

Geographic advantages come naturally in Longview:

Situated between the Columbia River and major landside rail and interstate systems, the Port of Longview's transportation connections are as strong as its partnerships.

From Longview, you can connect to the Pacific Ocean on one tide and reach main transportation arteries across the United States in just minutes.

With proven capabilities and convenient access to world markets around the globe, the Port of Longview is an ideal hub for international connections.

The Port of Longview handles a wide range of bulk commodities, including:

- bentonite clay;
- distiller's dried grains;
- iron oxide fines;
- oats;
- petroleum coke;
- potash;
- salt;
- soda ash;
- soya meal; and
- talc.

It also handles various breakbulk and project cargoes including:

- construction materials;
- mill assembly parts and equipment;
- pulp and paper products;
- steel;
- cranes and modules wind turbine components;
- heavy lift equipment and machinery;
- over-dimensional tanks;
- over-dimensional;
- wind energy; and
- Yankee dryers and generators.

With regards to fertilizer, the port handled import cargoes (including tropicote and potash sulphate) of 11,957 metric tonnes and export cargoes (potash muriate) of 124,681 tonnes in the first nine months of 2018.

Equipment and facilities at the Port of Longview

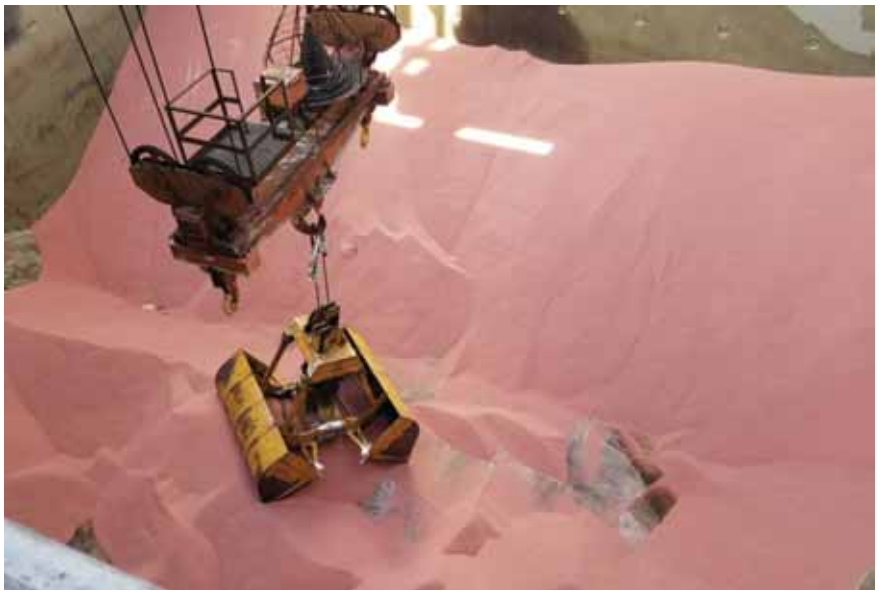
- 100,000ft^2 of on-dock covered storage;
- two Liebherr mobile harbour cranes;
- on-dock rail;
- dust-controlled hopper and conveyor systems;
- 32 cubic yard bucket;
- dual-served by BNSF and UP.

Metro Ports offers expertise in handling all types of fertilizer at US ports

Metro Ports is a subsidiary of Nautilus International Holding Corp. (Nautilus), a privately held stevedore and terminal operating company with headquarters in Long Beach, California, *writes Metro Ports Business Development Vice President Ted Winter*. Metro Ports can trace its roots to the California gold rush when the company was founded as California Stevedore and Ballast Co. in 1852.

The development of the ports of Los Angles and Long Beach led to the formation of a second company in 1923, Metropolitan Stevedore Company – Metro Ports as it is known today. The company has been in continuous operation in the maritime industry for the past 166 years.

Nautilus operates in 20 US ports, handling millions of tonnes of import and export commodities with an emphasis on a wide range of dry bulk and bagged fertilizer



products, such as urea, potash, and nitrates, as well as liquid urea ammonium nitrate, commonly known as UAN. Metro's locations for handling these fertilizers include Wilmington, N.C.; Morehead City, N.C.; Galveston, Texas; Burns Harbor, Indiana; Stockton, Calif.; and Long Beach, Calif.

In most instances, dry bulk fertilizers are unloaded from vessels or river barges, using conventional type clamshell buckets where the fertilizer cargoes are discharged into shoreside hoppers and conveyed or trucked into flat storage warehouses. Most of these storage facilities are leased from public port authorities and retrofitted to meet the various demands of fertilizer producers and traders so as to avoid contamination and moisture, as well as provide separation between various grades. Imported bagged products are normally discharged using highly automated spreader bars to achieve maximum production.

Besides vessel and barge stevedoring activities, Metro Ports also provides many value-added services, such as blending, screening, conditioning, bagging, and palletizing, in its warehouse facilities before products are either delivered to trucks or railcars. Unlike other dry commodities, fertilizer commodities can present their own set of unique handling and market challenges. Because of the corrosive nature of these products, proper maintenance and care of mobile equipment that is regularly exposed to these conditions is critical to maintaining the efficiency and operating life of this equipment.

Metro Ports has partnered with most of the major fertilizer producers and traders during a number of years by developing a deep understanding of the end-clients' needs and challenges, whether it be the effects of climate change, seasonal demand by growers, or simply the economic impact of fertilizer prices impacted of global supply and demand in the market. To that end, Metro Ports has entered into long-term contracts that provide for the agility to take these external circumstances into account, therefore a true partnership.

The Port of Hamburg: taking universality to the next level

The Port of Hamburg in Germany is one of the world's most flexible and effective universal ports. There are around 9,000 ship calls annually; 280 berths for ocean-going ships; more than 2,000 freight trains per week and around 50 specialized handling facilities for containers, bulk and general cargoes of all types, along with around 7,200 logistics companies. Among the many commodities that Hamburg handles is fertilizer — recent statistics are shown in the tables opposite.

One port: infinite potential

The Port of Hamburg as universal port offers the right terminal for all types of freight, including fertilizer. On an area of over 71km², more than 60 cargo handling companies ensure smooth handling of an immense variety of cargoes.

The 280 berths there can accommodate craft of all sizes, including mega-containerships and bulkers, oil and chemicals tankers, RoRo and general cargo freighters, feederships and inland waterway vessels. State-of-the-art handling technology and data communications systems, efficient traffic infrastructure and high-performance feedership and hinterland links cater for the exchange of cargoes with partners throughout the world.

In addition, the port discharges an essential function in supply and waste disposal logistics for industry in Hamburg and the Metropolitan Region. Raw materials and finished goods of all types are imported via Hamburg for trade and

SEABORNE TRAFFIC — PORT OF HAMBURG

All countries
Nitrogen compounds and fertilizer

Commodity	Tonnes total				Tonnes excl. container			
	2016	2017	Diff.	%	2016	2017	Diff.	%
Nitrogen compounds and fertilizers (except natural fertilizers)	4,125,600	4,295,837	170,237	4.1	2,513,661	2,644,033	130,372	5.2
Chemical and (natural) fertilizer minerals	4,620 11,393	6,733	146.6	0	0	0	*	
Total	**4,130,220**	**4,307,230**	**177,010**	**4.3**	**2,513,661**	**2,644,033**	**130,372**	**5.2**

SEABORNE TRAFFIC — PORT OF HAMBURG

All countries — inward
Nitrogen compounds and fertilizer

Commodity	Tonnes total				Tonnes excl. container			
	2016	2017	Diff.	%	2016	2017	Diff.	%
Nitrogen compounds and fertilizers (except natural fertilizers)	624,309	596,466	–27,843	–4.5	107,151	121,664	14,513	13.5
Chemical and (natural) fertilizer minerals	1,226	4,018	2,792	227.7	0	0	0	*
Total	**625,535**	**600,484**	**–25,051**	**–4.0**	**107,151**	**121,664**	**14,5133**	**13.5**

SEABORNE TRAFFIC — PORT OF HAMBURG

All countries — outward
Nitrogen compounds and fertilizer

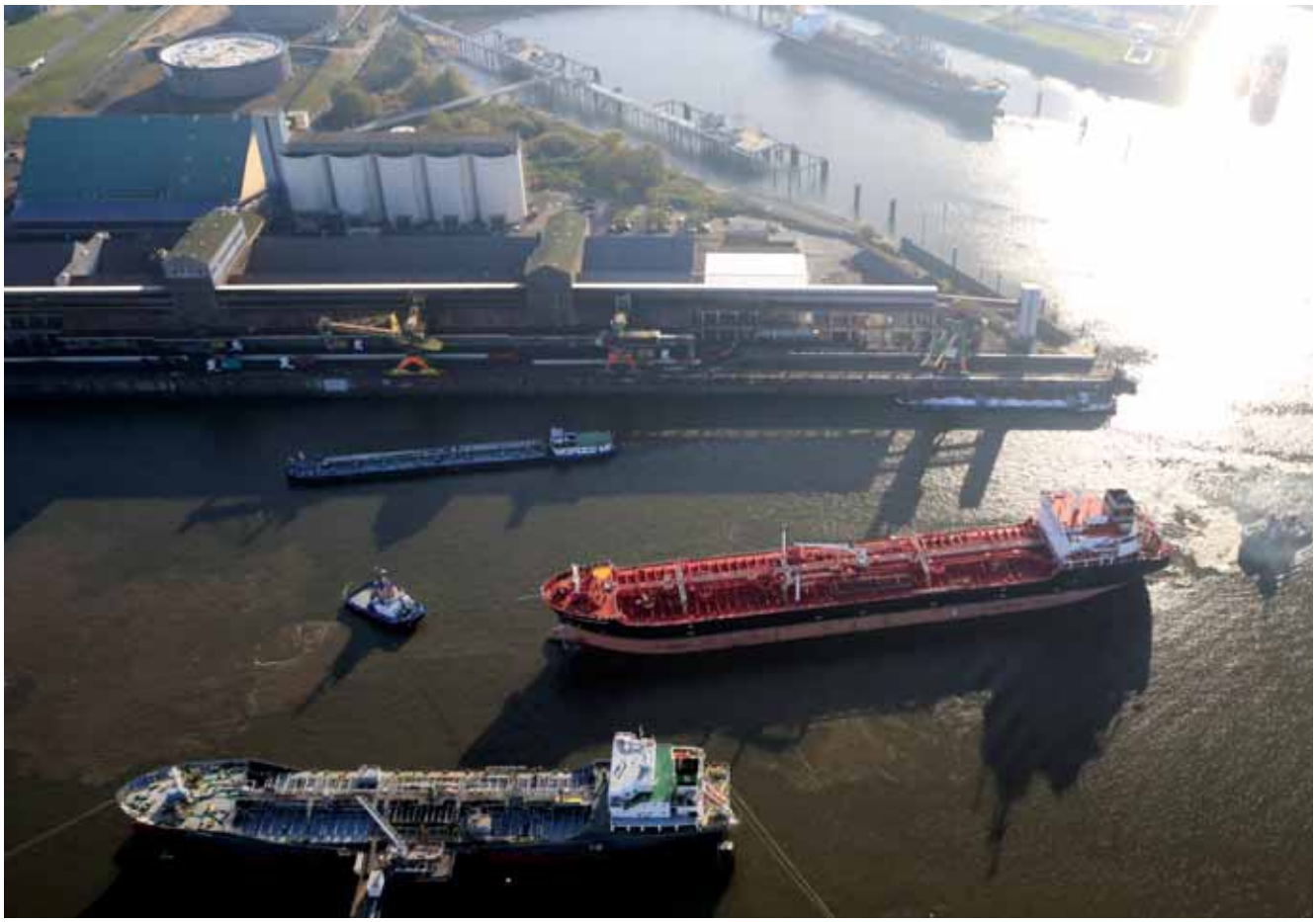
Commodity	Tonnes total				Tonnes excl. container			
	2016	2017	Diff.	%	2016	2017	Diff.	%
Nitrogen compounds and fertilizers (except natural fertilizers)	3,501,291	3,699,371	198,080	5.7	2,406,510	2,522,369	11,859	4.8
Chemical and (natural) fertilizer minerals	3,394	7,375	3,981	117.3	0	0	0	*
Total	**3,504,685**	**3,706,7446**	**202,061**	**5.8**	**2,406,510**	**2,522,369**	**115,859**	**4.8**

industry, or leave the industrially enhanced universal port on the Elbe as exports.

Gateway to the world

The port's geographical location and the excellent performance of businesses there make the Port of Hamburg Germany's pre-eminent foreign trade hub. As a cargo handling, storage and logistics hub, the port ensures high added value and employment in the Hamburg Metropolitan Region. On a countrywide basis, this universal port annually generates added value totalling around €22 billion.

Almost 270,000 jobs in Germany are linked to the Port of Hamburg, At the interface of international transport chains, it also fulfils an essential function as a hub for its European neighbours and international trading partners. So Germany's largest seaport is of immense importance for efficiently supplying European inland markets, with around 500 million consumers.



Port of Newcastle reports on fertilizer throughput

In 2017, the Port of Newcastle in Australia handled 587,852 tonnes of fertilizer, an increase of 19% (94,730 tonnes) on 2016. Port of Newcastle imports fertilizer through the Newcastle Bulk Terminal at Walsh Point for distribution to agricultural hubs across New South Wales (NSW).

The port recently commenced a $33 million project at the Newcastle Bulk Terminal that will see the introduction of new crane and conveyor infrastructure incorporating the latest in safety and environmental compliance features. The new crane will be a slewing/luffing grab crane that will be able to accommodate a diverse range of cargo types and significantly increase efficiency. Kerman Contracting is delivering the project for the Port of Newcastle and has partnered with Tenova Takraf, which will design and build the crane. The new unloader will have a capacity of 1,000 tonnes per hour.

The investment in new infrastructure, including a new unloading crane, will provide additional terminal capacity for new trades as well as growth from our existing customers.

Improved efficiency at the berth means greater access, more volume capacity and lower costs for a wide range of bulk products supplying the agricultural, mining and industrial sectors.

The Port of Newcastle has significant capacity for bulk freight growth, with existing road and rail supply chains to and from major export and import centres. Newcastle's natural catchment encompasses NSW's prime agricultural regions and significant mining developments, extending west of Parkes and north to Moree, taking in Cobar, Dubbo, Tamworth, Armidale, Narromine and Walgett.

Start of European research project for converting coal-fired power plant to biomass

This month (November), the European ARBAHEAT consortium started a research project to investigate the conversion of the ENGIE Ultra-SuperCritical coal-fired Rotterdam power plant into a biomass-fired heat and power plant. The innovative technology used to produce the required steam treated biomass has been developed by the Norwegian company Arbaflame AS.

The goal of this showcase is to investigate the technical possibilities of cost-effectively converting the coal-fired power plant into a flexible 100% sustainable biomass fired plant, which will be able to deliver sustainable electricity as well as sustainable heat. For this project the consortium will receive over € 19 million EU funding.

The ARBAHEAT project is aimed at integrating an innovative biomass pre-treatment installation into the ENGIE coal-fired power plant. The installation will produce so-called steam treated biomass pellets from sustainable biomass, which complies with the most stringent EU sustainability criteria.

These pellets were specifically chosen as energy source as they have comparable characteristics to coal. Compared to normal biomass pellets they are more water resistant, have a higher energy density and have almost the same burning characteristics to coal. This will facilitate the use in an existing power plant and significantly reduce costs for converting the existing coal-fired power plant to biomass.

Although parts of the steam treatment technology and resulting biomass pellets have been tested before by Arbaflame on 15 other power plants, demonstrating the cost-effective integration of the technology into an existing modern power plant has never before been done to this extent. "A successful demonstration of this concept will establish an impressive showcase for other EU coal-fired power plants or even to other bio-energy plants", says Arbaflame CEO, Håkon Knappskog.

Promising solution for retrofitting modern coal-fired plants in a cost-effective way

The European ambitions to limit CO_2 emissions has a significant impact on the operation of coal-fired power plants and on the required balancing power to support the grid supplementary to solar and wind energy.

Retrofitting some modern existing coal-fired power plants with the ARBAHEAT concept could offer a significant contribution to the realization of decarbonization targets in Europe by adding sustainable heat and power flexibility.

The state-of-the-art ENGIE power plant is the perfect candidate for this first demonstration project because of its size and strategic location in the port of Rotterdam. "The plant can play an important role in the harbour of Rotterdam not only supplementary to wind and solar but also in providing heat. However at this moment there is no viable business case to convert a coal-fired powerplant into a 100% sustainable and flexible biomass plant. A successful demonstration will allow for delivering large amounts of sustainable electricity and heat to the surrounding area," says manager Coal ENGIE, Jeroen Schaafsma. Besides energy, the project will also produce other biological side-products from the steam treatment process, such as biochemicals, allowing for an even more sustainable and cost-effective conversion of the power plant.

Energy, science and EU government join hands in achieving sustainability goals

This four-year demonstration project brings together European expertise from the energy sector, the scientific community and the renewable energy sector committed to achieving the EU sustainability goals. In addition to ENGIE (NL) Arbaflame (NO), PNO Consultants (NL), TNO (NL), Sintef (NO), Free University of Brussels (VUB, BE), Port of Rotterdam (NL) and University of Bergen (NO) are also members of the ARBAHEAT consortium.

The consortium partners have all the relevant knowledge and resources available to make the ARBAHEAT project to a success. With the € 19 million grant the EU acknowledges the sustainability of the project and its targets and supports the implementation of this demonstration project.

Günter Jung GmbH relies on Liebherr L 580 XPower® wheel loader for greywacke extraction

The Liebherr L 580 XPower® wheel loader feeding blast material into a crusher.

Rugged American lorries for bulk material transportation are pairing up with high-performance Liebherr equipment for the greywacke (a coarse type of sandstone) extraction process.

Based in Germany's Sauerland region in North Rhine-Westphalia, quarrying company Günter Jung GmbH operates a very special fleet of machinery, which boasts the L 580 XPower® wheel loader as its latest addition. About a year on from purchasing it, company owner Günter Jung is very satisfied with the machine: "We are glad to have chosen the XPower® wheel loader from Liebherr. It delivers loads of power while being efficient and reliable," he said. The L 580 XPower® is predominantly used in load-and-carry applications and feeds material into crushers and lorries. An eye-catcher in its own right, the wheel loader turns even more heads when it is loading one of the American lorries.

Günter Jung GmbH specializes in the extraction and processing of greywacke. The quarrying firm produces bulk material of various quality grades for use in industries such as special-purpose civil engineering. The high-quality quarry stones, irregular paving slabs, decorative stones and rectangular stone blocks are used in both construction and landscaping.

The L 580 XPower® wheel loader plays a key role in the extraction and processing of these products in the quarry. It picks up blast material at the quarry face and transports it to the two crusher units. In this process, the machine travels a distance of about 100 metres with ease. With its power-split driveline, the approximately 28-tonne wheel loader has no difficulty in covering this distance, which includes an incline of around 15 metres in length. Günter Jung explained: "I am completely amazed by the L 580's XPower® driveline. Our quarry area includes a steep ramp and the machine negotiates it with ease."

L 580 XPower® as the ultimate wheel loader for load-and-carry applications

Since its commissioning in June 2017, the Liebherr L 580 XPower® has proved to be ideally suited to load-and-carry applications at Günter Jung GmbH. The rugged Z-bar linkage can exert high breakout forces in the lower region of the lift arm. This plays a vital role in picking up blast greywacke using the 6.0m³ rock bucket efficiently. During material transportation, the power-split driveline ensures a smooth ride and a high level of performance by automatically adapting to the current driving situation. As a result, the L 580 XPower® contributes to boosting the quarry's productivity. "The new Liebherr wheel loader allows us to handle 1,500 tonnes of greywacke on a daily basis. At the same time, its average diesel consumption of 12 litres per hour of operation is impressively low and helps us reduce our operating costs," Günter Jung explained.

For the Sauerland-based quarrying company, moderate fuel consumption figures coupled with high levels of material handling performance were the main reasons for purchasing the L 580 XPower®. Determined to find the best possible solution, Günter Jung meticulously tested several machine models from various manufacturers. "In direct comparison with other makes, it was the L 580 XPower® by Liebherr that convinced me the most. The wheel loader is sturdily built and has a comfortable cab," said Günter Jung. He also values the close co-operation with Dortmund-based Liebherr-Baumaschinen Vertriebs- und Service GmbH, which has established itself as a reliable partner that provides invaluable support.

Run by the Jung family since 1988, the quarry in Drolshagen also operates other Liebherr machines including an A 900 wheeled excavator, three R 914, R 924 and R 944 crawler excavators and an additional wheel loader, an L 576. But one of the fleet's most popular models is the Liebherr A 902 wheeled excavator: built in 1989, it is maintained by Günter Jung himself and still works in the quarry as reliably as ever.

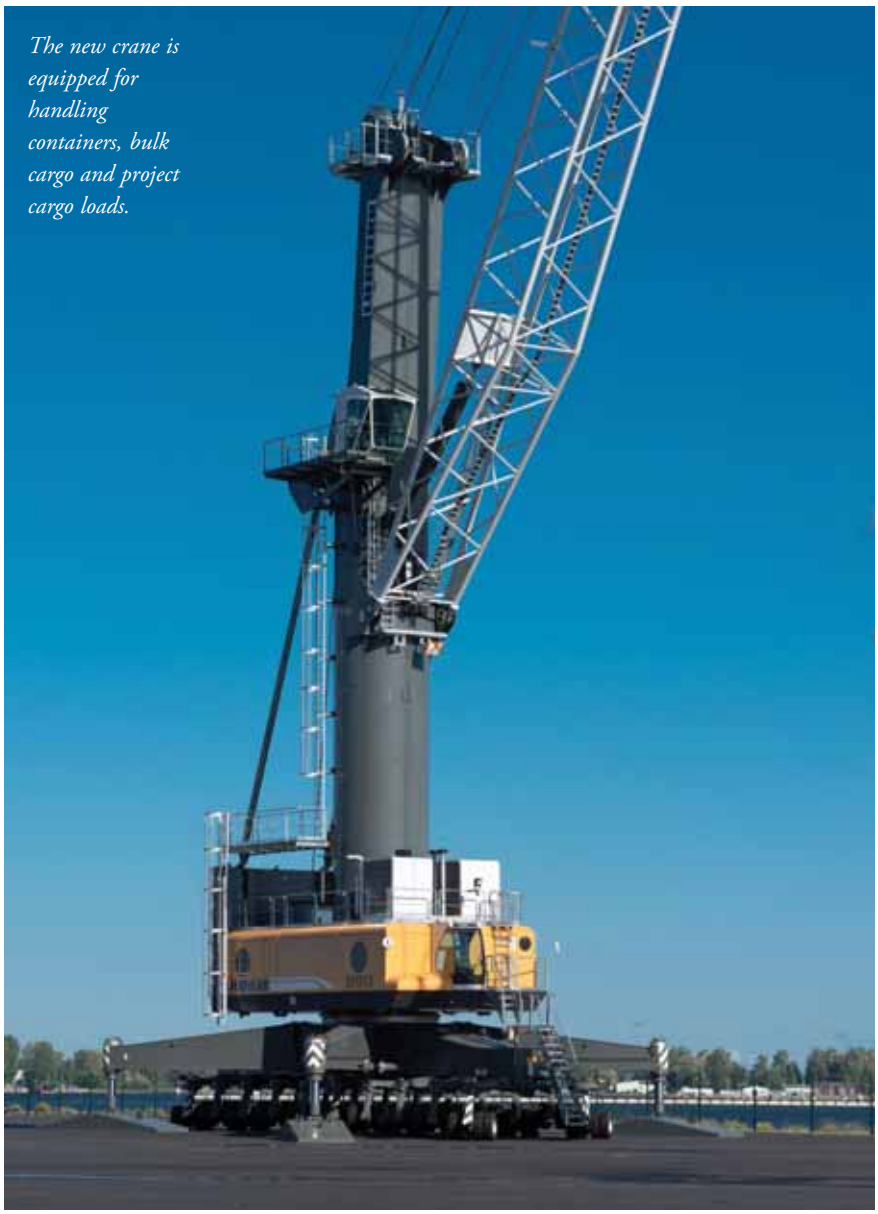
Biggest mobile harbour crane for Norway

Liebherr and Karmsund Havn IKS have just signed a contract for a Liebherr LHM 550. With a maximum lifting capacity of up to 154 tonnes and a maximum outreach of 54 metres, this crane will be the strongest mobile harbour crane in Norway. The crane can be operated with diesel or electric motors and will mainly be used for container handling, but will also be equipped to handle bulk.

Karmsund Port Authority is one of Norway's largest port areas with 13 million tonnes of goods and over 50,000 port calls each year. In January 2019, a new container terminal and a new ro-ro terminal will be opened at Haugesund Cargo Terminals, Husøy. This terminal will be an important logistics hub for the whole of western Norway and will be Norway's most modern port terminal. To be prepared for the increased freight volume that the new terminal will bring, the port has decided to invest in a new crane. In the course of this forthcoming investment, Karmsund just signed a contract for a new Liebherr mobile harbour crane type LHM 550. Furthermore, the Karmsund Port Authority has an option for four additional cranes until 2023.

"The new crane will become a prominent landmark in the region. The LHM 550 will be visible both from the air and from the sea when passing Husøy," says Tore Gautesen, Port Director in Karmsund. "We chose a supplier with a great design and state-of-the-art technology. The most important parameters for our decision in favour of Liebherr were capacity, technical structure, manoeuvrability and an overall assessment of technology and environmental compatibility. The Liebherr crane met these requirements satisfactorily and Liebherr submitted the best bid in the tendering procedure".

The harbour crane will be operated on electricity, which corresponds with Karmsund Port Authority's vision that the port should, as far as possible, be operated under the principles 'Lean – Clean – Green'. The crane will be able to operate the entire dock area at Husøy, and is equipped for handling containers, bulk cargo and project loads. With a maximum lifting capacity of up to 154 tonnes and a maximum outreach of 54 metres, this crane will be the largest and strongest mobile harbour crane in Norway. The new machine will arrive by sea and will be completely assembled and ready for use when landing on Husøy.



The new crane is equipped for handling containers, bulk cargo and project cargo loads.

Port Director Tore Gautesen states, "This is a great day for Karmsund Port, our customers, partners and the whole region. The crane will give the region completely new possibilities and will be a very important tool to create creating increased activity. We are pleased with the agreement we have entered into with Liebherr, which guarantees us top-notch cranes in terms of quality and technology."

Contract signing in the maritime Liebherr HQ in Rostock, Germany. Left to right: Leiv Sverre Leknes (CCO Karmsund Havn IKS), Tore Gautesen (CEO Karmsund Havn IKS), Aron Boysen (Sales Manager), Torsten Schapfl (Sales Manager), Andreas Müller (Sales Director), Andreas Ritschel (Area Sales Manager).

The new crane was sold with a Liebherr service contract. The entire service concept, including short response times and fast delivery of spare parts, had a positive influence on the decision. Together with the Liebherr service contract, which is based on Liebherr's market-leading service concept, this will ensure economic, stable and safe operation of the crane for the coming years.

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Bearing replacement: NK TEHNOLOGIJA makes it simple

With the help of just a 40-tonne crane, NK TEHNOLOGIJA was able to replace the slewing bearing on the shiploader, without the need to dismantle the machine.

Back in 2001, NK TEHNOLOGIJA started operations with a principal focus on servicing harbour cranes, providing all necessary repairs, maintenance, retrofitting, assembly and dismantling for brand new and used lifting equipment.

Since that time, the company's major clients have been related to dry bulk commodities (coal, grain, fertilizers) and transshipping. Over the years, NK TEHNOLOGIJA has improved and developed its scope of supply, and it now offers turnkey projects for designing, manufacturing, delivery and installation of bulk handling equipment, such as shiploaders, mobile ecological weighing hoppers and tilting spreaders.

In October 2018, in response to an enquiry from a customer, NK TEHNOLOGIJA provided a replacement for a worn-down slewing bearing on a shiploading machine, located at the seaport of Klaipeda (Lithuania).

This — usually standard — procedure stood out for two key reasons. The first is that the repair was carried out without having to dismantle the shiploader. The second is that all work was completed with the support of a single 40-tonne mobile harbour crane (see picture above).

Back in 2011, a whole range of equipment was needed to replace a bearing.

Normally, a repair like this requires the use of a range of heavy lifting equipment. For example, back in 2011, the replacement of a similar slewing bearing (carried out by another company) required the use of a 100-tonne floating crane, two 250-tonne mobile cranes, as well as a cherry picker (see picture, left).

NK TEHNOLOGIJA's expertise, and its refined engineering approach, enabled it to save the customer's time and to cut costs considerably, all to the complete satisfaction of the end-user.





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CRS's Coaltainer®: unloading bulk coal from containers with rotator systems

Australian company Container Rotation Systems (CRS) has unveiled its new coal container — the Coaltainer®. This heavy-duty coal container is designed to be extra strong for high duty cycle application. It is designed to be used with a rotator, such as CRS's Eurospec, making it possible to unload bulk coal from containers.

The Coaltainer® is certified for rotation through 360° or 180°. It has a gross weight capacity of 38,400kg, which includes a 34,720kg load capacity and a tare weight of 3,680kg.

The Coaltainer® is available with an optional hard lid or rear discharge door. It is fully compatible with the Rotainer Eurospec 38 and Tiltainer 35.

The Coaltainer® has clean inside walls for smooth discharge and dust minimization as it avoids hang-ups. Its curved inside wall contributes to a clean pour of the load, not a quick dump, which has less impact on the cranes.

The Coaltainer® has a certified standard patent, and registered designs. It has heavy-duty, specially designed replaceable twistlocks.

A fleet of Coaltainers® will soon be delivered to the Ust Luga port in Russia, where they will be used with CRS's newly

Rotainer Eurospec 38 in final assembly in the CRS workshop. This unit will be shipped to Ust Luga, to unload coal from CRS's Coaltainers®.

The Container®'s clean inside walls facilitate a smooth discharge.

released Rotainer Eurospec 38 rotator, working under a Kone STS crane.

Turning to your advantage

CRS, based in Sydney, Australia, developed its container-emptying system to offer an efficient solution to the problem of unloading bulk from containers. This is a concept that is gaining in popularity worldwide. CRS has recently delivered its first Eurospec rotator to Canadian stevedore and terminal manager QSL to empty its alumina cargoes. More Eurospecs have also been ordered from CRS — two Eurospec 38s are for Ust Luga port (as above), and another order has also been placed by PLP St. Petersburg, and will be for extra heavy duty models that will be used for a scrap metal application.

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Dr.-Ing. Pietro de Michieli – Managing Director of AUMUND Fördertechnik

On 1 September 2018, AUMUND Fördertechnik GmbH appointed Dr.-Ing. Pietro de Michieli as its new Managing Director, to focus on equipment sales, spare parts, after-sales service and PREMAS® 4.0, at the AUMUND headquarters in Rheinberg, Germany.

Dr.-Ing. Pietro de Michieli – Managing Director of AUMUND Fördertechnik (photo AUMUND).

De Michieli brings with him vast international experience in technology for handling different bulk materials. He has excellent know-how in capital equipment and complex engineered solutions in many key industries, such as cement, mining, fertilizer, steel, power, ports and terminals. Throughout his career, Pietro de Michieli has focused his attention on proposing the optimum solutions for satisfying the requirements of the customer.

Before joining AUMUND, Pietro de Michieli was Managing Director of OMG MGM Cranes (Bedeschi Group). Prior to that he was Chief Operating Officer of Bedeschi S.p.A. and member of the board of directors responsible for the business unit bulk handling, marine logistics and mining and minerals, with a particular focus on sales, marketing, design, manufacturing, purchasing and project management.

Earlier in his career he was projects director with ENDECO Engineering Design Construction S.p.A. and project manager at DANIELI S.p.A., both of which gave him a solid foundation in turnkey industrial contracts and experience in the execution of steel mill, melt-shop and bulk material handling projects in various countries all over the world. The main foundations of his education were a doctorate in electro-mechanical engineering at the University of Padua, Italy, and specialized university courses on economics and business administration. These were supplemented by his participation in an intensive workshop at the University of Stuttgart, Germany, on issues around energy, the environment and international economics.

Since January 2018 de Michieli has been a member of the board of directors of PEMA (Port Equipment Manufacturers Association), a forum and public voice for the global port equipment and technology sectors, reflecting their critical role in terms of safety, security and sustainability. He will support a bid for membership of PEMA by the AUMUND group of companies, on the merits of its wide range of conveying and storage solutions for bulk materials in ports and terminals. He has also written several papers in technical magazines on aspects of bulk materials handling technologies.

About the AUMUND Group

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

The manufacturing companies AUMUND Fördertechnik GmbH (Rheinberg, Germany), SCHADE Lagertechnik GmbH (Gelsenkirchen, Germany), SAMSON Materials Handling Ltd. (Ely, England), as well as AUMUND Group Field Service GmbH and AUMUND Logistic GmbH (Rheinberg, Germany) are consolidated under the umbrella of the AUMUND Group. The global conveying and storage technology business is spearheaded through a total of 15 locations in Asia, Europe, North and South America and a total of five warehouses in Germany, USA, Brazil, Hong Kong and Saudi Arabia.

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Handling and storing fertilizer

hard-to-handle commodity presents its own challenges

Atkinson, Nebraska fertilizer building by Legacy Building Solutions.

Louise Dodds-Ely

Stop corrosion before it starts: design features for fertilizer storage buildings

In the fertilizer storage industry, corrosion is a fact of life. The high ammonia content causes metal to corrode and weaken — which can eventually cause storage buildings to deteriorate and become unsafe. But it doesn't have to be that way.

Using non-corrosive building materials, as well as making a few design changes, will result in fertilizer storage buildings that last longer and require less maintenance.

Benefits of fabric buildings for fertilizer storage

Fabric buildings are a practical choice for storing fertilizer — the fabric is non-corrosive, so it will not weaken when exposed to corrosive materials such as fertilizer. Legacy Building Solutions uses an exclusive ExxoTec™ coated PVC fabric, which in addition to being non-corrosive is designed to withstand daily exposure to industrial use, UV rays and moisture. This fabric is warrantied in even the most corrosive environment.

The steel building frames are another element that can weaken or fail due to corrosion. Previous generations of fabric buildings relied on open web trusses for support. Open web trusses are made of a series of hollow tubes – which can corrode from the inside. This interior corrosion often proceeds undetected until it is too late to fix the problem.

Instead of relying on hollow tubes, Legacy Building Solutions uses solid steel I-beams as the frame. These solid beams have no unseen areas where corrosion can begin. All steel beams are fabricated of heavy steel plate up to one inch or more, making them a long-lasting choice in any environment.

In corrosive situations such as fertilizer storage, the beams should be hot dip galvanized. Hot dip galvanizing applies a solid layer of protective zinc to the beam, protecting the steel from exposure to corrosive chemicals.

Of course, any exposure to bulk fertilizer is able to cause corrosion. Legacy's building system includes the option to add a fabric liner to the interior of the frame. This liner creates a continuous non-corrosive barrier between the harsh materials and the frame — completely sealing the building from the inside out, and eliminating the possibility of fertilizer granules or dust settling on the steel. For highly corrosive environments, this method creates the highest layer of protection.

Fertilizer storage building by Legacy Building Solutions.

Prevent condensation and moisture build-up

Moisture is another common cause of corrosion — particularly in and around ports. Condensation build-up on the building material can cause the chemical reactions necessary for corrosion to start. Keeping fresh air flowing in while exhausting warm, moist air will reduce or eliminate the amount of condensation inside the structure.

A passive ventilation system with soffit and ridge ventilation is a cost-effective way to add airflow. One option is to add roof overhangs to the building design, which allows for air intake all along the length of the building. This system is often all that is necessary for a dry environment.

Legacy buildings use the same steel frame as pre-engineered metal buildings, and have the same design options — including the ability to add overhangs with vented soffits. They run the length of the facility, eliminating the dead spots common in facilities with endwall ventilation. Overhangs with mesh soffit keep pests out while allowing air to flow in. Combined with peak exhaust vents, overhangs provide cost-effective passive ventilation.

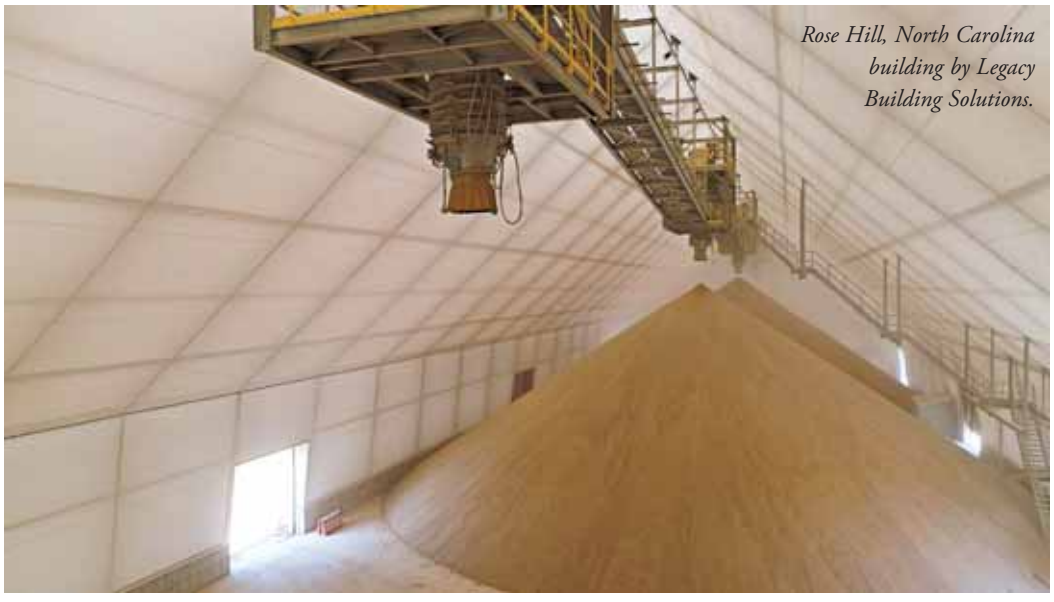
Lined fabric buildings use the same ventilation system for the cavity created by between the liner and the outer fabric membrane. This system also can be designed to allows airflow in the storage area of the building and in the frame cavity, preventing moisture build-up throughout the structure.

Secondary bracing

Engineered structures like those by Legacy also use secondary bracing to protect the structural integrity of the building. These secondary members need to be protected from corrosion as well.

The bracing cables used in many buildings have multiple grooves that create space for dust to settle, slowly weakening the strength of the bracing cable. An alternative is solid steel rods, which have no hollow areas or indentations. These rods are made of galvanized metal for further protection and are significantly less vulnerable to corrosion than cables.

Stopping corrosion is a process that starts before building construction begins. Making a few smart design choices can increase the longevity of any storage facility and provide a safe, cost-effective storage environment for decades.



Rose Hill, North Carolina building by Legacy Building Solutions.

Bedeschi plays major part in new terminal at the Port of Barcelona

Construction of a new terminal to handle fertilizer and salt in the Port of Barcelona is going according to schedule. The terminal, owned by ICL group, is expected to be completed by September 2019.

ICL is investing around €50 million, and Italian company Bedeschi is involved in the project as a qualified supplier.

Recently, the Bedeschi Group was awarded a new contract by ICL Iberpotash to supply two belt conveyors and tripper to convey potash and feed two shiploaders (boom lengths of 421m and 417m) at a rated capacity of 1,000 tonnes per hour.

The contract with Iberpotash, one of the biggest exporters of raw materials for the chemical industry with 80% of its production going to Europe, Asia and the American market, confirms that Bedeschi — which has been in operation for over a century — is a provider of effective, reliable, customized solutions for a variety of industries.

Safeguarding employees' health with the Bat Booth™ from Mideco

Dust suppression is an important challenge in bulk materials handling operations. Ports and shipping terminals are constantly on a look out for effective, cost efficient dust control methods to prevent air pollution and protect their staff. Failure to provide a safe workplace and maintain the air quality of the nearby residential areas can lead to litigation and sometimes closure of the facilities.

Fertilizer unloading in ports can result in considerable amount of potentially toxic dust leading to various health problems. Such problems are preventable through the use of appropriate personal protection equipment and dust control systems. Enter Mideco's Bath Booth™ — a unique personnel dust extraction device that can permanently remove up to 80% of dust in seconds.

Mideco, an Australian company with over 60 years of experience in design and supply of dust control solutions, launched Bat Booth™ in 2014. Its design is simple but effective. Bat Booth™ uses compressed air to blow dust off the contaminated clothing. The dust is then captured and contained via a dust filtering system. The process takes only 10–12 seconds and tests have shown a 50% improvement in dust removed from clothes over other methods. The competitive solutions where a single point air hose method is used usually provide only temporary relief.

Bat Booth™ is equipped with powerful HEPA filters which comply with the latest American NIOSH standard and are currently the most effective filters commercially available. As the filter system captures dust inside the booth, thus maintaining the quality of air in the surrounding areas, the device can be installed at any site — inside a building or out in the open air.

Bat Booth™ comes with full engineering support and undergoes regular maintenance. It could be used for a variety of applications, comes fully assembled and requires minimum installation. Bat Booth™ can be used frequently throughout the day without causing delay to work processes.

Mideco has received a few requests for Bat Booth™ installation in ports. The company has had discussions with the Geraldton Port Authority and the Australian Marine Services about purchasing Bat Booth™ for their staff. Bat Booth™ was also considered by CSL Australia for an installation on a ship. The project didn't go ahead due to space limitations; however, the possibility of such application is high.

The effectiveness and simplicity of Bat Booth™ design make this PPE device an ideal dust control solution for staff handling dry bulk material in ports and wharfs.

TTS develops handling system that can deal with five types of fertilizer

When TTS was tasked with designing and building material handling equipment for Riga Fertilizer Terminal (RFT), the job was not an ordinary belt conveyor line. The contract was for a sophisticated system of chutes, hoppers, bunkers, supporting structures, flap gates and, of course, belt conveyors, forming the chain with a total length of 1.5km.

One of the most challenging points was that the terminal must handle five different types of fertilizers with completely different characteristics. Each and every parameter was learned and taken into account in order to deliver versatile equipment system capable of handling different materials. Today, the facility has eight dome-shaped storages, railroad wagon unloading station, and a shiploader. All of these units are connected into one structure, allowing the cargo to travel within the system according to 120 pre-programmed routes.

At almost the same time, TTS was called upon to meet another challenge — the production of equipment for another terminal in Riga port, Riga Bulk Terminal (RBT). The terminal imports cargo from vessels being unloaded by double jib slewing crane to the receiving bunker and then via conveyors system to the railroad wagon loading station. As the entire material handling process must be encapsulated, TTS engineers needed to develop the so-called moving roof to ensure that the jetty conveyor is opened only at the loading point and moves along with a crane.

Thanks to two separate conveying routes, the terminal can handle eight different bulk cargo types, starting from grain and ending with alumina.

Besides stationary equipment for handling of fertilizers, TTS also offers mobile conveyor systems which can be easily relocated and adjusted according to actual needs.

Completing bigger and smaller projects for the field of fertilizer transhipment, TTS designers have learned and gained experience on handling different types of fertilizers and other bulk materials, making TTS an expert in mobile and stationary handling solutions.

Cotecna: respected provider of quality assurance services for the fertilizer industry

Cotecna provides testing, inspection and certification services to facilitate trade and make supply chains more efficient for its clients. Founded in Switzerland in 1974, this family-owned business has now grown to become a world-class international player with over 3,000 employees in more than 100 offices across approximately 50 countries. Its trusted network of professionals and certified laboratories provide expertise across some key sectors: agriculture & food, minerals, metals & fertilizers, government & trade, and general cargo.

Poor quality fertilizers can be costly and damaging, both for the industry and the environment. Cotecna's highly reactive network of experts and laboratories enable clients to verify product conformity and reduce risk. As a member of the International Fertilizer Industry Association, Cotecna is committed to helping clients trade securely and with confidence worldwide. Cotecna's adaptability and agility enable it to provide clients with seamless solutions that address quality control challenges.

Cotecna is present in all key fertilizers markets, where it offers specialized services covering dry and liquid mineral fertilizers in both bulk and bagged form, including all types of nitrogen, phosphate, potash and compound fertilizers, as well as sulphur.

Cotecna's experts are able to work with clients at every stage of the supply chain, from plant to port, thus helping producers in delivering fertilizers to final users in accordance with contractual and regulatory quality and quantity specifications. Its services range from independent assessments of the quality and quantity of the product to monitoring of transport and storage conditions.

Cotecna for instance supervises loading, discharge and transshipment operations at most major ports handling fertilizer cargoes.

At the production stage, Cotecna's specialists perform sampling. Samples are analysed in accredited laboratories according to the required national and international standards, which are specific to the transaction. At mines, pre-shipment inspections of rock phosphate can also be carried out.

Cotecna supervises the weighing and/or tallying of the cargo, and its loading into wagons or containers, confirming beforehand the presence of the cargo as well as the cleanliness and suitability of the loading equipment. At this particular step, Cotecna can also check packaging and marking, and sealing of railway cars.

At loading ports, Cotecna provides numerous services such as holds inspections, loading supervision, weight determination surveys using shore scales and/or draught surveys and marine surveys. The resulting quantity and quality determinations are then certified and used for the financial settlement of the sale contract covering the cargo. Hose and specific Ultrasonic Leak Detection (ULD) tests can also be performed to avoid damages to particularly water-sensitive fertilizer products during voyage. A constant monitoring of the loading process including field granulometry and temperature monitoring is essential, and Cotecna informs its clients immediately in case of any quality deviation.

Drawing on this experience, Cotecna has become, in 2017, the exclusive provider of testing and inspection services of Sorfert Algérie, a joint venture between OCI N.V. and Algeria's state-owned oil and gas authority, Sonatrach. Cotecna operates a laboratory at Arzew terminal, specialized in analysing urea and NH_3 products that will be loaded in this port.

At discharge ports, Cotecna's intervention typically includes weight determination, quantity determination by tally count, as well as sampling and analysis. The cargo is visually inspected, especially in order to detect water and oil damages, discolouration and other types of contamination.

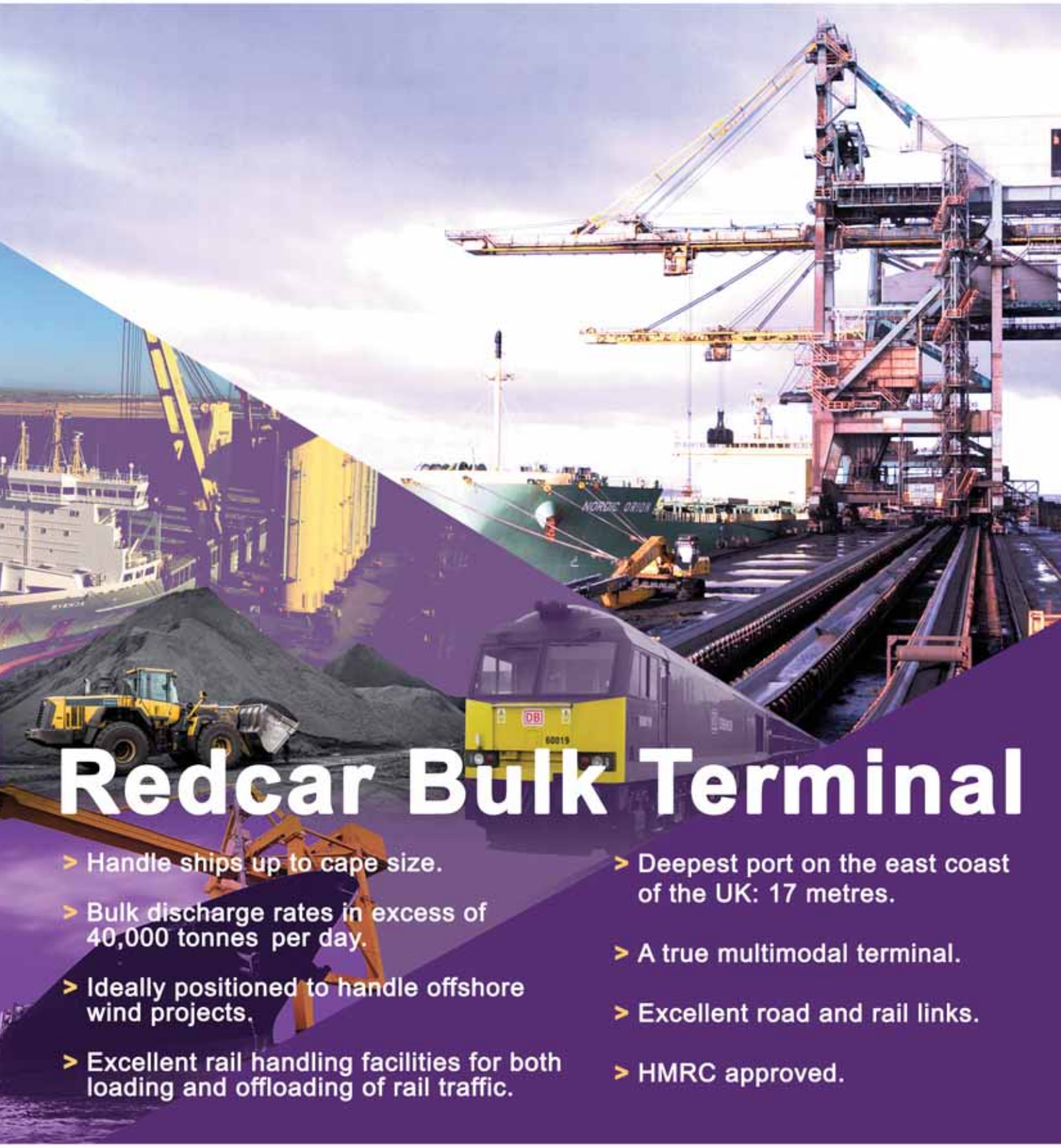
When it comes to storage, Cotecna can offer stock monitoring services in order to improve access to financing for borrowers. Thus, it mitigates transaction risks for lenders and assist in compliance with the requirements of the Basel frameworks for traders.

To stay competitive in this market, Cotecna is continuously investing in modern facilities and cutting-edge equipment. It keeps an innovative approach to the industry, providing technical expertise and unique solutions to individual challenges.

For example in 2016, Cotecna carried out an advanced technical investigation for the benefits of the rock phosphate trade community in order to understand the variations in quality results between loading ports in Egypt and discharge ports in India, which is the main destination for this Egyptian product. Cotecna's transparency, open communication and dedication led to the identification of the issue: teams at both ends collaborated to propose a unique and successful solution to the clients, through the harmonization of sampling procedures. This new model was accepted by the industry players, allowing them to get consistent results, maximize profitability and avoid quality claims.

RBT

Logistics Tees Valley



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Flinders Ports handles fertilizer in Port Lincoln and Port Adelaide in Australia

Flinders Ports in South Australia has seven ports located at Port Adelaide, Port Lincoln, Port Pirie, Thevenard, Port Giles, Wallaroo and Klein Point.

In addition to its port operations, Flinders Ports also has a hydrographic survey division, called HydroSurvey Australia. Other companies in the Flinders Port Holdings group include Flinders Logistics and Flinders Adelaide Container Terminal.

Flinders Ports only imports fertilizer through Port Lincoln and Port Adelaide. The ports co-ordinate the arrival of the vessels in port. Once alongside, a stevedore will handle the cargo. Flinders Logistics can also stevedore these vessels in Port Adelaide.

Fertilizer quantities for the last few financial years are as follows:

2017–2018 FY
Port Adelaide: 463,000 tonnes
Port Lincoln: 103,000 tonnes

2016-2017 FY
Port Adelaide: 459,000 tonnes
Port Lincoln: 142,000 tonnes

2015-2016 FY
Port Adelaide: 407,000 tonnes
Port Lincoln: 128,000 tonnes

2014-2015 FY
Port Adelaide: 479,000 tonnes
Port Lincoln: 125,000 tonnes

Annual tonnage depends on demand and confidence in the estimated amount of rainfall that may impact on grain crops each year. The amount of fertilizer handled each year by Flinders Ports is usually quite predictable, due to the predicted rainfall.

Equipment, storage and dealing with the specific challenges of fertilizer cargoes

On the berth at Port Lincoln, Flinders Ports utilizes environmental hoppers and grabs to handle the materials. It also has two mobile harbour cranes at Berth 29 in Port Adelaide that are used to discharge fertilizers when required.

Fertilizers are mainly stored by customers off-site at the relevant customer's facilities. If required, and subject to availability, the fertilizers can be stored on a short-term basis at some of Flinders Ports' Inner Harbour locations. Berth 29 has a shed that can hold approximately 12,000–15,000 tonnes and Berth 18 shed can hold up to 5,000 tonnes of material.

Environmental hoppers, street sweepers and good housekeeping are the key to ensuring minimal environmental impact. Fertilizer can begin to harden inside the hold of the vessel; this is managed by placing an excavator in the hold and breaking up the product to allow the grab to discharge and ensure the hopper does not become blocked.

The majority of the fertilizer is imported as loose bulk. It can also be imported as liquid fertilizer.

If bagging of the fertilizer is required, it is carried out off site.

Port Lincoln.

End-users for fertilizer cargoes

South Australia is a major agricultural state, and there is demand for imported fertilizers to support the grain farmers throughout the farming regions.

Staying competitive

Fertilizer is imported to Port Lincoln which is a hub port for regional farming for the Eyre Peninsula and far north of South Australia, making it an ideal port to transport fertilizer to farming areas. Port Adelaide is the main port for South Australia and has the major infrastructure already available for bulk imports. This makes the ports an excellent choice for those shipping fertilizer.

Vessel sizes and available draught

Both Port Adelaide and Port Lincoln can take vessels of all sizes from the small Handysize vessels to Panamax vessels. Fertilizer is usually imported in Handymax vessels which are 185m long. The maximum draught for a vessel in Port Adelaide inner harbour is 10m and in the outer harbour is 16m.

Port Lincoln, the main hub for fertilizer imports, offers a maximum draught of 11 metres.

From port to pot

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The market's choice

BHP optimizes its planned potash logistics chain to manage variability from customer demand

Abstract

The planned Jansen potash logistics chain is subject to variability originating from many sources, including the number of customers, the types of products ordered, the frequency of order placement, and the varying sizes of ships fulfilling such orders, *write Sylvie C. Bouffard of BHP Billiton Canada Inc. and Bryan Monk of Wood Canada Ltd.* A discrete-event simulation model was created to quantify the impact of the most important source of variability: the frequency of order placement. Substantial benefit would be gained from implementation of order management control. Notably, with this control, the number of vessels waiting for product or for berth availability for more than 24 hours would decrease from 87% to less than 10%.

Figure 1: muriate of potash.

Business context

Potassium, found in muriate of potash (KCl) (Figure 1), is essential for plant nutrition and has no natural substitute. The demand for potash is increasing as the world population grows and diets are changing. BHP is developing the Jansen Potash Project in Saskatchewan, Canada (Figure 2). Jansen is being designed as a conventional underground mine with a first stage of approximately 4mt (million tonnes) of potash per annum, with the potential for three further expansions of another 4mt of potash per annum each. Potash is intended to be mined underground, hoisted to surface, crushed, ground, floated, dried, screened, and compacted before being stored in a stockpile and later dispatched. Potash would be railed to North American markets and to an export port located on the North American West coast. At the time of publication, Jansen is in the feasibility study stage and subject to approval by the BHP Board.

The Jansen Project team has used sophisticated design and modelling tools to make informed decisions about the design of the mining, hoisting, processing, railing, and shipping systems. One such modelling tool was the Detailed Integrated Capacity Estimate (DICE) model, a discrete-event simulation of the integrated Jansen chain, herein grouped into two parts referred to as the production and logistics segments.

Figure 2: Jansen shafts would be used to hoist ore from the underground mine to surface. Location: Saskatchewan, Canada.

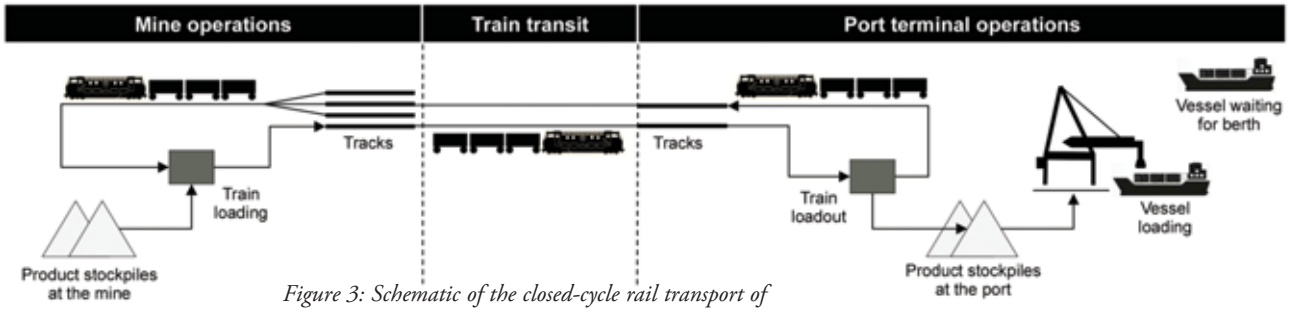

Figure 3: Schematic of the closed-cycle rail transport of potash from the mine to the port terminal and the loading of potash into vessels at the port terminal.

Bouffard et al. (2018) reported that the use of DICE to optimize the production segment of the chain added potentially $500 million to the net present value of Jansen in its first stage of operation.

The Jansen logistics chain would have fixed assets (e.g. mine stockpile building, port stockpile building, train loadout, shiploader) and mobile assets (railcars) (Figure 3). The size of the stockpile buildings, the number of railcars, and the shiploader rate are design choices that determine capital costs. Operating costs associated with managing a fleet of trains and managing the arrival of vessels at the port terminal are also important considerations. During the feasibility study stage, the Jansen Project team continued using the DICE model to minimize capital and operating costs. The details of this optimization work are not within the scope of this paper.

Rather, this paper examines how the optimized design copes with the variability that would exist in the logistics chain. In the marketing space, the mix of Jansen customers, the condition of their soils, the crops they choose to grow, the local agricultural cycle, agricultural policy, weather, market logistics, and storage capabilities, would cause variability in potash demand and customer orders. At the port, variability would exist in the preferred size of customer vessels, available draught clearance in the port and channel, vessel arrival times, weather events temporarily shutting down vessel loading, vessel loading rate, equipment failures, and third party vessel congestion. In the rail network, variability would originate from locomotive failures, railcar hatch failures, weather events, train transit time, pre- and post-loading delays, loading rate, pre- and post-unloading delay, unloading rate, and third party rail congestion. This paper examines the most important source of variability among all above mentioned: customer orders. The rate at which a customer would order potash (i.e. the customer demand) was varied by region month-to-month using historical export data. This variability could potentially create inventory surplus and shortage at the mine and at the port, creating long queues of vessels and trains, and late potash deliveries, or periods of under-utilization.

Overview of the DICE model

In the DICE model, production assets (mine, hoist, process mill) 'push' potash from the mine faces to the product stockpile located at the mine, whereas customers 'pull' potash from the same product stockpile via their orders which are delivered firstly by trains and secondly by vessels. The DICE model is more encompassing, more detailed, and more complex than previous models published by the resources sector to which the Jansen Potash Project belongs. For example, the models of Everett (2001), Howard and Everett (2008), and Sagan and King (2011) are lacking one or more components of the chain. Because of this, the effects of variable demand do not propagate far enough up the chain to fully quantify the extent of the impact.

We began our modelling of the planned Jansen logistics chain with a hypothetical case, one in which there is no mechanism in place to reduce variability from orders. In reality, the Jansen chain would be highly integrated and intensely managed. In the DICE model, these mechanisms, also herein referred to as variability controls, exist in the form of order management, train fleet management, and product stockpile management. Our modelling of these variability controls introduced the same concepts as those in place for other supply chains: demand inaccuracy and delay (*Dominguez et al. 2018*), inventory fluctuation and safety stock placement (*Schuster Puga et al., 2017*), lead time and forecast (*Chen et al., 2000*), and scheduled ordering policies (*Cachon, 1999*).

Potash orders, vessel calls, and train dispatches are highly interconnected. To avoid stockout at each customer location, the model forecasts the customer's next day's inventory as the current day's inventory, minus the daily consumption rate, plus any tonnage en route. If the inventory forecast is less than or equal to the reorder point, an order is generated. The quantity ordered then triggers a choice of a vessel class in the range from Handy to post-Panamax. The model with variability controls verifies that the inventory at the terminal would be sufficient. If the inventory is forecast to be low, the model does not accept the order in the original position but schedules it later in the earliest window when inventory is expected to be sufficient. This form of order management is likely to be invoked in the months leading up to the period of high potash application.

If the inventory is forecast to be large enough, the model performs a second verification; that there are not too many orders being fulfilled at the same time, which would cause an anticipated bunching of vessels arriving at the port terminal within days of each other. This condition creates an anticipated queue of vessels, with those at the back of the queue potentially failing to be loaded within the contracted customer loading time. If vessel arrival density is anticipated to be too large, the model does not accept the order and instead schedules it at a later date.

This form of order management is normal practice to deal with anticipated vessel congestion or material availability. The time between when an order is placed (i.e. customer requirement) and when the order is scheduled is a key performance indicator. Once an order is accepted, either in the position required by the customer, or a delayed delivery window, then it can no longer be moved (or rescheduled).

In the days before the arrival of a vessel at the terminal, the model calls for trains to carry potash from the mine to the terminal. When a vessel arrives at the terminal, either model version (i.e. with or without variability controls) places a vessel in a product queue if the inventory is too low. Otherwise, the vessel is placed in a berth

TABLE 1

	No seasonal orders	Seasonal orders
No order management	20%	87%
With order management	4%	9%

Better management of potash orders reduces vessel wait time at the terminal. Data presented refers to the percentage of vessels waiting more than 24 hours. Results are not exactly reflective of the expected operation of the Jansen logistics chain.

TABLE 2

	No seasonal orders	Seasonal orders
No order management	75%	44%
With order management	78%	71%

Better management of potash orders requires holding more potash at the port terminal. Data presented refers to the ratio of the average inventory to the terminal storage capacity. Results are not exactly reflective of the expected operation of the Jansen logistics chain.

queue, awaiting for berth availability prior to initiating approach and subsequently commencing draught surveys, paperwork, and shiploader activation.

Key findings

This section presents the DICE model outcomes for four simulations. Two simulations are rather hypothetical because of the absence of demand variability and order management control. The other two are more realistic: demand is variable and orders are managed appropriately to control this variability. Each simulation was performed with multiple customers, two potash product types, and multiple classes of vessels. One berth and one shiploader at the port terminal were modelled. For good statistical reproducibility, a simulation was replicated ten times, and each time, the model simulated 20 years of operation. Statistical robustness was further enhanced by using random number seeding for all distribution sampling. The key model outputs were the annual percentage of vessels waiting at the port terminal for product or berth availability for more than 24 hours before loading, the percentage of vessels not scheduled within 30 days of the customer request, and the ratio of the average port inventory to the port storage capacity. Metrics presented in Tables 1 and 2 are not exactly representative of the planned operation of Jansen logistics chain; the expected metrics are too sensitive to share at this time in the feasibility study stage of the project. The data in both tables nonetheless make a convincing case for the significant value of order management.

Table 1 identifies that orders, if left unmanaged, would increase the proportion of vessels waiting more than 24 hours from 20% to 87%. Table 2 shows that unmanaged orders would decrease the potash inventory at the terminal from 75% to 44% of the total storage capacity. We explain both results as follows: in months of high demand, inventories are low, causing vessels to wait longer at the terminal until the trains have transported enough potash to load the vessel.

Better management of orders and better scheduling of vessel arrival at the terminal were found to be very effective at controlling vessel wait time. Table 1 shows a significant reduction from 87% to 9% of the proportion of vessels waiting more than 24 hours. Order management thus reduces operating costs associated with vessel demurrage. That reduction is made possible, in part, by front-running potash to the terminal in anticipation of months of high demand. Therefore, the inventory at the terminal tends to be higher, increasing from 44% to 71%, but without the need to increase the terminal storage capacity.

Conclusions

The demand for potash is the most significant source of variability for the planned logistics chain of the Jansen Potash Project. Demand typically occurs in large orders in the months leading up to the application of potash and smaller orders during the remainder of the year. Other factors also play a role, such as weather, economics, and agricultural policy. Jansen plans to deliver potash by rail to a port terminal from where potash would be loaded onto vessels delivering to customers worldwide. The variability in demand from Jansen customers would cause unacceptable vessel queuing at the terminal and delivery delays, if left unmanaged. A discrete-event simulation model of the Jansen mine-to-customer chain showed that demand variability would cause 87% of vessels to wait at the terminal for product or berth availability for more than 24 hours before loading, if orders were not managed. If managed, only 9% of vessels would be impacted. Better management of orders ensures there is sufficient product at the port terminal when a vessel arrives. Order management prevents low inventory conditions and related vessel congestion at the terminal. The results of this modelling study enabled more informed decisions on the size of fixed and mobile assets, as well as the preparation of better forecasts for operating costs and inventory levels.

Acknowledgements

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Innovative additives to improve the physical properties of fertilizers

Fertilizers in various shapes are handled, transshipped and applied in vast quantities worldwide. Quite often they are prone to caking, moisture uptake, dust formation and they can cause corrosion problems. For the transport and transshipment sector it is of great importance that these phenomena are minimized.

Caking is undesirable in bulk storage as it hampers the excavation of the material and large walls of caked fertilizers lead to a risk of collapsing.

Caking

Caking is a powder's tendency to form lumps or masses rather than flow smoothly. Nearly every fertilizer which is stored and handled in bulk is prone to caking and everybody active in the fertilizer business has seen examples of massive lumps. It is undesirable in bulk storage as it hampers the excavation of the material and large walls of caked fertilizers lead to a risk of collapsing.

Factors involved in the degree of caking of fertilizers are:

- moisture content;
- chemical composition;
- moisture uptake;
- temperature;
- particle size, particle size distribution and presence of dust/fines;
- hardness of the particles;
- pressure/height of stacking of the material;
- time; and
- excess or poor distribution of anticaking agent.

Anticaking agents are commonly added to control caking. These can be coatings, fine inert powders or moisture-absorbing additives. The coating and powder controls crystal formation such that strong bridges are not formed and reduce the surface contact area. Anticaking agents are only palliatives though, for when the fertilizer particles can easily be deformed a 'dry stone wall effect' will take place and caking will still occur, regardless of the anticaking coatings. The producer should in this case use an internal agent to improve the physical properties of the fertilizer particles.

Moisture uptake

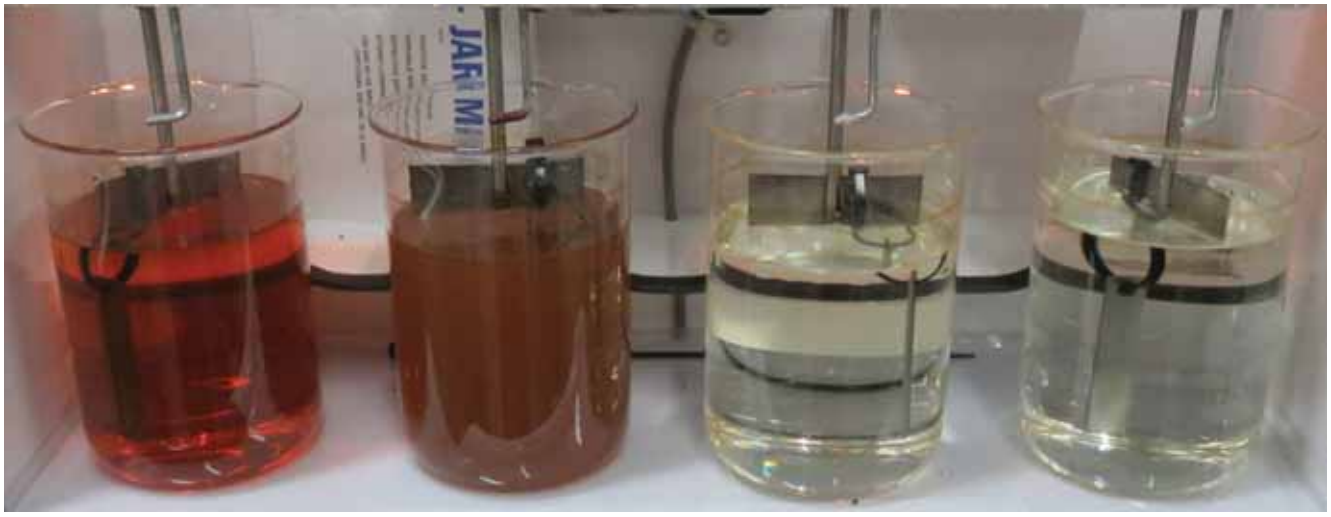
Most fertilizers are very hygroscopic and the rate of its ability to take on water is dependent on its critical relative humidity (CRH). The critical relative humidity (CRH) of a salt is defined as the relative humidity of the surrounding atmosphere (at a certain temperature) at which the material begins to absorb moisture from the atmosphere and below which it will not absorb atmospheric moisture. All water-soluble salts and mixtures have characteristic critical humidities; it is a unique material property. When the humidity of the atmosphere is equal to (or is greater than) the critical relative humidity of a sample of salt, the sample will take up water until all of the salt is dissolved to yield a saturated solution. Moisture uptake of fertilizers can result in caking, dust formation, disintegration of the particles, hard crust on the top layer of the bulk pile and hard stalactites in the bulk.

Dust emission

During the production, handling and transportation of solid fertilizers, a lot of dust can be generated and liberated. This dust causes discomfort and can be dangerous for the workers and surroundings, gives wear to equipment, corrodes metals and represents a substantial loss of raw material.

Corrosion

Liquid fertilizers are quite corrosive towards mild steel (up to 500 mill inches



Coupon test to determine from left to right: untreated UAN 32, UAN 32 with 100 gr/ton competitor product, UAN 32 with 80 gr/ton C-Force FCI, UAN 32 with 100 gr/ton C-Force FCI.

TABLE 1

	Function	Advantage
C-Force® FCI series	• Corrosion inhibition	• Prevents corrosion by liquid fertilizers
C-Force® FAC series	• Anticaking • Dustbinding	• No lumping • Dust-depressing
C-Force® FMR series	• Moisture repellency • Anticaking • Dustbinding	• No moisture uptake • No lumping • Dust-depressing
C-Force® FBI series	• Binders • Granulation improvers • Crushing strength improvers	• Aid in granulating difficult fertilizer types • Improves granule quality • Improves particle size distribution

per year on C1010 steel) and will therefore generally have to be equipped with a corrosion inhibitor to protect tanks, pipelines, nozzles, etc. Besides that, corrosion products can discolour the liquid fertilizer and make the solution turbid.

Innovative additives to improve the physical properties of fertilizers

INSTRAL B.V. specializes in the development and marketing of tailor-made solutions to problems associated with the physical properties of fertilizers. Every fertilizer manufacturer produces its own unique products and complex factors affect the quality of fertilizers in all forms: granules, prills, powders, liquid, *et cetera*. A complete survey is necessary to fully evaluate these factors and to establish an efficient treatment regime. INSTRAL BV has a specific Fertilizer Treatment Program consisting of one or multiple products in the C-Force® series and will be able to provide an exclusive solution for your specific complication.

Unique to the corrosion inhibitor is that the dosage can easily be determined without laborious tests. A corrosion inhibitor for ammonium nitrate solutions is also available.

C-Force® FCI 430 enables producers to ship and sell concentrated ammonium nitrate solutions without having to worry about corrosion, creating a safer and user-friendlier alternative for solid ammonium nitrate.

Coatings that do not need elevated temperatures to be applied can be used as after-treatment for handling and transshipment of fertilizers at warehouses and stockyard.

Instral is an excellent partner for tailor-made fertilizer additives and its specialists can help customers to optimize fertilizer production and quality.

Properly stored and treated fertilizer is essential to ensure a healthy crop.

VIBCO shakes up fertilizer transit

Are you aware of the impact vibrators can have in the world of dry bulk fertilizer process and productivity? Today, roughly 50% of all the people that handle fertilizer are using some type of vibration equipment. That means the other 50% of the market is losing time, losing money, and using brute force to keep their fertilizer materials moving. The new compositions and compounds of fertilizers, as well as materials from new suppliers globally, have a tendency to hang up more in hoppers and bins. This means those 50% not using vibration are experiencing even more trouble today. Used correctly, with proper mounting and the right frequency and force, vibration can easily solve those hang-up issues for consistent material flow.

Of the 50% who invested in vibration equipment, only half of them are using it correctly. That's only 25% who are getting the benefit vibration offers. Were the vibrators located properly on the bin, silo, or chute? Were they installed correctly with the appropriate safety restraints and overhead protections? Do they have the right air supply for pneumatic units or electric supply for AC or DC units? Do they have the right force and frequency to do the intended job?

Simply purchasing a vibrator is not enough. It is important to work with a company which will provide the correct engineering expertise to get the job done correctly, maximizing its customer's investment.

When working in the fertilizer industry, it is vital to maintain continuous operation at high throughputs. Equipment will need to transfer materials that are:

- abrasive;
- dusty;
- hot;
- corrosive - either acidic or alkaline;
- friable; and
- prone to fluidize.

A robust system is crucial to run consistently with minimal maintenance but with the correct force and frequency to safely maintain the integrity of the product. Vibration will make that system work more effectively.

Moving fertilizer products on and off ships, railroad cars, trucks, conveyors, or bins can be challenging. The transport, storage and handling of fertilizer products presents a range of risks including product loss, associated environmental hazards, and road safety issues. No matter what the product is — finished, packaged goods, or raw materials — the conveyance of fertilizer can be greatly improved with the use of vibration to keep the cargo material flowing.

How vibration assists in fertilizer transit

- speeds up the flow of materials;
- prevents build-up of materials in bins and hoppers;
- reduces clogging — clears ratholing, bridging and other hang-ups;
- works in wet or dusty conditions as the atmosphere changes;
- feeds material consistently at the flow rate needed;
- aids in compaction of material for packaging;
- enhances productivity and reduces downtime;
- reduces safety hazards — keeps humans from being buried in bin or injured while swinging a hammer or falling from high places while clearing out clogs; and
- keeps continuous flow operating.

The people who will prosper in the bulk fertilizer markets are the ones who know how to handle the materials in the best, most efficient ways, and that requires vibration.

Consider the amount of fertilizer product moved around the world every single day, then think about the profitability of handling a part of that market with the efficiency of vibrators. It has been found that millions of tonnes of fertilizer have created an increase in agricultural

production of more than 60% worldwide since 1960. That's the miracle of fertilizer. Generating approximately 3.2% of the dry bulk shipping trade, the fertilizer market is a profitable and beneficial commodity.

The big three ingredients are not found in every part of the world and which is why shipping globally is a crucial element of the market — nitrogen is produced but phosphate and potassium rely on mining. Fertilizer is also abrasive, dirty, corrosive (acidic or alkaline), friable, and prone to fluidize, all characteristics that add cost to shipping. Handling these materials quickly and efficiently is paramount to profitability.

The investment in an industrial vibrator is minimal compared to the cost of the fertilizer compounds and the benefits of using its vibration. Consider the man hours to unload the ship, hoppers, bins, and trucks as well as the problems with clogging that slow down operations. Now, envision the shortened time, speed, efficiency and predictable flow rate that can be achieved with the addition of vibration. The cost of vibration is a fractional cost that has long term payback every day when vibrators are sized correctly and installed correctly. The choice of vibrators is extensive with power supplies including; pneumatic, hydraulic, electric, 12 and 24 volt DC, and models including; linear and rotary vibrators, washdown safe, and housing of plastic, cast iron, stainless steel or aluminium.

When attached to hoppers, bins, chutes and conveyors, an industrial vibrator will enhance existing conveying equipment. Many existing bins were not designed for the flow of materials needed today — volumes have increased. Older bins have shallow slope angles and crazy designs because of legacy infrastructure. You can't just go out and buy new processing plants and new equipment, so you work with what you have and fix the roadblocks you can. For a small investment in vibration, you can help avert a large capital investment of new bins, chutes and silos. Vibration will reduce clogging, ratholing, and hanging up on bin sides; while speeding up the loading/unloading process, saving time and money.

When third-party carriers are waiting for the fertilizer to be dispensed to them, they want to load and go. They can't wait for problems with materials sticking along the supply chain. These types of time and flow problems can be easily rectified with proper vibration.

Transportation can compromise the fertilizer in several ways, depending on the chemical make-up of the product. It is imperative to minimize the degradation of dry bulk fertilizer during the loading and unloading process where it is subjected to actions that cause deterioration; moisture, heat, clumping, chemical change, etc. Some fertilizer types can degrade in quality with moisture so care needs to be taken during intake and off-loading. A vibrator mounted on the conveyor system can really improve the speed and flow of chemicals that may react with water. Proper handling in conveying materials helps to avoid any mechanical stress which could interfere with the product. Fertilizer arriving at the end user, ready to spread and working correctly yields greater profits.

SEARCHING FOR GREATER BULK HANDLING PRODUCTIVITY?

Reach out and grab it with a Konecranes Gottwald Portal Harbor Crane. Take these two Model 8 four-rope grab cranes at ABP in Immingham, UK that handle coal, biomass and petcoke to supply power and industrial plants. They have customized, robust rail-mounted portals topped by proven mobile harbor crane technology and they're equipped to operate on-grid to maximize eco-efficiency.

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- 1no collection chute and 3/600mm diameter KMH screw feeder system
- 1no 101.8m x 1.050m belt conveyor
- 1no 4/600mm diameter KMH screw transfer feeder system
- 1no 300m x 1.050m land transfer conveyor system
- 1no 4/600mm diameter KMH screw transfer feeder system
- 1no 90m x 1.050m land transfer conveyor system
- 1no 40.5m x 1.050m Stock pile conveyor system, 320 degree slew
- 1no mainland MCC Siemens control system housed in 14mx3m Modular building
- 3no Scania 400KvA generators housed in noise reducing enclosures
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Material stored in bins is also subject to moisture and mould, which can form obstructions that stick to the bin walls. Potential dislodging of these chunks can destroy conveyors and obstruct the discharger, stopping the flow of fertilizer from the bin. Regular use of vibration prevents these issues.

Fertilizer compounds can also present problems with dust which needs to be minimized. In these locations, explosion-proof vibrators help speed up the flow of material to get the fertilizer off the ship and transported to its final destination. As environmental regulations increase, it becomes more important to unload and load the ship quickly and efficiently to avoid environmental contamination impacts while planning for ever-changing future regulations.

Vibrators create an impact based on force and frequency. We've all seen how sound wave frequency can shatter a glass. Vibrator frequency, when used with proper force can shatter the toughest clogs and keep all materials moving. Linear and rotary models work for different applications to handle specific jobs.

The position that a vibrator is installed is key to the force and frequency it can provide. Vibrators can be connected into a PLC or other system or they can be run manually. It is important that customers work with a company that understands the industry, understands how to properly size their vibration needs, and recommends proper installation to fit with their present conveyance systems. At VIBCO, the company's expert application engineers are available, with 24/7 technical support, at no charge, to help customers determine where the vibrators should be placed and what type should be used for the greatest efficiency and impact. VIBCO uses Augmented Reality, 'AR', to help access the information when its engineering group can't be there in person. Customers send photos or Skype with VIBCO and its engineers will make recommendations for size and placement. VIBCO understands that its customers don't have an unlimited supply of people or resources, so it tries to supply useful solutions.

We all need more time, resources, and know-how. VIBCO's customers make the most of the resources available to them and rely on a company that understands the criticalness of components — which uses 'AR' for the first encounter — and which understands what's going on and asks the right questions. The company offers a wide array of units; hydraulic, electric, and pneumatic styles, both linear and rotary; in high frequency and low frequency models; in plastic, cast iron, stainless steel and aluminium housings; explosion-proof, totally enclosed, washdown safe; as well as air cannons and more, because the company understands how all these different vibrator units serve different purposes for solving its customers' problems. VIBCO can make an appropriate recommendation depending on its customers' conditions and requirements.

For customers that need to move fertilizer fast from railcars, there are specialized vibrators to do that efficiently and they can be specified to work well with the specific material being moved. Units are also manufactured to work in rough outdoor conditions, indoor settings, and in sterile environments.

Many companies just sell a vibrator. Customers should consider a company that sells the complete solution in a package, including a proper mounting system with all mounting hardware, nuts, bolts, starter box, controls, all required accessories, safety instructions and reference guides and the vibrator. VIBCO lets its customers know everything they need when they place a vibrator order, so that the installation process runs smoothly, according to the customer's timetable, meeting deadlines, and doing precisely what is needed.

In the shipping industry, consistent material flow leads to safety, enhanced productivity and reduced costs. The fertilizer market will rely on dry bulk shipping and industrial vibrators will continue to be an essential part of the movement of fertilizer throughout the world. Vibration generates a reliable trouble-free operation to keep materials in motion. A vibrator minimizes clogs in conveyor systems, clears trucks or hoppers, and safely prevents build-up in containers, silos, or bins.

Operators that are not using vibration, are losing potential profits from better, consistent, and speedier material flow.

About VIBCO, Inc.

VIBCO is a renowned provider of effective vibration solutions for material flow, efficiency and safety since 1962. It is the originator of the Silent Pneumatic Turbine Vibrator and has been awarded more than 46 US patents for its vibrator designs, including the original silent turbine vibrator. In addition, it manufactures over 1,800 finished products and serves 360,000 customers globally.

Building on the original foundation of quality, trust, and reliability, VIBCO continues to evolve its mission and philosophy to adapt to today's competitive marketplace. Embracing the principles of Lean and Six Sigma, VIBCO believes in continuous improvement and the elimination of muda (waste).

VIBCO listens to its customers and develops the product that is appropriate for their applications, often customizing an existing product to fit the materials they need to move. VIBCO's engineering team works closely with the end users to select the proper unit, and the proper placement to maximize the desired result, efficient material flow. At VIBCO, vibration is not a side business — vibration is its only business.

Port of Bilbao reports on recent fertilizer activity

Sulphate handling at the Port of Bilbao.

In 2017, 125,000 tonnes of fertilizers were handled at Port of Bilbao facilities, and between January and August 2018, the total was 85,000, 13% up on the same period for last year. Half of this tonnage is bulk and 84% is import traffic.

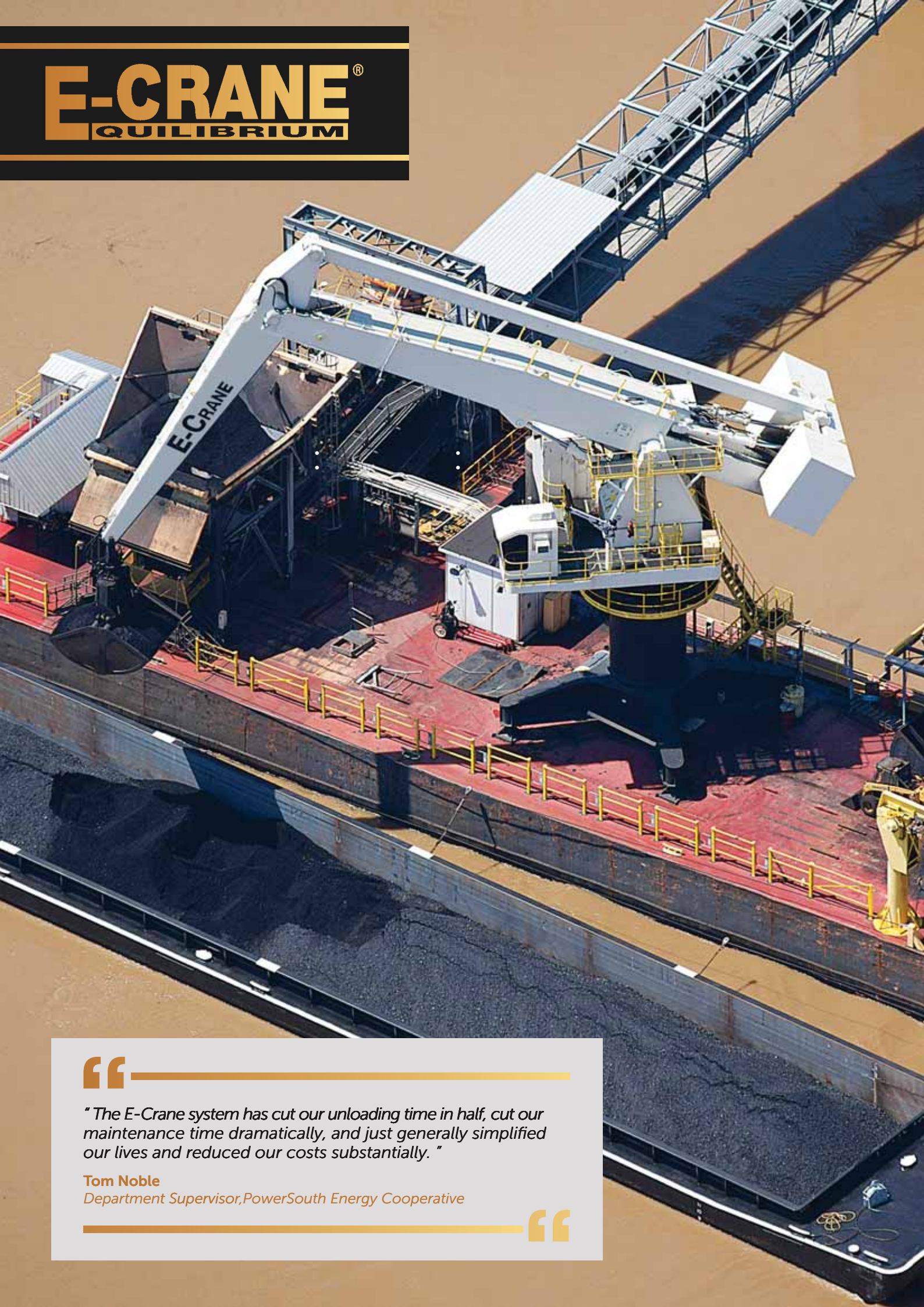
A breakdown by countries shows that traffic from the Netherlands, Germany, Belgium, the Republic of South Africa and Estonia stands out. In Bilbao, in addition to the Noatum Container Terminal, which handles container traffic, there are four terminal companies handling bulk fertilizers. Terminales Portuarias (Tepsa) handles liquid bulks, and the other three, located on different docks, move solids: Servicios Logísticos Portuarios (SLP), Consignaciones Toro y Betolaza and Bergé Marítima Bilbao.

Fertilizer traffic is seasonal for Tepsa. The last class of fertilizer to be stored in its tanks, after sea transport, was UAN 32 (a chemical fertilizer). The product is then re-despatched in tankers.

Solid bulk fertilizer is discharged using cranes and transferred directly to customer warehouses by lorry/hopper on some docks, and on others, mechanical loaders are used. Stevedoring companies also have high-capacity travelling cranes like the Liebherr 400 and Liebherr 500, or the Mantsinen 110 crane. DCi

Terminales Portuarias (Tepsa) handles fertilizer as liquid bulk.

E-CRANE® QUILIBRIUM



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

Tom Noble
Department Supervisor,PowerSouth Energy Cooperative

The Port of Silloth: small, friendly team enables smooth movement of fertilizer

The Port of Silloth is one of the 21 ports operated by Associated British Ports (ABP). It is located in Cumbria, close to Carlisle. It has good road connections with the M6 motorway, providing easy access to the north and north-east of England and southern Scotland.

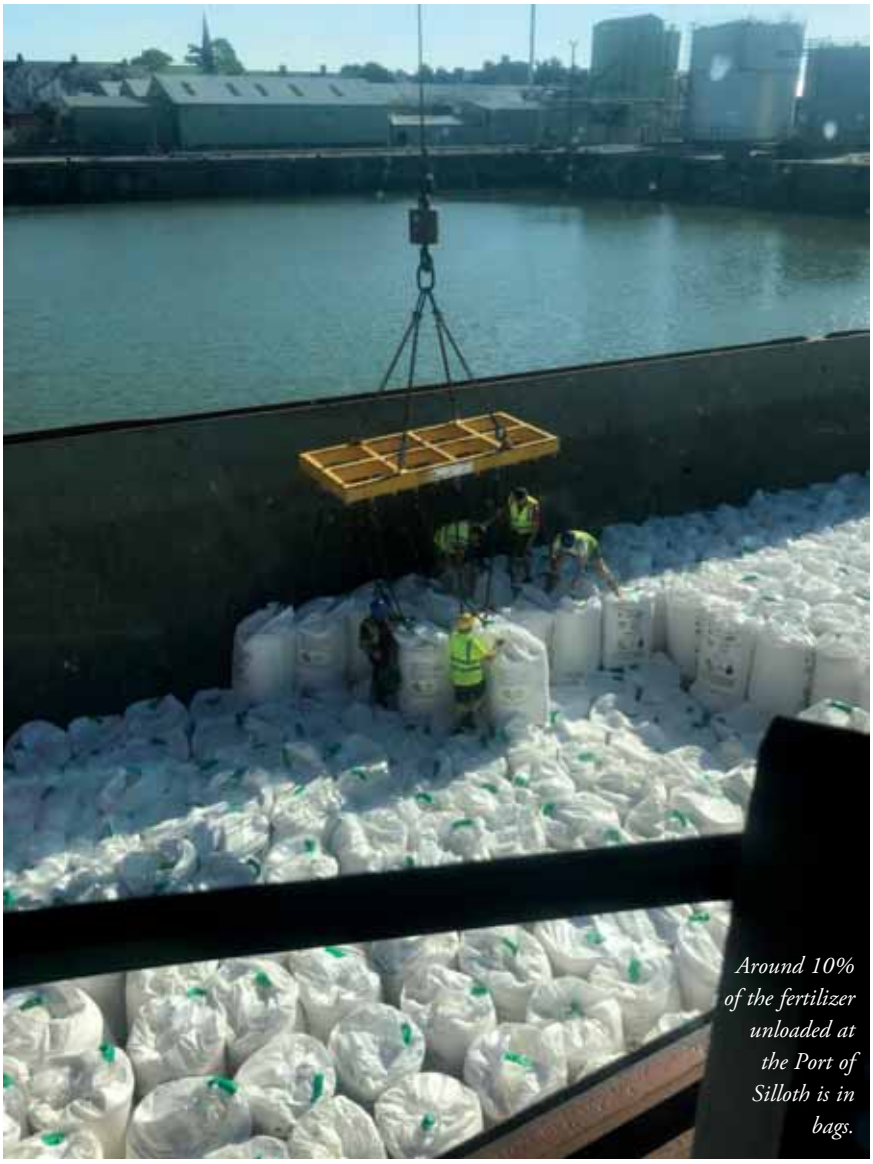
The Port of Silloth is one of ABP's ports in the north west of England. In terms of the fertilizer handled there, all fertilizer is imported, with an approximate annual quantity of 85,000 tonnes.

Local stevedores at the Port of Silloth use a five-tonne crane to unload all varieties of fertilizer. To unload a 3,000-tonne cargo, the time taken — with no stoppages — is around eight hours, cleared off the vessel, provided there are sufficient trucks and drivers. As the imported fertilizer is loaded direct to trucks, the port does not need to offer any facilities to store the commodity. Similarly, the port ensures that the different types of fertilizer cargoes are shipped separately, so the distributor is responsible for ensuring that there is no risk of cross-contamination.

The vast majority of bulk fertilizer received at the Port of Silloth arrives as loose bulk, so the port can encounter some challenges if it is raining. About 10% of incoming fertilizer arrives in bags.

The fertilizer is shipped to the Port of Silloth from: Antwerp, Ghent, Riga, Klaipeda, Hamburg, Vyborg, UstLuga, Sillamae, Rotterdam, Sagunto, Aviles, Szczecin and Vlaardingen.

Over recent years, there has been a very slow increase in the quantities of fertilizer shipped to the Port of Silloth; this is attributed to the increasing desire within the farming community to boost additional crop of silage prior to winter. The port anticipates that this growth, albeit slow, will continue in the coming years. The local distributor is currently only working at around 50% capacity.



Around 10% of the fertilizer unloaded at the Port of Silloth is in bags.

The Port of Silloth attracts incoming fertilizer cargoes, as it is local to a very large farming community, and there are no big city ports or other avenues in the area.

In order to remain competitive, the port runs on a minimum staffing level, with all employees multitasking where necessary. There is a strong, friendly relationship with the local community and businesses. The Port of Silloth watches carefully for any incursions into its market.

The Port of Silloth offers a draught of 6m, and can handle vessels of up to 110m x 15m.

All fertilizer is handled by a local company, which carries out all the haulage and stevedoring

The Port of Silloth is a very small port, looking to expand; there is plenty of space adjacent to the port for investors to build facilities, plant etc. and use the port as a means of bringing raw materials in or out of the country.

The port is ideally located for trade to Ireland from the northern counties and southern Scotland. There are good road links for standard trucks and the local stevedoring company can store goods off the port if necessary (at the local airfield in hangars or in the open).

The Port of Silloth has a short term covered storage facility up to 3,000m² which can be made available as necessary.

The team at the port is small and friendly, working in a small local community. If the employees cannot do it, they know a man who can!

Solent Stevedores: efficient fertilizer handling at the UK Port of Southampton

Solent Stevedores has been operating the Bulks Terminal in the Port of Southampton for almost 20 years and handles around 1.2mt (million tonnes) of cargo annually of recycled metal, woodchip, gypsum, salt, animal feed, fertilizer, rock armour, refuse derived fuel and project cargoes.

The award-winning stevedoring company has other bulk cargo operations in Immingham and at Silvertown, London for Tate & Lyle Sugars.

Alongside the Bulks Terminal in Southampton, the company also operates an intermodal rail terminal, together with a fruit terminal and will also handle 86% of the cruise vessel stevedoring this year. In addition to these operations, the business also has operations in Jersey and at London Gateway.

On behalf of its client Ultimate Fertilizers, Solent Stevedores handles 80,000 tonnes of fertilizer annually in the Port of Southampton.

The Bulks Terminal has a draught of 11.2m and coaster-type vessels deliver the fertilizer to Berths 107 or 108. Typical tonnages vary between 1,500 tonnes to 7,500 tonnes per vessel.

Given that Solent Stevedores can be handling numerous bulk cargoes at any one time, it has access to three Gottwald mobile harbour diesel cranes and the electric Titan crane.

A team of ten staff is utilized during the fertilizer-discharge operation and their roles encompass crane driving, Bobcat driving, tractor & trailer drivers, a weighbridge operator, vehicle marshal and a person-in-charge.

Depending on which crane is allocated for discharging a fertilizer vessel on any given day, a clamshell grab is used and these vary in size from 12m³ to 16m³.

The fertilizer is discharged directly to a free-flowing quayside hopper where the product is then loaded into trailers which are then shunted by tractor, a short distance to the weighbridge for weighing before then travelling to the fertilizer terminal.

Up to around 350 tonnes of fertilizer is discharged per hour, per crane, and through the vessel this equates to around 250tph (tonnes per hour), per crane.

Once a vessel discharge is completed, the cargo data is uploaded to the stock tracker system which was developed by Solent Stevedores and allows clients to review their cargo volumes using their personal log in details.

The fertilizer store is 4,860m² in capacity and can hold up to 24,000 tonnes of any single product. However, in normal circumstances the store is sectioned off into six or seven separate bays with Stelcon walling to enable a variety of different fertilizer products to be stored.

Once the fertilizer is discharged to store by the tractors and trailer operation, a front-end Volvo 120 loading shovel fitted with a pusher, is used to push up the cargo into its dedicated bay to maximize storage capacity.

Once a sale is made, the most commonly used types of fertilizer are loaded into one of six 14-tonne silos via an elevator system from the intake hopper, and from here the fertilizer is transported to the blending unit.

The next part of the process involves the calculation of the preferred recipe to the final specification required by the client and this can result in multiple types of fertilizer being blended simultaneously.

If the recipe required by the client needs an oil-based coating, then the various fertilizer types travel through the blending

tower and become coated. Those recipes which do not require an oil-based coating, go directly to the bagging plant.

When the blending of a required specification is undertaken batches of normally around six to nine tonnes of the required recipe are manufactured.

Once the recipe is completed, the blend is moved to the separate bagging store where a forklift truck, with an enclosed cabin, can then move the sealed bags to the yard awaiting collection, which can take place on the same day.

Churchill Freight Services, a sister company to Ultimate Fertilizers, is contracted to arrange a collection service for onward delivery to landowners and farmers. The fleet of lorries used can hold up to 46 × 600kg bags and 28 ×1,000kg bags, depending on the bulk density of the fertilizer. The various fertilizer types can vary in density from 0.7–1.1kg per metre.

The challenges to the operation revolve around accessibility to the store on days when a vessel is being discharged and when the fertilizer is being loaded to conveyor, due to the configuration of the site.

Other challenges include cross-contamination of cargo types, water ingress and stock control.

Embracing new technology to drive further efficiencies throughout the operation remains an important consideration to ensure the operation remains competitive.

The reliability of suppliers and continuity of a strong supply chain together with retaining full control of all aspects of the site operation, are essential to the ongoing success of the fertilizer terminal.

Fertilizer handling equipment from Sackett-Waconia

Sackett-Waconia was founded in 1897 in Baltimore, MD, and throughout its long history, the company has witnessed technology come and go, but can speak first hand for the long history of the basic, tried and true, equipment we all depend on.

While handling systems can vary widely in components, applications, and capacities, they all have several steps in common: receiving and transfer, material elevation, and building distribution. Given all of the possible layouts and equipment combinations, Sackett-Waconia prefers to work closely with its customers to understand their needs and develop a system that fits their location. It offers transfer capacities of 1,200tph (tonnes per hour) or more and engineers each project to simplify the flow of material. This not only increases efficiency, but often reduces the overall amount of equipment needed.

The Sackett-Waconia Lump-Buster.

Material receiving and transfer

In general, all systems include a receiving hopper and conveyor, with options for de-lumping for river or marine systems. Sackett-Waconia's standard receiving hoppers feature 304 stainless steel plate construction, stainless angles, clean-out access, and can include supports and grating as needed.

Transferring material requires a conveyor, and Sackett-Waconia offers two main types: Bulk-Toter flighted chain conveyors and belt conveyors.

Specifically designed to transfer free flowing bulk materials, the Bulk-Toter provides safe, dust tight, all weather, conveying. Combining the ability to convey at slopes up to 45° with integrated hoppers and self-regulating feed, makes bulk-toters ideal for handling a large range of granular materials. Capacities range up to 600tph+.

Sackett-Waconia's standard belt conveyors feature a 304 stainless steel formed channel design, and the company works with its customers to match components and drives to the needs of their projects and the materials they handle. Standard conveyors also feature industrial bearings and drives, and have capacities to 1,200tph+.

One challenge to handling fertilizer is lumps. While most times a sizing grate can be used for receiving material, sometimes lumpy material requires a bit more help. Designed to rapidly and efficiently break up large lumps in one pass, the Sackett-Waconia Lump-Buster is an excellent choice for use with firm lumps in high humidity conditions. Because the Lump-Buster has no screen to clear, maintenance is kept to a minimum.

Material elevation

While some properties have the room to allow for low angle elevation of materials via bulk-toters or belt conveyors, the most common piece of equipment used to raise materials is the bucket elevator.

Sackett-Waconia bucket elevators are designed for high-volume industrial applications, and each is engineered for their intended duty and environment. They handle materials from powder to granular, and can be found in process plants, fertilizer terminals, blending plants, and anywhere

Sackett-Waconia's Bulk-Toter.

Elevator.

bulk materials are handled. Capacities range from 50tph to well over 1,200tph.

Plant layouts that include barge receiving systems can generally use belt conveyors to achieve the elevation required to meet the building distribution system. In these cases, Sackett-Waconia can engineer and fabricate the required truss work and supports to reach the building distribution system.

Material distribution

Sackett-Waconia has a wide array of conveyor systems available for distribution of materials throughout a building. The company works close with its customers to recommend the proper system that meets their needs.

Single-sided tripper.


Barge-unloading hopper.

Tripper conveyors are an excellent option to fill a building as they can index anywhere along their travel and 'paint' a pile peak across a bin, enabling optimal filling of storage spaces. Sackett-Waconia tripper conveyors are ruggedly built to keep maintenance low. Standards feature 304 stainless steel construction, heavy duty belting, winches, system interlocks, pull safety switches, pinch guards, head and tail covers, and zero speed switches.

For smaller buildings, with low overhead space or centre-fill requirements, Sackett-Waconia also manufactures en masse style horizontal flighted conveyors and reversible shuttle conveyors. Its en masse style conveyors feature dust tight conveying and capacities up to 400tph, and shuttle conveyors can range up to 750tph+.

High speed/high capacity systems

Sackett-Waconia has long experience in engineering and designing high-speed and high capacity systems. Whether the application is in a rail terminal, port facility, or river terminal, it has systems available for each need. Sackett-Waconia offers a full line of high capacity equipment for inland terminals and hub plants. Receiving systems range up 1,200tph+ and can have the ability to unload railcars without re-indexing.

River and marine terminals offer the challenge of finding the best way to transport materials as efficiently as possible while limiting potential failures driven by the environment. Sackett-Waconia's terminal systems are tough, corrosion resistant, and designed to be as simple as possible. All standard systems feature 304 stainless construction, weather covers, and easy maintenance access.

Material de-lumping and dust mitigation is also available, as is truss work and controls. These terminal systems can also include direct transload of materials as well.

The one underlying principle for Sackett-Waconia's engineering and fabrication is to never compromise safety. All Sackett-Waconia equipment meets or exceeds OSHA regulations, and it works closely with its customers to ensure any site or company-specific requirements or concerns are met and addressed. Sackett-Waconia leverages its 120+ years of experience to work with its customers and find solutions to fit all needs.


*Conveyor systems.**

Foam control?

a vital aspect of biomass processing

Anaerobic digestion facilities must keep a close watch to ensure that production is not hampered by foam by-product.

Hycontrol brings anaerobic digester foam under control

Foam generated in anaerobic digestion can be a costly headache for AD (anaerobic digestion) producers and their insurers. In this article *Sam Gould, Foam Technology Specialist at level measurement pioneer Hycontrol*, discusses the problems uncontrolled foam can cause and how Hycontrol's SureSense+ system can address them.

The popularity of anaerobic digestion and biogas generation has increased significantly in recent years, and it is easy to understand why. This renewable energy resource is a perfect fit for many businesses in the food, waste treatment, and other industry sectors; waste generated in their own processes is used to power ongoing production, with the option of selling any excess power back to the grid. Besides this, Energy from Waste (EfW) has been proven to be a profitable industry in and of itself, taking in waste from other producers that may otherwise be abandoned to landfill and recycling it into a very useful, necessary product. This expansion has been encouraged with a range of government incentives worldwide; for example, the UK Renewable Heat Incentive (RHI) offers a tax-free boost to sites, allowing them to recoup installation costs in five to eight years. This has proven a tremendous support for industry growth. In 2017, the Anaerobic Digestion & Bioresources Association (ADBA) found that AD plants across the UK now have enough capacity to power over a million homes. Anaerobic digestion is generally held to be an environmentally responsible, effective strategy that, long-term, reduces both waste and costs.

Given all of these positive factors, it seems somewhat incongruous that costs for setting up and running AD plants are increasing, most notably insurance. Premiums are high, with insurers demanding strict standards and frequently despatching their own engineers to conduct site inspections. So what is the perceived risk associated with anaerobic digestion that drives up costs?

Problems caused by AD foam

A serious issue, from both a risk and cost perspective, comes from the thick, sludgy foam produced in AD. This is a natural by-product of the biological reaction that converts waste to biogas, but its behaviour can be unpredictable and difficult to manage.

In fact, foaming is a persistent,

Hycontrol's new SureSense+ specialized foam control system.

complicated issue for many biogas producers.

As previously stated, foaming is a normal part of the microbial reaction that produces biogas. However, research has shown that the problems caused by excess foam can actually reduce overall gas production by up to 40%. This level of productivity loss can be seriously detrimental to the profitability of an AD plant — and that doesn't even consider the additional risks that can arise from foam in the process.

As biodigesters are sealed units, it is hard for operators to monitor what is happening inside. If foam in an anaerobic digester gets out of control it can cause serious, even catastrophic problems:

- ❖ damage to gas compressors, pumps and other sensitive process equipment;
- ❖ congestion and blockage of safety valves and pressure relief valves;
- ❖ rupture and destruction of digester tanks and domes, leading to:
- ❑ high repair or replacement costs;
- ❑ months of downtime with associated loss of earnings;
- ❑ severe pollution hazards and clean-up costs;
- ❑ environmental fines;
- ❑ damage to company and site reputation; and
- ❑ potential revoking of operating permits.

Foaming has the potential to cause serious equipment damage and loss of production.

These are obviously worst-case scenarios, but horror stories of this kind are unsettlingly common. This is certainly not a problem unique to the UK, with reports of sites worldwide having lifted the roofs off of concrete digesters. Costs arising from this type of incident can run to tens of thousands, reportedly exceeding £1 million at some sites when factoring in downtime, loss of production and repair costs. Obviously this level of financial exposure can be very dangerous for operators and their insurers, and as a result there are a number of insurance companies who are now putting exclusion clauses for foam damage into their policies.

What causes AD foam build-up?

In industrial/large-scale biogas production richer feedstocks are used to accelerate the microbial feeding process, referred to

as the organic loading rate (OLR). Because these feedstocks are more potent, they can have unpredictable outcomes. Exciting the anaerobic micro-organisms in this way does achieve the desired outcome of increasing biogas output, but with a corresponding — indeed sometimes excessive — build-up of foam. The reason for this is an increase in the carbon dioxide/methane ratio. Put simply, carbon dioxide is not as easily released from the surface foam, increasing the emulsification of the foam bubbles. The richer feedstocks being used also tend to add a higher quantity of surfactants to the mix which, coupled with other factors within the digester, leads to greater metastability in the foam column. This means that, rather than the gas escaping from the surface foam, it remains trapped as its volume increases, leading to more and more foam build-up. If the foam level gets too high it will enter the gas compressor line, it will collect around and solidify on the pressure relief valve, and from there the risk of pressure build-up blowing the whole reactor grows ever greater.

Considering all of the above factors, the concerns of insurers are understandable. AD plants, particularly ones operating on a high OLR in order to increase throughput and profitability, are in many ways a perilous proposition. The more operators push them to increase turnover, the greater the risk of something bad — and costly — happening.

What is the solution?

Insurers and operators both want the same thing — AD plants maximizing their OLR to achieve a high level of production but with foam levels kept under control, suppressing the chance of it causing damage or reducing output. The challenge, therefore, is to introduce a monitoring and control system that maintains foam at the optimum production level with correctly-applied chemicals, liquids, or by other control methods — optimizing the digestion process whilst reducing any risk. Previous attempts at utilizing conventional level monitoring equipment such as ultrasonic or radar to achieve this have resulted in failure. These technologies generally prove unreliable as they were designed for use with liquids and not foam — which is, after all, mostly comprised of gas within a thin liquid layer. What is needed is a purpose-designed system.

The application of Hycontrol's new SureSense+ specialized foam control system has proven highly successful in bringing AD foam under control. It offers a practical solution to all the previously-outlined AD and biogas issues, reducing both risk and costs. Unlike competing products, this is not simply a liquid level sensor that has been adapted or modified. Hycontrol foam sensors have been designed specifically for this purpose with the high sensitivity impedance measurement required to measure all types of foam, and have a proven track record in critical applications. By passing a small alternating electric current at very low voltage through the foam and measuring the flow, the probe can determine if foam is present and measure its density. This patented technology has been in use for many years in other industries, but the scale of its applicability to AD is only now becoming apparent.

Measuring foam is one thing, but it is also vital to avoid false readings caused by the build-up of foam and other substances on the probe. Hycontrol has developed a technology called IMA Sensing (Intelligent Multi-Action) which allows the reliable measurement of foam even when a sensor is covered with a thick sticky layer of fouling.

The ATEX-rated system can be easily programmed to administer the preferred control method, either by directly controlling pumps or valves or by connecting to an external controller. SureSense+ comes with a pre-programmed digester setting which keeps digesters operating at the optimum level, preventing damage to both equipment and vessels and eliminating the risk of pollution. Additionally, it can improve efficiency (and cost-effectiveness) if using anti-foam chemicals.

Crucially for the industry as a whole, the adoption of proven foam systems demonstrates to insurers that operators are taking the risks posed by the AD process seriously and putting in place effective controls. A strong case can then be made that insurance ratings should be improved for plants utilizing this technology. Indeed, it is not hard to imagine arriving at a not-too-distant future point where an effective foam control system is a mandatory requirement for obtaining reasonably-priced insurance for an AD installation.

Conclusion

AD and biogas is now a burgeoning industry with considerable opportunity for continued growth, promoting energy sustainability whilst responsibly dealing with organic waste. However, as we have seen, foaming that occurs as part of the process can be problematic; it has the potential to cause serious equipment damage and loss of production — with potentially oppressive results financially, as well. There have been a number of attempts to control foam with traditional technologies, but industry operators need to be aware that foam is a uniquely complex product which requires a purpose-designed tool to control it. By utilizing effective foam control technology, AD producers have the opportunity to considerably increase their turnover whilst at the same time ensuring that their site and staff are safe, that their local environment is safe, and their insurance premiums are safe. Put simply, effective foam control benefits all stakeholders in the AD and biogas field. DCi

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Troubleshooting cement handling and storage solutions

A rock box acts like a shelf, catching and distributing falling material onto the impact cradle.

Louise Dodds-Ely

Finding a solution to damage and spillage at conveyor points

A 4kg (8 lb, 13oz) piece of limestone dropped from a height of 20ft (6m) will hit the pavement at 25mph [miles per hour] (10mps [metres per second]), *writes Don Papini, Martin Engineering Territory Manager.* Depending on how the rock lands, either it breaks apart and shoots various sized fragments in all directions, or it remains largely intact and damages whatever it hits. If that rock is accompanied by hundreds more like it and dropped onto an unprotected conveyor belt every few seconds, an operator can expect an inevitable outcome: fugitive material, persistent breakdowns and costly repairs of the belt, idlers and pulleys. That's the situation Martin Marietta found on the B-06 conveyor when the company merged with Texas Industries (TXI) — the largest cement producer in the state — and took over operations of the Hunter Cement facility in New Braunfels, Texas in 2014.

Built in 1979 as a single kiln cement facility producing approximately 0.9mt (million tonnes) of cement per year, the company added another, larger 1.4mt kiln in 2012, more than doubling the site's production to 2.3mt per year. However, Martin Marietta discovered there were some systemic problems that hindered the plant from consistently operating at full production.

Following the handover of operations, the company assigned Reliability Engineer, Rajeshwar Rao Akula, to identify production problems, analyse causes and offer recommendations with action items. Upon inspection of the facility, he found that one of the major issues was on the B-06 conveyor, which transported crushed limestone from the storage dome to both kilns through an underground tunnel. Akula determined that the main transfer point for B-06 was not able to sustain the force, weight and volume being fed to it, leading to a number of belt and component problems and causing excessive downtime. After presenting his report, company officials agreed on his recommendation to invite Martin Engineering to provide a solution, having already established a positive relationship with the company due to the use of hundreds of Martin Engineering Air Cannons placed throughout the plant.

The B-06 conveyor is an essential bulk material transport artery. According to

Akula, having problems so early in the production cycle impacts operations across the entire facility. "We were experiencing ongoing issues with spillage, broken idlers and belt damage causing downtime that could last for hours," he explained. "Every week, the system was shut down and a team of three to four workers would take the better part of a shift to go in with shovels and wheelbarrows to dig the system out to keep it operational. Add to that a belt replacement every six months, and it became a costly mess."

A receiving belt can experience severe damage from material transfers if it's not supported properly.

Diagnosis in need of a doctor

The Hunter Cement facility has a large quarry that extracts limestone and sends it to a 60,000-tonne storage dome, which is over 320ft in diameter (97.5m), roughly the length of a football field. From there, approximately 350 to 400 tonnes (317.5 to 362.8 metric tonnes) per hour of limestone is loaded into a crusher that breaks down the rock to a size of 8in minus in diameter (203mm), then deposits the material into a chute with a 20ft (6m) drop onto a 42in (1,066mm) conveyor belt. The limestone is then conveyed at 380ft/min (1.93m/sec) at a 35° incline for 150ft (48m) through the tunnel and 150ft in open air, where it is transferred and directed to the proper kiln to be mixed, heated and processed.

Jonathan Cole, Lead Service Technician for Martin Engineering assigned to the Hunter facility, inspected the system and helped issue recommendations, along with overseeing the installation of improvements. According to Cole, the problems began with the crusher, but extended along the conveyor and through the tunnel. "The crusher was producing 8in minus, but the conveyor was only built to handle 4in minus," Cole observed. "The impact from the 20ft drop blew out idlers and gouged the belt, causing misalignment and extensive spillage."

The loads of limestone would land on the fast-moving belt with such force that it often bent or cracked idlers and caused material to bounce, denting and scraping the skirt before it settled. Without being centred, the load would throw the belt off track and continue to shift throughout the transport process. This caused dust and fines to escape from the belt and pile along the conveyor's frame, clogging the maintenance walkway and obstructing access to the load zone.

Build-up around the frame also deposited jagged carryback material onto the topside of the belt's return path. The material would get caught in between the belt and tail pulley, gouging both, only to be thrown back onto the belt to make several more trips through, inflicting further damage. These blemishes contributed further to low conveyor performance and belt drift.

Workers frequently inspected the system, evaluating the belt and splice for wear and idlers and pulleys for required maintenance or repair. "The system was shut down regularly for one thing or another," Akula said. "This meant nothing was fed to the plant, causing a complete work stoppage. Something had to be done."

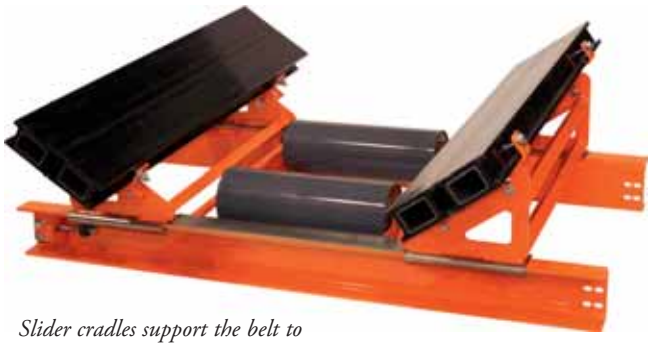
The solution

After analysis, the Martin Engineering team presented a detailed proposal offering a solution that involved several components working in concert to address the entire belt issue. "Our first recommendation was installing a rock box," Cole explained. "Set three feet above the belt, it would work like a shelf, catching and distributing the limestone softly onto an impact cradle."

Located directly under the chute, the impact cradle is mounted on four rugged steel I-beam supports, able to sustain an impact force of 12,000 lbs (5,443kg) by crushed material dropped from heights of up to 26ft (7.9m). The specially engineered impact bars are based on an aluminium T-slot design, which is surrounded by a layer of energy-absorbing 83A durometer urethane and coated with low-friction UHMW plastic to reduce friction and belt fraying. Wing supports adjust to a 5% fine-tuning angle, allowing the cradle to be precisely matched to the idler profile, assuring a tight belt seal and avoiding material shift on impact.

Following the impact cradle within the 34ft-long (10.3m) settling zone, the team

The modular impact cradle absorbs the impact of the falling load, yet slides in and out for easy service.



Slider cradles support the belt to prevent spillage from belt sag and eliminate material entrapment points.

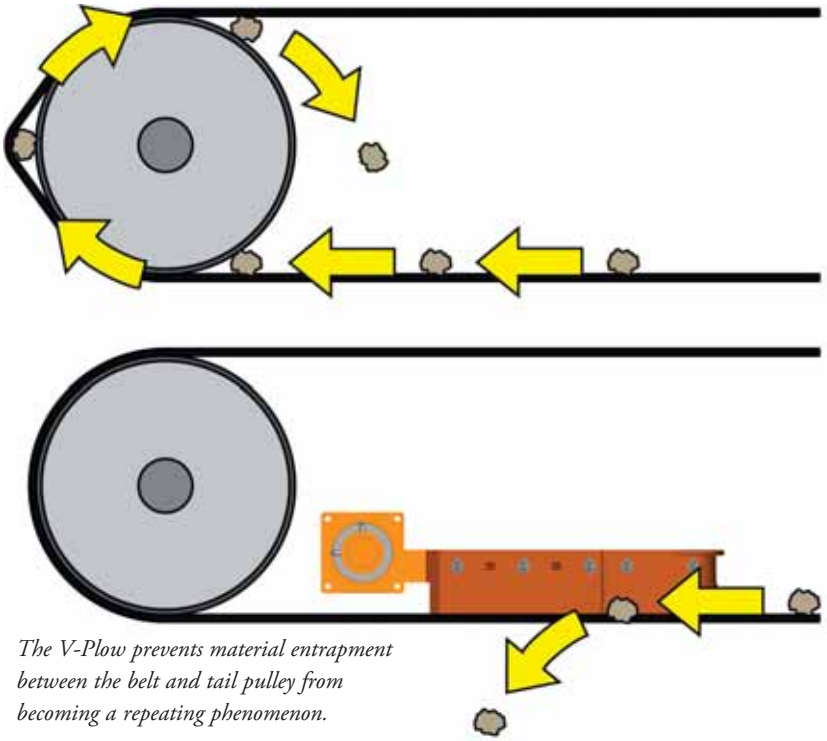
recommended a series of adjustable slider cradles that support the belt to prevent spillage from belt edge sag and to eliminate entrapment points where material commonly got caught. To avoid belt fraying and reduce drive-power consumption, the loaded belt glides over low-friction, 62 durometer (shore D) UHMW polyethylene sidebars featuring the company's unique 'box' design. The sidebars are 'double-life', which means they can be flipped over when one side is worn, providing a second wear surface. Using only hand tools, a single worker simply removes the release pin and pulls the unit away from the frame on its track-mounted sub-assembly to adjust and replace components quickly.

The proposal included track-mounted idlers to be placed in the tight spaces between support cradles where material can get trapped or escape. With slide-out/slide-in roller frames allowing idler service without the need to raise the belt or remove adjacent idlers, track-mounted idlers help stabilize the belt path between carriages to assure a tight seal through the entire chute box.

Another key element of the assessment was an external skirting system along the chute box, sealing the chute to the belt. Specially designed to provide dual-seal efficiency with a one-piece 70 Shore D EPDM durometer rubber composite skirt and an attached strip, the skirting floats on the belt and self-adjusts to maintain an effective seal. Offering chemical resistance and low-abrasion index characteristics, once the skirt is worn on one side, it can be flipped for dual usage by disengaging the 6ft (182.9cm) long angle clamps. This can be done quickly using hand tools.

"The wandering belt issue was also a huge concern, so we recommended a series of belt trackers with a parallel steering and training system every fifty feet," Cole added. "Another cause of misalignment was material getting caught between the belt and tail pulley, so we proposed a torsion V-Plow as well." Mounted on a dual steel bar attached to the mainframe a few feet from the tail pulley, the V-Plow has a unique suspension system that allows the polyurethane blade to rise and fall with fluctuations in belt tension. Any material carried back on the top of the belt return is deflected to either side of the frame before it reaches the tail pulley.

By reducing the impact of material with the rock box, improving the integrity of the settling zone and assuring the belt remained tracked throughout the process, the system is designed to mitigate spillage and improve the health of the entire conveyor.



The V-Plow prevents material entrapment between the belt and tail pulley from becoming a repeating phenomenon.

The external skirting system seals the chute to the belt.

Results

Installation by Martin Engineering technicians took less than two weeks, and coincided with scheduled breaks for other improvement projects addressing issues throughout the facility. According to Akula, the B-06 improvement was one of the most critical elements to the operation.

Since the conclusion of work in early 2014, there has been no unscheduled downtime of B-06. Moreover, monthly 'Walk the Belt™' inspections conducted by Martin Engineering technicians have recorded healthy pulleys and no significant belt damage or need for replacement. Clean-up time of spillage has been significantly reduced to an as-needed basis, without the requisite system shutdown.

"We are extremely impressed with how the system is performing," Akula concluded. "The service and maintenance have been excellent, and we are already working with Martin on other projects to further improve operations."

Martin Engineering is a major provider of flow aids and conveyor products for a variety of bulk material applications, including cement, coal, mining, rock/aggregate, biomass, grain and other materials. Founded in 1944 and headquartered in Neponset, IL (USA), with divisions on six continents, the company is constantly designing and manufacturing innovative solutions to increase productivity and workplace safety.

Clogging becomes a thing of the past with solutions from Standard Industrie

Since 1978, Standard Industrie International has specialized in the design and manufacture of equipment to facilitate the handling of powdery bulk products safely and with respect for the environment. Its equipment makes it possible to optimize operations while reducing operating and maintenance costs.

The company offers four main services:

- blockage & build-up removal
- industrial vacuum cleaning;
- conveyor belt optimization; and
- silo & hopper cleaning services.

In a recent contract, Standard Industrie was contracted by a cement plant in Missouri, USA, to solve the problems that it was experiencing with clogging occurring following the passage of hot gases back in cyclones. The combination of the colder material with these hot gases creates a significant amount of clogging that can affect the speed of the gases, thus influencing the precalcination of the raw cement.

Standard Industrie cleaned a large area of the kiln inlet, the smokebox and the gas duct. It then installed 70 air cannons and the AIRCHOC® positive safety version with guillotine insulators.

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There is a wide range of valve mechanisms and pressure tanks, which enables Standard Industrie International to recommend the best possible and personalized solution for any build-up or clogging problems. This equipment is available in both versions: standard or high temperature. The high-temperature version is specially designed to treat problems encountered in areas where the temperatures are high such as in cement works, lime plants, and incinerators.

The standard version is intended for applications involving silos, hoppers, chutes, piping for any kind of process and material in foundries and in ready mix concrete plants.

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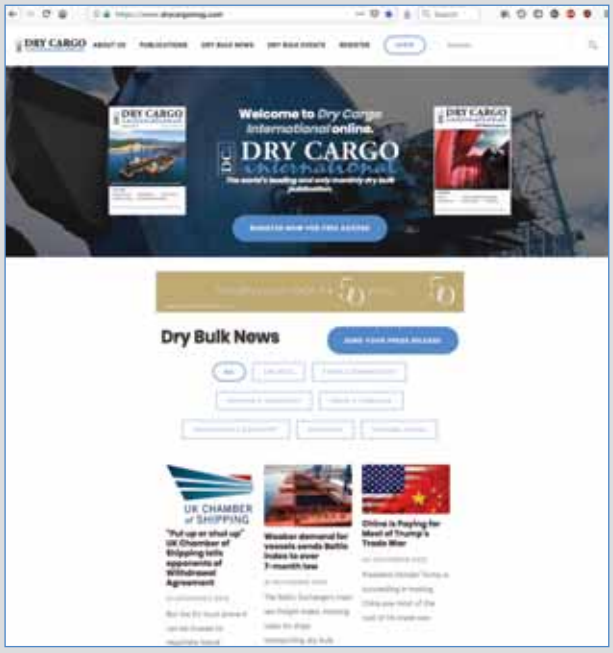

Siwertell technology chosen as best fit for South Texas cement handling operations

Siwertell, part of Bruks Siwertell Group, has secured an order from US-based GCCM Holdings LCC to supply a high-capacity ship unloader for South Texas Cement's terminal in the US port of Corpus Christi. The Siwertell ST 640-M unit will have a continuous rated cement-handling capacity of 1,500 tonnes per hour and will be able to unload ships of up to 60,000dwt.

"GCCM and South Texas Cement made the decision that their new terminal would be best served by a mechanical unloader," says Patrik Henryson, Sales Manager, Siwertell.

"The factors considered by the companies during the decision process included unloading times, venting requirements, electrical demand, capital and lifetime maintenance costs, ship size, and storage capacity," he adds.

"Siwertell's demonstrated ability was a large factor in the decision to choose them for this project," says Earl Ingram, President of GCCM Holdings and South Texas Cement. "Machine size and unloading rate were extremely important. This particular machine is well within the operational range of many other machines that Siwertell currently has in service, and when combining all of the deciding factors that led to choosing a mechanical unloader, it was apparent that Siwertell was the best fit for our needs.

"We especially like the high rate of unloading combined with the versatility to handle various ship sizes."

The unloader is currently being built and will be delivered fully-assembled by heavy-lift ship to the port. Siwertell will supervise its commissioning and the unit is expected into operation in June-August 2019.

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

Siwertell is part of Bruks Siwertell Group

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The first waste heat recovery project with ORC technology been awarded to CTP Italy

CTP Team Italy has been awarded a contract for the project to develop Turkey's first energy generation plant, which will generate energy from waste heat using the technology of 'Organic Rankine Cycle'.

CTP Team Italy signed a turnkey contract for the energy generation from waste heat project of Cimko Narli Cement Plant, a subsidiary of Sanko Holding, in March 2018. With the Organic Rankine Cycle (ORC) system, which will be applied for the first time in Turkey, the waste gas from the furnace cooling system will allow the 7MW turbo generator to generate electricity by evaporating the organic fluid which feeds the system. The energy plant to be installed will provide approximately 12% of the current plant's electricity needs, with an annual efficiency of 7,920 hours and annual energy of 36 million KWh. The plant is scheduled to start operating in the first part of 2019.


Cimko Narli cement plant.
Work in progress.

After the signatures, CTP Team Assistant General Manager Acelya ARIK and Sales Director Marco Ernesto DONGHI stated that: "The project will be the first project based on ORC technology with a thermal oil loop in Turkey for heat recovery from the cement industry. Our cement customers are trying to reduce operating cost in the sector and electricity is one of the highest cost in OPEX.

Cement producers already know about the advantages of a heat recovery system: decrease electricity cost in the electricity bill; the increase of competitiveness in the international arena, and no additional fuel consumption.

The annual energy production will be higher than 30GWh/ year, which will be entirely consumed by the cement plant. From an environmental point of view, the avoided CO_2 emissions will be about 15,000 tonnes per year and additionally, no water will be consumed in the waste heat recovery plant. It means that, we will generate energy without consuming natural resources by using organic fluid instead of water while preventing waste heat from being released into the air. Since this project is the first ORC-based heat recovery plant in Turkish cement factory, it will be an important milestone that will push further heat recovery projects in this field'

About CTP Team Italy

CTP is a leading engineering and manufacturing company with 50 years of experience in supplying components to cement plants for their EP & EPC projects, in the field of dust collectors, filtration & their equipments, chemical treatments, heat exchangers and waste heat recovery (WHR).

CTP is able to design different types of customized installations to meet the individual needs and expectations of its customers, with a strong understanding of the cement production process and relevant equipment. In addition to its headquarters in Milan, Italy, through its manufacturing workshop located in Turkey with the team up to 140 people, CTP can ensure continuous help for all its customers, with local manufacturing workshops and presence that enable its qualified teams to operate in emergency during the full life of the plant.

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Bedeschi awarded contract by Zahana Algeria

On 30 October this year, Bedeschi was awarded a new contract in Algeria by Zahana Cement Company (a member of GICA Group) for a double roller crusher, model RL 850/1500.

The contract is on an EPC basis and it includes the supply of the new machine, designed for 500tph (tonnes per hour) of marl, the removal of the existing machine and the installation of the new crusher with the revamping of the existing electrical board.

The commissioning is expected within nine months from when the contract came into force.

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How to protect cement and clinker cargoes with a MegaDome® building

Storing cement and cement clinker can be a challenge. It requires a building with maximum storage capacity that is easily accessible year-round, and that keeps products dry and protected from the elements, all while respecting local building codes.

MegaDome® buildings from Harnois are a trusted and proven solution for all bulk storage needs. Harnois' in-house engineering team designs and manufactures fabric buildings that are quick to install, cost-effect and built to perform, season after season.

Flexible structures adapted to the customer's unique needs

MegaDome® buildings are designed to adapt to intensive use in industrial environments. The dome covers and protects bulk industrial goods, making sure they are stored in dry conditions and are easy to access even in winter.

Harnois' in-house engineers design buildings that can fit entirely in one container (or a couple of containers depending on the size), allowing for fast delivery and efficient installation wherever the site is located.

Construction challenges solved

MegaDome® structures are designed to comply with municipal standards and regulations. The company's engineers officially stamp building plans making it easier to get quick approvals for projects of every scope and size, while making sure all required documents are available and well presented.

The company's dedicated experts are there to support customers at every step, from the initial planning and approval stages all the way through to final installation and follow-ups.

Innovative design for optimized storage

MegaDome®'s innovative buildings don't require a central column and offer large wall clearance to maximize bulk storage space, allowing users to easily access and manoeuvre machinery.

MegaDome® buildings can be customized with various industrial options, like single or double roll-up openings, side garage doors and ventilation systems, which are extremely useful when storing bulk goods. Cement and cement clinker are very sensitive to the outside elements. When exposed to damp or water, they can harden or form lumps. Storing this type of bulk product requires a well-ventilated building. With over 50 years of experience in the greenhouse industry with Harnois Greenhouses, the company has developed high-performance ventilation systems that are adapted to its buildings, allowing it to meet specific ventilation needs to ensure that products stay dry in all conditions.

Finally, the structures are covered by a PowerShield® membrane that is 100% waterproof. The membrane protects cement and clinker, keeping them dry year-round while allowing them to maintain their original quality and texture.

The membrane also allows natural light to penetrate the building. This reduces the need for artificial lighting, which can add up to significant energy savings. This durable, waterproof, fire-resistant and UV-resistant membrane is assembled at the MegaDome® factory to ensure the highest quality standards.

Expertise to count on

Harnois Industries Inc. has been a Canadian manufacturer of steel structures for over 50 years. Its trusted experts design innovative engineering structures for the agricultural, industrial and municipal sectors that meet the operational needs and financial objectives of its clients.

Known in the industry for its innovation, dedicated team and the very high quality of its service and products, Harnois' integrated offering ensures its clients always find the right solution for their unique needs. Looking to the future, Harnois will continue to push the boundaries of engineering to deliver solid, scalable, durable and cost-effective solutions that ensure the success of its clients.

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- **Apron feeders:** for extracting heavy and lumpy materials from silos and hoppers. There are no limits on capacity and material size. Surface feeders.
- **Elevators:** Bucket elevators — high and low speed, with single or double chains, with shackles or round link components, with bushed-type chains, with rubber belt. Capacities up to 2,000tph, lifting heights of 140m, material sizes up to 400 mm.
- **Drag chain conveyors:** all type of drag chain conveyors with single, double or multiple chains for conveying and extracting. Capacities range from 10 to 1,250tph, width from 190 to 3,000mm.
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Apron feeder.

Bucket elevator.

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Bucket elevator: aerial view.

Screw conveyors.

Gambarotta Gschwendt has enjoyed great co-operation with different cement plants and major engineering companies worldwide, and the experience gained through the installation of many machines have combined to allow the company to develop state-of-the-art technology and to offer tailor-made equipment.

The constant updating of the design solutions, which are supported and confirmed by the data collected following after-sales activities at customers, ensures a steady improvement in order to offer highly specialized and durables machines

Skills developed in the cement sector as well as a consolidated, global presence, make Gambarotta Gschwendt a reliable and expert partner, ready to face international challenges caused by globalization and increasing market complexity.

Designing efficient and integrated solutions and optimizing production processes thanks to the identification of innovative and custom made solutions make the difference

Gambarotta Gschwendt: 100 years of history, 100 years of reliable products.

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Asia Cement Group opts for 13.7km-long BEUMER Group troughed belt conveyor in Sichuan, China

Through wild nature and populated regions

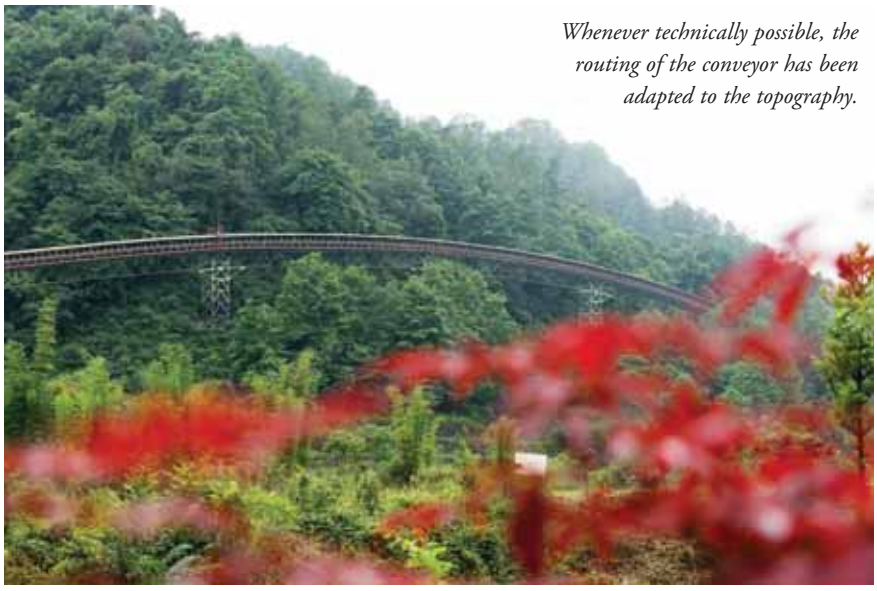
Sichuan Yadong Cement Co, Ltd. in Pengzhou, China, has been relying on a 12.5km overland conveyor from BEUMER Group in order to convey limestone from its quarry to its silo. When constructed in 2009 it was the longest belt conveying system in BEUMER history (BEUMER installed a longer system in 2016). The troughed belt conveyor runs through hilly terrain and nature reserves, over streams and unstable ground. The second project includes two additional overland conveyors, with an overall length of 13.7km, transporting limestone to the cement plant. Unlike the first project, the task here was to build the conveyor across inhabited areas. Noise emission limitations set forth by the government also needed to be considered.

A traditional Chinese proverb says that the roads in Sichuan are hard, harder than climbing to heaven. Depending on the destination, there are rivers and valleys to be crossed and mountains to overcome. The southwestern Chinese province of Sichuan is the source of the majority of different ores in the country, such as titan, lithium and silver and plays a major role economically. The electronics, mechanical engineering, metallurgical, chemical, medical, food and building material industries are all pillars of the economy. One of the cement manufacturers in the region is Sichuan Yadong Cement Co, Ltd. located near Chengdu, the capital of Sichuan. The company is a member of the Asia Cement Group, headquartered in Taipeh, Taiwan.

From the quarry to the cement plant: BEUMER Group built a 12.5 long conveyor through hilly terrain and unstable ground in the Chinese province of Sichuan. An additional, smooth running system is added with a length of 13.7 kilometres. This system can feed a potential third conveyor with limestone.

In 2004, the company decided to build a new cement plant in Sichuan. During the development phase, Asia Cement Group received approval from the Chinese government to use an abandoned railway to transport the limestone. Halfway through finishing the plant however, the government decided to build a new dam. The area intended for the transport was to be flooded, which would have changed the project conditions considerably: roads would be flooded and the trucks would have to take significant detours. Asia Cement Group was also planning on building two additional kiln lines at this location. It was determined, as a time- and cost-efficient alternative, to install a troughed belt conveyor able to navigate horizontal and vertical curves.

For this, the company turned to BEUMER Group. For many years now, Asia Cement has been relying on the system supplier's expertise and are currently operating several of its bucket elevators.



Whenever technically possible, the routing of the conveyor has been adapted to the topography.

Knowing what the customer wants

BEUMER Group took over the mechanical and electrical engineering and supplied the core components for the overland conveyor and monitored and commissioned its installation. The advantage: the Chinese subsidiary BEUMER Machinery Shanghai can be reached easily and deployed quickly to site. "Our colleagues were able to work closely with the customer. They know the specific local customs, speak the language and are familiar with the particular market and customer requirements," reports Dr. Andreas Echelmeyer, Director of Conveying and Loading Systems at BEUMER Group.

In May 2006, Asia Cement Group awarded the contract for the 12.5km-long system. The overland conveyor can reach a mass flow of 1,500tph (tonnes per hour) and a conveying speed of four metres per second. "Compared to other conveying solutions, the open troughed belt conveyors are suitable for higher throughputs. Horizontal as well as vertical curve radii are possible," explains Echelmeyer. They can be adapted to the specific task and topography. Using BEUMER calculation programmes, it is possible to precisely calculate the static and dynamic tractive forces of the belt during the development phase of the system. This is a prerequisite for the safe dimensioning of horizontal curves. The type of drive technology and conveyor belts needed are based on these calculations. This ensures longevity of the entire system.

Mountains, soft grounds and extreme heights

The terrain is hilly and covered with dense bamboo forest, parts of which are listed as nature reserve. For this reason, the

government did not approve a service route nor deforestation. The ground also presented a major challenge for the BEUMER Group engineers: "The ground is unstable due to previous coal mining. In other areas, the ground consists mostly of granite that could only be partially removed," explains Echelmeyer. Another section of 1.5km had to be guided across a river. These framework conditions contributed to the fact that 90% of the system was installed manually on site. As it was impossible for trucks to transport the components, they were carried by mules, one part at a time, to the place of installation.

The route of the overland conveyor was co-ordinated between BEUMER Group and the cement manufacturer. The system supplier calculated the tractive forces of the belt considering the eight horizontal curves with radii of 1,000 to 5,000 metres. The routing was checked for its feasibility on site. The complete route was checked by employees on foot, passing through rough terrain, in order to reliably check the predefined positions for the 460 supports for their suitability directly on site. Whenever technically possible, the routing of the conveyor was adapted to the topography. Height differences of up to 100 metres had to be overcome within shortest distances, so several sections were equipped with bridges of up to 55 metres. One section was realized with a 130 metre-long tunnel.

In close co-operation with the customer, BEUMER Group designed the overland conveyor and the bridges. The system supplier developed, built and supplied the core components for the drive and take-up station as well as the belt of an overall length of 25km, the idlers and the drive technology. Since February 2009, the overland conveyor has been transporting bulk material from the quarry to the bulk loading system. Since commissioning of the first section, the mass flow of the conveyor was increased in two steps. Today, the system conveys a mass flow of 2,200tph at a conveying speed of 4.5 metres per second.

The troughed belt conveyor not only runs through rough terrain and over instable ground.

The longest belt conveyor in company history

In July 2013, Asia Cement contracted BEUMER Group again for an additional, efficient overland conveyor to replace the trucks transporting the limestone from the bulk loading system to the cement plant. A mass flow of 2,200tph of limestone was necessary to meet the plant's requirements. For this project, the first conveyor was to be customized to these requirements. "We were planning a second troughed belt conveyor with an overall length of 13.7km," says Echelmeyer. This is the longest system in the history of BEUMER.

Projects of that size are often unpredictable, so flexibility was needed from the engineers. During the planning phase, the cement manufacturer acquired another plant in Lanfeng, approximately ten kilometres away. "Now we had to design the system so that both plants could be supplied with limestone," explains Echelmeyer. The team had to divide the overland conveyor in two parts. After 5.4km, an additional conveyor can be added to be fed to Lanfeng in the future. In February 2015, the system supplier started with the installation of the conveyor frame.

Both overland conveyors have four horizontal curves with radii of 1,200, 1,500 and 1,800 metres. "We provided the engineering and the individual parts such as

View of the enclosed conveyor flight in the area of the bridge.

pulleys, motors, drive and control technology and the entire automation," describes Echelmeyer. The installation was monitored by a BEUMER Group supervisor and the wiring of the system was supported by a BEUMER electrical engineer. The system supplier was also in charge of the commissioning in May 2016. The troughed belt conveyor is now supplying three kiln lines, a fourth line is planned.

For the whole project, BEUMER Group was able to ensure that the limestone is transported safely and quietly, without disturbing the residents or disrupting the surrounding nature.

Reaching the destination — no longer through rough terrain, and quiet

The requirements were different for the two projects: the challenges for the first project were the hilly terrain, instable grounds and crossing through conservation areas and over waterways, for the second project the system had to be built crossing through populated areas. The Chinese government has set out exact regulations on the noise emission levels so that the residents would not be impacted. "We had to minimize the noise to an extremely low level," describes Echelmeyer. The system supplier took several constructive measures in order to reduce the noise emissions. "We used noise-reducing idlers and customized protective covers on the drive stations," explains Echelmeyer. In collaboration with the operator, BEUMER Group optimized the conveyor frame and the completely enclosed conveyor bridge.

For the whole project, BEUMER Group was able to ensure that the limestone is transported safely and quietly, without disturbing the residents or disrupting the surrounding nature.

NACC Alicudi: setting new standards in the cement carrier market

The *NACC Alicudi* is setting new standards in cement carrier market. The 2011-built bulk carrier *Sider Alicudi*, named after the volcanic island between Naples and Palermo, was converted in 2017 with a Van Aalst dry bulk handling system to become a unique and state-of-the-art 120m self-discharging cement carrier. The vessel now has a cement handling system based on compressors and vacuum pumps, driven by Tier III Scania engines. Together they form the heart of the unique vacuum-pressure system for pneumatic conveyance of cement, fly ash and granulated slag, as applied in over a dozen of vessels in recent years.

The development of the world's first Scania IMO tier III diesel engines in service has been the fruit of extensive joint engineering of Van Aalst, based in Dordrecht, the Netherlands, and Scania from Sweden. The challenge put forward was to find correct placing of the Scania Selective Catalytic Reduction (SCR) system in the engine room deckhouse, which was smaller as the previous non-SCR equipped engine room deckhouse. This resulted into lowering emissions, but also, and very important for the cement carrier owner, the lowering of the height of the loading system and loading points on board the vessel. This has considerable advantages during her operational life, as she can serve an increased number of ports.

Directly after the conversion works were completed, the now-renamed 8,000dwt *NACC Alicudi*, began operations for the next three years on the east coast of the United States of America and Canada. This area was declared a NO_x Emission Control Area (ECA) for newbuilt and converted vessels as from January 2016, and the *NACC Alicudi* is now compliant with the area emission rules.

The new rules under IMO Tier III (NOx Emission Control Areas) envisage a 70% reduction in nitrogen oxide as well as sulphur oxide emissions from diesel engines, considerably more stringent than the EPA 2010 (USA) and EURO 6 (Europe) legislation. The *NACC Alicudi* is world's first cement carrier equipped with IMO Tier III-compliant diesel engines driving the bulk handling system.

The high emission standards of the vessel will enable a shift to the NOx and SOx ECA's of the US Gulf of Mexico, and even Puerto Rico and Hawaii, in future. With this combined technology on board the vessel is well prepared for serving a worldwide emerging cement market for many years to come.

This approach fits well with the (environmental) policies of both NovaAlgoma Cement Carriers (the vessel owners) and McInnis Cement (the end user). The latter works under the motto: "THE NEW CEMENT COMPANY: High Standards, Customer Conscious, Ecologically Sound". The McInnis cement company expressed its appreciation of the delivered performance of the bulk handling system which is performing above contractual discharge rates. This enables McInnis Cement to reduce the turn-around time and increase the annual throughput of the vessel.

McInnis also puts its money where its mouth is. The new McInnis cement plant in Port-Daniel-Gascons, Quebec, is state-of-the-art, in every way, and so is the new receiving Bronx terminal in New York.

As such, the newly-converted *NACC Alicudi* is a fitting addition to the overall logistic foot print of McInnis, which already consists of another NovaAlgoma vessel, the *NACC Quebec*.

CTP has a strong presence in Pakistan

Focus on strategic marketplace and huge untapped potential

Pakistan, one of the fastest-growing domestic markets in Asia for the cement sector. For many years, CTP has had a strategic presence in the region, which has tremendous untapped potential.

CTP is a major engineering and manufacturing company with 50 years of experience in supplying components to cement plants for their EP & EPC projects, in the field of waste heat recovery and filtration and equipment.

The strategic importance recognized by CTP is the huge potential growth for this marketplace and, furthermore, Pakistan has new restrictive regulations on emissions from industrial processes, so there is growing pressure as regards environmental impact from governmental authorities and public opinion.

CTP Team offers a wide range of products which meet the needs of customers: CTP waste heat recovery system based on ORC (Organic Rankine Cycle) technology without water consumption and advanced bag filter cleaning system based on the best available technology. In particular, CTP Pulse-jet technology guarantees an emission level lower than 5mg/Nm³. CTP bag filters and recovery of waste gases from industrial processes guarantees lower energy consumption for its customers, as well as the most secure control of emissions at the highest performances, to the benefit of OPEX.

For many years, CTP Team has had a very strong presence in Pakistan, and a range of loyal customers that — together with the good results obtained when using its equipment — has encouraged CTP's latest projects in 2018. Popular Cement and Cherat Cement have chosen CTP due to its background of strong innovation and control of emissions thanks to its expertise in de-dusting and air filtration systems. Popular Cement prefers CTP Team for the conversion to bag filters of cement mill EP with CTP European state-of-the-art technology for restarting cement plant after nine years stoppage. Also Cherat Cement needed to comply with new environmental limits and chose CTP Technology for the conversion to bag filters of N° 2 Kiln EPs in Nowshera, Pakistan.

CTP Team helps customers meet local environmental regulations: the government authority gave a bursary to Power Cement Limited for the conversion to bag filters of kiln and cooler EPs of lines K1 and K2 by CTP Team in 2016 in Jamshoroo plant in Pakistan. CTP Team's advanced de-dusting system reduces dust emissions to lower than 20mg/Nm³, better than the specified environment quality standard of Pakistan and even better than the emission limit value of the World Bank for plant cement.

Furthermore, CTP is near to local customers through its network of local representatives, together with the collaborations with local suppliers for spare parts, inspection, supervision, monitoring and retrofit are another decisive added value in CTP approach of Pakistani market.

Upgrade project in Ukraine for HeidelbergCement

World's second-largest producer in cement market turns to CTP Team for its upgrade project

CTP Team has been awarded a contract for the strategic upgrade project to replace the existing filtering system and relevant dust handling for Drying Drum 4 at the HeidelbergCement plant in Kryvyi Rih, Ukraine.

CTP Team has recently signed an upgrade contract for the replacement of the existing electrostatic precipitator with a state-of-the-art bag filter with HeidelbergCement, for the plant in Kryvyi Rih, Ukraine.

HeidelbergCement group is one of the world's largest building material companies with 140 years of experience in cement market. The HeidelbergCement Group is active in around 60 countries with a wide range of products including classical and special building materials for diverse applications.

The HeidelbergCement plant in Kryvyi Rih, Ukraine.

The goal of this project is to comply with the new environmental regulations in Ukraine and it is the proven sign of the substantial efforts of HeidelbergCement Group in investing in energy-efficient technologies and production processes for the reduction of emissions in the industrial processes. CTP Team will supply a new baghouse equipped with SWAP technology for the cleaning of bags with low pressure compressed air. The new filter will fit with the constraints given by the existing surrounding, that in the case of Kryvyi Rih plant are extremely demanding. CTP will design the new filter to fully recover the existing ESP support structure, with relative foundations, in order to minimize the CAPEX.

With this project, CTP Team confirms that it is part of the select panel of technological partners that Heidelberg-Cement Group has chosen to pursue its global environmental policy, with the adoption of CTP's SWAP cleaning system as one of the best available technologies in the market for cleaning of bags.

CTP supports the group in the global effort to minimize emissions and spread the group's environment strategy.

J.C. Steele & Sons – specialists in sizing and handling difficult materials

Steele is a machinery engineering and manufacturing company headquartered in Statesville, North Carolina, serving customers in global markets. The company develops solutions for sizing, handling and shaping difficult materials, including clays and shales, high-value coal fines and mill by-products (flue dust, filter cakes, oily mill scale, and blends of fines, dust and sludge).

Steele also works with major operators in cement, gypsum mining and wallboard, engineering even feeder solutions that provide consistent metering of wet, dry, sticky or otherwise challenging materials, without the bridging and sticking issues that affect competitive feeder technologies.

Steele is a vertically integrated engineering and manufacturing company, with an in-house foundry and fabrication, machining and assembly operations, and parts and service.

Innovative solutions for recovering value

Founded in 1889 to manufacture and sell machinery to brick, block and tile makers, Steele eventually added the agglomeration of high-value clays, lateritic ores and blast furnace byproducts to its portfolio. Its stiff extrusion technology is ideal for sizing, handling and shipping bulk raw materials, with pellets engineered for mechanical strength, dust control and reducibility.

Steele extruders process dust from the rotary kiln and dryers at a ferro nickel plant, for use in additional smelting.

The company serves a global installed base with engineering, manufacturing, technical support, strategic warehousing, and deep inventories of spare and wearing parts.

The machines of Steele

Steele manufactures feeding, sizing, mixing and extrusion machinery, as well as dies and bridges, tools, upgrades and auxiliary equipment. The design philosophy has never changed — build simple, heavy-duty machines with the torque and pressure to handle difficult materials, delivering continuous, reliable output, ease of service and fast replacement of wearing parts.

Steele machines include:

- Fine Grind Primary Crusher — cost-effective, reliable sizing for bulk raw materials;
- E Series Even Feeders — consistent, accurate output for continuous processing downstream; and
- Pug Sealers & Extruders for high-shear mixing, de-airing and shaping up to 80tph (metric tonnes per hour).

Laboratory and test plant services

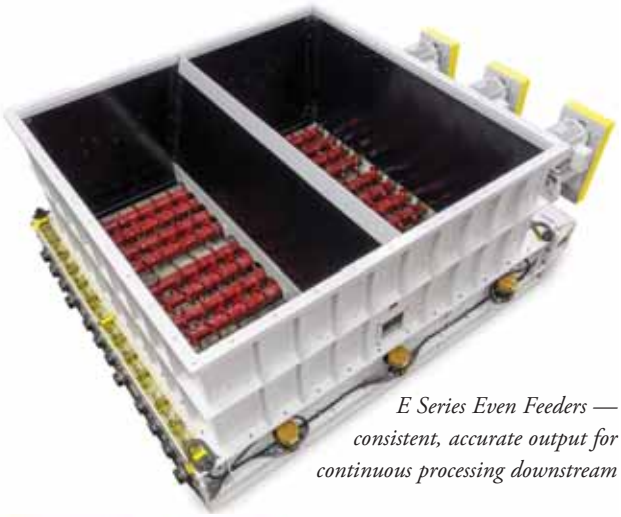
Simple solutions need reliable machinery and that reliability starts with Steele's lab

Fine Grind Primary Crusher — cost-effective, reliable sizing for bulk raw materials.

and test plant services. Engineers and technicians test raw materials for processing and continuous shaping, from lab-scale testing with 5kg up to 20tph in Steele's test plant.

Once the company has qualified the customer's materials, it can recommend specific machines and processes. These data-driven solutions ensure machines that work from day one and deliver reliable, consistent production around the clock.

Steele has lab and engineering locations around the world, to offer local testing with networked technical resources.



E Series Even Feeders — consistent, accurate output for continuous processing downstream

25 Series Extruder & Pug Sealer — high-shear mixing, de-airing and shaping up to 20 metric tons per hour

How the company stays competitive

Steele's machine designs haven't changed significantly over the decades and units commissioned in the early 20th century are still going strong.

With that in mind, Steele's management has focused on opportunities in new bulk raw material markets and innovations in engineering, tech support and customer service.

Steele strengthened its vertical integration with the 2001 acquisition of Händle, a German manufacturer specializing in heavy clay preparation and shaping solutions. Händle manufactures a complete line of equipment, including souring plant excavators for cross and longitudinal dredging, circular silos and box feeders.

The company also founded Direxa Engineering in 2009 to offer turnkey plant delivery. Direxa, an engineering, procurement and construction enterprise based in Colorado, with subsidiaries in Australia and Brazil, specializes in plant and application engineering for the construction material industry.

Innovations in technical support and customer service

The company recently began posting its technical information online, including drawings, installation and operating videos, and technical service bulletins, all linked by QR codes on the machines. The move helps Steele machine operators who need fast answers to maintenance and operating questions.

Steele also sustains long-term customer relationships with its parts and service operation. The company maintains a significant inventory commitment and has strategic warehousing around the world, to expedite parts for minimal downtime.

Steele offers in-house raw materials testing and application development.

The Steele Group offers turnkey plant solutions, including souring and storage.

An interest in new material handling opportunities

Having defined its niche in managing difficult to handle bulk raw materials, Steele continues to talk to companies in new markets that need engineered material handling solutions. Its vertical integration and network of global operations deliver a proven combination of engineering, manufacturing and service.

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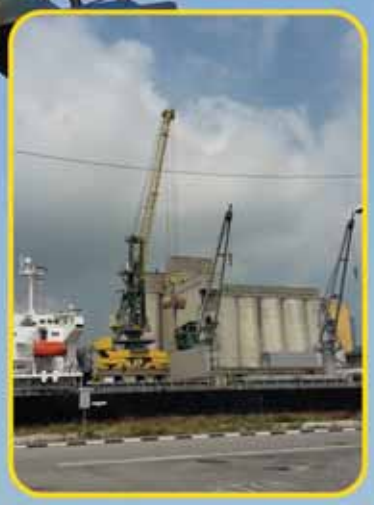

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Italian equipment manufacturers

Jay Venter

STEMM's hydraulic orange peel grabs aid construction in new port of Safi, Morocco

Recently, Stemm has been developing new products and techniques for dredging at greater marine depths.

The system and techniques used by Stemm are an alternative to traditional orange peel grabs, are innovative and have several registered patents.

These underwater grabs, used for dredging from 100m onwards, have been installed in the *STORNES* vessel equipped with Stemm grabs combined with peripheral vision and lightning equipment.

Stemm grabs allow a very exact position control system, and cause a very limited turbidity, vital to the potential sensitive marine environment, for example coral. Each grab has an automatic autocorrecting positioning system on the marine seabed.

These days, gas and oil are being extracted from isolated fields in deep water. This equipment is a worthwhile solution, both for preparing the bases to install coastal pipes, or to extract big rocks and breakwaters when constructing new ports. Stemm's grabs have already been used in deep applications in Australia and Norway, taking care of the excavation of thousands of cubic metres of hard and soft soil.

The expertise of Stemm company includes design and implementation. It has

been involved in significant projects. such as Maasvlakte 2 in Rotterdam, architectural parks in Belwind (Belgium) and Teesside (United Kingdom). Stemm took part at the significant Project of civil work Palm Islands, a set of the three biggest island in the world with a palm shape such as: Palm Jumeirah, Palm Deira y Palm Jebel Ali, located in Dubai (United Arab Emirates). Docks and breakwaters were built with an important underwater dredging task.

The new Moroccan Port of Safi, where a coal terminal is under construction to receive 3.5 million tonnes per year, has a dike of 2.3km. When the port was almost finished, a routine control detected cracking on the submarine foundations of the docks, which implies the reconstruction of a very important part of it.

The constructor company, the Turkish-Moroccan group SGTM/STFA has purchased the most up-to-date hydraulic grabs, in order to drive forward an adequate working rhythm and efficiency. They are working at full capacity to try compensating the delay on the works execution deadlines.

With the Stemm grabs, the depth of water is being increased, large rocks are being extracted – some of them weighing up to 30 tonnes.

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TAKRAF Technology for Rio Tinto at its Paraburdoo iron ore operations

Rio Tinto Iron Ore has commenced a major sustaining capital project in Paraburdoo, Western Australia, where TAKRAF plays a key role as advanced technology provider.

Rio Tinto Iron Ore has commenced a major sustaining capital project to replace the original stackers at the Paraburdoo mine — stackers are pieces of machinery used to evenly distribute ore into stockpiles. The existing stackers were part of the mine's original infrastructure, stacking the very first load of iron ore from Paraburdoo in 1972. In 46 years of operation, they have stacked just over 800 million tonnes of ore, requiring only minimal structural changes throughout that time. Rio envisages that this project will create almost 100 jobs.

TAKRAF — a Tenova company and a solutions provider to the global resource industry — is leading the design and implementation phases of the stacker replacement and has committed to sourcing all material and equipment from well-known, reputable suppliers with a high preference for local content predominantly in Western Australia.

TAKRAF's office in Perth will manage the entire project, with support provided from the company's offices in Brisbane and global competence centers. The design of the new stackers is under way and the start of fabrication is scheduled to begin later this year with installation and commissioning completed by early 2020.

The new Paraburdoo stackers boast some advanced new features:

- modern advances in engineering design and mechanical technology;
- latest-generation variable-speed drive control and fibre-optic network infrastructure;
- advanced anti-collision system with GPS back up; and
- fully automated and monitored from the Rio Tinto Operations Centre in Perth, Australia

On 29 June, Dr. Frank Hubrich, TAKRAF CEO, along with the West Australian Premier, Mark McGowan, and Rio Tinto Iron Ore CEO, Chris Salisbury, visited the Paraburdoo Mine to mark the start of the project. Hubrich had this to say of the

event: "We are extremely proud of having been selected to provide some of our advanced machines to this important project for Rio Tinto, the state of Western Australia and the country as a whole. This only serves to reinforce TAKRAF as a leading global provider of mining and bulk material handling equipment and we look forward to working together with Rio Tinto in other important projects in the future."

This project forms part of Rio Tinto's broader sustaining capital programme estimated at $1 billion a year over the next three years. The company is also investing in replacing depleting assets with an estimated $2.2 billion expected to be spent on replacement mines over the next three years.

GOLFETTO SANGATI: over 90 years of experience in grain handling & milling

GOLFETTO SANGATI has developed advanced technologies for the handling, cleaning, calibration, selection and storage of seeds and other free-flowing or non-free-flowing commodities such as wheat, corn, barley, soybean, sunflower seeds, rapeseed, coffee, rice, soy meal and other similar products.

In more than 90 years of activity GOLFETTO SANGATI has completed the successful installation of 5,000 plants all around the world and has established a good partnership with some of the main international groups trading and dealing with grains and meals.

Reliability and flexibility

Two keys to the success of GOLFETTO SANGATI are reliability and flexibility.

To be reliable means to have clients still satisfied with the plants built more than 15 or 20 years ago (45 years in some cases) and still in operation thanks to a good design and good after-sales service for any problem arising or for spare parts. Many of these customers are often available to let new clients visit their plants as in Italy and abroad.

The support is provided starting from the design or tendering phases when the customer need to consider the CAPEX of the investment he is about to make, but also the OPEX and the TCO (total cost of ownership); to assist the customer in this way the company must be able to propose different technologies comparing pros and cons, which means being flexible.

In this sense, GOLFETTO SANGATI has a wide range of solutions for the main equipment and plants manufactured; furthermore, the company continuously offers customized solutions based on the customer's needs; very few companies are able to offer a range of handling solution such as the one proposed by GOLFETTO SANGATI, thanks to its long-standing experience.

In most cases, the customer needs to comply with different constraints depending on site conditions, environmental factors and operating model; GOLFETTO SANGATI evaluates and studies the best solution taking into account all inputs and offering the most suitable handling system.

100% Italian design and production

GOLFETTO SANGATI designs the handling systems and produces the equipment in its own Italian offices and workshops, guaranteeing high-quality solutions.

The production sites are permanently 'open doors': customers are welcome to see with their own eyes the status of production activities at all times of the process.

Products, projects and new solutions

As mentioned above, the product range is extremely wide, including shiploading systems, pneumatic and mechanical ship-unloaders, full grain terminals and handling systems.

Recent developments and new solutions are:

- anti-collision system for movement and operation of the shiploading and ship-unloading mobile equipment, to ensure safety during operations and avoid misuse and choking events;
- new concept of counterweight: the counterweight is often necessary in mobile equipment and GOLFETTO SANGATI has developed a solution to avoid 'external' counterweight for a shiploader currently being installed in East Europe and a special counter-weight that require a very small space on the jetty; and
- new loading and unloading systems for fluvial and small installations granting efficiency and high profitability

Integration with the GEA Group

Being part of the GEA Group is giving the chance to cooperate with the existing GEA sales and service team, with 300 office all around the world.

The co-operation among the different business units is becoming more effective every day.

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

– Henry Ford

A new solution for fracking sand

Considering the chain process of handling raw materials, it is clear that use of state-of-the-art technology, able to reduce cost and to allow faster procedure, is an essential part in any type of operation. This is the reason why Bedeschi constantly invests in developing its products, thereby increasing efficiency and technological enhancement, which helps customers choose the correct type of machines in every field of application and with different kinds of raw materials, both hard and sticky.

Nowadays another important aspect to consider is the eco-friendly question, choosing green solutions, and always looking at the material handling process with sustainability and optimization in mind. Bedeschi products make use of cutting-edge technology and quality production and they have been sealed to avoid dust emissions to the external environment.

Created in 1908 as a specialized company for the treatment of clays for brick manufacture, Bedeschi has grown in the last decades, applying its extraordinary expertise: it first learned how to treat sticky and humid materials (including materials from sectors such as cement and limestone), and it has now extended its reach and manufactures important equipment in the areas of grain or sand.

The following case study shows how Bedeschi could meet customer's quality requirements with its complete range of products, from bucketwheel and stacker reclaimers for use with dry material, to bucket reclaimers that can be used with any type of raw material, but especially with moist, plastic and sticky ones.

In 20017 Bedeschi was awarded by CCC a contract for the supply of a storage and reclaiming system for fracked sand (40–70 mesh) for Winkler County Texas plant owned by Vista Sand LTD.

This company is specialized in dry silica sand for oil and gas fracking, and industrial uses. The company was founded in 2003 and is based in Granbury, Texas, USA.

The supply consists of two orthogonal storage systems, 50,000 and 100,000 tonnes each, completely automated.

As proof of its continuous effort toward innovation and up-to-date technology, Bedeschi Group will supply the first plant for the handling of frack sand.

Each storage provides a stacking and reclaiming capacity of 900 tonnes per hour thanks to the installation of two stackers and two reclaimers PAL PS, supplied by Bedeschi. The supply also includes four belts necessary to handle the material.

At present, Bedeschi is carrying out the commissioning of the plant.

CFS Handling completes installation of electro-hydraulic buckets at Massa Carrara

On 23rd October 2018, CFS Handling successfully completed the testing of two 14m^3 electro-hydraulic buckets. The buckets were installed on Gottwald cranes at the Massa Carrara port in Italy, and will be used for the handling of marble granules.

The new customer is extremely satisfied, which echoes CFS Handling's work ethos: to work with passion and dedication to achieve ambitious goals.

NEGRINI
since 1967
S.R.L.

Negrini company, established in 1967, specializes in engineering and manufacturing a comprehensive range of grabs and buckets for rope machines and crawler mounted cranes; they are employed to do many jobs. Negrini buckets and grabs are very well-known for quality as well as for the very accurate and skilful engineering work; in fact Negrini supports their clients by analyzing the job to be done and, if needed, by adjusting the standard design of grabs and buckets to enhance their performance once in operation.

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www.negrini.org

Logistics services from Intergroup ensure smooth handling and distribution of fertilizer cargoes

Logistics company Intergroup, based in Italy, has been handling fertilizer cargoes since 1986. The company now covers six Italian ports, and specializes in logistics and the packaging of fertilizers. Today, the group handles 4mt (million tonnes) of goods and one million passengers each year.

The movement of fertilizers is one of the main focuses for Intergroup, which was founded in Italy in 1986 by Nicola Di Sarno and today operates in several Italian ports, including the ports of Rome, Gaeta and Civitavecchia.

Intergroup's fertilizer activities are growing year on year, and it is constantly making investments in new warehouses, equipment, strategies and technologies, thanks in great part to its highly skilled staff.

Since the outset, Intergroup has achieve had the same goal — to achieve excellence in providing high quality services related to the logistics industry of fertilizers, distributed throughout the whole of Italy.

However, fertilizers are not the only product managed by Intergroup: as a logistics company, it has gained experience in many other fields: biomass, sugar, cement, petcoke, irons & steel, and ro-ro cargoes.

Fertilizers

Fertilizers are managed in different steps as follows.

- **Step 1:** fertilizers arrive in the ports of Gaeta or Civitavecchia in bulk ships, coming from northern Europe or north America. At these ports, Intergroup staff unload the product using large tower cranes, which load the product into lorries through loading hoppers built with the purpose of containing dust, preventing its spread on the pier.
- **Step 2:** once the lorry is completely filled up, it reaches Intergroup's warehouses nearby. The fertilizers are unloaded from the lorries and then packed through automatic conveyor systems able to fill 25/40/50kg bags (or one-tonne Big Bags [FIBCs]). All the bags are then ready for delivery to the end-user.
- **Step 3:** fertilizers are delivered to clients throughout Italy with lorries. Intergroup has integrated IT systems with its main customers in order to handle orders and the information flow.

Each bag is tracked to keep high quality standards, and all pallets are also tracked with a bar code.

Intergroup also follows all deliveries to the customer, to ensure a high-quality service.

The challenge

In 2017, the company opened an office in the centre of London, with the aim of developing activities in the international market, working as a logistics company in any port for companies which require its expertise in providing the same services that Intergroup offers in Italy.

"In order to stay competitive we focus on the quality of our service," Nicola Di Sarno said. "To achieve this, we are always looking for the best technologies offered by the market. Intergroup is very strong in packaging lines technologies and it employs only the best people; in fact, we hire the best talents in the industry and we co-operate with partners who design and provide us technologies tailor-made for our company.

"This is a real plus which has always allowed Intergroup to be competitive on the market."

Bedeschi wins contract in Indonesia

Bedeschi has been awarded another contract, to supply an SHL 25/1400 for use on Demarga Jetty (Gresik, Indonesia). The loader will be used to handle fertilizers (NPK, NPS) at a rate of 1,000 tonnes per hour, loading ships up to 30,000dwt.

The order was signed with Barata Indonesia, an Indonesian engineering company that will manage the civil works concerning the manufacturing of the structural steelwork for the shiploader.

The end user is PT, Petrokimia Gresik, company that has already chosen Bedeschi for the supply of a circular storage and a longitudinal storage facility with PAL PD, manufactured at the same site in the last five years.

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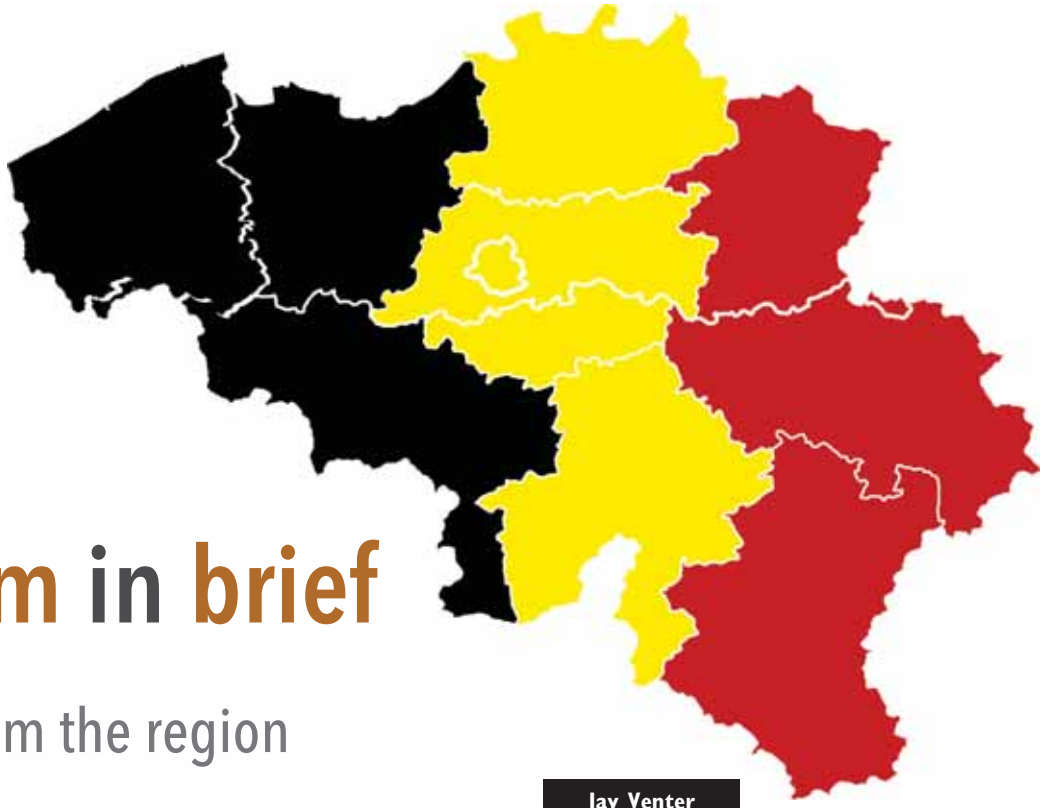

Belgium in brief

reporting from the region

Jay Venter

Euroports & Antwerp Port inaugurate new investments at the Sugar Terminal

On 6 September 2018, Euroports and Antwerp Port representatives — along with their clients — in Antwerp officially inaugurated the latest investments Euroports has made to its dedicated Sugar Terminal, Terminal TA 518. During the inauguration ceremony, Bart De Wever (Mayor of the City of Antwerp), Marc Van Peel (Chairman of the Port and Deput Mayor of the City of Antwerp), Charles Menkhorst (CEO Euroports) and Geert Gekiere (Managing Director Euroports Belgium NV), delivered speeches to celebrate this new milestone.

Euroports' Terminal TA 518 is the largest dedicated independent sugar terminal operation in Europe, with a storage capacity of over 260,000 tonnes over the 9-hectare site. This represents a significant material contribution to the sugar exports handled at the Port of Antwerp. With more than half of the 2.5 million tonnes of European export volumes currently routed through it, the Port of Antwerp is the market leading sugar export hub for Europe. To support the clients' export growth and their integrated supply chains, Euroports invested about €27 million in quality enhancements, capacity expansion and technology, increasing operational flexibility and productivity during the past two years.

Euroports' Sugar Terminal is fully International Featured Standards (IFS)-certified and offers closed sugar circuits as well as an expansive sieving footprint. The new unloading rail station and additional unloading pitches for trucks allow for maximum flexibility while simultaneously handling inbound flows. Two additional container bag loaders and new bagging lines provide a high level of flexibility in handling outbound flows, enabling differentiation between container and non-containerized flows. Euroports' Sugar Terminal is equipped with leading-edge technology and processes, and meets all quality requirements for multi-modal transport. The terminal's infrastructure accommodates any vessel type up to Panamax-sized vessels. Along with its in-house forwarding company, Manuport Logistics, Euroports delivers end-to-end maritime supply chains, tailored to the specific needs of its sugar clients.

With the next sugar campaign starting soon, Euroports is now, more than ever, ready and prepared to successfully manage sugar volumes that will come through this state-of-the-art sugar terminal.

Beer, chocolate and VIGAN ship-unloaders

VIGAN 200tph pneumatic barge unloader installed at Dossche Mills in 2014.

Created in 1968, the Belgian company VIGAN Engineering S.A. manufactures a complete range of pneumatic and mechanical conveying systems for dry agri-bulk products, and is renowned expert in pneumatic ship unloading equipment.

VIGAN headquarters are located in Nivelles industrial area, at the heart of the European Community, about 30km south of Brussels and a one-hour drive from the international port of Antwerp — providing easy connections to ship equipment worldwide. Indeed, VIGAN is proud to export 99% 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 on carbon emissions over the last years, the carbon footprint of transport by road, etc. have also created great new opportunities. A revival of fluvial transport in the EU has namely created excellent new opportunities where VIGAN has made the necessary efforts to acquire a major share.

Made in Belgium

From the alloyed steels — which are produced by a sister company — used for all the metallic structures and parts, up to pre-assembly in the factory, VIGAN's production remains Belgium-made.

All the company's activities take place on the same 12,000m² site, which enables easy exchange of information between all teams including sales, engineering, manufacturing, quality control and after-sales technical assistance. This guarantees an accurate control of the entire machine manufacturing process and enables an easier and faster response time with respect to after-sales support.

Some customers are still using machines that were built 30 years ago. VIGAN's dedicated policy to produce maximally at its in-house facilities allows adequate follow-up of all of its customers.

Moreover, VIGAN's central position in Europe makes it possible to exploit the excellent network of top-quality suppliers in the region.

VIGAN's international network of agents enables the engineering to adapt its equipment to any specific local customer's requirements.

Pioneer in its home market

Like Belgian beers and chocolates are numerous and recognized worldwide for their quality, the diversity of VIGAN range of equipment is a key asset to propose the most adequate solution to any project requirement.

VIGAN enjoys its pre-eminent position in its home market, where the company has developed partnerships of great value with companies which are also Belgian leaders in various sectors. These include:

- the three largest mills: Brabomills, Dossche and Ceres;
- the biggest malt producer: Malterie Albert, part of Heineken group, using a VIGAN unloader to take in barley for the malting process;
- the biggest producer of glue for wooden panels: Advachem;
- the biggest producer of Corn Flakes: Maselis; and
- the biggest rapeseed and sunflower processing facilities in the ports of Ghent and Antwerp: Cargill.

Recently, another company joined the group. Cargill's malt business, ranking among the major malt producers in the world, has partnered with Zuidnatie, a Belgian logistics service provider, to build a new logistics platform in the Port of Antwerp, offering transshipment facilities and storage for up to 300,000 metric tonnes of barley and malt.

In this framework, VIGAN just installed

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a shiploader of 150 tonnes per hour at Zuidnatie for the loading of barley and malt (bulk density 0.55/0.65) into barges of up to 2,500dwt.

The gantry is mounted on rails and has a rail span of 11 metres.

One chain conveyor of 21.5 metres length transfers the grain from the tripper of the quay conveyor up to the slewing shiploading boom.

For lower dust emissions and better hatch coverage, the machine is equipped with a telescopic chute to reach hatch barge bottom.

The gantry is equipped with an electrical power cable drum of 400 Volts, 3 phases, 50Hz.

VIGAN 150tph shiploader installed at Zuidnatie in 2018

Belgian company orders its 15th Konecranes Gottwald mobile harbour crane

Konecranes has won another order from Goeyvaerts-R bvba (Goeyvaerts), a rental crane expert. The order was placed in the third quarter of 2018 and the crane will be delivered to Antwerp in November 2018. It will be Goeyvaerts' fifteenth Konecranes Gottwald mobile harbour crane and the largest crane in its fleet.

Goeyvaerts will add the diesel-electric crane to its large fleet of rental cranes. Goeyvaerts' many customers in the Port of Antwerp will use it to handle mainly containers and heavy cargo.

Rudi Goeyvaerts, CEO, explains: "We started our rental crane business in 2006. Due to the growing need for container twin-lifting and heavy cargo handling, our customers increasingly require larger cranes.

"The new Konecranes Gottwald Model 7 crane will provide a higher lifting capacity and a wider outreach than our existing machines and will therefore be an excellent addition to our current fleet of fourteen Konecranes Gottwald mobile harbour cranes. It will help our customers to expand their service offering further."

Alexandros Stogianidis, Regional Sales Manager, Konecranes' Business Area Port Solutions, says: "We are proud that Goeyvaerts continues to rely on our technology in Antwerp and its other locations. Our cranes can be used for a wide variety of applications and are easy to move around the port, which is of course a key advantage when they are operated as rental cranes as in the case of Goeyvaerts."

Goeyvaerts' new crane will be an eco-efficient Model 7 mobile harbour crane in the G HMK 7608 variant providing a maximum lifting capacity of 150t and an outreach of up to 54m.

Three cranes of the current Konecranes Gottwald mobile harbour crane rental fleet at Goeyvaerts' terminal in Antwerp. From November 2018, a new large Model 7 crane will join this fleet.

UBT has added new operations to its business portfolio

As a result of a successful bidding process, UBT (United Bulk Terminals) was selected to perform stevedoring and in-plant services for the handling of 'green' and calcined petroleum coke for Rain CII at its calcining facility in Chalmette, Louisiana.

Calcined petroleum coke (CPC) is a critical ingredient in the production of aluminium. It is a high purity carbon material derived by heating premium quality raw (or 'green') petcoke to remove any impurities and increase its electrical conductivity.

Rain CII, one of the world's largest producers of high value calcined petcoke, owns and operates the petcoke calcination

plant in Chalmette, Louisiana. The Chalmette facility receives 250,000 tonnes of green coke via barge, produces and ships, by ocean going vessels and river barges, approximately 350,000 tonnes of calcined coke. This location lies approximately 35 miles (56km) north of UBT's facility in Davant.

By assuming these new operations, UBT increases its regional presence, establishes a gateway into new businesses, and creates an opportunity to realize operational synergies with its existing facility in Davant.

We are excited about this new addition, and wish UBT a successful continuation of its operational expansion.

Tessenderlo Group inaugurates new membrane electrolysis plant in Loos (France)

On 28 September this year, Tessenderlo Group (founded and headquartered in 1919 in Belgium) held a ceremony to mark the inauguration of its new membrane electrolysis production facility at the site of PC Loos (Produits Chimiques de Loos). This marks a new milestone in the history of Tessenderlo Group, as the new plant provides state-of-the-art technology to produce chlorine, sodium hydroxide (NaOH) and potassium hydroxide (KOH). The plant in Loos is being used by the Performance Chemicals business unit, which supplies municipalities and industry with coagulants and other chemicals for the treatment of wastewater or the purification of drinking water. It also produces industrial chemicals that are used by a broad spectrum of industries such as chemicals, oil and refinery, steel, de-icing and fertilizers.

"We have recently invested in a new electrolysis plant in Loos, where we have now the best available technology for the production of chlorine, sodium hydroxide or potassium hydroxide. The site in Loos is the largest production plant for water treatment coagulants in Europe. The new membrane electrolysis production facility confirms the commitment of Tessenderlo Group to the long-term continuity of supply to its customers. It also allows the group to serve both external market demand as well as internal consumption of sodium hydroxide and potassium hydroxide.

In addition to securing continuity for the current activities in Loos, this investment also offers new opportunities for the further development of the site," explained Stéphane Leclef, BU

Director Performance Chemicals at this ceremony.

Business Unit Performance Chemicals

The Performance Chemicals Business Unit provides coagulants and other chemicals for either the treatment of wastewater or the purification of drinking water. It supplies these coagulants to major metropolitan areas such as Paris, Amsterdam, Brussels and Geneva, as well as renowned industrial players. The business unit also produces industrial chemicals that are used by a broad spectrum of industries such as chemicals, oil and refinery, steel, de-icing and fertilizers. For example, the sodium sulphide and sodium hydrogen sulfide are used in the tanning and mining industry and as precipitating agents for metals in waste treatment. Other chemicals include bleach, acids, sodium and potassium hydroxide for disinfection and household cleaning, as well as iron salts, used as a key ingredient in drugs both for the treatment of iron deficiency anaemia and specific veterinary applications. Performance Chemicals has four production sites – in Loos (France), Tessenderlo and Ham (Belgium) and Rekingen (Switzerland).

Dry bulk still on the rise at North Sea Port

While many ports are seeing their dry bulk volumes shrink, North Sea Port continues to gain importance in this sector. Last year there was even a two-digit increase in dry bulk volumes. The port continued this growth in the first nine months of 2018.

North Sea Port, the merger of the ports of Ghent, Terneuzen and Vlissingen, is a leading player in the handling of dry bulk. This category of goods accounts for no less than 47% of total maritime transshipment. Of the 66.6mt (million tonnes) loaded or unloaded in and out of seagoing vessels last year, 31.4mt fell under this category. Dry bulk thus leaves liquid bulk (29%), conventional general cargo (17%), ro-ro (6%) and containers (2%) far behind.

The former Port of Vlissingen now operates under the 'North Sea Port' flag. Unloading biomass at the Ovet terminal.

Accessibility

The importance of dry bulk for North Sea Port can be explained by several factors. The port area is home to a number of large industrial companies, such as a steelworks, which consume significant quantities of raw materials such as coal and iron ore. The port traditionally plays a role as a hub for grain traffic and as a transit and distribution point for fertilizers and building materials.

With its location on the great delta of the Rhine, the Meuse and the Scheldt and its excellent connection to the Western European waterways and rail network, North Sea Port is also perfectly equipped to serve as a transit point to and from the economic centre of the continent for goods flows that primarily depend on train and barge.

Nautical accessibility is not a problem either. This year the channel to Vlissingen underwent another modification that enables the port to receive bulk freighters with a depth of 17 metres. Few ports in Europe can offer more. A new depth record of 17.08 metres was recorded in mid-October when the bulk carrier *Citius* unloaded 160,000 tonnes of steam coke there.

As from 2022, Ghent and Terneuzen, the two other port zones within North Sea Port, will benefit from a new sea lock that will be able to handle ships with a length of 366 metres, a width of 49 metres and a depth of 15 metres. From then on they will be accessible for lightered Capesizes instead of Panamaxes.

Growth

In terms of traffic volume, North Sea Port, as dry bulk port within the Le Havre/Hamburg range, is only beaten by Rotterdam and Amsterdam. As a proportion of total transshipment, the Belgian-Dutch combination is at the same level as Amsterdam, Dunkirk or Rouen.

Volumes of dry bulk are on the rise at North Sea Port, while in many neighbouring ports they have stood still or — as in Antwerp and Rotterdam — have been under pressure for years, partly because of the closure of coal-fired power stations in their hinterland.

Last year, North Sea Port recorded a 13.2% increase, setting a new absolute record for dry bulk. This year, a new increase of 4.9% followed over the first nine months.

The counter only stopped at 24.2mt at the end of September, setting a new record for 2018. This translates into an increase in the market share in that sector within the range.

The port operators active in this market segment are supporting this growth by investing in specialized terminals, warehouses and equipment.

Added value

These are very different flows, covering the whole range from 'big bulks' such as coal, iron ore and grains to fertilizers and niche traffic such as kaolin, sugar or salt. As 'Other dry bulk', these combined achieve a total of 9.8mt. They thus weigh more heavily in the final balance than 'ores, cement, lime, plasters' (7.7mt) or 'coal and lignite' (6.5mt).

By screening, mixing, cleaning or bagging these goods, the specialized terminals usually provide them with added value.

Merger port in European top ten

Since 1 January 2018, the Belgian port of Ghent and the Dutch ports of Terneuzen and Vlissingen have been operating under the 'North Sea Port' flag. This is the result of the largest cross-border port merger to date. Ghent Port Company and Zeeland Seaports exchanged their ever-closer co-operation for a real merger in a 50/50 joint venture, convinced that the resulting synergies will strengthen their assets and increase their development opportunities.

This 'merger of equals' created a new superpower on the European port scene. In the world of maritime transshipment, the sum of its three sub-ports immediately earned North Sea Port a place in the top ten European ports, with a total of 66.6mt in 2017. The inland shipping traffic climbed to 56.5mt. Both are new records.

In terms of added value, North Sea Port can even claim third place in the European ranking with its €13.3 billion. This includes almost 100,000 jobs, of which almost 45,000 are direct jobs with the 525 employers in the 60km port zone from Ghent to Vlissingen. It has 19 docks and 55 kilometres of quay walls.

Port of Antwerp on track for sixth record year

Throughput continues to register growth in the Port of Antwerp. After record semi-annual figures, the total throughput after nine months stands at 177,026,550 tonnes — a sharp 6% increase compared with the same period last year. With these results, the port seems to be on track for the sixth record year in a row. The recent wave of investments moreover confirms the port's appeal and reaffirms its role as a world player.

After a long period of negative figures, total breakbulk is showing the first signs of recovery with a slightly positive figure.

Container graph keeps going up

Maritime throughput continues to grow. Container traffic registered robust growth yet again, up by 7.1% (98,436,773 tonnes) compared with the first nine months of 2017. In terms of twenty-foot equivalent units (TEUs), throughput grew by 6.8%, to 8,333,523 TEU.

All shipping areas registered growth, both imports and exports, with the sole exception of exports to Central America which registered a slight drop.

Throughput for the largest shipping area, Europe, registered the strongest growth: 12.4%. Throughput for North America grew by 8.2% and for Asia by 2.2%. Imports from China after eight months stand at the status quo more or less, while exports are 6.7% lower. Owing to the Chinese import ban on old paper and plastic waste, export of full containers to China declined and more empty containers are exported.

Jacques Vandermeiren, CEO, Antwerp Port Authority: "2018 is already a peak year for our port. Not only because of the record figure that we can present yet again, but also because of the wave of investments in recent months. The decision of major players in the chemical industry such as Borealis, Ineos, Nippon, Sea-Mol and Oiltanking/AGT to opt for Antwerp confirms and reaffirms our strong appeal as the largest chemical cluster in Europe. The significance of this wave of investments, to the tune of some €2 billion, cannot be stressed enough. They will make an essential contribution to the sustainable future of our port and to the continuity of our role as the biggest economic driving force of our country."

Port Alderman, Marc Van Peel,: "Sustainable growth for our port is possible only if we make sure that it remains accessible to people and goods. We are assuming our responsibility on this front, together with the port community. The recent expansion of the route of the successful waterbus is a fine example of a structural solution to the mobility challenge. On the goods transport front, we are aspiring to a modal shift by 2030, with a drop in goods transport by road and an increase by rail and inland navigation."

Breakbulk

After a long period of negative figures, the total breakbulk throughput is showing the first signs of recovery once again and has posted a slightly positive figure.

The total roll-on-roll-off lading grew by 5.6% to 3,960,845 tonnes. The number of passenger vehicles shipped after nine months grew by 4.1% while the number of lorries and other heavy rolling stock grew by 2.6%.

Whereas the conventional breakbulk cargo still posted a loss of 6.5% after six months by comparison with an exceptionally strong first half of the year in 2017, a slight increase was registered in the third quarter. As a result, the loss on an annual basis was limited to 2.7%. The reason for this is a recovery in iron and steel imports. Steel imports from China registered strong growth in the third quarter, whereas steel imports from Turkey and India dropped further. The surge in steel imports from China can be explained as a reaction to the European Commission's quota-based safeguard measures. They were introduced in July to protect the European steel market against a possible flooding as a result of the 25% import tariffs imposed on steel by the United States.

Iron and steel exports grew by 4.9% after 9 months. Iron and steel exports to the US were 8% higher than in the same period the previous year. The total throughput of iron and steel grew by 1.9% after nine months.

Liquid and dry bulk

Liquid bulk posted strong growth figures, up 5.7% to 57,652,877 tonnes. Imports grew by 9.1%, exports by 0.5% which is a considerable recovery after a drop of 12.2% in the first quarter.

The throughput of crude oil dropped by 7.1%, while that of petroleum derivatives (+6%) and chemicals (+10.1%) spurred the liquid bulk.

The throughput of dry bulk grew by 1% compared with the same period in 2017. This is due in particular to the bigger transshipment of fertilizers (+11.2%), sand and gravel (+23.9%) and coal (+3,3%), because the other traffic (ores, kaolin, cereals and scrap) were volatile in the previous period and are currently posting a drop.

Seagoing vessels

10,901 seagoing vessels (+1.9%) called at the Port of Antwerp in the last 9 months. The gross tonnage of vessels that called at Antwerp rose by 2.3% to 314,200,283 tonnes. DCi

France in focus

bulk, breakbulk and heavy lift

Jay Venter

France is connected to China by the 'Northern Route', the strategic new shipping route through the arctic

This was a national event: on Thursday 6 September, the Heavy Lift and ice-class cargo ship *TIAN EN*, belonging to the Chinese shipowner COSCO Shipping, called for the first time at a French port having sailed the Arctic Route.

"It was an icy journey to the west through the polar silk road waterway. Our *TIAN EN* is an ice-class cargo ship from China's COSCO Shipping Specialized Carriers Corporation. Further to its maiden voyage transporting wind power equipment from Lianyungang, China to North West Europe through the Arctic North-East Passage, it will call at the Port of Rouen, Radicatel Terminal," Mr Yao, COSCO Shipping France President, explains.

The department 'Project Cargo and Heavy Lifts' at SEALOGIS, a French port logistics and shipping group, organized transport for this cargo:"We are honoured to participate in this maiden voyage from China to France via the Arctic and in carrying these heavy lifts. Experienced in transport of oversize goods, we add another string to our bow with the *TIAN EN* sailing the ice shipping route" Christophe Buisson, Sealogis President, underlines.

The handling operations to offload the 63 heavy lifts, weighing up to 70 tonnes, including 21 wind turbine blades 53 metres long were carried out by RMS Manutention, a subsidiary of Katoen Natie, the long-standing partner of HAROPA in the Radicatel terminal, under the best security, safety and reliability conditions.

HAROPA – Port of Rouen is proud of being chosen by the leading Chinese shipping company for the exceptional call of this ship: "HAROPA has a very comprehensive port environment: expert professionals, dedicated infrastructures and equipment, an ideal geographic location. Specialized in breakbulk and heavy lifts, HAROPA is a port system providing a flexible, fast and sustainable supply chain" Nicolas Occis, HAROPA President and CEO of Rouen Port, is pleased to say.

Let's study a case of AIRCHOC® Wireless application in a quarry in FRANCE

Standard Industrie sold four AIRCHOC® Wireless for the unclogging of two extractions in a tunnel under a stockpile.

Customer's requirement

When stored on the ground, the material tends to compact because of its own weight, and the action of rain increases this phenomenon. During cold periods in winter, this water can freeze and freeze the material making its extraction complicated. The extraction is generally located below, in an extraction tunnel where is installed a conveyor with multiple extractions located at various places of stock pile.

Solution:

The installation of air cannons (usually two by extraction) makes it possible to break this compact block and push the material towards the exit. In addition, this solution increases the angle of crumbling thus increasing the quantity of material that can be extracted.

At this customer, Standard Industrie started by equipping two extractions in the tunnel. After a few months of testing, the client was convinced and dediced to equip the other eight extractions. This installation is also wireless, no cable is apparent and had to be pulled along the conveyor, facilitating the installation, programming and use of the system. The customer is also a user of Standard Industrie's LIFTUBE and has already equipped various conveyors carrying materials of various particle sizes.

New Saudi shipping line calls at Le Havre

Since the beginning of the year, HAROPA – Port of Le Havre has been berthing the Saudi Arabian national shipping line with a ro-ro service for containers, as well as conventional and heavy-lift cargo. This new bi-monthly service, which now links HAROPA to the Red Sea and the Arabian Gulf, reinforces HAROPA's position among the major European industrial and port complexes.

Six ships have been deployed as part of this service. Among them, the *Bahri Tabuk*, which opened the new sea link to the ro-ro terminal in Le Havre at the beginning of the year. The *Bahri Jazan* called in Le Havre on Monday 18 June and it was the ship's third port call to France in the year.

These 225m-long vessels are equipped with an access ramp with a capacity of 250 tonnes and two cranes each lifting 120 tonnes.

The ships carry various export goods such as new vehicles, construction machinery and electric power generators, as well as railway and miscellaneous construction equipment.

The main ports of call directly affected by Bahri's North Europe service are:

- Bremerhaven, Antwerp, Tilbury, Bilbao, Porto Marghera, Alexandria, Jeddah, Jebel Ali, Dammam.
- And, depending on the goods transported: Djibouti, Sohar, Abu Dhabi,
- And other ports either direct or by transshipment.

In doing so, Bahri has demonstrated its intention to maintain its presence on the French market by choosing the port of Le Havre as a bridgehead.

For Hervé Martel, CEO of the port of Le Havre and vice-president of HAROPA, "this new service underlines HAROPA's aim to develop a range of quality services for each market sector, thus reinforcing the ports of the Seine corridor in the supply chains of the leading shipping lines worldwide."

In Le Havre, Bahri is represented by Shipping Agency Service, a subsidiary of the Naxco group.

HAROPA – Port of Le Havre confirms its investment scheme of more than €500m

The Port of Le Havre Supervisory Board has confirmed a multi-year investment programme devoted to development representing €500 million. The decision was voted unanimously in Le Havre on 29 June in a plenary session chaired by Emmanuèle Perron.

A WORK METHOD BASED ON ANALYSIS AND CONSULTATION

The decision is based on the information resulting from the consultation of the governance bodies to which the port authorities had referred and the review of the consultation on improving river access to Port 2000 conducted last year.

"The consultation process, as wide as possible, has allowed all of the stakeholders to express themselves with rigour and objectivity," said Jean-Louis Le Yondre, chair of the Development Board. And we are delighted that this program, which is both feasible and financeable, has met with genuine consensus from the entire port community. It makes it possible to re-launch the investments necessary for the further development of the #1 French port for foreign trade."

THE HAROPA INITIATIVE

The three HAROPA ports have launched a forward planning analysis of the investments to be made over the next ten years. For each port, the question is how to reconcile the needs of commercial development with the issues involved in the maintenance and rehabilitation of the port assets with respect to the Seine corridor.

In parallel with the Port of Le Havre Supervisory Board, the investment roadmap was presented to the Port of Rouen Supervisory Board. The programme is structured around two priorities:

- development investments representing some € 500 million;
- investments in the maintenance and modernization of existing assets, i.e. €110 million over five years.

The phasing, whether technical or temporal — depending on the project — will make the programme financially sustainable.

PRIORITY: THE COMPLETION OF PORT 2000, INCLUDING BERTHS 11 AND 12 AND THE FLAP GATE

Based on the joint analysis of the projects and requirements, the completion of Port 2000 is crucial to the development strategy of the port in the very short term.

Its completion is based on two ancillary projects: the construction of berths 11 and 12 which will feed the Seine corridor by the growth in maritime traffic and river access to Port 2000 (via the flap gate) which will help to evacuate containers by waterway, and will complete the current river solutions with their natural market outlets of Rouen and Paris.

Considered 'vital', the construction of berths 11 and 12 satisfies all the conditions for work to immediately start: "the process of selecting candidates for the allocation of the two berths has been launched and its results demonstrate the maturity of the terminal operator market and the strategic quality of the proposed location," said Hervé Martel.

The foundation stone for the project could be laid as early as July 2019, "which offers a guarantee of technical and administrative maturity liable to win the support of Europe for co-financing, for which we could apply alongside the flap gate project".

The flap gate project has also been maintained in the priority programme, to serve a multimodal and low-carbon transport system advocated by many of the stakeholders in the port area; every effort will be made for the public inquiry to take place in optimal conditions.

CONFIRMATION OF ALL INVESTMENT PROJECTS RELATED TO DEVELOPMENT

"At the end of these consultations," explained Emmanuèle Perron, Chair of the Supervisory Board, "after taking into account the financial capacities and commitments already made by the main partners, the Supervisory Board decided to retain all the projects presented at the meeting on March 30 and to continue studies on all projects: the extension to the ro-ro terminal, road/rail safety and security enhancement, further development of the logistics parks, and redevelopment of the northern terminals".

- The project for the ro-ro terminal will be carried out without delay, given the current pressure on available space.
- The Atlantic project will be continued based on the aims for the 'North Port', which constitutes a fundamental capacity reserve for the development of container traffic in certain market segments (in particular on the transatlantic routes, the Mediterranean and West Africa).
- The crossroads between the Industrial Road (Route Industrielle) and the A29 motorway, considered a bottleneck for the industrial zone, will be redeveloped;
- Finally, the infrastructure maintenance and modernization scheme is designed to ensure maximum safety and security of port facilities; some benefit

from co-financing through contracts already signed as part of the State-region development contract (CPER) or the port revival plan.

The content of the investment program having been approved, there now begins a period of consolidation of project financing plans and the confirmation of the cofinancers' commitments. A financing contract will be set up for each of the projects and each project will be the subject of individual decisions by the Supervisory Board, the aim being to consolidate the programme as a whole as soon as possible.

With this ambitious investment programme which was voted unanimously on June 29, the whole of the Le Havre port community has demonstrated its backing for France's maritime, port and industrial ambitions.

Competitiveness of river Seine transport

All industry members concerned (shippers, shipping lines, goods handlers and transport operators) have undertaken to launch the works required from September onwards to sustainably improve the competitiveness of inland waterway transport for shipping maritime containers on the Seine basin.

Offshore wind farm project

The Supervisory Board has decided to accelerate the set-up on-site of the offshore wind farm project. The Management Board has thus been authorized to launch work on the Joannès Couvert wharf, which will begin during the summer; they will enable Siemens-Gamesa to start building the factories for the turbine blades and nacelles in line with its industrial commitments. These factories will equip the wind farms that were the subject of an announcement by the President of the French Republic on the agreement to renegotiate the contracts for the farms.

Dunkerque-Port gains 'PERS' certification from EcoPorts network

In line with the commitments of the PA2D (Sustainable Development and Action Plan), Dunkerque-Port has received the EcoPorts network's PERS certification (Port Environmental Review System), granted by the ESPO (European Sea Ports Organisation).

This environmental management certification, specific to the port sector, attests to correct compliance with current rules and standards, and rewards involvement in projects and initiatives for better environmental performance in ports.

This European recognition also stresses the environmental and innovative actions that have been carried out by Dunkerque-Port for nearly ten years as part of its activities. Purposeful and often unprecedented initiatives have emerged in favour of sustainable development: optimized management of dredging sediment (Dredging Master Plan), improvement in quality of port water (Sewerage Master Plan), consideration of biodiversity upstream of development projects (Natural Heritage Master Plan), collection of waste from ships, knowledge and management of the coastline, greenhouse gas inventory, and soon the opening of a Port Centre.

Environmental conservation thus entails the implementation of proactive policies integrating the environmental issues related to all the port's activities. This specific know-how of Dunkerque-Port, thanks to responsible planning and a policy of continuous progress, is now fully recognized.

So, following the renewal of its ISO 9001 certification (since 2009), the PERS demonstrates Dunkerque-Port's determination to continue developing its activities through efficient and responsible environmental management. The exemplary approach followed in accordance with of the PA2D, the 2014–2018 Strategic Plan and the Quality, Safety and Environment Policy, stands as the framework for the port's new Environmental Policy.

The PERS will prove to be an effective tool, complementing Dunkerque-Port's other planning tools, and creating with them a firm basis for the CAP 2020 project (project for a new dock and new infrastructures for the container sector at Dunkirk) to limit its environmental impact through the definition of concrete solutions.

Dunkirk thus joins the restricted network of the 33 PERS-certified ports among the 94 European and Mediterranean ports awarded the EcoPorts label, notably alongside the port of Calais.

For the record, in 2016 Dunkerque-Port was a winner at the ESPO Awards on the theme of 'Nature in ports'. The ESPO had already recognized the proactive dynamic of the port of Dunkirk in terms of conservation of the natural heritage in its district.

The PERS is awarded to ports after submission of a detailed report to Lloyd's Register. It is valid for two years.

About ESPO

Formed in 1993, the European Sea Ports Organisation is an association that brings together European sea ports to encourage the sustainable development of port activities. ESPO's main role is to defend the interests of European Union ports within the Community's organisations. The Brussels-based organization was responsible for the first Code of 'good'environmental practice in 1994 and

the launch of the EcoPorts initiative a few years later.

About The port of Dunkerque

Located on the North Sea, just one and a half hours' sailing time from the world's busiest seaway (600 ships every day), the Port of Dunkirk offers excellent accessibility to shipping and large land reserves.

Its facilities mean it can handle all kinds of cargoes and the largest ships.

The port extends along a frontage of 17km and has two entries for shipping : the older, to the east, which is restricted to ships with draughts of 14.2 metres (Eastern Port), and the other to the west, which is more recent and can accommodate ships with draughts of up to 22 metres (Western Port).

The port's territory covers 7,000 hectares and includes ten towns : Dunkirk, Saint-Pol-sur-Mer, Fort-Mardyck, Grande-Synthe, Mardyck, Loon-Plage, Gravelines, Craywick, Saint-Georges-sur-l'Aa and Bourbourg.

Situated 40km from the English port of Dover, 10km from the Belgian frontier, close to the city of Lille and at the heart of the Brussels-London-Paris triangle, Dunkirk is the ideal platform for goods consolidation and redistribution in Europe.

Haropa traffic figures

1st half of 2018[1]

In a context in which HAROPA's seaborne traffic globally remains stable, at 45.8mt (million tonnes), the first six months were marked by very good figures for highly strategic trades:

- Maritime container traffic posted an all-time high figure to the hinterland with a total of more than 1 million TEU that is +1.1% against first half of 2017.
- This rise means growth of maritime container river traffic by 12.6% in TEU[2]; The market share of HAROPA for the export of wheat and barley produced in France (2017–2018 season) reached a record level of 50%, with 75% traffic growth against the previous season.
- Seaborne traffic of aggregates, sands and gravels strongly rose by 55%, regarding this trade, river traffic recovered after the period of strong rise in the water level with 7.5 million tonnes.
- Sea "Ro-Ro" trade confirmed continuous growth with 157,000 vehicles that is +2%.
- Sea and river cruises still posted high momentum, with, especially, +11% of calls for sea cruise.

(1) change between January to June 2017 and January to June 2018

(2) figures for maritime container river traffic as at end of May2018 (counted in Le Havre)

Cereals: an all-time high market share

All cereals counted together, the terminals of the Port of Rouen operated 7mt in the course of the 2017–2018 season, that is a 75% rise compared to last year.

This figure confirms the competitiveness of the port of Rouen which handles about 50% of the French exports of wheat and barley. The new 2018-2019 season should confirm this good positioning in terms of market shares.

The river traffic of cereals in the Ile-de-France region actually rose by 22.5% connected for the major part with the supply of the port of Rouen.

Aggregates, sands and gravels: high growth

Sea traffic rose by 55%, with 900,000 tonnes: it is boosted by the re-start of the Paris area and Normandy building sector.

On this very trade, river traffic significantly recovered as from the month of April with 7.5mt after a beginning of the year strongly impacted by the period of strong rise in the river water level (–2% at end of June against –16% at end of March).

Ro-Ro: continuous rise

The ro-ro terminal in Le Havre processed 157,000 vehicles, that is 2% more than in 2017. MSC Shipping Company launched its Ro-Ro service in February connecting HAROPA with West Africa twice a month.

Key facts to remember...

New commercial offers:

- Change in the round-trip service Asia-to-Europe FE2 of THE Alliance in April; this service operated by the largest vessels placed Le Havre as the first continental port of call on import from Asia.
- Since the beginning of the month of August, the connection with West Africa from Rouen which was performed by a Mac Andrews service between Rouen and the hub of CMA CGM in Algesiras (connecting its services Algesiras-WAC), has been replaced by an improved service owing to a feeder between Rouen and Le Havre (BL Rouen) in order to connect the direct services to the WAC provided by CMA CGM from Le Havre.
-

New services:

- THE Alliance has introduced a new Asia service in Le Havre, the FE3.
- From end of August, the 2m alliance positions Le Havre as the first port of call on import on the North-European Range for its service calling at the East Coast of the United States, the Gulf of Mexico and Mexico.

New river connection: Bolloré Logistics has launched a river connection to deliver 36 x 40' containers by waterway directly to the port of Bonneuil from the port of Le Havre.

New call at La Roche-Guyon: in order to develop a network of public and shared-use calls, on the scale of the Seine corridor, HAROPA – Ports of Paris has created a new stop-over to receive river cruise boats with accommodation measuring up to 135m long.

New rail connection: in September, start of a new rail connection between French-speaking Switzerland and the ports of Le Havre and Marseille Fos.

LE HAVRE expertise dedicated to the training of foreign port executives

The Port Institute of Teaching and Research (IPER) of the Business Higher School (EM Normandie) and HAROPA – Port of Le Havre organized the 32nd edition of the advanced course on port operations and management, under the aegis of the International Maritime Organization (IMO), from 10 September to 12 October 2018 in Le Havre.

This course groups together 20 port executives from 18 emerging or developing countries (Bangladesh, Brazil, Jamaica, Kenya, Mexico, Panama, Seychelles, South Africa, Suriname) holding posts as Technical Director, Internal Control Director, Head of the accounts department, Sales development Manager, etc. They come to acquire the new skills necessary to higher efficiency in the management and operation of their respective ports relying on the know-how of the port community in Le Havre.

The port from every angle

The participants attend an advanced French or English-speaking training session in port management during five weeks directed by the experts of HAROPA – Port of Le Havre and the Le Havre Port community (UMEP, GMP, Shipping Companies, CIM, TCSI, LHTE etc.), by Consultants and lecturers from the 'EM Normandie' Business School and from the 'Ecole Nationale Supérieure Maritime' (ENSM – French Maritime Academy). Various courses especially in maritime and port economics, port security, logistics, terminal operation, port projects, marketing and information systems offer them a more comprehensive view of the subject to which are added technical visits of the port of Le Havre and its terminals, as well as of the site of the Arcelor Mittal group in Luxembourg.

"Being a very first partner of the Port Institute of Teaching and Research since its creation, HAROPA – Port of Le Havre is proud to actively support the training actions of IPER in France and abroad, reminds Hervé Martel, CEO of HAROPA – Port of Le Havre. Our executives and engineers, who participate in the training sessions, share their skills, competence and experience on numerous development projects conducted in Le Havre, fostering a high-quality exchange of views between professionals".

"Since the creation in 1986, the advanced course on port operations and management has acquired international renown. The high level of expertise, the pertinence of the modules tackled and the outstanding careers of the port executives thus trained are as many assets which make the number of applicants and the reputation of the programmes grow every year more. For this new session, we welcome for the first time an expert from Nicaragua. We are delighted at this great momentum which draws forces on a fruitful cooperation with port and shipping stakeholders of the Le Havre community and of IMO, explained Céline Rolland, IPER Director.

To-date, more than 600 experts living in about a hundred countries have already attended this course which is the international showcase of the port expertise as regards maritime and port training.

More about IPER

Founded in 1977, IPER is specialist in qualifying continuing education programmes for executives in the Maritime, Port and Logistics areas. The seminars are taught in French and/or English, in Le Havre and Paris, and cover three main areas: Port Works, Management and Operations.

More about HAROPA – Port of Le Havre

Owing to an outstanding location on the West-European sea board, HAROPA – Port of Le Havre, #1 French port for external trade and fifth-largest North-European port for container trade, accommodates each year around 6,000 vessels among which the world largest containerships. Accessible 24/7 without any limitation of tide, it handled over 70mt of cargo in 2017 and 40% of the French imports of crude oil.

Being a member of HAROPA, #1 French port system, together with the ports of Rouen and Paris, Port of Le Havre offers an easy and fast gateway to all continents for all world major shipping lines with around 700 ports of call. As one of the biggest European port systems, HAROPA has about 500 hectares of available land and estate reserves along the Seine corridor. It helps its customers setting up and managing competitive and sustainable logistics systems to serve the N°1 European consumer basin with 25 million inhabitants.

More about EM Normandie

EM Normandie, which was founded in 1871 as one of the first French Business Grandes Ecoles, has now reached an unquestionable status as an institution of reference on the business school scene. The School has been accredited by EQUIS, AACSB International and EPAS (EFMD) for its pre-experience Grande Ecole Programme. On its five campuses in Caen, Le Havre, Paris, Oxford and Dublin EM Normandie welcomes some 4 000 students and professionals, and has an Alumni network of almost 17,500 members across the world.

More about the International maritime organization (IMO)

Created in 1948, IMO is one of the United Nations specialized agencies. Its main role is to create and harmonize the regulations of the states in the fields of safety and security of shipping, fixing standards for shipbuilding and the prevention of marine pollution by ships. It has 171 member states and three associate members.

AMECO, the French face of bulk handling equipment

AMECO's origins are rooted in Alsace, a French region that lies in-between the Vosges Mountains and the Rhine River, bordering both Germany and Switzerland. The origins of the French equipment manufacturer AMECO lie in the fertilizer and mining industry.

Founded in 1932, the company was part of the Alsatian potash mines. It went from providing maintenance services, to supplying conveyors, and delivering all types of equipment to fulfil specific material handling needs. This technology allowed AMECO to develop into different markets, such as cement plants and electricity power plants where bigger storage facilities were required at the time.

In the 1950s AMECO was one of the few companies from its region providing machinery internationally. This early international vocation is the origin of AMECO's global presence today. With over 380 references around the globe, this proud business now operates in the cement, commodity food, fertilizer, mining, power generation as well as pulp & paper industry.

AMECO has two main offices in a thriving area on the borders of Germany, Switzerland, and France.

Strategic locations serving the World

AMECO has two main offices located in a thriving area where the borders of Germany, Switzerland, and France meet. AMECO also has numerous agents worldwide serving AMECO's Customers as a first port-of-call.

The core business functions are based in Germany. Its full design team is based in France soon to be relocating to KM0 in Mulhouse, an ecosystem of digital companies bearing the French Tech label.

AMECO recently established KBH Services, Inc, based in California, an exclusive re-seller of AMECO to better serve its North American customers' needs. AMECO Asia-Pacific will also soon be opening in Kuala Lumpur as a first port-of-call for its Customers based in this region of the World.

AMECO's people are at the heart of its business

Stéphane Killian is the CEO of AMECO and the sole proprietor of the company. Killian has prior experience in the French nuclear industry, and pursued an MBA in Paris at Collège des Ingénieurs, before taking over the family business in 2008. Killian is a mechanical engineer who has followed the curriculum at Iowa State University and Massachusetts Institute of Technology in Cambridge, MA.

Killian believes that AMECO's employees are at the heart of the company's development. Their modern outlook and know-how, combined with their responsiveness and enthusiasm enable them to design, engineer, and manufacture machine's that meet the company's client's needs.

More than just machines...

AMECO not only supplies bulk material handling equipment, it also performs regular inspections on its installations to ensure the safety and longevity of its machines. This in turn, reduces maintenance costs and prevents equipment failure. AMECO's supervision engineers are trained and experienced in all mechanical and electrical aspects, and can provide complete refurbishments, preventative maintenance, and repairs.

The general condition of the machine is checked including:

1. Safety (switches and sensors)
2. Movements (travelling, luffing, slewing, shuttling)
3. Electrical (programmable logic controller (PLC), cabin, cable reel, junction box)
4. Mechanical (conveyor, tripper car, arms)
5. Critical parts (motor, slewing ring)
6. Lubrication

The company is also able to take care of its customers' on-site and off-site spare parts management which is an important part of its business. AMECO supplies all critical parts for its machines including:

- blades
- chains
- motors and motor reducers
- pillow blocks
- seals and bearings

AMECO's goal is to ensure clients always have the right spare parts available, at not only the right time and place, but at the right price. This will enable them to optimize maintenance time and cost keeping long-lead items in storage for emergency parts.

AMECO combines its first-class predictive maintenance and innovative revamping services with its superior product delivery and dedication to service clients' needs.

Next steps: connected machines for higher customer satisfaction

AMECO believes digitalization will dramatically change the way its customers will run their operations and the company is therefore striving to be best-in-class for predictive maintenance and remote diagnostic.

AMECO continues to specialize in its three main product lines: stackers, reclaimers, and shiploaders for a wide range of industries and materials. The company's challenge/mission for the future is to maintain and increase its satisfied client base worldwide and exceed their expectations.

SOGET and Microsoft: a strategic partnership for a secure digitization of ports in France and worldwide

SOGET, world specialist in Port Community Systems (PCS), and Microsoft are strengthening their partnership to offer a secure digital environment for maritime and port economy stakeholders. From US$1,500 billion in 2010, the added value of the world maritime economy could represent US$3,000 billion by 2030 according to the OECD, which highlights the relevance of digital data as well as safety/security in this forecast.

As a strategic asset of the global trade pattern, ports are critical infrastructures where millions of logistics players exchange billions of data every day. Digitization represents a major source of value as long as the new digital and logistics era combines fluidity, cybersecurity and reliability. The pooling of SOGET's and Microsoft's skills and expertise offers an innovative and effective response to the world's port communities.

SOGET's expertise in intelligent, shared and instant management of supply chain information is combined with Microsoft's major technological advances with cybersecure management, in particular by hosting all data in a confidential way on the Azure Cloud.

From the ports of the Seine Corridor to the Jakarta terminals and the containerized transshipments in Kingston or Kinshasa, SOGET and Microsoft already offer optimal collaborative solutions to combine productivity, efficiency and security in all operations related to the movement of cargo.

Microsoft supports the excellence of S)ONE, SOGET's latest generation Port Community System through its Artificial Intelligence, predictive analysis and data visualization services such as PowerBI, to meet the transport and logistics requirements of its common customers.

Microsoft Azure helps to meet strict security needs by assisting in identifying and protecting threats.

This partnership would not exist without the possibility of offering global coverage to SOGET's customers with a presence in more than 42 countries, but also data centres in France when the aim is to have a local data hosting.

"We are very pleased to provide S)ONE with the power of the Azure cloud while respecting the business specificities. Microsoft and SOGET's joint offer provides to our common import-export customers a flexible and secure solution. We support strongly this technological transformation and the volume increase of trade through privileged partners such as SOGET." says Alain Bernard, Managing Director Partners France, Microsoft.

SOGET is currently deploying S)ONE, its next-generation PCS based on 100% Microsoft technology, on a national scale in Jamaica and the DRC and on the Seine Axis in France, which represents 80% of French foreign trade. The next steps will be to extend the system to other places in metropolitan and overseas France as well as to other countries, in close collaboration with Microsoft.

According to Hervé Cornède, CEO of SOGET: "Our strategic partnership with Microsoft over the past seven years has been key for our partners and customers. Collaborative work with Microsoft teams places our digital platform at the heart of cutting-edge digital solutions for our port and logistics communities. It is an honour and a privilege for an SME like SOGET to be recognized as a Microsoft Gold Partner for the digital optimization of global port boundaries".

About SOGET

Founded in 1983 from the collective ambition of the port community of Le Havre, France, SOGET provides fluidity to port operations, by organizing for public and private stakeholders an intelligent, shared and on-time management of logistics information. As a builder of port communities, SOGET offers innovative turnkey solutions based on its mastery of business processes, technology excellence and proximity with its clients and partners.

With more than 70 references on fourcontinents, SOGET is editor and operator of S)ONE and AP+ PCSs as well as provider of e-Customs solutions, a dedicated Warehouse Management System with SOGET CM+ and container tracking & tracing services. Every day, nearly 17,600 people are using SOGET's solutions to process more than 12 million containers and 400,000 vehicles per year.

Founding member of the International Port Community System Association (IPCSA), of the SEFACIL Foundation and of TRAFIS Lab, a public-private research laboratory, SOGET acts as an expert company with many international organizations and a member of Normandy French Tech cluster.

About Microsoft France

In France for 32 years, Microsoft has made a commitment to be as close as possible to its customers.

Its ambition is to offer technology for priority issues: development, education and digital inclusion, while respecting the compliance.

From the cloud located in French data centers to the support of Station F start-ups under the sign of artificial intelligence, Microsoft is committed to make France shining in the global digital economy through:

- An open ecosystem of more than 10,500 partners;
- Support of 3,500 start-ups and its presence at Station F;
- A collaborative culture at its Issy-les-Moulineaux Campus, which employs 1,500 people;
- Disruptive technologies, business growth and vectors of creativity, around the Cloud, Artificial Intelligence and mixed reality; and
- A partnership with INRIA.

DCi

Package deal?

bulk bags, FIBCs, bagging & palletizing systems under scrutiny

STATEC BINDER's PRINCIPAC open-mouth bagging machine.

STATEC BINDER: specialist in high-performance bagging & palletizing systems

Austrian company STATEC BINDER manufactures high-performance bagging and palletizing machines for free-flowing bulk goods. The product portfolio includes open-mouth bagging machines, FFS (form, fill & seal) machines, big bag filling stations, bag closing machines, weighing equipment, high-level palletizers and robot-palletizers.

The company's major clients include customers in many fields like petrochemical, fertilizer, seed, flour, animal feed, pet food, grain, sugar, rice and many more. In order to remain competitive in a tight market, STATEC BINDER knows that it is important to develop and improve its machines continuously to offer the best possible solutions to its customers. Therefore its high quality standard is always increasing. It also keeps abreast of new trends to provide the best solutions on the market. STATEC BINDER combines this approach with very good customer service. Together with its local partners, it is growing its local service teams to be able to offer its customers fast support worldwide when needed.

STATEC BINDER is an internationally known specialist for customized bagging systems. The Austrian company has already successfully installed more than 1,300 machines worldwide. STATEC BINDER develops and manufactures all of its machinery in its ISO 9001-certified plant. For STATEC BINDER, the most important thing is to find an ideal solution for bagging and/or palletizing the products of its customers together with them.

High-performance bagging & palletizing systems

The Austrian company STATEC BINDER is dedicated to providing its customers with ideal solutions for bagging and palletizing free flowing bulk goods. Flexibility is therefore an essential aspect for the company itself and for the development of the machines.

Whether it's plastic pellets, rice, grain, sugar, animal feed, pet food or fertilizer, the product range offers top-quality customer-focused solutions for any industry. The

PRINCIPAC, CERTOPAC, ACROPAC and CIRCUPAC open mouth bagging systems are designed for polyethylene (PE), polypropylene (PP) and paper bags with a filling weight of 5 to 50kg. The high-performance segment is rounded off by the SYSTEM-T FFS (form-fill-seal) machine used to process bags from tubular reel, and the SYSTEM-F vertical FFS machine for processing bags from flat film.

The palletizing of bags and boxes of any type is made possible thanks to the fully automatic PRINCIPAL high-level palletizing system, as well as the PRINCIPAL-R high-performance robot palletizer. Manual and semi-automatic bagging systems, Big Bag Stations, which allow for the filling of up to 150 big bags per hour, net weighers and the latest bag closing-systems round off the extensive product portfolio of STATEC BINDER.

Specialist for open-mouth bagging

STATEC BINDER's product portfolio includes three open-mouth bagging machines. PRINCIPAC has an output of up to 2,000 bags per hour and is one of the fastest open-mouth bagging machines in the world. CERTOPAC is the second high-performance bagging machine in the family and can fill up to 1,500 bags per hour. The third machine is the ACROPAC, which processes 600 bags per hour. The machines are also available in stainless steel for customers with special requirements.

As already mentioned, the different models are designed for bags with a filling weight of between 5kg and 50kg. The bagging process is largely identical. Individual prefabricated pillow or gusset bags made from woven PP, PE or paper are transported separately from a stack in the magazine to the delivery table using vacuum suction cups. Here the bag is opened by a suction bar, inserted onto the filling spout, fixed in position and filled. The filled bag is then picked up and placed on the transport conveyor. From here it is taken to the bag closing machine, which seals the bags using stitching, heat sealing or hot glue, depending on the material. Each stage of the process is carefully monitored to prevent errors from occurring and to ensure that production is not interrupted.

Furthermore, STATEC BINDER offers a fully automatic high-performance bagging carousel. CIRCUPAC is an ideal bagging machine for flour and powdered products and can fill up to 1,200 bags per hour.

High quality standards

The high quality standard of STATEC BINDER's machines, which is valued by its customers, is achieved by using only the best components from well-known suppliers, by the extensive use of stainless steel and by ensuring that the machines have a sturdy design.

Quality is a top priority for STATEC BINDER. For this reason, the Austrian company combines high-quality products with a high-quality individual service for its customers. It is not only the STATEC BINDER machines that are reliable and efficient. The company's service teams also make every effort to ensure that customers are satisfied. STATEC BINDER aims to meet all its customers' special requirements in order to provide them with the perfect solution for packaging and/or palletizing their products.

Recent technological developments

Tape over seal

The patented bag closing system from STATEC BINDER seals woven PP (polypropylene) bags hermetically. For this, a woven PP tape is used for a reliable and secure bag closure. If required, bags can also be additionally stitched. The bag closing machine is available with sewing heads of different manufacturer. This innovative bag closing machine convinces in terms of application and conforms to STATEC BINDER's high technical standards. It is designed for sewing, cutting and sealing of laminated woven PP bags.

STATEC BINDER, together with Starlinger, developed the technology for producing bags where the bottom and, if desired, top of the sack is welded with a

sealing band instead of sewn.

Circupac

CIRCUPAC is a fully automatic high-performance bagging carousel for open-mouth bags to pack flour and powdered products. Ideal for prefabricated pillow bags and gusseted bags made of woven PP (polypropylene), PE (polyethylene) or paper. Six filling spouts that extend the filling time, permanent compression of the product through specially designed vibrating plates and a continuous rotating carousel are the result of an unique system.

PRINCIPAL high-level palletizer.

Forty years of experience

With 40 years of experience, STATEC BINDER is now a technology leader in open-mouth bagging. However, the company works on the principle that innovation is the key to success. Therefore, it constantly monitors changing market requirements to be able to identify them quickly and respond accordingly.

It has successfully held its own against its competitors for 40 years by constantly innovating and, most importantly, by supplying high-quality, high-tech machines.

Company background

STATEC BINDER is a Joint Venture between Binder+Co AG and BT Wolfgang Binder GmbH, founded in 2008. Binder+Co developed its first open-mouth bagging machine in 1978. BT Wolfgang Binder GmbH took over STATEC Anlagentechnik in 2006.

Two years later the two companies decided to bundle their competences in the field of bagging and palletizing technologies. The result is an internationally known specialist for bagging and palletizing systems: STATEC BINDER GmbH.

Filling equipment produced by experts in bags.

Mondi is a global leader in packaging and paper, employing around 26,000 people across more than 30 countries. It offers its customers innovative and sustainable packaging and paper solutions.

Mondi is fully integrated across the packaging and paper value chain — from managing forests and producing pulp, paper and plastic films, to developing and manufacturing effective industrial and consumer packaging solutions. Sustainability is embedded in everything it does, with clearly defined commitments.

Natro Tech impeller packer.

Bag filling equipment

When it comes to cement handling, Mondi produces a range of equipment, through its subsidiary Natro Tech S.r.l., which offers 90 years of experience in manufacturing industrial bag filling machinery. Founded in 1925, Natro Tech S.r.l. is a subsidiary of Mondi closely working with the service department of Mondi Italia. The company provides filling equipment for industrial bags. With the development of innovative machinery Natro Tech S.r.l. has built up a solid reputation as an innovative filling equipment producer in the domestic and international market. The company has developed specialized expertise in the building industry notably for dry mortar filling equipment and related service. Natro Tech S.r.l. is located in Northern Italy, 40km from Milan, 40km from Bergamo and 20km from Brescia.

Through the integration of industrial bags production and filling equipment customers can benefit from optimized solutions.

Natro Tech S.r.l. provides a thorough knowledge of customers' filling processes of powdery goods. This knowledge, in combination with first-class materials and technologies as well as highly educated and committed staff, enables the company to design filling solutions most suitable for fillers throughout the world.

The company provides various types of filling and packaging equipment for valve bags, open mouth bags, and big bags.

Natro Tech S.r.l. offers 90 years of experience in manufacturing industrial bag filling machinery.

Natro Tech, specializes in manufacturing filling equipment such as:

- **air packers:** developed to fill granular or powdery products at high speed into valve bags.
- **impeller packers:** developed for filling very fine powdery products (<3mm) at high speed into valve bags.
- **bag applicators:** bags can be placed onto the filling spout conveniently through an automatic bag applicator.
- **sealing systems:** offering in-line sealing systems and on-board sealing systems
- **weighing systems:** various types of weighing systems for optimized productivity, providing various types of statistics.
- **palletizers (high, medium and low capacity):** they provide automatic means for stacking products onto a standardized pallet for optimal usage of transport and storage room.

Natro Tech air packer.

Mondi Industrial Bags

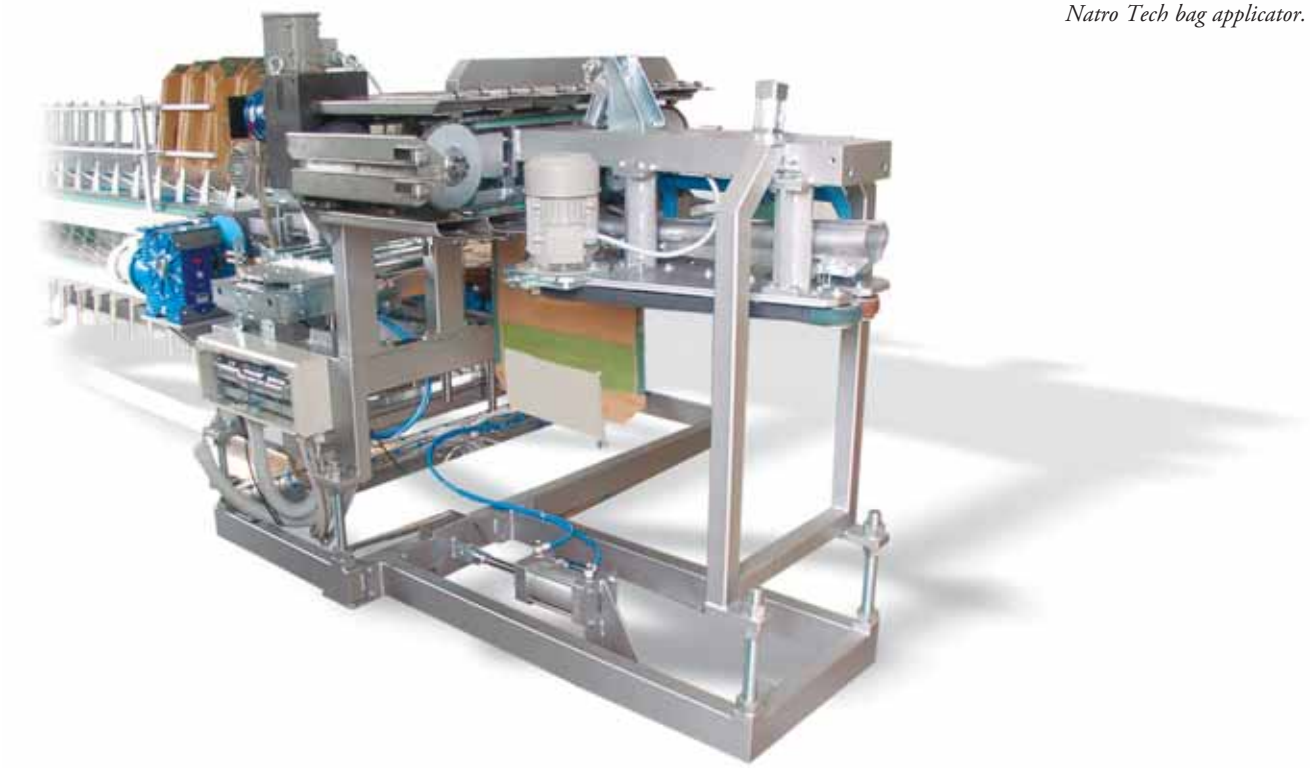
Mondi offers a wide range of bagging solutions, including:

- **pasted open mouth bags:** open mouth bags are made of high quality materials, closed on one side by sewing or glueing, offering reliable hygienic closure techniques.
- **pasted valve bags:** pasted valve bags are closed bags made of high quality materials, designed for high-speed filling through a valve on spout packers.
- **pinch bottom bags:** pinch bottom bags are best suited for medium and large content, available with/without gusset and a variety of barrier and closing options.
- **SOS (block bottom) bags:** self-standing open mouth bags available in a multitude of combinations of materials, features and closing methods.

Moreover, among Mondi Industrial Bags' innovations are:

- **HYBRID^{PRO}:** pasted valve bag with an HDPE outer ply for high-speed filling of

Natro Tech bag applicator.



moisture sensitive goods.

- **SPLASHBAG:** pasted valve bag with a water-repellent paper outer ply that can resist rain up to six hours.
- **Hot Lock Bag®:** open mouth bag with hot melt coating for sift-proof pinch closure, ideal for packaging goods under strict hygiene standards.
- **ONE Bag:** pasted valve bag made of only one ply of high-performance paper for high speed filling of powdered goods.
- **PE-Inliner Bag:** open mouth bag, equipped with a PE-inliner as a moisture barrier for hygienic packaging.
- **Airstream® family:** pasted valve bags with a unique de-aeration system for high-speed filling of moisture-sensitive powders and building materials.
- **Effusion Bag:** pasted valve bag with funnel formed effusion opening for precise dosing, optimal protection and reclosing.
- **Mini Bag:** a compact pasted valve bag for shelf-sized packaging: a great solution for small needs!
- **Terra Bag®:** Mondi's biodegradable pasted valve bag, OK Compost certified; for sustainable waste management of industrial bags.
- **Window Bag:** pasted valve or open mouth bag with a transparent window to make the bag's content visible.

- **World Bag:** pasted valve bag with a unique flap construction for additional printing space.

In addition to the industrial bags mentioned above, Mondi Industrial Bags can pack more than you would expect.

- **Refuse Bag:** open mouth bags for waste management. Performing even in moist and wet environments. Fully compostable and biodegradable.
- **Protector Bags:** multi-layer paper based bags, suitable for packaging bulky goods/heavy duty. Flexible, cost efficient, ecological.
- **MailerBAG:** the paper mailer for the courier express packaging industry and e-commerce, equipped with a double adhesive strip for easy returns.

Van Beek Liner Filler enables the transport of bulk by container

Van Beek screw system makes 20ft containers ideal for bulk transport

Twenty-foot containers are, in many cases, ideal for bulk transport. Their square shape makes them efficient in terms of use of space and they are easy to transport by truck, rail or ship.

There is, however, one issue: how can you fill a container quickly? If this question has held you back from using these containers, read on. Van Beek has found the answer.

80–85 % filling in half an hour

Van Beek developed its Liner Filler for fast loading of bulk goods into 20ft containers. It fills a container to over 80% in less than half an hour.

For this, the container is fitted with a container liner; a big bag that lines the inside of the container. Container liners can only be filled via a relatively small hole at the back of the container, and that has held lots of logistics companies back from transporting their bulk goods in this way. They simply had no means of filling the container liners quickly.

Reliable and cheap

Thanks to the Liner Filler a reliable, cheap and efficient solution is at hand. The operation is as easy as it is efficient. The machine is a horizontally mounted screw conveyor with an open underside. The inlet can be round or a hopper.

It is filled from a silo, Dino bulk truck loader, shovel, belt or screw conveyor. The installation can as an option be fitted with wheels so that a fork lift truck can move it.

Operation

The liner filler is elevated. A truck with a 20ft container drives backwards towards the liner filler and pushes the opening of the container over the screw until the screw is fully inserted into the container.

As soon as the screw is inserted into the container, the loading process can begin. The cargo falls through the open underside of the screw first into the back of the container and forms a heap there. As soon as it reaches the height of the screw, the cargo automatically falls further forwards in the container. At the end of the screw a filling detector is fitted so that the user knows for sure that all the space in the container is utilized and the screw stops in time.

Proved in practice

The Liner Filler has proved itself in practice for loading pellets (plastic granules), powders (such as flour) and flakes.

Bulk bag discharge systems from Van Beek streamline operations

Van Beek specializes in the area of screw conveyors. The core activities of the company, set up in 1939, consist of selling, designing and manufacturing screw conveyors. Van Beek customizes every screw conveyor. The company has 45 employees.

Van Beek is a niche player. The organization specializes in high quality customization of stainless steel screw conveyor systems and it delivers them worldwide. More than 80% of production is exported. In particular the chemical, stainless steel, environmental and food industries make use of Van Beek's expertise.

The bulk truck loaders form a separate machine line. Van Beek is extremely well known for its Dino bulk truck loader, which is widely used in the bulk industry.

In terms of the bagging industry, Van Beek has used its screw-conveying expertise to develop a range of big bag discharge systems.

Safe and hygienic

Van Beek big bag discharge stations are customized and designed for the trouble-free discharge of packaged bulk goods (big bags/FIBC/bulk bags). These are dust-free, hygienic, user-friendly and without any loss of product.

Modular concept with extra features

A fork lift truck or hoisting equipment positions the full big bags above the big inlet hopper. An inclined screw then conveys the bulk goods dust-free and hygienically to a higher level. This is all done without any loss of product.

Big bag discharge station connects with additional machines and components

The Big Bag discharge station connects well with Van Beek's screw conveyors and dosing screws. As a result, the discharged product can be further dosed or conveyed easily. An extension with drop-through or blow-through air locks, pneumatic transport, elevators, etc. is also possible.

Expertise and safety

Van Beek delivers big bag/FIBC discharge stations with supported strength calculations and according to the hoisting and lifting regulations.

FIBC Liners from 3D Barrier Bags make bulk products immune to the environment

3D Barrier Bags Inc. based in Orlando, Florida is an ISO 9001:2015 accredited manufacturer of custom-fit barrier foil bags and liners. Barrier foil liners are designed to provide total protection to dried products that have a sensitivity to moisture, oxygen and other climatic and biological volatile. Barrier foil liners can also prevent odor transfer either into or out of the product.

A flexible intermediate bulk container (FIBC), bulk bag or super sack has been a long-established industrial container designed for storing and transporting dry products safely and efficiently.

3D Barrier Bags announces new location and expansion

CORROSION AND VAPOUR DAMAGE PREVENTION SPECIALIST UNVEILS NEW MACHINE AND LOCATION.

3D Barrier Bags Inc, an ISO 9001:2015 accredited manufacturer of custom-fit high barrier bags and liners has announced that, earlier this year, it made a significant investment in the manufacture of a customized automatic bag forming machine (BFM) to service the vapour barrier bag requirements of the North American market.

With this investment, the company is excited to announce that it will also be re-locating to a very carefully selected Class A+ industrial unit on the brand new Crews Commerce Center, located in the heart of the Industrial Corridor in South Orlando, Florida, to accommodate its customized automatic bag forming machine (BFM) which is scheduled to be installed in Q1 2019.

After opening its USA manufacturing facilities in Orlando, Florida, back in 2015 3D Barrier Bags has experienced high demand for its custom packaging solutions. The move to the new facility allows for the accommodation of 3D Barrier Bags Inc's customized, automated bag forming machine, new round-bottom drum liner making machine and the additional supporting infrastructure and ancillary equipment, ensuring that it can continue to meet ever-increasing demand for its climatic packaging solutions.

Of the company's recent expansion, 3D Barrier Bags Inc Vice President, Simon Jolly said, "This venture has been an exciting project for us. We have been working alongside a specialist engineering company, providing guidance on the design and incorporating features that have been derived from 30 years of Protective Packaging Ltd.

"Since opening up our facilities in Orlando, FL, we have relied upon hand fabrication to meet our customers' requirements. The introduction of our new location and BFM 3 will significantly improve our productivity and capabilities, allowing us to reach a larger customer base and offer protection to more corrosion and dried product industries."

3D Barrier Bags Inc's BFM 3 machine will allow it to automate the manufacture of the following bags and liner formats:

- 3-D bags for Gaylord Boxes (manufactured with open top or with filling spouts and/or discharge spouts)
- Big Bag (FIBC) liners (manufactured with open top or with filling spouts and/or discharge spouts);
- medium to large flat bags; and
- lay flat and gusseted tubing.

About 3D Barrier Bags Inc

3D Barrier Bags Inc is an ISO accredited manufacturer of custom-fit high barrier foil bags and liners formatted with a wide range of laminate materials including QPD listed MIL-PRF-131K Class 1 laminates, based in Orlando, FL. It is also a part of Protective Packaging Ltd, with production facilities based in the UK, supplying and exporting corrosion prevention and dried product protection barrier bags and liners globally to over 50 countries.

Unfortunately FIBCs have an inability to provide climatic protection to very hygroscopic and oxygen sensitive materials on their own.

However, combined with a barrier foil liner, an FIBC can be used to pack atmospherically sensitive products which previously had to be shipped in sealed containers such as steel, plastic or fibreboard drums. Not only does a barrier foil liner with an FIBC offer cost savings on material, shipping space efficiency can also be improved by up to 40% compared to drums.

All barrier foil liners from 3D Barrier Bags Inc. are custom made to suit the dimensions and style of the FIBC. They can be made open topped with a flat base or with filling and/or discharge spouts which ensure safe filling and emptying of the FIBC.

This type of liner can also be fitted with valves that facilitate flushing of gas, allowing residual oxygen to be displaced. Valves also allow vacuuming of the liner and samples of the residual air in the liners to be taken for analysis, all without the need to open up the hermetically sealed liner.

FIBC barrier foil liners are suitable for food contact, and hot fill products up to 320°F. They are commonly used to protect numerous applications including pharmaceuticals, foodstuffs, chemicals, and polymers, or any product which may be susceptible to moisture.

3D Barrier Bags Inc. has invested substantially in the manufacture of a customized automatic bag forming machine (BFM) to automate its liner manufacturing process, ensuring that they can continue to meet ever-increasing demands for its climatic packaging solutions.

100 % Starlinger
rPET Flakes

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.**

Visit us at:
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textile packaging | consumer bags | recycling technology | viscotec

Hapman solutions safeguard employees and make operations more cost-effective

Hapman case study

Werner G. Smith is a chemical manufacturer which specializes in plant and marine-based oils, esters, and waxes used in additives in a wide-range of industries from wire drawing, and metal working lubricants, to glazes, putties and cosmetics. Examples of customer products are modelling clay for car designs as they are scaled for production, and for home products. The unique and sometimes complex nature of the additives manufactured by Werner G Smith has been the key to the company's 85 year-long success.

The company focus on continuous improvement is the reason Jennifer Bugbee, Vice President of Operations at Werner G. Smith, sought a better alternative to a cumbersome, costly, and time-consuming process coupled with the goal of complete customer satisfaction.

Manual processing left strain

Werner G. Smith was awarded a long-term contract from a new customer. The job required the blending of a granular powder with an aqueous chemical solution.

Under the terms of the agreement, the customer provides the raw materials and Werner G. Smith makes the product in accordance with the specifications set forth by the customer.

The job began at a time when Werner had extra capacity in one of its large reactors allowing the reactor to be dedicated for this process. Dedicating the unused processing space was an excellent way for Werner to maintain on-time deliveries while still accepting new work from other customers. The building where the product was initially made had no loading dock, and would require 55 lb bags of raw material to be hauled and processed manually.

Bugbee and her production team developed a system for handling the bags of material. The system included the use of a hand jack to load pallets holding 50 bags each into a box truck. The box truck would transport the pallets from the warehouse to the reactor building.

At the reactor building five employees formed a human chain, off-loading each of the 55 lb bags from the box truck and reloading them on pallets inside the production building. The pallets were then hoisted up one storey where an operator would manually pull an individual bag from the pallet, cut the bag and dump it directly into the reactor. Each batch of product took 16 hours to produce and required

Hapman Model 24 vacuum conveyor installed at the Werner G. Smith facility.

200 bags of material. Werner was producing two batches per shipment at a rate of two shipments per week. This meant in one week the five employees were manually moving over 800 55 lb bags multiple times in the week. Bugbee noted, "This was an enormous waste of time and manpower and with expansion on the mind of our customer we needed to think about streamlining our process, not only to speed up manufacturing and reduce powder hazards, but to reduce the strain on an ageing workforce."

Automation improves operations and employee health

Bugbee needed to find resources to help her design a new material handling system. She understood the manual handling of the bulk material was hurting operations from both a material cost and employee safety stance; however, finding the time to research the best alternatives was daunting given her normal day-to-day work load.

Bugbee reached out to a local industrial supplier, Powell Equipment Company. Jeff Powell met with her at the facility to see the current operating situation first hand.

Powell quickly assessed that the manufacturer he needed to contact for this project was Hapman. Bugbee spoke with Steve Grant, Hapman Vacuum conveyor Product Manager, to explain her operating conditions and her goals for improvement. Grant worked with Bugbee to fully understand the details of the application and the material that needed to be handled. Grant requested information such as material type and required flow rate, temperature, flowability, particle size, moisture content, and material contact surface requirements. Also important information asked was the horizontal and vertical distance required, existing plant layout, and existing controls automation.

Compiling all of the details from Bugbee, Grant, made a full recommendation to improve the bulk material handling in her facility.

The complete system pays back

The foundation of material characteristics and flow dynamics goes into the design of each piece of Hapman equipment. The Hapman knowledge and experience worked to provide Werner G. Smith with new equipment that achieved the company goals of increasing productivity, decreasing operating costs and improving worker safety. Process manufacturers of all types also evaluate capital equipment purchases based on total cost of ownership. These factors vary from one industry to another; however the goal is the same, to make an investment in equipment that adds to the bottom line over the long term.

The system recommend by Hapman consisted of a loss-in-weight bulk bag unloader with a vacuum conveyor.

The equipment worked together, automatically moving material from unload to process. The details of the system included:

Bulk bag unloader:

- **hoist and trolley bulk bag unloader with loss-in-weight measurement:** provided for consistent feeding of material to the downstream conveyor.
- **automatic bag agitator assembly:** this assembly will keep compacted material flowing smoothly and evenly and includes an air-operated control panel and air cylinder-operated bag agitator paddles. Controls provide a simultaneous paddle stroke for optimum bag massaging.
- **bag spout access chamber:** includes the side access door and top inlet opening for bag spout.

The bulk bag unloader fed the vacuum conveying system, which included:

- **vacuum conveying system;**
- **carbon steel filter/receiver housing:** designed for longevity and ease of use, with slide gate, and quick release side access door for tool-less filter change over.
- **safety features:** safety interlock switch to shut down system if side access door

Hapman's loss-in-weight bulk bag unloader optimizes batching operations and alleviates the physical strain of manually handling bulk bags, which eliminates health, housekeeping and product loss issues associated with material dusting.

is opened.

- **integral micron filter:** filter with a 99.99% efficient rating down to 0.5 micron.
- **reverse air pulse filter cleaning mechanism:** keeps filter clean and system running at optimum operating efficiency.
- **integral regenerative vacuum blower assembly:** complete with exhaust silencer.
- **surge capacity:** eight cubic foot surge hopper provided optimum capacity and minimized operator monitoring.
- **batch controls:** integral control panel to operate the entire system automatically or manually, fault alerts, and safety shut-off, VFD relays, NEMA 4X rating, load cell readout and diverter control for future expansion.

Each of the Hapman components worked together as a complete system, automating most of the material handling process while improving production time and quality.

Proven results – positive return

After purchasing and installation of the Hapman bulk material handling system, the returns to Werner G. Smith were almost immediate. The cost savings began with the elimination of the need to have a third party supplier break down larger bags of raw material into the 55 lb bags so Werner employees could manually handle them. The elimination of this step automatically dropped the cost per unit for Werner's customer. The five employees were assigned duties directly related to production rather than wasting time manually unloading pallets of 55 lb. bags.

This change improved production time by several hours. In addition Werner improved overall housekeeping within the facility because bags of material were emptied in an enclosed system and the new process eliminated 80% of the bag waste they had been generating.

About Hapman

For 70 years, Hapman has provided manufacturing plants around the world with technologically advanced powder and bulk handling equipment and systems, offering custom engineered equipment and systems for chemical, food, pharmaceutical, plastics, building, minerals, and other industries. DCi

Basics in the Baltics

bulk-related developments in this busy region

Tahkoluoto harbour at the Port of Pori.

UgleMetTrans: serving ports in Russia and Finland

UgleMetTrans is a logistics company based in the Baltic region. It has over 20 years of experience in logistics, and focuses on cargo transshipment, multimodal forwarding and chartering. In Russia, the company is active in: the Port of Novorossiysk; the Port of Kavkaz; the Port of Temryuk; the Ports of Rostov-on-Don; the Port of Kaliningrad. In Finland, it is represented in the ports of Kokkola, Pori and Valko.

The main types of cargo handled are:

- coal and other coal industry products;
- coke and coke products;
- metal products;
- large-diameter pipes;
- non-ferrous and ferrous metal ores;
- grain;
- containers;
- oversized cargo; and
- dangerous goods.

The annual total cargo handled is more than 4mt (million tonnes).

Railway forwarding

- **transport scheduling:** providing the customer with a full range of services to co-ordinate cargo traffic with Russian Railways, JSC and ports.
- **traffic control:** monitoring the movement of railcars with cargo along the network of Russian Federation railways.
- **supply of railcars:** regulating the cargo receipt in the port to form shipping lots.
- **additional services:** temporary placement of railcars on the routes of Russian Railways, JSC to arrange work on the sea transport loading, including when loading directly on board by 'railcar-board of a vessel' scheme.

Port of Novorossiysk (Russia)

- Port of Novorossiysk is one of the largest European ports.
- Today NCSP, PJSC, is a multifunctional modern terminal with a wide range of cargo handled.
- UgleMetTrans provides full cycle cargo

Aerial view of the Port of Kaliningrad.

transshipment and storage services.
- In 2014, UgleMetTrans introduced and now successfully uses a coal transshipment technology by the 'railcar-board of a vessel' scheme, with railcar accumulation for a shipping lot on the route of Russian Railways, JSC, which has doubled the coal traffic through the Port of Novorossiysk.
- Draught: 11.7m.
- Shipping lot: up to 25,000 tonnes.
- Loading rate: 4,000tph (tonnes per hour).

Port of Kavkaz (Russia)

- The terminal specializes mainly in bulk cargo transshipment.
- Draught (berth/roads): 3.6m/17m.
- Storage capacity: 50,000 tonnes.
- Shipping lots (berth/roads): 5,000t/45,000 tonnes.
- Loading rate: 4,000tph.

Port of Temryuk (Russia)

- The terminal specializes in handling general cargo.
- Experience of arrangement of transshipment of large-diameter pipes under the South/Turkish stream project
- Draught: 4.8m.
- Shipping lot: up to 7,500 tonnes.
- Loading rate: 2,500tph.

Ports of Rostov-on-Don (Russia)

- The terminals specialize mainly in transshipment of coal, metal, scrap ferrous metals, etc.
- Draught: 4m.
- Storage capacity: 50,000 tonnes.
- Shipping lot: up to 5,000 tonnes.

Port of Kaliningrad (Russia)

The most western and the only nonfreezing Russian port on the Baltic Sea.

UgleMetTrans provides integrated forwarding for export coal cargo traffic through the berths of Kaliningrad Sea Commercial Port, JSC, including transit support for rail transportation through the territory of Belarus and Lithuania.

Coal transshipment can be arranged both through the warehouse and directly by 'railcar-board of a vessel' scheme with the accumulation of railcars on the port ways.

- Draught: 7.8m.
- Warehouse capacity: up to 30,000 tonnes.
- Storage: up to 30 days.
- Rate of loading from the warehouse: 5,000tph.
- Rate of loading directly 'railcar-board of a vessel, 2,500tph.

Ports of Kokkola, Pori and Valko (Finland)

A complex of transport and logistics services is provided, including arrangement of cargo delivery by rail from a Russian border station across Finland and transshipment in the ports of Kokkola, Pori (Tahkoluoto) and Valko (Loviisa).

Port of Kokkola

- Draught: 13m.
- Storage: up to 65 days.
- Storage capacity: up to 50,000 tonnes.
- Loading rate: 15,000 tonnes.

Port of Pori

- Draught: 15.3m.
- Storage: up to 30 days.
- Storage capacity: up to 50,000 tonnes.
- Loading rate: 15,000 tonnes.

Port of Valko

- Draught: 9.5m.
- Storage: up to 30 days.
- Storage capacity: 30,000 tonnes.
- Loading rate: 3,000 tonnes.

NORDEN invests in scrubbers ahead of new sulphur regulations

NORDEN has allocated US$54 million for installation of scrubbers on owned and long-term chartered vessels. These scrubbers will provide NORDEN with a significant competitive advantage when the new sulphur regulations are introduced in 2020.

On 1 January 2020, there is a significant deadline in international shipping. From this date, fuel emissions from vessels sailing the oceans are only allowed to have a maximum sulphur content of 0.5% replacing the former limit of 3.5%. This substantial reduction in harmful sulphur emissions results from years of intensive debates and will lead to significant changes in the shipping market and, especially, in relation to fuel for the vessels — known as bunkers.

Two options

Compliance with the new sulphur regulations may be done by switching to a new fuel with a lower sulphur content or by installing scrubbers that rinse exhaust gases. Over the course of 18 months, NORDEN has analysed both pros and cons in relation to both solutions.

"It is said that making predictions — especially about the future — is a difficult thing to do, and this is also true in this case," says Peter Grønsedt, from Business Analytics, who has headed the analyses.

"We have looked far and wide into this question and have also called in external expert advisors because this is indeed a complicated issue with many variables. Our analyses and available information suggest that installing scrubbers is a financially viable and very attractive solution," says Peter Grønsedt.

Substantially cheaper fuel

In future, only vessels with scrubbers on board are allowed to use HSFO — High Sulphur Fuel Oil. This provides these vessels with a financial advantage since HSFO is expected to be substantially cheaper than low sulphur fuels such as Marine Gas Oil, MGO, or other 0.5% fuels, which most vessels are expected to switch to in order to comply with the new regulations.

"Our calculations show that even based on a relatively conservative estimate of the price difference between HSFO and MGO, vessels with scrubbers could save approximately US$2,000 daily in fuel. That is a significant saving which will make vessels equipped with scrubbers clearly more competitive," says Grønsedt.

Supply and demand

A salient point in the calculation is fuel availability. Ninety per cent of the world fleet is expected to comply with the new sulphur regulations by switching to the much more expensive fuel MGO. It is therefore very likely that MGO will become the new standard and most widely available fuel but still very expensive due to the large demand. In contrast, HSFO, which has been the standard fuel so far, will see a significant drop in demand and may therefore not be available at all ports but, on the other hand, it is expected that this fuel type will continue to be significantly cheaper than MGO — an aspect which has been included in NORDEN's calculations.

"We believe that it will still be possible to tank up with HSFO sufficiently for the scrubbers to prove their worth. We may have to refuel a bit extra at the major maritime hubs and it may happen that we sometimes have to top up with some of the expensive MGO but not to an extent that will change the scrubber solution from being a very attractive investment," says Grønsedt.

The first scrubbers are expected to be installed and in use in the course of 2019.

Installation plan

So far, NORDEN has ordered 26 scrubber systems with the option of an additional five systems. The initial 26 systems are being installed on owned and long-term chartered vessels.

Two systems are installed on owned newbuildings.

Sixteen systems are installed on selected owned vessels in operation (retrofitted).

Eight systems are installed on long-term chartered tonnage being built until 2020.

Solid return expected

NORDEN expects that scrubbers will yield a return of minimum 25% within five years. The return results from significant savings in fuel costs as HSFO can be used in stead of MGO. The payback time is expected to be less than 2.5 years.

Washing out the sulphur

A scrubber acts like a sort of enlarged shower that washes out the sulphur particles from the exhaust gas by spraying it with water. The sulphur then binds to the water which can then be separated from the emissions in the funnel.

The sulphur can either be held in a separate container or discharged into the sea — that is either closed loop or open loop scrubbers. The impact on seawater by releasing the used water from the scrubbers into the sea has been examined by among others The Danish Environmental Protection Agency which has concluded that the overall impact is negligible for the marine environment.

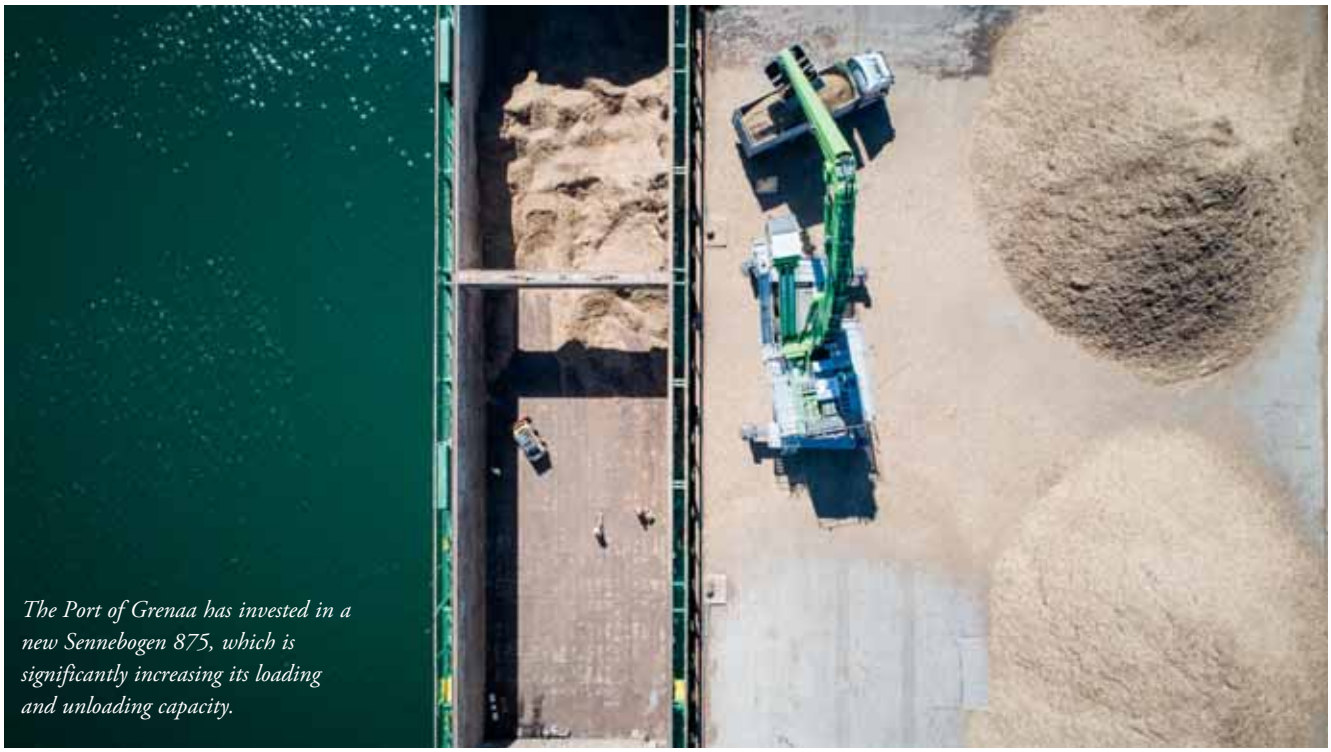
Important step towards cleaner air

The purpose of the new sulphur regulations is to improve air quality. With the limit of 0.5%, sulphur emissions from vessels will be significantly reduced which will lead to both great health and environmental improvements – especially for people living in coastal areas (source: IMO).

Fuel types

- **HSFO:** High Sulphur Fuel Oil — the fuel which most of the world fleet has been using so far. It contains up to 3.5% sulphur which is the limit until 1 January 2020. At a price of approximately US$400 per tonne, it is a relatively inexpensive fuel and available in large volumes.
- **MGO:** Marine Gas Oil — a refined oil product very similar to conventional diesel only somewhat thicker. It is relatively expensive at approximately US$700 per tonne. Unlike HSFO, it can be used without preheating.

The Port of Grenaa: Denmark's most central deep water port



The Port of Grenaa has invested in a new Sennebogen 875, which is significantly increasing its loading and unloading capacity.

Eco-friendly heavyweight – first of its kind in Denmark

New machine for materials handling saves energy, despite massively increased capacity. The Port of Grenaa significantly increases its loading and unloading capacity.

With the investment in a new machine for materials handling, as well as three new grabbers, the Port of Grenaa has significantly increased its loading and unloading capacity.

The new machine is a Sennebogen 875, which is both the largest and the first of this model to be delivered to Denmark.

"As the ships that dock in the Port of Grenaa are getting bigger and bigger, it is a necessity to be able to offer our clients an optimal solution. That is something we can do with the new machine, which can reach far further and deeper into the ships. It comes equipped with a 26-metre-long new type of jib and cylinders, which have increased the machine's loading capacity with as much as 45% compared to earlier," says Theis Gisselbæk, CCO at Port of Grenaa.

The additionally purchased grabbers for the Sennebogen 875 also add a significant capacity increase, as the grabbers are approximately 50% bigger than the current grabbers for the Sennebogen 860 machine.

Cylinder saves energy

The jib of the new materials handling machine comes with a so-called 'recover cylinder' that can add savings of up to 30% by absorbing the jib's energy when lowered, and releasing the energy again as the jib raises. This can be done without increasing the machine's diesel usage, meaning that this solution also contains a

financial and environmental profit.

The investment means that the Port of Grenaa in the future will be able to handle the primary product lines faster and more efficiently than with current machinery. A competitive advantage, especially within the bulk market, which the port is focussing on massively.

Other new exciting features of the new machine are:

- top modern operator cabin, from which all functions can be performed. The new operator cabin features, among other things, air-suspended operator seat with heating and ventilation that can be adjusted in relation to joystick and floor;
- the operator cabin is equipped with two seats, making room for training; and
- the cabin is mounted so that the crane operator reaches an eye level of 11 metres, adding a unique visibility of the loading/unloading area for safe operation.

Two new bulk warehouses, with a total capacity of 26,000m³, will strengthen the Port of Grenaa in its effort to get even more bulk in and out of the port.

Several new bulk warehouses – multiple opportunities

Two new bulk warehouses with a total capacity of 26,000m³ represent a strategic investment in a growing bulk market. The warehouses will strengthen the Port of Grenaa in its effort to get even more bulk in and out of the port.

"Bulk is a strategic focus and investment area for the Port of Grenaa, and the two new warehouses are in 100% compliance with the demands of the bulk market today. At the same time, we can take new bulk products into the port," says Gisselbæk, Business Developer at the Port of Grenaa.

The warehouses are dimensioned with the purpose of accommodating cargo from ships between 10,000dwt and 15,000dwt. This measure will increase the port's ability to bring grain and feed products, biomass in the form of wood pellets and vegetable products in the quay in Grenaa.

Strategic investment

"We are gearing up the port to handle this type of bulk because we are seeing an increasing demand in the area. The two new warehouses interact with other investments that enable us to handle bulk cargoes in an efficient manner. Our latest investment in a Sennebogen crane is part of the same strategic position," says Gisselbæk.

The two new warehouses will each be 2,000m² and will have a clearance of up to 13m. They are equipped with 4.6m of pressure-resistant sides and can accommodate up to 13,000m³ of bulk goods.

The warehouses are equipped with fire alarms and can supply all areas and meet the current demands.

The two warehouses are expected to be ready and commissioned in December 2018 and February 2019 and are already rented for long-term. At the same time, investigations will be initiated on additional warehouse capacity with the purpose of meeting the demands.

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New large storage area for wood chips and biomass — 10,500m² coated with SF coarse aggregate and supplied with concrete blocks for dividing the size as needed.

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