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Iron ore importers contribute an uplift

Recent indications of global commodity import demand in the twelve months ahead suggest that a cautiously optimistic outlook is still justified. After last year's pick up in the growth rate, world seaborne dry bulk trade seems set to continue expanding firmly in 2018, although there are doubts about quite how strong this advance will prove.

Most current forecasts of global economic output point to a further improvement this year. However, while average GDP growth for the world as a whole could rise, several individual economies which are key dry bulk importers may see reduced increases. Based on the latest IMF estimates for 2018, China, Japan and the European Union are unlikely to repeat last year's economic growth achievements.

Iron ore

One major contributor to dry bulk trade expansion during 2017 was iron ore, which saw an increase of around 4%, according to provisional estimates. While a large proportion of the incremental volume consisted of China's additional imports, there were positive changes among other countries.

An exception to the general pattern over the past twelve months was Japan's iron ore imports, which declined by 3% to 127mt (million tonnes). Elsewhere imports into the EU, South Korea, Taiwan and several smaller importing countries rose, boosted by stronger steel output. China's extra 51mt, raising annual iron ore imports to 1075mt, was the largest contribution. During 2018, the upwards trend could be sustained.

Coal

As more complete information on world seaborne coal trade over the whole of last year emerges, it seems that growth was faster than earlier signs indicated. Expansion may have been in the 5–6% range, according to some estimates. If that calculation proves accurate, it will be a remarkable upsurge after previous weakness.

Uncertainty about coal trade both in the short term and further ahead remains valid, given environmental pressures. Nevertheless, imports into many countries, especially in Asia are still growing and are likely to continue expanding. Analysts at Klaveness Research estimate that among rises in 2017 India's imports rose by 2% to 197mt, while a group of Asian emerging economies — Malaysia, Vietnam, Philippines, Pakistan and Bangladesh — saw a 26% increase to 82mt.

Grain

Changing patterns in world grain trade are clearly visible, amid evolving slight growth in the total annual volume. During the current 2017/18 crop year ending June, exports from the USA and Australia are expected to be much lower, contrasting with upturns in Argentina and Brazil, accompanied by strong expansion in Russia's exports, as reflected in the figures shown in table 1.

Updated International Grains Council forecasts published last month show a 2% rise in global wheat plus coarse grains trade within the present crop year.

Changes predicted among importers are limited, but variations among exporters are likely to be more noticeable. The recovery in Brazil's corn production, leading to exports jumping by well over 20mt, to 34mt in 2017/18 from 13mt in the preceding year is especially prominent. Russia's good harvest could raise grain exports by 25%, to 45mt.

Minor bulks

Positive influences were seen in the minor bulk trades sector during the past year and some are expected to persist, resulting in further growth. Global seaborne movements of bauxite and alumina are an example. These are estimated to have totalled 130mt in 2017, a 14% increase. Forest products trade also appears to be strengthening.

Bulk carrier fleet

The deadweight carrying capacity of the world bulk carrier fleet grew by about 3% to 817 million deadweight tonnes at the end of 2017, according to Clarksons Research and is expected to see a further enlargement of around 2% this year, as shown in table 2. It seems certain that newbuilding deliveries will fall sharply in 2018, but scrapping also may be much lower.

TABLE 1: MAJOR GRAIN EXPORTING AREAS (MILLION TONNES)

	Wheat and coarse grains, crop years ending June					
	12/13	13/14	14/15	15/16	16/17	17/18*
North America	73.2	106.6	108.2	102.9	122.2	109.1
South America	63.4	41.0	49.1	67.7	51.8	77.8
Black Sea	45.9	66.4	70.9	82.2	88.3	93.5
EU	28.3	40.0	48.1	46.9	34.6	32.2
Australia	27.2	25.6	23.5	22.0	31.9	26.2

source: International Grains Council **forecast, 22 February 2018*

TABLE 2: WORLD BULK CARRIER FLEET (MILLION DEADWEIGHT TONNES)

	2013	2014	2015	2016	2017	2018*
Newbuilding deliveries	63.0	48.2	49.3	47.2	38.4	26.0
Scrapping	23.2	16.4	30.7	29.2	14.5	8.0
Losses	0.5	0.1	0.2	0.2	0.3	0.2
Other adjustments/conversions	0.3	0.1	-0.6	-0.6	0.0	0.0
Net change in fleet	39.6	31.8	17.8	17.2	23.6	17.8
Fleet at end of year	**727.1**	**758.9**	**776.7**	**793.9**	**817.5**	**835.3**
% growth from previous year		4.4	2.3	2.2	3.0	2.2

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

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

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China's growth boosts trade in dry bulks

Another vigorous expansion in China's dry bulk imports last year assisted the wider revival of global seaborne trade in these commodities. Growth of volumes into China during 2017 matched the previous year's 7% increase. Additional iron ore, coal, soyabeans and bauxite purchases were especially notable.

Global trade is greatly affected when there are large changes in China's import volumes, which comprise about one-third of all world seaborne dry bulk commodity movements. The proportion is higher for some individual commodities. In the iron ore segment, Chinese imports of well over one billion tonnes annually are by far the biggest component, comprising over 70% of the world total.

A question naturally arising is: how will this pattern evolve over the year ahead? Some further growth in 2018 is a realistic possibility. But it seems unlikely that the upward trend will continue quite as strongly as seen in the past twelve months. Slackening, albeit moderately, of economic activity generally in China could act as a restraint, while various government policy measures related to environmental pressures also may have a restraining impact.

The brisk economic performance last year exceeded most expectations and solidly underpinned commodity consumption. Gross Domestic Product, representing goods and services output, grew by 6.8% in China last year, marginally faster than the previous year's rise. The latest (mid-January) International Monetary Fund report suggests that a slowing trend is likely to resume in 2018, when 6.6% is estimated.

Slowing economic activity is a clear intention of the Chinese government. Rebalancing the economy away from manufacturing towards services is a long-term aim. But improving the environment is a more urgent necessity, and has been reflected in policy changes, particularly those designed to improve air quality. These influences are having effects, mainly negative, on commodity consumption and imports.

Buoyant iron ore imports

Doubts about whether China's iron ore imports growth in the past twelve months could maintain the previous year's 7% rate of expansion proved justifiable. The upwards trend slowed, but this trade is so enormous that even a slower enlargement still adds a huge volume of cargo movements.

During 2017 the total expanded by 5%, representing an additional 51mt (million tonnes), raising the annual volume to 1075mt, most of which is seaborne. One support was the 2% rise in pig iron production at blast furnace mills, amid a strong steel consumption trend. Iron ore stocks at ports also increased, and there was continued replacement of lower-grade domestic ore output with higher-quality foreign supplies.

Forecasts point to potential for China to import a higher iron ore volume this year. Further switching towards the international market, where the superior grade material is less polluting than domestic ore, is seen as a positive aspect. However, steel production could level off or decrease if domestic demand slackens, while the port stockpiles may be reduced, implying possible negative influences as well.

Strengthening coal imports

Given the extent of uncertainties surrounding China's coal market, it was remarkable that the imports trend in the past twelve months remained positive. After rebounding very strongly in the preceding year, there was a more measured increase.

When low-quality lignite is included, the 2017 coal imports total was 15mt or 6% higher, at 271mt. But this volume includes shipments carried overland from Mongolia, which reportedly rose by more than a quarter, and therefore the growth rate for seaborne movements was below the headline overall rise.

Despite shifts in China's energy market towards cleaner fuels and renewable energy, coal is likely to remain the dominant energy source for many years. In the immediate future, during 2018, several aspects are difficult to predict because government policy changes are influential. Closure of smaller, less efficient domestic mines and safety inspections have limited output, a plus for import demand. Conversely, boosting gas usage, and additional hydro-power and wind generation, is a minus factor.

Higher grain and soya purchases

Supportive influences resulted in higher imports of both grain and soya into China last year. The volume of wheat, corn, barley, sorghum and other coarse grains received increased by 3mt (16%) to reach over 21mt. Soyabeans (meal imports are minimal) received rose by 12mt to 96mt.

Although domestic soyabeans output has been rising, it supplies a limited part of the market, which is still enlarging. Meal and oil consumption in livestock feed and food manufacturing continues to expand. Consequently, imports in 2018 may rise again.

Prospects for China's wheat and coarse grains imports are more complex. Possible changes in domestic production and stocks are likely to have a big impact. Excessive corn stocks have accumulated in recent years, and the government's policy aims to reduce these, implying adverse effects on feedgrain imports.

Positive changes in other commodities

Among other dry bulk commodity imports into China are forest products, steel products, fertilizers, various ores and minerals and some agricultural bulks such as sugar. This broad category apparently totalled over 290mt last year, a huge volume.

Changes in such a varied category are often mixed in magnitude and direction. Two of the largest elements are shown in the table. Bauxite/alumina imports totalled 72mt in 2017, a 30% rise. Nickel ore volumes were up by 10%, at 35mt.

Richard Scott

CHINA'S IMPORTS OF MAIN DRY BULK IMPORTS (MILLION TONNES)

	2013	2014	2015	2016	2017	% change**
Coal*	327.2	291.6	204.2	255.7	271.1	+6.0
Iron ore	820.3	933.1	953.4	1024.7	1075.4	+4.9
Soyabeans	63.4	71.4	81.7	83.2	95.5	+14.8
Grain	12.3	16.9	29.3	18.4	21.4	+16.3
Bauxite/alumina	75.4	41.8	60.8	55.1	71.6	+29.9
Nickel ore	71.2	47.7	35.2	31.9	35.0	+9.7

source: China Customs, USDA, BSA **coal includes lignite* *** 2017 compared with previous year*

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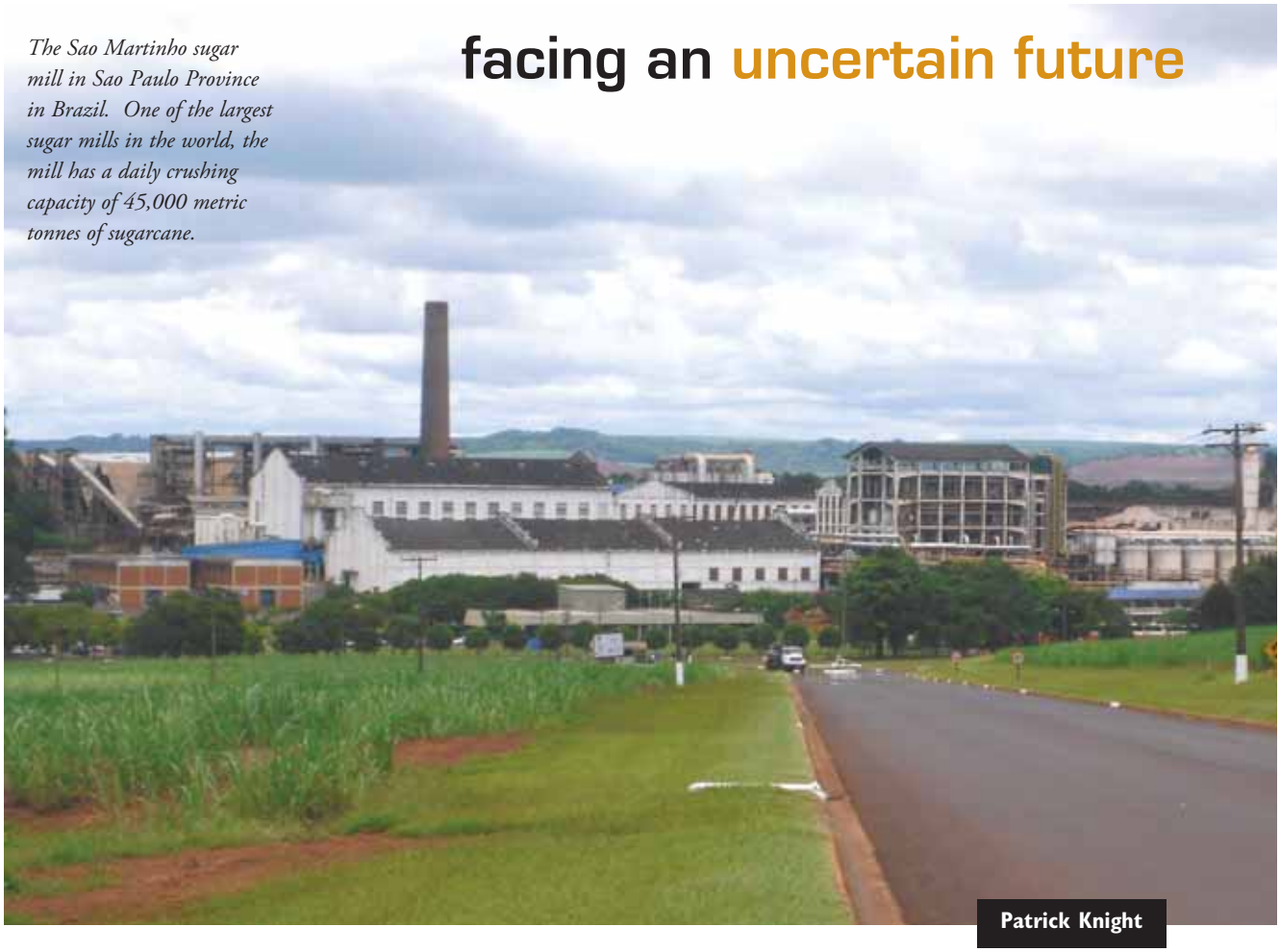


The Sao Martinho sugar mill in Sao Paulo Province in Brazil. One of the largest sugar mills in the world, the mill has a daily crushing capacity of 45,000 metric tonnes of sugarcane.

Patrick Knight

Brazil's sugar industry has many challenges ahead

With the world's largest debts, Brazil's deeply indebted sugar industry, the world's largest, faces an uncertain future.

With Brazil's 366 sugar mills now in debt to the tune of about $30 billion, more than the industry's annual revenues, companies have cut back on key investments at mills and in the cane fields. The average plantation is now 14 years old, so productivity is plummeting. Sixty mills have closed in the past 15 years, and a further 30 have suspended payments to creditors.

The world sugar price is low at the moment, so mills are giving preference to ethanol rather than sugar. Up to 3mt (million tonnes) less of the sweetener will be produced this year than the 38.5mt of 2017 and exports will fall by that amount this year.

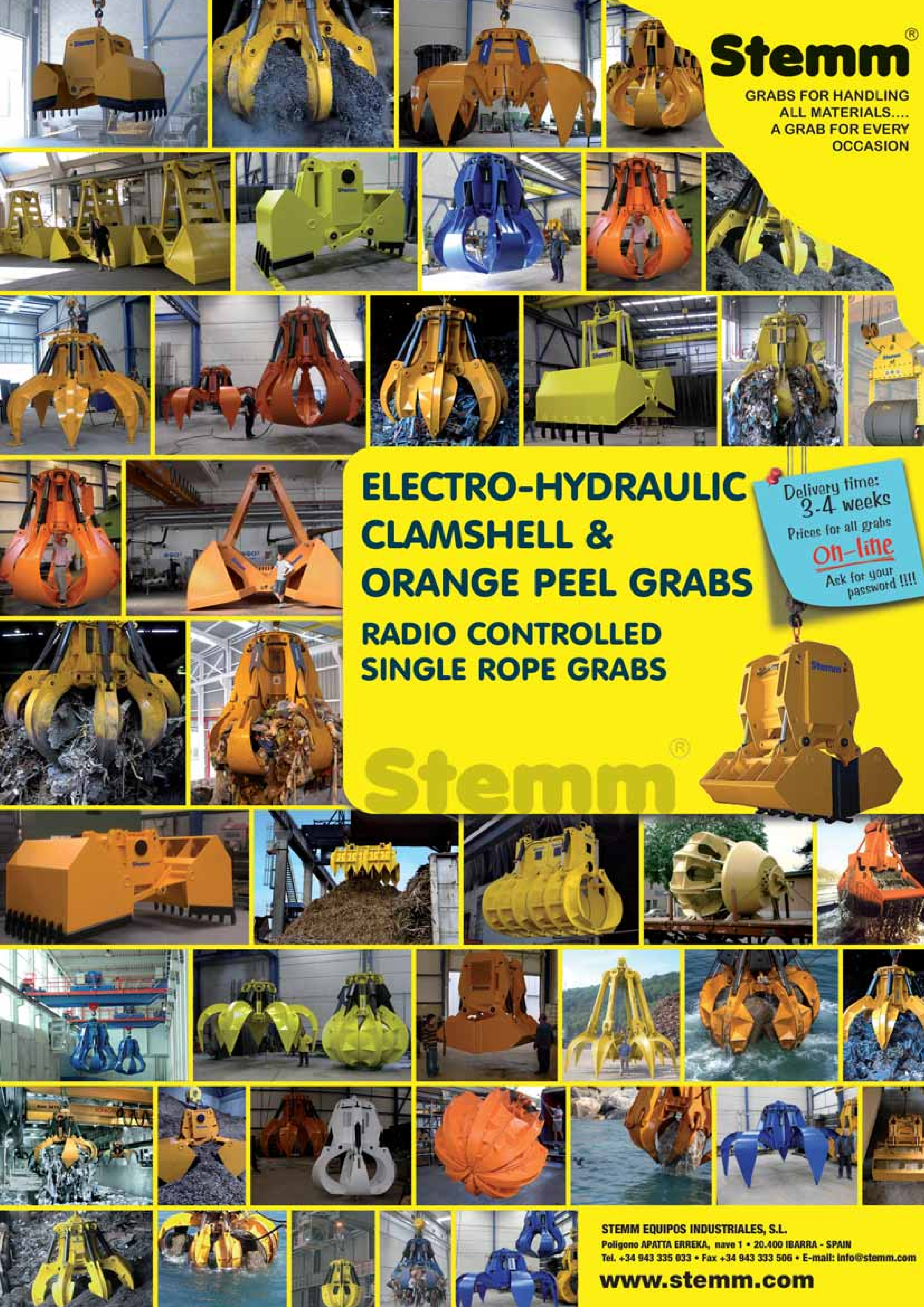
Brazil's giant sugar industry, by far the world's largest, and which exported 29mt of sugar in 2017, 40% of the total traded, has long been used to major change. For most of its long history, sugar was dominant, but on several occasions in the past 30 years, ethanol has proved more popular, as is the case now.

In the past couple of years, less than half of the 750mt of cane produced — 90% of it in the centre south of the country — has been made into sugar. The majority of the cane is now being refined into ethanol, and most is used to fuel the country's 30 million cars — some pure, some blended with gasolene. A new source of income for most of the 200 new mills built between 2003–2008 is the sale of electricity. Virtually all of the new mills incorporated high pressure boilers, which make better use of the sugar cane waste, produced when the cane is crushed. Such boilers have been added at many older mills as well.

Most of the sugar produced in Brazil is of the high quality 'crystal' variety, which needs little further processing before it can be classified as 'refined'. Brazil's 'crystal' is exported to about 80 countries, a list headed last year by India, the world's second-largest producing country. India is sometimes obliged to import some sugar, to meet contract commitments.

Most customers are in third world countries, such as Algeria, Morocco, Indonesia as well as China. Little is exported to Europe, where sugar is produced from sugar beet. Much of Brazil's 'crystal' sugar is refined in oil-producing countries, notably in the Middle East. Cheap fuel allows processing to be done far more cheaply there than it can in most sugar-producing countries, but this makes trading patterns complex.

Until the 1980s, Brazil exported only about 2mt of sugar each year, most of it made from cane grown in the north east of the country. It was exported from ports in the states of Alagoas and Pernambuco.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However, since then, cane has increasingly been planted in the mainly flat centre south. Three quarters of the sugar made in the centre south, is exported from the port of Santos, with Paranagua handling 18%. Only 4% of the total now leaves from Maceo, in the north east.

Unusually in a country where 90% of all goods are moved by road, virtually all the sugar exported from Santos travels to the port by train, a distance of 300–600km. A fleet of specialist hopper wagons has been built, and new storage and loading facilities built at ports.

Until the late 1970s, virtually all Brazil's cane was refined into sugar, with only a small proportion of it made into ethanol. The majority was used to make beverages, or for medicinal purposes. At that time, Brazil imported virtually all of the oil used by its small, but fast-growing. fleet of motor vehicles. But a war in the Middle East caused the price of oil to shoot up, to the point that imports of crude cost Brazil as much as all its exports earned. This provoked a major crisis and the government turned to the sugar industry to solve it.

Dozens of new refineries able to make ethanol were built, most of them attached to existing sugar mills, some standing alone, while the area planted to cane shot up. The motor industry developed a new range of cars equipped with engines designed to run on 100% ethanol. Such vehicles were not taxed, nor was the fuel, so sales of alcohol-powered cars soon exceeded those of cars fitted with gasoline engines. However, this state of affairs did not last long. The oil price fell and Brazil broadened its range of exports, notably that of soya beans and meal, but also of meat and market pulp. Most important of all, substantial reserves of oil were found in Brazil, mainly offshore, from the early 1970s on.

Subsidies on ethanol were first cut, then withdrawn entirely, while the popularity of vehicles using ethanol declined. Ethanol is very corrosive, so fuel systems were damaged, and fuel tanks leaked, which irritated motorists. By that time, however, world demand for sugar was increasing and has continued to grow by about 2% a year, so mills switched back to sugar. Brazil soon became the world's leading sugar exporter, at its peak, being responsible for more than half of all the sugar traded worldwide.

If subsequent rises in the price of crude oil caused by hostilities in the Middle East did not affect Brazil, fast becoming a major oil producer, it also brought opportunities for the sugar industry, convinced that exporting ethanol had a great potential.

Sugar cane growing.

The United States was already making ethanol fuel from maize, a far more costly process than making it from sugar cane, and Brazil started exporting cheaper ethanol to there. A big mill building programme was started, with the latest generation of mills able to process 2mt of cane a year. The area planted to cane doubled, with plantations spreading further to the west. Pipelines were built to take ethanol from the mills to cities and ports. The motor industry had developed a new generation of 'flex' engines, which could run on either gasoline, pure ethanol, or any blend of the two. Sensors allowed ignition systems to adjust to whatever was in the tank, so the domestic market for ethanol grew strongly again.

Until very recently, the price of fossil fuels had been held below the world price in Brazil, in a misguided attempt to reduce inflation, always a big problem there. Subsidies for fossil fuels meant ethanol was far less profitable than sugar, so in some years, mills channelled close to 60% of all the cane to making sugar, the maximum share possible.

Due mainly to bad mismanagement, the Brazilian economy has experienced four years of crisis, while the state-owned oil company, Petrobras, was involved in a major corruption crisis, which brought it close to financial collapse. To save Petrobras, subsidies for fossil fuels were scrapped, with the result that the price of gasoline and diesel rose to the point that ethanol became much more competitive once again. In the past two years, mills have devoted up to 60% of the cane to making ethanol fuel. But a new challenge now looms — electric vehicles. None are yet made in Brazil, but imports have begun and it seems unlikely that Brazil will buck the worldwide trend to switching from Otto cycle engines, whatever fuel they use, to electric ones.

Brazil is unusual that the great majority of its electricity is generated at large hydroelectric power stations. Numerous gas-fired stations have also been built, to guarantee power when supplies of hydroelectricity are reduced by drought. An increasing number of wind and solar power plants have also been built, as weather conditions in Brazil are ideal for both. In such a scenario, what is the future for ethanol, and for the country's sugar industry as a whole? Some suggest that Brazil's unique experience with ethanol, could allow the country to ignore the expected growth in electric vehicles and concentrate on ethanol. But this point of view does not extend to the sugar industry's main body Unica, which, backed by the government, is drawing up a 'National Plan for Biofuels' .

One suggestion is that ethanol could be used to generate the extra electricity which will be needed to charge the millions of batteries which will be used in future. For the time being, the world population is growing fast enough to mean a fall in demand for sugar because of the spectre of obesity, is not a problem, although it could become one. It all means that Brazil's sugar industry, which has adapted to numerous major changes in its long life, will face more challenges ahead. DCi

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Global grain trades

Telestack's TB52 radial telescopic conveyor loading grain onto a coaster vessel from a fixed plinth for Trans-Oil based in Moldova.

Maria Cappuccio

Ample supplies to limit upside price potential in 2018

In the latest assessment of the global economy the International Monetary Fund (IMF) confirmed that last year, more trade, investment and faster-than-expected growth in China and most of the G7 countries, which is to remain stable over the next few years, should help boost demand. The IMF raised its growth forecasts for the global economy to 3.9 percent for 2018 and 2019, the strongest expansion since 2011.

In global grain and oilseed markets, production has outpaced consumption for many grains and oilseeds over the last four years. Overall trends for the three major crops in 2018/19, point to only a modest decline in wheat production with potentially larger output for coarse grains and soybeans. The combination of rising wheat stocks, relative to use, approaching record highs-and continuing large global production, is expected to limit upside potential for prices although an uptick in demand is expected relative to production in the new season. Longer-term the USDA projects a moderate rise in prices, reflecting growth in global demand for agricultural products and continued biofuel feedstock demand.

Wheat output forecast lower in 2018

The International Grains Council (IGC) forecast a reduction in the global wheat area to 217.9/ha the lowest in six years, due to unfavourable weather conditions, experienced in India, Morocco, Russia and parts of the EU only partially offset by increased plantings in the US and Canada, with global wheat output projected at 741mt (million tonnes), still a substantial crop, albeit some16mt below last year.

GLOBAL WHEAT PRODUCTION 2014–2018 (MT)

	2014	2015	2016	2017	2018
Europe	161	164	150	156	146
EU	157	160	145	152	142
Eastern Europe	4	4	5	4	4
CIS Baltics	112	118	131	141	133
Russia	59	61	73	85	77
Ukraine	25	27	27	27	25
N &C America	88	87	98	81	84
US	55	56	63	47	50
Canada	29	28	32	30	30
South America	25	22	29	25	26
Argentina	14	11	18	18	18
N East Asia	35	43	40	43	45
Turkey	15	20	17	21	21
Far East Asia	258	252	251	265	260
China	126	130	129	130	130
Africa	25	26	21	25	24
North Africa	17	20	14	18	16
Australia	24	22	30	22	23
Total	728	735	750	758	741

Source IGC, USDA, UN trade — totals may not add due to rounding

North American wheat acreage to expand

With winter wheat seedings for 2018 essentially flat, current price strength in spring wheat suggests some expanded area in the Northern Plains, with the domestic harvest forecast at 50mt. Recognizing some considerable setback from the dry conditions affecting winter wheat crops in major growing areas in the southern Plains, with wheat prices to rise modestly to $4.70/bu and slightly above last year. Canadian plantings are also anticipated to rise helped by a more competitive currency

EU wheat output projected lower

Several parts of Europe recorded a rain deficit this year, but this does not represent an immediate concern for crops according to the EU's Monitoring Agricultural Resources (Mars), but the possibility of a cold-snap and a plunge in temperatures below –12° Celsius may threaten large parts of Europe where crops have not acclimatized sufficiently, particularly in Hungary, Romania, Bulgaria and the Iberian Peninsula. EU winter wheat crop is forecast lower at 142mt.

Fewer plantings, scant rainfall to reduce India's wheat crop

India's wheat crop is forecast to fall to 92mt in 2018. Fewer plantings and lack of adequate rain is expected to cut India's wheat output to 92mt in 2018/19 with imports expected to double to 4mt according to the IGC.

Rise in wheat plantings buoyed by exports

Argentina's wheat plantings are expected to rise in 2018/19 buoyed by a record export campaign. On the back of a large wheat harvest, low-priced Argentine supplies are challenging US exports not only in Brazil and Central and South American but also in other markets including, Sub-Saharan Africa and Southeast Asia.

GLOBAL WHEAT SUPPLY & DEMAND 2014–2018/19 (MT)

	2014/15	2015/16	2016/17	2017/18
Production	728	735	750	758
Consumption	705	712	739	745
Trade	162	172	182	184
Stocks	218	242	253	266
China	76	97	111	127
Major exporter stocks*	65	64	70	71

Source: IGC, FAO, USDA-Production-mainly harvested Jul-Dec/Local marketing years
**Argentina, Australia, Canada, US, EU, Kazakhstan, Russia, Ukraine*

Record wheat crop boosts supplies

Boosted by a huge crop in Russia, India and better crops in the EU and Turkey offset the steep fall in US production, with global wheat output forecast at a record 758mt in 2017/18.

Strong global growth propels trade to 184mt

Consumption growth especially for food/industry and feed in developing countries has pushed global trade to a record 184mt, the top importers for wheat in 2017/18 include, Indonesia, Egypt, Iraq, Bangladesh and the US. In the current marketing year, Indonesia has surpassed Egypt as the largest single wheat buyer. Imports are forecast to rise by 2.5mt to 12.5mt, mostly in response to growing food and feed needs as population/incomes rise, and diets move towards western trends for bread, noodles, poultry and aquaculture products. Additionally, importing low-quality milling wheat for use in feed rations, helps feed millers circumvent the government's ban on imports of corn and feed wheat.

Black Sea wheat dominates trade

Russia and other Black Sea countries continue to dominate global trade with offers $50–60/t below their rivals and increasing market share at the expense of other major exporters. Russian wheat exports are forecast at 36mt in 2017/18 and together with the Ukraine 17mt and Kazakhstan 7.5mt, Black Sea exports total almost 61mt, one-third of the global wheat trade. Record wheat production, better infrastructure and transportation subsidies have improved Russia's competitive edge, reflected in Egypt's GASC tender (2 February 2018) for 180,000/t wheat at prices $202–204/t FOB (free on board) basis.

Drought in Argentina and in the southern US Plains, robust export demand contributed to price gains in some countries. CBOT (Chicago Board of Trade) May 2018 wheat contract closed up at $4.642/bu ($170.55/t), Paris May contract milling wheat E164.50/t ($202.24), UK May contract feed wheat £139.25/t ($194.50/t) (23 February 2017)

Larger corn, barley and sorghum in 2018/19

USDA forecast a modest increase in US corn plantings c.90m/acres and a crop of c.366mt with pressure from soybeans expected to impact corn and other soybean acreage and with a rebound in South America's, likely to boost the global corn output higher in 2018/19. For other coarse grains, barley and sorghum lower inventories and improved profitability point to above-average global harvest. US corn output due to lower yields is anticipated to fall to c.366mt, with a small increase in domestic consumption and fewer exports of 48mt, US corn stocks are expected to close down to 58mt.

COARSE GRAIN SUPPLY & DEMAND 2014–2017/18 (MT)

Production	**1,283**	**1,312**	**1,260**	**1,366**	**1,322**
Consumption	1,236	1,277	1,255	1,356	1,355
Trade	165	174	185	182	190
Stocks	212	247	253	263	230
China stocks[1]	83	101	111	101	80
M. exporters – C grains*	78	88	84	107	101
Major corn exporters	48	56	54	77	64-76

*Source: USDA -*Argentine, Australia, Brazil, Canada, EU, Russia, Ukraine, US*

[1]The IGC in January raised their estimate of China's corn stocks from 76.2mt to 190.6mt by the end of 2017/18

Demand for coarse grains outpaces supply in 2017/18

The global coarse grain harvest is forecast at 1.32bn/t in 2017/18, some 42mt below last season, due to a reduced corn crop and smaller barley and sorghum output. Overall demand is expected to outpace supply for the first time in five years. While food/industry use is expected to contract by over 17mt to 539mt, demand for feed use expected to rise in several regions by16mt to 816mt, with global trade forecast at a record 190mt.

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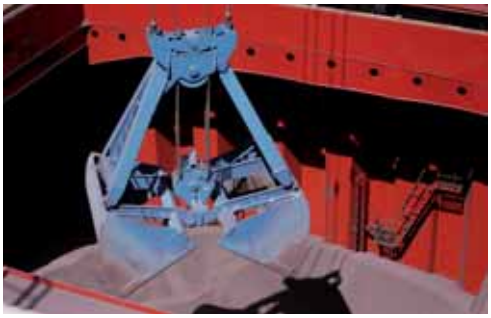

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Corn output drops in major exporters

Global corn production is forecast lower at 1.042bn/t down by 34mt in 2017/18 from last season. Lower crops in the US 371mt, Ukraine 24mt, China 216mt and a significant fall in South America, while drought conditions have sharply cut corn output in Argentina from 42mt to c.35–37mt, with some estimates as low as 30mt. In Brazil the safrinha corn crop, which usually powers exports, handicapped by harvest overrun and dry weather in the south-preliminary crop estimates have been revised down c.88mt.

GLOBAL PRODUCTION OF MAJOR OILSEEDS 2014–2017/18 (MT)

Oilseeds	2013/14	2014/15	2015/16	2016/17	2017/18
Production	504	538	522	575	579
Soybean	*283*	*320*	*314*	*351*	*347*
Trade	134	147	153	170	176
Crush	420	441	446	471	487
Meal use	279	294	304	318	331
Oil use	167	172	178	184	191
Stocks	79	93	91	108	110
Soybean	*66*	*78*	*78*	*96*	*98*
US	*3*	*5*	*5*	*8*	*13*
*S.America**	*41*	*51*	*50*	*61*	*58*

*Source: *Brazil and Argentina; USDA/Meal use excl. fishmeal c.5mt*

Corn demand outpaces supply

Strong demand for corn at 1.068bn/t, is set to outpace supply by 42mt, while food and industry use is expected to contract by over 11mt to 418mt; feed use is expected to rise by almost 19mt to 651mt, especially in China, US, Mexico, Egypt, Vietnam, Saudi Arabia and several other countries, boosting global trade, to rise by 10mt to 152mt in 2017/18. With the downturn in South American crops, prices are expected to remain competitive. Brisk sales of US corn lifted exports to 52mt, while Argentina expects to export near 27mt, Brazil 34mt and Ukraine 20mt.

Lower corn stocks in major exporters

Global corn stocks expected to fall for the first time in seven years to 230mt mostly in China as it continues to dismantle the mountain of corn stocks. The IGC made an upward revision in January to China's corn stocks from over 76mt to almost 191mt, by the end of 2017/18. Excluding China, corn stocks held in the major exporting countries are forecast at 76mt and much lower if estimates for South America are confirmed.

Rising demand and smaller supplies than anticipated strengthened corn prices to a record high in export markets — corn US 3YC FOB (Gulf) $177/t (26 February 2018) and on Futures Markets CBOT May Corn contract closed up at $3.762/bu (26 February 2018).

Robust demand supports upturn in barley

Firm demand in Saudi Arabia, Iran, Japan and China and with barley prices, unusually above those for corn for some time, global barley output is expected to rise in 2018/19 in the EU, Canada, CIS countries and Australia.

Reduced output in 2017/18 in the major producers, partially offset by larger Russian and Moroccan crops, cut the global barley crop to 142mt. Fewer imports into China 6.5mt, Iran 1.9mt, modest increase in Saudi Arabia 8.5mt reduced global trade to 27mt, with stocks forecast at a record low of 18mt. Saudi Arabia's state grain buyer (Sago), purchased 960,000/t of barley at an average price of $243.47/t from Australia, North/South America, the EU and the Black Sea.

Sorghum output to rise in 2018/19

Global sorghum crop to expand supported by demand and firm prices, that continue, like barley, to be at a significant premium to corn. Smaller crops in the US, Sudan and Nigeria, reduced output to 9mt in 2017/18, with consumption down to 59mt, mostly in the US and Sudan. Trade increased to over 8mt, on increased exports to China 6mt, with stocks reduced to 4mt. Prices strengthened at export ports-Sorghum FOB Nola (April) $204.61/t, (23 February 2018)

US soybean acreage to rise in 2018/19

With a slew of new estimates USDA forecasts soybean acreage at 90m/acres (89.5m/acres harvested), crop output at 118mt (4.320m/bu), stocks by the end of

2018/19 expected to rise from 9mt to 12.5mt (460m/bu) and slightly lower prices $9.25/bu for next season, with large US stocks expected to hold prices in check. According to Todd Hubbs Dept. of Agricultural and Consumer Economics Illinois, unless a significant increase in soybean consumption (higher exports and strong crush levels) or, a fall in output occurs, then a drop in soybean prices $9–9.20/bu is unavoidable. Longer term, USDA expects the US soybean area to match or exceed the corn area for much of the next decade supported by import demand from China, the expansion of trade in soybeans, to continue to put pressure on corn, but more likely on other crop areas too.

China to import 100mt soybean in 2018/19

Rising global demand, along with a decline in the South American harvest, is expected to ease competitive pressures in the current season; although a rebound in South American output will likely support increased exports in 2018/19. Global trade will be driven by China, imports expected to exceed 100mt, with continued demand growth in the rest of Asia, Middle East and North Africa.

Global soybean crop lower in 2017/18

USDA forecast global oilseed production for 2017/18 at 579mt, a slightly lower soybean output 347mt and sunflower seed partly offset by higher output for cottonseed, ground-nuts, palm kernel, rapeseed and copra. Strong demand for soybeans in China, Japan, Thailand, Pakistan, Egypt and Mexico expected to boost trade above176mt in 2017/18, with a rise in crushings on robust demand for meal for feed use. Stocks are forecast to fall by the end of 2017/18.

Sharp fall in Argentina's soybean output in 2017/18

Record soybean crops for the US 120mt and Brazil 118mt, but drought in Argentina — the worst in ten years — is expected to slash output. The Rosario Grains Exchange revised its forecast to 46.5mt while private analysts peg the crop as low as 40mt well below USDA's 54mt; sunflower seed output is also expected to be adversely affected. Elsewhere, soybean forecast are lower for Paraguay, Bolivia, India and Ukraine.

Drought supports soaring meal values

Argentina is the largest producer and exporter of soybean meal/oil on the global market, the persistent drought and the declining crop conditions since the beginning of February, strengthened values on CBOT Futures market — SBM May 2018 contract closed up at $380.6/t (Feb 22'18). Soybean meal trade forecast to expand in 2018/19, with lower exports anticipated from Argentina and some other countries, US exports are forecast to rise from 11mt to 12.4mt in 2018/19.

Global oilseed crushings have increased with meal production to rise to 334mt in 2017/18, supported by strong demand for proteins in several countries. Despite a period of oversupply and low prices the prospect of a growing world population, nearing eight billion-expected to drive demand for proteins, like meal-fed beef, pork and aquaculture products, and remains attractive to companies like ADM, who are considering the takeover of longtime rival and major player in the global oilseeds sector Bunge Ltd. The deal, estimated at $16bn, to have enormous implications for the global agricultural industry.

SOYBEANS MAJOR PRODUCERS 2014-2017/18 MT

Countries	2013/14	2014/15	2015/16	2016/17	2017/18
US	91	107	107	117	120
Brazil	87	97	97	114	112-118
Argentina	53	61	57	58	40-54
China	12	12	12	13	14
India	10	9	7	12	10
Paraguay	8	8	9	11	9
Canada	5	6	6	7	8
Others	16	19	19	21	21
Total	283	320	314	351	334-354

Source: USDA

SOYBEAN & SOYBEAN MEAL-MAJOR IMPORTERS 2015-2017/18MT

	Soybeans			Soybean meal		
	2015/16	2016/17	2017/18	2015/16	2016/17	2017/18
EU	15	13	14	19	19	19
Asia	98	109	113	20	19	21
China	83	93	97	—	—	—
S &C America	2	3	3	6	6	6
N. America	5	5	5	4	3	4
Mexico	4	4	4	2	2	2
MidEast/Africa	9	8	9	8	8	9
Others	5	5	6	4	4	4
Total	133	144	150	62	60	63

Source: USDA

MAJOR OILSEEDS, MEAL & OIL SUPPLY/DEMAND 2017/18 (MT)

	Oilseeds				Meal		
	Prod	Trade	Crush	Stocks	Prod	Trade	Use
Soybeans	347	150	300	98	237	67	233
Sunseed	46	2	42	2	19	7	19
Rapeseed	70	17	70	6	40	6	40
Copra	6	*	5	*	2	1	2
Palm kernel	19	*	18	*	10	7	10
Peanuts	44	4	18	3	7	*	7
Cottonseed	45	1	33	2	15	*	15
Total	579	176	487	110	334	91	331

*USDA: *less than 500,000/t. Meal totals excl. fishmeal*

Combating piracy with innovative barriers from Guardian Maritime

Before installation of the Guardian Maritime barrier.

During installation.

After installation (and below).

Piracy at sea has been a problem for hundreds of years. In recent years, it has extended far off the Somali coast, into the Indian Ocean and is now escalating on the West Coast of Africa, Indonesia and Central America.

To present-day shipping companies piracy is a major concern and expense — so it is no surprise that there has been a lot of interest in the development of vessel protection.

Guardian Maritime Limited has developed a new and deceptively simple solution to the problem of unwanted boarding under sail, at anchor or in port.

Unlike razor wire the GUARDIAN™ units are quick, simple and safe to install.

The GUARDIAN™ ship protection system is a BMP 4-compliant installation which forms part of a vessel's layered defence system. It provides worldwide 24/7 protection against stowaways, robbery and piracy for vessels, crew and cargo at sea, anchor or in port

Guardian Maritime is totally committed to providing a world class service, and its solution is a fit-and-forget passive sustainable, recyclable anti-piracy barrier system.

Guardian Maritime celebrates fifth anniversary of its anti-piracy barrier

The founders of Guardian Maritime Ltd, Teresa and David Stevens, are very excited to have now passed the five-year marker on the first ship installed with the Guardian system. On 20 June 2012, the *CMA CGM Bellini* became the first commercial vessel to have the Guardian system installed on her lower poop deck.

This was a bold step by CMA CGM to combat the dangers of piracy and has paid off, giving substantial savings and resulting in no replacements having to be supplied. Both Maersk Line and CMA CGM have now had Guardian systems protecting their container vessels for over five years. As the original claim by Guardian was that the system was warranted for five years there can be no doubt that the durability of Guardian can be proclaimed a success. No other anti-piracy barrier system can make this claim.

In addition to the anniversary Guardian can also announce its pride at having defeated five piracy attacks in the Gulf of Guinea. Teresa and David are proud of the fact Guardian has denied pirates the capture and ransom of the vessels worth hundreds of millions of pounds and an incalculable value in cargo, but are proudest at saving over 100 mariners from the terrors of captivity with its associated pain and suffering for crews and that those men and women have returned to their families unharmed.

Guardian goes 'self-install'

In an effort to keep costs down for ship-owners and operators whilst having a highly effective anti-piracy system available on their vessels, Guardian Maritime is now offering to provide would-be clients the opportunity to have the crew install the Guardian system. David Stevens of Guardian said "Of course in our opinion the best way to install Guardian is by using our installers but many clients are now eager for their own crews to carry out the install during transit. By providing clear instruction to the crew via a specially filmed installation, the crew quickly learn how simple the system is to install and use and by working with Guardian the confidence of the crew is enhanced".

Guardian Maritime has also announced that, working in partnership with a finance brokers, it can now offer a finance option to anyone wishing to purchase Guardian Barriers; this helps to spread the cost and allows budgets to be managed over a longer term. •

The Guardian Promise:

- a proven track record with over five piracy attacks defeated in the last 36 months, saving billions of dollars in revenues for its clients;
- 99% crew injury reduction using Guardian achieving increased crew productivity and higher motivation;
- saved over 100 mariners' lives to date; and
- five-year warranty validated by Guardian Maritime's annual vessel inspection if used — a quote can be supplied.

Clear and present danger

stringent safety measures needed to safeguard crew and vessels

The latest bulk carrier casualty report from Intercargo reveals that seafarers currently loading cargoes on specific trades in Asia are at high-risk from cargo liquefaction. It also highlights that Flag States tasked with filing timely reports into casualties — a process designed to help prevent future tragedies — are continuing to neglect their duties, writes Michael King.

Last year the global bulk carrier fleet suffered 337 'incidents' including two major casualties, according to the latest *Bulk Carrier Casualty Report* by Intercargo, the International Association of Dry Cargo Shipowners.

The two casualties were, of course, the loss of the 266,141dwt *Stellar Daisy* in the South Atlantic in April last year with 22 crew presumed dead, and the sinking of the 57,000dwt bulk carrier *Emerald Star* on the morning of 13 October with 26 seafarers on board. Sixteen *Emerald Star* crew members were rescued but the remaining ten crew are still missing and presumed dead.

The presumed deaths of 32 seafarers last year made 2017 the worst in terms of loss of lives on bulk carriers since 2011. The loss of the *Stellar Daisy*, a Very Large Ore Carrier shipping iron ore from Brazil, is thought to have been related to flooding. A casualty investigation is ongoing and, independently, South Korea and China are conducting inspections of all converted VLOCs to check the structural stability of

the vessel class, while Brazil's Port State Control has committed to inspecting all VLOCs at its ports before loading.

The *Emerald Star* capsized after loading nickel ore in Buli, Indonesia, for delivery to China. The vessel sank just 150 nautical miles north-east of the Philippines. If the cause of the casualty is finally shown, as expected, to have been caused by cargo liquefaction, then no one involved with shipping or commodities should be surprised. Indeed, *The Economist* tagged the trade of nickel ore from Indonesia to China — a minuscule proportion of the total dry bulk moved by sea each year — shipping's 'Deadly Trade' as long ago as 2013. The article was prompted after it was found that this backwater trade accounted for four of the 20 bulk freighters lost worldwide during 2010/11, and for 66 of 82 deaths. All four casualties were attributed to liquefaction of the cargo and all four ships had loaded during Indonesia's rainy season.

Intercargo is certainly very well aware of the trend. It noted that 53 bulk carriers over 10,000dwt were identified as total losses over the years 2008 to 2017, with nine of the 53 attributed to cargo liquefaction. "Cargo shift and liquefaction continues to be a great concern for the life of seafarers and the safe carriage of dry bulk cargoes," said its latest report. "Those nine casualties of suspected cargo failure consisted of six bulk carriers carrying nickel ore from Indonesia, two vessels with laterite (clay) iron ore from India and one with bauxite from Malaysia. There were 101 lives lost associated with the nine casualties of cargo failure against a total of 202 lives for all the 53 casualties."

What Intercargo failed to note was that the number of vessels and lives lost could easily have been far higher if Indonesia had not banned the export of unrefined nickel ore and bauxite in 2014 in a bid to force miners to process more cargo in-country. Nickel ore exports slumped almost overnight, hugely increasing the safety of seafarers as a by-product. However, at the start of 2017, the ban was removed as Indonesia's government tried to reduce its budget deficit.

When approached by *DCi* last summer, the IMO and Intercargo were not fully aware of the impending menace to seafarers posed by the Indonesian monsoon season which usually runs September to March. With miners holding heavy stocks of nickel ore and storage in Indonesia's many remote ports almost always uncovered, the danger to crew was certain to increase once the rains commenced. The loss of the *Emerald Star* sadly, predictably, followed.

The facts

- 53 bulk carriers of over 10,000dwt were identified as total losses by Intercargo in the years from 2008 to 2017;
- 202 crewmembers lost their lives as consequence, or on average 20 lives lost per year;
- 24.2 years was the average age of the bulk carriers lost;
- 2.77 million dwt was lost over the period, an average of 276,508 dwt per year;
- 22 Handysize bulk carriers were lost over the period, representing 41.5% of the total of 53 casualties reported, with most cases recorded before 2011;
- 11 Handymaxes were lost, representing 20.8% of the total
- The Supramax class of vessels suffered eight ship losses, taking 15.1% of the total, with five losses related to suspected cargo failure (liquefaction) resulting in the loss of 85 lives;
- The Capesize class suffered seven ship losses over the period, representing 13.2% of the total; and
- The Panamax class recorded the fewest total losses, representing 9.4% of the total.

The Emerald Star.

Another concern highlighted by Intercargo's latest report is the failure of Flag States to make public investigation reports into bulk carrier casualties that have resulted in the loss of life. The IMO's mandatory Casualty Investigation Code does not give a specific timeline but refers to "as quickly as possible" and "as soon as is reasonably practicable" in terms of completing a marine safety investigation report after a casualty.

The Code specifies that the "marine safety investigating State(s) shall submit the final version of a marine safety investigation report to the Organization [IMO] for every marine safety investigation conducted into a very serious marine casualty".

And it adds: "Where a marine safety investigation is conducted into a marine casualty or marine incident, other than a very serious marine casualty, and a marine safety investigation report is produced which contains information which may prevent or lessen the seriousness of marine casualties or marine incidents in the future, the final version shall be submitted to the Organization."

A spokesperson at the IMO told *DCi* that while "every case is different, so it is impossible to set a strict timeline, as soon as possible is the message".

However, as Intercargo notes, this is not happening. The IMO GISIS database of casualties at the end of January 2018 recorded that 29 investigation reports into 53 bulk carrier losses over 2008–2017 had not been submitted to IMO by their respective Flag States.

The highest loss of life on bulk carriers over 2008–2017 was attributed to cargo failure — liquefaction — resulting in 101 lives lost from nine casualties. Three of the nine investigation reports have not been submitted to IMO. Among the missing reports is one due from Vietnam into the loss of the Supramax vessel *Vinalines Queen* and its 22 crew in 2011. The vessel was carrying nickel ore loaded in Indonesia.

The most commonly reported cause of bulk carrier losses over the period was grounding, totalling 22 losses among the 53 cases. Ten investigation reports of those 22 cases have not been submitted to IMO. Six bulker losses over the period were attributed to 'unknown causes'. These casualties accounted for 61 deaths but, shockingly, five investigation reports into the six vessel losses have not been submitted to IMO.

"Lessons learnt from past incidents play an important role in determining where additional safety improvement is necessary," said Intercargo. "The importance of Flag States' timely submission of casualty investigation reports to IMO should be stressed, as a means for identifying the cause of incidents and enabling corrective actions to be taken."

From stamp to screen: DNV GL issues over 50,000 electronic certificates

With the introduction of IMO-compliant electronic class and statutory certificates DNV GL took classification into new territory. Now, just four months after the launch of this new service, more than 50,000 certificates have been issued.

The classification rules covering shaft alignment are formulated to achieve an acceptable distribution of loading on the shaft bearings and lubrication of the aft bearing, taking into consideration the bending moment induced by the propeller during operation. However, during turning manoeuvres at higher ship speeds, exaggerated propeller bending moments can occur, potentially resulting in a reduced shaft-bearing contact area and an exponential increase in local pressure and thermal loading. This could cause damage to the aft bearing. Most of the reported bearing damages have been observed in the aft-most part of the aft bearing, typically during a starboard turn on a right-handed propeller installation. The new rules put additional focus on the impact of these transient hydrodynamic propeller forces and moments, induced in turning conditions, on the aft-most propeller shaft bearing.

"We have been overwhelmed by the positive response from our customers and the industry as a whole," says Knut Ørbeck-Nilssen, CEO of DNV GL – Maritime. "Many owners have opted not to wait for their first scheduled survey to shift vessels to the new certificates, but have asked to move their whole fleet onto the new system. Our goal for 2018 is to have every vessel in the fleet using electronic certificates in conjunction with their periodic survey."

Since the launch in mid-October 2017, DNV GL has issued approximately 50,000 certificates, with more than 6,000 vessels of the classed fleet now trading with one or more certificates. Digitally signed electronic certificates represent nearly 80% of all certificates issued by DNV GL since the roll-out. Fifty-two flag states accept the certificates, with further acceptances expected over the coming year.

"The administrative savings for our customers have been significant, in particular in the ease with which customers always have access to new and updated certificates on the fleet status portal and through email subscription," says Knut Ørbeck-Nilssen. "And vessels issued with electronic certificates have successfully been through close to 1,000 port state inspections worldwide. The port state process is also made more efficient, by enabling owners to use a secure electronic certificate folder to grant temporary access to authorities through our fleet status portal."

DNV GL has issued over 50,000 electronic class certificates

About DNV GL's electronic certificates

Certificates are published on DNV GL's customer portal immediately after an onboard survey is completed, so that all relevant parties can access the latest certificates from anywhere in the world. The electronic certificates are secured with a digital signature and a unique tracking number (UTN) which can be checked online, assuring their validity and authenticity. Customers can choose to share access to their certificates with stakeholders (charterers, ports, flag administrations, insurers) by using temporary access codes. With the temporary code the stakeholder can directly access the customer's secure certificate folder, bringing the administrative burden on the shipowner down to the absolute minimum.

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, DNV GL enables its customers to advance the safety and sustainability of their business. Operating in more than 100 countries, the organization'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 highly renowned 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. It invests heavily in research and development to find solutions, together with the industry, that address strategic, operational or regulatory challenges.

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AAL meets the specialized challenges of keeping heavy lift & breakbulk vessels safe

AAL delivering the Johnson Street bridge.

Shipping company AAL has a range of equipment and technologies to maintain and improve the safety of its vessels, *writes Valentin Gherciu, Operations Manager at AAL.* Loading, stowing and discharging breakbulk, heavy lift and project cargo is a complex operation, requiring considerable technical and engineering expertise, as well as specialized hardware and equipment. To ensure that all cargo is handled safely and efficiently, AAL invests in and maintains specialized lifting equipment and the world's finest training for its technical teams.

AAL was the first shipping company to be issued 2015 certifications – ISO 9001 for Quality Management and ISO 14001 for Environmental Management – by DNV–GL, awarded simultaneously as ISO 50001:2011 for Energy Management and OHSAS 18001: 2007 for Occupational Health & Safety. These accreditations benchmark AAL's operational performance against the highest standards of cargo care. To fortify this commitment to safety, AAL has one of the most comprehensive investment programmes to ensure that the attitudes, values, and working practices meet its customers' expectations.

AAL's representative offices and supporting agencies stretch from North Asia and Oceania to the Middle East, Europe and the Americas, and its clients' geographies and cargoes are equally diverse. This means that on any given day it can be transporting process units for a major working the oil sands, windmill blades for a renewable energy project, heat recovery steam generators for an NOC's power plant, cyclone vessels for a petrochemical refinery, or superyachts to customers in the Caribbean. But what they all have in common is a flexible and competitive solution that delivers value to customers great or small on every voyage.

AAL continues to operate the sector's youngest fleet of specialist MPP (multi-purpose) vessels and recently had a major fleet expansion, with the addition of seven 33,000dwt 'W-Class' ships. This makes AAL the market leader in the 'megasize' MPP segment, and forms an essential element of AAL's total solution for breakbulk, heavy lift and project cargo transportation. Because of the company's expertise in collecting and combining multiple cargo types and parcel sizes on regular scheduled sailings, it can also provide significant value and efficiencies for its customers in multiple industry sectors at the same time.

The technical knowledge of AAL's in-house teams and many hundreds of years' combined experience means that there's rarely a cargo it hasn't seen before. That said, AAL is particularly proud to recently handle a pair of very impressive projects.

At the end of 2017, it completed the transport and discharge of the replacement structure for the iconic Johnson Street Bridge in Victoria, British Columbia. At 42.7m in length, 18.6m wide, and 4.1m tall, the bridge section is the major component of the biggest single-leaf bascule bridge in Canada and one of the largest in the world. When the new bridge officially opens in March 2018 it will create a new historic structure and destination within Victoria's Inner Harbour. The architect who designed the original Johnson Street Bridge, Joseph Strauss, would later go on to design the Golden Gate Bridge in San Francisco.

AAL also completed a major project in February 2018, delivering the longest-ever windmill blades into Australia. At 63 metres in length, the blades will power 58 turbines that will reduce CO_2 emissions by 655,000 tonnes annually and produce enough power to maintain more than 137,000 Australian homes.

In recent weeks, AAL has also entered into an exciting global co-operation agreement with Hyundai Merchant Marine (HMM). The co-operation will create a joint Far East–Middle East MPV Liner Service, served by four 30,100dwt 640-Class from HMM and one 31,000dwt A-Class from AAL) on a 15- and 30-day sailing rotation. By pooling resources with HMM, AAL will be able to offer a more comprehensive service portfolio with improved frequency, capacity, coverage, and economies of scale for all of its customers.

In much of the MPV market today, the reality is that many of today's cargo bookings are focused too heavily on cost alone. This is especially prevalent in the non-heavylift space, and for cargoes that require reduced engineering and operations expertise. However the bulkers, box ships and other vessels which are transporting project cargoes cannot provide the logistical insight, the technical knowhow, the specialist lifting and transportation equipment, or the years of experience required to safely and consistently shift complex consignments from A-to-B. It's leading to a real loss of quality in the sector, and risks putting both crew and cargo in harm's way.

In the coming years, AAL is hopeful that the dry bulk industry will become subject to stricter vetting requirements that will improve the standards and safety of the industry. AAL has seen how much success equally high standards in the tanker market have benefited all parties, and looks forward to safety, experience, quality and efficiency making the critical difference in freight earned.

Ensuring cargo hatches remain watertight with Cygnus Instruments

Cygnus Instruments Ltd is a well-known and trusted UK manufacturer of high quality ultrasonic testing equipment which is extremely durable and simple to use.

Poor maintenance of hatch covers, seals and coamings, resulting in water entering a ship's hold, can lead to highly expensive or even devastating consequences. Testing that hatch covers are weather-tight is a fundamental requirement for preventing damage to cargo and ensuring the safety of a vessel and its crew.

Ultrasonic testing is the most accurate, repeatable and convenient method of testing hatch covers, doors, ventilators and access hatches and is the preferred method of inspection by P&I Clubs but there are others methods in use.

Light testing

Hatches are fully battened down and a surveyor will view the underside of the covers to see if any visible daylight is shining through gaps. If the sunlight level is insufficient a strong torchlight will be shone directly from above instead. This is the simplest method for identifying defects and their location but it may not be so easy to identify very small gaps.

Chalk testing

Chalk powder is applied to the coaming compression bars and panel cross seams, the hatches are then closed and re-opened. The rubber joints are carefully examined. If there are irregularities in the chalk markings then it is assumed that these areas are not weather-tight. This method was the traditional way for testing hold cover compression but does not test the watertight integrity of the hold. IACS states that this test should be followed by a hose test.

Hose testing

The conventional technique for testing weather tightness of hatch covers is hose testing which uses large volumes of water sprayed at the rubber seals

The hatches are secured, with one surveyor in the hold. On deck a constant jet of pressurized water is then directed at the hatch-cover seams and joints. Any water leaking into the hold should then be seen by the Surveyor inside, indicating a defect in the seams or joints. Although the most common method of testing hatch-covers, this technique has many limitations when compared with using ultrasound:

- the hold must be empty;
- a minimum of two surveyors is required;
- it cannot be performed in sub-zero temperatures;
- run-off from the deck which can lead to pollution — some port authorities will not permit this;
- it cannot accurately pinpoint leakages as water might travel along drainage channels and enter the hold at a different point or travel through the drain valves and back onto deck;
- variance in water pressure and distance of the jet can affect results; and
- it is time consuming.

Ultrasonic testing

This is an accurate, repeatable and convenient method of testing hatch-covers, doors, ventilators, access hatches, etc.

A transmitter emitting ultrasound is placed in the hold and the hatches are then fully closed. On deck the surveyor wearing headphones will walk around the periphery of the covers using a hand-held receiver or detector and will be able to hear ultrasound leaking through any defective seams or joints — even through the smallest of openings.

A percentage scale is used with an open hatch emitting 100% of the ultrasound. DNV and ABS state that during an inspection any reading over 10% indicates an area of potential leakage.

When a vessel is at sea and is pitching and flexing, seals that were demonstrated to be tight when the ship was stationary might potential leak. A benefit of the ultrasonic method is that the level of compression of a seal can also be detected and monitored through periodic maintenance checks. A higher percentage reading indicates a lower level of compression and could indicate a seal which will leak when the ship is in rough conditions.

Hatch cover tester

While ultrasonic hatch cover testing has been available since the 1980s, Cygnus

Kit contents

The Cygnus Hatch Sure kit contains everything needed to test the watertightness of cargo holds:

- Hatch Sure receiver with protective case;
- two rechargeable batteries for the receiver;
- neck & waist strap for the receiver;
- telescopic extension and cable;
- two flexible inspection microphones;
- protective foam cover for inspection microphone;
- headphone 2-into-1 splitter cable;
- neck-band headphones;
- Hatch Sure transmitter with protective case;
- shoulder strap for the transmitter;
- two sets of six rechargeable batteries for the transmitter;
- fast charger for the rechargeable batteries;
- external DC power lead for the transmitter;
- emergency microphone cable;
- rucksack style carry case; and
- operation manual.

Hatch Sure has advanced the current technology with fully automatic Open Hatch Calibration (OHC) to set the Open Hatch Value (OHV). This ensures consistent results from hold to hold with a lightweight and extremely powerful 19 × 40Hz element transmitter. This is powerful enough to saturate the largest cargo hold with ultrasound. The variable output transmitter has six selectable power levels allowing the unit to also be used in confined spaces, such as for testing watertight doors. Designed for ease of use and powered by standard rechargeable batteries, the whole system is extremely light and aircraft friendly for passenger cabin transportation.

The Cygnus Hatch Sure leak detector is a purpose-designed, robust and very

lightweight system; as such it has become the market leader for ultrasonic hatch cover inspections and is the preferred choice of multinational ship management companies across the globe who want to test covers quickly, accurately and cost effectively.

Cygnus Hatch Sure is ABS Type Approved and accepted by all P&I Clubs. The Cygnus product training syllabus has been endorsed by the International Institute of Marine Surveyors (IIMS).

Cygnus Hatch Sure

The Cygnus Hatch Sure system is comprised of two main components (see picture, right): a powerful ultrasound transmitter with 19 x 40 KHz elements and a hand-held receiver.

The system is used by placing the transmitter within the ship's hold, conducting a quick and simple calibration and then closing down the covers. The transmitter is then switched on remotely and it will fill the hold with ultrasound; any ultrasound that escapes will be detected by the operator, who will be on the deck walking around the periphery of the covers using the receiver. Using the sensitive microphone attached to the receiver, the system allows the operator to locate ultrasound leaking through any defective seams or joints; exact locations of potential costly leaks in heavy seas or rain are quickly and easily identified.

Cygnus Hatch Sure is entirely designed for ease of use and powered by standard rechargeable batteries. The whole system is extremely light and aircraft friendly for passenger cabin transportation.

The two components of the Cygnus Hatch Sure system.

PSM's new analogue programmable transmitters win DNV/GL approval

PSM Instrumentation has announced that its latest products, the Analogue Pressure Transmitters (APT), have both received Marine Type Approval from DNV/GL.

These cost-effective transmitters, which are suitable for marine, industrial and hazardous area applications, have demonstrated that they are fit for purpose and meet the required environment and performance criteria.

The range includes level transmitters and pressure transmitters. Both are available in stainless steel, titanium, and hastelloy materials for compatibility with all mediums, and offer measurement ranges from 0.2 to 40 Bar in both gauge pressure and absolute pressure versions. Factory calibration to specific requirements and integral temperature compensation ensure excellent accuracy.

PSM believes that its APTs offer a new alternative tank level transmitter solution and are pleased that they've been recognized as compliant to give customers further confidence in the product range.

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New shiploader at Vizag

Essar Vizag Terminal Ltd (EVTL) has installed and commissioned a new 8,000tph (tonnes per hour) shiploader.

Iron ore handling capacity at the outer terminal installation at the Port of Vizag is being upgraded at a cost of $13 million. This will allow the terminal to boost tonnage from 12.5mtpa (million tonnes per annum) to 23 mtpa.

As part of the revamp, a new reclaimer and a mechanical conveyor system were also commissioned.

EVTL is now targeting a cargo handling rate of 120,000 tonnes per day, thereby boosting turnaround times and allowing freight costs for exporters on the east coast to be more competitive.

According to CEO CH. Satyanand, during the shutdown, there was no disruption to exporters' shipments.

The new shiploader replaced a 41-year old incumbent.

Essar Vizag Terminal began the port expansion project in May 2015 as part of a 30-year design-build-finance-operate-transfer concession. Since taking over, it has increased iron ore loading capacity at the terminal from 25,000 tonnes per day to 70,000 tonnes.

Once all improvements are in place, loading capacity should increase to 120,000 tonnes per day, while the terminal will be able to berth vessels up to 200,000dwt, thanks to a draught of 18 metres in the outer harbour. *Barry Cross*

Port of Longview awarded top honour for maritime safety efforts

The Port of Longview was recently awarded the Partnership Award from Maritime Fire and Safety Association (MFSA) in recognition of the port's impact in advancing emergency response and preparedness in the region.

The port participated in Command Training in September, as well in an Oil Spill Response Preparedness Committee. Additionally, Port representatives spoke at and attended the Fire Protection Agencies Advisory Council (FPAAC) Summit and provided tours of Port facilities and vessels throughout the year.

"The Port of Longview has played a crucial role in educating first responders on the intricacies of Port operations," said Don Doyle, who is the Fire Protection Agency Advisory Council (FPAAC) Training Coordinator, as well as a Lieutenant at the Longview Fire Department. "The Port has been instrumental in preparedness for first responders in the region."

The MFSA Partnership Awards Program has been implemented to recognize both MFSA members and outside organizations who have shared in the goal of making MFSA "the leading provider and advocate of safe, environmentally responsible, and cost-effective response services to commercial vessels in the Columbia Willamette River Marine Transportation System."

North Sea Port dredges Wielingen rise to make the port more accessible

At the end of December 2017, North Sea Port started dredging the rises in the Wielingen area of navigation off the Dutch coast. Consequently, the Flushing port area will be accessible to vessels having a draught up to 17 metres from the end of February onwards.

By removing those rises, the access to the Vlissingen-Oost port area for vessels having a draught of up to 16.5 metres will be guaranteed. Moreover, the sailing opportunities for vessels having a draught of 17 metres will strongly improve.

Deep-draught vessels for Vlissingen-Oost have had to cope with delays for years. When the tide is not high enough, there are literally thresholds in the way off the Wielingen in front of the coast of Zeeland Flanders. Deep-draught vessels (Capesizers) carrying cargo on board for the companies are then not able to pass these rises in the fairway. They have to lie in wait at sea or move to other ports. It also happens that vessels sail to the Vlissingen port area not fully loaded, which does not benefit sustainability.

More certainty for shipping

After the dredging works, the port area of Vlissingen-Oost will be better accessible to deep-draught vessels and it will be possible to reduce waiting times to a minimum. The companies will be able to plan the reception and handling of deep-draught vessels with a lot more certainty. As such, the competitiveness of the port companies and of North Sea Port will strongly improve. A better approachability will also be of benefit to the regional economy and to employment. This improvement of approachability and accessibility has been the object of talks for more than a decade. In fact, a lot of deliberations with trade and industry and with environmental organizations preceded this development. Moreover, these dredging works fit in the 'Ambition 2030' programme in which economic and ecological development go hand in hand.

Fairway of 180 metres wide

The present fairway at sea from and to the Vlissingen port area has a width of 500 metres. The works consist of the laying of what is called a 'made-to-measure channel'. Instead of completely removing the shallows in the fairway over the entire width, the fairway will be tackled 'to size' over a width of 180 metres. The dredging spoil will be dispersed a few kilometres further on in a deeper part. Because of this innovative approach, only 600,000m³ of spoil have to be moved. This can be compared to two football pitches full of spoil up to 60 metres high. The works will cost €2.5 million. The Dutch State will contribute half of this sum. It is assumed that by the end of February the dredging works will be finished.

New barge unloading services introduced at Convent Marine terminal

SunCoke Energy Partners, L.P. has begun offering barge unloading services at its Convent Marine terminal (CMT) in combination with stevedoring and barge services provider Cooper Consolidated, LLC. The multi-year agreement between CMT and Cooper Consolidated provides for the use of Cooper Consolidated's extensive floating crane fleet and its unique Louisiana Mid-Stream One transload system to efficiently unload coal, petroleum coke and other materials from barges at CMT's dock. The companies recently demonstrated their combined capability by successfully unloading the first 30-barge shipment of coal bound for the export market.

The addition of barge unloading capabilities complements Convent's existing rail and truck offerings, and provides the terminal with the ability to transload, blend and store a significantly broader array of materials going forward.

Senior Vice President of Commercial Operations and Business Development at Terminals and International Coke said: "We are excited to announce our alliance with Cooper Consolidated and the launch of our barge unloading service at CMT."

"Through this agreement, CMT is positioned to offer a more flexible range of transport options to new and existing customers at the terminal. We continue to work towards driving US$5 million to US$10 million of additional earnings across our logistics portfolio over the next couple of years, and are confident that this capability will further differentiate CMT as a world-class terminal for both bulk and liquids shipments."

CMT is one of the largest terminals on the US Gulf Coast, and the only bulk terminal in the region that provides direct rail access for ocean going shipments. Convent has two independent shiploading systems, with its newest shiploader capable of accommodating Capesized ocean vessels. Its location on the Lower Mississippi River, 1.5 million short tons of ground storage and unique inbound and outbound capabilities provide a cost-effective option for transloading a range of bulk materials and liquids.

Published by Claire Cuddihy, Editorial Assistant, World Coal
Source: World Coal

Poland booms while Latvia suffers Russian backlash

Maritime Bulk Terminal Gdynia.

Barry Cross

Baltic terminals report recent activity

In Poland, Maritime Bulk Terminal Gdynia Ltd (MTMG) had something of a banner year in 2017, with overall traffic rising by 33% to 5.356 million tonnes. Of this, coal and coke performed well, reaching 1.876 million tonnes, an increase of 116% over 2016's figure of 866,000 tonnes. Other bulks were slightly down from 146,000 tonnes to 129,000 tonnes, with a similar fall in agribulk. In 2015, this had amounted to 1.82mt (million tonnes), falling to 1,708mt in 2016 and 1.517mt last year. Liquid bulk, in comparison, rose 425 tonnes to 1.832mt.

"Dry bulk consignments to the terminal arrive by both road and rail, with an almost equal split," explains the spokesperson. "Agribulk and other bulks mostly use road transport, while the rest go by rail. We don't have an inland waterway connection at all."

Despite the year-on-year rise in traffic, the number of vessel calls continues to shrink. In 2015, there were 304 calls, falling to 292 calls in 2016 and just 256 calls last year. However, the spokesperson says that the relative size of vessels has stayed the same.

As for current storage capacity for dry bulk, this amounts to around 360,2000m^3 of covered warehousing and around 105,830m^3 of open area. The terminal can handle in the region of 40,000 tonnes per day.

On 10 March 2017, Maritime Bulk Terminal Ltd opened a brand new storage yard located on French Quay. The new investment, whose first consignment was 45,000 tonnes of imported coal, is dedicated to the storage of bulk cargo such as coal, coke, aggregates, and so on.

The yard itself is 40m wide and 198m long, covering a total area of approximately 8,000m^2.

It is surrounded by three ferrous-concrete walls, 7m high, and has a partial roof with a reach of 5m inside the yard. This is to help reduce dust during handling operations on French Quay.

At the same time, MTMG took the opportunity to modernize the entrance

road and railway tracks at French Quay, as well as water, energy and telecommunication networks.

MTMG, which is located at the main entrance of the port, is connected to both the national road and railway and networks. It is a common user terminal, offering various services, including reloading, open and covered storage, big-bagging and sorting of dry bulk cargo, as well as transshipping liquid bulk.

The terminal, which operates around the clock, handles coal, coke, grain and feedstuffs, minerals, fertilizer, biomass, ores and other dry bulk, in addition to liquid and general cargo.

"We already have various ISO certificates granted by the Polish Chamber of Foreign Trade Certification and Bureau Veritas Certification," notes the spokesperson. "However, MTMG keeps investing to increase qualitative and safety standards on the terminal both for clients and for the workforce employed there. Apart from that, MTMG also focuses on being an environmental friendly terminal through the idea of MTMGreen, which involves investing in dedicated equipment, such as dust-prevention solutions."

Indeed, to protect the environment and local neighbourhood, MTMG has acquired modern systems to protect stockpiles against excessive dusting by covering commodities with thin layer of cellulose using a patented Dustcrusterliquid installation.

Last year, the Szczecin–Świnoujście Port Complex also recorded exceptionally high cargo handling figures. The twin ports handled nearly 25.5mt of cargo, which is an increase of 5.4% compared with 2016.

Two products stood out: ores and fuel respectively increasing by 59.4% and 46.7%. According to the port authority, demand for iron ore from Polish, Slovak and Czech steel mills mainly accounted for these high growth rates for this commodity, while demand for fuel increased due to the operation of the LNG terminal in Świnoujście and larger imports of crude oil from Russia, not to mention extra demand for oil from Western Europe.

Other bulks did very well last year, going up by 5.4%. General cargo also had a good year, demonstrating growth of 4.2%, especially in the ferry sector were an increase of 6.9% was logged.

Significantly, while containers went up by 3%, this was actually at the lower end of growth posted by the Complex's various terminals. A port authority spokesperson noted that the drop in grain was "a major surprise". In fact, the two ports saw a 28.6% decline, due to adverse weather and the rainy summer of 2017.

Last year, the downward trend continued in the handling of coal, with tonnage declining 27% compared with the 2016 figure.

Overall, though, the twin ports handled 25.42mt of cargo, which was 1.31mt more than in 2016, equivalent to growth of 5.4%.

The port authority foresees that the upward trend should continue throughout 2018 and has set an end-of-year target of 26mt. Nevertheless, this comes with an important caveat: that market volatility could well still impact negatively on traffic.

Both the port authority and terminal operators have been making strident efforts to attract new cargo. This includes investment in port infrastructure. Indeed, according to the 2014–2020 investment plan, the Seaports Authority intends to spend nearly PLN1.5 billion.

The intention is to modernize quays in Szczecin near the Dębicki Canal and around the Kaszubski Basin. The technical parameters of the quays will be aligned with the new water depth of the

Świnoujście–Szczecin fairway.

In Świnoujście, the ferry terminal is to be upgraded to make it suitable for intermodal transport, while a new redistribution facility will be built at the LNG terminal. The port is additionally going to build a new deep sea quay.

Stressed is the fact, that, in the near future, investment in the ports will improve access infrastructure through the dredging and modernizing of the Świnoujście-Szczecin fairway to a depth of 12.5 metres. At the same time, improved navigation conditions will be applied to the Oder Waterway.

"All the activities are expected to enhance the competitiveness of the Szczecin and Świnoujście seaports, which should mean growing volumes of cargo handled," says the port authority.

Today, in the Szczecin and Świnoujście complex, general cargo accounts for 51% of total traffic, dry bulk 36% and liquid bulk 13%. Besides, the Świnoujście ferry terminal is the acknowledged ferry service leader in the South Baltic Sea. Presently, 12 ferries operate to and from Sweden, with 11 trips daily to the ports of Trelleborg and Ystad.

While business in Poland was buoyant, some Latvian ports and terminals struggled as Russian exporters switched key consignments to domestic ports.

Freeport of Ventspils, however, bucked the trend. It handled around 6.832mt in 2017, which was 1.423mt more than the previous year, equivalent to growth of 26%. According to a port authority spokesperson, the increase was due mainly to changes in the coal market at the beginning of the year, which meant that the port's specialist terminals attracted an extra 1,642mt of traffic compared to the corresponding 2016 period.

Świnoujście port.

The main focus for Ventspils remains Russian transit cargo. Other than dry bulk, Ventspils is seeing a rise in Ro-Ro and containerized cargo. It is also become a hub for niche project cargo, which requires both high quality handling and a stable environment, both of which the port can offer.

As for traffic in 2018, the spokesperson pointed out that the majority of cargo passing through the port is essentially transit cargo, which is impacted above all by the global economy. Ro-Ro cargo is continuing to increase in importance due to domestic exports and also because it is attracting new transit cargo types.

Port capacity is a nominal 43mt per annum, which is more than sufficient for current traffic levels. However, Freeport of Ventspils Authority has invested in enlarging and customizing the port area in recent years so that it can handle new cargo flows, such as grain, frozen products, oil and so on.

While previously planned expansion has now been completed, the port is looking at a 100ha new harbour, known as the Northern Port. This project will only go ahead if a private sector investor can be found.

The port authority, as such, does not undertake terminal handling equipment investment, since this forms part of the remit of terminal operators. These also offer some added value services in the form of bagging, blending, and the removal of metal objects, among a host of others.

According to the port authority, the port can handle the largest vessels that currently service the Baltic Sea market. Increased profit is resulting in larger vessels being chartered on some services.

In terms of terrestrial access, Ventspils port forms part of the European TEN-T

Freeport of Ventspils has experienced a growth of 26% in the past year, due mainly to changes in the coal market at the beginning of the year.

Freeport of Ventspils.

transport network. Nowadays, the majority of dry bulk traffic enters the port by rail, although traffic bound for Ro-Ro services naturally makes greater use of the connecting highway network. The port currently has no inland waterway connection.

In contrast to Ventspils, traffic at the Port of Riga fell 6.6% last year to 20.9mt. The reason for the decrease was the fall in the transhipped volume of the two largest types of bulk cargo: coal and mineral fertilizer. As both of these are almost 100% Russian transit cargo, this decline reflects the impact of Russian transport policy on the Port of Riga and other non-Russian Baltic ports. Russia is steadily developing its own ports on the Baltic Sea and reorienting its cargo towards them, the port authority told *DCi*.

As a result of the decrease of Russian transit cargo, local cargo from Latvia, other Baltic States and Belarus is gaining in importance at Riga. This is in the form of grain and grain products, as well as bulk wood commodities, such as wood pellets, wood chips and sawn timber.

In 2017, 1.34mt of grain and grain products passed through the Port of Riga, which was 3.8% more than in 2016. However, there was a slight drop in the transhipped volume of wood pellets (-4.7%), related to a decrease in demand from European markets, while during the year 1.37mt of wood pellets were handled. Wood pellets are predicted to be one of the main growth areas for the port going forward.

Asked about factors impacting this year's traffic, the port authority notes that Russian transport policy will continue to favour the shifting of cargo away from ports in the Baltic States to its own ports, therefore, it is forecasting that the decrease of Russian transit cargo at the Port of Riga will continue.

"The main reasons are not economic, but rather politically related. The voluntary redirection of cargo to ports in Russia is their response to the European Union's sanctions against Russia," notes a spokesperson.

The current bulk cargo handling capacity at the Port of Riga is 35mt annually, which is viewed as quite sufficient given the decrease in dry bulk volumes. Although investment is being made to boost terminal efficiency, for reasons of modernization and the switching of one type of cargo to another, no money is needed to increase overall capacity *per se*.

In 2018, investment by the Freeport of Riga Authority and the port companies will continue with the creation of the new port complex on Krievu island. From 2019, all transshipment of coal should be diverted from berths close to the city centre to here.

As for adding value, in the port's various terminals, processing services are available. These consist of coal crushing, sorting and magnetic treatment (cleaning), as well as packing of cereal products for fodder. Some terminals indicated are also carrying out the packing and weighing of dry cargo commodities.

Vessel sizes (dwt — deadweight tonnage) vary depending on the type of cargo. In addition, if different types of cargo are shipped to different markets, then dwt also varies from market to market. For example, at the Port of Riga, ships with the largest dwt transport coal, which is mostly shipped to Western European ports.

The average size of dry bulk vessels increased significantly in 2012. During the last few years, the average size has not changed considerably.

Finally, in terms of terrestrial connectivity, dry bulk arrives mainly by rail to the port, with the two largest commodities — inbound coal and mineral fertilizer from Russia — moving exclusively by rail. This is made possible since Latvia, like Russia, operates on the 1,520mm rail gauge, which is broader than the European standard.

Consignments of cereal products and wood pellets arrive by both road and rail. DCi

AVERAGE SIZE OF DRY BULK VESSELS CALLING AT THE PORT OF RIGA

	2010	2011	2012	2013	2014	2015	2016	2017
Bulkers (average GT)	23,636	26,121	29,588	30,982	29,822	28,393	29,815	30,302
Bulkers (average dwt)	40,798	45,924	53,028	55,334	52,742	50,278	51,585	53,127
Share, of bulkers with dwt >50,000	29%	40%	54%	58%	49%	45%	49%	53%

Multifunctional material handler from SENNEBOGEN fits the bill

Scrap metal shears or multi-shell grab: Thanks to the ULM kinematics and quick-action coupler, the SENNEBOGEN 825 can be used for the most diverse jobs around the scrapyard.

Multifunctional material handler: for any job with either scrap metal shears or multi-shell grab

With his SENNEBOGEN 825, operator Martin Tausch can make a quick choice between the multi-shell grab or the scrap metal shears at any time. The material handler is equipped with a quick-action coupler that makes it a highly flexible and multifunctional tool. It is used to handle scrap at the yard of customer Schenker in Hohenkammer.

As a certified disposal specialist, Schenker Industrie- und Städtereinigungs GmbH takes care of the disposal and recycling of waste and all kinds of raw materials. The family-owned company is located in Southern Bavaria. It has been a reliable business partner for 40 years, operating its own recycling facilities and value-added chains. Every month around 15,000 tonnes of material are handled and recycled at the Hohenkammer site, including approximately 5,000 tonnes of scrap metal, paper, waste wood, plastics and other recycling materials. In total, four SENNEBOGEN material handlers are used for material sorting, yard logistics and, in particular, loading the processing plants. The latest piece of machinery is a SENNEBOGEN 825, which, thanks to its special handling equipment, can be used with a multi-shell grab and 3-tonne scrap metal shears as well.

Swapping attachments from the cab – without effort

The SENNEBOGEN 825 was delivered by sales and service partner Fischer & Schweiger at the end of 2016. It is equipped with a 6.8m boom and a 3.2m grab handle with quick-action coupler to provide a reach of 10m. The different attachments can be exchanged easily from the cab. Schenker uses both an original SENNEBOGEN multi-shell grab with a 2.1m short handle for material handling and the existing three-tonne Zato shears.

To managing director Thomas Schenker, the advantages of this custom solution are obvious: "Depending on requirements, we can simply switch between the two attachments. The shears allow us to trim large steel beams and pipes for subsequent processing right after delivery. The material handler with the grab can be used for loading and sorting tasks around the entire yard wherever needed. With this set-up, we can reliably perform two tasks with just one machine".

Flexible use on company premises – no problem

The actual material handler is a SENNEBOGEN 825 with all-wheel-drive undercarriage, a 129kW diesel engine and an elevating cab with a standard lift of 2.7m. At the Hohenkammer site, work has to be done at frequently changing locations, so any solution has to be ultimately flexible. For example, the SENNEBOGEN 825 fitted with shears is used for preparatory work at the large 2000-HP shredder. On other occasions, the machine is used on short call to feed the processing plant or sort material using the multi-shell grab. Quickly responding to demand is no problem because attachments can be swapped in only a few minutes.

"We were looking for a truly multifunctional machine, and found it in the SENNEBOGEN 825", says a delighted Thomas Schenker. Once again, SENNEBOGEN has been able to impress with a straightforward solution. Schenker has been highly satisfied with the reliable SENNEBOGEN machines for many years. "Up to now, we have been more than satisfied. The contact is very personal, and the service provided by sales and service partner Fischer & Schweiger is excellent."

Order for AUMUND machines from LafargeHolcim in France

LafargeHolcim is investing around €100 million in the modernization of the Martres-Tolosane cement plant in the South West of France. AUMUND Fördertechnik GmbH and AUMUND France S.A.R.L. will be accompanying the customer on this ambitious upgrade project until well into 2019, supplying a varied range of equipment. The specialist from Rheinberg and Paris won an open bidding process against several competitors.

AUMUND Fördertechnik is supplying a package including belt bucket elevators to feed the 96m-tall heat exchanger and the raw meal silo at the plant. Two AUMUND BWZ chain bucket elevators will be used to convey raw meal and filter dust, and for silo feed. An AUMUND KZB pan conveyor with a vertical lift of nine metres will be installed under the clinker cooler.

Seven AUMUND LOUISE-type drag chain conveyors with short centre distances of 13m and conveying capacities between 7tph (tonnes per hour) and 50tph will extract filter dust. Two CENTREX® machines (25–250tph) will extract a mixture of limestone and clay as well as iron ore from silos up to seven metres high.

The modernization project at the Martres-Tolosane works is part of LafargeHolcim's extensive €300 million investment project in France. Comprehensive measures are being taken with a strong focus on environmental protection to make this plant, with its 110 employees, fit for the future.

Once upgraded, the plant will be equipped to burn alternative fuels, and energy consumption and CO_2 emissions will be greatly reduced. Work on the project will start in the final quarter of 2018 and be completed by mid-2020.

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.

AUMUND bucket elevator, pan conveyor, trough chain conveyor and CENTREX® (examples, photos by AUMUND)

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Baosteel shows confidence in SCHADE solutions

Four more semi-portal reclaimers for China

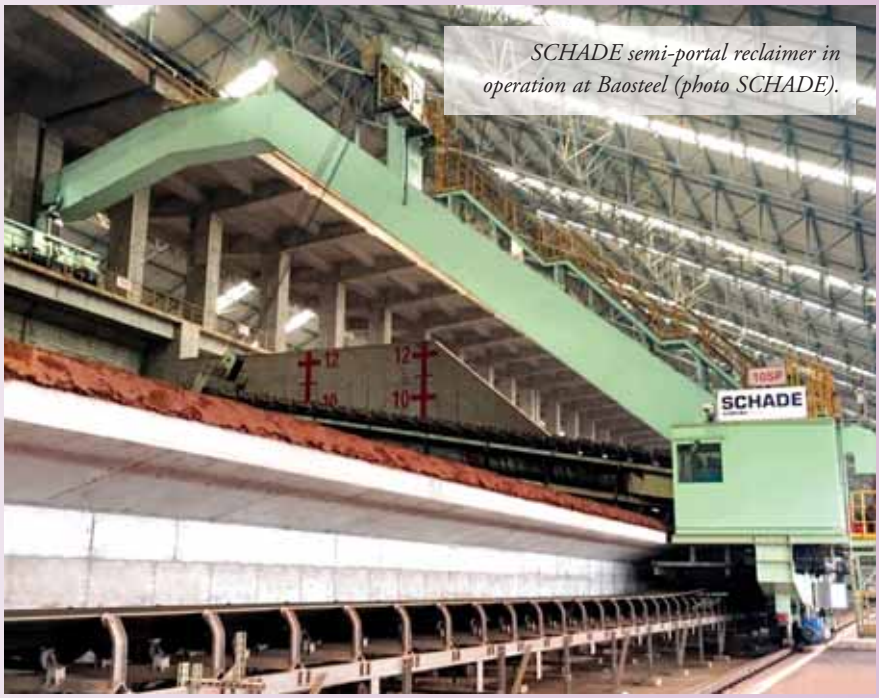
In October 2017, SCHADE Lagertechnik GmbH won a further order from Baosteel Iron & Steel Company Ltd., Shanghai, this time for an additional supply of four semi-portal reclaimers. These machines have a rail span of around 38m and a capacity of 1,500tph (tonnes per hour), and are expected to be delivered in November of this year. Commissioning is planned for mid-2019.

A year earlier, SCHADE Lagertechnik, a member of the AUMUND Group, secured an order to supply six combined portal type stacker-reclaimers to Baosteel Iron & Steel Company.

The six combined portal type stacker-reclaimers with outer rail spans of 56m are designed for a stacking capacity of 3,600tph and a reclaiming capacity of 1,200tph. This was the first time that SCHADE had received an order for combination machines of this type for the Chinese market, but it is now the third major order from the Shanghai Baosteel Group Corporation, which bodes well for SCHADE's prospects in China.

SCHADE's first sales success with Baosteel dates back to 2015, when it supplied two of its semi-portal reclaimers with rail spans of 31.5m and reclaiming capacities of up to 1,500tph of iron ore.

"SCHADE is securing an increasing market share and has built up a large portfolio of references in China, thanks to its particularly energy-saving special developed outboard roller scraper chain, and environmentally friendly technology features," says SCHADE sales director Andreas Markiewicz. "Because of the compact and specialized design of the SCHADE machines compared with bucket wheel technology, stockpiles can be easily and cost-effectively located in enclosed halls.



SCHADE semi-portal reclaimer in operation at Baosteel (photo SCHADE).

SCHADE reclaimers are becoming the industry standard because they present solutions which are safer, more flexible and environmentally friendly. In addition they are fully automated and more cost-effective than silos or bucket wheel machines when the overall investment is considered," continues Markiewicz. "Because environmental regulations are becoming more and more strict, with mandates for enclosure of stockpiles, our products are proving to be the optimal solution for the steel industry, as can be seen from our established references in Asia."

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SAMSON wins re-accreditation to ISO 9001 at the new 2015 standard

On 17 January, SAMSON Materials Handling Ltd, Ely, UK, successfully achieved its re-accreditation to ISO 9001 as well as transitioning from the old 2008 standard to the newly recognized 2015 standard. ISO 9001:2015 is an internationally recognized quality management system. The ISO 9001 standard demonstrates commitment to quality, customer focus and continuous improvement. In order to obtain this accreditation, an organization must demonstrate its ability to satisfy the requirements of the customer in addition to any statutory and regulatory requirements. SAMSON achieved this new standard without any non-conformances being identified.

Photo from left to right: Dale Lockley (SAMSON Managing Director), Richard Wynn (Trainee Auditor, Alcumus ISOQAR), Emma Barton (SAMSON HR Manager and ISO Compliance), Daren Basson (Auditor, Alcumus ISOQAR) and Peter Jones (Quality Consultant)

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Legacy Building Solutions adds Vice President of Sales

Legacy Building Solutions, a renowned manufacturer of custom fabric structures, has appointed Eric Donnay as Vice President of Sales.

In his new role, Donnay will lead the sales team and provide vision and direction to help grow the company. "Legacy Building Solutions has built their name and reputation from the ground up," said Donnay. "I am excited to help grow the company in new and existing market sectors."

Donnay comes to the company with more than a decade of sales and leadership experience, most recently at Arnold's of Kimball, where he worked directly with customers and a staff of 25. A lifelong resident of the area, Donnay was familiar with Legacy's reputation and story before joining the team.

"I've known Eric for over 25 years, and he is absolutely the right person for this role," said Ben Fox, president and CEO of Legacy Building Solutions. "He approaches business deals with a win-win attitude, and it will be a huge benefit to our customers to have Eric on their side."

Eric Donnay, new Vice President of Sales at Legacy Building Solutions.

About Legacy Building Solutions

Legacy Building Solutions manufactures, designs and installs fabric buildings on a rigid steel frame. The company's mission is to provide innovative structure and service solutions that solve the needs of clients and partners. Legacy fabric structures are used for fertilizer storage, military shelters, aviation hangars and sports centres, among others.

EMG brake thrusters in ports: 100% safety

ELDRO® AND ELHY® BRAKE THRUSTERS FROM EMG OFFER ENDLESS POSSIBILITIES

Brake thrusters are crucial components in the braking systems of harbour crane systems and container gantry cranes when it comes to safety. Huge investments and, most importantly, human lives depend on brake thrusters working reliably.

For more than 70 years, EMG in Wenden, Germany, has been producing brake thrusters that have been setting standards with their safety and durability. More than two million of these brake thrusters are now in use worldwide, and EMG is a major global presence with its brands ELDRO® and ELHY®.

Over the course of time, the brand name ELDRO® has become synonymous with brake thrusters, but ELDRO® is only present where EMG is the manufacturer of the brake thruster. The ELDRO® slogan, "The Original. Be safe." emphasizes the high quality standard.

ELDRO® and ELHY® brake thrusters are used to ensure the safe operation of crane systems and container gantry cranes of harbour systems across the entire world. A system failure can have not only serious financial consequences, but also implications for the safety of employees and on the system itself. Crane builders and system operators therefore need brake thrusters to be '100% fail-safe'; in other words, completely reliable, and EMG brake thrusters meet this requirement. This creates a basis for fast, safe and trouble-free cargo handling at a large number of ports across the world.

EMG brake thrusters are particularly reliable and fail-safe due to their proven, purely mechanical operating principle without electronics or electrically operated valves. This design has further benefits: both the cost of maintenance and wear are low, and the brake thrusters can be repaired quickly in the unlikely event that a fault should occur.

Decades of experience in the development and construction of brake thrusters and the high quality standards that are expected of products that are made in Germany ensure that the EMG ELDRO® and ELHY® brake thrusters can handle even the extremely high demands of port systems. The ELDRO® brake thruster was even used as a template for drafting the current SEB 602471 (1988) and DIN 15430 (1989) standards.

In addition, the product diversity appears unlimited. EMG promises that virtually every lifting device on the market could be replaced with ELDRO®/ELHY®. The cost of installing these devices has also been minimized over the course of 70 years of constant development. And this development is far from over. During this year, EMG will introduce a new model range under the product names ELDRO®dynamic and ELDRO®digital to meet growing customer requirements. Further information on this new model range, its additional customer benefits and unique technical features will be published shortly.

EMG will be exhibiting its products at TOC Asia, which will take place in Singapore from 24–25 April. There, visitors will be able to view the new ELDRO®dynamic and ELDRO®digital model ranges live for the first time ever.

About EMG Automation

EMG Automation GmbH, a company of the elexis group, is a highly respected supplier, due to its technological competence in the core area of regulation systems as well as quality assurance in automated manufacturing processes. Fields of application are fast-running continuous production processes in the metal and especially in the steel industry. The product portfolio includes, besides quality assurance systems, strip running regulators. The EMG group has its own factories as well as sales and service offices in Germany in Wenden, Oschersleben, Bielefeld, Leopoldshöhe and Hallbergmoos. International offices can be found in: Gerona,Spain; Verrières Le Buisson, France: Saronno, Italy; Istanbul, Turkey; Elmhurst, USA; Madison, USA; Twinsburg, USA; Belo Horizonte, Brazil; Osaka, Japan; Mumbai, India; Beijing, China; Shanghai, China; Bangkok, Thailand; as well as Australia.

EMG is an official member of the Port Equipment Manufacturers Association (PEMA), an international association of harbour equipment and technology manufacturers.

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Modern times

new BEUMER sales office to support customers

BEUMER customer support replaces, for example belt and buckets, with BEUMER-developed heavy duty technology components, so that cement manufacturers can meet any performance and technology requirements. (All pictures: BEUMER Group GmbH & Co. KG)

BEUMER opens sales office to support customers by retrofitting systems from a range of suppliers

The BEUMER Group has opened a new sales office in the Ruhr area of Germany to support its customers with an even more comprehensive range of services. From this 'West' office, BEUMER Customer Support will handle worldwide retrofitting and modernization projects, for example on currently operating conveying systems like bucket elevators and clinker conveyors, including those from other suppliers. The goal is to co-operate closely with the group's headquarters in Beckum and provide everything from one source — from receiving a query, to technical dimensioning and on-site installation. With only one contact, the operator can be sure of high system availability.

The goals for many building materials companies include being able to compete with the leading cement manufacturers and to position themselves for profitable construction projects. This requires systems that run reliably and can be adapted to the growing requirements of the market. "We ensure high availability during the entire running time," says Guido Hesse, Director Customer Support at BEUMER Group. "Our customers know that they can rely on us." More than 1,000 employees worldwide now work for this business segment. They take care of the customer, starting with the first project discussion, through the time when the system is in operation.

"We provide comprehensive solutions," explains Hesse. "They are matched individually to the respective needs of the customer, including service intervals and response times as agreed by contract." In the event of a system standstill, qualified Customer Support technicians arrive quickly on site to prevent long downtimes. Customer Support offers around-the-clock telephone support every day of the year worldwide, helping to further reduce downtime to a minimum.

The technicians perform remote analyses, indicate corrective measures and offer quick and reliable solutions to correct malfunctions. BEUMER Customer Support also ensures that the machines are always up-to-date. "We make sure that the machines are comprehensively modernized," says Hesse. The advantages include higher performance and availability, minimized energy consumption, more ergonomic working conditions, new functions and a better overall system utilization. For this, BEUMER employees can update or upgrade the systems.

"As all systems used by the customer need to be complementary, we also take care of retrofitting the mechanical parts and control technology produced by third-party manufacturers, in addition to the continuous development of our own products," explains Hesse. To further optimize these processes in the future, the corporate group opened the new 'West' sales office in the German Ruhr area. The team of experts focuses on the implementation of projects where BEUMER technology is used to retrofit or update conveying systems for bulk material such as bucket elevators and clinker conveyors, including those from other suppliers.

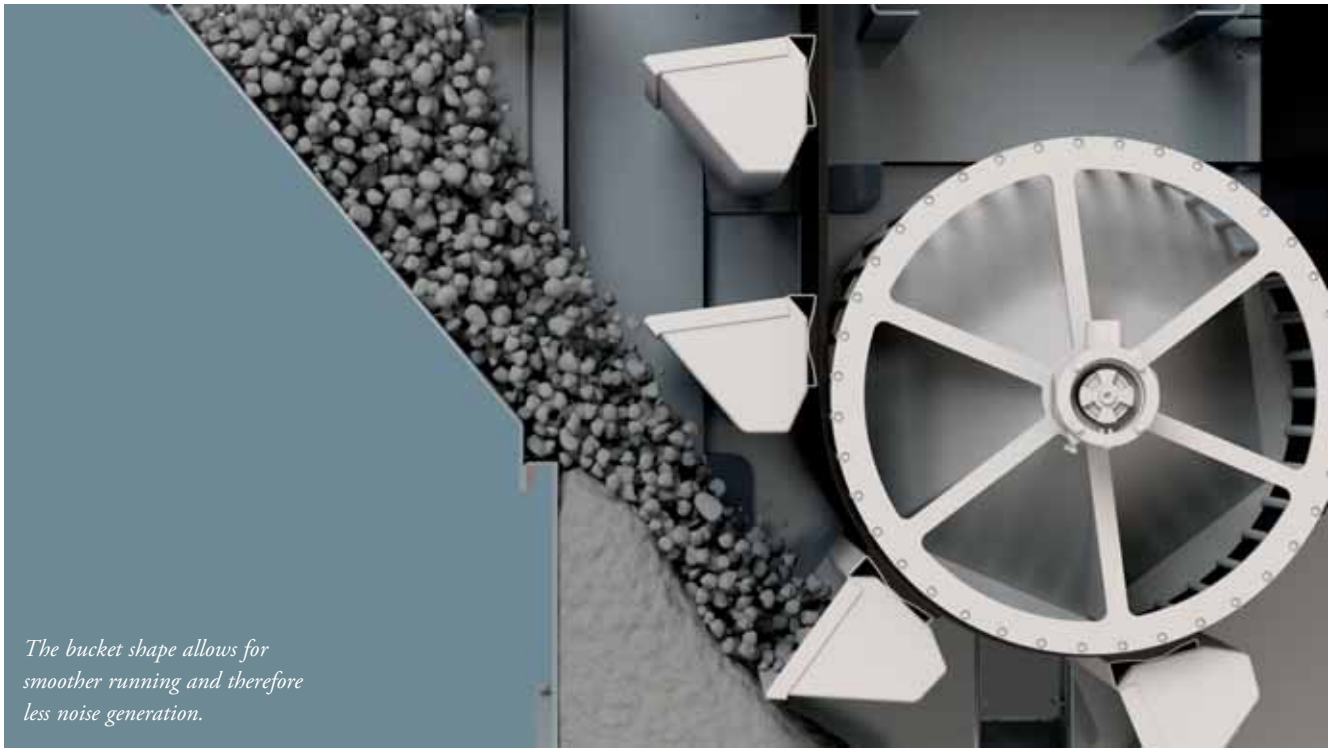
One contact – faster decisions

"We work closely with our headquarters in Beckum. The customer receives everything from one single source, starting with the query to technical dimensioning and the installation on site," explains Hesse. Customers have one contact, which means they can benefit from reduced organizational and co-ordination expenses and they generally decide faster on modernizations. "The costs for these measures are mostly provided from the customer's maintenance budget or factory investments. Hesse: "From our new 'West' office, we can now react to each request immediately, worldwide, and provide support with extensive know-how." External consultants are no longer necessary, like for the co-ordination of new investments, which speeds up the decision making-process considerably.

Modernization pays off

The BEUMER modification concept has already achieved high levels of customer satisfaction, keeping existing structures as they are as much as possible. Companies can reduce their costs because they need to spend money on only a few components, which means a more rapid return on investment. Shorter

From its 'West' sales office, BEUMER Customer Support handles the retrofitting and modernization of bucket elevators from any supplier.



The bucket shape allows for smoother running and therefore less noise generation.

installation and transfer times are another advantage.

"As a market leader, we have been developing sophisticated technical retrofitting measures for conveying systems of bulk materials from any manufacturer," says Hesse. "This is why we can offer the optimal solution for different application scenarios. We know our competitors, their products and the differences between each."

An African cement manufacturer suffered recurring production losses due to the malfunctioning belt of a 60m-high bucket elevator from a different manufacturer used for feeding a silo. "This is a typical problem," according to Hesse. The system had to be stopped repeatedly for the workers to correct the error. In the long run, this needed to be corrected.

In this case, the modernization of the plant was recommended. "We didn't just want to repair the error, but actively support the company to meet upcoming capacity and technology requirements," emphasizes Hesse.

The BEUMER experts replaced the belt and the buckets with heavy duty components developed by BEUMER Group. This solution offers buckets that are mounted firmly to the back of the belt by segments and bolts. Belts with wire-free zones are used for the HD bucket elevators just as with all BEUMER belt bucket elevators. The buckets can be fastened to the belt without damaging the steel wires or even cutting them. The traction forces of the bucket elevator belt are maintained throughout. The bucket shape also allows for smoother running and therefore less noise generation.

The drive and return pulleys were also exchanged. The new conveyor belts are resistant to mechanical wear and tear and allow conveying of large grain sizes and taking up high tensile loads. This helps the cement manufacturer to increase the availability of the bucket elevator, reduce energy consumption and extend service life. This solution, instead of simply replacing the belt, makes the company more competitive in the long run.

Guido Hesse, Director of Customer Support at BEUMER Group.

Speaking the same language

BEUMER Group sets high standards for its Customer Support employees. When systems are installed and used in other countries, BEUMER believes that the customer should have access to a Customer Support technician that originates from the same cultural background and speaks the same language. "This is why we decide from our 'West' office which of our colleagues, for example, will be on site for projects in Africa and who will be responsible for Southeast Asia," explains Hesse. Successful customer support requires successful communication. How is the customer positioned? What are their goals and how do they want to develop in the future? These questions require tact and cultural know-how. The BEUMER Group is a global company and capable of meeting this challenge. DCi

Bulk on the move: conveyor systems

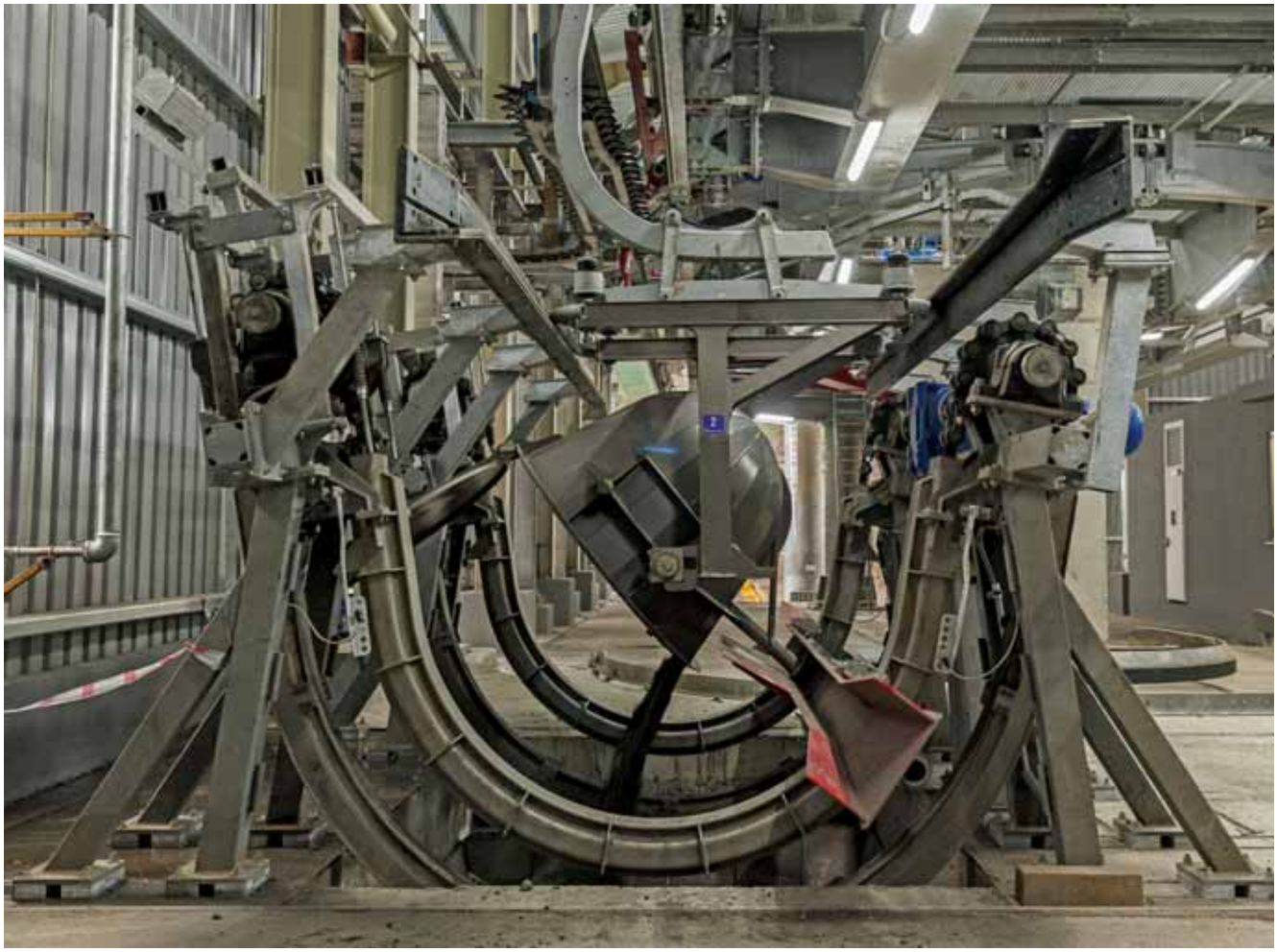
Louise Dodds-Ely

Dual-use Doppelmayr ropeway transports material and people

The Cerattepe underground copper mine of the Turkish Eti Bakır A.S. mining company (a member of Cengiz Holding) is situated in very mountainous terrain approximately 3.5km southwest of Artvin, a city in the Black Sea region in north-eastern Turkey. The mined copper ore is transported to the river with a 4.5km-long ropeway, which covers a difference in elevation of more than 1,500m on its way there.

The mouth of the Cerattepe copper mine is at approximately 1,700m above sea level. From there, the ropeway transports the ore into the valley over a distance of 4.5km across steep, wooded terrain. The incline is more than 43° at the steepest point. The ropeway can also be used to transport backfill material from the valley to the mouth of the mine.

The system consists of a continuously moving steel wire rope to which the 51 material buckets are attached by means of a grip. The rope loop is driven by bull-



wheels in the loading station and tensioned via a return bullwheel in the unloading station in the valley. A mechanism in the stations opens the detachable grip of the material buckets and slows down each bucket. The buckets can thus be stopped for the loading and unloading procedures in the stations but can still travel along the track at full speed. They are re-attached to the rope as they leave the station.

Furthermore, the Cerattepe ropeway allows for the combined transport of material and people. Apart from the material buckets in which the ore is transported, the system will also be equipped with some passenger cabins.

In these cabins, the mineworkers can travel to their workplace comfortably and in safety. A trip in any of the cabins takes approximately 20 minutes. Two different types of guides are installed in the stations: one for the material buckets, and one for the passenger cabins.

Material flow and passenger transport can thus be kept separated.

To prevent soiling of the sensitive environment, the buckets have been fitted with lids. Any loss of material along the track can thus be prevented. In the unloading station, the lids are opened automatically via a special mechanism and the buckets are turned upside down so that the material will fall onto a chute. Then the buckets are tilted back to their normal position.

Operation of the ropeway is fully automatic. Operating costs can thus be optimized. There are also hardly any moving parts along the track. All material buckets and cabins travel through the stations regularly and can be easily inspected and maintained there.

To cover the entire distance and the enormous difference in elevation of 1,500m, the ropeway requires only 11 towers.

The footprint on the ground can thus be minimized, and because the system is elevated off the ground, it does not represent an insurmountable obstacle for man or wildlife.

The ropeway started operations in December 2017 and, since that time, has been transporting 60 tonnes of copper ore per hour into the valley.

It's time to expect more from your conveyor belts

Conveyors remain the most effective method of transshipment and on-site transportation. The dry cargo industry spends millions each year buying, fitting and repairing conveyor belts. Therefore, conveyor belt durability and reliability are critical factors in both productivity and cost management. All too often, however, much of that expenditure is wasted in the pursuit of what as often as not prove to be false economies.

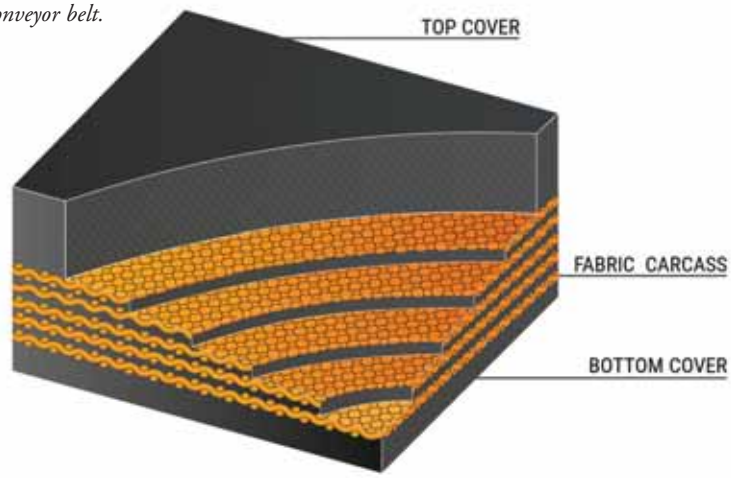
During recent years, the technology used to manufacture conveyor belts has advanced quite significantly. Today's belts, especially those that carry products such as coal and biomass, should run for years and years. Surprisingly, many operators still seem satisfied with getting two or three years' wear life out of a belt when that lifetime should really be at least 50% longer.

What is also changing is the need to have conveyor belts that are much more adaptable and that can convey a wider variety of product, while at the same time conforming to increasingly stringent fire safety standards and regulations.

Getting the best advice and guidance is not always as easy. For most belt suppliers and service companies, conveyor belts that last longer and require less maintenance are not good for business. All too often, their philosophy seems to be "sell cheap and replace often".

Here, Les Williams of Dunlop explains about the three types of conveyor belt most commonly used within the cargo industry and provides advice on how to dramatically reduce the frequency of conveyor belt repair and replacement while boosting productivity and improving safety at the same time.

Basic structure of a conveyor belt.



Conveyor belts — the basic structure

Although conveyor belts would appear to simply be long lengths of thick black rubber to most people, there is much more to them than meets the eye. The basic structure only consists of two elements — the carcass and the rubber used to protect that carcass. However, there is a tremendous amount of science and technology involved in those two elements.

The carcass is the basis of every conveyor belt and typically contain layers of extremely strong but flexible fabric (usually polyester/nylon) each separated by a layer (skim) of rubber.

It is the carcass that provides the inherent characteristics of a conveyor belt such as its tensile strength and elongation (elasticity or 'stretch' under tension).

The quality of the fabric used by the manufacturer is key. The longitudinal and transversal tensile strength and elongation (elasticity) of the fabric plies must be consistent throughout the entire length of all the plies. If the strength and elongation varies then problems with tracking/steering will occur. These are common problems when low-grade fabric has been used to gain a price advantage in the market.

Something that is often not sufficiently taken into consideration is the size of the drums and pulleys. Diameters that are insufficient for the tensile strength and thickness of the belt will lead to problems such a dynamic stress within the carcass and also splice joint failures.

Calculating the correct belt specification is not easy and usually requires specialist knowledge. A good manufacturer or supplier should be able to provide honest advice supported by detailed technical information in the form of technical datasheets. At Dunlop our application engineering and local sales representatives see providing this kind of technical support as an everyday part of the job.

Abrasion resistance test.

Protecting the carcass

The second element of a conveyor belt's basic structure is the rubber outer covers that protect the carcass. The type and quality of the covers will, without doubt, have the single biggest impact on the operational lifetime of the conveyor belt and ultimately its cost effectiveness. Several different types of rubber compound are used for rubber multi-ply belting. Each compound is specifically engineered to withstand the damaging effects caused by abrasion, ozone, tearing and cutting, heat, cold, fire and oil penetration. These covers are generally referred to as 'cover grade qualities'. The most commonly used cover grades within the dry cargo industry are abrasion resistant, oil resistant and fire resistant, often in a combination thereof.

Abrasion resistance

Regardless of the type of cover (heat resistant, fire resistant etc.) it is the abrasion (wear) resistance of the rubber that will almost invariably have the most influence the ultimate working life. As a general rule, 80% of conveyor belt surface wear occurs on the top cover of the belt. Approximately 20% of wear takes place on the bottom cover.

Wear on the top cover is primarily caused by the abrasive action of the materials being carried, especially at the loading point or 'station' where the belt is exposed to impact by the bulk material and at the discharge point where the material is effectively 'accelerated' by the belt surface. 'Short' belts (below 50 metres) usually wear at a faster rate because they pass the loading and discharge points more frequently compared with longer belts. For this reason, the selection of the correct type of cover quality and the thickness of shorter length belts becomes even more important than usual.

Wear on the bottom cover of the belt is mainly caused by the friction contact with the drum surface and idlers. The rate and uniformity of this type of wear can be adversely affected by many other factors. These include misaligned or worn drums, idlers set at incorrect angles, ozone penetration or an unclean environment where there is a build-up of waste material. All of these factors can cause accelerated wear.

Different types of abrasion

It is a common misconception that a belt specified by a supplier as being 'abrasion resistant' should naturally be expected not to wear quickly. In actual fact, because of the variety of materials that are carried on conveyor belts, there are a number of different causes of wear and abrasion. For example, heavy and/or sharp objects can cause cutting and gouging of the belt surface whereas materials such as coal, sand and gravel literally act like sandpaper constantly scouring the rubber cover. For this reason, there are different types of abrasion-resistant cover.

There are two internationally recognized

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sets of standards for abrasion, EN ISO 14890 (H, D and L) and DIN 22102 (Y, W and X). In Europe, it is the longer-established DIN standards that are most commonly recognized and accepted. Generally speaking, DIN Y relates to 'normal' service conditions and DIN W for resistance to abrasion, cutting, impact (from high drop heights), and gouging resulting from large lump sizes of heavy and sharp materials.

Thicker is not always better

In an effort to achieve a longer operational life, many conveyor belt suppliers offer belts with covers that are thicker than are actually necessary but this can lead to other operational problems. However, as I touched on earlier, the actual abrasion resistance quality of the rubber is far more important than the thickness.

Each manufacturer uses its own mix or 'recipe' of polymers to create cover compounds that have different abrasion (wear) resistance qualities. The main polymers used are SBR (Styrene-Butadiene-Rubber) and BR (Butadiene-Rubber). Both SBR and BR have particularly good resistance not only to abrasion but also tearing, cutting, ripping and gouging. Many manufacturers try to avoid the use of natural rubber wherever possible in order to keep costs (prices) low.

It is important to remember that DIN and ISO standards are only the minimum benchmark of acceptability. Belts that conform to international standards still often have to be replaced after unacceptably short periods. Despite the claims of the manufacturers stating otherwise, laboratory tests reveal that more than 50% of all belts are found to be significantly below the minimum standards expected.

Our approach at Dunlop has always been to provide belts that will provide the longest-possible wear life. This is best achieved by developing abrasion resistant covers such as the RA grade, which significantly exceeds international quality standards. For extremely abrasive materials, or simply to achieve an even longer working life, Dunlop RS covers are recommended because they exceed the highest abrasion standard (DIN W) and the equivalent ISO 'D' standard and have excellent resilience when it comes to conveying materials that can cut and rip the belt covers.

Oil resistant belts

Cargo such as grain and biomass can contain oil or resin. Oil is particularly damaging to conveyor belts because it penetrates into the rubber covers causing them to soften, swell and distort. This results in all kinds of problems including a dramatic decrease in resistance against abrasion (accelerated wear). As the rubber softens it is also prone to ripping and tearing much more easily, along with a serious reduction in the elongation at break (the amount of stretch before the belt snaps) together with a loss of tensile strength.

The distortion of the belt is caused by the rubber in the top cover (which carries the material) absorbing oil and swelling while the bottom cover does not, thereby creating opposing forces that distort the belt. The photograph on the left shows a section of an abrasion resistant belt that has been exposed to oil over a two-week period alongside a section of oil resistant.

A common downside of having rubber that has good resistance to oil is that the ingredients used to create that resistance tend to have an adverse effect on the wear-resistant properties of the rubber. In other words, oil-resistant belts usually wear out faster but it is possible to have the best of both worlds. At Dunlop, our oil resistant rubber compounds have a higher resistance to abrasion than the vast majority of abrasion resistant belts in the market.

Testing oil resistance

Most belt manufacturers supply only one type of oil resistant cover, usually referred to as 'MOR', which means 'medium oil resistant'. Unfortunately, manufacturers and traders can confidently claim that the 'MOR' belt they are supplying has good oil resistance while safe and secure in the knowledge that there are no ISO or DIN international standards for oil resistance that the belt being offered has to meet. At Dunlop we have two different oil-resistant compounds (ROM and ROS). We use the American ASTM 'D' 1460 test method for these compounds. This test is widely regarded as being the most demanding of its kind in the world.

Fire-resistant belting

The first thing to understand about fireproof rubber conveyor belts is that they do not exist. By its very nature, rubber and the fabric inner plies (usually polyester and nylon) that is used to make conveyor belts are combustible. They will be destroyed by fire — end of story. The two descriptions used by conveyor belt manufacturers are 'fire retardant' and, most commonly, 'fire resistant'. In truth, a more accurate description would be 'self-extinguishing'. This is because the ability of a conveyor belt to 'resist' fire is achieved by adding special chemicals and additives to the rubber compound during the mixing process. What actually happens when the rubber is ignited it effectively starves the fire of oxygen, thereby extinguishing the flames.

If poor quality and/or insufficient amounts of the additives are used in order to minimize production costs (and ultimately the selling price) then the slower and less able the rubber will be to self-extinguish. This is enormously important because the conveyor is doing what it is meant to do, which is to convey at speed, only this time it is conveying fire. So, literally every second counts.

There are numerous safety classifications and international standards for which there are many different tests used to measure the self-extinguishing properties of conveyor belts. The basis of most tests for belting used in the recycling and waste industry is EN/ISO 340. This standard makes the distinction between fire resistance with covers (K) and fire resistance with or without covers (S).

From an official standards point of view

'K' grade is EN 12882 Class 2A and 'S' grade is EN 12882 Class 2B. The relevance of 'with or without covers' is that as belt covers wear (become thinner) during their operational life, the amount of fire-resistant rubber protecting the flammable carcass reduces.

EN/ISO 340 testing

EN/ISO 340 tests involve exposing six individual samples of belt to a naked flame causing them to burn. The source of the flame is then removed and the combustion time (duration of flame) of the test piece is recorded. A current of air is then applied to the test piece for a specified time after the removal of the flame. The flame should not re-ignite.

The time it takes for the belt sample to self-extinguish after the flame has been removed is then measured. The duration of continued burning (visible flame) should be less than 15 seconds for each sample with an absolute maximum cumulative duration of 45 seconds for each group of six tests. This factor is of paramount importance because it determines how fire can be effectively carried along a moving belt.

Even if a manufacturer states that its fire-resistant/fire-retardant belt has passed the ISO 340 test, the buyer should still exercise caution. A typical conveyor belt can easily travel more than 40 metres within the 15 seconds sufficient for a belt sample to pass the test, so this would still allow the belt to carry flames over a potentially dangerous distance. For this reason, our required self-extinguishing time limit standard in Dunlop is no more than one second, ideally 0 seconds. Buyers of fire-resistant belt are therefore recommended to ask to see copies of the test results.

What standard of fire resistance do I need?

One of the most difficult challenges for users of conveyor belts is establishing the correct level or standard of fire resistance is needed. For the vast majority of belts being used in the open air, especially those carrying only coal, EN 12882 Class 2A would be perfectly adequate while Class 2B is usually regarded as the minimum standard for belts being used indoors unless the conveyor is used to carry biomass. If you are unsure of the fire resistant grade of belting needed, then it is best to carry out an internal risk assessment. If the expertise for this does not exist within your company, then there are a number of external organizations (and almost certainly your insurers) that can perform this function for you.


Fire testing.

Handling biomass

One of the biggest issues when handling biomass is dust emission. In the production process of biomass wood pellets, wood chip and similar renewable resources, the materials are continually broken down. This results in high levels of combustible dust. The dry flammable dust found in biomass can be ignited even by abrasion created within a conveyor system because the source does not require high levels of ignition energy for the ultimate ignition. This is one of the major factors in biomass dust explosion prevention. Biomass dust can also be highly prone to self-ignition, especially if the material has become damp. A chemical reaction can take place that causes self-heating and what is referred to as 'off-gassing' (carbon dioxide and carbon monoxide emissions).

This means that conveyor design including dust extraction systems and chutes take on a much greater importance. Strict conformity to Directive 2014/34/EU (also known as 'ATEX 114' or 'the ATEX Equipment Directive') applicable to potentially explosive atmospheres of zones 20, 21 and 22 where combustible dust is present should be a pre-requisite.

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

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

Ozone & UV resistance

Apart from being able to resist the wear and damage physically caused by the materials they have to convey, all conveyor belts also need to have first class resistance to the effects of ozone and sunlight (UV). This especially applies to belts being in used in coastal areas, even if the belts are under cover. At high altitude, ozone acts as a protective shield but at ground level it is a pollutant. The effects are known as ozonolysis. If you search for "the effects of ozonolysis on rubber" on the internet it will tell you under 'Susceptible elastomers' that "Tiny traces of ozone in the air will attack double bonds in rubber chains, with natural rubber, polybutadiene, styrene-butadiene rubber and nitrile rubber being most sensitive to degradation."

Exposure to ozone increases the acidity of carbon black surfaces and causes reactions to take place within the molecular structure of the rubber. This can have several consequences such as a surface cracking, a marked decrease in the tensile strength of the rubber and consequently a much shorter belt life. The same applies to exposure to ultra violet light (including fluorescent light) and is

The invisible belt destroyer. Ozone causes rubber to crack and degrade.

referred to as 'UV degradation'.

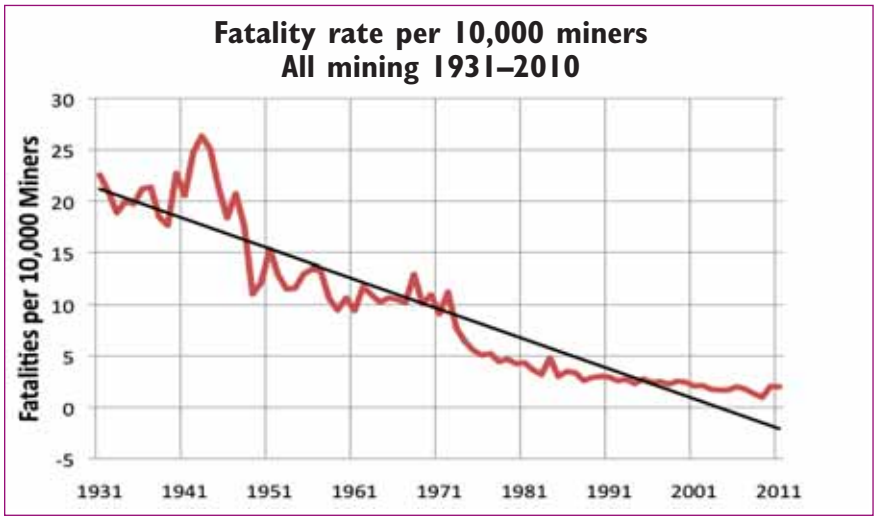
Even more significant are the environmental and health and safety consequences, especially when carrying biomass because the dust particles penetrate the surface cracks and are then discharged (shaken out) on the return (underside) run of the belt. You will hardly ever find a belt manufacturer that mentions the subject of ozone and UV resistance. This is because it requires quite expensive special anti-ozonant additives in the compound to create the resistance. We have hardly ever tested a competitor's belt that passed the EN/ISO 1431 test specific conditions. My advice is to always insist on certification confirming that the belt you are ordering has successfully passed the EN/ISO 1431 test.

Always ask for proof

My final piece of advice is to always demand a manufacturer's technical datasheet and insist on documented evidence of the belt's providence (origin), the warranty and the various standards that it promises to achieve such as being anti-static and resistant to ozone. Doing so could well save you an awful lot of money.

Eliminating the risk: a new approach to conveyor safety

Miners and material processors in the US have made great strides in improving safety over the last 80 years, with fatalities and injuries showing a significant decline since the 1930s, *writes Jerad Heitzler, Safety Training Manager, Martin Engineering*. The fatal accident rate among miners has dropped from a peak of more than 25 deaths per 10,000 workers in the early 1940s to fewer than five currently. If the rate is plotted graphically, we can see that there have been two significant drops — one in the mid-1940s and another in the mid-70s. But the graph also illustrates that while the overall number has continued to decline slightly in the last 30 years, the rate of improvement has slowed drastically. Despite more money spent on safety, along with tighter regulation, better training and higher fines, the fatality rate seems to have reached a plateau.



The knowledge gap

Conveyors are among the most dynamic and potentially dangerous areas of equipment at a mine or a plant site. Even though their safety and performance are critical to the plant's success, the impact of their contribution to the plant's efficiency is often unrecognized by management and workers alike. Operational basics of belt conveyor systems are too often a mystery to those employees, who have little understanding about the hardware installed and the performance required from the components.

The knowledge gap is understandable. The attention of personnel at a mine or coal handling operation is centred on the production of the company's main product. The 'care and feeding' of belt conveyors —

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that is, the adjustment, maintenance and troubleshooting that make a huge difference in safety, performance and profitability — is typically outside of their expertise. It's not that they don't care about conveyors, but the ongoing maintenance and service of these systems is often not part of their immediate focus or within their time constraints.

Further, there is often a failure of the retiring workforce to pass along the wisdom they've gained over the years. Sometimes making matters worse, when they do provide instruction to less experienced workers, the 'old guard' can be communicating outdated information or even unsafe habits that have been ingrained over time.

How important is safe conveying?

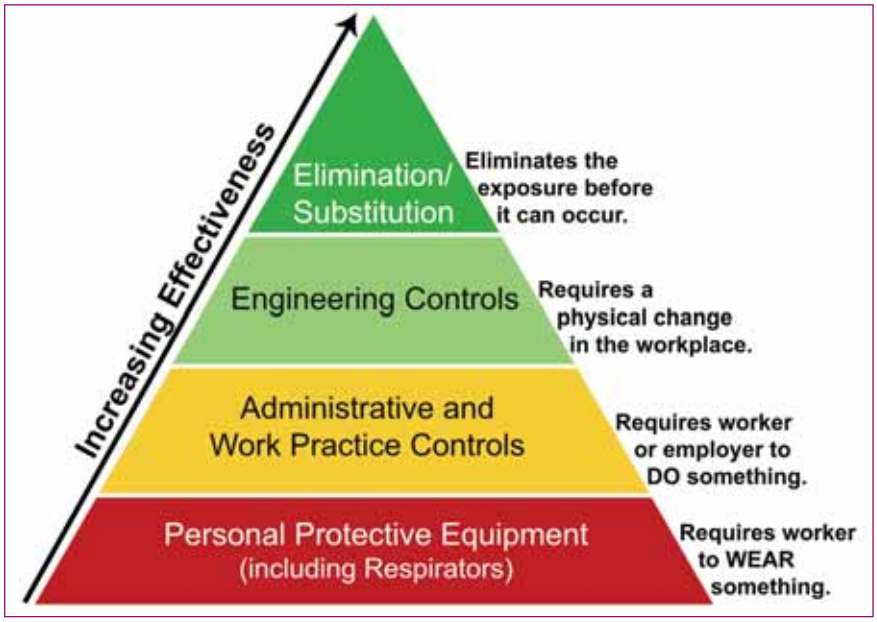
Conveyors apply large amounts of mechanical energy to what is essentially a giant elastic band, stretched tight and threaded through a maze of components. This stretched band is burdened with a heavy load of material and moved at high speed, sometimes with drive motors as large as 600HP (450kW). Given the inertia and kinetic energy, enormous forces are involved. The human body, able to generate less than 1HP, is simply no match.

A report from the Mine Safety and Health Administration found that over a recent four-year period, more than 40% of injuries were caused while a worker was performing maintenance or checking a conveyor. Nearly as many more were hurt while the subject was cleaning or shoveling near a moving belt.[1]

In another study of more than 200 fatal mining accidents, data compiled by MSHA and the US Department of Labor observed that 48 of those involved conveyors. Activities most often leading to conveyor-related fatalities were maintenance (such as replacing idlers or clearing blockages) and cleanup (including shoveling or hosing). Together they accounted for more than 50% of the total.

What works?

OSHA (Occupational Safety and Health Administration) statistics indicate the effectiveness of various approaches to safety, represented here in a pyramid. The least effective method of reducing injury is personal protective equipment (PPE). While no doubt helpful in a worker's ability to withstand accidents and minimize injury, items such as hard hats and steel-toed shoes do nothing to help prevent an accident event.



More effective are administrative and work practice controls, such as creating Standard Operating Procedures and Best Practices for conveyor operation, service and maintenance. An even better approach is the use engineering controls, which require a physical change in the workplace, such as effective guards and lockouts that bring the system closer to the pinnacle of accident reduction: preventing the exposure to a hazard before an accident can occur.

Training

A critical element of improving conveyor safety and performance is the training of plant personnel in how components work, what problems can interfere with their efficient operation, and what personnel can do to improve those issues. Unfortunately, there are few industry standards that focus on conveyor training, and in light of the number of conveyor-related accidents each year, it appears that existing programmes have not accomplished their mission.

The goal of a sound training programme is to instruct plant personnel — operators and managers alike — on the principles of conveyor operation, identifying the signs and corrections for common conveyor problems. While some companies recognize that training is a worthwhile investment (rather than an expense), there are many firms that lack focus. Conveyor performance and safety is a specialized field, and whether it's in-house or from contracted specialists, the most effective training is conducted by full-time safety professionals.

Guarding

Guarding is a critical element of a safe conveyor. It's also one of the most common reasons government agencies have issued citations over the last several years. Many accidents involving conveyor belts can be attributed directly to the accessibility of danger zones. The majority of these occur during maintenance activities with conveyors still in operation and danger zones unprotected. Preventative measures must be implemented in order that work on or near conveyors can be performed safely.

It's essential that all pinch points be equipped with well-designed guards to prevent accidental or unwise encroachment by employees. This includes rotating components like pulleys and idlers, as well as equipment that may create sudden movement, such as gravity take-ups. Many plants are beginning to totally enclose hazardous spaces as a way of protecting employees and visitors using walkways and secure inspection points, with heavy guards fabricated from metal mesh or screen that permits observation of moving parts without posing an opportunity for injury.

Detailed safety guidelines for the US are published in *ASME Standard B-2.1-2006: Safety Standard for Conveyors and Related Equipment and in B15.1: Safety Standard for Mechanical Power Transmission Apparatus*. While virtually every nation has individual requirements that apply to the placement of guards, local and general industry standards should also be consulted and implemented.

Lockout/tagout/blockout

Workers may feel confident that they can avoid harm by letting go of whatever tool

[1] References 1. Padgett, Harvey L. (2001): Powered Haulage Conveyor Belt Injuries in Surface Areas of Metal/Nonmetal Mines, 1996-2001; Denver, Colorado; MSHA Office of Injury and Employment Information.

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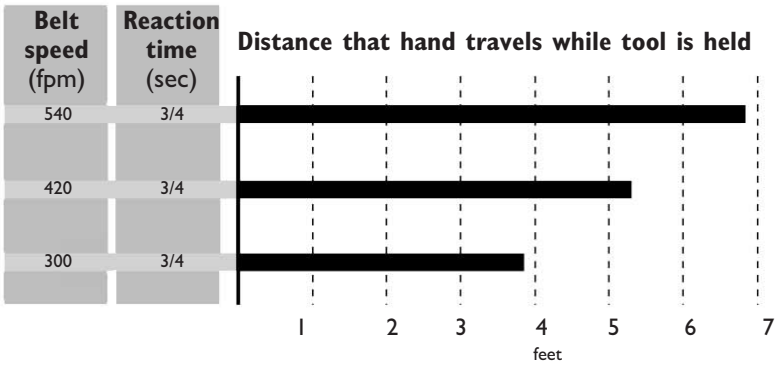

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they might be using around a moving conveyor in time to escape entrapment, but in reality that's extremely unlikely. Even if a person could react in just 3/4 of a second (slightly longer than the time it takes for a major league fastball to travel from the pitcher to the hitter), belts travelling at typical speeds would move several feet before the object could be released, likely producing tragic consequences. The key is to prevent the need for the employee to release that tool, by significantly reducing the fugitive material that requires clean-up near a moving conveyor.

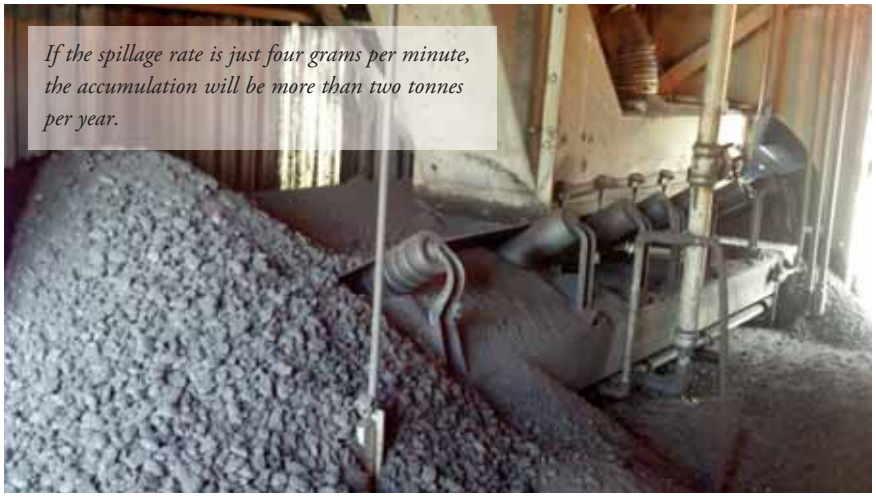
Because of the potential energy stored in belt tension or elevated bulk materials, a crucial part of an effective conveyor safety programme is the lockout/tagout procedure. In the US, lockout/tagout is an OSHA requirement, and MSHA has adopted a similar version of this rule. Exact steps for the procedure are very site-specific and will depend on the individual facility's equipment and layout of the computer system. But there are some general features that should be part of every SOP.

Lockout/tagout procedures require that power to the conveyor system (and any accessory equipment) be shut down, locked and tagged by the person who will be performing the service. Only the person(s) performing the work should be able to unlock it, in order to prevent the conveyor from being started by someone else. If the procedure requires multiple staff members, each worker involved should be required to place a personal lock on the de-energizing switch or switches, and only that employee should have a key to remove it. This may require more than one lock bar, but it's worth the small investment. Each employee should also hang a tag on his/her lock that includes name and contact information.

However, it's not enough that the conveyor be locked out; the belt must also be prevented from moving. Blockout procedures are designed to prevent unintended belt travel after lockout/tagout due to stored tension energy in the belt or potential energy from an elevated load. Lifting gravity take-up counterweights may not release these tensions, and although properly-installed brakes and backstops may help prevent this type of motion, physical restraints on the belt are the only sure method. Belt clamps, chains and ratchet lever hoists (come-alongs) can be used to physically restrain the belt by securing the blocking device to a structural member of the conveyor that is capable of restraining the expected forces. Equipment engineered to securely clamp the belt is critical to prevent movement and potential injury.

Accumulation of Fugitive Material Over Time

Fugitive Material Released	Accumulation				
	Hour (60 minutes)	Day (24 hours)	Week (7 days)	Month (30 days)	Year (360 days)
"packet of sugar" (4 g) per hour	4 g (0.1 oz)	96 g (3.4 oz)	672 g (1.5 lb_m)	2,9 kg (6.3 lb_m)	34,6 kg (75.6 lb_m)
"packet of sugar" (4 g) per minute	240 g (8.5 oz)	6,2 kg (13.8 lb_m)	43,7 kg (96.3 lb_m)	187,2 kg (412.7 lb_m)	2,2 t (2.5 st)
"shovel full" 9 kg (20 lb_m) per hour	9 kg (20 lb_m)	216 kg (480 lb_m)	1,5 t (1.7 st)	6,5 t (7.2 st)	77,8 t (86.4 st)
"bucket full" 20 kg (44 lb_m) per hour	20 kg (44 lb_m)	480 kg (1056 lb_m)	3,4 t (3.7 st)	134,4 t (15.8 st)	172,8 t (190 st)
"shovel full" 9 kg (20 lb_m) per minute	540 kg (1200 lb_m)	13 t (14.4 st)	90,7 t (100.8 st)	388,8 t (432 st)	4665,6 t (5184 st)



If the spillage rate is just four grams per minute, the accumulation will be more than two tonnes per year.

Fugitive material

Given the number of conveyor-related injuries that occur during routine maintenance and cleanup, controlling fugitive material should be viewed as one of the primary elements in reducing hazards and preventing injuries. Dealing with spillage, dust and carryback typically requires employees to work in close proximity to the moving conveyor, where even incidental contact can result in serious injury in a matter of seconds. Airborne dust can also raise inhalation concerns, primarily when fine, lightweight particles are sufficiently disturbed that their low mass causes them to hang suspended in the air and migrate easily.

Further, spillage can contribute to the risk of fire by interfering with pulleys and idlers and by providing potential fuel. Most conveyor fires are ignited by friction-generated heat from a pulley turning against a stalled belt or a belt moving over a seized idler. A conveyor belt fire of any size is a serious issue, not only because the

belt or its contents may burn, but also because the length and movement of the belt can spread a fire a great distance in a very short time. One overheated bearing and a small amount of powdered material can quickly turn into a large-scale event. Even worse, in confined spaces, airborne particles can create the right ingredients for an explosion.

The build-up of fugitive material can occur with surprising speed. As the chart below illustrates, spillage in an amount equal to just one sugar packet (about four grams) per hour will result in an accumulation of about 1.5 pounds at the end of a week. If the rate of escape is four grams per minute, the accumulation will approach 100 pounds per week, or more than two tonnes per year. If the spillage amounts to just one shovelful per hour (not an uncommon occurrence in some operations), personnel can expect to have to deal with nearly 500 pounds of fugitive material every day. As material escapes, it accumulates on idlers and other components, contributing to premature failure. Once a bearing seizes, the constant belt movement can wear through an idler shell with surprising speed, leaving a razor-sharp edge that poses a threat to workers and to the belt itself.

Containment

There are several technologies available to help contain fugitive material, helping to control ongoing costs and reduce the risk of injury. These include specially-engineered transfer points that channel the material stream to reduce the entrainment of air into the material flow and minimize the release of dust, as well as new component designs to improve belt support and sealing systems that reduce maintenance requirements, allowing service to be performed more safely from outside enclosures and away from moving parts.

Engineered transfer chutes can accomplish conveyor loading and discharge without blockages, while greatly minimizing the dust generated. With a design based on testing and computer-based flow studies of the specific material to be handled, these transfer chute systems deliver better material control, more continuous flow at higher capacities and dramatic reductions in material spillage and dust release. By controlling the velocity and force of impact in the load zone to match the belt speed and direction, these engineered systems mitigate material splash, turbulence and dust.

New impact cradle designs are also helping to improve material control, while drastically reducing the time and effort needed for service. Among the newly-introduced components is a cradle engineered so that one person can easily change the rollers, directly reducing downtime and labour.

Designed for ease of service, modular components allow faster, safer changeouts by one person.

For years, wear liners have been installed on the inside of the transfer point's skirtboard, to help preserve the steel structure and protect the skirtboard sealing system. But this internal liner proved difficult to install and inspect, and even harder to replace. Today, modern conveyor architects have developed an external wear liner; that is, a liner mounted on the outside of the skirtboard, allowing safer installation and maintenance. External wear liners effectively protect the skirtboards and the sealing system, yet are easily inspected and maintained or replaced without requiring confined space entry.

Guarding is one of the most common reasons for citations. All pinch points need well-designed guards to prevent access.

Modular chute walls, which simplify the design and construction of transfer point skirtboards and stilling zones, help to manage airflow and control dust. Skirtboard covers with a 'peaked roof' form a settling zone to prevent escape of airborne dust from the conveyor loading zone, while improving safety by keeping workers away from moving cargo and rolling components.

New innovations include the first dual-sealing skirt system for belt conveyors, incorporating a primary seal clamped to the steel skirtboard to keep lumps on the belt and a secondary or 'outrigger' strip to capture any fines or dust particles that pass beneath the primary seal. The secondary seal lies gently on the belt and self-adjusts to maintain consistent strip-to-belt pressure, despite high-speed material movement and fluctuations in the belt's line of travel.

Innovations in skirting are also delivering improved material containment, as well as extended service life. One of those designs is a double-sided skirt that delivers two wear surfaces on a single elastomer sealing strip, installed along the bottom of the skirtboard in a loading zone to contain dust, prevent spillage and reduce cleanup expenses. When the bottom side of the strip against the belt is worn, the sealing strip is inverted, providing a second service life.

Conclusion

Fugitive material in the form of dust and spillage has always plagued coal conveyor operators, but it has been considered an unavoidable factor for far too long. In order to truly keep workers safe according to the strategy of hazard elimination, it's critical that the true hazard be understood. While rolling components and pinch points may be the source of injury, in many cases it's fugitive material that places workers in danger. If an operation can reduce fugitive material, it can also reduce injuries.

The coal industry can be rightfully proud of the advancements made in safety over the years, and the tools that have been proven to reduce accident rates should continue to be used. Much has been done to achieve an expectation of safety, but to sustain even lower rates of accident and fatality, the true risk should be identified as exposure to a hazard, rather than the hazard itself. Only by eliminating the possibility of that exposure can we continue our progress toward the holy grail of zero conveyor-related injuries.

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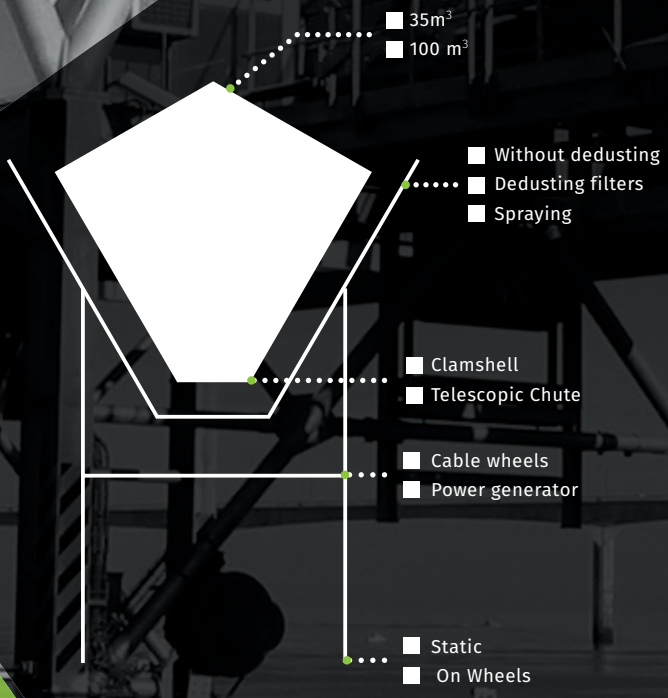
BULK UNDER CONTROL

MULTI-BULK HOPPER



GENERAL CHARACTERISTIC		
Util capacity	35m³	100m³
Feeding height without dedusting filters or with spraying	10m	11.5m
Feeding height with dedusting filters	12m	13m
Opening diameter without dedusting filters or with spraying	7m	9.5m
Opening diameter with dedusting filters	5.5m	8m

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Claudius Peters is especially innovative when tailor-made solutions — such as for bulk cargo terminals — are required by customers in the cement, aluminium and coal industries. The company's daily business involves handling typical bulk materials such as cement, fly ash, burnt oil shale, GGBS, coal, meal alumina etc.

Regardless of whether the bulk materials have to be transshipped from road or rail-based silo trucks, open or self-unloaded ships to stationary silos or vice

versa. Claudius Peters has technical solutions for all requirements.

As one of the world's most renowned suppliers of systems and equipment for the pneumatic transport of dry materials in large quantities, Claudius Peters has proven its capabilities in many installed terminals, worldwide. The company can easily offer capacities of e.g. 500tph (tonnes per hour), paired with conveying distances over more than 1,000m — it is very used to projects of this magnitude. In combination with the unique patented Claudius Peters FLUIDCON system, it is also possible to save up to 50% in energy costs.

In addition to the different shore-based conveying systems, Claudius Peters offers discharge and receiving equipment such as aeroslides, pumps or pressure vessel conveyor to equip self-unloading cargo vessels to transfer the bulk material from ship to shore, or vice versa. To reduce demurrage to a minimum, the Claudius Peters Contank, which offers discharge rates of up to 600tph with only one device, would be an excellent choice of feeding device.

Further, Claudius Peters' ground-breaking technology is prevalent in high capacity bulk storage. For capacity requirements, typically from 5,000 to 50,000 tonnes for free flowing bulk solids materials, Claudius Peters Projects excels. Discharge rates up to 1,000tph — or even more — from one storage silo can be achieved by means of Claudius Peters aeroslides, flow-control gates and bulk loading devices and be either filled into road or rail-based silo trucks. Additionally, river or sea carriers can be loaded using a Claudius Peters shiploader using gravity or injected by means of pneumatic conveyance, directly. Furthermore, the bulk material can be packed with the reputable Claudius Peters PACPAL packing and palletizing systems into bags or big bags, if required.

High belt speeds: a challenge for scrapers

High belt speeds represent a challenge for scrapers. Cleaning results are often less than satisfactory. But that is not always the case, as can be seen at this opencast lignite mine in Jänschwalde, Germany.

The mine uses four F 60 series conveyor bridges, built by the former GDR company TAKRAF Lauchhammer. Their job is to transport and dump overburden from the mining area in the Lausitz lignite mines. These are some of the biggest mobile machines in the world. They are approximately 200 metres wide, 500 to 600 metres long, up to 80 metres high and weigh several thousand tonnes.

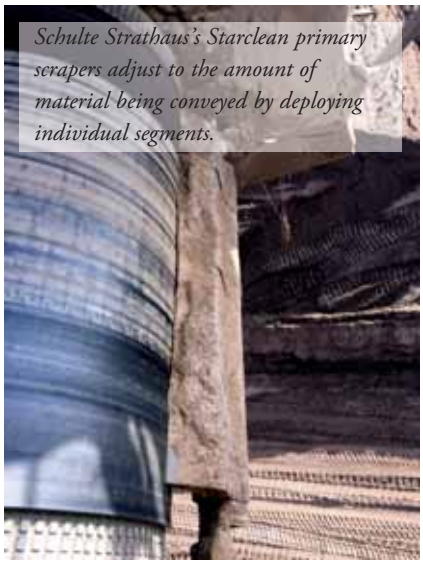
The maximum hourly load is a prodigious 34,000m³, according to Peter Hobracht. The 57-year old is responsible for heavy machinery maintenance at the Jänschwalde opencast mine near Cottbus, south of Berlin. He also has to look after the AFB F60/34, one of the conveyor bridges.

Once a year, "all bridges stop running", he says. The time is used for major maintenance and repair work. This time, primary and secondary belt scrapers also had to be renewed or replaced. Since the belts are not only hundreds of metres long and up to three metres wide but also run at very high speeds of up to ten metres per second, the demand for cleaning efficiency, ease of servicing and durability were high. As Hobracht knows, high speeds are "extremely challenging for scrapers".

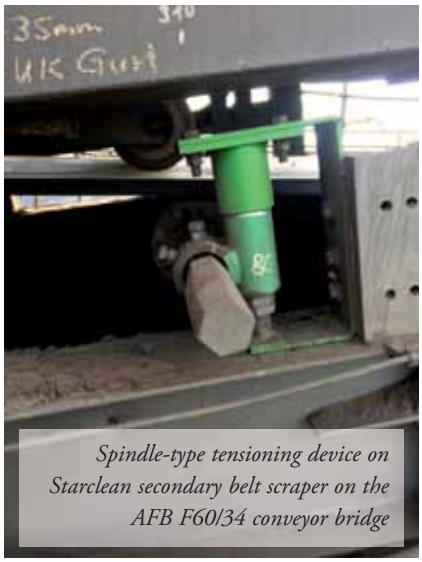
The main No. 5 conveyor belt alone reaches a speed of nine metres per second. Cleaning efficiency is often visibly reduced at such speeds and scraper wear and tear greatly increased. "With Schulte Strathaus and their Starclean scrapers we have found another manufacturer who can supply our particular needs," says Hobracht. Both cleaning efficiency and ease of servicing were considered "exemplary in practice".

As Franz Hering, head of distribution in East Germany for German manufacturer Schulte Strathaus, explained, thanks to the use of individual blades the scrapers automatically adapt to the conveyed material and the belt. The automatic torsion tensioning device ensures the segments always operate with the correct tension. Manual adjustment is unnecessary.

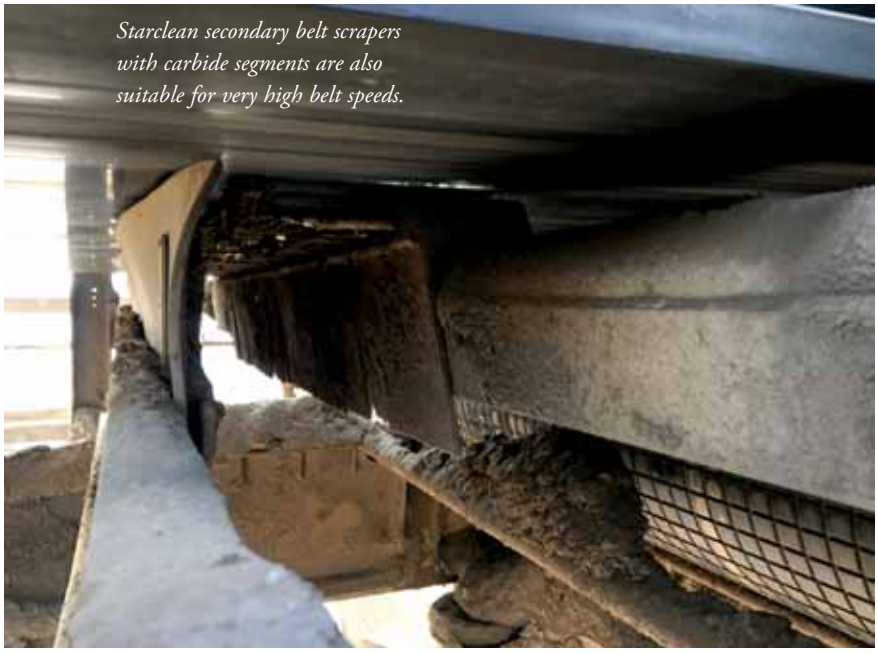
The same principle applies to the secondary belt scrapers. Here too the individual carbide segments with polyurethane snap-on feet adapt to the belt in optimal fashion. In addition, their position ensures belt cleaning with reduced wear. Installation and maintenance are relatively simple thanks to the snap-on system. As Hering says, "the replacement of worn-out parts in a different scraper system with bolted-on elements would be considerably more complicated."



Schulte Strathaus's Starclean primary scrapers adjust to the amount of material being conveyed by deploying individual segments.



Spindle-type tensioning device on Starclean secondary belt scraper on the AFB F60/34 conveyor bridge



Starclean secondary belt scrapers with carbide segments are also suitable for very high belt speeds.

One of the biggest mobile machines in the world: the AFB F60/34 conveyor bridge in the German opencast lignite mine Jänschwalde near Berlin.

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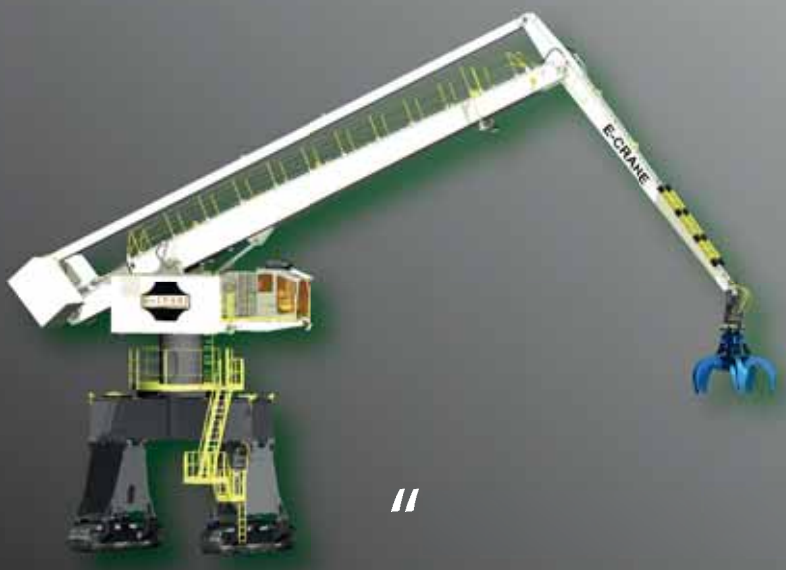

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Martin Engineering: controlling fugitive dust at limestone conveyor transfer

A global provider of quicklime and chalk products has resolved a significant fugitive material problem by implementing state-of-the-art containment and dust suppression on one of its primary limestone conveyors. After finding that an estimated 10–20% of the material load was spilling along the belt path, independent UK lime supplier Singleton Birch implemented a control strategy from Martin Engineering that included a rebuilt transfer point as the material takes a 20ft drop from one belt to another. Once the upgrade was complete, the air inside of the conveyor enclosure was clear enough to see down its entire length, with dust management so complete that, at first, remote operators questioned whether the material flow had resumed or not.

Piled high enough to encapsulate the tail pulley, the dust blocked walkways, posing a potential hazard.

Singleton Birch supplies products and services for steel production, land stabilization, acid neutralizing, water treatment and building mortars. The limestone is extracted from the Melton Ross Quarry a short distance away and transported to the processing facility, where it is crushed to 150mm minus (6in. minus) and transferred to the kiln.

Passed through the twin-shaft parallel-flow regenerative kiln running at about 1,000°C (1,832°F), the calcined soft-burned lime is discharged into another crusher and reduced to 50mm minus (2in. minus), and then either deposited into hoppers for bulk delivery or transferred to the GLC1 conveyor.

This system transports the limestone to conveyors leading to either the crushing and screening operation or the milling plant.

The company currently produces 1.5mtpa [million metric tonnes per annum] (1.65 million tons per annum) of processed limestone and chalk, as well as approximately 300,000 metric tonnes per annum (330,700 tons per annum) of calcium oxide products. Although the

The external wear liner and apron seal help prevent damage to the chute wall.

Dust curtains slow down the air flow and reduce fugitive particle emissions.

existing enclosure confined the fugitive dust, many serious issues arose due to the sheer volume and density of the particles. The abrasive particles would get into the bearings of rolling components and cause them to seize, leading to increased friction on the belt — a potential fire hazard. Dust would also build up around the loading zone and encapsulate the tail pulley, eventually causing the belt to just slide over the built-up material rather than riding on the rollers, which fouled the return side of the belt and the face of the tail pulley. Fugitive material would travel freely throughout the long tunnel, piling up and restricting access for maintenance workers to address these issues.

"The encapsulation and equipment failure issues really took a toll on the system," explained Oliver Whelpton, Process Optimization Specialist at Singleton Birch. "We first tried to mitigate the dust using mechanical filtration systems mounted on the top of the loading chute, but the filters clogged so quickly, maintenance became a burden."

According to Whelpton, to maintain normal operation of the system and avoid serious hazards, the area needed to be cleaned by two workers once per week, requiring nearly an entire shift. Before engaging in what he described as a "substantial undertaking," the system had to be shut down so workers could see. Anyone entering the enclosed area was required to wear personal protective equipment (PPE), including breathing masks with respirators and hooded suits to protect against airborne particles.

Improved loading zone design

Since Martin Engineering has a division in nearby Nottingham, managers asked local representatives to draft a proposed solution to the GLC1's issues. According to James Kevill, the Martin Engineering Technician who led the inspection and installation, "A local contractor and I took measurements and then created a detailed design overhaul. The goal of our proposal was to contain the dust at the point of production by creating an environment that would quickly settle agitated particles and return them to the cargo flow to control spillage and improve air quality."

The plan included raising and lengthening the existing chute to create a more robust settling zone. Using 2.5 metric tonnes (2.75 tons) of steel, the contractor fabricated a 4m-long (13ft) chute extension and tail box. The overhaul integrated Martin® ApronSeal™ Double Skirting HD and an EVO® External Wear Liner to protect the chute wall and seal in the dust, with a series of dust curtains at the end.

The new design raised the chute 102mm (4in.) from its previous position to accommodate the new wear liner. Mounting brackets with jackscrews provided a secure mount, with precision adjustment of the wear liner to reduce spillage. This system closes the gap between the liner and the sealer, thus eliminating abrasion from trapped material without interfering with existing supports. When accompanied by the skirting and clamps, the system forms a tight belt seal, delivering outstanding fugitive material control. Special mounting tabs allow the liner and skirt seal to be adjusted or replaced from outside the chute, requiring no confined space entry.

Results

According to Whelpton, spillage and accumulation along walkways and around the mainframe have been eliminated. There has been no encapsulation of the belt or tail pulley since installation, and rolling components are far less prone to fouling due to dust and spillage. Protective suits are no longer required for people to enter the area, as they need only PPE masks to protect against trace particles emitted through normal operation. "This has led to a morale boost for the plant staff," he pointed out.

In addition to the complete turnaround of the operating environment and its effect on morale, managers were impressed by the reduced labour costs and improved safety due to external adjustment and replacement of the chute's wear parts. Operators report the cleaning and maintenance schedule has been adjusted accordingly, freeing up staff for other assignments. The time and cost for replacement of rolling components and chute accessories is a fraction of what it used to be.

"The service Martin provided was first class," concluded Chris Smith, Lime Maintenance Leader at Singleton Birch. "We are currently looking at other measures to reduce spillage and dust around the site that we can implement in the future."

Presona conveyors – designed for rugged recycling environments

Presona UK's range of modular conveyors is designed specifically for rugged environments, including recycling, waste management and logistics facilities.

Dean Clarke, managing director of Presona UK, explained why the British-built conveyor range has become so popular: "Chain belt conveyors are integral to many facilities, especially in the recycling and waste management sectors.

"But few of the conveyors currently available have been designed specifically for these demanding applications. Many cannot cope with the exceptional tonnages that are frequently experienced while others cannot cope with the volume of material, resulting in an overflow over the low side walls which is inefficient and can be a health and safety problem. This is especially true in the waste management sector. Maintenance due to inaccessible components is also a problem," he said.

Over the years Presona UK has designed many bespoke conveyor systems to overcome these problems and support its LP Series balers which are used by recyclers, waste management companies and logistics/retail organizations which take responsibility for the backhauling of packaging, such as XPO.

The company pooled all of this expertise to design the modular conveyor system which can be fitted to any make of baler. The result is a range of conveyors which is stronger, better suited to rugged environments, and easier to maintain and upgrade than any others currently available.

The conveyors in the range are:

- versatile: can be used with any make of baler;
- bespoke: tailored to individual requirements, materials and footprints;
- innovative: designed to solve recycling/waste problems by including high side walls and a suspension system to accommodate exceptional tonnages;
- heavy duty: galvanized inside and out; improved powder coated finish; slat and chain construction will flex; resistant to chemicals;
- modular: quick to assemble, adjust and maintain; and
- service-friendly: parts are modular, bolted and easily accessible with replacements available from stock.

Engineering support is available 24/7. Presona UK conveyors are designed and built in the UK.

Martin Engineering is a global innovator in the bulk material handling industry, developing new solutions to common problems and participating in industry organizations to improve safety and productivity. The company's series of Foundations books is an internationally recognized resource for safety, maintenance and operations training — with an estimated 10,000 copies in circulation around the world — and employees take an active part in ASME, SME, VDI, CMA and CEMA. The firm also played a pivotal role in writing and producing the 7th edition of the CEMA reference book, Belt Conveyors for Bulk Materials. Martin Engineering products, sales, service and training are available from factory-owned business units in Australia, Brazil, China, France, Germany, India, Indonesia, Italy, Mexico, Peru, Russia, Spain, South Africa, Turkey and the UK.

STM: Italian expertise used to handle bulk materials

The Italian company STM specializes in the engineering and supply of belt conveyor systems for bulk materials handling facilities. Since 1975, when it was set up as a family business, STM has provided worldwide innovative integrated solutions to increase efficiency, reliability and cost savings for the customers production process.

STM offers its customers a full range of project services: engineering, fabrication, commissioning and carries out every step by developing flexible, individual and effective solutions. Therefore, STM succeeds in creating equipment of any size and complexity, which fully meets its customers' needs.

The whole supply process, from feasibility studies to final delivery and commissioning, is completely implemented in STM's factory, which is located at the company's headquarters in Tito Scalo (Potenza).

Thanks to an efficient and breakthrough Engineering Department, it is possible to optimize the design, the industrialization time and the information exchange with the clients. In-house engineers and designers use cutting-edge tools and advanced designing and calculation software. Moreover the competencies of the employers are continually enhanced so they are able to develop complete projects from general lay-out proposals up to shop-drawings, with all necessary calculations to satisfy any requests.

Over the years STM gained a deep knowledge and expertise operating in many fields, with specific and innovative solutions for each applications: mining conveyors, RCC conveyors, tunnelling conveyors, crushing plants conveyors, batching plant conveyors and waste to energy plant conveyors.

The opportunities presented by the bulk terminal market

STM is aware of the huge opportunities that have resulted from the requirement to develop new bulk terminals or to upgrade existing terminals in terms of increased

Doppelmayr builds ropeway for material transport in Colombia

In North-western Colombia, approximately 72km from the city of Medellín, CGL Sucursal Colombia, a subsidiary of the Canadian mining company Continental Gold, Inc. is developing the gold ore deposit Buriticá. The logistics of the project has to overcome some challenges in this very mountainous region. A ropeway will be installed to transport tailings from the valley floor to the paste backfill plant at 1,700m above sea level, covering a difference in elevation of 646m. In October 2017, Doppelmayr, headquartered in Austria, was awarded a contract to build an approximately 1.4km-long ropeway to transport 175 tonnes of material per hour in buckets. Commissioning of the system is planned to take place in March 2019.

capacity and to meet stringent environmental regulations arises, in terms of dry bulk handling.

STM has gained extensive experience and in-depth knowledge while operating in many fields, and this has all been extremely useful for its work in the bulk terminals market. In the last few years, STM's portfolio has become more challenging and specialized to meet the demands of handling grains and cement. A further opportunity is biomass handling facilities that are becoming ever more popular and are encouraging investment in new port terminals.

STM's new telescopic swinger conveyor

To meet the needs of contractors that require uninterrupted feeding, STM has engineered and developed its telescopic swinger conveyor to distribute material. This new conveyor is STM's pride and joy and is an excellent example of Italian engineering.

The structure of the swinger is made of steel. The conveyor swinger can assume different configurations according to the application requested; it can assume different inclinations and extensions during the working phase.

The conveyor was originally developed for use in the construction of RCC (roller-compacted concrete) dams, but it also has wide application for use in the bulk handling market, especially at bulk terminals.

The new STM telescopic swinger conveyor is a machine that can carry up to 2,000tph (tonnes per hour). Mechanically it can swivel approximately 300°, change vertical slope between +23° and –20°, adapt the length between approximately 30m (completely closed) and approximately 45m (completely opened).

It is manufactured in metal profiles that are suitably sized and designed. The sections are connected with external steel plates and internal steel profiles. The volume of the loading hopper is 3–4m³. No fixings on the ground are needed.

The telescopic swinger conveyor is composed of three different modules:

- the first module, 37m long, can rotate

around the vertical axes by a slewing ring, and can have different inclinations that are adjusted by a piston;

- the second and the third modules are built-in on the first module and can move longitudinally and extend the belt conveyor length until to the 45m length.

This solution is very popular, because it satisfies the multiple needs of contractors.

Specific conveying system for each material

STM has also gained experience in the handling of different kind of materials like RCC concrete, petcoke, coal, and muck from tunneling excavation.

- **petcoke:** this is an environmentally responsible recycling process used in some oil refineries to make the most use of hydrocarbon residuals that otherwise would go to waste. STM designs innovative solutions for petcoke handling. In its plants all the electrical and mechanical equipments are certified ATEX to run a good and safe operation and to respect the main international regulations. STM designs and supplies enclosed conveyors are often used to move the coke into a storage building and then onto docks for loading, onto barges, ships or to land-based transportation loading facilities. The conveyor used in this field is known as flow dynamic conveyor and has very particular features. Indeed this system does not have rollers and the rubber belt closes itself into a pipe and moves on air cushions, avoiding any friction, so it can reach high speed. In this way, it is possible to convey the material from different points of the site into a storage building and then onto docks for loading, onto barges, ships or to land-based transportation loading facilities.
- **RCC Concrete:** STM gained great experience in concrete placing systems, particularly in the placement of RCC concrete used in the gravity dam construction, gained operating in many world projects (Canada, Iran, Namibia, Malaysia, Ethiopia, Morocco, Turkey, Sudan) to develop even more innovative solutions for bulk material handling in order to meet the needs of all its customers.
- **muck and spoil from tunneling excavation site:** Conveyor systems provide an efficient, reliable, cost-effective and lower-risk method of removing muck and spoil from tunnelling excavation sites. STM's continuous conveyor is specifically engineered to smoothly handle the transport of materials from the tunnel excavation site to the surface and beyond. Large Belt Conveyor storage capacity increases TBM (tunnel boring machine) utilization, reduces construction time and results in lower costs.

Buttimer offers wide range of conveying solutions

Forty years ago this year, the Buttimer Group was founded in Co. Tipperary, Ireland by Edward Buttimer. Since its humble beginnings in 1978, the company has gone from strength to strength. This substantial growth looks set to continue.

Buttimer engineering is an extremely diverse company, which is proficient in a number of areas. One area in which it particularly specializes is in the bulk handling process, which modestly began by providing equipment for handling bulk dairy and grain products to the Irish agri-industry market. In the intervening years, Buttimer has developed industry-leading capabilities in the design and supply of mechanical handling equipment, drawing on a team of engineers with expertise in intake, storage, processing and of course, conveying.

In order to maintain an advantage in this highly competitive market, Buttimer is keen to be at the forefront of innovation. To achieve this, it designs and manufactures its own conveying equipment. And because no two jobs or requests are ever the same, it is of paramount importance that Buttimer is proactive and flexible in order to satisfy demands.

Whilst successfully completing projects in mines and elsewhere, Buttimer predominantly deals with bulk handling at ports and terminals, and so this has become a cornerstone of the business over the last couple of decades. This has led to an increased emphasis on its conveyors to be as efficient and functional as possible.

Buttimer offers a wide range of conveying equipment to handle a vast array of dry bulk cargoes. These conveyors are designed from the ground up by Buttimer's skilled engineers who work tirelessly to produce the highest-standard products and service for its clients. Be it a shuttle conveyor, mobile stacking conveyors or belt conveyor complete with discharge car, Buttimer is adaptable enough to produce a range of conveyors, depending on the needs and desires of clients. These conveyors are often capable of handling a capacity of up 2,500m^3 per hour, and all bulk product commodities.

Buttimer's conveyors also handle a wide selection of products and commodities, across a number of industries. The company works very closely with Cimbria (one of the world's leading suppliers of grain handling and seed processing technology) and others to supply conveyors and elevators up to a capacity of 1,000tph (tonnes per hour) for grains and cereals, plus all necessary seed processing equipment, be it cleaning, drying, weighing etc. For non-grains and cereals, Buttimer offers its own design of conveyors. Some of the products handled include, but are not limited to;

- grains/cereals;
- coal;
- iron ore and other minerals;
- fertilizers;
- biomass;
- woodchip; and
- aggregates.

Because Buttimer's conveying systems are so versatile, they are used across a number of varied industries and, therefore, it has a diverse range of clients.

Diageo

In a re-development of its famous Guinness Brewery at St James' Gate in Dublin, Diageo was seeking a high-quality, highly efficient and standard-setting system for its grain storage and processing line and equipment. The system required rapid throughput and handling designed specifically for the barley and rice that form the basis of Guinness's brewing technique

Covanta

Buttimer Engineering was employed by Hitachi Zosen Inova (HZI), an international waste-to-energy EPC company with headquarters in Zurich, Switzerland to carry out a large-scale operation at

Poolbeg Incineration plant. It was tasked with receiving, managing and installing a number of key mechanical engineering process packages on one of the largest international plants with an annual capacity of 550,000 tonnes. This involved installation of a bottom ash removal conveyor, boiler fly ash handling conveyors and horizontal pass conveyors

Indaver

Buttimer Engineering was employed by Babcock & Volund, an international waste-to-energy EPC company, to design, fabricate, procure, install and commission the ash handling systems for the first waste to energy incinerator plant built in the Republic of Ireland. This required Buttimer to size, design, fabricate and install all handling equipment including belt and chain conveyors and all vibrating conveyors. The contract also involved the design, supply and installation of specialist conveyor system to cool down the hot ash from 600°C.

Peel Ports

Buttimer Engineering was employed by Graham Construction on behalf of Peel Ports to carry out the mechanical/ structural engineering installation packages involving the fuel handling systems on its new biomass import facilities at Gladstone Quay in Liverpool. Buttimer installed the conveyor gantries, conveying systems from ship unloaders, conveying systems to silos, and most markedly 1,224 linear metres of 1.8m-wide belt conveyors

Lisheen Mines

Buttimer Engineering carried out a range of design, fabrication, installation and maintenance work at Lisheen Mines, which spanned across a period of almost 20 years. The scope of work was large and included everything from steel and plastic pipework installation to the manufacture of thickening tanks. It also involved the installation of numerous conveyors, including mill feed conveyors.

Conveyors are an integral and vital part of the bulk chain, says TTS Latvia

Today, it is impossible to imagine a single port terminal, processing plant or production location, which handles bulk products without the use of different types of conveyors — belt conveyors, chain conveyors, elevators.

Modern companies need to remain flexible and to be able to rapidly react to market changes, which are dictated by current economic trends.

Engineers of the Latvian production company TTS closely follow these trends, so that they can offer the customer solutions to fit the needs they have today and those they may have in the future.

One example of a successful TTS installation is the 'Riga Bulk Terminal' in Riga Port in Latvia. For this, TTS designed produced and installed all material handling equipment, right from ship-unloading to conveying and loading product into railcars. TTS was tasked to design the terminal in such a way that it can handle eight types of dry cargo, starting from grain and ending with alumina. Today, the terminal is operating successfully and provides great flexibility to its owners in terms of the type of cargo handled.

TTS mobile stacker.

Chain conveyor.

Being in the material handling business for 25 years, TTS has developed much of its own expertise, and has created a wide net of reliable components suppliers. This allows it to offer its customers solutions that are financially balanced and will meet their requirements 100%.

Combining a very modern approach to material handling with extensive experience in the manufacture of equipment to move bulk commodities, the engineers of the Latvian company TTS have created mobile link conveyor, which maximizes material handling performance, making it technically adaptable, economically favourable and environmentally friendly.

The TTS mobile link conveyor system makes it possible to create a highly productive transfer complex for bulk cargo without the need for major construction, in the shortest times, with optimum investments.

TTS material handling equipment allows customers to build a cargo handling system that is customized to their needs — one which can also be adjusted and modified according to the specific operational requirements.

Belt conveyor.

Belt conveyors are integral to most Sackett-Waconia fertilizer projects

Sackett-Waconia is a diversified manufacturer of equipment for the fertilizer industry. It engineers systems and solutions for all aspects of fertilizer including process, handling, blending, and loadout. Belt conveyors are integral to the vast majority of projects that it takes on, and its equipment can be found on six continents, operating in nearly every environment.

Belt conveyors represent a vast and varied category of equipment. They are one of the most diverse and ubiquitous types of equipment on the market today and can quite literally found everywhere from your local grocers to miles underground.

Since Sackett-Waconia specializes in the fertilizer industry, it engineers its equipment to the unique challenges and opportunities the industry affords. Most fertilizers are corrosive, abrasive, and hygroscopic. As such, Sackett-Waconia's belt conveyors are engineered to be simple, easy to maintain, and contain as many corrosion-resistant materials as is feasible and affordable.

The basic structure Sackett-Waconia employs is built around a stainless steel formed channel design, that allows flexibility in both design and production. It also reduces weight compared to some older methods. Beyond the basic frame, each conveyor may have an individual and unique design. Two conveyors may be handling the same material, operating at the same speed, and in the same manner — but as every environment is different, a similar application could be completely different in its operation and maintenance, depending on where it is located. This is why Sackett-Waconia takes the time to discuss, listen to and understand each customer's needs. It enables the company to customize the equipment to suit its customers' needs.

Given the wide range of applications it encounters, Sackett-Waconia's value lies in its experience. After more than 120 years, there aren't many challenges that it hasn't encountered. For example, it designs belts to handle low tonnage in process plants under harsh conditions, and also designs conveying systems to handle thousands of tonnes per hour. Sackett-Waconia has engineered metering and feeder conveyors, which have dosing rates measured in ounces and that handle highly fluidized powder materials. It also engineers systems designed to receive entire railcars

Rail hopper.

(all gates), at 1,200+ tonnes per hour, based around heavy duty belt conveyors. The latter can generally be found at larger fertilizer terminals and on loop tracks. Time is money, after all, and Sackett-Waconia understands that its customers need to move material as quickly and efficiently as possible to meet shrinking windows of opportunity. They also need equipment engineered to be operated safely and reliably for many years.

Sackett-Waconia has a full line of conveyors optimized to handle all types of fertilizer applications. Its product lines include fixed belt, tripper belt, shuttle belt, loadout conveyors, as well as belt-walled conveyors for some applications. It also engineers and fabricates its supports and trusses, for both inland and marine applications. Its experience and expertise has been developed in process plants, inland terminals, ship and barge receiving as well as blending facilities throughout the world.

Due to the abrasive and corrosive nature of fertilizer, Sackett-Waconia engineers conveyors to use many corrosion-resistant materials, such as 304 or 316 stainless, HDPE, and UHMW. To meet project demands, it also uses various styles of belting from PVC to multi-ply heavy duty rubber, smooth top to cleated top, and oil resistant to fire retardant. Sackett-Waconia designs conveyors to be OSHA-compliant, and works with its customers to ensure they meet all safety standards, such as additional guarding or safety switches, that may be required for their site beyond general safety requirements.

What makes Sackett-Waconia's materials handling systems different? "The Devil's in the Details" and correctly engineered systems are critical. Conveyors can be deceivingly simple. It's just a frame, pulleys, idlers and drive. But in the end, they need to work in the application they are designed for. Sackett-Waconia's goal is to build a system that, with proper maintenance, does exactly what it promises and does it for a very long time.

Sackett-Waconia also prides itself on its long term commitment to its customers. The relationship doesn't end at delivery or commissioning. The company was founded as The A.J. Sackett & Sons company in 1897. It has been around for more than 120 years and didn't get there by leaving its customers behind. Sackett-Waconia likes to think of customers as partners, and wants nothing more than a solid, long standing, relationship. The company wants to do more than just sell equipment — it is also there to support its customers and their businesses.

Hübner Giessen protects conveyor belts against damage

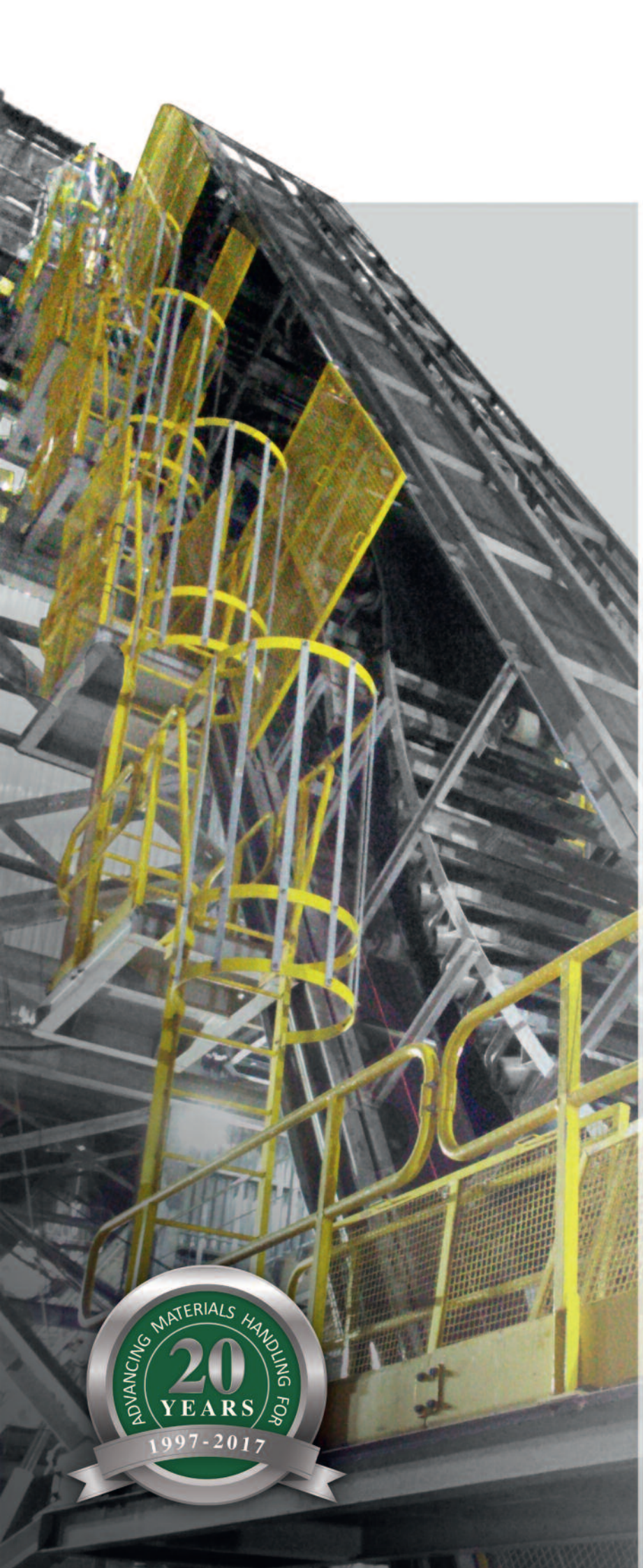
Incremental encoder FGHJ 5 ensures more stability and accuracy

For generations, conveyor belts have been used to transport loose bulk material, proving to be highly efficient and cost effective in a wide variety of mining applications. Depending on requirements they are equipped with several speed-controlled drive motors to ensure smooth start-ups, optimum loading during continuous operations as well as controlled stopping processes.

In particular, conveyor belt components must be able to permanently withstand the powerful effects of oscillation and vibration. These not only result from the length of the conveyor system or the material being transported. Other causes can be traced back to the construction of the drive station, the drive solutions, transfer points, the condition of the belts and similar reasons. In addition, inverter-controlled drives can cause shaft currents that place a heavy strain on the bearings of the encoder system and damage them over time. In addition, dust, dirt, moisture, extreme temperature fluctuations and, depending on the region in which the installation is operating, extreme cold or heat can also lead to system breakdowns. With the incremental encoder FGHJ 5 housed in a heavy-duty casing Hübner Giessen offers a reliable alternative and sustainable solution for operations facing these challenges.

A crucial factor is that the FGHJ 5 is equipped with hybrid bearings; when fitted in combination with the insulated torque bracket and, if required, an insulated adapter shaft they can effectively prevent the negative influence of shaft currents on the service life of the encoders. If required, it is also possible to augment the incremental encoder with an overspeed switch integrated in the second terminal box to guarantee safety-related special functions as well as provide additional protection against overspeeds and underspeeds.

That is how the intelligent solution from Hübner Giessen ensures the highest levels of reliability and a long service life in continuous operations under extreme conditions – and also avoids unplanned conveyor systems downtimes. Moreover, users profit from increased accuracy and added peace of mind in comparison with a conveyor system operating without an encoder.



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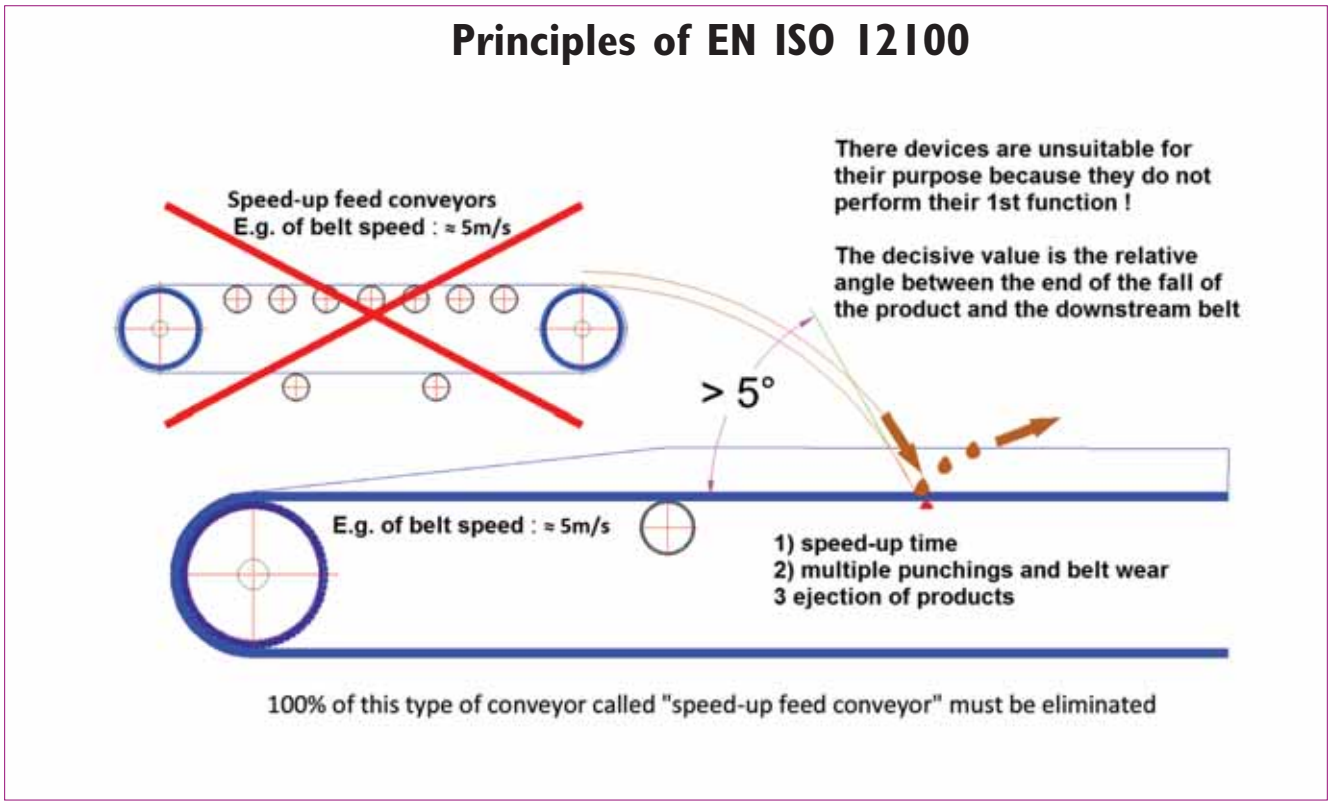
Conveyor design: the principles of the 'new approach'



How best to apply safety standards

Like many inventions, the way the conveyor belt has evolved is the result of questions that have arisen over the years with users and manufacturers, *writes conveyor expert Marc des Rieux*. Since 1989, European States have been concerned about the safety of machines, through the Machinery Directives (current version: 2006/42 / EC). Today, the big question is why, despite all the efforts in terms of safety, there are still too many conveyor-related accidents. It is especially troubling that so many of these are due to causes that have been problematic since the old times.

To answer this question, this article focuses on 'understanding standards, proposing solutions and showing the added benefits.'

Understanding

Conveyors and safety are two technical domains that interact with a complexity accentuated by several hierarchical levels (hierarchy of Laws). Herein lies the difficulty.

Hierarchies of texts

The texts that rule machine safety in Europe are the Machine Directives, the EN safety standards of category A (fundamental, general), B (specific and medium aspects) and C (category of machine). The laws of each country complete the legal and regulatory documentation (the Labor Code in France); they must transpose European standards. The peculiarity is that it is the local laws that apply in the case of accidents. The application of the EN, ISO standards has the presumption of conformity value; they must be applied with discernment.

In general, it can be said that the Code Laws give the goal to be achieved and the standards say how to do it.

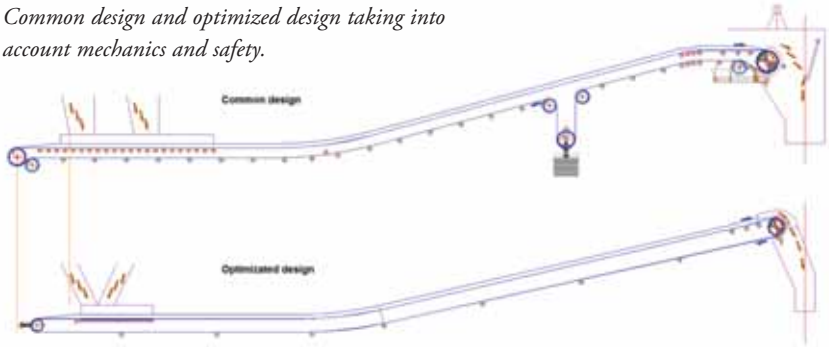
EN 620, category C, is the 'reference' for conveyor safety, but the common mistake is to ignore standards A. This 'C' standard applies only to hazards that could have not been previously removed by the application of the higher category A standards (e.g. EN ISO 12100).

The other major pitfall comes from the Machinery Directive 2006/42 / EC, # 1.1.2, 1st paragraph which says "eliminate or reduce risks ...". It is this co-ordinating conjunction "or" that is problematic, so much so that the commented version of the directive (official document) is required to specify that there is always this hierarchy of solutions by stipulating that "eliminating the risk prevails over any other provision ... because they are more effective than protective measures ...".

The standard EN ISO 12100 version 2010 article 4 paragraph e, logically transcribes the legal text: "– remove the dangerous phenomenon, or reduce the risk..." with a small subtlety that accentuates the strength of the co-ordinating conjunction by placing a comma before "or".

According to experts, it is important to distinguish between the two levels of the

Common design and optimized design taking into account mechanics and safety.



Common design and optimized design in mechanics and safety

term 'eliminate (delete)':

1) Eliminate: by deleting the machine, the component exposing at least one risk;
2) Eliminate: by replacing the hazardous component with a non-hazardous component (see §178: comments on section 1.1.3 of the directive).

In conclusion:

At this reading level of the directive, there is no longer any ambiguity about the hierarchy of safety solutions:

1) eliminate the risk by:
   a) deleting the machine;
   b) deleting the component;
   c) replacement of the hazardous component with a non-hazardous component;
2) the risk duty be protected (EN 620).

a) By a nip guard device before the nip point;
b) By an added device fixed guard around the risk area
c) By completely enclosing.

These statements are further reinforced by the 'NOTE 1' and 'NOTE 2' at the end of Article 4 of EN ISO 12100.

In fact, EN 620 only applies for the remaining risks; that is, those that could not be removed. QED!

Proposing solutions

In concrete terms, the design that best meets these requirements consists of:

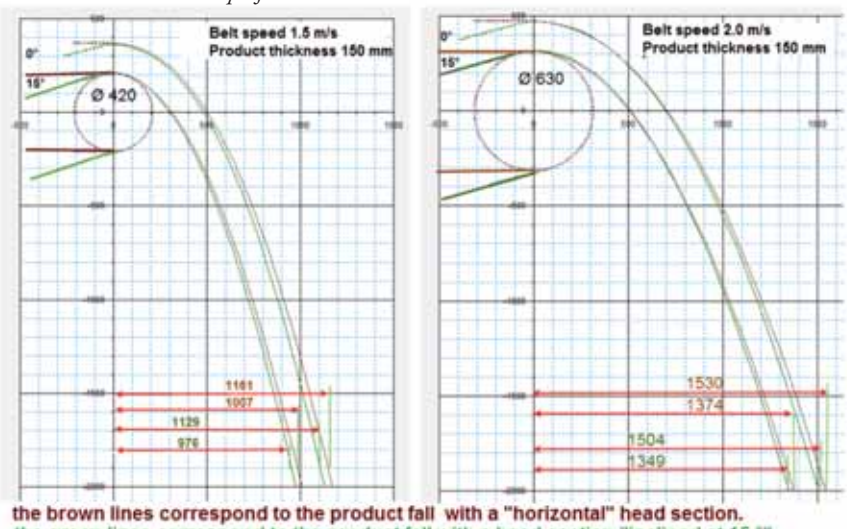
1a. Delete the machine

As an example, ultra radical, of the prescription 'delete':

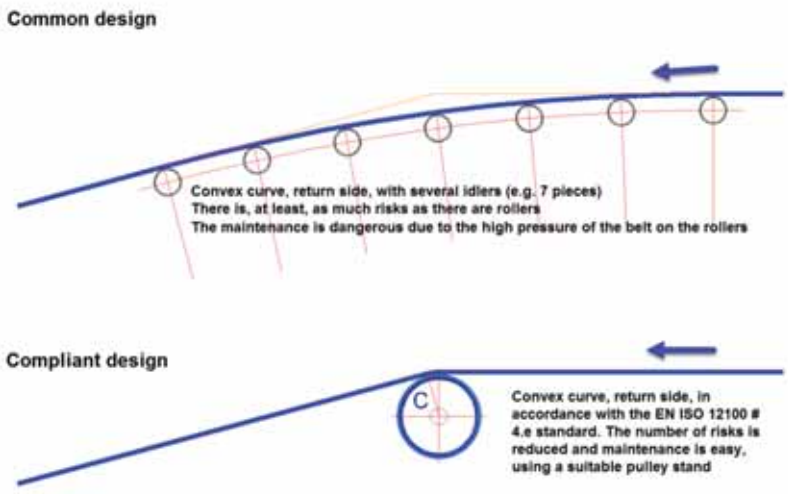
- 100% of the conveyors called Speed-up feed conveyors are unsuitable for their purpose because they do not perform their first function. A simple observation of the angle of the drop parabola of the product at the moment of its contact with the plane of the downstream belt demonstrates the systematic underperformance of this type of machine. Since this type of conveyor exposes at least at one risk, it must be eliminated from the equipment.
- a certain percentage of reversible and/or shuttle-type conveyors can be eliminated in favour of simple rotating corridor type. It is wise to ask the question on a case-by-case basis; and
- 100% of the conveyors called 'pick up crumbs' installed under the head section of certain conveyors and which are exposed to several risks; this isn't justified if ISO 5048 standard 5.3.3 is correctly applied (see below: 75 to 80% of the return idlers).

Since this type of auxiliary machine has at least one risk, it must be eliminated from the equipment.

Comparison of drop parabolas between a profile with a convex curve and a rectilinear profile.



Convex curve return side with a common design and optimized design taking into account mechanics and safety.



1b) Delete the components

- 100% of snub pulleys associated with a drive pulley, which allows a belt winding arc/drive pulley less than or equal to 200°, has no justification, proved by calculation. Since this snub pulley is exposed to at least one risk, it must be removed from the conveyor. The above argument is often true with a belt/pulley winding arc greater than 200°; it must be calculated;
- 100% snub pulley, associated with a free tail pulley, has no technical justification. Historically, these snub pulleys were intended to reduce the vertical space between top belt and return belt thanks to a large diameter tail pulley thanks to cotton belt carcass. This design has continued under the pretext of a better stability of belt trajectory in this section. This assertion is questionable, if the relative geometric position between these two pulleys is out of tolerance (very frequent case). The problem is revealed when the belt reaches a significant asymmetric deformation of its carcass. Thus, few establish the causality with the snub pulley and this anomaly is compensated for by the addition of various self-training idlers with limited efficiency, but with extra risks. Since this snub pulley has at least 1 risk, it must be removed from the conveyor and, if necessary, the tail pulley changed to a diameter in accordance with ISO 3684;
- 100% of belt pre-tensioning systems of take-up type with variable in running, by means of a counterweight, for conveyors with a horizontal or ascending profile, handling cold (≈20°C), on a distance between centre to centre

up to 1,100m, an elevation of about 28m, isn't proven by calculation. Since this GTU system is exposed to at least one risk, it must be eliminated from the conveyor in favour of a simple 'invariable' take-up system (screw/nuts model) applied to a tail pulley. For example, during a theoretical and practical training, seven pulleys out of nine were deleted from a conveyor of 425m of length, a reduction of 78% of the number of pulleys! Before intervention, the customer suffered many malfunctions with of upkeep costs and a costly maintenance; but after simplification, reliability and safety have reached a very high level with added durability over time.

- 75 to 80% of return idlers are in excess, which is demonstrated on the base of calculation in support of ISO 5048 section 5.3.3 (v 1989). Here, a text explanation is required! This article defines the minimum and maximum deflection of the belt, at any point on the conveyor (under the feed, carrying side in tail, in head, return side ditto), in all circumstances (starting-up, working, braking, empty, under load). This is the prescription that must be applied. For top idlers, 'observe a pitch of between 1.0m to 1.5m and 2.5 to 3.0m, for bottom idlers' comes from the examples written in the 1970 version of the standard. This was revised in 1989. Very many conveyors are now running with a pitch distance of 12 to 15m between return idlers, even ≈ 30m for conveyors up to about 30m of length (= zero return idler), even 36m on a conveyor of 5km length, for the return section, which is a 'stretched belt strand', between the head pulley and the drive pulley 215m away. The long pitch design between idlers is even more the case when the return belt is a stretched strand; that is to say with a drive pulley in tail. The above example of 36m becomes obvious.
- 100% of trough idlers in convex-curve section, top side, are in excess, when it comes to the section before the head of the conveyor, insofar as these two last sections can be combined into a single rectilinear section. This typical design, with a convex curve, was due to a fall parabola of product, to the unloading pulley, considered as shorter. The fall parabola calculations show that this argument is unfounded. Since this convex curve system exposes as many risks as there are rollers, it must be removed from the conveyor in favour of a single rectilinear section.
- 100% of the idlers of convex curves on the return side, are in excess and should be replaced by 1 category C pulley, for a reduction of the number of risks and the obligations for easy maintenance.
- 50 to 100% idlers of concave curves on the return side are in excessive number from the simple fact that the belt is in sustentation by its tension forces, in this section. A simple observation of this section shows that the belt does not touch or very weakly contact on the idlers of this section. A pitch between rolls of 18 to 24m is often possible, with many advantages to the key.
- 98 to 100% idlers of the top side are in excess! Here, it's a case of conveyors with a tripper, for the section between the last point of belt contact on top idler, to the beginning of the concave curve which precedes the tripper, and the drive pulley, if the section following the carriage is always empty. If we consider a length of 80m, for this section, with a pitch of 1.20m between idlers, this represents the removal of about 64–66 supports and as many risks as there are rollers removed (trough three rolls = 192–198 rolls)... The best, in case of a project, is already to shorten the conveyor for the section beyond the tripper end-location.
- Often, 100% of the idlers of the feed bridges, top side, are in excess. Indeed, a simple study can demonstrate that it is easy to remove the 'feed bridge' and all the risks associated with it (snapping, shock, ...) and for better conditions for the conveyor components, including the conveyor belt.
- Some percentage of idlers, carrier side, could be considered in excess. For example, in the case where the belt has an arrow less than 1% of the pitch and a low filling coefficient. The solutions are:
  a) Increase the pitch between idlers until a belt deflection greater than 1% or more of the pitch is obtained.
  b) Decrease the belt speed and thus increase the filling coefficient (about 85% of ISO) which will increase the belt deflection.
  c) As the case may be, good design is a combination of both.

Starting from a pitch correctly calculated between supports, carrier side, in tail section, for example 1.25m, it is certain that this pitch can increase as one approaches the head pulley; this assertion is even more the case when the conveyor is steeply inclined, with a significant difference in height between the tail and the head. As an example, the pitch can easily go up to 6.0m. A variable pitch, as recommended above, is easier to apply with clam-operated fixing brackets.

1c. Replace the components

- 100% of the rollers, especially under the feed section, which can be replaced by sliding sole, sliding pads, sliding bars, must be replaced subject to feasibility (speed, load, products, etc.).
- A high percentage of rotation detectors are not compliant; adding a protective hood to them is contrary to the safety requirements, since there are models that are not exposed to the risk of cut-off and snapping. For conveyors with high industrial risk, the belt is monitored by ultrasonic sensor; more efficient equipment and without risk.

2a/b/c Risk protection

For risks that could not be eliminated by the deletion of the machine and of components, it is necessary, now and only now, to apply the requirements of EN 620 and all the safety standards mentioned in this standard. For information, a few French experts, members of CEN TC148 WG1, in charge of the EN 620 standard, argue that 'nip guards' must be defined as the first level of safety devices. For example, they allow for the cleaning of the conveyor without risk with the machine running, without disassembly of the protectors.

Other types of protectors apply in order of priority, in the case of it being impossible to incorporate nip guard models; these are the fixed-guard, then the surrounding grills (completely enclosing). These models are often disassembled for various reasons; in this case the area at risk is no longer protected and, in fact, this is the source of many accidents.

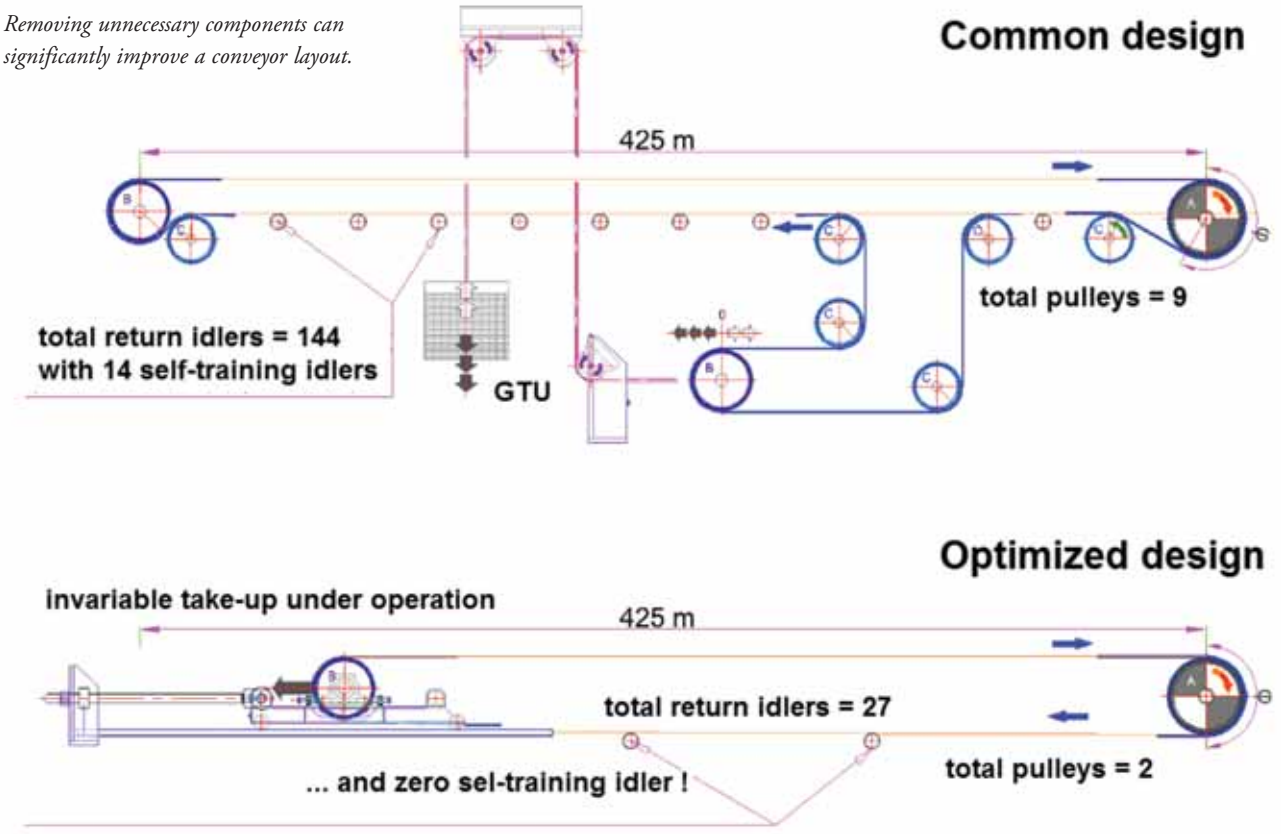
Added benefits

This chapter shows some of the advantages gained by the deletion of machines and components, described above.

After deletion of conveyor for speed-up feed conveyor: the conveyor upstream will be adapted to allow a 'mass' feed, with at 90° orientation with respect to the downstream conveyor (belt to protect). Thus, the speed of the product is considerably reduced.

Damage to the belt is eliminated (punching, wear), product ejections (rebound phenomenon) are eliminated as well as cleaning costs, the risk of falling due to cluttered grounds; etc.

Removing unnecessary components can significantly improve a conveyor layout.



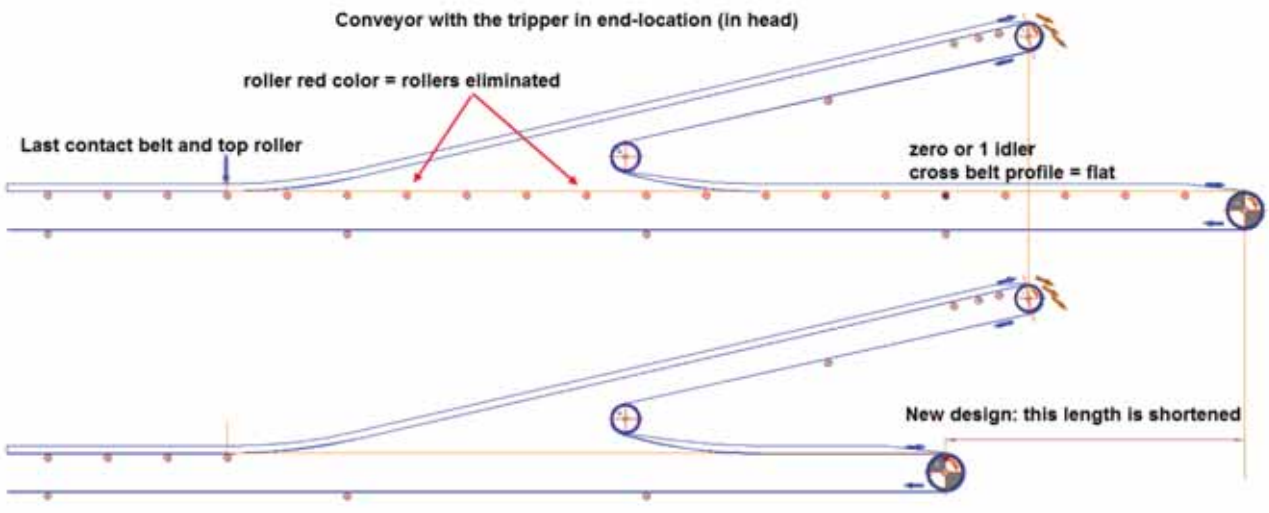
After deletion of the 'pick-up crumbs' conveyors:
The risks related to their maintenance, often expensive, the disorders related to their presence, at the level of the hopper of the conveyor it serves, are removed.

After deletion of snub pulley at the head:
Its removal eliminates the disorders related to the underlying scraper, because of the clogging of this pulley by splattering material after the scraper. This clogging causes a significant loss of efficiency of the scraper. The presence of the snub pulley implies a reduced slope of the hopper face under this pulley, which leads to the clogging of the hopper. The removal of this pulley increases the slope of the chute face and reduces the risk of clogging. Dirt on the floor immediately behind the hopper and all along the conveyor, as well as the related risks (falls, slipping, cleaning interventions).

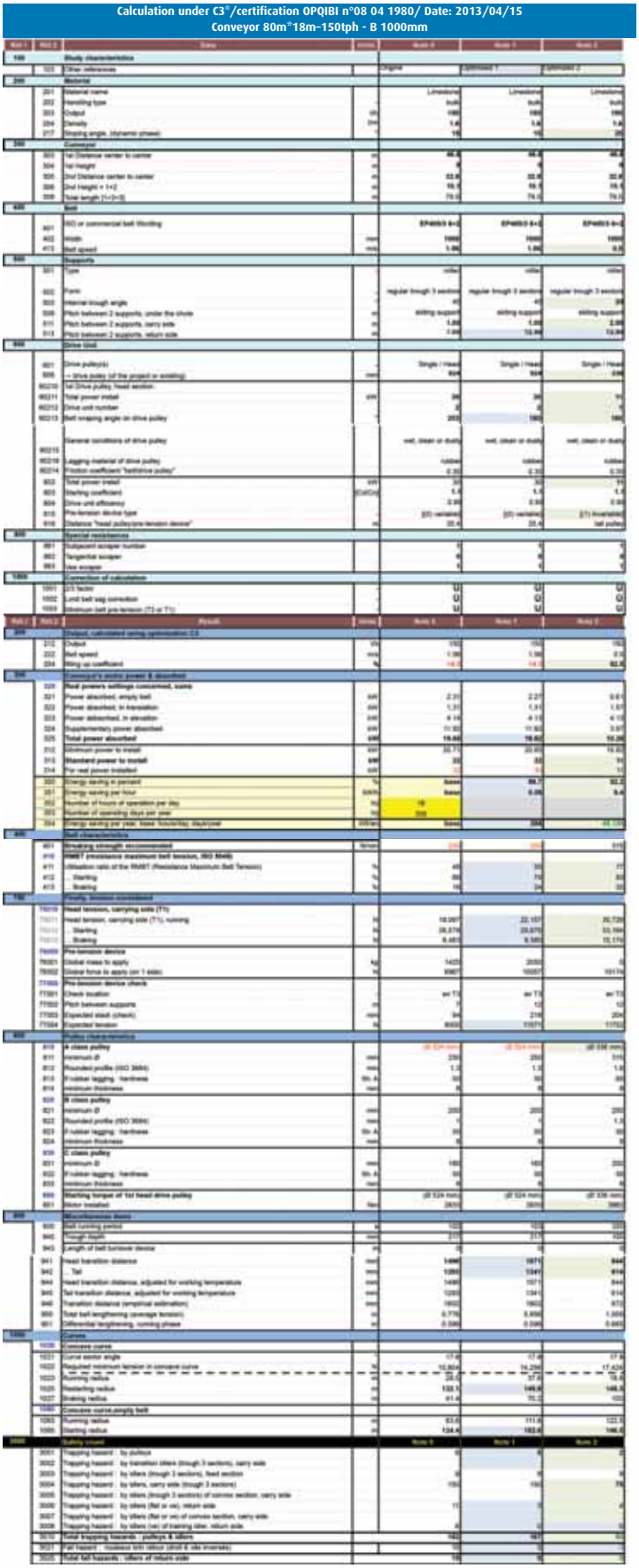
After the deletion of snub pulley in tail:
Its removal eliminates 'hidden' damage to the carcass of the belt. This type of damage represents a significant cost with the constant need for adjustment of the swerved belt, the addition of training idlers and, consequently, the addition of new risks, and the premature replacement of the belt. This deletion reduces the accumulation of products on the ground at this section, which in turn greatly reduces the frequent need for cleaning and the risks associated with subsequent interventions.

After deletion of counterweight tension (GTU)
This concerns all models, mainly those installed return side and having one or two bend pulleys, in favour of a simple screw

Conveyors with a tripper, for the section between the last point of belt contact on the top idler. Common design and optimized design, taking account of mechanics and safety.



system to tail pulley. This deletion eliminates 'hidden' damage of the carcass of the belt (misalignment of the pulleys), which represents a significant cost between the incessant adjustment actions of a swerved belt, the addition of training idlers and, consequently, the addition of new risks, and the premature replacement of the belt. This deletion eliminates accumulations of products on the ground in this area, eliminating the cleaning needs and associated risks.


Calculation under C3®/certification OPQIBI n°08 04 1980/ Date: 2013/04/15
Conveyor 80m°18m-150tph - B 1000mm

The proof by example!

Since 2002, a cement plant has successfully operated an overland conveyor of 1,100m in length, with a rise of 28m and an output of 700tph (tonnes per hour), with a polyester-carcass belt of 800mm width, operating at a speed of 1.7m/s, whose take-up is 'invariable under operation' (cable tractive device) and has a useful stroke of only 4.50m for belt tension length. So we recommend for any conveyor project, of modest size, a configuration with an ultra-simple belt-tension system (screw / nut or the like), as the first safety requirement. With this conclusive experience, another cement plant has applied this rationale over the course of a few years, with this simple design introduced for all its conveyors, starting with those which disrupted the production because of recurring disorders with the counterweight (GTU).

Return-side idlers:

The increased idler pitch, in a ratio of 1 to 4 or 5, that is to say an original pitch 3m and a new pitch of 12 to 15m, or more, makes it possible to obtain a greater stability of belt trajectory. The first benefit is in terms of safety. This design eliminates the adjustment interventions; this means so many risks are removed. The cleanliness of the rollers is easily achieved because of the increase in the belt-on-rollers pressure. Care should be taken to coat the roller with a smooth rubber, of 35 Shore, according to the plasticity of the product being handled. In fact, the so-called 'anti-sticky rubber disc' rollers are disappearing from the world of conveyors; because these components are very often the cause of swerved belt and with its destruction, that is to say many interventions and additional costs. With the disappearance of these rollers, the risks which are related to them also disappear.

Note: the return rollers are often loaded to between 5 and 20% of their admissible load! Increasing their load to 100% of their capacity will not reduce their longevity, on the contrary. The 'long' pitch between the supports eliminates the axial forces (force due to the swerved belt) applied by the belt to the rollers. These axial forces are the first cause of the destruction of the rollers! Again more gains!

Zero return idler:

A design reserved for short conveyors, up to ≈30m length. A design with zero return idlers eliminates any risk of trapping, roller drop and dirt on the ground. A clean floor eliminates the risk of falling, people slipping and the risks associated with cleaning interventions. Maintenance and stock costs are removed as well as the belt-damage that was due to the rollers in the old design.

Sources

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It is NOT just a chute!

Those in the 'flow business' — i.e. those that engineer or manage the operation for bulk material handling where reliably achieving thousands of tonnes per hour of material throughput is of paramount importance — are highly likely to be using belt conveyors, *writes Eric Maynard, of Jenike & Johanson*.

These operators most likely have several, if not dozens, of transfer chutes that provide a critical link between the conveyors. Though these chutes may be viewed as just 'metal boxes', to trained personnel, they are typically major locations for costly bottlenecks due to frequently material plugging, spillage, excessive dust generation, belt off-tracking, and abrasive wear.

Consider, for instance, iron ore shiploading in Western Australia (WA). Iron ore is loaded at a rate of about 12,500mtph (metric tonnes per hour) — that's about 2m^3 per second! — into ships holding 220,000 metric tonnes. The shiploading must be done efficiently as tidal fluctuations normally restrict loading to 12 hours. Companies loading the iron ore must get the iron ore from the train load-out to stockpiles to ships in as efficient a manner as practical, all while dealing with necessary chute maintenance due to significant abrasive wear of liners. Furthermore, if a belt conveyor breaks down due to a plugging event or from belt off-tracking, a cost in the order of many thousands of US dollars per minute can result due to demurrage fees.

To be competitive, chutes should deliver the performance needed to maintain flow and achieve plant nameplate capacity. A chute must be sufficiently steep and smooth to permit sliding and clean-off of the most frictional bulk material that it handles. This is particularly important at impact points such as after a free-fall or where the chute changes direction. However, chutes should be no steeper than necessary for clean-off so as to keep material velocities and abrasive wear to a minimum.

The challenge is handling bulk materials that are both frictional and cohesive, whereby a rock box type design is commonly implemented. The difficulty with approach, where material impacts on a dead pocket of itself, is that plugging eventually results, along with poor stream control leading to spillage and belt off-tracking.

Here are five key chute design rules that can help to avoid costly chute problems:

- Prevent plugging at the stream impact point. Consider using an acute impact angle (less than 30°) and low friction surfaces/liners.
- Ensure sufficient cross-sectional area for the material stream. A good rule of thumb is that a chute should be sized such that it is no more than one-third full at the point of minimum velocity.
- Gain and maintain control of the stream. In order to control the velocity of a stream through a chute (both magnitude and direction) it is advantageous to slope the chute rather than allow the particles to free-fall in a vertical section, which leads to a 'dust-pump' phenomenon.
- Minimize abrasive wear. Avoid soft steel surfaces with known hard and abrasive particles, and keep impact angles small, while minimizing large drop heights.
- If material is cohesive, avoid rock boxes. Instead, use a properly designed inertial flow chute that has wear-resistant surfaces with rotable components for ease of maintenance.

Once the chute is designed functionally, it is vital to establish whether it will work with the bulk material being transported. This is where discrete element method (DEM) computational modelling is critical to validate the design over a range of stress-test scenarios.

With the bulk material properly calibrated, the simulations can evaluate in-plant situations where there is a variation in flow rate, belt speed, and perhaps diverter gate positioning. This step is highly value-added as the chute mechanical design and fabrication does not proceed until the engineering analyses have proven chute viability. Think of the DEM analysis as an approach similar to a finite element analysis (FEA) optimization.

After completion of the chute functional design, then mechanical and structural engineering can commence. These crucial engineering stages will consider the loads of the material impact and flow, means to attach liners, belt cleaners, and sensors, as well as incorporation of moving parts like gates, access doors, and main shafts holding the head pulley.

Once this design is complete, then chute fabrication and installation can occur. An experienced chute manufacturer is vital as employing someone that just knows metal bending or welding is not likely adequate. The fabricator must know how to incorporate complex liners, which may be non-metal (e.g., ceramic or UHMW plastic), as well as how to build the components for assembly and dis-assembly when maintenance is needed.

The same applies for an installer, as there is more than basic rigging involved for installing the headbox and chute parts. Careful measurements, via laser survey, are recommended up-front during the engineering phase to ensure the chute will fit into the current assembly without creating costly interference issues during installation.

Choosing a qualified engineering firm that can synthesize all the critical steps for front-end engineering, material testing, chute design and DEM analysis, mechanical/structural design, and fabrication is the key to prevent or solve costly chute flow problems. It is important to consider the total cost of ownership — that involves not only the capital costs, but also the operating costs that can be substantial and can readily outweigh the initial project cost by a few magnitudes!

For 2018, with the perpetual need for reliable flow of bulk materials, it is vital to implement a proper chute design to avoid creating massive bottlenecks. DCi

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Grain handling and storage

keeping up with developments

New Cimbria installations in the Baltic States

Cimbria's partner in the Baltic States, 'Dotnuva Baltic', has achieved great success over a long period of years and is today the most prominent provider of agricultural solutions for the grain and seed industry in Lithuania, Latvia and Estonia.

The range of Dotnuva Baltic's activities and services includes seeds, machinery, farming and grain equipment, as well as drawing up of proposals, designing plants, carrying out installations and after-sales service. With a strong local set-up on the market and the ability to offer a full package solution, Dotnuva Baltic has secured a solid position as a preferred supplier in the Baltic States.

The year 2017 was particularly intense for the team of Cimbria and 'Dotnuva Baltic', as they were involved in implementing several grain storage projects in the Baltic States, with most of the installations built in Lithuania.

Record-breaking grain yields in the last few years have encouraged farmers and companies engaged in the trade of grain to invest in grain silo plants. Three new Cimbria silo installations were completed in Lithuania in 2017, augmented by extensions to four previously installed facilities. Many orders were received from farmers, with more than 20 grain handling projects of various size and capacity being built.

Furthermore, two turnkey silo plants were successfully implemented in which Dotnuva Baltic was responsible for everything from design/engineering, construction of the foundations, equipment supply, installation and automation.

The capacity of grain silos built by Dotnuva Baltic UAB in 2017 exceeded 130,000 tonnes, while the total capacity of grain stores established by the company since 1999, when the company was first involved in the business, is approximately

1mt (million tonnes). In recent years, the total quantity of grain harvested in Lithuania has been more than 6mt — which means that close to one-fifth of total grain yield in Lithuania is stored in grain stores built by Dotnuva Baltic.

The year ahead will be no less intense — four contracts for industrial grain elevators have already been signed and construction work has been commenced. Difficult harvesting conditions in 2017 have encouraged grain growers to continue to invest in grain dryers, silo projects and cleaning machines.

Cimbria equipment has a good reputation and is well known in the Baltic region, and it is to be expected that grain growers will continue to choose this equipment, since it is recognized as being amongst the best in the market.

Cimbria was established in 1947 and is today an international organization with 900 employees in 30 companies throughout the world. Since 2016, Cimbria has been a part of AGCO corp. Cimbria offers storage, equipment and processing plants for the grain and seed industry and transport and conveying equipment for bulk handling.

The company has an experienced, highly qualified workforce, as well as its own development and construction department and modern production facilities, which enable it to construct and manufacture all of the solutions in accordance with the individual requirements of each client.

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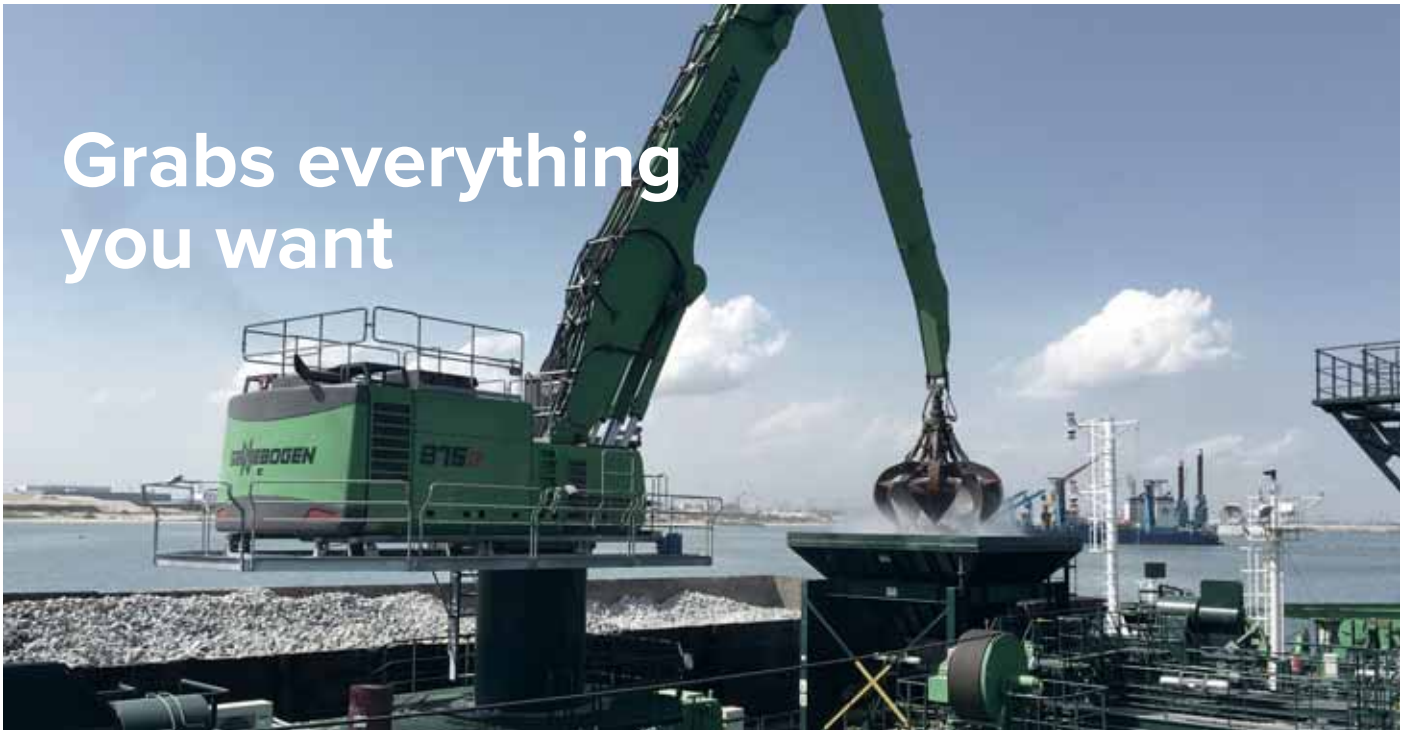

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Expert oversight from Alex Stewart Agriculture assures grain quality

Grain and oilseed inspection and analysis are core businesses of Alex Stewart Agriculture Ltd. Alex Stewart is a superintendent and analyst member of the Grain and Feed Trade Association (GAFTA).

Alex Stewart works with many leading grain traders by providing trustworthy professional inspection and laboratory services globally. In addition, ASA can arrange fumigation services in most areas of the world to ensure that its customers' cargoes are treated as with the greatest care.

Upon nomination, Alex Stewart's mission is to protect customers' interests at loading and/or discharge ports worldwide. ASA is also able to provide collateral management services such as supervision of long term storage of grain or control of transportation between storage facilities.

The head office of Alex Stewart Agriculture Ltd in the UK also provides consultancy services. Strategically and commercially located operations offices offer support and advice regarding ports and silos worldwide and will provide information concerning the latest industry standards in sampling and analysis.

Agricultural laboratories

Huson & Hardwick and A. Norman Tate Laboratories are GAFTA/FOSFA (Federation of Oils, Seeds and Fats Associations) registered analytical laboratories that specialize in the analysis of oilseed and edible oil, grain, barley, rye and wheat, animal feed, sugar and food products operate from Alex Stewart's head office in England. They are able to perform a full range of commercial and shipping sample including protein, fat, fibre, ash, moisture analysis via classical wet chemistry and hi-tech instrumentation including NIR (near infrared), ICP (inductively coupled plasma) and HPLC (high performance liquid chromatography); also infestation, foreign matter and admixture, hazardous contents, fuzarious grains, nutritional values, toxic contents (eg. arsenic, mercury & lead) mycotoxins and pesticides.

Dry bulk commodities certified by Alex Stewart

Fertilizer

Alex Stewart Agriculture's highly experienced and knowledgeable inspection team has built a trusted reputation within the international fertilizer-trading arena. The fertilizer division offers first class inspection and analytical services for bulk, bagged and liquid fertilizer with the aim of protecting client's interests at production site, during transportation, or at store. ASA has fertilizer laboratories in the UK, Belgium, Ukraine, Russia, South Africa, China and India. Its offices in the UK, Belgium and the Ukraine are all members of the International Fertilizer Association.

Animal feed

The Alex Stewart Group provides a fully comprehensive package of inspection and analytical services. Its GAFTA/FOSFA-registered and approved laboratories strategically located around the world perform a full range of analysis for soya, oilseeds – sunflower and rape, and fish meal including infestation, foreign matter and admixture, hazardous contents, fuzarious grains, toxic contents (e.g. arsenic, mercury & lead) mycotoxins and pesticides.

Grain and wheat

Grain inspection and analysis is a core business of Alex Stewart Agriculture and is a superintendent and analyst member of

the Grain And Feed Trade Association (GAFTA), working with many leading grain traders by providing monitoring, testing and consultancy services globally. In addition fumigation services can be offered as ASA works closely with fumigation companies to ensure that cargoes are loaded and stored in appropriate condition and quality is not affected during transportation. Grain inspection services also extend to provide collateral management services such as supervision of long-term storage of grain or control of transportation between storage facilities.

Quality inspection services

Warehouse inventory control and collateral management: ASA can provide a diverse range of services, from stock audits and control procedures, to security advice and commodity/store condition surveys.

- **pre-shipment inspection and analysis**: the Alex Stewart inspection team will check that the customer's product is within specification and fit for the intended use.
- **quality control:** checking that cargo conforms to contractual specifications, checking cargo for signs of contamination, odour, colour change, moisture levels, friability, protesting/ rejecting inferior cargo on sight, granule sizing, radioactivity testing and laboratory analysis.
- **vessel hatch inspection:** service includes checking hatch condition ensuring that they are free from loose rust and paint flake, free from previous cargo, checking that hatches are tight fitting, checking hatch open and closing operation is functional and timely, inspecting hatch rubber condition, hatch hose water testing, checking that holds are water-tight.
- **vessel hold cleanliness:** detailed inspection ensures that holds are clean, dry, free of loose rust and paint flake, free from previous cargo, free from infestation and odour and in every respect fit to receive the designated cargo.
- **continuous supervision:** ASA guarantees continuous supervision of customers' cargo loading and/or discharge (24 hours), representative sampling/sealing as per contract.
- **quality control inspection:** packaging reporting when applicable.
- **weight verification:** gross, tare & net weighing.
- **weighbridge control:** test weight checking, scale calibration and certification check, recording truck movements across scale ensuring that all cargo is weighed.
- **bagging supervision and tallying:** full tally and checking for bag strength and durability (laboratory testing is available) and verifying markings.
- **continuous information updates:** ASA's busy administration centre is in contact with all of its inspectors operating in the field and provides its customers with up-to-date, hour-by-hour detail of all loading and discharging operations.
- **documentation:** Alex Stewart Agriculture uses state-of-the-art technology to supply standardized reports and certificates; certification and reporting can be tailored to suit customer requirements. Photographic reports by conventional and digital camera can also be supplied for evidence purposes.
- **damaged cargo assessment:** establishing possible source, cause, and severity.
- **loss prevention:** supervision of reconstitution of acceptable cargo.
- **container services:** supervision of stuffing and unstuffing, container sealing, container condition surveying (on/off hire, damage assessment).
- **transportation services:** whether the commodity is manufactured, stored, shipped, railed, trucked or containerized, ASA can assist customers in their trading activities.
- **consultancy:** ASA offers consultancy services to assist customers on methods concerning material handling, weighing, transportation, sampling and analysis. Local knowledge and years of experience are primary assets of its business.

Key agricultural GAFTA/FOSFA superintendent operations within Alex Stewart Agriculture

Argentina, Australia, Belgium, Brazil, Bulgaria, Chile, China, Egypt, Estonia, Germany, Italy, India, Indonesia, Kazakhstan, Latvia, Malaysia, Netherlands, Peru, Philippines, Romania, Russia, Spain, Thailand, Turkey, Ukraine, UK, Uruguay & USA.










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AMECO goes for grains

Food commodities are actively traded around the world. The most important type of these commodities is grains. Grains include cereals, oilseeds, soya beans and rice. They are the third-largest dry bulk commodity transported by sea. A more minor, but nevertheless important food commodity is sugar.

AMECO, founded in 1932, designs and manufactures bulk handling equipment that supports the logistics of food commodities such as grains and sugar.

AMECO shiploader (TSL) in Lithuania.

Seaports and inland terminals are an important market for AMECO. Domestic consumption is on the rise for wheat, rice, and corn in the dry bulk segment. It is expected that these factors will drive the growth in seaborne trade and associated bulk handling services.

For this market, AMECO takes into account the need for efficient dust control. As a result, its storage solutions and shiploaders are equipped with dust suppression systems that provide an optimal protection against dust emissions, in accordance with ATEX guidelines.

AMECO's SHIPLOADERS

AMECO is a renowned supplier of shiploaders for a wide range of industries. Manufactured in Europe, AMECO's design is well-known for being robust and durable, perfectly fitting-in with requirements for sea transportation.

For the ports and terminals industry, AMECO provides a complete range of travelling, slewing and/or luffing shiploading equipment that can be installed onto longitudinal jetties. Its shiploaders can handle any type of dry bulk material. Moreover, AMECO can provide the stacker/reclaimer systems required for the storage of bulk materials in intermediate stockyards.

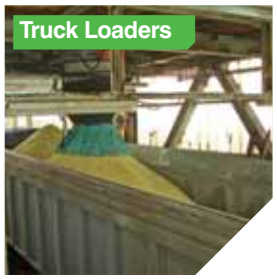
AMECO can provide a fit-for-purpose shiploader model depending on the customer's needs. It also offers a hybrid shiploader which can be fitted with two types of descending cutes:

- **for bulk:** Cleveland cascade chute, telescopic pipe with rotary banana chute/belt slinger/kick-in kick-out mechanism; and
- **for bags:** telescopic pipe with spiral chute.

AMECO shiploader (TSL) in Brazil.

Cleveland Cascades Ltd

Global leader in bespoke dry bulk loading chutes



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

Our bespoke solutions are designed to meet each customer's specific requirements from a tool kit of proven components, utilising the expertise of a team of specialist in house design engineers.

We lead the loading chute industry & set the standard for dust emissions and environmental pollution control in dry bulk handling.

Our worldwide reputation is built on high quality, well-engineered, robust, high performance chutes, backed up by excellent customer service and global lifetime product support.

Contact Cleveland Cascades Ltd

Unit 22, Dukesway, Teesside Industrial Estate, Thornaby, Stockton-on-Tees, Cleveland, TS17 9LT, United Kingdom Tel: +44 1642 753260 | Fax: +44 1642 753270

E-mail: enquiries@clevelandcascades.co.uk | Website: **www.clevelandcascades.co.uk**

AMECO shiploader (TSL) spiral chute for bags in Brazil.

AMECO's shiploaders are easily accessible, maintenance-friendly, and equipped with remote automated operation.

Case study: AMECO helps the Port of Klaipeda Expand

AMECO delivered a travelling shiploader to the Port of Klaipeda in Lithuania in 2001, handling grain at a rate of 1,320tph (tonnes per hour). It was part of a Port Rehabilitation project, sponsored by the World Bank in conjunction with the Klaipeda State Seaport Authority.

The upgrade started out as an improvement to the channel entrance in the port. It included maintenance and development of physical infrastructure and a significant improvement in environmental protection. The project also increased efficiency in key economic sectors by offering cheaper and more efficient access to markets.

Since 2001, AMECO has followed the shiploader through its life-cycle carrying out an inspection in 2015, ensuring the safety and efficiency of the machine and therefore replacing critical parts.

Klaipeda State Seaport is the northern-most ice–free port on the Eastern coast of the Baltic Sea and is therefore operational even during the coldest winters. It is the most important and biggest Lithuanian transport hub, connecting sea, land and railway routes from East to West, handling port cargo of up to 65 million tonnes per year.

Current Projects: commissioning of AMECO's hybrid shiploader complete

AMECO has just delivered a shiploader to the Port of Suape in Brazil, currently under construction. AMECO is particularly proud of this project given the machines rare hybrid function of loading bags/bulk raw and refined sugar into sea vessels at a capacity of 2,200tph.

A new sugar terminal was recently installed at Suape Port in Pernambuco. With an investment of R$150 million, the terminal has expanded and streamlined the transport of sugar at the port. AMECO's hybrid shiploader has been a vital part of this project, with its conveyor belt system reducing the time for loading ships from 15 days to six days.

The new terminal has attracted larger ships for cargo transport, to move its capacity to 500,000 tonnes of refined sugar per year. This in turn has opened a new export corridor for mills in the Northeast at a time of strong demand, and AMECO is proud to have loaded these first ships.

AMECO's services

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

- Overseeing, organizing and co-ordinating the erection, commissioning and/or start-up of AMECO-supplied equipment by a third party contractor.
- Complete erection, installation, and commissioning of equipment from unpacking to the handover.
- Maintenance services by a multilingual team of inspectors and engineers, covering all its customers worldwide, including inspections, refurbishment, preventive maintenance and repairs.
- Ensuring clients always have the right spare parts available — at the right time and place, but at the right price.
- Keeping lead items in storage for emergency parts.

GOLFETTO SANGATI becomes part of GEA technology group

GOLFETTO SANGATI — which develops, builds and installs turnkey plants for durum and wheat mills, maize mills, rice mills, shiploading and unloading systems, storage for raw materials and finished products — has been part of Pavan Group since 2010.

When it concluded the acquisition of the Italian Pavan Group at the end of November 2017, the Düsseldorf engineering group GEA purchased a worldwide leader in the design and engineering of technologies and integrated product lines for cereal based food. GEA is one the largest suppliers for the food processing industry and for a wide range of other industries.

The Pavan Group and, with it GOLFETTO SANGATI, benefits from the merger of the structures of the large corporation. In conjunction with GEA and its extensive sales and service network, new markets are opening up around the world. As a result, GEA offers ideal growth opportunities as a globally established system provider for the food processing industry.

GOLFETTO SANGATI grain terminals.

Ninety years of experience in grain handling

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.

Shiploading: TRANSLOAD

The TRANSLOAD is a mechanical shiploader. It can be stationary or mobile on rails or wheels, and its capacity ranges from 200 to 2,000tph (tonnes per hour) handling cereals and wide range of free-flowing materials and meals, handled with chain conveyors or belt conveyors depending on the quay layout and customer requirements.

The TRANSLOAD is equipped with a loading telescopic pipe that can be provided both with kick-in/out (KIKO) system or mobile trolley. The self regulating dust suppressor system is useful also for directing and distributing the product flow.

Recently GOLFETTO SANGATI has developed a fixed loading system for smaller capacities (from 100 to 500tph); the system is a cost-effective solution for river-based and other small installations.

GOLFETTO SANGATI TRANSLOAD.

Ship-unloading: TRANSMEC

GOLFETTO SANGATI has been supplying pneumatic unloaders since 1965. In 1993, the company developed a new technology — the TRANSMEC mechanical continuous ship-unloader.

The main reason to choose a TRANSMEC is its higher profitability and cost-effectiveness.

The capacity of a single unloader ranges from 300 to 1,500tph; for lower capacities small pneumatic systems are recommended.

The in-house designed DIGGER system for the efficient unloading of non free flowing products is available.

Based on the data registered on site in various countries where TRANSMEC has been in operation from years, the most important factors in comparison with pneumatic unloaders are:

- total installed power is 40 to 50% lower;
- energy consumption is 70% lower;
- nearly 0% of broken kernels thanks to

GOLFETTO SANGATI TRANSMEC.

the moving speed of the product being 20 times lower;
- annual maintenance costs are 70% lower;
- much lower noise emissions;
- almost zero dust emissions during operation;
- high unloading efficiency across the vessel (higher than 70%) and hatch accessibility thanks to the kick in kick out system.

The savings accrued in two years of operation will offset the slightly higher initial investment compared with pneumatic solutions.

Then, for the remaining (at least) 20 years of operation, a huge annual saving (energy cost, maintenance expenses and reduced unloading time) will ensure great profitability.

Grain terminals

GOLFETTO SANGATI is one of the few companies able to design, manufacture and install full grain terminals from the receiving section to storages and cleaning/treating equipments up to loading section.

In challenging projects, it is necessary to consider several factors associated with the location of installation and the operational procedures. GOLFETTO SANGATI conducts a preliminary investigation taking into account all those factors and then develops the most appropriate solution for all parties.

Advantages of GOLFETTO SANGATI solutions

GOLFETTO SANGATI offers its customers extensive expertise in designing and engineering integrated technology lines for grains and grain-based food.

This expertise, together with decades of experience in grain handling and milling, is fundamental when proposing the most suitable solution in terms of best technology and of optimized investment profitability considering the input and the output required by the client for the construction of loading/unloading plants and full grain handling terminals.

Recent contracts

- **Yuzhny Port Project (Ukraine):** design, manufacture and delivery of one TRANSLOAD mobile shiploader rated at 2,000tph, with KIKO system;
- **Barcelona Port Project (Spain):** supply of one TRANSMEC ship-unloader (600tph) for soya beans; it includes also a shiploading boom for soya meal (200tph);
- **Cocoa beans Project** in Toronto (Canada): design, manufacture and delivery of a handling system for cocoa beans. Intake, cleaning and bulk load out for raw material for chocolate manufacturers.

GOLFETTO SANGATI conveyors and grain terminals.

DESIGNED, ENGINEERED AND BUILT

WITH 90 YEARS OF EXPERIENCE AND EVOLUTION

Golfetto Sangati is an Italian company designing, building and installing turnkey equipment for grain handling and milling. This strong industrial reality is born from the merger of three historic Italian brands: Golfetto, Sangati and Berga. The company fulfills the market demand in a competitive way and with state-of-the art technologies based on research, experience and in-depth technical knowledge.

Golfetto Sangati is a reference point for the design and construction of complete port systems for loading and unloading ships. The company designed and built more than 50 port systems all over the world and plays a primary role in technological advancement from the first pneumatic ship unloader to the more advanced mechanical loaders and unloaders.

The company supplies a large range of handling, processing and storage, loading and unloading systems on tires or rail with a capacity of 50 to 2,000 tons per hour implementing the best technical principles.

GOLFETTO SANGATI

A COMPANY OF PAVAN GROUP

www.golfettosangati.com - info@golfettosangati.com

Ship-unloading systems: mechanical or pneumatic?

Figure 1: The simple design of mechanical unloaders reduces wear and maintenance costs.

For efficient unloading of grain and other bulk goods, both mechanical ship-unloading systems like the Bühler Portalink and Portalino and pneumatic ship-unloaders like the Bühler Portanova are employed worldwide, *writes Vincent van der Wijk*. Each of these system types is founded on sophisticated, powerful technology and is the perfect instrument for specific areas of application.

Mechanical and pneumatic ship-unloaders serve the same basic purpose: to unload grain or other bulk goods as efficiently as possible. But each system possesses specific advantages that make it the preferable choice for certain areas of application.

An often-used rule of thumb is that pneumatic unloaders are an excellent choice for lower unloading capacities and lower annual shipping volumes, while mechanical unloaders show off their strengths at higher capacities. The comparison that follows is intended to illustrate the most important characteristics, advantages and disadvantages of each of these technologies. Grab systems, which are also commonly used, are not included in this analysis.

Figure 2: The more complex design of pneumatic unloaders increases wear, construction and maintenance costs.

Functional principles and technical configuration

Mechanical: The Portalink mechanical ship-unloading systems transport bulk material to the pier at low speed via a high-performance chain conveyor. This is carried

out using two independently run chain conveyors, one in the vertical conveying arm, the other in the boom. The boom and tower designs are standardized and can thus be manufactured economically.

The advantages of this simple design principle with few wearing parts and low conveying velocity are high dependability and low maintenance requirements. The low wear also ensures a constant conveying capacity with no losses in performance over the entire life cycle. Thanks to the minimal maintenance requirement, the amount of downtime of the entire installation decreases while system availability increases.

Pneumatic: The design of pneumatic ship-unloading systems requires the inclusion of several components such as telescopable spouts, airlocks, filter systems and the suction nozzle. These parts require more maintenance and thus also lead to higher maintenance costs. The high conveying velocity of the bulk material also contributes significantly to the high level of wear — unexpected failures of the installation are more probable with this system. Additionally, many of the parts must be designed to be particularly resistant to wear in order to withstand great forces — another cost factor to consider. The frequency at which parts must be replaced is naturally greater, which increases the amount of downtime of the installation and reduces the availability of the system. The higher amount of wear also automatically causes a loss in capacity that reduces the overall efficiency of the unloader. The berthing times of the ships can also increase due to sudden stoppages in operation, leading to higher berthing fees.

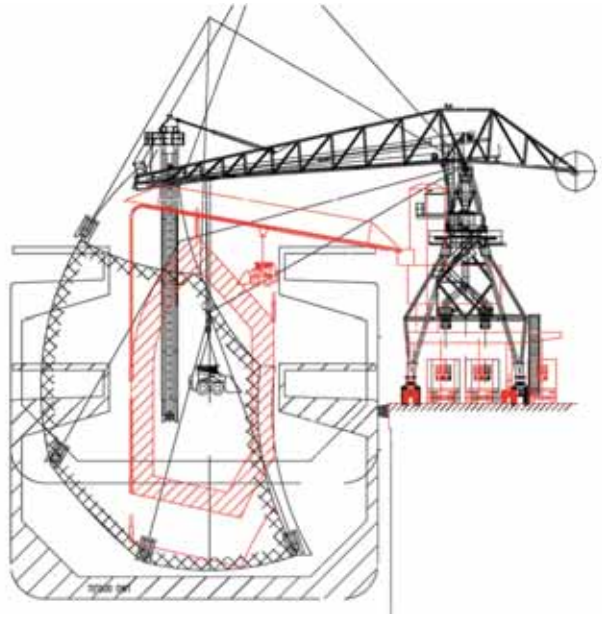
These disadvantages are less critical at lower conveying capacities, since wearing parts do not need to be replaced as often and maintenance requirements are lower as a result.

Unloading process

Mechanical: Mechanical unloading systems like the Bühler Portalink/Portalino use a so-called 'kick-in/kick-out system' for unloading bulk materials. In this process, the conveying arm moves through the bulk material in a curve. In this manner, it reaches the bulk material below the rim of the cargo hold without requiring repositioning of the ship (with stationary systems) or the unloader (with mobile systems). This flexibility significantly speeds up the unloading process and minimizes the need for bulldozers for removal of bulk material residues.

Figure 3: ***Grey:*** *the curved operational area of mechanical unloading systems up to the rim of the cargo hold.*

Red: *the more limited operational area of pneumatic unloading systems.*



Pneumatic: Pneumatic solutions can only adjust the position of the conveying arm vertically or horizontally. This makes more frequent repositioning of the ship or unloading system necessary which, in turn, reduces unloading velocity. The bulk material below the rim of the cargo hold cannot be reached, requiring bulldozers to be used earlier and leading to longer unloading times.

Unloading of bulk material residues

Mechanical: As a rule, bulldozers and bucket loaders are used for the removal of bulk material residues from the cargo hold. Many modern unloading systems with mechanical technology such as the Bühler Portalink and Portalino are equipped with a winch integrated in the boom for moving the bulldozer into the cargo hold. Depending on the capacity of the unloading system, the winch — e.g. in installations with a throughput of 1,500tph — can offer a high load-bearing capacity of 15 tons. In this case, the use of a single heavy bucket loader is sufficient to remove all cargo residues. However, the bulk material residues must first be placed into the bucket of the loader so that it can then be lifted out of the hold.

Pneumatic: By comparison, pneumatic unloading systems come equipped with winches having a more limited load-bearing capacity of no more than 3.5 tonnes. Winches capable of bearing higher loads are technically feasible; however, they require larger steel constructions which lead to much higher costs as compared to standard systems. Thus, several smaller

Figure 4: Problem-free transport of a heavy bulldozer thanks to 15t load-bearing capacity.

Figure 5: Maximum load-bearing capacity of the winch (3.5t) requires several smaller bucket loaders.

bulldozers or bucket loaders must often be moved into the hold in order to remove the remaining bulk material. This takes time and increases unloading time and, in turn, the berthing time of the ships, resulting in an increase in costs. The basic advantage pneumatic systems offer, i.e. being able to remove literally every grain from the hold, is countered by their (physically determined) low residue unloading capacity.

The following simulation based on a comparison of unloading systems with 600tph throughput and a Panamax ship

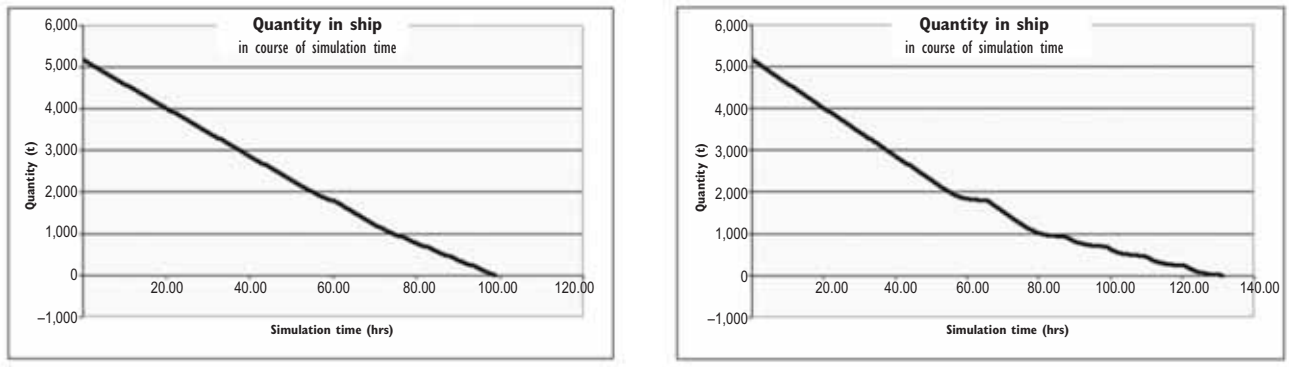


Figure 6: Comparable unloading capacity up to approx. 20,000 t, then significantly longer unloading time with the pneumatic unloading system.

shows just how greatly the use of heavy bulldozers or bucket loaders can impact the efficiency of the entire unloading process. While the unloading time of the simulated ship comes to only 99 hours using the mechanical Portalink unloading system, with a pneumatic unloader, the complete process takes a total of 131 hours. This enormous difference comes about not only through the use of heavy bucket loaders to unload the material residues, but also through the difference in throughput: while the Portalink unloading system continues to unload at constant full capacity as the level of bulk material sinks, with the pneumatic unloading system, the throughput decreases by at least 10% as the bulk material level decreases and the conduit pipes are extended fully. The overall efficiency of the mechanical Portalink system is 87%, whereas with the pneumatic system, efficiency is only 66%.

Here again, it should be pointed out that at lower conveying capacities, the efficiency disadvantages of pneumatic unloading systems illustrated here can be significantly lower.

Handling

Mechanical: With the mechanical Bühler Portalink and Portalino unloading systems, operating staff only occasionally has to intervene in operation. The conveying arm automatically sinks into the bulk material and discharges large amounts of cargo at a constant throughput level before repositioning becomes necessary. The static construction of mechanical unloading systems does however have disadvantages whenever there are strong variations in the water level at the pier. In this case, the length of the conveying arm cannot simply be flexibly adjusted to the water level, which means additional repositioning is required.

Pneumatic: Without the benefit of the automatic 'sink-in' function, operators of pneumatic unloading systems have to manually adjust the position of the conveying arm depending on the height of the bulk material and reposition the suction nozzle accordingly. On the other hand, the possibility of varying the length of the telescopable spout allows the system to be employed flexibly where water level varies. The disadvantage of this flexibility: as the length of the telescopable spout increases, throughput decreases.

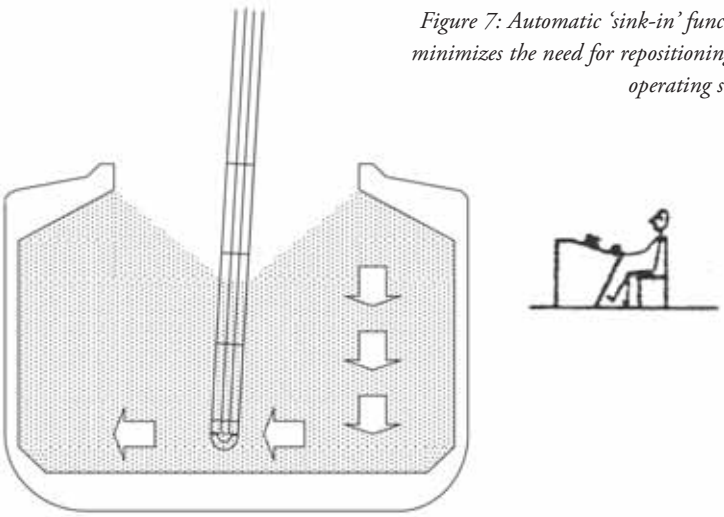


Figure 7: Automatic 'sink-in' function minimizes the need for repositioning by operating staff.

In addition, pneumatic systems prove superior with regard to handling, e.g. when two different products are transported in the same hold and are separated only by sheeting or flooring or when tankers are employers as bulk carriers.

Product protection

Mechanical: Mechanical solutions like the Bühler Portalink/Portalino unload the bulk material at a constant low velocity. This not only reduces wear and the maintenance costs of the system, but also ensures that especially sensitive grain is unloaded in an exceedingly gentle manner. In this way, damage to the product is minimized and financial losses caused by high reject rates are avoided. The overall high product quality leads to higher margins than with pneumatic unloading systems — a financial

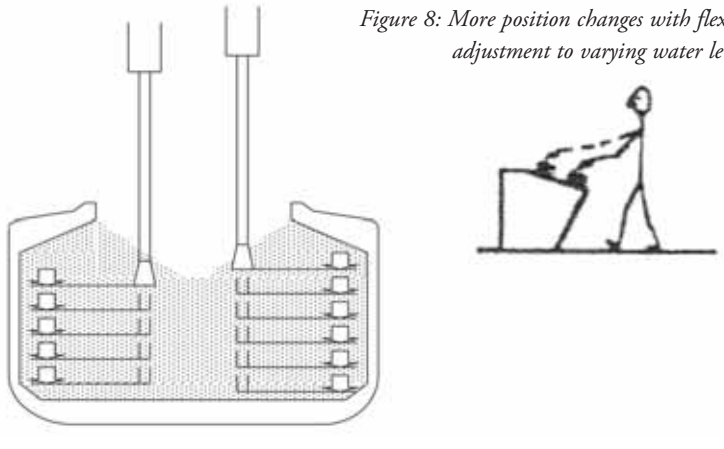


Figure 8: More position changes with flexible adjustment to varying water levels.

aspect that shouldn't be underestimated in light of increasing grain prices.

Pneumatic: The physical properties of pneumatic solutions require the conveying speed to be higher than that of mechanical systems. The resulting higher maintenance costs are not the only disadvantage; critical disadvantages also include higher reject rates and lower product quality, which in turn leads to lower market prices. Additionally, greater system wear results in reduced unloading throughput.

Energy consumption

Thanks to a simple design with few components and a lower conveying speed, the energy consumption of mechanical unloading systems like the Bühler Portalink or Portalino is approximately 0.35–0.4kWh per tonne. By comparison, the energy consumption of pneumatic systems is roughly 0.85–0.9kWh/t; older systems even require more than 1kWh/t. Depending on conveying capacity and local energy prices, mechanical unloading systems can save the user tens of thousands of Euros each year.

In the light of the continuing trend toward higher energy prices, it stands to reason that in the future, mechanical unloading systems may also become more attractive for lower capacities — above all in countries where energy is expensive.

High levels of specific energy consumption also have a negative impact on the overall power supply of an installation — and on costs for the provision of energy. The necessary investment costs as well as the annual increases in electricity rates are often overlooked in calculating the overall costs of a system. In this regard, mechanical unloading systems like the Bühler Portalink or Portalino are clearly superior to pneumatic solutions.

Noise pollution

Mechanical: To say that mechanical unloading systems like the Bühler Portalink or Portalino operate quietly would certainly be an exaggeration. Nevertheless, with the exception of necessary safety signals, their constant noise level means they can only be heard in the immediate vicinity. In this way, the system adheres strictly to environmental and occupational safety guidelines and minimizes the impact of noise on workers.

Pneumatic: In contrast to mechanical systems, the air suction blower (roots type) employed in pneumatic unloading systems produces an unpleasant noise frequency that is often perceived as an annoyance, particularly at long distances. While multi-stage fans produce less noise as a whole, at further distances, they result in noise pollution similar to that of roots-type blowers.

Costs

Mechanical: Mechanical unloading systems such as the Bühler Portalink and Portalino are capable of handling throughputs up to 1,500tph and beyond. This means even larger amounts of bulk material can be unloaded with just a few unloading systems. At an average of €0.08, the specific maintenance costs per tonne of unloaded raw material are also low (replacement parts and personnel).

Because of their design however, mechanical unloading systems are heavier and must be built larger than pneumatic solutions due to their geometry. This requires greater investments in the pier installations.

Pneumatic: By contrast, pneumatic unloading systems are only capable of handling a maximum of 600tph throughput (with one suction nozzle). Larger conveying amounts require the employment of several unloading systems, which in turn drives up investment costs. At approximately €0.14 per tonne of unloaded raw material, the specific maintenance costs are significantly higher. On the other hand, costs for the pier installations are lower than that of mechanical unloading systems.

Conclusion

The advantages of mechanical ship-unloading systems like the Bühler Portalink/Portalino lie in the areas of energy consumption, low wear and low maintenance and efficient unloading with short berthing times, in particular at high throughputs starting at 300tph or higher volumes of approximately 300,000–500,000 tonnes annually. Continuing increases in energy prices could also make mechanical systems an attractive alternative to pneumatic systems at lower volumes in the future.

Pneumatic systems continue to demonstrate advantages with low material volumes, through their high level of flexibility where water levels vary at the pier, when different products are transported in the same cargo hold or when tankers have been converted into bulk carriers.

In short: Each of these technologies serves a purpose. The specific area of application and volume of bulk material are the deciding factors.

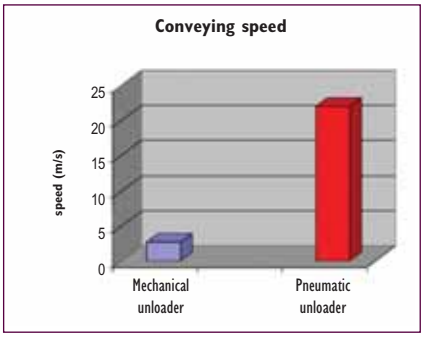


Figure 9: The reduced conveying velocity of mechanical unloading systems protects products and increases margins.

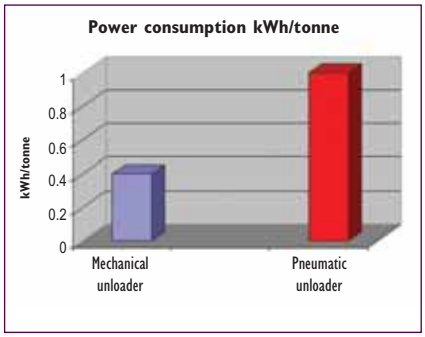


Figure 10: The energy consumption of mechanical unloading systems is two to three times lower.

Bühler has long experience in both technologies and offers methods and calculation tools to assist any client when making a decision for the right technology for the individual application.

About Bühler

Every day, billions of people come into contact with Bühler technologies to cover their basic needs for food and mobility. The company strives for innovations for a better world, with a special focus on healthy, safe, and sustainable solutions. It contributes significantly to feeding the world's population, while setting the focus on food security and safety. Bühler's solutions and technologies enable efficient and clean mobility.

As a major technology group, Bühler invests up to 5% of its turnover every year in research and development. In 2017, around 11,000 employees in over 140 countries generated a turnover of CHF 2.7 billion. As a globally active Swiss family-owned company, Bühler is particularly committed to sustainability.

Bühler wants its customers to be successful. It wants every human being to have access to healthy food. It wants to protect the climate with energy-efficient cars, buildings, and machinery.

Telestack mobile shiploaders critical to anticipated growth in Ukrainian grain industry

Figure one: New Nibulon transshipment terminals at Holoprystans'ka branch.

The State Statistics Service of Ukraine announced that in 2017, Ukraine harvested 61.3mt (million metric tonnes) of grain. According to forecasts, agricultural production in Ukraine will increase by approximately 16mt of grain in the next four to five years. Central to this growth is the continued investment by Ukrainian company Nibulon.

Over the years, Nibulon has invested heavily in the transshipment network throughout Ukraine and has strategic plans to further invest along the Dnipro River and along other rivers, fundamentally changing the logistics map of the Ukraine. The most recent of Nibulon's river transshipment terminals was opened in Bilenke village (Zaporizhzhia region) which had a Telestack TS227 rail-mounted shiploader installed as part of the transshipment process.

Telestack is one of the leading suppliers of grain handling equipment in the Ukraine. Since 2009 Telestack has supplied 27 units across the Ukraine region and its equipment is integral to the multi-billion-dollar Ukrainian grain industry and can be found in various ports and river terminals throughout Ukraine. Nibulon as one of the main customers has various new terminals on the Dnipro River in the Kamyanka-Dniprov'ska, Dnipro and Grady'zk regions. This investment came from the growing

Figure two: TS 527 rail-mounted mobile shiploader fed directly from overhead slatted conveyor.

export demands of Nibulon for Barley, wheat and Oilseeds, especially to Japan and Asia.

Philip Waddell, International Sales Manager with Telestack commented "Telestack are proud to be a supply partner for Nibulon, who have established themselves as the most innovate and progressive vertically integrated Grain producer/ Exporter in Ukraine. The river terminals which Nibulon have built in Ukraine have greatly reduced truck traffic on the roads and increased efficiency of their logistics chain. From field to port, Nibulon have established themselves as a buyer of best-in-class equipment and a company which others in the industry see as the industry leader. Having been associated with Nibulon since 2009, Telestack appreciate Nibulon's continued business, resulting in third batch of equipment ordered in 2017 for further river terminal expansion."

On a single mobile chassis each ship-loading unit consists of the key functions including, rail-mounted parallel travel, radial slewing, luffing and telescopic features. Telestack continues to excel in providing customized bulk material handling solutions to its wide customer base and over the years Nibulon has taken models of varying lengths. The company offers the ship and barge loading/ unloading industry highly innovative and customized mobile conveying systems. Telestack's success derives from achieving sustainable value for the client; using mobile bulk handling technology to enhance operational efficiency, minimize environmental impact and maximize product flexibility, service-ability and availability.

Superb site mobility and flexibility

The Telestack Radial Telescopic conveyors are loading 3,000–5000dwt barges/vessels up to 500tph (tonnes per hour) fed from a slatted conveyor installed on site. The ship-loader is fed from an overhead slatted conveyor system with specific discharge points. This system is fed directly from the grain silos onto the overhead conveyor and directed to the selected discharge chutes.

The shiploader is installed with electric driven rail bogie units, which are used to move the unit in parallel mode to the pre-defined transfer points from the slatted conveyor. The entire unit moves smoothly down the quayside to each specific discharge point, which is controlled from the central control panel (optional remote control) and ensures loading change times are minimized to enhance production rates.

As the unit is installed on the rails, it eliminates the need for further operators to move the shiploader, with only one person required to operate the machinery during the entire loading process, with all control/monitoring signals integrated into the fully diagnostic control panel within the shiploader.

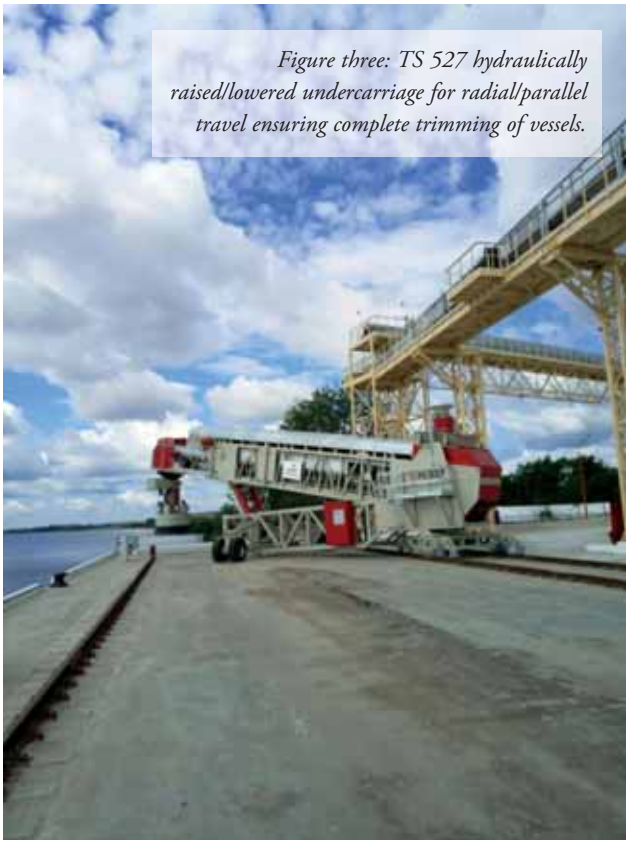


Figure three: TS 527 hydraulically raised/lowered undercarriage for radial/parallel travel ensuring complete trimming of vessels.

The most distinctive feature of this unit is the ability to move from parallel travel to radial travel at the pre-defined discharge points which are aligned at the centre of each hatch (see figure two). This is achieved by the hydraulic jacking legs which lift the machine from the front rail (closest to the barge/vessel) and lower the unit to the hydraulic driven radial wheels.

This feature allows for complete radial trimming of the hatch and specific area of the barge/vessel. The radial feature also enhances production rates, as it allows the operator to load a larger area of the barge/vessel from the single feed-in point, which minimizes the required movements and ensures the barge/vessel can be easily balanced with an equal load during the loading process.

Once the loading sequence is complete, the machine is lifted (via the hydraulic jacking legs) back onto the rail and moved parallel to the next loading point. This method ensures for an efficient loading cycle while trimming the entire hatch of the barge/vessel.

The telescopic feature adds further operational flexibility during the loading cycle, as it allows the operator to load (in conjunction with the radial facility) the complete area of each hatch from the single feed-in point. This process is replicated over the four hatches to ensure that the barge is loaded evenly throughout (See figure four). The combination of these features ensures the operator has the maximum flexibility/mobility for an efficient and effective loading cycle.

Integrated dust-suppression and extraction techniques

A major consideration when handling any grain materials is to control the dust emitted when the material is aggravated. Telestack addressed this issue by custom designing unique dust suppression/ extraction features to meet the needs of the application.

This included the design of the hydraulically raising transfer chute which connects to the slatted overhead conveyor which eliminates dust emissions and spillage at the transfer points. This allows the operator to move parallel to each specific discharge point and raise/lower this chute with ease, confident that no material/dust is escaping form the discharge point. This is further enhanced by the completely sealed feed-boot and integrated primary and secondary skirting. The outer conveyor and innovative inner conveyor telescopic dust covers on the Ship-loader ensure that dust is eliminated when material is on the belt. This feature protects the material from the rain/wind and ensures the quality of material is maintained.

This is further enhanced by the telescopic free fall chute with integrated dust extraction, which eliminates dust as the material is fed into the barge/vessel. The telescopic chute also ensures complete flexibility when the loading cycle begins as it can trim all sections of the vessel with ease. The telescopic chute raises up/down during the loading cycle to reduce the drop height of material and in conjunction with the built-in dust extraction system, it eliminates

Figure four: mobile shiploader trimming the entire barge directly from the grain silos.

dust emissions.

Telestack is renowned for customizing and tailoring its products to maximize mobility and operational flexibility of these units to improve and sustain an efficient and affective loading cycle. Telestack is committed to continually innovate and another development is the availability of the All Wheel Travel system on any Telestack shiploading unit. With the ability to turn 360° with ease, the All Wheel Travel offers the operator unrivalled flexibility, particularly when loading geared vessels. The flexibility and mobility of the All Wheel Travel system also allows the fastest hatch to hatch change in the marketplace as well as maximizing the use of the radial telescopic unit for example, in all aspects of stockyard management when not used to load vessels.

The unquestionable success of these award-winning units is demonstrated clearly in the repeat orders from the respected customer in line with the expansion of other terminals throughout the Ukraine. These units will be of similar design and manufacture, with an increased capacity to meet the needs of the application and the exporting demands of the terminal.

Figure five: Telestack TS527 at the Nibulon transshipment terminals at Khortytsya branch.

Telestack
Mobile Bulk Material Handling

ALL WHEEL TRAVEL SHIPLOADER

- Unrivalled **Mobility** and **Flexibility**
- **Fastest Hatch to Hatch** change in the market
- Range of **Steering Modes** to meet restrictive quayside conditions - Turn 360° with ease
- **Versatility** - Use in all parts of Logistics Chain (Shiploading/ Stacking)
- **Technology** translates across the Telestack Product Range

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The right belts for grain processing: Continental offers the full range

Grain production is growing worldwide. Conveyor belts from Continental help in harvesting grain.

- reinforced belts for grain processing;
- grain elevator belts resist swelling caused by from seed oils; and
- white conveyor belts for the transportation of foodstuff.

Grain production is growing worldwide. The Food and Agriculture Organization (FAO) of the United Nations estimates that the 2017/2018 marketing season will set a new record. Conveyor belts from Continental help in harvesting of many small grain or forage crops, loading ships and trucks and processing materials in the food industry.

Increased harvest yields thanks to conveyor belts

Draper belts for grain can and do come in many shapes and sizes for various uses. Draper belts are used on combine headers to facilitate the movement of items like soybeans after cutting through the combine to where they are collected in the combine hopper. "This approach is more efficient than the other option, which is an auger or screw-type system that does the same thing but sometimes crushes the soybean or drops the soybean back in the field," notes Kelley Burianek, Product Manager Specialty Ag Products at Continental Conveyor Belt Group. The endless draper belt from Continental was honoured with an Innovation Award from John Deere.

Reinforced belts for grain processing

Continental offers both lightweight and heavyweight conveyor belts for the grain processing industry. Depending on the application, textile conveyor belts feature various cover stock properties and a single- or multi-ply textile tensile member. These long-lived products are made for diverse conveying tasks in machine and plant construction as well as many other industries, such as grain handling applications.

The Pathfinder Plus reinforced fabric belt is designed to stand up to the unique operating conditions of grain handling facilities. "Using the Pathfinder Plus belt increases the overall belt strength capability by a minimum of 10%," notes Kelley Burianek, Product Manager Specialty Ag Products at Continental Conveyor Belt Group. "Exceptionally low electrical resistance and the maximum degree of oil resistance provide operational safety and long life. Furthermore, low belt elongation minimizes downtime spent re-splicing grain belts."

The fabric belt is specifically made to resist potentially damaging effects of crushed and whole soybeans, oily grains and mineral oil dust suppressant sprays. Pathfinder Plus allows customers to increase bucket projection by a minimum of 10%, which translates into great conveying capacity. The conveyor belt is based on two compounds: Pathfinder Arctic and Pathfinder Supreme. Both compounds are designed especially for the grain industry where oily grains and controlled mineral or vegetable oil dust suppressive sprays come in contact with the belt. Supreme covers provide superior oil resistance to the potentially damaging effects of crushed and whole soybeans, oily grains and mineral oil dust suppressant sprays.

Continental has also developed suitable belts for storage operations and loading silos: Continental rubber compounds are developed with the agricultural applications in mind. For example, the grain elevator belts have compounds that resist swelling caused by seed oils. Grain elevator belts are used to load/unload grain bins. Buckets that pick up grain and move it to an elevator/silo or truck are fastened to the belts.

"Our PVGE products are an economical

alternative to rubber grain elevator belts and offer a wide range of service in grain elevator applications," explains Burianek. The all-polyester, interwoven carcass provides very low stretch as well as excellent fastener retention and bolt-holding capability to fasten the grain buckets to the belt.

The belt is available in a full range of working tensions from 20KN per metre for light-duty applications all the way up to 130KN per metre for elevators lifting heavier loads to higher elevations. "Our PVGE compound is specially designed to provide oil resistance and low temperature capability, for example –29°C, as well as static conductivity and flame-retardant properties. They are used in a wide variety of grain handling applications and are available in both black and white colours, depending on the customer's needs. Additionally, the very strong interwoven carcass results in long belt life," Burianek adds.

The material is used for the PVGE 600 & PVGE 750 grain elevator conveyor belts. The high-tensile-strength belts are made with unique hybrid warp yarns and are designed to lift heavier grain loads or typical loads to higher elevations. The durability of the all-polyester interwoven carcass allows for exceptional bolt-holding capability and fastener retention, as well as the flexibility to be used on systems with smaller pulley diameters. The PVGE compound delivers oil-resistance and low-temperature capabilities while meeting and exceeding safety standards.

The range also includes baler belts, which are used to create round bales of hay or forage, cleated belts, which are used on mobile conveyors for transporting seed, and merger belts, which are used to create windrows of crop or hay.

Selected compounds make grain belts better

Continental also focuses on conveyor belts for industrial applications as well as special-purpose belts for agricultural machinery. "Selected compounds make our grain belts, for example, fire-retardant and appropriate for elevation of oily conveying materials," explains Burianek. The Grain Handler is engineered for use in the grain elevator industry or where a static conductive belt is needed. Different impressions help with the transport of grain. For example, Continental offers the Diamond Top impression, which is ideal for conveying products with mild oil content or a slight amount of oil in different carcass constructions. Furthermore, Continental offers a comprehensive range of belt profiles. For optimum performance even under the toughest of conditions all profiles are integrally moulded into the belt using rubber cleat extrusion.

White conveyor belts for the transportation of foodstuff

Apart from these specialized products, the portfolio includes white conveyor belts that have been specially engineered for the transportation of foodstuff. In this branch of industry, abrasion wear on black conveyor belt surfaces must be avoided at all costs because it can cause material in transit to become discoloured and impure. For this reason, foodstuff conveyors are made from white nitrile (NBR) or styrene-butadiene rubber (SBR) and comply with international standards and norms governing the foodstuffs industry.

About Continental

Continental develops pioneering technologies and services for sustainable and connected mobility of people and their goods. Founded in 1871, the technology company offers safe, efficient, intelligent, and affordable solutions for vehicles, machines, traffic, and transportation. In 2017, Continental generated preliminary sales of €44 billion and currently employs more than 235,000 people in 61 countries.

As a division in the Continental Corporation, ContiTech is one of the world's leading industrial specialists. Its customers can be found in key industries such as machine and plant engineering, mining, the agricultural industry, and the automotive industry. With around 47,000 employees in 42 countries, the company uses its development and material expertise for products and systems made of rubber, polyamide, metal, textile, and electronic components to combine these with individual services. ContiTech also offers functional and design-oriented living solutions and is always searching for customer-friendly and environmentally-friendly answers — going well and truly beyond its roots as a producer of rubber products. With preliminary sales of approximately €6.2 billion (2017), this international technology partner is active with core branches in Europe, Asia, North and South America. DCi

Dry bulk cargo intake, processing & distribution

SCHADE — classical travelling and luffing stacker for the blending of limestone at the cement plant of Holcim Campulung in Romania (photo: SCHADE).

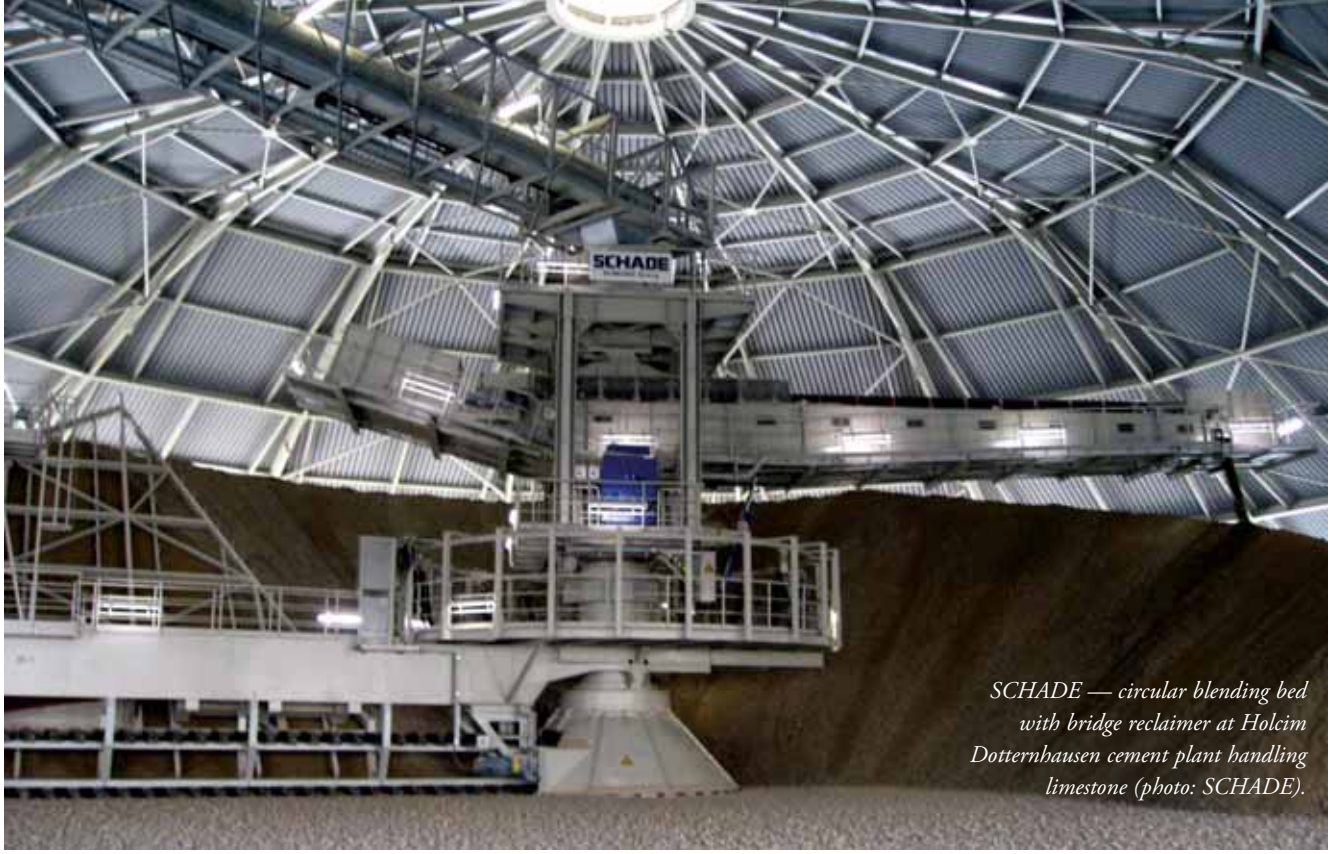
Storage, reclaim and blending at bulk terminals, process and power plants

Automated storage and reclaim are now a fundamental part of all new bulk terminals, process and power plants; generally divided into two categories to maximize the flexibility of the raw material and fuel intake and distribution, *writes Andreas Markiewicz, Director of Sales of SCHADE Lagertechnik GmbH (AUMUND Group)*. At large bulk terminals strategic storage must provide the capacity to discharge the largest vessels with a margin of flexibility. Similarly for central prep plants and transhipment terminals very high reclaim rates from strategic stockpile are essential for rapid train loading and onward distribution. Often at process and power plant strategic stockpiles will be combined with blending beds to homogenize the materials to ensure a consistent grade for burning, or processing or export.

The AUMUND Group — including, particularly, SCHADE — is heavily involved in this market with a range of stacker and reclaimer designs from around 100tph (tonnes per hour) to over 6,500tph, handling materials as diverse as solid fuels, sulphur prills, fertilizers, iron ore, concentrates, ores, limestone and many other specialist products.

To satisfy modern environmental demands the vast majority of new storage and blending facilities are fully enclosed based either on circular or longitudinal stockpile configurations depending upon the site topography and the management demands of the storage system plus the range of segregated materials to be stored.

Circular storages are popular for handling a single material type, such as limestone in a cement plant, and when combined with a bridge-style reclaimer offer a compact solution delivering a homogenized output. The radial and luffing stacker builds a layered stockpile on the chevron principle, ensuring materials of varying specification are deposited in discrete vertical layers. When this material is recovered using the bridge reclaimer incorporating a reciprocating harrow, the resultant output represents a part of each layer and is thus blended creating a homogenized discharge. Both the radial/luffing stacker boom and the discharge of the bridge reclaimer are supported on slew bearings mounted to the central supporting column which is extended above the inlet chute of the stacker to support the head of the incoming belt conveyor. This arrangement eliminates any machinery loading applied to the enclosing dome structure thereby reducing the structural weight and relative cost. Material is discharged from the horizontal



SCHADE — circular blending bed with bridge reclaimer at Holcim Dotternhausen cement plant handling limestone (photo: SCHADE).

reclaimer to the centre via a conical transfer chute to the feed boot of a belt conveyor mounted within a tunnel below the storage dome.

Clearly the effective control of the stacking and reclaiming system is critical to avoid material engulfing the bridge reclaimer boom. Therefore, SCHADE offers a control package that can be integrated to the plant control system and sequenced to the incoming conveyor system. The control system and associated field instrumentation ensure the relative motion of the stacker and reclaimer are controlled such that the stacker follows the reclaimer and, in addition, the layering of the incoming material is generated to ensure effective blending.

All SCHADE reclaimers are based on the scraper chain principle with shovels that convey the material either to the side of the building for longitudinal storages or to the centre for circular designs; whether bridge scrapers or portal/semi-portal designs the fundamental principle is the same for all.

SCHADE has developed a unique range of heavy duty conveyor chains with shovels in excess of four metres wide able to convey vast volumes of material efficiently and reliably.

Longitudinal storages come in various formats based primarily on the full portal design or the semi portal arrangement; typically half a full portal. Full portal reclaimers have a symmetrical frame supported to rails either side of the storage building, or allocated storage area for open stockpiles. The concept is primarily reliable offering high performance with minimum degradation and complete control of the discharge rate by controlling the speed of travel along the stockpile. This is a flexible design able to handle a range of materials in segregated storage bays, with rail span of over 75 metres possible and handling rates over 6,000tph using a twin boom design with two reclaimer booms mounted to a common portal frame.

The portal reclaimer is often combined with a travelling, luffing and slewing stacker

SCHADE — chain scraper with cross-mounted shovels and, in this application, including outboard rollers plus a central roller for lateral alignment (photo: SCHADE).

SCHADE — two-part boom design handling synthetic gypsum and discharging to a belt conveyor running parallel to the storage (photo: SCHADE).

used to generate the stockpile which may be also offer a degree of blending using the strata stacking profile where layers are built up by continuously travelling the stacker along the designated working zone. When recovered by the portal reclaimer, elements of layers are combined and the output will be a relative blend of the differing grades loaded to the stockpile. As with circular storage, SCHADE offers automated control options allowing the stacker and reclaimer to operate as an integrated system linked to the main plant control equipment.

For installation within an enclosed storage building the full portal design is generally combined with a two-part boom reclaimer design such that the total height is reduced to minimize the building size.

In addition to the full portal design SCHADE also offers the semi-portal concept as mentioned above using half of the portal with the upper part supported on the stored material retaining wall. This design can also be arranged with multiple units mounted back to back with a common central retaining wall giving maximum stored volume for a given building footprint. Differing materials including raw materials and fuels may be stored together using concrete dividing wall for segregation, the reclaimer boom may be raised up sufficiently to travel over the bay walls to move to another section. The operating concept is similar to the full portal design but offers greater flexibility particularly where multiple material type must be handled.

These examples of differing storage techniques are a representative sample of the core designs offered by SCHADE with the knowledge gained over many decades in this market specifically and nearly 140 years in the materials handling business. Now part of the worldwide AUMUND Group SCHADE is able to offer a wealth of experience and support in any location and any application. DCi

SCHADE — semi-portal reclaimer handling synthetic gypsum with a cement plant with segregated storage for multiple material types (photo: SCHADE).

Steel trades

modest growth anticipated

'Protectionism' may present a threat to the global steel industry

In October last while releasing the World Steel Association's (WSA's) short range outlook for steel in 2018, TV Narendran, chairman of the economics committee of the organization, left a warning relating to growing "populism and protectionism" even while the metal had seen the cyclical upturn "broadening and firming" throughout 2017, *writes Kunal Bose*. Narendran, who is also the managing director of Tata Steel, saw for the commodity "the best balance of risks since the 2008 economic crisis." The concern about protectionism found a trigger in President Donald Trump's haranguing about drastically remaking American trade. The President's objective is to take trade actions to shield US industries like steel and aluminium from low-cost imports not only from China and South Korea but also from allies such as European Union and friendly countries like India.

Trump's plan to secure the future of US steel, which has shrunk over the years in the face of competition and relatively high production cost got a boost when recently the US Commerce Department in a report said the influx of metals of foreign origin posed a risk to national security. The claim, though unsubstantiated, is exactly what Trump is telling his countrymen. In a bipartisan meeting with lawmakers following submission of the report, the President said: "I want to keep prices down but I also want to make sure that we have a steel industry... and we do need that for national defence. If we ever have a conflict, we don't want to be buying steel from a country we are fighting." The reference unmistakably is to China and Russia, both suppliers of steel to the US.

As is to be expected, the targeted country China was not found wanting in debunking Trump by saying: "The spectrum of national security is very broad and without a clear definition it could easily be abused." The Commerce Department report based on section 232 of the US Trade Expansion Act of 1962 offers the President three alternatives to deal with steel imports that expose the US steel producers to tough competition.

By mid-April, Trump will be choosing one of the three options depending on to what length he will be ready to go to curb steel imports. At the same time, the US Administration will not be unaware that putting up high tariff barriers or tight import quotas will not only invite retaliatory actions from China and South Korea but also from countries and regional groups such as European Union, which stand to suffer collateral damage. The 1962 Act under which the Commerce Department carried out the enquiry has not been invoked since 2001.

Infrastructure investment is key to the future, says India's steel secretary

An important engine of steel demand growth in all emerging nations will continue to be investments in infrastructure and construction, *said India's steel secretary Aruna Sharma during an interview with DCi's Indian correspondent, Kunal Bose.* Further growth of industrial and farm sectors in India and other BRIC countries will demand strengthening of infrastructure. Even China, which of late has slowed down investments in urbanization and building of roads and bridges as it tries to cut debts, engages in rebalancing the economy and focuses on environmental protection, suffers from infrastructure deficit in many of its provinces. "Infra projects have a big correlation with steel use. On an average, steel will account for 40% to 50% investment in infra development," says Sharma.

Aruna Sharma, India's steel secretary.

According to Sharma, the elasticity of steel demand *vis-à-vis* gross domestic product growth ranges from 0.8 to 1. Indian steel demand was up 6.8% to 7.63mt (million tonnes) in January 2018 over the corresponding month of the previous year. Going ahead applying the Sharma-referred formula, annual rise in steel use in India should be around 7%, by far the highest among all countries. If this holds good, then the World Steel Association (Worldsteel) forecast of Indian steel demand to be up by 5.7% in 2018 at 92.1mt will fall short of ground reality.

Worldsteel, however, is more likely to be proved right about China not recording any growth in steel demand this year after last year's 12.4% rise at 765.7m tonnes. The unusual China development was because the country in its drive to fight environment degradation forced closure of induction furnaces (IFs) whose steel production and use is not captured in official statistics. The market vacated by IFS automatically came to BF-BOF and electric arc furnace route steelmakers. The world excluding China will record a steel demand growth of 3% at 882.4mt, thanks largely to emerging and developing economies likely to see steel application advancing by 4.9% to 470.4mt. But since China is such a big user of the metal, it not showing any demand growth this year will restrict world steel use rise to 1.6% to 1.648bn tonnes.

The best balance of risks since the 2008 global economic crisis is here today with cyclical upturn firming over the past year and a half. The industry badly needed this relief. The 2008 crisis inflicted considerable pain on steelmakers globally leading to distortions in trade that saw China exporting as much 110mt in 2015 unarguably aided by government subsidy, raising concern and appropriate trade actions. Sharma believes that steel prices improvement will stay as the world economic outlook has become better with International Monetary Fund forecasting a 3.9% growth for both 2018 and 2019.

Sharma has no problems with steel companies continuing to sell their products at prices that leave them with surpluses to keep their assets in good shape and also to fund for future growth. "But in India we in the government remain watchful to ensure that there is no indulgence in profiteering. Mercifully so far nothing like that has happened." Rated globally as highly cost efficient and producers of top quality value added steel, Tata Steel and JSW Steel took no time to make the best of turnaround in the market.

But what about the government-owned Steel Authority of India Limited, which suffered considerable time overrun in implementing a Rs720bn (over $11bn) modernization *cum* expansion programme? Sharma went on putting pressure on SAIL management to complete the programme without further time slippages that alone would enable the group to return to profitability. As SAIL modernization is virtually over, the company made a net profit, however small it may be in the three-month period ended December 2017 snapping ten straight quarters of losses. But the experience of implementing the massive investment programme will prove useful when SAIL embarks on taking capacity to 50mt from its about to be 22mt.

Asked about her views on trade in steel, Sharma says: "We are not against imports, but we are not to allow steel being brought here at less than production cost amounting to dumping. I have initiated a series of trade measures to ensure that the plans of domestic steelmakers to rapidly grow capacity are not compromised by dumping. Our target is to become a 300mt steelmaking capacity nation by 2030. But I want along with volume, the industry must arm itself with state-of-the-art technology to make electric grade steel and high grades of automotive steel leading to import substitution. I shall welcome joint ventures between Indian groups and foreign owners of advanced technologies in pursuit of the goal."

What Trump finally does with imports will prove to be a defining moment for the world steel industry. He could opt for a broad 24% tariff on all steel imports. Or he could slap a 53% tariff on all steel products from 12 countries, including China, South Korea, Brazil, India and Vietnam. If this option is exercised, then all other countries will find their steel exports limited to the 2017 level. Yet another proposal entailing no new tariffs will enjoin on steel exporting countries to restrict their sales in the US to around two-thirds of last year's level.

Many wonder why should there be so much carping in the US about imports from China when less than 1% of the country's steel production finds its way into the world's largest economy! So China is not the top country, not even among the top ten from where steel comes to the US. Following imposition of trade penalties by

previous Administrations, China is sending much less steel to the US directly than in the past. But a good portion of the finished metal that comes to the US from Vietnam and South Korea originate in China as unfinished steel products.

The US point of concern is not only the amount of steel that directly comes from China. It also believes that the quantity of steel that China, which has close to 50% share of global production is exporting annually led to price collapse not long ago in the past spelling doom for many producers in the US and EU. The over four-year bearish market for steel that mercifully came to an end two years ago was the reason for large-scale capacity shutting in major steelmaking countries, restructuring of business by the likes of Tata Steel Europe and ThyssenKrupp and bank credit to steel groups turning into non-performing assets as is seen on a big scale in India.

TV Narendran, chairman of the World Steel Association's economics committee.

Canada tops the list of countries from where the US imports steel with a 16% share followed by Brazil (13%), South Korea (10%), Russia (9%) and Mexico (9%). Expect some retaliatory trade actions by China, South Korea and EU if the US decides to put unreasonable trade barriers on steel imports. At the same time, the Chinese economy being heavily export-dependent, Beijing will be wary of any further escalation of trade disputes with the US. So to express it unhappiness about the possible steel trade restriction moves by the US, Beijing's retaliatory actions will be targeted at agricultural goods such soybeans, for which China is the US' largest export market, sorghum and animal feed.

In the meantime, China as usual is keeping the rest of the world guessing as to how much steel it will be making this year after it lifted production by 5% in 2017 to 831.7mt (million tonnes) and what quantity it will sell in the world market. *Metal Bulletin Research* expects some rise in Chinese steel production in 2018. This is to leave the country with greater exportable surplus for exports in the context of WSA forecast that "the outlook for China's steel demand in 2018 will remain subdued, showing no growth over 2017 as the government resumes and strengthens its efforts on economic rebalancing and environmental protection." But global steel demand excluding China will register a growth of 3% to 882.4mt in 2018 which will work out to a modest world demand rise of 26mt to 1.648bn tonnes.

Every Chinese move concerning steel comes for close scrutiny by producers in other countries because the volume China will export will have a bearing on steel prices. But the impact of Chinese exports on prices in a year will be moderate if the growth in steel demand in the rest of the world stays ahead of any incremental shipments of steel made in China. Most analysts believe that if Chinese apparent domestic demand remains subdued in a situation of further improvement in market conditions outside China, then, according to Metal Bulletin, Chinese exports could rise to 80.9m tonnes this year from 72.9m tonnes in 2017.

Improvement in world steel demand and in its wake prices have been triggered largely by cyclical factors rather than structural. For one, the world remains beset with surplus capacity in excess of 600mt, most of it in China. Capacity utilization has remained around 70%. Narendran has sounded a note of caution: "The lack of a strong growth engine to replace China and a long-term decline in steel intensity due to technological and environmental factors will continue to weigh on steel demand in the future."

Better times ahead for Brazilian steel

Brazil's steel industry is on the mend, following difficult years

After three very difficult years during the 2010-2016 period — when almost 80 steel mills and processing plants were closed down; 50,000 workers were laid off; and only 60% of production capacity was being used — things have started to look up for Brazil's steel industry last year, *writes Patrick Knight.*

There are several reasons for this. One leading reason is that, following the Chinese government taking disciplinary action against many companies — mostly state-owned — steel prices have risen. This is coupled with an upturn in growth in numerous countries in all parts of the world, which has resulted in strengthening demand for steel.

Brazil's own steel exports are concentrated in slabs for further processing, which can be made there very cheaply. About 10mt (million tonnes) of slabs are usually exported each year, mainly to mills in the US & Europe.

In Brazil itself, the key motor industry, which absorbs up to a third of all steel, most of it sheet, has seen a strong recovery. The industry grew by 9% in 2017, when 2.2 million units were sold in the country, while a further 850,000 were exported, most to neighbouring Argentina. Argentina is the leading market for the Brazilian motor industry, and many companies have plants in both countries. The motor industry hopes to sell 15% more cars in Brazil this year.

The share prices of four leading steel companies, CSN, Usiminas, Gerdau, and Arcelor Mittal, rose by up to 75% last year, after collapsing in a period when some companies were close to closure.

The price of steel in Brazil rose by about 10% in 2017, and the motor companies have agreed to pay about 23% more for their steel this year. Because steel prices elsewhere have increased by more than in Brazil, imports have become less competitive, so have been held down.

Despite this, the industry asked the government to consider raising taxes on imports, now set at 10–14%. But to the satisfaction of the motor and white goods industries, the request for extra anti-dumping measures was turned down. The official position was that, because imports have fallen from their highs of a few years ago, local steel companies do not need more protection and that some competition is positive.

There is still a long way to go before full recovery is achieved. For example, between 2009–2014, more than three million motor vehicles were sold in each year. Up to 28mt of steel was sold on the domestic market in those years, compared with last year's 18mt. Virtually all the world's leading motor manufacturers have plants in Brazil, where there is sufficient capacity to make five million units.

The large and powerful construction industry was also a major market for steel, particularly for long products, and was booming until three years ago. Demand for housing was stimulated by an overheated economy, low unemployment, and because access to credit had been eased. All these factors changed sharply during the crisis period, and only now has unemployment started to fall, and banks are easing credit restrictions once more. A very large number of unsold and uncompleted buildings still weigh on the market, however, so it will be some time before this important market for steel recovers.

In the past few years, the financial situation at all levels of government, central, state and municipal, has greatly deteriorated. Cash-strapped administrations at all levels have been forced to postpone, or halt infrastructure works which would require steel. Many of these are needed just to sustain exports at their current levels, let alone to allow the competitiveness of the goods Brazil exports, to improve.

One result of the better prospects for the economy is that investments of capital, notably from abroad, have risen greatly in recent months. Many long-delayed projects for new railways, ports and terminals, etc., are now moving ahead. Several involve investors from China, the leading market for numerous Brazilian commodities. These investors want to safeguard supplies and keep prices down.

Last year saw the start up of the 3mt-capacity Pecem steel mill, in the north easterly state of Ceara, built by the Korean companies Posco and Dongkuk, in conjunction with Vale. Like its fellow slab manufacturer, Arcelor Mittal, which operates three slab plants at Tubarao, Pecem will export the great majority of what it produces to associated companies round the world. The older Brazilian companies started up some mills which had been shut down, notably Usiminas's Ipatinga, but not yet that company's plant at Cubatao, near Santos.

The Gerdau company — which in the last years of the last century and early part of this, acquired numerous companies in the United States, elsewhere in Latin America and in Europe — has disposed of many, to reduce its debts. Other steel companies plan to sell iron ore mines, or their participation in ports and railways for the same reason. Gerdau itself has held on to companies which supply steel to the buoyant oil and energy industries in the United States, however, which are benefiting from fracking.

Brazil's own oil industry, on the other hand, has been a great disappointment to the steel industry in the past few years. Following the discovery of large quantities of crude oil under deep waters offshore more than a decade ago, the oil industry announced that it would need dozens of complex production platforms, as well as many drilling rigs, in addition to numerous vessels of all types and sizes. A large network of pipelines would also be needed to bring oil and gas ashore, and because many wells are now drilled long distances under the sea bed. The strongly nationalist government that was in power when the oil was discovered decided that some of the revenues from the booming oil industry should be used to boost the economy as a whole. It was determined that up to 70% of all the equipment needed should be made in Brazil. Several shipyards built in the 1960s and 70s to provide vessels needed by Vale and oil company Petrobras, were given a new lease of life, while numerous brand new yards were built.

However, as well as Petrobras being forced to sharply cut back investment, many shipyards were caught up in the far reaching 'car wash' financial scandal, which involved widespread corruption which virtually bankrupt the oil company. This forced a sharp cut back in the 'national content' percentage of goods for the industry and urgently-needed production platforms were imported from China and Korea. Many shipyards have shut down and the hoped-for boom in demand for locally made steel for the oil industry has not materialized. Although hundreds of large wind-powered plants have been built, expansion plans for wind have now slowed sharply, cutting demand for steel.

Additionally, plans for several more new large hydroelectric power stations, have been shelved. Demand for power, notably by industry has fallen in recent years, rather than continuing to grow at expected rates. DCi

Carrying the carriers

Project Cargo & Warehousing

Duluth Cargo Connect saw a flurry of activity as the 2017 shipping season wound to a close. Fleet mates, BBC Mississippi *and* BBC Vesuvius*, are shown here docked side-by-side at the Clure Public Marine Terminal and its adjacent newly rehabbed heavy-lift dock. The first ship discharged 64 wind turbine tower sections from Indonesia (stored/staged along with nacelles and hubs from Europe), while the second had arrived to load a 220-metric-tonne reactor bound for Columbia via the Great Lakes-St. Lawrence Seaway System.*

Jay Venter

Duluth delivers heavy lifts in heartland of North America

Handling overweight/over-dimensional (OW/OD) cargo and packaged freight continues to be big business for the Port of Duluth and crews at Duluth Cargo Connect.

Not only does Duluth anchor the western edge of the entire Great Lakes-St. Lawrence Seaway System, the port is unique in the world of transportation by having four Class I rail carriers that serve the general cargo facility — BNSF, CN, CP and UP. That kind of connectivity fosters competitive pricing and staging for landside legs of cargo movement.

Attention to detail is a hallmark of heavy-lift moves through the Port of Duluth. The Duluth Cargo Connect team collaborates daily with freight forwarders, shipping lines, trucking companies and logistics specialists worldwide.

In December, a semi pulling a 147.5mt industrial boiler finished the final landside leg of its journey from Nebraska to the Port of Duluth, where it was loaded onto the *Erik* and transported to Sarnia, Ontario (Canada). The entire unit — two tractors, two flatbed trailers and the boiler — weighed 442 tonnes and stretched 350 feet in length, which made for slow manoeuvres with dozens of agencies assisting the convoy as it made its way along rural roads, heavy haul corridors and down Duluth's hillside to the waterfront.

"Multiple companies were involved in the transport of that single unit," said Kate Ferguson, business development director for the Duluth Seaway Port Authority, partner in Duluth Cargo Connect. In addition to complimenting the work ethic of Duluth Cargo Connect crews, she was quick to credit colleagues at Spliethoff, Precision Logistics and Barnhart for streamlining logistics of that particular move.

Additional names surface regularly in their Duluth offices when discussing heavy-lift project cargo transport — names like BBC, Wagenborg and Hansa Heavy Lift; logistics companies/forwarders Damco, DSV, Martin Bencher and CH Robinson; plus specialized heavy haul companies like Kivi Bros. Trucking, Perkins and Vic's Crane & Heavy Haul; plus the Minnesota Department of Transportation and State Highway Patrol.

"It takes teamwork to co-ordinate the logistics of dimensional freight delivery and to determine the safest, most expedient routes," says Jonathan Lamb, head of terminal operations for Duluth Cargo Connect. "This move was but one example of the collaborative approach we follow in arranging transits of heavy-lift project cargo across North America and around the globe."

While the Port of Duluth has seen a decline recently in heavy-lift components destined for the Canadian oil sands, there has been an increase in the movement of transformers, wind turbine components and other power generation equipment. Three shipments that arrived in the Port of Duluth in 2017 included nacelles, hubs, drivetrains, blades and towers for 16 wind turbines destined for installation in ALLETE Clean Energy projects across the upper Midwest. Components arrived aboard the *Marsgracht* in April 27, the *Muntgracht* in May and the *BBC Mississippi* in late November.

Building capacity and connectivity

"As components keep getting bigger and bigger — dimensionally and weight wise — we've upgraded our facilities and equipment to ensure safe, seamless handling of heavy-lift cargoes moving in and out of the heartland," added Jonathan Lamb of Duluth Cargo Connect.

Construction on the $18 million Clure

Terminal Expansion project was completed just over a year ago, which tripled outdoor storage capacity and doubled heavy-lift cargo handling capabilities. Included in the redevelopment project was construction of a new Ro-Ro dock, a rail spur and reinforced heavy-lift dock, plus installation of security fencing around a resurfaced 26-acre deck. Today, Duluth Cargo Connect offers five general cargo berths at Seaway depth, plus on-dock rail for direct transload operations, a loop track for rail access to storage areas, 24-hour security, perimeter fencing, shore-side power, a truck scale, twin 80-tonne rail-mounted gantry cranes with a 120-tonne tandem lift capacity, a 300-tonne crawler crane plus other mobile units employed to handle payloads that exceed those capacities.

Last spring, the Port Authority also completed a $3 million debottlenecking project on the main Clure Public Marine Terminal to improve traffic flow for landside cargo movements. Those infrastructure investments laid the groundwork for the 2017 opening of a brand new CN Duluth Intermodal Terminal onsite, which connects the region to containerized imports and exports via a high-capacity rail network that spans the continent, providing direct service to and from East, West and Gulf Coast ports.

Having been stored in the Port's Foreign Trade Zone #51, a 220-metric-tonne reactor bound for Columbia is transported and loaded into the cargo hold of the BBC Vesuvius *at the Port of Duluth in late November 2017.*

Full service, ship-to-shore stevedores

The Port of Duluth continues to serve as a multimodal hub for domestic and international trade as it has since the Seaway opened almost 60 years ago. With a Foreign Trade Zone, over 400,000ft² of indoor warehouse space, and 40-plus acres of secure outdoor storage space, many Duluth Cargo Connect customers take advantage of its warehousing and distribution facilities to streamline their supply chains.

The experienced stevedores at Duluth Cargo Connect safely and efficiently load and discharge breakbulk, dimensional and heavy-lift cargoes. The Railway Industrial Clearance Association has twice voted the Port of Duluth number one in customer service. In addition, Duluth Cargo Connect offers a wide array of ancillary services including: custom crating/skidding, container stuffing and de-stuffing, fixture change-out and component separation, plus ship servicing and fuelling.

Moving over weight/over dimensional, heavy-lift cargo is Duluth Cargo Connect's speciality. This series of photos shows how crews from Duluth worked collaboratively with MnDOT, freight forwarders, trucking companies, a shipping company, power companies and others to move a 148-metric-tonne boiler from Nebraska to the Port of Duluth for final delivery to Sarnia, Ontario. The entire unit consisted of two tractors, two specialized flatbed trailers and the boiler — which altogether extended 350 feet and weighed 442 tonnes. Workers used poles to elevate power lines and signal frames at intersections to enable the big rig to make it through safely. Night had fallen by the time the caravan made its way to the Clure Public Marine Terminal where Duluth Cargo Connect crews and the Erik *was waiting to load.*

The Port of Fredericia – international hub for dry bulk operations

Thanks to its central location on the European Core Network Scan-Med Corridor, the Port of Fredericia in Denmark, owned and operated by ADP A/S, is an attractive hub for dry bulk operations. Utilizing this strategically strong location, ADP is developing Taulov Dry Port in the hinterland of the Port of Fredericia. An estimated total investment of DKK 1.5–2 billion over the next decade will create the best conditions for further development of the area. With easy access to the European and overseas markets, customers can optimize their bulk operations, especially regarding trans-shipment operations of grain, soy meal, wood pellets and similar cargo.

Easy access & ideal dry bulk facilities

Customers in the Scandinavian and Baltic region are largely using Fredericia as a hub for dry bulk operations to and from the Baltic countries due to the port's prime navigation conditions, easy access to the international deep-water route in the Great Belt and a water depth of 15 metres. Additionally, the port offers considerable quay and hinterland areas as well as warehouses dedicated to dry bulk.

For customers, this means facilities that are ideal for transshipment from large ship loads to smaller vessels that can dock at ports of the region with lower water depth and vice versa.

Effective dry bulk operations

Know-how in handling dry bulk including shipments of up to 72,000 tonnes shows that the Port of Fredericia can meet customer requirements, and the potential is huge for many operators in Scandinavia and the Baltic region. The logistic conditions, dedicated dry bulk areas and an efficient infrastructure at the port provide high efficiency with daily loading and unloading capacity of over 14,000 tonnes.

Taulov Dry Port — a multimodal hub

Since 2015, ADP has been developing a large hinterland dry port area of 700,000 square meters, connecting port activities with land-based transportation on road and rail.

Recently, Denmark's largest pension company, PFA, agreed a joint venture with ADP in order to add further momentum to the extensive logistics project at Taulov Dry Port.

By operating Taulov Dry Port with the Port of Fredericia, ADP can offer the transport and logistics sector services at every stage in the logistics value chain.

The joint venture represents an estimated total investment of DKK 1.5–2 billion over the next decade, and is a major step towards the development of Fredericia and Taulov as Denmark's multimodal hub.

ADP owns and operates the ports of Fredericia, Nyborg and Middelfart. Each of the ports has a unique central location, good logistic conditions and international standards in capacity and water depth. ADP's commercial activities range widely — from container handling, miscellaneous cargo, heavy lift, dry and liquid bulk carriers, RORO and in the case of Fredericia, cruise liners.

ADP establishes Denmark's Multimodal Transport and Logistic Centre, Taulov Dry Port, at the hinterland area to the Port of Fredericia.

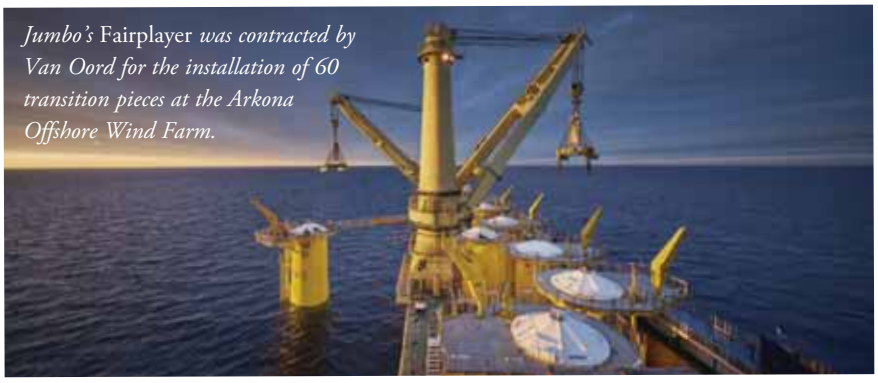
Jumbo completes project for Arkona Offshore Wind Farm

Earlier this year Jumbo completed its project for the Arkona Offshore Wind Farm (E.ON and Statoil).

The entire project involves the construction of a 385MW offshore wind farm in the German Baltic Sea.

Van Oord contracted Jumbo for the installation of the 60 transition pieces.

The vessel chosen to tackle the job was the *Fairplayer* a DP2 heavy lift crane vessel suited to the offshore requirements of the energy industry worldwide.



Jumbo's Fairplayer *was contracted by Van Oord for the installation of 60 transition pieces at the Arkona Offshore Wind Farm.*

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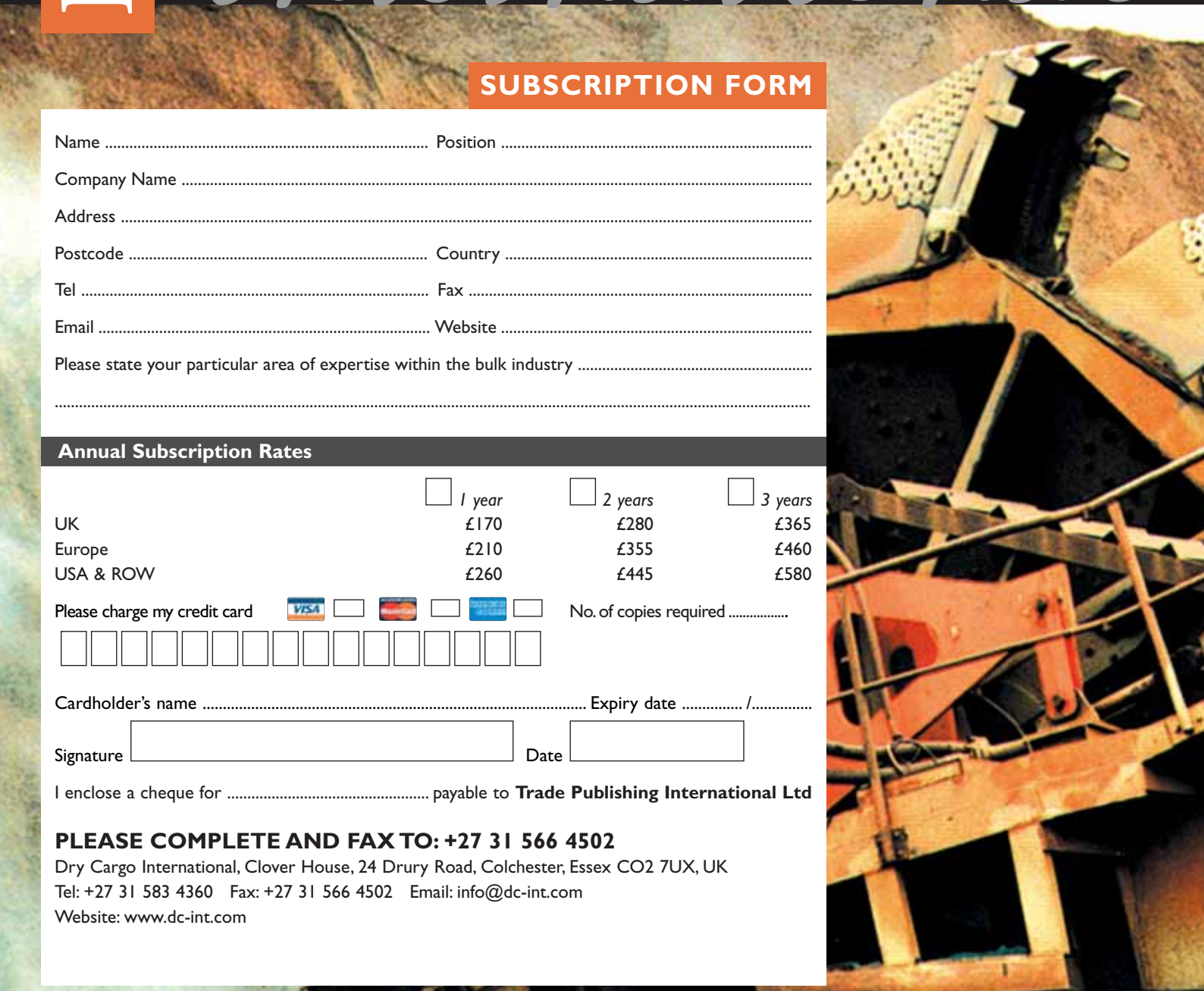

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Niche strength: how specialization can be the key to success

For the J. Müller Group, a medium-sized and family-owned group of companies in its sixth generation, this concept definitely applies. The group operates a terminal for cocoa, coffee and fish meal in Bremen and mainly the seaport of Brake on the western bank of the River Weser, 34nm away from the pilot station in the open North Sea. This short distance is also an advantage for the seaport as vessels only need about four hours navigation on the river estuary without having to pass any port locks.

Specialization

As an 'outport' J. Müller Group (in comparison to mainports such as Antwerp or Hamburg) concentrates on certain commodities in order to be recognized by shippers, agents and shipping lines as an expert at handling and transporting them. That is why J. Müller Group is not mainstream.

Brake is a niche port handling grains and feedstuff and breakbulk cargoes. The latter category is divided in forest products (wood pulp, paper and lumber), iron and steel, the classic breakbulk and project cargo.

As an outport, the J. Müller Group provides great specialist expertise with regards to cargo handling and logistics in the seaport of Brake. To start with, the group operates an extensive fleet of fork lift trucks, reach stackers and a straddle carrier, all individually equipped with handling gear for different breakbulk cargoes. Heavy lift and extended trailers for carrying breakbulk and project cargoes are widely available. The stock of lifting gear is also fairly extensive. This includes automated lifting gears, vacuum and magnetic spreader bars for pipes and plates, lifting traverses of more than 100 metric tonnes, to say nothing of the corresponding quay-based cranes, two of which can lift up to 140 metric tonnes each.

Advantages

However, it is not just the specialized equipment that drives customers to the port. It is the accessibility, operational options and available space that shippers, forwarders and shipping lines appreciate in a seaport of Brake, especially for final assemblies of industrial installations, crane structures or machinery.

Indoor and outdoor storage sites in Brake meet with mainly three requirements: they are vast, they are swiftly accessible and they support 20 metric tonnes/m². And J. Müller has a lot of these storage sites. More than 160,000m² of indoor storage and 200,000m² of outdoor storage facilities are available.

Next are the connections to the interior of Europe. The seaport is in every respect well specialized.

In terms of road connections, the seaport offers with a specially modified transport route for heavy lift and voluminous cargo that allows trucks to transit without police escort and without any need for construction works (disassembly of traffic lights or similar). Currently, the most impressive transports on a daily basis are wind turbine rotor blades with lengths of up to 70 metres. However, yachts, tanks, tower sections, and machinery are also brought to — or picked up from — Brake via road transport.

Brake excels at achieving maximum accessibility. The road access to and from Brake will be extended as in the future wind power components of up to 80m will be transported to and picked up from the port. This is greatly appreciated by manufacturers.

With regards to inland waterway transport, J. Müller has a fleet of waterway barges at its disposal, always ready to transport a variety of bulk or breakbulk cargoes. The company regularly operates transports for wind turbine components as well as forest products or grains and feedstuffs.

A large volume of cargo from and to Brake is transported via rail. In the field of just-in-time production, supply for the paper industry block trains are operated from Brake up to Austria, Switzerland or Czech Republic that reach their destinations within 24 hours.

Expectations for 2018 as a project-driven seaport

Since there are no specific large industrial projects in the surrounding region that constantly provide work for the port, J. Müller relies on the business of various wind turbine manufacturers, that appreciate the terminal's capabilities in project cargo handling, to import or export their components via Brake for projects across Western Europe.

There is a steady up-and-down in the breakbulk and project business. This is mainly due to the fact that these commodities are not consumer goods with a constant cargo flow, but are transported whenever the corresponding industries or economies demand them — and the demand increases or decreases according to the market conditions.

Specialists in pipe handling: SENNEBOGEN 870 E material handler at Mülheim Pipecoatings

A total of seven SENNEBOGEN 870 material handlers are now successfully in operation as specialist equipment for pipe handling at the company Mülheim Pipecoatings. Every day, the material handlers move hundreds of pipes up to 18m (approximately 59 feet) in length and up to 15 tonnes in weight. This requires a fine touch — the pipes are to be used in the new pipeline Nord Stream 2, which in future will transport more gas under the Baltic Sea through to Germany. That is just one of many major orders from around the globe — SENNEBOGEN material handlers have a lot of work to do.

Mülheim Pipecoatings (MPC) is part of the EUROPIPE concern, which is a market leader in the production of longitudinal and spiral seam-welded large-diameter pipes in practically any dimension you could wish for. Among others, they also produce pipes for the Nord Stream Pipeline in the Baltic. Since 2011, Russian gas has flowed through this pipe over a total length of 1,224km under the Baltic Sea and through to Germany. Back then most of the pipes needed also came from MPC from Mülheim an der Ruhr. In the future, with the construction of a second parallel pipe, up to an extra 55 billion cubic metres (1942 billion cubic feet) of gas will be transported. The construction of the Nord Stream 2 is currently under way at full speed and once again the pipes are from Mülheim — sorted, stored and loaded by SENNEBOGEN material handlers.

At the end of 2016 sales and service partner Baumaschinen Rhein-Ruhr (BRR) was able to deliver two more SENNEBOGEN 870 material handlers for pipe handling at MPC. The machines in the current E series are equipped with a 261kW diesel engine and the tried and tested Green Hybrid energy recovery system. With a maximum range of 20m (± 66 feet) even pipes up to 15 tonnes in weight and 18m (± 59 feet) can be stacked and loaded safely.

'Before loading them onto wagons we check each pipe for damage and ensure that they are loaded in the right order. For this reason, it is also important that, despite the heavy loads, it is possible to work as carefully as possible, ensuring that materials are not damaged. With the SENNEBOGEN 870 we have the perfect combination of range, an easy to handle working load and sensitive control,' Head of Logistics Alexander Jähring explains the advantages of the green material handlers.

If nothing else, as the cost per pipe can reach up to €20,000, the driver needs to be fully focused. The pipes are carefully lifted from the truck using a hanging spreader or vacuum traverse, are inspected again and then finally loaded onto wagons for further transportation — always within perfect view from the Maxcab industrial comfort cab which can be raised by 3m (9.8 feet) and moved forwards by 2.6m (8.5 feet).

The SENNEBOGEN machines have also won Alexander Jähring over in day-to-day operations and maintenance and service. "In the meantime we have seven machines from the 870 range in operation. They have not had to undergo any major repairs and in the case of minor incidents we are able to solve the problem ourselves thanks to the easy to service machine structure — a quality feature that we are very satisfied with," he said.

MC-Class vessels incorporated in BigLift fleet

Towards the end of February 2018, BigLift Shipping's *BigLift Baffin* arrived in Singapore to deliver a crane boom and luffing frame for Heerema Marine Contractor's new flag ship *Sleipnir* from the Huisman wharf in Xiamen, China. This is the first project for the vessel after her transformation into the BigLift colours. Sister vessel *BigLift Barentsz*' first voyage in the BigLift livery will start next month with a shipment of container cranes for a Japanese client.

It is well-known that at the end of 2017 BigLift Shipping ended the co-operation with RollDock for the management of the MC-Class vessels. Since 1 January, the two BigLift-owned MC Class vessels have been part of the BigLift fleet and are now sailing under the names *BigLift Barentsz* and *BigLift Baffin*.

By adding the two wide deck carriers to the BigLift fleet, BigLift's heavy transport capabilities have grown significantly, when looking at module size handling, load carrying ability, shipping optimization and project efficiency.

Subsequent to the fleet expansion, BigLift is engaged to further focus on developments in the Renewable and LNG markets. This involves transport of jackets and the new-generation monopiles but also of large modules for substantial LNG projects. BigLift is also looking towards opportunities in a rebalancing Oil & Gas segment and at global expanding ports and new port developments.

All these market developments and subsequent projects demand good insight and analysis for optimized project execution. The BigLift organization is more than capable and prepared to perform the necessary tasks. Complementary to the BigLift engineering department a significant part of the BigRoll engineering team has moved to the BigLift office in Amsterdam after the winding up of the BigRoll enterprise.

BigLift's decision to end the BigRoll venture shows BigLift's confidence in its capabilities and market approach. It further underlines BigLift's dedication to providing customers with reliable and efficient heavy transportation solutions. By understanding the customer's specific needs and by thinking in solutions, a better project result will be secured, reducing risk and costs.

BigLift Shipping

BigLift Shipping — a member of Spliethoff Group — is a world-renowned heavy lift shipping company with a history dating back to 1973. BigLift's fleet consists of 14 modern heavy lift vessels with lifting capacities up to 1,800 metric tonnes, and two state-of-the-art heavy transport vessels with their large 125 × 42 metre deck, the MC-Class vessels increase BigLift's shipping capabilities for Ro-Ro cargoes up to about 16,000 metric tonnes a piece.

Chocolate demand gives Port of Liverpool a boost

The UK's largest importer of cocoa and coffee beans is to build a major new warehouse at the Port of Liverpool in the UK to meet growing demand from food and drink manufacturers.

CWT Commodities is leasing the land from Peel Ports and has engaged Mazdon Construction to build the 36,000ft² warehouse and new offices, which is in addition to the eight warehouses it has already built on the Liverpool site. Construction has begun and is expected to be completed later this year.

Nearly 65,000 tonnes of cocoa beans, more than two thirds of the UK's demand, arrive via Liverpool each year due to its proximity to factories in Yorkshire and North Wales. The port also handles around a third of the UK's annual 150,000 tonnes of coffee bean imports. Approximately 80% of the cocoa and coffee beans arrives in containers, with the remainder in bulk vessels. The cocoa beans largely originate in Africa, mainly Ghana and the Ivory Coast, with the coffee coming mainly from Vietnam, Brazil, Colombia and Indonesia.

Jason Cross, Director of CWT Commodities UK, said: "The Port of Liverpool is strategically important to us due to its geographical location resulting in reduced inland transport costs and carbon footprint for the supply chain involved in delivering to the factories.

"The continued investment we have made in logistical infrastructure such as the warehouses wouldn't have been possible without the strong partnerships formed over many years with Peel Ports and Mazdon Construction. We are excited about the completion of the new facilities and the future growth opportunities this will offer."

Alex Hemmings, Managing Director of Mazdon Construction, said: "Having designed and built CWT's previous warehouse schemes at the Port of Liverpool, we are pleased to be undertaking our third phase of warehouse construction with adjoining offices on three levels. Our successful relationship with CWT over the last ten years has been founded on our ability to understand their commercial and operational needs, providing them with a bespoke design and build service here in the UK and ultimately delivering value engineered storage and handling facilities to meet their growing requirements."

Andrew Martin, Peel Ports Group Land and Property Director, added: "This further investment by CWT reinforces the Port of Liverpool's premier position as the logistics hub that connects food and drink manufacturing and processing centres across the northern half of the UK.

"CWT has been a highly valued customer for many years and we're delighted to support them in the next stage of their growth in the UK market. We thank them for investing in the Port of Liverpool. We would also like to thank Sefton Council and Natural England for their support in making this development happen."

About Peel Ports Group

Peel Ports Group is the UK's second largest port group, owning and operating seven of the UK's most important ports (Liverpool, Heysham, Manchester Ship Canal, Medway (Sheerness/Chatham), Clydeport, Ardrossan and Great Yarmouth). It also owns BG Freight shipping line and operates a container terminal in Dublin.

Peel Ports handles over 60 million tonnes of cargo every year, which is around 13% of the total UK major ports traffic. Over 35 shipping line services (from 26 shipping lines) call through its network of ports every week. Headquartered in Liverpool, it employs around 1,200 staff, and had revenue of £596m and EBITDA of £212m for the year ending 31 March 2016.

About the Peel Group

Peel Ports is part of the Peel Group, one of the UK's foremost privately-owned investment enterprises. Its strategy embraces a broad range of sectors — land and property; transport and logistics; retail and leisure; energy and media, with assets owned or under management of more than £5 billion. Group investment policy is focused on actively managing our diverse portfolio, enhancing the quality of our assets and recycling capital over the long-term.

About CWT

CWT is a wholly-owned subsidiary of CWT International Limited and a member of Chinese conglomerate HNA Group.

The company specializes in the storage and handling of soft and hard commodities through warehouse management services. The company offers its services to international traders, producers and trade & commodity finance banks.

It has a network of offices and presence in Asia, Europe, the Middle East, Africa and the USA.

RollDock and SAL Heavy Lift forms world's first pool for dock vessels

As of 1 April this year, the world's first pool for dock vessels will be established. RollDock and SAL Heavy Lift will join forces for roll-on/roll-off and float-in / float-out heavy lift cargoes. The pool will consist of the combined fleet of six vessels and will be managed by RollDock with SAL providing specialized heavy breakbulk cargo support.

A great new adventure has commenced between RollDock and SAL Heavy Lift. Both companies represent industry leading brands and solutions within their respective fields of heavy cargo transportation. RollDock has over the past decade developed into a world recognized roll-on/roll-off + float-in/float-out carrier with their fleet of the most technically advanced dock type vessels. SAL Heavy Lift has for over 37 years, been a symbol of premium project shipping solutions with its fleet of high class heavy geared vessels. Offering unmatched opportunities for project markets world-wide, RollDock and SAL will stand together at the very forefront of technical marine heavy transport.

Paul Könst, CEO RollDock explains; "Both SAL and RollDock stands for superior shipping solutions in their respective fields, where we place the engineering part of our work at the forefront. Our companies share the same philosophy on client focus, quality, innovation and safety. With our pool, we will be offering a competitive yet high quality heavy transport service."

The pool will consist of six geared dock vessels, all being operated under the RollDock brand. Five of the vessels comes from the existing RollDock fleet (S and ST class vessels) and one from SAL (Combi Dock I). Through a strong global network of offices and agents, the pool will have

representation in all major regions. Both companies will also continue independently and operate vessels outside the pool.

Martin Harren, Managing Director SAL states; "Between RollDock and SAL, we quickly saw the advantages of working together. Through a consolidation, we will see a better utilization of the vessels and because we share our network of offices and agents, we can offer global representation of heavy shipping disciplines".

Justin Archard, Commercial Director SAL continues; "SAL wants to keep its place in the roll-on/roll-off and float-in/float-out market, however we also realize that our core service is lift operations. Whenever clients look for heavy transportation — with lifting, rolling or floating services or a combination — our setup offers them a one-stop-shop."

About Roll Group

Roll Group offers a total solution on transportation and lifting of heavy cargo. Operating under one name, the forces of the companies RollDock, Roll-Lift and BigRoll are strengthened. With an innovative and diverse asset base, Roll Group takes care of the heaviest cargo and provide the most efficient, cost effective and practical solutions. RollDock owns five dock-type vessels, which all have the option of three loading modes — Ro-Ro, Flo-Flo and Lo-Lo, and two ice-classed BigRoll Module Carriers. On the land side Roll-Lift operates a large number of modern heavy lift cranes, self-propelled modular trailers (SPMTs) and conventional trailers.

About SAL Heavy Lift

SAL Heavy Lift, a member of the Harren & Partner Group, is one of the world's leading carriers specialized in sea transport of heavy lift and project cargo. The company was founded in 1980 as "Schiffahrtskontor Altes Land GmbH & Co. KG" and belongs to Harren & Partner Group since 2017. The modern fleet of 21 heavy lift vessels offers highly flexible options to customers. The vessels of SAL Heavy Lift boast an impressive travel speed of 20 knots, up to 3,500 square metres of unobstructed main deck space and combined crane capacities ranging from 550 to 2,000 tonnes: amongst the world's highest lifting capacity in the heavy lift sector.

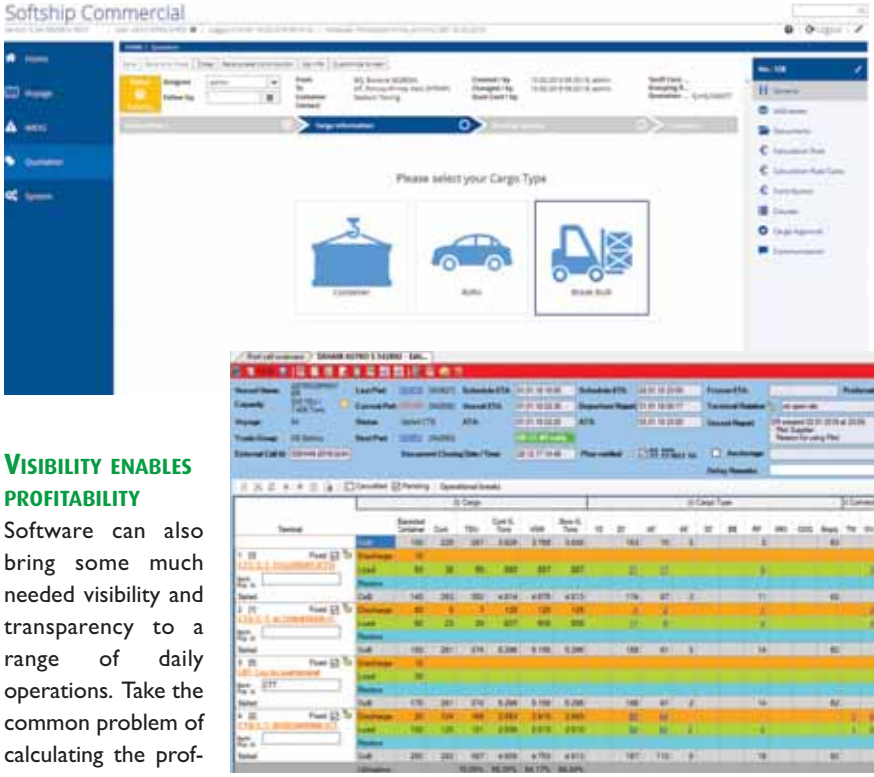
Seeking efficiencies from software solutions

Although the macro-economic picture is healthier than it has been for many a year, shipping markets continue to struggle with the burden of overcapacity coupled with a dip in demand growth, *writes Lars Fischer, Managing Director of Softship Data Processing Ltd, Singapore.* Margins are thin and the search for cost savings and efficiency gains remain the name-of-the-game for all break-bulk operators. Aside from physical innovations applicable to the vessels themselves and their loading/unloading activities, some operators are achieving efficiency gains and cost savings from streamlining a range of back-office processes. This is in addition to achieving much-needed visibility across their business itself. Modern IT systems and software applications, if used intelligently, can help deliver these much-needed benefits but care must be taken to select applications that are specifically tailored to the break-bulk sector. Many operators mistakenly choose container–orientated software which is often simply not up to the job.

Hidden gains

Whilst some operators believe their activities are already cut to the bone, others are looking more forensically at their resource heavy administrative processes and leveraging recent advances in software technology to inject an additional level of efficiency. Modern shipping software is modular meaning that an operator need only select the applications they need to automate certain processes within their business. They do this in the knowledge that each module seamlessly integrates with the others to facilitate a flow of information across the company. Data need only be input once thus reducing duplication, errors and confusion. It also frees up staff to focus on more customer-oriented tasks.

A good software suite will connect and integrate all activities from sales to customer service through to documentation and invoicing. Many companies still duplicate their work in these areas which is both inefficient and error prone. Implementing intelligent solutions will streamline these processes and introduce a level of accuracy not previously experienced. Working on the "one input only" principle, data is input only once and then shared across the company and with relevant business partners. This significantly reduces the administrative burden and introduces efficiencies across the business.



Visibility enables profitability

Software can also bring some much needed visibility and transparency to a range of daily operations. Take the common problem of calculating the profitability of a break-bulk cargo booking: a well thought out software application will retrieve variable costs per shipment from a cost database and apply these as estimated costs to the booking.

Information on volumes taken from the customer at the time of booking are automatically married with this data to provide analysis and profitability assessments for each consignment. And, as the voyage progresses and actual costs become known, real-time updates can be delivered allowing profitability to be monitored throughout the voyage.

By automating these processes a huge amount of data is captured, shared and re-used throughout the company. It can also be analysed and presented in the form of management reports. Introducing such transparency across the business allows busy executives to understand which areas of their business are profitable and which require more focus. Good software will also manage and monitor voyage progress and port call activities. Schedules can be monitored and updated from arrival, departure and noon-reports automatically received from the vessel. Changes caused by unforeseen events can be simulated to provide visibility on the impact on the overall schedule and bunker consumption allowing the operator to simulate the most appropriate counter measures. Statistics provide transparency in terms of port performance and will help to analyse important voyage KPIs.

In a world where the customer is king, clients expect real-time, up-to-date information delivered directly to a platform of their choice. Modern internal software applications will link seamlessly with browser-based and cloud solutions to deliver this easily and without fuss. Online bookings, bills of lading, cargo documentation and cargo tracking can all be delivered to a customer through a branded web-portal giving the operator a much needed edge over its competitors.

Software can provide the solution to many daily headaches. And, with poor markets and increasing competition, installing intelligent software could deliver a much needed advantage to a breakbulk operator. DCi

Lars Fischer is Managing Director of Softship Data Processing Ltd, Singapore, a wholly-owned subsidiary of Softship AG, the leading provider of shipping software solutions.

Bulk in Britain: UK in focus

Jay Venter

Disputes concerning 'portions' risk rejection of entire consignments

A recent article published by Clyde & Co, a law firm, described the uncertainties that arise regarding the meaning of a 'unit' of bulk cargo (Sharma and Woods, 2018). Similarly, disputes often arise when 'portions' of bulk cargoes are identified as unfit for shipment at the time of loading, writes *Dr Aime Harrison, a Geotechnical Civil Engineer at London Offshore Consultants*.

Cargoes can be deemed unfit for shipment when their physical properties pose a chemical hazard (Group B) or a stability hazard due to liquefaction potential (Group A). These hazards are mitigated by the provision of accurate information for the cargo properties based on rigorous laboratory analysis. The definition of a portion of a bulk cargo consignment is not specified in the International Maritime Solid Bulk Cargoes (IMSBC) Code, and therefore often leads to confusion about how to distinguish between the suitable and unsuitable portions when hazardous cargoes are suspected. This confusion can lead to lengthy delays at load ports which escalate berthing and loading costs and disrupt port operations.

The most common bulk cargo disputes arise when portions of cargo appear to have properties different from those reported on the shipping information documents and test certificates*. The suitability of the cargo comes into question when any disparities between appearance and documentation are identified.

The portion(s) of a consignment which should be rejected by the vessel can only be determined by sampling and analysis. The test results identify any physical properties that would render the cargo unfit for carriage.

According to Section 4.4 of the IMSBC Code, "physical property tests on the [cargo] consignment are meaningless unless they are conducted prior to loading on truly representative test samples". The physical properties for a consignment cannot be accurately determined without laboratory analysis which is why the representativeness of the samples taken for analysis is extremely important. The IMSBC Code provides guidance on how to obtain truly representative samples, however most disputes concerning unfit cargo portions arise after loading has commenced. It can then be difficult to obtain representative samples for analysis. Establishing the suitability of the questionable cargo portions and comparing them with the rest of the consignment should be completed before the vessel sets sail. In such cases the vessel may need to remain at the port or nearby anchorage awaiting instructions for weeks or longer, with consequent contractual issues.

In other cases, some portions of cargo

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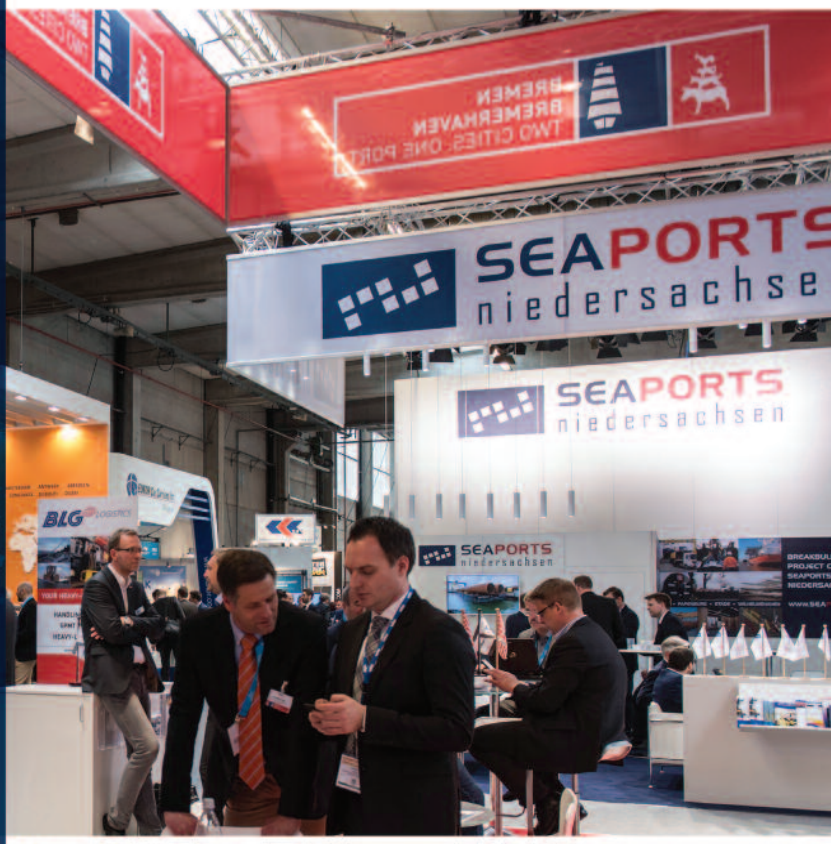

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may display hazardous changes (such as self-ignition or a visible change in moisture content) during the voyage and seek refuge at the nearest available port. There are many operational and commercial factors to consider when a bulk carrier berths at an unexpected destination.

- What cargo-handling equipment is available?
- What are the terminal's standard cargo-handling practices?
- How long can the vessel remain at the port?
- When do the original cargo certificates become invalid (due to IMSBC Code limits on the time interval between sampling and testing)?
- Is there enough accessible space on the quayside to discharge all the cargo if necessary?
- Will it be possible to discharge the cargo so that the questionable portions are kept separate from the suitable cargo (if they are rejected for re-loading on board the vessel)?
- Where is the nearest Competent Authority that can test cargo samples and how quickly can they perform tests and provide certificates?
- What additional costs may arise from berthing, discharging, sampling, testing, and re-loading the cargo in this unexpected location?
- How will rejected cargo be removed from the port of refuge?

In summary, if analysis results indicate that some portions of cargo show a marked departure from the properties of other portions, they may raise questions about the suitability of the entire consignment which can result in further delays and operational challenges at ports. All cargo portions should comply with the cargo information provided by the shippers. Accurate reporting of the physical properties of the cargo reduces the risk of non-hazardous portions of cargo being questioned and rejected. The provision of reliable shipping documentation avoids unnecessary delays and disputes regarding cargo suitability for shipment.

About London Offshore Consultants

LOC is an independent marine and engineering consultancy and survey organization, providing high quality services to the shipping and offshore energy industries. LOC was established in London in 1979. Since then, it has grown into an international, multi-disciplinary organization, with offices across the world. Its team now comprises over 400 professionally qualified personnel.

** Refer to Section 4.2 of the IMSBC Code for the Provision of Information.*

Dr Aime Harrison, a Geotechnical Civil Engineer at London Offshore Consultants, has been a Technical Expert on the subject of cargo liquefaction at the IMO since 2011.

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Sharma, J. and Woods, I. (2018) The "AQASIA" – Court of Appeal rules on the Hague Rules limitation. Published 22 January 2018 on www.clydeco.com

International Maritime Organization (2016) International Maritime Solid Bulk Cargoes Code and supplement – incorporating amendment 03-15, London, 2016 edition

DB Cargo UK rail chief welcomes new training and development opportunities

Doncaster's new National College for High Speed Rail is an "enormous opportunity for the whole rail industry", the chief executive of Britain's biggest rail freight company said on 5 February. Hans-Georg Werner, Chief Executive of Doncaster-based DB Cargo UK, said he was very excited by a recent visit to the new facility to discuss future opportunities for collaboration.

Werner said: "While the college has an important role to play in supporting the development of HS2 the state-of-the-art training and opportunities being offered here in Doncaster will be relevant to drivers, engineers and ground-staff across the entire UK rail network."

"Here at DB Cargo UK we are leading the next generation of rail freight and we look forward to working closely with the college's Chief Executive Clair Mowbray and her team on shaping the experience and opportunities they offer."

DB Cargo UK is based in Carolina Way, Doncaster, just a stone's throw away from the multi-million pound new college.

Employing more than 2,200 staff, DB Cargo UK transports everything from cereal to steel, as well as providing essential infrastructure services to Network Rail.

During his visit, Werner presented the college with a pantograph — the apparatus that sits on the top of an electric train — which will be used in the training of students. In return, Mowbray, Chief Executive of the National College for High Speed Rail, gave him a certificate and a plaque, acknowledging the company's ongoing support.

From left to right: Dr. Amy Pressland (Professional Development Manager); Clair Mowbray, Hans-Georg Werner and Kerrie Talbot, Apprentice.

Mowbray said: "The National College is focused on delivering the skills training that is required to modernize rail. The UK's engineering workforce is currently falling short by around 69,000 engineers every year, with a growing older workforce which currently lacks diversity. It is our challenge to work towards solving the skills gap that Britain faces as it invests billions of pounds into modernizing the rail network and wider transport infrastructure. By working with industry partners like DB Cargo we can ensure the range of opportunities reflect the needs of all aspects of the rail industry."

The National College for High Speed Rail is dedicated to supporting the UK's growing rail sector, with everything it does matched to the current and future needs of the industry. The college's focus is post-18 education and is also accessible for those looking to retrain or develop their expertise in the industry. Learners can choose from higher apprenticeships currently available in High Speed Rail and Infrastructure (Level 4) and Operations and Departmental Management (Level 5). The college also runs an entry level one-year full-time course — the Certificate of Higher Education (Cert HE) in High Speed Rail and Infrastructure, equivalent to Higher National Certificate (HNC) qualification.

The National College for High Speed Rail has a second campus based in Birmingham. There will be open days for prospective learners taking place at each campus in March. For those interested in attending and for businesses interested in exhibiting,

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Clarksons Port Services – Weighbridge Software Project

In 2016, ABP Ipswich was redeveloping a number of areas within the port including Haven Marina and the Ipswich Flood defences. During this time, Clarksons Port Services decided to investigate the upgrade of their original unmanned computerized weighbridge system.

Clarksons Port Services has been operating from its Sentinel Terminal in the port of Ipswich for just over 20 years, the anniversary of which was in January. The core activity of CPS is the loading of grain and the unloading of animal feeding stuffs from vessels up to about 15,000 tonnes carrying capacity. Operating with a policy of ongoing investment and modernization Clarksons Port Services has been keen to enhance and improve the performance and functionality of its weighbridge software.

STC Solutions, the local weighbridge specialist, had been keen to secure business with Clarksons for some years but hadn't tied in any long-term agreements with an appropriate software supplier. In 2016, STC engaged with Infotech Ltd from the Midlands to provide a solution for Muntons Malt and a modified version of this was offered to Clarksons Port Services in the port of Ipswich.

After a number of months of trial and discussion, Julian Scott, General Manager of Clarksons, agreed to progress forward and STC installed 4 × Cardinal satellite unmanned cabinets with network link back to the Clarkson's main office on site and a modified and enhanced Infotec package; this design enabled certain key customers to import and export data and information on contract reference numbers and weighbridge tonnages directly from the Clarkson computer package.

The operation at the unmanned terminal was simplified; large tally rolls were used so that there was less frequent need to change the paper and a simple ID number was put in so that shuntings to and from the stores and ships could be facilitated with ease.

At the same time, Julian Scott wanted to upgrade some of the existing CCTV and STC installed some HD cameras both to capture number plates and to look into the rear of the lorries and also to give general surveillance on the site.

These are now an integral part of the site security and recently an enhanced high-definition infra-red camera has been installed along the dock side to monitor ship discharge and filling.

The project was completed in 2017 and is now being fully maintained and serviced by the local team at STC headquarters at Claydon.

Aerial view of Sentinel Quay.

Clarksons Port Services recently celebrated its twentieth year of occupation of the Sentinel Terminal located in the ABP Port of Ipswich. From left, Paul Ager, Divisional Port Manager – East Coast, Short Sea Ports ABP; David Rumsey, Finance Director Clarksons Port Services; Andrew Harston, Director, Short Sea Ports ABP; and Julian Scott, General Manager Clarksons Port Services.

At the same time, STC installed a new weighbridge facility for APB to be used by the Ipswich Grain Terminal and the investment in a new road vehicle weigh-bridge meant that most of the weigh-bridges on the docks at Ipswich are now looked after by STC.

Clarksons Port Services: 20th year anniversary — Sentinel Terminal, Port of Ipswich

Paul Ager, ABP Divisional Port Manger, East Anglia, said: "We have been working with Clarksons for more than 20 years now and have enjoyed many great successes together. Through continuously investing in facilities at the Port of Ipswich, we have increased trade and we hope that together we will continue to contribute to the growth of the Suffolk and wider UK economies in future."

Ipswich's status as the UK's number one export port for agricultural products was confirmed in September 2017 by the 2016 GB Port Freight statistics released by the Department for Transport (DfT), a record it has now held since 2005.

The Port of Ipswich confirmed its place as the UK's number one port for agricultural products, handling 40 per cent of UK barley exports, with 46,173 out of a total UK export tonnage of 113,000 tonnes passing through its facilities. This was followed by King's Lynn, which handled 10,002 tonnes and Lowestoft which exported 7,000 tonnes.

Together, ABP's East Anglian ports at Ipswich, Lowestoft and King's Lynn, make a significant economic contribution to the UK, as they reported handling more than half, or 56% of total UK barley exports in July 2017.

The three East Anglian ports combined handled more than two million tonnes of agribulks and 170,000 tonnes of timber in 2016 and play a key role in connecting businesses in the region to ports across the North Sea and beyond.

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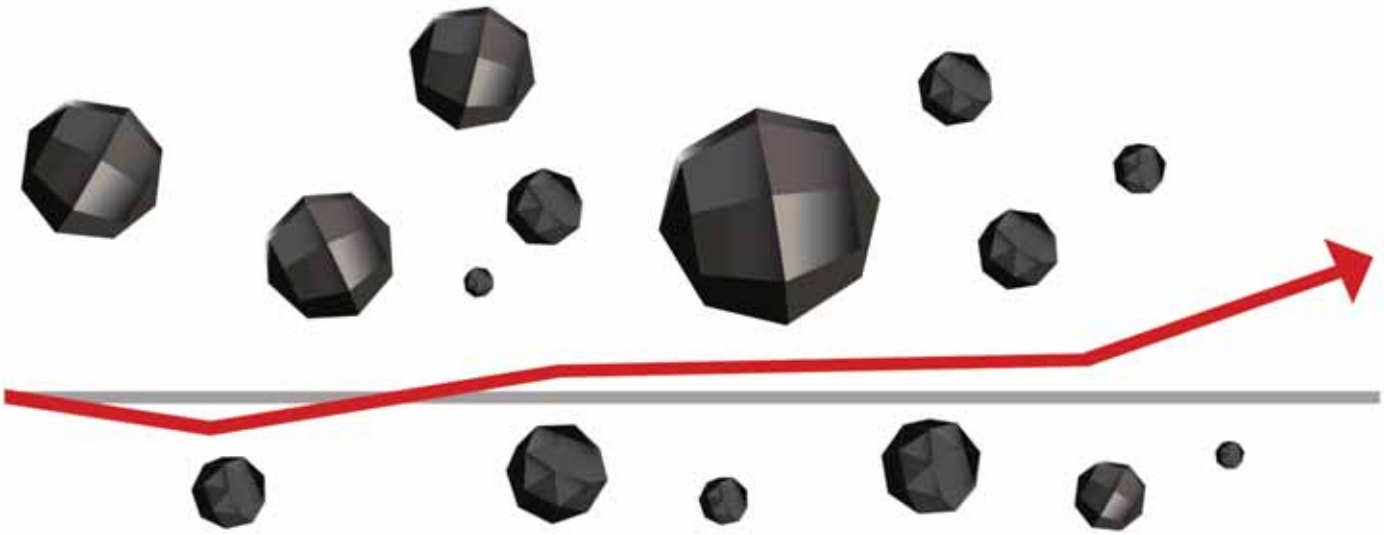

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Port of Tilbury handles glass cullet from new recycling facility

The Port of Tilbury, London's major port, handles thousands of tonnes of bulk glass cullet processed from a new recycling facility at the port in Essex. The new bulk rail handling facility will have the capacity to load over 500,000 tonnes per annum of raw materials to train wagons for distribution across the UK.

Around 5,000 tonnes of raw glass cullet currently leaves Tilbury en route for Cheshire by train every month. The shipments are under a long-term supply agreement between the port and URM. The cullet is produced from glass across the south of England, predominantly from kerbside collections as well as bottle banks, which is processed in URM's state of the art recycling hub at the port.

URM operates some of the world's most advanced cullet sorting and treatment plants. They use sophisticated optical and mechanical processes to ensure that cullet of the highest quality is available for re-processing. Berryman has pioneered new methods of treatment to make sure that glass can be put to useful second life. The port took over the ownerships and management of the rail terminal late in 2017 and has invested in this to reconfigure the site to create a first for Tilbury, a dedicated bulk materials rail terminal for recycled and construction materials. There are direct rail connections within the port, with access to the whole of the UK rail network.

Peter Ward, Commercial Director at the Port of Tilbury said: "It's great to see bulks leaving the port from Tilbury's dedicated rail head. We have a strong partnership with URM and both companies have invested significantly in the new processing recycling hub at the port. Being based at the port takes advantage of our unique transport connections by sea, road and rail. We expect to see many more rail loads of glass cullet from the port throughout the year."

Mark Wilson, Chief Executive of URM UK said: "We chose Tilbury as our partner and the port as the location for our new facility, due its superb infrastructure connectivity and their expertise in material handling. We are delighted that the first product has moved by rail, to complement our shipping and road capability. This will ensure that URM remains at the forefront of glass recycling and environmental management in the UK."

The Port of Tilbury is London's major port, providing fast, modern distribution services for the benefit of the South East of England and beyond. The Port of Tilbury is a dynamic and diverse port, handling the full range of cargoes with specialist expertise in the handling of paper and forest products, containers, Ro Ro, grain and bulk commodities and construction and building materials.

Tilbury's strategic location makes it a natural point for distribution, with 18 million people living within 75 miles. Serving the UK's market, the port offers customers excellent transport links to and from the UK's capital and across the South East where over 50% of the population live and work. The port is a diverse multi-modal hub, covering around 1,100 acres and is well positioned to access the M25 orbital motorway and the rest of the UK's national motorway network.

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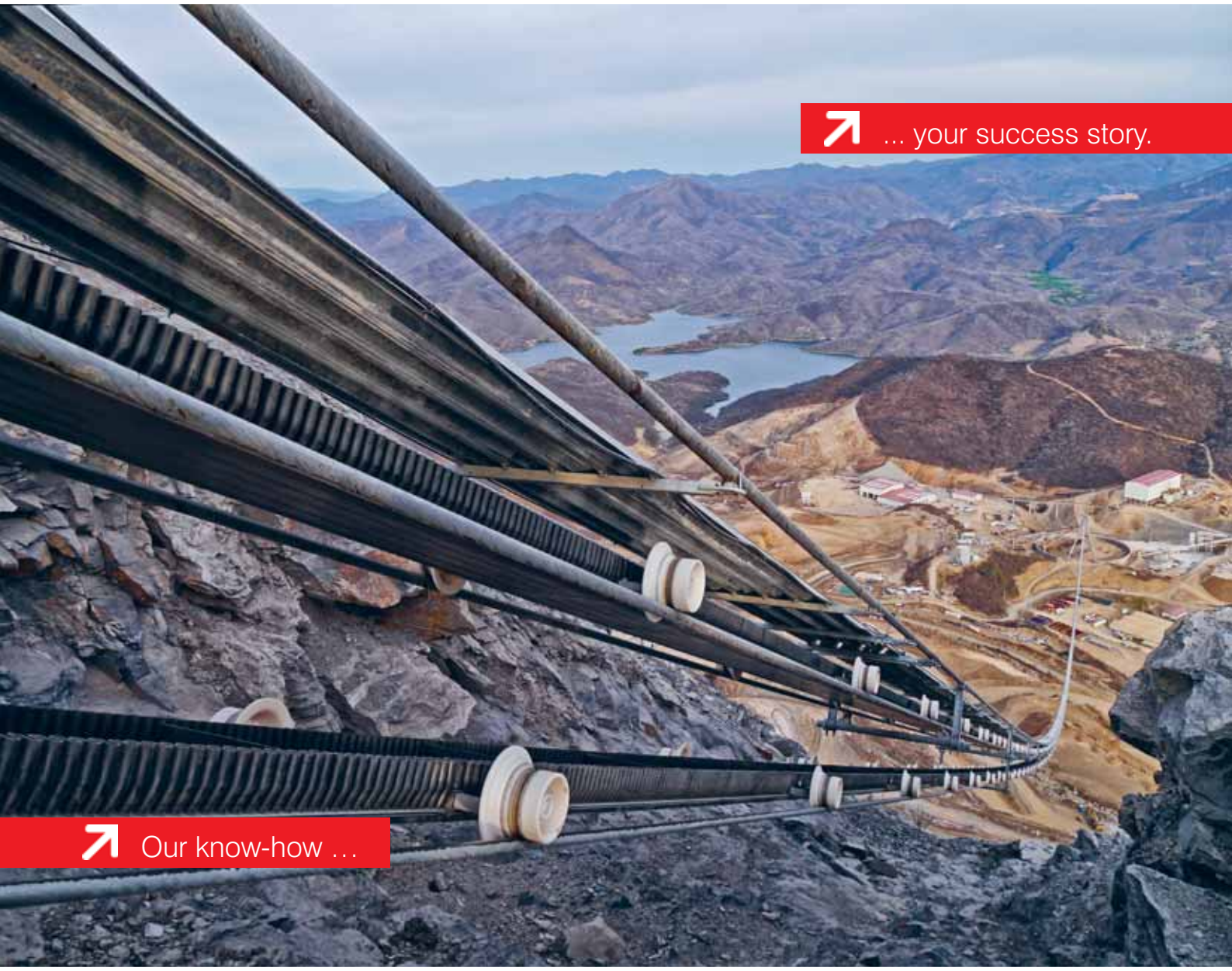

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