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# Flat outlook for iron ore

*Prospects for growth in global commodity import demand in the twelve months ahead are looking quite subdued. In most of the largest components, signs pointing to extra volumes are not prominent. As a consequence, forecasts for world seaborne dry bulk trade during 2019 suggest only a small increase from last year's level.*

One general reason for cautious trade expectations is the mounting evidence of a slowing world economy, implying a restraining influence on numerous industries. In a number of countries, especially China and the European Union, more signs of slackening economic activity have emerged. An indicator published recently by the World Trade Organization indicated a below trend global trade pace, although temporary factors are thought to have been partly responsible.

## Iron ore

Within the dry bulk commodity seaborne trade sector, world movements of iron ore are the biggest element, comprising well over one quarter of the total. Estimates for last year suggest that there was little or no growth in the overall iron ore volume transported and the 2019 outlook suggests an extended fairly flat performance.

During 2018 China's marginally reduced imports (down by 1% to 1,065 million tonnes) were accompanied by a 2% decrease in Japan to 124mt. European Union imports also appear to have decreased slightly to about 105mt, although in South Korea there was a 2% rise to over 73mt. Together these four importers comprise more than 90% of the world total. Currently, expansion signs for the year ahead are not prominent.

## Coal

Despite the well-known negative influences affecting the international coal market, potential for sizeable parts to remain on an upwards trend are still clearly visible.

According to some recent calculations, these strengthening parts may be enough to result in a slow 1–2% global seaborne coal trade growth rate in 2019 as a whole.

But there are major uncertainties, which also affect several countries where prospects for continued import growth are most evident. One example is India, where coal imports apparently rose by about one-tenth to over 220mt last year. Another rise this year seems quite likely, as India's domestic coal output struggles to keep pace with increasing demand. However, while higher coking coal purchases from foreign suppliers seem firmly predictable, extra steam coal purchases are not so certain.

## Grain & soya

As the end of the current 2018/19 crop year for world grain trade approaches, a significant change in the total volume remains an unlikely outcome. Although expectations mostly point to a flat total, with only limited changes among importers, the pattern among exporters is likely to show large variations.

Exports of grain, including wheat plus corn and other coarse grains (the definition used here does not include soya) from North America could increase, as shown in table 1. The latest International Grains Council forecast suggest that US exports in 2018/19 ending June could be 9mt or 10% higher, at 95.4mt. But the other key exporters are all likely to see lower volumes, with the biggest percentage reduction in Australia where a 22% fall to 18.5mt could result from a recent poor harvest.

## Minor bulks

Commodity movements in the minor bulk trade sector as a whole appear to have increased solidly last year, and positive influences could continue. One example is bauxite/alumina, world seaborne movements of which may have been about 10% higher in 2018, reaching over 140mt. China's imports rose by 16% to reach 83mt.

## Bulk carrier fleet

The world bulk carrier fleet's capacity grew by almost 3% in 2018, as shown in table 2, to 841 million deadweight tonnes at year end. A similar growth rate could be seen this year, amid higher newbuilding deliveries offset by increased scrapping of older ships.

**TABLE 1: MAJOR GRAIN EXPORTING AREAS (MILLION TONNES)**

| | Wheat and coarse grains, crop years ending June | | | | | |
|---|---|---|---|---|---|---|
| | 13/14 | 14/15 | 15/16 | 16/17 | 17/18 | 18/19* |
| North America | 106.6 | 108.2 | 102.9 | 122.0 | 113.6 | 124.9 |
| South America | 41.0 | 49.1 | 67.7 | 51.8 | 74.3 | 69.5 |
| Black Sea | 66.4 | 70.9 | 82.2 | 88.3 | 102.7 | 100.3 |
| EU | 40.0 | 48.1 | 46.9 | 34.6 | 30.1 | 29.1 |
| Australia | 25.6 | 23.5 | 22.0 | 31.9 | 23.7 | 18.5 |

*source: International Grains Council* **forecast, 21 February 2019*

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

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019* |
|---|---|---|---|---|---|---|
| Newbuilding deliveries | 48.2 | 49.2 | 47.2 | 38.4 | 28.2 | 35.0 |
| Scrapping | 16.4 | 30.7 | 29.3 | 14.7 | 4.4 | 11.0 |
| Losses | 0.1 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 |
| Other adjustments/conversions | 0.1 | –0.4 | –0.7 | 0.1 | –0.1 | 0.0 |
| Net change in fleet | 31.8 | 17.9 | 17.0 | 23.5 | 23.5 | 23.8 |
| **Fleet at end of year** | **759.0** | **776.9** | **793.9** | **817.4** | **840.9** | **864.7** |
| % growth from previous year | | 2.4 | 2.2 | 3.0 | 2.9 | 2.8 |

*source: Clarksons Research (historical data) & Bulk Shipping Analysis 2019 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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# Fednav overcomes uncertainty over steel tariffs to enjoy successful year in 2018

For Fednav, 2018 was quite a year with respect to steel imports considering tariffs imposed by the United States.

The introduction of the 25% duty on steel imports brought about great uncertainty as regards to import tonnage volumes for FALLine, the company's transatlantic general cargo liner service from Europe to St. Lawrence and Great Lakes ports.

Ultimately, inbound tonnage led by flat products for the automotive industry, followed by structural steels, wire rods, and plates remained steady as prices for American steel increased nearly offsetting the tariffs imposed. In addition, construction projects within Canada remained robust throughout the year which meant good volumes of beams.

Therefore, FALLine was able to offer the same high level of service to the steel and general cargo trades by offering over 50 sailings throughout the season from the main load ports of Antwerp and Brake with other European ports also called on inducement basis.

Outbound, the St. Lawrence Seaway Management Corporation (SLSMC) announced that overall bulk tonnages transiting the seaway was the highest in over a decade.

Fednav's fleet mirrored the Seaway's assessment with the largest number of vessels sailing in and out of the Lakes in over a decade.

For 2019, it is too early to estimate what volumes of steel inbound shippers will have for FALLine's 60th consecutive year of serving the Great Lakes. Some indications, however, point towards a season similar to 2018.

Again this year, FALLine offered monthly sailings throughout the winter to the St. Lawrence River ports of Trois-Rivières and Sorel. Fednav Direct, the company's logistics service, continued to offer its customers year-round JIT deliveries from both River and Great Lakes ports.

As regards export tonnage, again it is early to say what 2019 will bring in terms of bulk exports. It is safe to say, however, that there are some of the best shippers in the world marketing US and Canadian grains, so demand for domestic canola looks to be much better than what was seen in 2018, and that there is a lot of high quality durum in North America that was not moved in 2018.

All in all, Fednav currently has no reason to believe 2019 will be any different from 2018.

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# Strong recovery for wheat

## with corn acreage to rise in 2019

Maria Cappuccio

The Organization for Economic Co-operation and Development (OECD) lowered its global growth forecast to 3.3% for 2019 and 3.4% for 2020, warning that Brexit uncertainty, China's slowdown and trade disputes are hurting the global economy-while downgrading almost every major economy and a number of emerging countries. The deteriorating outlook for global growth prompted the Federal Reserve's to put rate rises on hold, a position followed by most of the leading Banks including the European Central Bank (ECB)-by making a new offer of cheap loans to eurozone banks signals interest rates are likely to remain lower for longer.

Preliminary projections for 2019/20, point to an improved wheat harvest, the increase in supply to be partly absorbed by growth in consumption. With global corn consumption outpacing production and tight US stocks, corn acreage is expected to expand in the US and in China — relatively strong prices are also expected to encourage a small increase in the global barley area. US soybean acreage is forecast lower, due to large global and US soybean stocks, relative to use-anticipated to grow more slowly.

### Global wheat output to rise in 2019/20

With the winter wheat crop underway in the Northern Hemisphere the UN's Food and Agricultural Organization (FAO) preliminary forecast for global wheat production is a strong recovery from last year, rising by 4%, to 757mt (million tonnes) in 2019. Much of the projected growth is associated with expected increases in the European Union (EU), Russia and Ukraine, where a larger planted area combined with generally favourable weather so far expected to push up wheat production.

### North America wheat to expand in 2019

Excessive wet weather in key US winter wheat regions like Kansas, Oklahoma and Nebraska, led to a significant fall of 4% in the planted area. The strong contraction in area (lowest since 1909) is anticipated to support wheat prices and expand the spring wheat area in the Northern Plains. Overall US wheat area is lower at 47m/acres and assuming average yields, production is forecast to rise to 52mt. In Canada, total wheat production is projected to rise to 33mt, resting on a price-induced expansion in spring wheat plantings to offset reduced winter sowings

### Higher output in the EU, Russia and Ukraine

The EU sown area is forecast to expand by 3%-favourable conditions limited frost damage and expected to drive up wheat

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production to 149mt in 2019. Similarly increased wheat plantings and better weather conditions, are expected to boost wheat output in Russia to 79mt and in Ukraine to 26.5mt.

### India, large crop anticipated

With a planted area of 29.8m/ha and timely rain fair conditions expected to boost wheat output to 99mt. By contrast lack of water and a smaller sown area in Pakistan to reduce wheat output to 24.5mt.

### Australia wheat to recover

The Australian Bureau of Agricultural and Resource Economics and Sciences (Abares) forecast a near 20% rise in Australia's wheat plantings (due to start in May) and pegged the wheat crop at 23.9mt in 2019/20; although if hot, dry weather conditions persist over the next three months, then a below-average crop more likely.

### Lower wheat output in 2018/19

With the exception of Argentina, Canada and India most of the major wheat exporting countries had significantly smaller crops with global output forecast down by 30mt to 733mt in 2018/19, supported wheat values for several months before prices turned lower. Wheat used for Feed/Food/industry declined by 2mt to 742mt- trade at 180mt reflected smaller purchases by Algeria, Bangladesh, China, Indonesia, Turkey and the US.

**GLOBAL WHEAT PRODUCTION 2015–2019 (MT)**

| | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Europe | 164 | 150 | 155 | 142 | 153 |
| EU | 160 | 145 | 151 | 138 | 149 |
| E.Europe | 4 | 5 | 4 | 4 | 4 |
| CIS Baltic's | 118 | 130 | 142 | 126 | 138 |
| Russia | 61 | 73 | 85 | 72 | 79 |
| Ukraine | 27 | 27 | 27 | 25 | 26 |
| N &C America | 87 | 99 | 81 | 86 | 89 |
| US | 56 | 63 | 47 | 51 | 52 |
| Canada | 28 | 32 | 30 | 32 | 33 |
| S America | 22 | 29 | 26 | 28 | 26 |
| Argentina | 11 | 18 | 18 | 19 | 19 |
| N East Asia | 42 | 39 | 42 | 40 | 41 |
| Turkey | 20 | 17 | 21 | 19 | 21 |
| F East Asia | 254 | 256 | 269 | 265 | 262 |
| China | 133 | 132 | 134 | 131 | 129 |
| Africa | 27 | 22 | 27 | 29 | 24 |
| North Africa | 20 | 14 | 19 | 21 | 21 |
| Australia | 23 | 32 | 21 | 17 | 24 |
| Total | 738 | 756 | 763 | 735 | 757 |

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

**GLOBAL WHEAT SUPPLY & DEMAND 2015–2018/19 (MT)**

| | 2015/16 | 2016/17 | 2017/18 | 2018/19 |
|---|---|---|---|---|
| Production | 738 | 756 | 763 | 733 |
| Consumption | 716 | 740 | 744 | 742 |
| Trade | 172 | 182 | 183 | 180 |
| Stocks | 244 | 261 | 280 | 271 |
| China | 97 | 115 | 131 | 140 |
| Major exporter stocks* | 66 | 73 | 73 | 60 |

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

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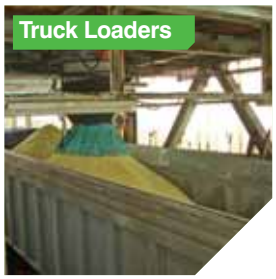



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## Exporters slash wheat prices

Global demand for wheat continues to lag despite increasingly competitive prices and early prospects for large harvests. Egypt recently bought Russian12.5% protein wheat 60,000/t at $232/t C&F (freight $9.75/t – 5 Mar). Black Sea region set a record pace for exports, but supplies have tightened in Russia with EU wheat expected to become more competitive. US wheat futures slid to an 11-month low-CBOT May contract closed down $4.382/bu (7 Mar) due to slow pace of exports and tough competition from the Black Sea region.

**GLOBAL COARSE GRAIN SUPPLY & DEMAND 2015–2018/19 (MT)**

| | 2015/16 | 2016/17 | 2017/18 | 2018/19 |
|---|---|---|---|---|
| Production | 1,303 | 1,415 | 1,357 | 1,372 |
| Consumption | 1,270 | 1,379 | 1,371 | 1,406 |
| Trade | 185 | 182 | 187 | 199 |
| Stocks | 350 | 385 | 370 | 336 |
| China stocks[1] | 213 | 224 | 223 | 205 |
| M. exporters — grains* | 91 | 112 | 101 | 89 |
| Major corn exporters | 54 | 79 | 68 | 62 |

*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*

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

| Oilseeds | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 |
|---|---|---|---|---|---|
| Production | 538 | 524 | 573 | 576 | 593 |
| *Soybean* | *321* | *317* | *349* | *340* | *360* |
| Trade | 147 | 153 | 171 | 176 | 178 |
| Crush | 440 | 445 | 467 | 483 | 495 |
| Meal use | 293 | 302 | 317 | 328 | 335 |
| Oil use | 171 | 178 | 184 | 192 | 199 |
| Stocks | 96 | 94 | 110 | 115 | 122 |
| *Soybean* | *79* | *80* | *96* | *98* | *107* |
| *US* | *5* | *5* | *8* | *12* | *25* |
| *South America** | *52* | *52* | *60* | *56* | *53* |

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

## Corn acres rise to keep pace with demand

The global corn area is predicted to expand by 1% mostly in China and in the US where soil moisture levels are in good shape moving into spring. USDA forecast US corn acres to rise to 92m/acres (at the expense of soybeans), with a crop c.378mt based on average yields of 176.6bu/acre, the largest acreage since the 2016 planting season, when the price ratio was more favourable to corn.

According to Dan Basse, president of AgResource Company corn acres have room to shrink to 91.5m/acres. Other analysts think fertilizer price and availability will drive crop choices, especially for swing acres, as many mid-west farmers found the wet autumn not conducive for fall tillage or fertilizer applications. "Globally, corn stocks outside of China leave very little room for error," said Arlan Suderman of FCL Stone. In his view, corn acreage is needed just to keep up with feed/food/industry demand but not as much as the USDA forecast, with many farmers likely to stick to traditional crop rotation, despite uncertainty in the soybean market.

For 2019/20, USDA forecast increased US domestic corn use to 315mt and pegged exports at 60mt. Stocks are expected to fall to 47mt, with stocks-to-use ratio 11% – average farm price $143.69mt ($3.65/bu).

### Strong demand for feed grains in 2018/19

The global coarse grain harvest is forecast at 1.37bn/t in 2018/19, due to an increase in corn output. Overall demand is expected to rise over 1.4bn/t and outpace production for a second consecutive year. Global use of coarse grains for food/industry use is expected to rise by 16mt to 551mt with feed use rising by 19mt to a high of almost 855mt, the largest yearly increases projected for China, Mexico and the US trade is also forecast to rise by 12mt to 199mt, while stocks excluding China, fall to 336mt.

### Substantial rise in feed demand for corn

Global corn production is projected to rise by 24mt to 1.13bn/t in 2018/19, due to lower (but substantial) crops in the US (366mt), China (257mt), and large crops in the Ukraine (36mt), Brazil (95mt) and Argentina (46mt). Strong demand for corn rising by 48mt to 1.13bn/t – food/industry to increase by 16mt, with a substantial rise of 32mt in feed use to 703mt, especially in China, EU, Brazil.

Global trade is forecast at a record 165mt in 2018/19, with imports destined for the EU, Mexico, Vietnam, South Korea and many other countries. US corn exports are lower at 60mt, with rising exports from Ukraine 29mt, Brazil 29mt and Argentina 29mt.

### Significant fall in global corn stocks

Global corn stocks are expected to fall for the second consecutive season to 309mt, mostly in China (205mt), the US (47mt) and also in some southern hemisphere countries by the end of 2018/19. Corn stocks (excluding China), are forecast lower at 104mt.

### South American crops weigh on forward market

Reports that progress made in the trade talks between the US and China could lead to a formal trade deal at a summit around 27 March sparked a brief market rally — South Korean buyers bought 63,000/t corn for August delivery at $198.30/t CFR plus $1.25/t for second port discharge. The trades likely to be supplied from Argentina's 46mt corn crop with Brazil set to enter the market in July with a 95mt crop — the large outturn weighing on the forward market. Global corn prices fell during Feb/March — Argentine (up river) by $14/t to $162/t; Brazil Feed Corn FOB Paranagua $190/t; US 3YC (Gulf) $170/t (6 Mar '19); Futures Markets CBOT May Corn contract closed at $3.67/bu (8 Mar '19).

### China probes Australian barley pricing

Relatively strong prices are expected to encourage a 1% increase in the global barley area in 2019/20, to a four-season

high. Global barley output is expected to rise in 2019/20 in the EU 59mt, Canada, CIS countries and Australia. China's anti-dumping investigation into Australian barley pricing, likely to put at risk future exports-Australia shipped 0.89mt of feed and malting barley to China in December. Ukraine's barley was the cheapest origin offered at $185/t FOB Panamax ports, Russian barley at $190/t; 60.000/t barley (optional origin) for delivery mid/late June down by $35/t to $223.2/t C&F Aqaba.

### Wet autumn may increase US sorghum acres

US sorghum prices and overall acres are projected to hold steady in 2019/20, despite tariff barriers and additional challenges. The combination of a wet autumn, to replenish soil moisture-prevents wheat planting, but could encourage sorghum acres in some states, like Kansas. James Welch, Texas A&M University economist forecast higher prices of $3.50–4/bu in 2019 for feed grains; lifting tariffs would add value of 20¢ to the price outlook.

Sorghum output increased to 58.4mt in 2018/19 — trade 5mt; feed/food/ industry use lower at 58mt mainly due to loss of Chinese market. Sorghum FOB Nola (May) $181.19/t (7 Mar '19)

### US soybean acreage to fall in 2019/20

With rising global soybean stocks, USDA forecast the US soybean area to fall by over 4m/acres to 85m/acres in 2019, tempered by the soybean-to-corn price ratio, which in March remained below the ratio seen in the past two years.

Soybean prices likely to be affected by continued tariff barriers to trade-the 25% tariff imposed by China on US soybeans blocked sales to the Chinese market and led to steep discounts of $90/t for US soybeans during the current season, with the outcome of the bi-lateral US/China trade talks expected by end March.

**SOYBEANS MAJOR PRODUCERS 2015–2018/19 MT**

| Countries | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 |
|---|---|---|---|---|---|
| US | 107 | 107 | 117 | 120 | 124 |
| Brazil | 97 | 97 | 115 | 121 | 117 |
| Argentina | 61 | 59 | 55 | 38 | 55 |
| China | 13 | 12 | 14 | 15 | 16 |
| India | 9 | 7 | 11 | 8 | 11 |
| Paraguay | 8 | 9 | 10 | 10 | 9 |
| Canada | 6 | 6 | 7 | 8 | 7 |
| Others | 20 | 19 | 21 | 20 | 22 |
| Total | 321 | 317 | 349 | 340 | 360 |

*Source: USDA*

**SOYBEAN & SOYBEAN MEAL-MAJOR IMPORTERS 2016–2018/19 MT**

| | Soybeans | | | Soybean meal | | |
|---|---|---|---|---|---|---|
| | 2016/17 | 2017/18 | 2018/19 | 2016/17 | 2017/18 | 2018/19 |
| EU | 13 | 15 | 16 | 19 | 18 | 19 |
| Asia | 109 | 109 | 105 | 20 | 21 | 21 |
| China | 94 | 94 | 88 | — | — | — |
| S&C America | 6 | 6 | 7 | 5 | 5 | 6 |
| N. America | 5 | 6 | 6 | 3 | 3 | 3 |
| Mexico | 4 | 5 | 5 | 2 | 2 | 2 |
| M.East/Africa | 8 | 11 | 10 | 8 | 7 | 8 |
| Others | 5 | 6 | 7 | 4 | 4 | 4 |
| Total | 144 | 154 | 151 | 60 | 60 | 63 |

*Source: USDA*

### Record global oilseed production in 2018/19

Global oilseed production is expected to rise by over 23mt to 593mt in 2018/19, mainly due to a significant recovery in Argentina's soybean crop and increased US output; for other oilseeds, sunflower seed, palm kernel and copra are expected to increase with lower output anticipated for cottonseed, groundnuts and rapeseed.

USDA forecast trade to show a small increase to 178mt with crush to expand to 495mt, with global stocks to rise to 122mt.

### China buys US soybeans

USDA confirmed that China bought 664,000/t and then a further 926,000/t of soybeans (8 Mar) for delivery to China during the 2018/19 marketing year, but the sales are well below the 10mt that US Agriculture Secretary Sonny Perdue said China had promised to buy as part of the trade negotiations. CBOT Soybeans Futures May contract closed down at $8.90bu (11 Mar '19).

### China halts imports of Canola seeds

China has halted imports of canola seed (6 Mar) from Canada's largest independent grain handler Richardson in a sign of broadening tensions over the detention of a senior Huawei executive in Vancouver. Exports to China of Canola seed 2017/18 c.$4.5mt to $1.9Bn plus oil and meal a further $1bn. Richardson's was the only

**MAJOR OILSEEDS, MEAL & OIL SUPPLY/DEMAND 2018/19 (MT)**

| | Oilseeds | | | | Meal | | |
|---|---|---|---|---|---|---|---|
| | Prod | Trade | Crush | Stocks | Prod | Trade | Use |
| Soybeans | 361 | 154 | 304 | 107 | 238 | 67 | 235 |
| Sunseed | 51 | 2 | 46 | 4 | 21 | 7 | 21 |
| Rapeseed | 71 | 17 | 68 | 7 | 39 | 6 | 39 |
| Copra | 6 | * | 6 | * | 2 | 1 | 2 |
| Palm kernel | 19 | * | 19 | * | 10 | 7 | 10 |
| Peanuts | 42 | 4 | 17 | 3 | 7 | * | 7 |
| Cottonseed | 43 | 1 | 34 | 1 | 16 | * | 16 |
| Total | 593 | 178 | 495 | 122 | 338 | 89 | 330 |

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

exporter of Canadian grain barred from selling canola.

### Record soy exports from South America

Brazil's soy exports are forecast to rise to almost 80mt in 2018/19 despite a slightly smaller crop in 2018/19, due to an extended dry spell, lower yields anticipated in southwestern Brazil. In Argentina, rains swept through the major crop areas, with a larger sown area 17.5m/ha, the crop is forecast at 55mt, with exports higher 6mt for beans and 30mt for meal.

### African Swine Flu (ASF) outbreaks rising

African Swine Fever (ASF) in China is more serious than initially thought with Beijing considering plans to carve up the country into separate self-sufficient zones to contain the rate of infections. Pan Chenjun, senior analyst at Rabobank said, "I think this is not going to tackle the issue… It helps contain the disease in the area but not really eradicate it." Many experts believe the disease is now endemic in China and may take years to eradicate. With 111 outbreaks of the disease in 28 of its provinces and regions reported since August 2018, many analysts predict China's pig population of around 400–600m/heads will fall by 15–30% this year, with farmers reluctant to breed the animals.

### Soymeal demand for pig feed lower

Demand for soymeal the main protein source for pig feed, has fallen due to continuing ASF outbreaks, with crush margins reported to be in the red for the last three months according to Agricensus data. A Chinese government agency said, soy meal demand is expected to fall by almost 5% to 66.8mt this marketing year. China has culled more than one million pigs over the past few months, though this figure is likely to be higher given the scale of the outbreak — reflected in China's rising hog prices that hit a 14-month high as pork supplies tighten, prices jumping over 40% in a month. DCi

# The Swedish Club delivers expert advice on dealing with the Sulphur Cap 2020

On 1 January 2020 vessel owners must have made the decision to install exhaust gas scrubbers or to burn low sulphur or alternative fuels. The cost implications of any decision will be difficult to predict and there is no shortage of opinions in the marketplace. To assist the shipowner, The Swedish Club has cut through the chatter and obtained expert advice from a leading marine engineering consultancy and from experts in contract law.

The Swedish Club's *Sulphur Guide* provides both technical and legal advice. It explores technical considerations when making the decision between operating with low sulphur fuels and retrofitting scrubbers and explains the legal implications, both in terms of compliance and in relation to the terms of any charterparty in place, following that decision.

The *Sulphur Guide* has been written in conjunction with Tony Grainger, Marine Engineer, TMC Marine; Paul Harvey, Associate, Ince & Co and Jamila Khan, Partner, Ince & Co. All are experts in their field, providing information based on real life situations they have encountered in their working lives.

Lars A Malm, Director Strategic Business Development & Client Relations says: "In this area there are many unknowns facing ship operators. Will low sulphur fuel be available? If so, what will it cost? What risks do we face in the changeover period? How can we turn this to our advantage? One thing we do know is that, at least at the beginning, the Sulphur Cap 2020 legislation will produce a two-tier charter market – scrubbers installed versus no scrubbers. "The *Sulphur Guide* is aimed at providing no-nonsense information to those thinking about the effect potential modifications will have both on the operation of their vessels, and existing charterparties and charterparties entered into in the future."

The *Sulphur Guide* can be downloaded at The Swedish Club's website.

# GAC Qatar wins multiple customs clearance awards

GAC Qatar's customs clearance expertise has earned it two titles in an awards ceremony organized by the General Authority of Customs, held in conjunction with International Customs Day.

The accolades for the awards were presented at a ceremony attended by His Excellency Jassim bin Saif al-Sulaiti, Minister of Transport and Communications, His Excellency Ahmed bin Abdullah Al Jamal, Chairman of the General Authority of Customs, and many officials from different ministries and the General Authority of Customs.

GAC was one of three logistics service providers to be honoured as Best Customs Clearance Brokerage Company. GAC Qatar's Customs Broker, Sabri Eltahir Elsiddeg Mohamed, also received the Distinguished Customs Clearance Agent Award in appreciation of his dedication and outstanding work. Winners were selected by the General Authority of Customs based on the companies' and individuals' compliance with rules and regulations, staff's knowledge and transparency in their operations.

"These awards not only recognize our local know-how and operational excellence but, most importantly, the commitment of our customs clearance team to ensuring the efficient and timely clearance of our customers' goods in accordance with the country's laws, regulations and Customs procedures," says Daniel Nordberg, General Manager of GAC Qatar.

*Fatima Mubarak Ahmed Nasralla, Manager of Customs Affairs of GAC Qatar (centre), receives the Best Customs Clearance Brokerage Services Award from His Excellency Jassim bin Saif Al Sulaiti, Minister of Transport and Communications (left) and His Excellency Ahmed bin Abdullah Al Jamal, Chairman of the General Authority of Customs (right).*

"We would also like to thank the Customs Authority for the support to shipping and logistics service providers like GAC and the continuous development of technology in the field of Customs work for greater efficiency and integration with companies."

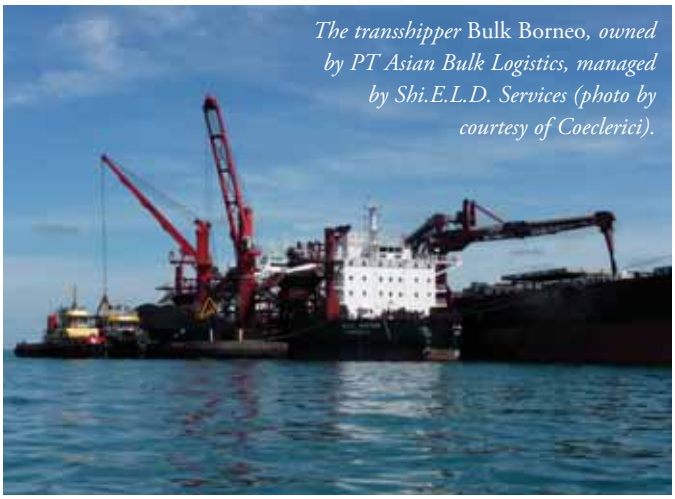
The year 2019 marks the company's 40 years of operations in the country. Since its establishment in 1979, GAC Qatar has become one of the country's leading providers of integrated shipping and logistics services.

It offers a complete portfolio of services including customs clearance, freight forwarding, ship agency, husbandry services, contract logistics and international moving.

## About GAC Group

GAC is a global provider of integrated shipping, logistics and marine services. Emphasizing world-class performance, a long-term approach, innovation, ethics and a strong human touch, GAC delivers a flexible and value-adding portfolio to help customers achieve their strategic goals. Established since 1956, the privately-owned group employs over 9,000 people in more than 300 offices worldwide.

# Ship management: recent history and present developments



*The transshipper* Bulk Borneo, *owned by PT Asian Bulk Logistics, managed by Shi.E.L.D. Services (photo by courtesy of Coeclerici).*

In the old maritime tradition of the most important shipping nations, from North Europe as Norway, Germany United Kingdom and France and from the Mediterranean sea, like Greece, Italy and Spain, ship-ownership coincides with management in the same person or company.

After many years, the shipping environment has changed with serious modifications in company structures and organization; the second generation of owners, in the Far East, but also in northern Europe, Greece and Italy, has become more familiar in business and finance but less involved in direct ship management.

Consequently, inside the shipping companies, owners and managers are involved directly in strategies, marketing finance, sale and purchase and accounting, while the other shipping activities — such as crew personnel management, technical management, ship operations, purchasing and certifications activities — have been assigned and/or delegated to outside personnel.

So little by little, inside owners' offices, the personnel directly involved in ship management has been significantly reduced, and often only with supervision tasks.

Accordingly, starting from the 1970s/80s, in the shipping industry there has been the spread of a new important actor, the ship manager.

This process has been subsidized and helped, by other factors like globalization, foreign Flag adoptions with more convenient taxation and limited constraint on crew nationality, new technologies application, development of more complex new standard and regulations, frequent change of ownership and external investors like private equity funds.

All of these have led to the need for ship management, to have more complex professionalism and, meantime, to grant and carry out more professional services. The additional professionalism and organization risks cause a dramatic rise in the management cost that, in the shipping industry, needs to be strictly kept within a limited budget.

Ship managers always work within a fixed budget, as required by their shipman contracts, granting a closer control on expenses. Therefore, long-term relationships between owners and ship managers, more confidence and trust grant more effectiveness and adoption of strategical decision and targeted investments to improve owners' profits, safety and achieve cost reduction.

The most important factors that have led ship owners to look for and appoint ship management are expertise, tailor-made services, good reputation, flexibility and specialized and quality services.

In some particular businesses and trading areas, it is very important to know the process exactly, and Shi.E.L.D. Services has the right expertise to do so.

Shi.E.L.D. Services is an Italian company born from Coeclerici Logistics Spa, with headquarters in Milan and Balik Papan. Its CEO and all the personnel employed have worked for many years at management level operating in bulk transshipment worldwide, in Europe, Far East Africa and South America.

Shi.E.L.D. Services is focused on offerings its clients the ability to design a logistics solution for the commodities sector and supports the client during construction, operation and management stage of their assets, to ensure they always respect the environment, run in a safe and a cost efficient manner and are maintained so as to preserve their book value. With the over 20 years of experience gained by its personnel, Shi.E.L.D. Services has the expertise, efficiency and reliability to help owners to achieve their goals.

Shi.E.L.D. has matured the ability to find and select experienced and capable crew to be employed satisfactorily in transshipment activities, with a mutual interest in developing a longer working relationship and ensuring a high retention factor.

Doing so, the cost for crew-specific training and familiarization can be optimized, avoiding the need to repeat for continuous new joiners and employing well trained and inducted crew members reducing the incidence of injuries and loss of work time.

Providing comprehensive services, Shi.E.L.D. offers its clients considerable experience, contacts and good relationships with trusted partners, suppliers, as well as its commercial relationships, economies of scale and volume discounts.

Meantime the technical maintenance and dry dock activities carried out by Shi.E.L.D. represent not only a cost advantage but the chance to get planned and unplanned maintenance through proper and specific services. It also enables preventative checking, with particular care for such items of equipment that are more critical in the transshipment business, and provides a continuous information flow to the owners.

If necessary, occasional ship assesment services or technical supervision during construction or repair/overhauling are carried out.

Additionally Shi.E.L.D. Services is able to design and manage port infrastructure in connection with its partners which specialize in cargo handling, to carry out design and maintenance of conveyors, stackers, reclaimers and shiploaders, to optimize loading/unloading equipment, to optimize maintenance programmes to reduce downtimes, and monitor capital and operating costs.

With more than 20 years of experience in the maritime logistics business, Shi.E.L.D. Services can provide tailor-made solutions for the logistic chain in the maritime transport services:

- feasibility studies for logistics projects, on-shore and off-shore; and
- design,build and operate transshipment vessels;
- optimization of the logistic cycle.

Therefore, Shi.E.L.D. is experienced in designing tailor-made on-shore and off-shore equipment, including:

- design of mine and port infrastructure equipment;
- design of vessel, ship system and cargo handling equipment; and
- design for conversion of ships into transshipment vessels.

Shi.E.L.D.'s motto is: 'make your job a passion, and never give up'.

# Goltens lands major ballast water retrofit orders with NYK Bulk & Projects, BW LPG


Goltens' Worldwide Green Technologies Division Asia has announced contracts with NYK Bulk & Projects Carrier Ltd. (NBP) and BW LPG for support in retrofitting a total of 37 vessels with ballast water treatment systems (BWT).

The NBP order is for 25 of its bulk carriers. NBP is one of the world's major ocean carriers of project cargo, heavy lift cargo, steel products, and bulk cargo. The company is a subsidiary of NYK, Japan's largest shipping company.

The scope of the contract with Goltens includes 3D laser scanning and modelling of BWT systems, delivery of detailed design packages, and installation supervision in the shipyard.

BW LPG awarded orders for the same scope of work for the retrofitting of 12 of their LPG carriers. BW LPG currently owns and operates the world's largest fleet of very large gas carriers (VLGCs).

Work has already commenced on both contracts. Sandeep Seth, Goltens Vice President for Asia, said: "These are significant orders for Goltens, and we appreciate the confidence both NBP and BW have shown in our capabilities."

With the Ballast Water Convention in effect and emissions regulations coming into force in January 2020, Seth reports a marked increase in response from owners and operators. "Goltens' clients are feeling the pressure of regulations, and they need solutions. Demand for fast-track compliance support with Goltens Green Technologies' smart retrofit services is really starting to take off."

Goltens Green Technologies has now completed, or is in the process of completing, 435 ballast water retrofit projects around the globe, ranging in scope from 3D scanning and modelling to turnkey installations of systems. Goltens also reports a strong order book, with over 100 additional BWT systems contracted.

## Worldwide reach for world-class products

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

# In safe hands?

## striving to protect seafarers and vessels, and to improve the overall shipping environment

*photo: Frans Berkelaar.*

Louise Dodds-Ely

## Maintaining an even keel – are digital systems the answer to vessel losses?

With 90% of global trade transported by sea, assuring the safety of vessels in transit is paramount. While collisions and human injuries account for a high proportion of accidents at sea, vessel losses continue to present a significant risk, according to the latest statistics. The 2018 AGCS Safety Shipping Review* reports cargo ships as the most frequently lost vessel in 2017, with a year on year increase in losses, driven by a rise in foundering incidents.

While total ship losses over the past decade have declined significantly thanks to improved ship design and technology, any loss is unacceptable when measured not just in financial terms but also loss of life and environmental impact.

For bulk cargo ships, liquefaction is recognized as a continuing hazard, with cargoes such as iron and nickel ore at risk of liquefaction.

Liquefaction is the process by which saturated, unconsolidated metal ores are transformed into a substance that acts like a liquid. Typically, this arises during the voyage where cargoes are subject to agitation from the ship's motion and engine vibrations, which can be further aggravated by rolling and wave impact. This causes cargoes to be transformed from a solid dry state to a fluid state, especially where moisture is already present prior to loading, a common occurrence in rainy and monsoon conditions. The resultant shifting of cargo can cause instability, leading to listing, structural damage, fire or explosion, with the potential to capsize the vessel very quickly. It is estimated that, on average, ten 'solid bulk cargo' carriers have been lost at sea each year for the last decade.

The IMO's International Maritime Solid Bulk Cargoes (IMSBC) Code governs how much moisture is allowed in solid bulk cargo in order to prevent liquefaction. However, liquefaction depends not just on moisture but other material characteristics, as well as the method of loading and the motions of the vessel during the voyage that may not be as well understood, particularly for newer materials such as bauxite. Commercial pressures too, can play a part, with the

**Safety and Shipping Review 2018 Allianz Global Corporate & Specialty (AGCS)*

emphasis on speed of loading and the need to maintain cargo tonnages. Climate change is also an ever-present challenge for today's shipping operators, with an increase the incidence of typhoons for example in 2017: the AGCS report reveals natural catastrophes to be the top-ranked risk in the Allianz Risk Barometer 2018.

The 1974 SOLAS X11 Regulation 12 addresses specific risks posed by the condition known as liquefaction in bulk carrier ships carrying dry cargo such as metal and mineral ore. In 1999, the regulations were extended to include single hold cargo ships and void spaces. The loss of the 10-year-old Bahamas-based *Bulk Jupiter* in January 2015, resulting in 18 fatalities while carrying 46,400 tonnes of Bauxite and resulting in 18 fatalities prompted a further IMO warning on

liquefaction.

The need to upgrade to meet incoming legislation has seen most larger vessels equipped with the basics in terms of safety systems. However, there remains an ongoing need for operators to demonstrate compliance. As suppliers, we are unfortunately seeing increasing cases where the previous systems installed have proved unreliable, leading to operational failures as well as unexpected replacement costs. This has occasionally been complicated by difficulties in obtaining replacement spares where the original suppliers may since have gone out of business.

The AGCS review, among others, highlights the importance of sensors in enhancing risk management at sea. In the case of liquefaction, sensors allow the water pressure of bulk cargo in holds to be monitored, triggering a real-time warning


to allow action to be taken to compensate for the additional liquid.

The requirement for a more robust and reliable system was a key driver for PSM in developing its BulkSafe water ingress detection and alarm system. Through constant monitoring, the BulkSafe system provides advance warning of water formation in the bottom of the cargo, widely acknowledged to be an early stage of liquefaction. Conforming to SOLAS XII Regulation 12 for bulk carriers, BulkSafe has undergone extensive testing to ensure compliance with IMO standards in the presence of all major classification societies.

In the face of market uncertainties and rising operational costs, PSM's aim has been to engineer a system which offer fast installation and easy integration with existing equipment, to minimize replacement and repair costs and shorten turnaround times.

At the same time, alongside the technological advances digital system can offer, it is important to recognize the commercial pressures on captain and crew operating in the real world. The streamlining of supply chains with tighter time constraints and reducing crew numbers means that is vital to ensure any monitoring system is simple and convenient

to ensure it is used.

PSM's Water Ingress Detection and Alarm systems use self-checking, active sensors to monitor cargo holds, triggering an alarm if water is detected. The BulkSafe system additionally features a 'check from deck' facility which allows mandatory Inspections to be completed with the cargo holds full or empty. The system uses pressure-based rather than float-based sensors, with cables incorporating pipes to create a vacuum on deck.

Another important requisite for today's ship operators is a means to establish a safety audit trail, both to protect staff and to provide documented evidence in the event of an incident. PSM's BulkSafe application provides a solution in the form of an RS485 serial communications output which connects to the ship's Voyage Data Recorder to provide a permanent and secure record that can be analysed offline.

PSM has seen a steady increase in the take-up of its BulkSafe water ingress systems including orders for 30 smaller special purpose bulkers built by Ferus Smit and five vessels for Briese Shipyard in the Netherlands.

With autonomous vessels still some way off, technology developments in the form of sensor-based monitoring systems continue to assist crews in improving safety and reducing future vessel losses.

# Next generation.

CRANE BARGE 6324


It's not just a barge, it's a Damen Barge. More than that, it's a Damen Barge with remote monitoring capabilities. With our next generation transshipment barge we've taken a digital leap, incorporating a dashboard that displays all data such as overall performance and fuel use. And, with this new technology applied to proven, innovative designs, this barge will transship up to 1,000 tonnes per hour.

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# Putting your best foot forward

Marine paints and coatings are specifically formulated to protect and strengthen a dry bulk vessel's hull, cargo holds, and hatch covers against damage — protecting the ship from the inside out, *writes Davide Ippolito, Group Product Manager, Marine Newbuilding, Hempel A/S.* Externally applying an antifouling coating solution to the hull of a ship is not a new concept but coatings technology has advanced greatly, particularly in recent years. High-performance hull coatings now deliver enhanced protection against fouling, and they optimize efficiency by lowering the maximum speed loss thereby saving fuel and minimizing a shipowner's environmental footprint; they also improve trading flexibility.

Internally, cargo holds are constantly put to the test and are subjected to extremely harsh treatment. Cargoes range from metal ores, coal, cement, tin, steel, grains, coffee and sugar — to name a few — and the loading and unloading of these cargoes cause abrasion, impact and mechanical damage. Certain cargoes expose holds to high temperatures and harsh chemicals which can also damage and weaken the steel.

Many dry bulk cargoes are classified as 'dangerous goods', so it comes as no surprise that there are important codes and cargo transport guidelines that shipowners and operators strictly adhere to in order to move cargo safely from port to port. Different classes of solid bulk cargoes have their own individual handling criteria and P&I Clubs publish guidelines on preparing cargo holds for their loading and safe transportation. Keeping abreast of these regulations is vital in ensuring the safety of a vessel and protecting the cargo both from incidental or environmental damage.

## It's what's inside that counts

Protecting a vessel from harm for the long term is in everyone's best interest. The right cargo hold coating enhances operational efficiency from the outset. By investing in the right tool, such as Hempel's Hempadur Ultra-Strength Fibre 47510 cargo hold coating, shipowners can benefit from faster turnaround times in ports as the holds are easier to clean. They are protected against damage and corrosion, and out-of-service time is minimized — up to 40% reduction in maintenance costs compared with standard epoxy coatings, which have traditionally been applied to dry bulk cargo holds.

*Inspecting the hull coating.*

Hempadur Ultra-Strength Fibre 47510 incorporates a unique combination of superior mechanical resistance with a fibre and self-toughening technology that delivers the most robust and reliable cargo protection for cargo holds currently available.

Importantly, the heavy-duty nature of the coating provides superior resistance to abrasion, impact, cracking and chemical attack, combined with an easy-to-clean smooth surface to avoid contamination between cargoes.

Hempel's hold coatings can be applied with various degrees of surface preparation, making it easier for applicators to apply and greatly minimizing repair costs. Fast curing times of just three days before carrying the first hard cargo and a ten-year maintenance major repair interval offer fast return to service and reduced repaired costs during the coating service life.

## A protective exoskeleton

Trading flexibility is crucial for dry bulk shipowners as the shipping industry continues to face challenging times. Using the same patented microfibre technology as the Hempadur Ultra Strength Fibre, Hempel recently launched a new powerful antifouling coating Atlantic+. Designed to protect the hull from fouling throughout service intervals of up to 60 months, Atlantic+ is suitable for all water temperatures ensuring complete operational efficiency.

The science behind the microfibre technology involves introducing an internal skeleton of fibres into the paint to enhance its mechanical strength — in the same way that steel rods can be inserted into concrete to reinforce a physical structure. Strengthening the antifouling coating in this way means ensuring protection from fouling on areas exposed to impact and abrasion; improving 'overcoatability'; reducing the areas to blast; and ultimately decreasing the costs for the ship's dry docking.

Applying the right coatings to the external and internal structures of a vessel is vital to maximizing operational efficiency. By putting your best foot forward and investing for the long term, shipowners and operators can generate more sustainable operations, minimize downtime and maximize savings. The market is not out of the doldrums yet and will continue to face challenges but by looking at the big picture — and selecting the optimum coating solution — shipowners can make creditable gains.

# The Polish Register of Shipping weighs in on bulker safety issues

The random nature of the ocean, wave conditions, a wide variety of shipping operations, indiscriminate loading conditions, arbitrary shipping routes and decisions by the crew are all contributing factors to the safety of a vessel and its seafarers, *writes Dr Jan Jankowski, PRS (Polish Register of Shipping)*. The case of VLOCs (very large ore carriers), another major factor is probably the impact of high loading rates on structural safety. This can affect the structure in ports, and wave loads can often cause further failure of the structure, leading on occasion to marine casualties.

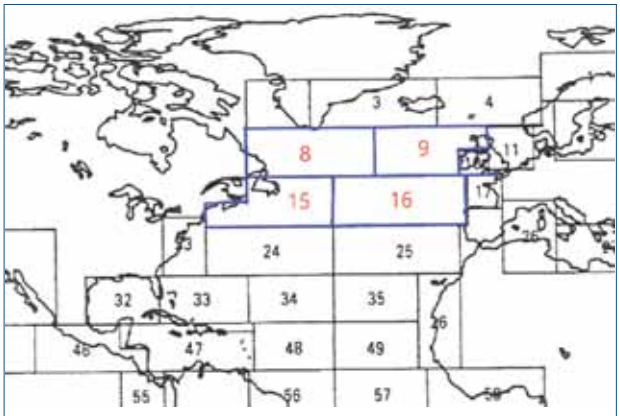


*Illustration of the northernmost zones of North Atlantic (GWS), used to determine the probability distribution of sea state occurrence.*

The traditional approach to ship safety criteria is often such that new safety regulations are triggered by casualties, which can result in the proliferation of regulations.

In reaction to this regulation culture, the IMO (International Maritime Organization) Maritime Safety Committee has developed its Goal Based Standards (GBS), which deal with the goals and functional requirements that define the required safety level for bulk carriers and oil tankers. The role of classification societies within the regime of GBS is to develop rules that transpose the functional requirement into ships.

The classification societies associated in IACS (International Association of Classification Societies) developed such rules — the Common Structural Rules for Bulk Carriers and Oil Tankers (CSR), which significantly increase the required safety level of these ships structures and which will significantly reduce the bulk carrier loses due to the hull structure failure in the future.

The CSR also provide criteria for the allowable thickness diminution of ships' hull structures which require to:

- assess local and global corrosion during the operational life of ships (the span life of 25 years is the functional requirement of GBS); and
- measure the hull structures thickness which should be assessed against the newbuilding requirements incorporating corrosion additions.

The assessment is not required during the operational life of ships, provided that the measured thickness of any structural members remain greater than the renewal thickness specified in the Rules.

This approach, determined by CSR, improves the safety of dry bulk carriers during their operation due to the appropriate regime imposed on the vessels maintenance.

Although current rules provide a high level of safety for hull structures, there are still some issues that need to be improved. The most important is the probability distribution of sea state occurrence in the North Atlantic (the North Atlantic wave environment is the functional requirement of GBS). The distribution was develop by IACS for the northernmost zones of North Atlantic through:

- fitting the theoretical distributions to the average data of zones 8, 9, 15 and 16 of Global Wave Statistics (British Marine Technology. 1986), in the first step; and then
- the use of the fitted distribution to determine the probability distribution of sea state occurrence (presented in 'IACS Rec. 34, Standard wave data').

The recommendation of International Ship Structures Congress (Lyngby, 1988) that the observed, measured or hindcasted wave data should be smoothed and extrapolated to more extreme, less frequently occurring conditions, was incorporated into the fitting the theoretical distributions.

The Global Wave Statistics wave data is based on visual observations of waves collected from ships in normal service; however, the "eye concentrates on the near, steeper waves, while the visually observed wave periods tend to be shorter than instrumentally observed periods" (WMO Guide to Wave Analysis and Forecasting).

The visual observations of waves and their extrapolation causes that long term predictions of vertical bending moments are greater by about 15% than required by "IACS Unified Requirement S11 Longitudinal Strength Standard" which well assures longitudinal strength of hull girder.

This conclusion implies that Rec 34 should be updated to reflect the reality. However, there are problems how to do that because satellite data is not fully accepted due to lack of knowledge about their accuracy. The wave hindcast data generated by the wave spectral model are global today, but there are large discrepancies in prediction offered by different databases, the measured wave data limited to the coastal areas etc.

The wave hindcast data generated by the wave spectral model seems the only way to solve the problem of wave data. However, to determine the nonlinear


*The Polish Steam Company's* DRAWNO *is a new vessel in the PRS class.*

# Cyber security threat awareness initiative wins award for GAC


*Robbie Naden, GAC's Group IT Infrastructure & Operations Manager, accepted the award at the ceremony held in Dubai.*

## GAC Group IT and Corporate Academy honoured in CIO 100 Awards

GAC's group-wide initiative to raise awareness of threats to cyber security has earned it recognition in the CIO 100 Awards for 2019.

Hosted by Tahawultech.com and Computer News Middle East magazine, the fifth annual awards honoured the top 100 C-level IT leaders from across the region, including GAC's CIO Martin Wallgren.

The group was selected for the mandatory worldwide Cyber Security Awareness course conducted through the GAC Corporate Academy last year. It tackled the threat and impact of cyber crime on the shipping and logistics industries, and outlined smart technical solutions and practices to stay ahead of the criminals.

A series of short movies under the slogan 'Think Before You Click' created an easy-to-follow and engaging programme covering scam emails, social engineering, smart and secure passwords, identity and personal information theft, the risks of social media, and more.

More than 4,000 GAC employees worldwide were invited to take the course and after just six weeks, 94% had completed it and provided positive feedback.

"The direct result was that we succeeded in giving our staff greater awareness and we lowered the risk for our company," says Wallgren. "This project has a high business value that mitigates risk and protects our customers' data."

## About GAC Group

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Established since 1956, the privately-owned group employs over 9,000 people in more than 300 offices worldwide.

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energy transfer through the wave spectrum it is necessary to solve strongly non-linear wave problem derived by prof. Zakharov in 1968.

Simplifying assumptions introduced allowed for better understanding of the physics at the cost of a strict mathematical solution. Despite the simplifications introduced, the evaluation of the nonlinear energy transfer, caused by four resonantly interacting waves, requires an enormous amount of computation of integrals in six-dimensional space. Therefore, the proper solution of this problem still is a challenge for the industry.

PRS collaborates with professors of mathematics from Gdansk University in solving the problem in a strict mathematical manner. At this stage, PRS is testing the solution of the problem for first, second, third (and so on) order of nonlinearities.

JOTUN

Jotun Protects Property

# WANT TO REDUCE YOUR CLEANING AND REPAIRS?

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# Saving vessels from piracy with Guardian Maritime's ship-protection system

Piracy at sea has been a problem for hundreds of years. In recent years piracy 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. It is also highly effective for use on static installations such

Guardian Maritime's solution is a fit-and-forget, passive, sustainable and recyclable anti-piracy barrier system. The GUARDIAN™ system has been in constant use for over five years with no degradation in safety or effectiveness, thus casting no doubts on Guardian Maritime's original five-year warranty and the durability of the product.

GUARDIAN™ has protected over 100 mariners from direct pirate attacks. Not only did these mariners return to their families unharmed, but this also saved the client potentially billions of dollars in lost revenues.

As a new feature, GUARDIAN™ is now available as a 'self-install' option allowing crews to carry out the installation during transit. 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. Clear instruction will be provided by the specially filmed installation videos and bespoke support direct from Guardian Maritime to give the crew enhanced confidence in the simple installation.

## Innovators not imitators

Guardian Maritime Ltd has now been protecting vessels for many of the world's largest blue-chip shipping companies for seven years.


# MODERN CLASS FOR SMARTER OPERATIONS

Today's market needs smarter solutions – and a modern classification partner. Find out how our modern classification solutions can turn possibilities into opportunities – and make your operations safer, smarter and greener.

Learn more at **dnvgl.com/maritime**

No vessel with Guardian installed has ever been successfully boarded by pirates — there have been five attacks and many approaches by suspicious skiffs who have looked at Guardian *in situ* and not attempted to try and board,

The installation is simple and easy: the crews themselves can install, which encourages them to take a productive step to protect themselves and their vessels,

The feedback received by Guardian Maritime is that the crews find it very safe to use with none of the injuries associated with razor wire, which in turn cuts down the need for hours away from their duties in the sick bay and the also the need for writing injury reports by the safety officer on board,

The purchase and installation of Guardian is a highly effective and cost-conscious way of protecting vessels.

The compound used to produce Guardian Barriers is the very best, and is safe to use in all weathers and range of temperatures as it is fire retardant and resistant to axe blows.

Due to its innovative design and compound it is almost impossible to climb over and has never been breached.

It has been thoroughly tested by ex-royal marines, SBS, and other special forces,

Guardian Maritime has recently been awarded several large contracts with some of the largest shipping companies and is looking forward to raising the profile of Guardian.

Guardian Barriers is leading the anti-piracy battle in protecting vessels cargo and crews to the value of $98 trillion, and crews go home after their tour of duty to their families.

Shipping companies are not having to pay enormous ransoms and negotiate with pirates for the return of their crew and vessels.

# Alfa Laval PureSOx scrubber systems – ten years at sea

The arrival of 2019 leaves just one year until the global sulphur cap becomes reality. But as the marine industry scrambles to ready itself, an important milestone has already been reached. The new year marks a decade since the first vessel set sail with an Alfa Laval PureSOx scrubber on board.

In 2009, the RoRo vessel DFDS *Ficaria Seaways* entered dry dock for an expansion of its cargo space. While the vessel was being rebuilt, a hybrid PureSOx system — able to perform closed-loop as well as open-loop scrubbing — was retrofitted to clean the exhaust gas from its 21MW main engine. At the time of the pilot installation, the prospects for SOx scrubbers were anything but certain.


*The very first PureSOx system was installed on board the* DFDS Ficaria Seaways.


*Alfa Laval PureSOx.*

"Ten years ago, there were many who didn't think SOx scrubbers were feasible," says Erik Haveman, Sales Director, Exhaust Gas Cleaning at Alfa Laval. "People simply weren't convinced that a scrubber could meet ECA limits while operating in a marine environment, and the doubts about closed-loop scrubbing were even greater. Alfa Laval had sold scrubbers as part of inert gas systems for many years, and we had the water cleaning expertise needed for closed-loop operation. But the system and the challenges here were on a completely new scale."

A decade later, the merits of both the scrubber and the centrifugal water cleaning unit are undeniable. The PureSOx system on Ficaria Seaways has spent thousands of hours in compliant operation — and is still going strong. In fact, so is every other PureSOx system ever installed. This flawless track record is unmatched by any other supplier to the industry, and it is underpinned by Alfa Laval's 100 years of marine experience as a whole.

## From theory to experience

"The ten-year mark is an important milestone for Alfa Laval, but it also holds weight for customers facing the global sulphur cap," Haveman says. "It means that our claims about PureSOx are not theoretical, but have been proven at sea, time and time again." Over the past ten years, PureSOx has been installed on vessels of nearly every type. This experience is valuable in the current wave of retrofits, where limited space demands practical answers. Alfa Laval has found solutions not only to vessel complexity, but also for the complex process of working with shipyards, engineering companies and the other partners involved.

*Installing the very first PureSOx system on the* DFDS Ficaria Seaways.

## Positioned today to meet the future

Alfa Laval also has a head start in production capability, even if the global sulphur cap has led to a spike in demand. Having developed a well-functioning production apparatus in the early years of the scrubber market, the company has since been focused on scaling up with retained quality. The vital processes and routines are already in place, along with the physical capacity to machine the large metal components.

Perhaps more important, however, is the head start Alfa Laval has in scrubber services and optimization. Having followed dozens of PureSOx installations, on widely differing vessels and in widely varied conditions, the company has amassed a significant body of working knowledge.

That knowledge has been packaged into a well-defined PureSOx service offering and is now being applied in new ways — such as helping customers optimize their systems through scrubber connectivity.

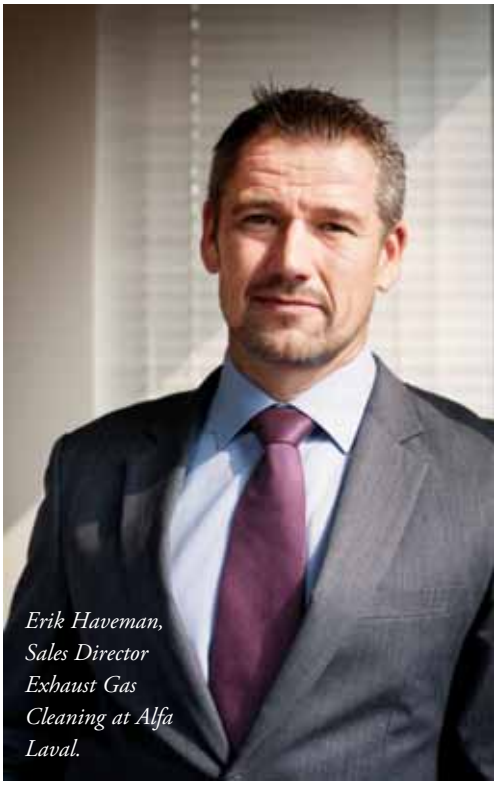
"With our PureSOx Connect offering, we're entering the next phase even as other suppliers are just entering the market," says Haveman. "A decade ago, our pilot PureSOx installation was the cutting edge. Today, we're pushing the boundaries for exhaust gas cleaning on a fleet scale."

## About Alfa Laval

Alfa Laval is a major global provider of specialized products and engineering solutions based on its key technologies of heat transfer, separation and fluid handling. The company's equipment, systems and services are dedicated to assisting customers in optimizing the performance of their processes. The solutions help them to heat, cool, separate and transport products in industries that produce food and beverages, chemicals and petrochemicals, pharmaceuticals, starch, sugar and ethanol.

Alfa Laval's products are also used in power plants, aboard ships, oil and gas exploration, in the mechanical engineering industry, in the mining industry and for wastewater treatment, as well as for comfort climate and refrigeration applications.

Alfa Laval's worldwide organization works closely with customers in nearly 100 countries to help them stay ahead in the global arena. Alfa Laval is listed on Nasdaq OMX, and, in 2017, posted annual sales of about SEK 35.3 billion (approximately €3.6 billion). The company has about 16 400 employees.



*Erik Haveman, Sales Director Exhaust Gas Cleaning at Alfa Laval.*

# Optimized for large flows

## New 1500 m³/h UV reactor for PureBallast 3

Alfa Laval PureBallast 3, the third generation of the leading ballast water treatment technology, is now even more optimized for large ballast water flows. A new 1500 m³/h reactor enables large-flow systems with less cost and complexity – and all the advantages that chemical-free UV treatment has over electrochlorination.

Discover the big difference at www.alfalaval.com/pureballast

www.alfalaval.com

# The growing debate on scrubbers: keeping options open

*Yara Marine scrubber in the workshop.*

## When your scrubbers cannot be open, your options need to be

A growing number of countries and regions around the world are introducing bans on open loop scrubbers that utilize seawater in the exhaust cleaning process. What are the ambitions behind the bans, what are the consequences for stakeholders along the entire value chain, and what are the options?

Yara Marine Technologies R&D Manager Shyam Thapa examines the facts behind the debate: "Some studies have shown that open loop bans have no real environmental impact, while others maintain that the effects of wash water on marine life have yet to be assessed or may even be harmful."

Regardless, he says, there are different reasons for enacting bans. Open loop scrubbers do not perform effectively in water with low alkalinity, such as rivers and inland waterways. "In these areas, systems supplying alkali in a closed loop are required, so open loop bans are largely formalities."

Some private ports are also enacting open loop bans, but Thapa observes that this may often be for reasons other than environmental concern. He believes that a combination of 'want to' and 'need to' is a likely future scenario on open loop scrubber bans, with flexibility being the common key to ensuring compliance and unrestricted operations.

Yara Marine manufactures both open and closed loop exhaust scrubber systems, and hybrid scrubbers capable of operating in either mode depending on applicable geographical regulations. "Open loop is still viable for 80–90% of global marine transport," Thapa points out. "Our estimates for hybrid solutions assume maximum 15% of operation time using closed loop mode. But if the vessel is operating in waters where open loop is forbidden, owners either need to be able to operate the scrubber in closed mode or switch over to alternative fuel."

## Being scrubber smart

For those still pondering their options, Thapa is sympathetic. "I think the main thing is to emphasize that the overall picture is more complex than what is presented in the media. There are many factors in the calculation, and each case is different. There is no blanket solution for every situation."

He notes that vessel-specific considerations and trading profiles will determine the choice of solution for many, venturing that the spread of open loop bans could influence more owners to choose hybrid solutions in order to ensure flexible operations for the life of the vessel.

Thapa assures that those choosing Yara Marine will benefit from a simple, light and efficient solution. The Yara in-line system has no internal moving parts, and Yara's magnesium oxide technology is cheaper to operate and maintain and safer than systems requiring caustic soda.

## Strengthening research efforts

International research continues into the effects of scrubber washwater discharge to the sea.

Several major shipowners have been collecting data from their own fleets as well, and all will have to be considered before consensus can be reached on the ultimate consequence of open loop scrubbers for marine environments.

For its part, Yara is involved in an ongoing research project with Chalmers University of Technology to combine SOx and NOx gas cleaning in a single system. The project is also investigating possible industrial uses for exhaust sludge. The results could be applicable for both marine and land-based applications, giving the project wider environmental significance. Yara is also working intensively to solve the issue of particulate matter (PM) from combustion processes. The goal is to reduce harmful PM smaller than 2.5 micron by more than 95%.

Yara Marine Technologies CEO Peter Strandberg encourages further investigation into scrubber options, supported by more hard facts: "We want to see more independent research to move the debate forward, and we invite owners and operators who are uncertain about the best scrubber solution for them to contact us. With our flexible technology, Yara Marine can help owners and operators comply, whatever the abatement requirement."

# Alfa Laval expands its PureBallast 3 training programme with three new sites for crew training

Compliance in ballast water treatment depends on crew knowledge as well as the ballast water treatment system itself. To help customers secure the needed competence, Alfa Laval is expanding its Alfa Laval PureBallast 3 training programme with crew training in Houston, Manila and Mumbai.

*Computer-based training.*

Alfa Laval will begin PureBallast 3 crew training courses in Houston, Manila and Mumbai during the first and second quarters of 2019. The strategically located sites complement Alfa Laval's state-of-the-art facility in Stockholm, forming a network of training locations to serve the needs of customers worldwide.

"Training is integral to success in ballast water treatment," says Anders Lindmark, Head of Alfa Laval PureBallast. "Marine authorities have made clear that a lack of crew knowledge is not a valid reason for non-compliance. So besides providing crew training on board and online, Alfa Laval is making convenient courses available where our customers do business."

*Martin Melin, Technical Communicator.*

No matter which of the three sites they choose, customers can expect well-equipped facilities that are modern and purpose-designed. Likewise, they will encounter knowledgeable and experienced instructors, ready to share insights and best practices developed over years of hands-on work with ballast water treatment.

Lindmark points out that training is more than a matter of system knowledge. "PureBallast 3 is designed for ease of use, which means crews can quickly learn its operation and maintenance," he says. "However, ballast water treatment is still a relatively new application. For crew members to get it right, they need to understand not only how, but also why and when the ballast water treatment system should be used."

"Simply put, Alfa Laval crew training will help customers ensure safe, correct and efficient operation of their PureBallast 3 systems," Lindmark says. "By leading to optimal system use, it will safeguard their investment and their compliance."

### About Alfa Laval PureBallast

PureBallast, which was the first commercially available ballast water treatment solution, is a chemical-free technology sold and serviced by Alfa Laval. A vital component of PureBallast is the enhanced UV reactor, which was developed jointly by Alfa Laval and Wallenius Water based on Wallenius Water technology. All PureBallast systems are available with both IMO and US Coast Guard type approvals.

# Ultrasonic testing helps improve safety at sea

Founded in 1983, Cygnus Instruments Ltd is a UK manufacturer of high-quality ultrasonic testing equipment. For the bulk carrier, Cygnus prides itself on making high quality ultrasonic thickness gauges (UTGs) and leak detectors that are entirely focused for the job in hand — and that are both highly ruggedized and simple to use.

### Thickness measurement

At Periodical Survey, it is a Class requirement to carry out overall examination and thickness measurement of hull structures. With almost 40 years of close involvement with the marine inspection industry behind them, the team at Cygnus provide the industry with a small, dedicated range of UTGs that are entirely designed for the task.

Central to Cygnus' place in the marine inspection industry was the company's development and pioneering of the 'multiple echo technique'. This is an ultrasonic technique that utilizes three back wall echoes to verify and error-check thickness readings. At its core, Cygnus' multiple echo technique is extremely accurate and will ignore all coatings. IACS' procedural requirements document URZ17 (IACS Req. 1997/Rev.13 2018) states that wherever there are coatings present during the vessel inspection, the multiple echo technique must be used. With the ever-increasing proliferation of coatings used in the marine industry, Cygnus has cemented

*Cygnus 4+ ultrasonic thickness gauge.*

its position as the number one choice for Class-Approved thickness measurement companies around the globe.

Taking a closer look at the equipment itself, Cygnus offers several options for bulk carrier, marine and shipping inspection. The Cygnus 2 and Cygnus 4 units use the required multiple echo technique — and will ignore coatings (up to 20mm thick) with no special technique or set up required.

The Cygnus 2+ and 4+ units also have single echo (SE) and echo-echo (E-E) modes (as well as multiple echo); the use of a range of twin crystal probe with SE and E-E modes adds flexibility to the units, and allows measurements to be taken in areas of extreme corrosion.

The Cygnus 4+ unit will also record (data-log) readings at the single press of a button; measurements can then be downloaded in to Cygnus' easy-to-use software – or simply export in to Excel (as a .CSV file). The 4+ unit also features a live A-Scan and manual gain control to round out an exceptionally comprehensive UTG for bulk carrier inspection.

Drawing on its extensive experience in the market, it is natural that the Cygnus UTGs are very well designed. With environmental sealing to IP67 – US MIL STD 810G, all the units are waterproof, drop-proof and shock proof in order to cope with the very tough environment they will be used in. And the probe housings and cables that are made by Cygnus are exceptionally robust and durable too.


*Cygnus MK5 ultrasonic thickness gauges.*

## Hatch cover inspection

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 other 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. 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. 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 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
- time consuming.

*Cygnus Hatch Sure hatch cover leak detection system.*

Ultrasonic testing 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 potentially 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.

While ultrasonic hatch cover testing has been available since the 1980s, Cygnus 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 × 40KHz 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.

The Cygnus Hatch Sure system is comprised of two main components: a powerful ultrasound transmitter with 19 × 40 KHz elements and a hand-held receiver. Designed for ease of use and powered by standard rechargeable batteries, the whole system is extremely light and aircraft-friendly for passenger cabin transportation.

*Ultrasonic hatch cover testing.*

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 hatch 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). DCi

# The Port of Sept-Îles welcomes its first ship of the year

The *Frontier Voyager*, a Panama-registered vessel, sailing from Kimistu in Japan, was the first ship to arrive in Sept-Îles this year at 3p.m. on 9 January 2019. The vessel arrived in ballast and set sail again on 22 January with 170 000 tonnes of iron ore from IOC Rio Tinto Mining Company destined for Rotterdam in Holland.

During a short ceremony, Pierre Gagnon, President and CEO of the Port of Sept-Îles, presented Captain Paeg Sung Hon with the prestigious cane bearing the Port of Sept-Îles insignia.

Several gifts were also offered to the Captain by Réjean Porlier, Mayor of the City of Sept-Îles, as well as by Benoit Méthot, General Manager Port and Railway QNS&L, IOC Rio Tinto Mining Company, by Lucie Lessard, Chairman of the Seamen's Center, by Pierre Côté, Chairman of the Port of Sept-Îles and by Pierre Gagnon, President and CEO of the Port of Sept-Îles.

This tradition, now in its 32nd year, marks the arrival of the first ship of the year to call the port.

To be eligible, the vessel must come directly from a foreign port and be bound for a destination outside the country without making any other calls at a Canadian port.

## About the Port of Sept-Îles

Boasting diverse, state-of-the-art facilities, the Port of Sept-Îles is one of North America's largest ore-handling ports, with an expected volume of more than 30 million tonnes in 2019. The port facilities at Sept-Îles play a vital and strategic role in the economy of Eastern Canada. Annual economic impacts are estimated at nearly $1 billion and almost 4,000 direct and indirect jobs.

# ABP Hull marks dry bulk milestone

The Port of Hull in the UK has recently celebrated a milestone, completing the largest shipment of wood pellets ever handled at ABP's Dry Bulks Terminal.


*Making history: the Hull Dry Bulks Team successfully discharges 30,000 tonnes of wood pellets from the 200-metre-long* Isadora *vessel.*

The ABP operations team successfully discharged nearly 30,000 tonnes from the 200 metre *Isadora* vessel, destined for the Drax Power Station in Selby. The shipment will generate enough sustainable electricity for almost 18,000 homes for a year.

Fully complete in over 77 hours (including stoppages), the weather-sensitive cargo of compressed wood pellets was directly loaded to lorries and the remainder of stock is stored in the state-of-the-art 26 Shed.

ABP Humber Director, Simon Bird, said: "It's important to work in partnership with our customers to enable to them to grow and achieve fundamental business objectives.

"Our highly-skilled teams and continuing investment in infrastructure are vital factors in ensuring we can always offer the best possible services to our customers."

The Port of Hull is home to a dedicated rail-load-out facility for Drax and in 40 minutes it can load a train with 1,600 tonnes of wood pellets. Up to 17 biomass trains per week can deliver fuel to Drax from the Port of Hull.

Drax Head of Logistics, Mark Gibbens, said: "Developing a supply chain able to deliver the sustainable biomass in the quantities required was central to us being able to convert two thirds of the power station to use biomass instead of coal, transforming the business to become the largest decarbonization project in Europe.

"We have supported investment of £300m in our port facilities and our operations support 5,700 jobs in the supply chain in the north and contribute £600m to the region's economy. The Port of Hull is an important part of the Drax supply chain, and continues to handle biomass for us in a safe and reliable manner."

The terminal is seeing increased business, and 2018 saw a strong performance with the UK's foremost crop production and grain marketing business – Frontier Agriculture.

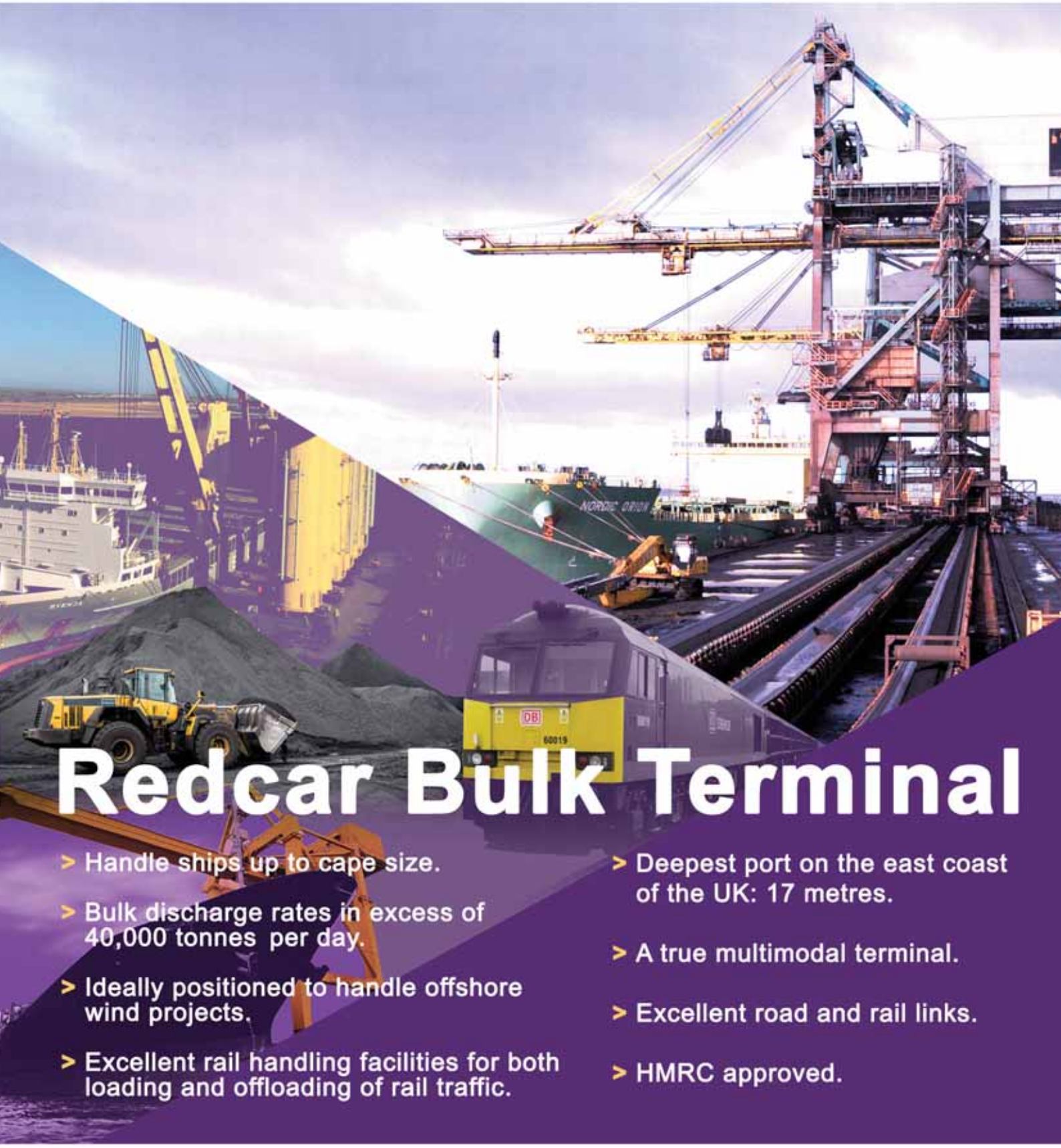
Frontier Agriculture Operations Director, Richard Pollard, said: "Access to efficient import and export services is important to us as it enables us to manage the grain supply chain effectively for our farmer and grain consumer customers.

"ABP has provided vital support to this aspect of our business; handling up to three times more throughput than planned last year and at times exceeding the expected tonnes-per-hour performance rate by up to 50%."

Other significant terminal investments include the introduction of the new in-house haulage team and state-of-the-art tipper trucks in July 2018.

RBT

Logistics Tees Valley



# Redcar Bulk Terminal

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# Great Yarmouth powering the winds of change

Offshore wind is a British success story on a grand scale, thanks to UK-led innovation, and the combined efforts of industry and government, *writes Richard Goffin, Port Director at Peel Ports Great Yarmouth*.

The launch of March 2019's new joint government-industry Offshore Wind Sector Deal will help further position the UK as a global leader in clean growth, with a third of British electricity to be produced by offshore wind power by 2030.

Under the Sector Deal the industry plans to invest £250 million to develop the country's supply chain, ensuring that it can deliver an expected fivefold increase in global exports to £2.6 billion by 2030.

At the epicentre of this visionary industrial strategy is the East of England, which provides the perfect mix of physical and locational characteristics such as shallow waters, consistent wind speeds and proximity to key UK and European port locations, creating a favourable environment for offshore wind production. One such port location is Peel Ports' Great Yarmouth, which has fast established itself as one of the UK's foremost offshore energy port, with more than 50 years of experience supporting the sector.

Since taking ownership of Great Yarmouth in 2015, Peel Ports has made a series of significant infrastructure investments, which have enabled exponential growth and opportunities for the offshore renewable, oil and gas and decommissioning sectors.

Peel Ports' current £12 million investment has included outer harbour upgrades to create a supply base for offshore wind farms, and investment in new cranes in-river and in the outer harbour, which has increased its operational efficiency and capacity for unitized, non-unitized and bulk cargoes for all commodities, including offshore.

Now, as part of the East of England's role in the new sector deal, further investment in Peel Ports' port infrastructure is key in supporting offshore wind farm development through preassembly, construction, installation and operations and management (O&M).

Peel Ports is planning further significant expansion at the outer harbour to create a centre of excellence for O&M, including 350m of extra berthing space and about 100,000m$^2$ of additional land. These facilities will include an extended quayside space with deep-water access, training facilities and sufficient land to accommodate manufacturing facilities linked to the offshore energy sector.

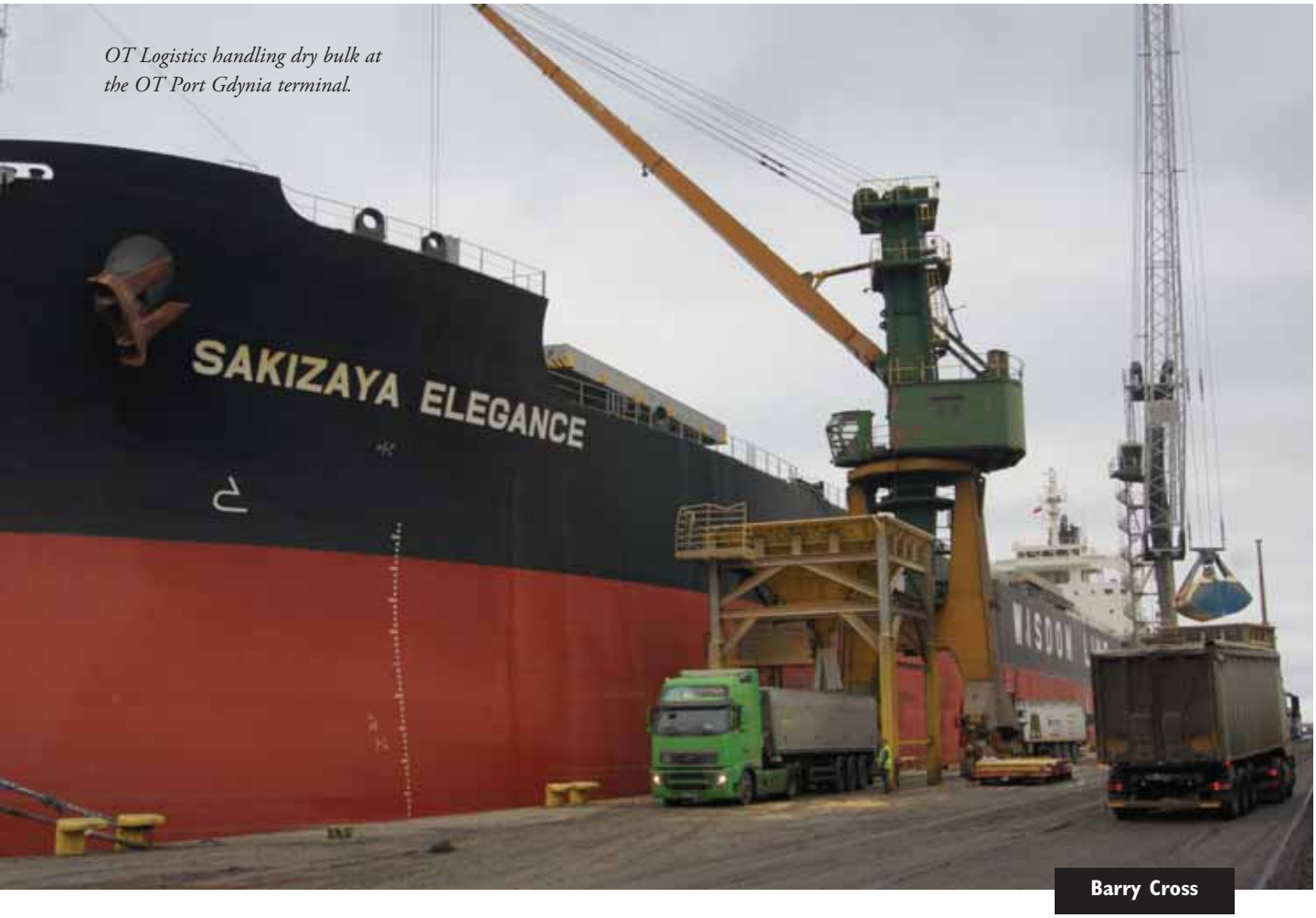
Today, nearly 4GW of offshore wind power is operational off the East of England, accounting for 52% of the UK's current 7.5GW installed capacity.

With Peel Ports' involvement and other businesses across the region, the cumulative capacity in operations and development off the East of England is 14.5GW, enough to meet approximately half of the Sector Deal ambition for 2030.

Offshore wind will play a crucial role as the energy sector continues to shift its focus towards low-carbon power. With Peel Ports' current and future plans for investment at Great Yarmouth, it is hoped to drive the region's position as a leading centre for the UK's clean energy sector in an opportunity that is worth £59.4bn by 2040.

# Polish ports continue to break records

## as coal boosts throughput tonnage in 2018




*OT Logistics handling dry bulk at the OT Port Gdynia terminal.*

**Barry Cross**

Ports in Poland are experiencing something of a renaissance, in part, driven by significant European Union (EU) funding, which aims to bring them up to the same level as ports in north-western Europe.

The port authorities have seized hold of these investment opportunities and now many of them feature state-of-the-art handling facilities for dry bulk, with infrastructure upgrades making it possible for them not only to accommodate larger bulk carriers, but also turn them around in ever faster times, as quayside productivity grows.

Unsurprisingly, therefore, many ports are posting record figures for total tonnage handled, even though not all dry bulk commodities continue to grow. For 2018, however, there was one notable exception: coal traffic showed considerable growth, as a cold winter boosted domestic demand and sucked in imports.

Grain, for its part, seems to have had a more difficult time of it during the past year.

The importance of the Port of Gdansk cannot be underestimated in Poland. In 2018, for example, it handled half of all the country's port traffic and is on the verge of becoming one of the largest of all the Baltic Sea ports. Indeed, during the year, it overtook Klaipeda to become the fourth-largest regional port.

"Our goal for 2019 is to advance to third position. Currently, it is occupied by Russia's Primorsk, where over 53mt [million tonnes] have been transshipped with a 7% drop in dynamics. I am convinced that with such an effort the Port of Gdansk will be on the podium next year," says Lukasz Greinke,the President of the Port of Gdansk Authority,

The year 2017 had been a record one, with total traffic handled of 40.6mt, this being the highest volume ever reported for

*Coal throughput at the Szczecin-Świnoujście Port Complex increased by a staggering 61% in 2018.*

one of the country's ports.

But in 2018, the port broke its own record, with traffic of 49mt, which was an increase of 20.7% and a national record for the year.

"Last year, our contractors transshipped 9mt of goods more than in 2017. They did so not only using the old infrastructure, but also during the ongoing construction work on the whole port territory," says Greinke, adding that the final figure for the year had been 17% above budget.

Coal had an absolutely fabulous year. In total, Gdansk handled 7.2mt of this commodity, 41% more than last year. General cargo also rose by 18% to 21.5mt.

Aggregates also performed well, closing the year with 3.9mt handled, which was 14% better than in 2017.

The performance of Gdansk is even more remarkable when grain is focused on. In 2014, the port handled a remarkable 1.629mt, the highest figure in recent years, only for volumes to shrink thereafter. So, in 2017, 774,169 tonnes were handled, dropping to just 559,007 tonnes last year, a decrease of 27%.

In 2018, OT Logistics handled 6.5mt of dry bulk cargo at its two Polish terminals: OT Port Świnoujście and OT Port Gdynia. This represents an 18% increase over 2017.

Karol Bowżyk, the company's Ports Division Director, says that 2019 should record a further increase in bulk cargo volumes, in particular in coal imports.

"Taking into consideration ongoing railway and road investments, aggregate imports may also attain a higher level. We expect around a 15% overall increase compared to the previous year," he says.

In terms of commodities handled, he says that, between them, the OT terminals in Gdynia and Świnoujście are responsible for coal, coke, ores, pet coke, biomass, grain, soya bean meal, aggregate, and fertilizer.

"Around 70% of this cargo tends to be imported," he says.

Berths in both terminals are equipped with both ship-to-shore and mobile harbour cranes with a lifting capacity of up to 120 tonnes. In addition, the company also operates bulk gantry cranes.

"For bulk cargo handling, we use grabs with a capacity of up to 26 cubic metres. We also have technological lines incorporating hoppers and belt conveyors that connect storage yards with the berths," he adds.

Rail is the primary source of transport for both inbound and outbound commodities at OT Logistics's two terminals. In terms of dry bulk, approximately 80% is served by rail.

"Our clients include coking plants, co-generation power plants and steelworks, which have railway sidings. For them, railway transport provides optimal transport costs," says Bowżyk.

OT Logistics is also an added value service provider for dry bulk cargo, including offering warehousing in both open storage areas and covered warehouses; the blending, crushing and sorting of coal; and the bagging of fertilizer.

"At Świnoujście, we have the deepest draught, of up to 13.5m, which allows us to handle Panamax vessels. Most bulk cargo is transported to our terminals using vessels ranging from 50,000dwt to 80,000dwt," he says.

Productivity on the quay is very good. OT Logistics says it can achieve loading rates of up to 25,000 tonnes per day and unloading productivity of up to 20,000 tonnes per day.

Finally, asked about competition, Bowżyk says that OT Logistics has a lot of competitors in Polish ports.

"Customers choose our terminals because we guarantee a high quality of service, substantial storage possibilities (for example, up to 1mt at Świnoujście) and good productivity. We are additionally able to offer the entire logistics process using our capital group assets, such as rail, barge and forwarding," he says.

The Szczecin-Świnoujście Port Complex, in Poland, is another that reported record cargo handing volumes in 2018. Combined, the two ports handled more than 28.6mt, an increase of 12.5% compared to 2017. The previous record was posted in 1979, when 26.697mt was handled.

In terms of dry bulk, this amounted to

10.486mt, up 22.3% over the previous year.

Of all the commodities handled, coal did best, increasing by 61%, which was followed by fuel, which went up 18%. According to the port authority, strong economic growth within Poland was the main reason for the buoyant figures, since the rapidly expanding economy triggered higher demand for energy resources and raw materials for the production of steel.

There were also increases in "other bulks", which went up by 10%, thanks to increased traffic in fertilizer, aggregates, methanol and sulphuric acid. Breakbulk also did well, rising by 4.4%.

On the down size, grain performed badly, dropping by 25.1%.

"Results attained by our ports was the effect of the synergy between action taken by the port authority, on the one hand, and the operation of port-based companies on the other," noted Dariusz Słaboszewski, CEO at Szczecin-Świnoujście Seaports Authority. "Moreover, the Polish economy was rapidly growing as reflected by imposing port cargo handling statistics. The results are motivating us to continue promoting further growth in the ports of Szczecin and Świnoujście."

According to the latest BIMCO report, Szczecin-Świnoujście has been recognized as the best port of 2018 for quality of service for vessels engaged in the carrying of dry bulk.

**COAL TRAFFIC**

| Year | Import | Export | Total |
|---|---|---|---|
| 2015 | 944,600 | 2,175,200 | 3,119,800 |
| 2016 | 771,500 | 2,159,300 | 2,930,800 |
| 2017 | 924,700 | 1,214,300 | 2,139,000 |
| 2018 | 2,262,800 | 1,177,200 | 3,440,000 |

Forecasts for 2019 suggest that around 30mt of cargo will have been handled by the end of the year. However, the port authority cautions that the market situation can fluctuate and certain factors may remain outside the control of the many stakeholders in the port, and that these may impact on volumes.

Karolina Bierdzinska, the ports' Business Assistance Manager, reveals that the 2019 traffic forecast factors in a reduction of Polish export coal and a reduction in imported iron ore, with 9.811mt expected to be the end—of-year total.

She says that the trend across both ports is one of seeing more imports of dry bulk and fewer exports. More than 34% is now exported, being mainly coke. In 2018, imports amounted to 8.025mt, which was a 38.8% increase compared to 2017. In contrast, export dry bulk fell 12% to 2.460mt.

Poland has long been associated with coal traffic, however the overall pattern continues to evolve, with exports last year being particularly of note, as can be seen from the table.

The rapid growth being experienced by the ports of Szczecin and Świnoujście is being supported by large-scale EU-funded investment project. In total, in 2007–2020, the value of completed and planned projects has been estimated at nearly €480 million. The priority of investment has been to improve access to the ports and enhance transport handling quality. For this purpose, new quays are being built and existing ones modernized to handle larger vessels. Projects scheduled in the 2014–2020 EU budget period include, the extension of port infrastructure in the bulk and break bulk cargo handling areas in the port complex.

As part of the last EU finance plan (2007–2013), Szczecin-Świnoujście rebuilt its road and rail infrastructure in order to improve the quality of services offered by its stevedoring companies.

In respect of rail upgrades, 35,927 metres of track and 134 level crossings

*Grain handling at Szczecin.*

were either restructured or modernized.

"The total length of rail infrastructure in the ports of Szczecin and Swinoujście currently amounts to 73.5 kilometres of tracks and 198 track intersections," says Bierdzinska. "In 2018, 45% of cargo was transported by rail, 45% by road and 3% by barges, the rest being moved by pipeline. 100% of coal, coke and ore was moved by rail."

As for relatively new dry bulks, in 2018, 75,900 pallets were handled by the two ports, along with 40,800 tonnes of woodchip.

The port authority has also been working with the various port companies to attract new cargo and this includes possible new port infrastructure. The investment plan for Szczecin and Świnoujście in 2014-2020 is in the region of $393 million. Part of this is to be invested in modernizing quays in Szczecin in the area around the Dębicki Canal and Kaszubski Basin. These will be upgraded to meet requirements of the Świnoujście-Szczecin fairway, which is to be dredged to 12.5 metres. In Świnoujście, a new ferry terminal will be built to handle intermodal transport, and new deep water quays will be built.

In the near future, other organizations are going to invest in port access infrastructure, which includes the dredging and modernization of the Świnoujście-Szczecin fairway to 12.5m, extension of the S3 expressway, modernization of railway links, and the improvement of the navigation capacity of the Oder Waterway.

"All the above mentioned activities are designed to enhance competitiveness of the Szczecin-Świnoujście Port Complex," notes the port authority, which hopes that this will include growing volume of cargo handled year on year.

Asked about how much of the bulk handled by Szczecin-Świnoujście was effectively captive to those ports, Bierdzinska points out that dry bulk has long accounted for the largest segment of the overall tonnage handled. This includes coal, ore, grain and other bulk, such as aggregate, woodchip, fertilizer and tar.

"The main goal of our strategy is to preserve the universal nature of the two ports, allowing them to handle both bulk and general cargo. Nevertheless, we expect to handle more than 9.5mt of dry bulk each year, which is around 37% of total turnover. In addition to that, we also handle around 4.8mt of liquid bulk (16%), which means around 53% of total cargo is either dry or liquid bulk."

Finally, in respect of environmental control, she points out that bulk handling stevedores use both modern sealed cargo handling equipment and follow appropriate procedures for loading and handling dusty goods.

"Dust pollution is kept to a minimum by using approved procedures. Loads, depending on the recommendations of the operators/producers, are protected from the weather or stored in sheltered areas or covered warehouses. The storage areas are equipped with devices that pre-treat rainwater discharged from these areas to surface waters, thanks to which both soil and water are protected against the discharge of harmful substances into the environment," she says. DCi

*New agro warehouse at Świnoujście.*

# The new Mantsinen 60 is compact, yet strong and smart

## Setting new standards for medium size material handling machines

While the trend on the market tends to be 'go big or go home', the Finland-based material handling machine manufacturer Mantsinen Group Ltd Oy swims against the tide. Mantsinen already launched the world's largest material handling machine — Mantsinen 300 — two years ago and paved the way for evolution on the market. Mantsinen is well known for 'from bigger to smaller' approach for its large-scale large-capacity machines and Mantsinen 60 will forge ahead the approach by setting new lifetime expectancy for material handling machines in 60–70-tonne category.

"We have an outstanding offering for large-capacity machines, and now we are aiming to offer our clients something more targeted and tailored for especially round-wood and scrap handling," Tapio Pirinen, Vice President for Mantsinen Material Handling Machinery explains.

Indeed, nowadays more is not necessarily more in material handling, but the key factor seems to be the combination of optimal features for the task at hand and

long lifetime expectancy for the machine. The Mantsinen 60 carries all the operation-proven Mantsinen qualities in a condensed package. Combining agility, intelligence and strength, the Mantsinen 60 also comes equipped with the Mantsinen Telematics Systems (MTS) as standard, and it is optimized for mid-scale material handling. - "We want to offer operation-specific solutions for our customers," Pirinen says.

For Mantsinen the main advantage compared to its competitors is its strong experience in hands-on material handling. That gives the company a head start in both machine and attachment R&D and consulting sales. "It can't be denied, that an industry-specific practical know-how is a great asset in our line of business. For example, when it comes to round-wood, through our own Logistics Services – business unit, the company possesses in-house experience of handling over 500,000,000m$^3$ over the years, which creates unbeatable foundation to our proposals. We know exactly which specific demands and challenges our clients face, and we can offer solutions to their challenges," Pirinen concludes.

The new Mantsinen 60 can be seen live in Bauma 2019 in Munich from 8–14 April.

## Strong link in the global logistics chain

Mantsinen provides efficiency, speed and capacity for its customers in global logistics chain, operating with heavy and basic industry raw materials and semi-finished products.

# Liebherr's LRS Log Handler to make its début

For the first time, a machine from Liebherr's maritime division will be presented at the Bauma exhibition in Munich. The Liebherr LRS Log Handler has already convinced selected test customers with its remarkable performance.

From the 8–14 April 2019, the Liebherr LRS Log Handler will be presented to the public for the first time at the world's largest construction fair, the Bauma in Munich, Germany.

The Log Handler showpiece will receive a prominent position on the so-called Bauma Boulevard. The agile timber-handling machine marks the first appearance of a Liebherr maritime division machine at Bauma so far.

## The LRS in Log Handler-Version

The main field of application of a log handler is the fast, manoeuvrable and, in particular, mobile transport of logs within industrial plant premises and timber handling terminals.

Especially in wood-processing companies such as sawmills, paper or pulp mills, but also for transshipment in ports and inland ports, the Liebherr Log Handler is considered to be a robust, reliable and powerful machine.

At this stage, several test devices have already demonstrated their capabilities to selected customers. The LRS LH was particularly convincing with its impressive

*Unloading of a wood transporter by the reachstacker LRS Log Handler.*


*The LRS Log Handler handling timber on a sawmill site.*

# at Bauma 2019


grapple capacity of 8.2m² and an unprecedented load curve. The working area of the machine is characterized by a stacking height and an outreach of over eight metres each.

The new Liebherr Log Handler combines all the advantages of the well-known LRS series for container handling, with a wide range of modifications specially designed for timber handling. Thanks to numerous parallels to the common reachstacker, the construction of the new device was able to benefit from the company's wide experience. In addition, the Log Handler — like all Liebherr-Reachstackers — is equipped with a stepless, hydrostatic drive. It is characterized above all by reduced fuel consumption and excellent driving performance.

## Hybrid Power Booster

The Liebherr Pactronic® hybrid drive system fitted as standard in the Log Handler enables a temporary increase in performance without additional fuel consumption and exhaust emissions, if required. The sustainable hybrid drive therefore reduces the emission of $CO_2$ and other harmful substances. The fuel saving is achieved through complete utilization of the regenerative energy and surplus power in the system. The Pactronic system from Liebherr is an impressive power booster. With Pactronic, Liebherr smooths the path towards goods handling with high efficiency and low emissions.

Other new features for the Log Handler include a log pusher specially designed for tim-ber handling and a massive protective structure for the driver's cab.

# Ceramic liners from Kingfisher protect equipment from harsh materials

Kingfisher's wear-resistant ceramic lining systems extend the lifetime of slag granulation equipment over traditional refractory lined and hardened steel components.

Production of blast furnace generates large amounts of liquid slag and can be processed into valuable raw materials known as ground granulated blast furnace slag (GGBS). By installing wear protection systems within key components, it has proven to add longevity to equipment however many plant engineers invest in a particular wear-resistant system which in many cases is not fit for the process.

Incorporating wear-resistant lining systems amongst steel or aggregate manufacturing processes is not an innovative or new solution. In fact, wear-protection systems have been implemented within the bulk handling industry for many years. Tried, tested and trusted systems have proven ceramic-lined components last much longer *in situ* in comparison to refractory type or hardened steel systems, with the GGBS process.

Traditionally, metallic materials such as QT, and manganese plate and castings have been used as wear resistant solutions in various quarrying crushing operations, where the product is handled and crushed down to a minus-sized aggregate. As further processing is undertaken for sand and small aggregate, polymer-type materials such as rubber and polyurethane operating in a hydraulic state have been used with great success.

As with all solutions to problems, careful consideration has to be given in identifying what unique issues associated with grades and mineral types are prevalent, as a 'one size fits all' approach very rarely succeeds.

A large building product producer in Port Talbot utilizes liquid slag and further creates aggregate and building products for the construction industry. Kingfisher was visited by this client at the Hillhead 2016 exhibition. The client had been using another supplier of wear systems; however, the system supplied was not offering the equipment longevity required.

Granulated slag can replace up to 70% of the more costly Portland clinker. However slag volume depends on the quality of the raw materials used in the blast furnace and may range depending on production levels of a modern blast so the annual slag production could amount to more than one million tonnes.

*Without Kingfisher's wear-resistant liners, slag granulation equipment can quickly become damaged and, eventually, unusable.*

Efficient processing of blast furnace slag into a product suitable for further use is accomplished through a slag granulation plant. The main objective of the slag granulation plant is to process liquid blast furnace slag into valuable raw materials for the cement and construction industries. The value of the slag depends on its characteristics such as mineralogical, chemical, physical and mechanical properties, glass content, structure and moisture content. These technical properties are related to the blast furnace burden and process. The applied granulation technology and operating conditions, storage and dewatering time.

To extract iron from ore, it is necessary to purify the ore from foreign substances it holds and remove the oxygen inside the iron oxide by resolving it. In order to carry out these processes, iron ore is heated and melted at high temperatures in blast furnaces. With high temperatures in the furnace, residual molten iron, molten lime,

silica, alumina, a slag composed of coking coal ash, and other foreign matters are generated while the carbon in the coking coal combines with the oxygen in the iron oxide and leaves the furnace as CO and $CO_2$ gases. Molten slag, which is cooled down and granulated, is referred to as 'ground granulated blast furnace slag'; it is through this purification phase, key components are subject to high levels of wear and abrasion.

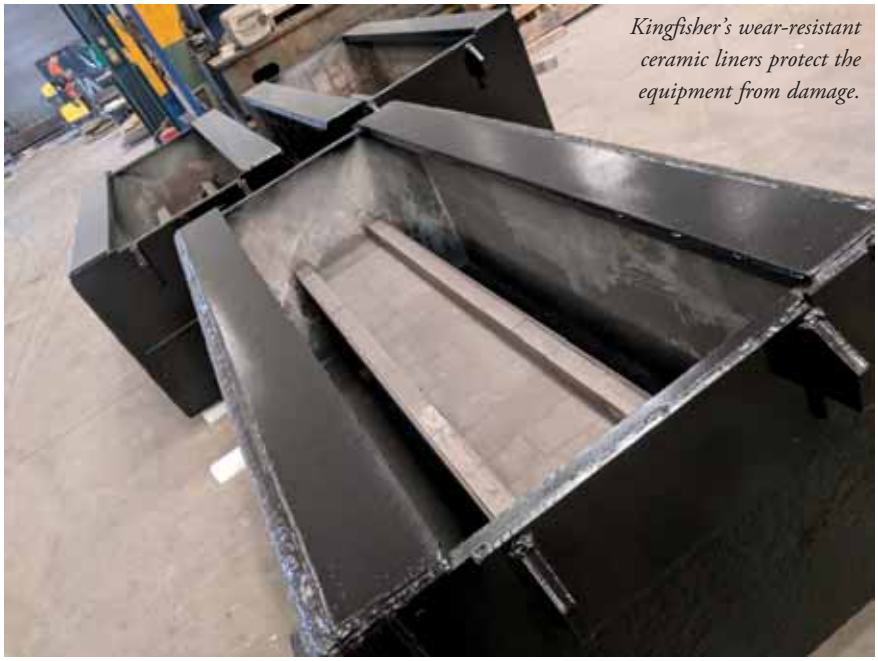
Consuming a great amount of energy and emitting destructive greenhouse gases to the atmosphere during the production process, most of the binder materials have a significant role in environmental pollution. Therefore, binders utilize various mineral additives to reduce the $CO_2$ emissions and to increase the production rate, by reducing the energy consumption. Granulated blast slag, which is one of those mineral additives, is formed during the production of pig iron in iron and steel factories and major part of it is ready to be used as an alternative binding material.

Processing raw materials, with such strong foreign characteristics has detrimental effects on the equipment used throughout its manufacturing process and this is where many manufacturers invest in the use of wear-resistant lining systems to be incorporated within their components.

The use of industrial by-products, containing high percentage of silica and alumina as additives in cement or is a convenient area for the utilization of large volumes of waste materials.

Wear protection also lends itself to the repair process, as it offers the flexibility to be implemented at any time during the life of process plant and equipment. In addition, most equipment is designed to allow access for cleaning, repair or replacement, so as long as the substrate of the original equipment is not compromised through excessive wear or corrosion, then it can continually be repaired *in situ*. Even if the substrate is compromised, then, by utilizing Kingfisher's engineering operatives, be it on or off site, it can be brought back to a suitable working condition for re-use by re-plating incorporating suitable surface preparation and protection. An additional benefit of repairing *in situ* is that it removes major requirements for expensive plant hire, including lifting equipment and specialist personnel to remove and replace.

Ideal components such as slow down boxes and distributor which are subject to handling slurries and highly contaminated material often experience increased levels of wear and abrasion.



*Kingfisher's wear-resistant ceramic liners protect the equipment from damage.*

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- 1no 4/600mm diameter KMH screw transfer feeder system
- 1no 300m x 1.050m land transfer conveyor system
- 1no 4/600mm diameter KMH screw transfer feeder system
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# Moving up a gear with today's conveyor systems

## how technological developments are shaping the market

Louise Dodds-Ely

## Breaking new ground: has Dunlop discovered the Holy Grail of conveyor belting?

Conveyor belts perform an enormously important function in the cargo industry where all manner of potentially destructive materials are conveyed in enormous volumes. They are also a very significant overhead. Although reliability and durability are very important considerations, finding a belt that is super-tough and genuinely good quality — but which is also competitively priced in line with basic standard belting — might be regarded as looking for the Holy Grail. Until now it seems.

Just over a year ago Dunlop Conveyor Belting in the Netherlands and its sister operation in North America (Fenner Dunlop Americas) rather quietly introduced a very new and unique design of belt that it claims is not only considerably more durable and tougher than conventional ply belting but also extremely competitive on price. That is certainly not an approach that Dunlop is renowned for.

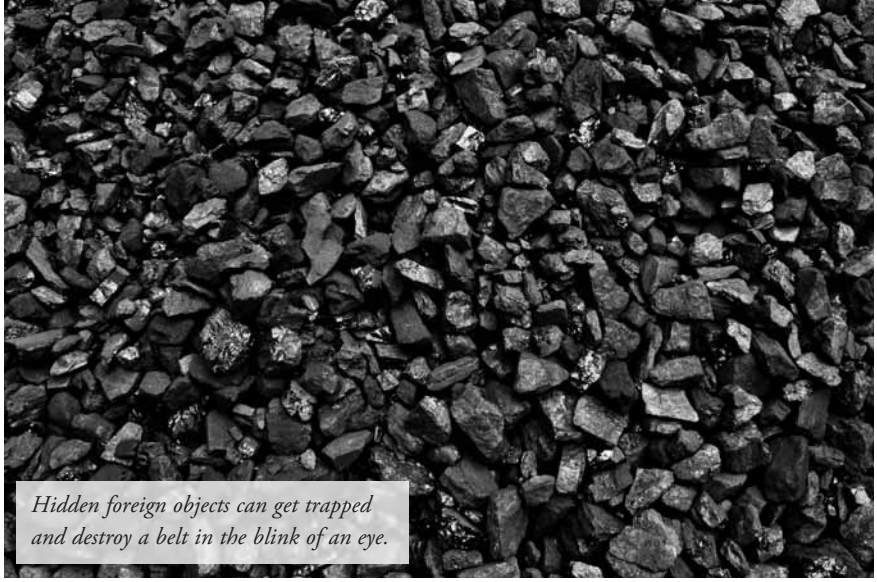
In Europe, Dunlop has branded its discovery Ultra X. Here, *Leslie David* unearths more about an innovation that some industry insiders believe will ultimately change traditional thinking on conveyor belt design.

### The conveyor belt market

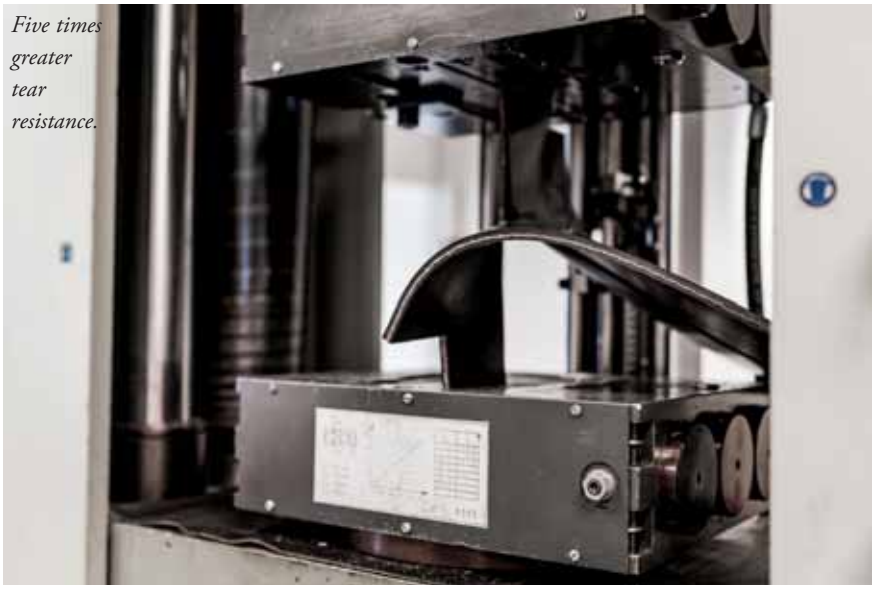
In order to appreciate the significance of what Dunlop is doing, it is important to first look at the market backdrop. The vast majority of rubber conveyor belts are only required to cope with abrasive wear

(abrasion resistant). With the exception of oil resistant and fire resistant belts, the vast majority of cargo terminals fit wear-resistant belting as standard. At first glance, buyers of conveyor belts might appear to be spoilt for choice because there are so many manufacturers and traders competing for a share of the market.

The market is dominated by 'economy' belting imported from South East Asia. If truth be told, the very best that can be said for it is that 'it does a job'. This market dominance is actually much greater than many might think because it is not uncommon for European belt manufacturers to import from Asia to supplement their own production thus enabling themselves to offer low-price belting to their often unwitting customers in Europe.



*Hidden foreign objects can get trapped and destroy a belt in the blink of an eye.*



*Five times greater tear resistance.*

However, Dunlop Conveyor Belting in the Netherlands has always refused to play such a game. Instead, it focuses its approach based on 'lowest cost' rather than lowest selling price by offering belting that provides a much longer operational lifetime along with heavy-duty belting and specialist belting such as heat, fire or oil resistant. Although this strategy has served the company well, its research & development teams have still continued to search for a super-tough, high quality belt that can also compete at the 'economy end' of the market. And in Ultra X, Dunlop believes that it has found exactly that.

## An age-old dilemma

It is a fact that even the strongest, heaviest belts can be ripped, torn or punctured by heavy, sharp materials or foreign objects, either falling from height or becoming trapped. "Accidental belt damage is something that all cargo terminals that operate conveyors have to contend with," says Dr. Michiel Eijpe, Dunlop's development director in the Netherlands. "Hidden foreign objects in the materials being conveyed get trapped and can destroy a belt in the blink of an eye. Using low grade 'sacrificial' imported belts invariably proves to be a false economy for a lot of reasons including loss of production, higher repair and maintenance costs and the high cost of frequently having to fit replacement belts. It's an age-old dilemma,"

According to Dr. Eijpe, the problem of rapid wear caused by abrasion was solved long ago. "Our belts are well-recognized as being the longest lasting belts on the market. For us, the rubber covers were the easy part. The biggest challenge was designing a 'problem solver' belt that could really handle impact, ripping and tearing but which could be priced economically. To do that, we focused our attention on the actual belt construction; primarily the ply fabric itself".

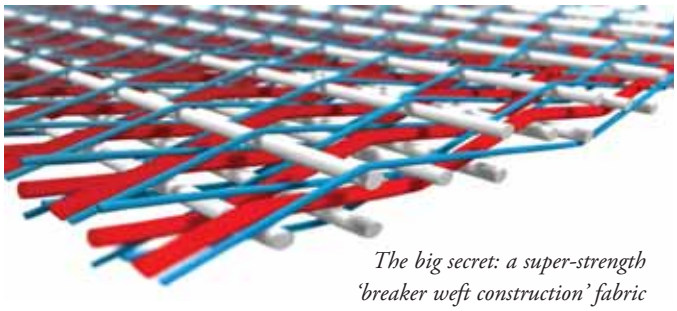
## Thinking outside of the box

What the Dunlop engineers and technicians did was to think outside of the box. Rip-, tear- and impact-resistance primarily comes from the belt carcass and not from the rubber covers, so Dunlop's engineers went back to the drawing board. What they came up with was a new and unique super-strength 'breaker weft construction' single-ply belt. The basis of their concept is an amazingly tough patented fabric that is exclusively made in their own in-house fabric weaving facility in the USA.

Dunlop says that the fabric has more than three times greater longitudinal rip resistance and up to five times better tear resistance and a far superior resistance to impact compared to traditional three-ply or even four-ply belting.

## What's the big secret?

Dunlop engineers say that Ultra X owes its outstanding strength to its specially woven carcass. This fabric design uses crimped warp polyester yarns to provide high strength and low stretch. These are combined with strong 'binder' and 'filler'



*The big secret: a super-strength 'breaker weft construction' fabric made only by Fenner Dunlop.*

yarns to provide strength and stability under load and it is these that create the exceptional resistance to ripping, tearing and impact.

The tear resistance is strictly measured according to the international EN ISO 505 standard. Throughout its development, sections of Ultra X were repeatedly tested to destruction.

## Ticking all the boxes

As Dr. Eijpe explained earlier, protecting the carcass with hard-wearing rubber covers was the easy part. Ultra X belts are produced with Dunlop AA anti-abrasion covers as standard "Using this grade of rubber ensures that the belt has excellent resistance against the cutting and wearing caused by coarse materials and a resistance to abrasion that outperforms typical DIN Y requirements (average loss of less than 150mm³) by as much as 20%". With the cargo industry very much in mind Dunlop also produce a vegetable oil resistant (ROM) version for conveying grain and biomass.

"All of our cover rubber qualities are extensively tested in compliance with EN ISO 1431 for ozone resistance (50pphm, strain 20%, 96 hours no cracking)

*Rubber with poor ozone and UV resistance cracks and degrades prematurely.*

and resistance to the damaging effects of UV light. We know from experience that these are essential design characteristics that are vital in helping to avoid premature replacement of the belt due to cracking of the belt surface. This is especially so in ports because coastal areas invariably have a much higher level of ozone pollution".

Dr Eijpe was also keen to point out that every type of Dunlop rubber cover is produced in compliance with REACH (Registration, Evaluation and Authorisation of Chemical substances) regulation EC 1907/2006 and are anti-static according to EN ISO 284. "Ozone resistance, REACH compliance and being anti-static are all important health and safety credentials as far as we are concerned. Besides, ticking as many boxes as possible makes it much easier for the operator to choose our belts!"

## A question of strength

Ultra X is available in abrasion-resistant rubber and in two strengths — Ultra X1 (Type 330), which is designed for users of EP250/2, 315/2 and 400/3 conventional ply belts and Ultra X3 (Type 550), which is designed to replace EP500/3, 500/4, 630/3 and 630/4 ply belts.

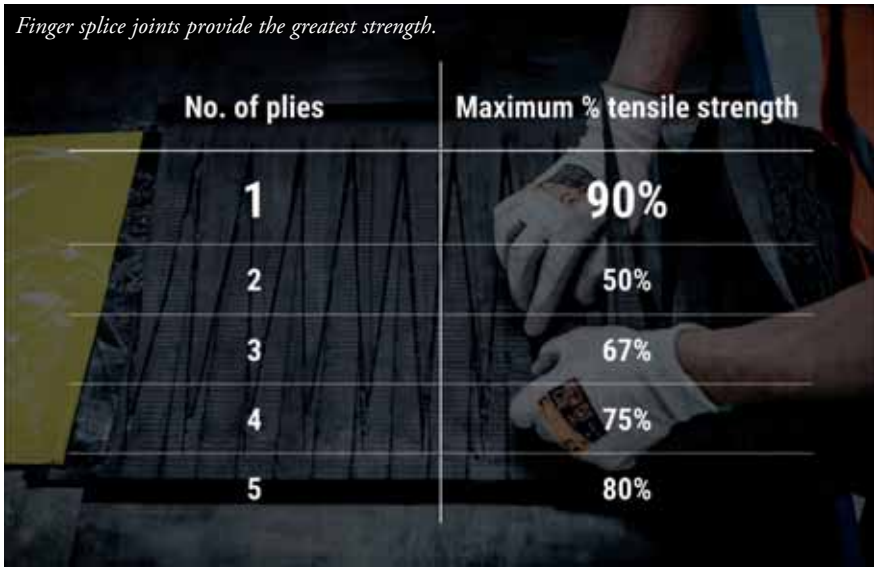
The fact that Ultra X is a single-ply construction designed to replace conventional two-, three- and even four-ply belts has already raised quite a few eyebrows (and questions) amongst traditionalists. The first question that seems to be on everyone's lips is how on

earth can a single-ply belt provide sufficient tensile strength and yet still have such high levels of rip, tear and impact resistance? Rob van Oijen is manager of application engineering in Dunlop's Drachten headquarters and is clearly well-versed in explaining not only the hows and whys but also rather adept at throwing in some not inconsiderable additional benefits as well.

"We keep coming back to the genuinely unique fabric that we are using. Besides being able to withstand the kind of punishment that would destroy a normal belt, Ultra X has amazing tensile strength. The longitudinal tensile strength of the X1 is 330N/mm and the X3 has a longitudinal strength of 550N/mm. The fact is that we stepped away from the conventional range of multi-layer belting for good reason. A single-ply construction requires a finger-splice joint to be made and the big advantage of finger splice joints is that they retain up to 90% of the belt's tensile strength whereas a two-ply step splice only retains a maximum of 50% and a three-ply step joint can only achieve a maximum tensile strength of 67%".

*"When such a high level of splice efficiency is combined with the X1 and X3 tensile strength then at the very least it effectively creates equivalent tensile strengths and belt safety factors that would be expected from comparable three- or four-layer belting. Belt safety factors are one of the prime selection criteria so this is a really important advantage."*

Van Oijen freely admits that finger splices do take longer to make (initially about 30% longer in his experience but such a difference would be expected to reduce quite significantly with growing experience) and that they are a turn-off for some vulcanizers, especially those who only want to use cold splice techniques. However, he is convinced that that viewpoint can be changed with a little help and encouragement. "The technical and economic arguments in favour of finger splicing are unquestionable. Finger splice joints are immensely strong and durable and when you consider the fact that Ultra X has an appreciably better performance compared to conventional ply belt it means that the need to repair and re-splice joints will be significantly less frequent".



*Finger splice joints provide the greatest strength.*

"To help our customers, we supply the splice kits including finger pattern templates, materials and tools, a guide manual and a training film. We even provide training and supervision where warranted". For those who still remain dead set against the idea of finger splicing the good news is that Ultra X just happens to possess excellent mechanical fastener retention.

There certainly does not appear to be any question mark against the overall strength of Ultra X because, as the promotional film proudly states, an Ultra X3 single ply belt is able to pull up to 56 tonnes in weight.

## Endless opportunities

Yet another advantage of Ultra X is that despite its much greater strength, being thinner and lighter allows it to be used on smaller drive pulley diameters. The dynamic stress placed on the inner carcass and on splice joints by continual flexing over small diameter pulleys has until now been a long-standing problem because the pulley size effectively determines the strength and thickness of multi-ply belt that can be fitted.

"The X1 drive pulley diameter for over 60% rated tension can be as small as 315mm and the X3 drive pulley diameter, again for over 60% rated tension, can be as small as 400mm" says sales & marketing director Andries Smilda. "This means that Ultra X is also ideally suited to run on equipment such as mobile stackers, crushers and screening machines that are notorious for having small pulley diameters." Dunlop in Europe is so confident that Ultra X will prove to be a game changer, it has geared up its endless belt production capacity in Drachten and also in its service facilities in Poland and Italy.

*An Ultra X3 single-ply belt can pull up to 56 tonnes.*

## Under the radar

Dunlop actually launched Ultra X more than a year ago. It was a deliberately low-key affair and under the radar of most of the market. Smilda explains that there were many reasons for taking a cautious approach. "We knew from the years of research and intensive laboratory testing that went into the development of Ultra X that we were onto something special. But, Dunlop being Dunlop, we still wanted to prove it in the field so we have been working with several tried and trusted end-users across a wide cross-section of industries."

Dunlop appears delighted with its successes in Europe so far, including the highly price-driven Spanish region. Ultra X

is already the belt of choice in the biggest quarry in Europe whilst OEMs are finding that Ultra X has more than doubled the average belt lifetime.

"We have sold many thousands of metres in the past year and we are recruiting more and more production staff for our factory in Drachten so that we can keep up with demand. Ultra X is all that we thought it would be and more. We have not had one single complaint or technical issue," Smilda continues.

*Until now, pulley size determined the strength and thickness of the belt that can be fitted.*

## Competing on quality and price?

There is a surprising openness about the need to be able to 'slug it out on price' and why and how Dunlop is able to offer prices that are at least comparable (and often lower than) multi-ply belting. "We would never ever compromise on quality for the sake of competing on price. That is simply not our culture. Actually there are several reasons why we can price Ultra X so competitively".

"Firstly, the single-ply carcass is made from fabric that we manufacture in-house. That's a big advantage both quality and cost-wise. Having a single-ply construction also allows for maximum efficiency of production because there are fewer calender runs. And having no rubber skim between the plies not only results in a thinner, stronger carcass, it also keeps the cost down. Dunlop is making longer than usual production runs at a maximum width of 2,000mm and is only selling Ultra X in full roll lengths of 300 metres. Endless belts and belts that are pre-prepared 'ready to splice' need to be ordered in multiples.

"Cutting and shipping short lengths creates additional costs that impact on the selling price but for all customers starting out with Ultra X for the first time we are of course trying to be as flexible as possible. We know from experience that they will be coming back for more once they see what Ultra X can do!"

## A cultural change

There is no questioning the belief and enthusiasm that everyone at Dunlop Conveyor Belting seems to have for Ultra X. There is also no question about Dunlop's history of innovation when it comes to conveyor belts; from creating the very first fire-resistant belts through to heavy duty application belting such as Dunlop UsFlex. It's clearly part of its culture.

At the same time, what is also clear is that Dunlop is looking for something of a cultural change. To many, the very notion that a relatively lightweight, single-ply construction belt can provide the necessary tensile strength together with considerably more resistance to ripping, tearing and impact and have a much greater splice strength is difficult to comprehend. To do all of this while at the same time competing on price is an even bigger ask. Remember, this is Dunlop we are talking about! But if the market can perhaps take off its blinkers and just look a little beyond its long-held beliefs and preferences, then I strongly suspect that Ultra X really could be a game changer.

*Pioneers of conveyor belt innovation.*

# Conveyor components from Rulmeca smooth the way for cargo transport

Rulmeca designs and manufacturers rollers and components for conveyors and is one of the world's foremost suppliers of premium components for material handling.

Rulmeca solutions are used both in bulk and unit handling. It offers the widest range of products available on the market: rollers/idlers, motorized pulleys, pulleys, drum motors, drive rollers and other components.

Today's movement of goods and bulk materials demands state-of-the-art methods.

During the project design stage for the transport of raw materials or finished products, the choice of the method must favour the most cost-effective solution for the volume of material moved, the plant and its maintenance, its flexibility for adaptation and its ability to carry a variety of loads and even be overloaded at times.

Rulmeca Group products are developed and produced to meet the most demanding everyday challenges of all major handling applications.

Bulk handling applications include: coal and lignite mining, cement, steel, quarries, tunnelling, power plant installations, ports, salt and fertilizers, sugar plants, recycling and demolition, crushing and screening, import and export terminals.

Unit handling applications include: airport, security and x-ray screening, postal, parcel and e-commerce, manufacturing and automation, distribution centres and warehousing, food and fish processing and beverage processing.

Rulmeca's research departments are equipped with dedicated test facilities, where the products are thoroughly examined under extreme conditions and the company is committed to the development of new products and the continuous improvement of the current range.

The electrical and mechanical components of the conveyor — such as rollers, drums bearings, motors etc. — are produced according to the highest standards. The quality level reached by major manufacturers guarantees function and long life.

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maintenance providing the design and the installation has been correctly performed.

Rulmeca doesn't only sell products but finds solutions.

The close partnership with customers, OEMs, engineering companies and end-users has made Rulmeca one of the most trusted brands in the industry.

The development of the company has reached impressive and significant levels.

The company philosophy has always been, and continues to be, to satisfy, the needs requests and problems of customers, providing not only products but a service based on specialized technical competence.

Every day and on all continents, Rulmeca products improve the performance, safety and reliability of systems, equipment and machines within the handling industry.

Along with the products, which help to handle and move bulk materials and unit loads all over the globe, the Rulmeca Group is also moving ahead.

Building on the experience in supplying to OEM and end-users in Italy, one of Europe's key markets for unit handling applications, Rulmeca has developed a comprehensive range of components for internal logistics: made by Rulmeca.

The aim is to remain the preferred supplier and trusted partner for its customers who produce and engineer machinery, equipment and systems for bulk and unit handling applications. Rulmeca believes it has something important to offer to its customers. Its international presence makes it possible to access the most efficient sources of procurement, thus boosting the competitiveness of the offering. At the same time, its extensive network of affiliated companies and business partners means that it can always be in close contact with customers.

As a vertically integrated manufacturer, the company has the flexibility to respond to individual needs whenever they arise.

## About Rulmeca

The Rulmeca Group, with headquarters in Bergamo (Almè), Italy, is internationally respected in the production of components and equipment for all types of conveyors, providing a service based on a specialized technical competence.

Founded in 1962, the Rulmeca Group has grown to be a prominent partner to the global materials handling industry.

Today, Rulmeca Group's global business incorporates the product brands Rulmeca, Precismeca and Melco.

The Rulmeca Group's strengths include:

- family-owned company with more than 55 years' experience in manufacturing and marketing of components for materials handling industries;
- 1,200 employees in eight manufacturing companies and eight sales companies;
- global approach with strong presence in Europe, Asia, America, Africa and Australia;
- significant investment in own R&D, technologies and quality systems;
- largest range of rollers and motorized pulleys of any supplier globally;
- strategic focus on building up local service centres to support the businesses of its customers;
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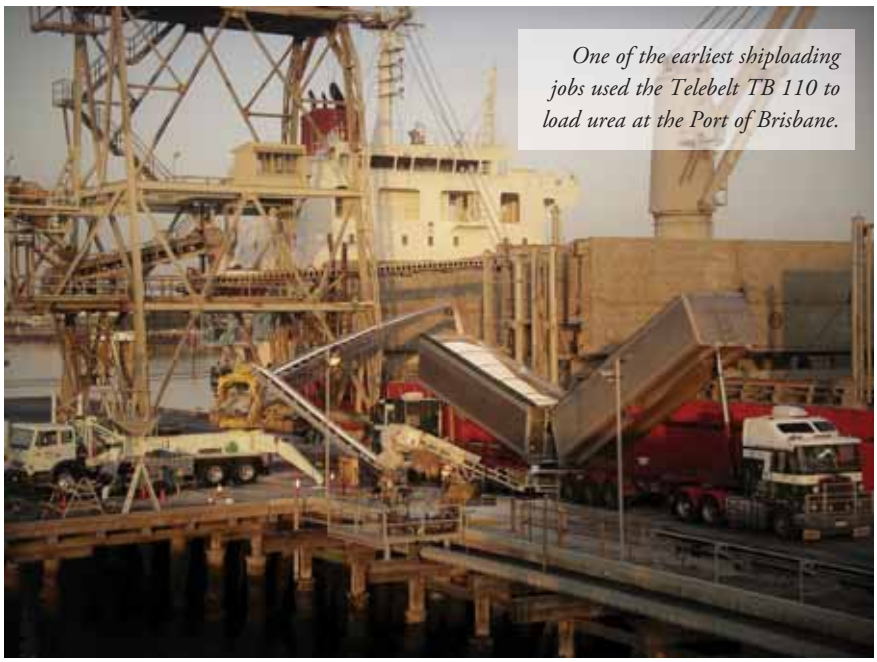
# MCS offers tailored mobile shiploading solutions

Mobile Conveying Services (MCS) started out as a specialist in mobile conveying with a single truck-mounted Putzmeister Telebelt TB 110 in 2007. Its next acquisitions were two track-mounted link conveyors, a telescopic radial stacker and an Ashross truck unloader.

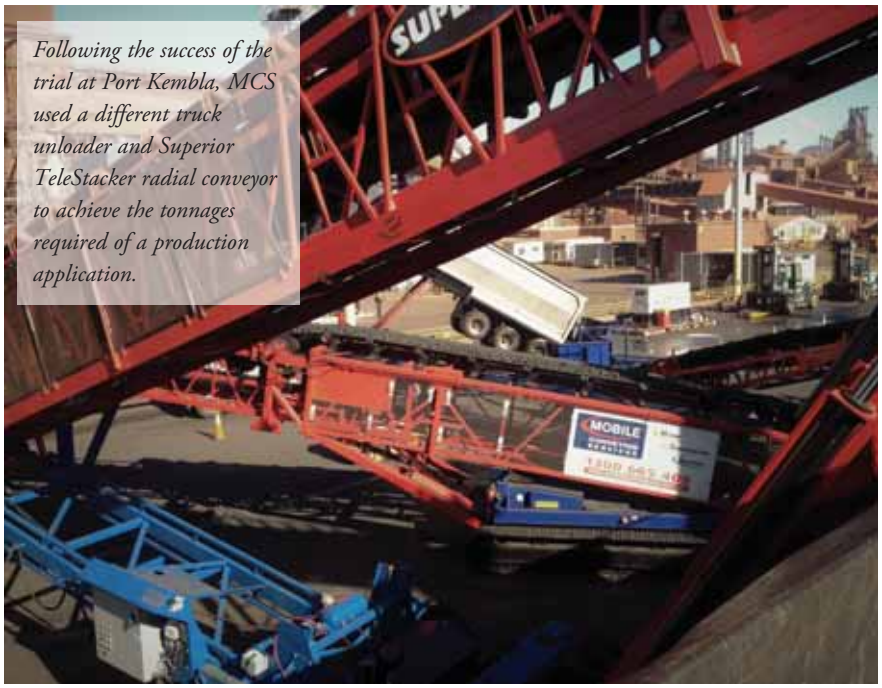
This was an unusual fleet mix for Australia, but reflected founder Graeme Cooney's desire to offer solutions rather than single machines, and to service all conveyable materials rather than specialize in one sector.

Although more by accident than design at the time, this approach meant that shipping became an early repeat business sector and it is one of the three cores of the current business (the others being construction and mining).



*One of the earliest shiploading jobs used the Telebelt TB 110 to load urea at the Port of Brisbane.*

## Early recognition



*Following the success of the trial at Port Kembla, MCS used a different truck unloader and Superior TeleStacker radial conveyor to achieve the tonnages required of a production application.*

MCS was recognized for its innovation in the prestigious Lloyd's List DCN Australian Shipping & Maritime Industry Awards in 2009 with a win in the Transport and Logistics Intermodal Award category. This was for its work in loading coke at Port Kembla.

With no stockpiling allowed at the wharf, 25 trucks shuttled over public roads to truck coke from an off-site stockpile to a coal loader.

A trial showed that, using a truck unloader and track-mounted conveyor, a wharf closer to the stockpile could be used. This was accessible by private roads, with cycle time cut from 60 to 15 minutes.

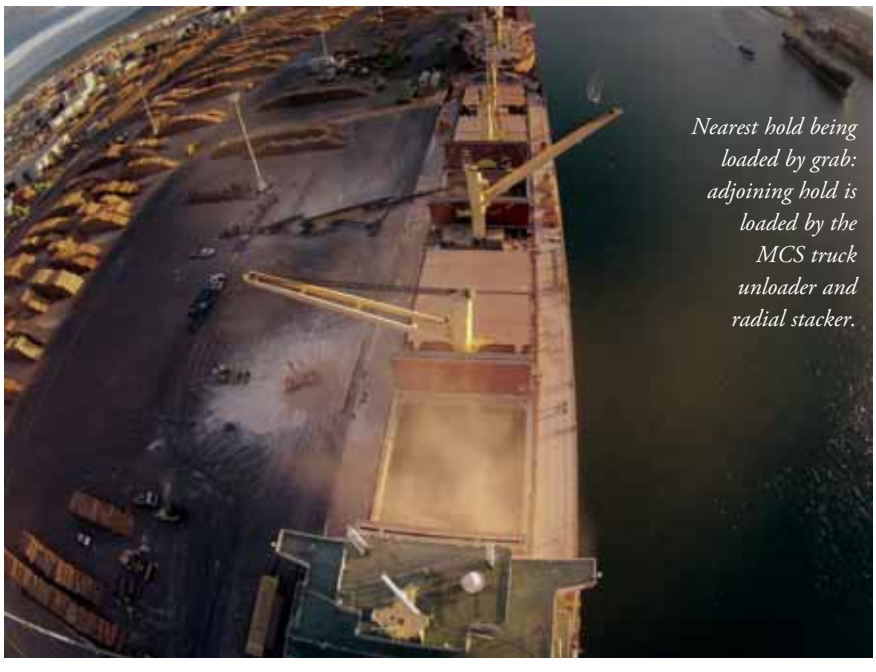
## Offshore experience

One notable project outside Australia was when a Superior Razertail truck unloader, TeleStacker conveyor and tracked pivot base built in-house were shipped to the New Zealand port of Tauranga, initially to unload trucks and stockpile fertilizer inside an undercover facility.

The tracked prime mover, combined with the radial wheels of the stacker, meant that the radial stacker could be manoeuvred inside the building while the truck unloader was placed in an area where trucks could drive through to discharge their load, delivering productivity in a difficult environment.

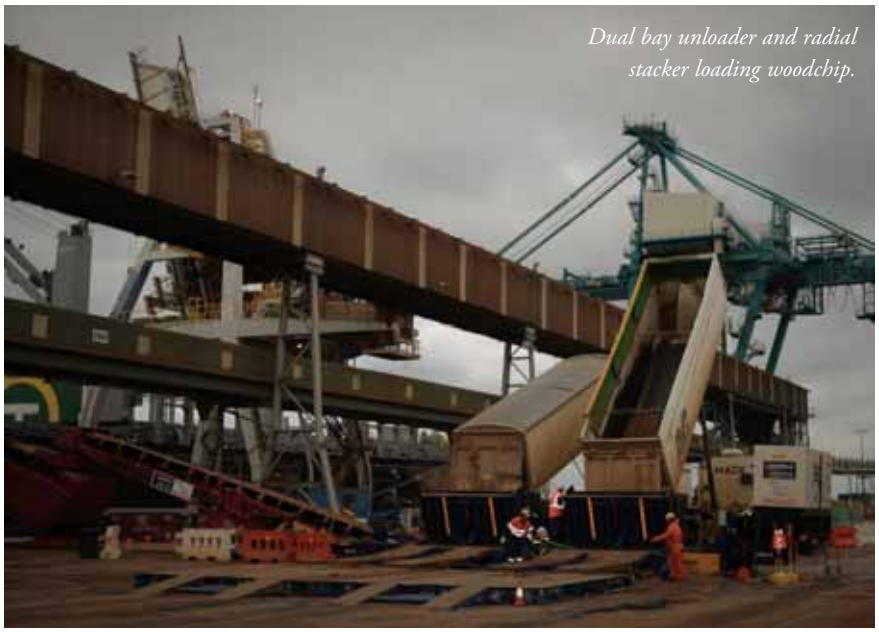
An unexpected opportunity to load a ship arose from this work, and the drive-through approach to truck movements again produced a productive outcome.

A rare opportunity to compare the



*Nearest hold being loaded by grab: adjoining hold is loaded by the MCS truck unloader and radial stacker.*

*MCS-built tracked prime mover manoeuvring the radial stacker into the fertilizer storage shed.*



*Dual bay unloader and radial stacker loading woodchip.*

port is the key to achieving high loading rates. In mobile shiploading applications, this can be easier said than done as the wharves were not designed for this work and obstructions can limit the flow of vehicles and the flexibility of positioning the loading conveyor.

The upside is that mobile conveyors can provide the opportunity to economically export commodities whose value or volume cannot justify fixed facilities, or where transport costs to a wharf with fixed facilities would be prohibitive.

In a single bay drive-over truck unloader, productivity is lost as one truck drives off after unloading and the next truck positions itself on the ramp to tip. MCS developed a dual bay truck unloader to address this, so that as one truck finished tipping, the next was ready to tip.

This was seen to advantage where APLE engaged MCS to load woodchip at Esperance (WA). Road trains were used to deliver the woodchip, and MCS had concerns that the trailers would bottom on the ramps. It only received confirmation of this shortly before loading was due to commence, but quickly developed a dual ramp 'fix' involving flat racks to overcome the problem.

MCS also assisted APLE by building stockpiles in the production area, 35km from the port, in advance of the shiploading. A truck unloader was modified with a hopper to receive woodchip transported by ADT from the chipper to the stockpile area. This fed the radial stacker that built the stockpiles. This typifies MCS's approach of assisting many truck unloader/stacker combination arose when a ship crane and grab loaded a hold alongside the one loaded with the stacker.

A full 27-tonne trailer load could be discharged in the cycle time of the ship's 8-tonne grab: almost a 350% productivity improvement. MCS has also undertaken shiploading work in Vanuatu and Papua New Guinea.

*Having proven itself on a major infrastructure project, MCS' tri-bay truck unloader is now being prepared for a long-term shiploading application.*

## Productivity through innovation

In an application such as shiploading, fast turnaround of trucks bringing bulk material to

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clients with a complete solution rather than one confined to the actual shiploading.

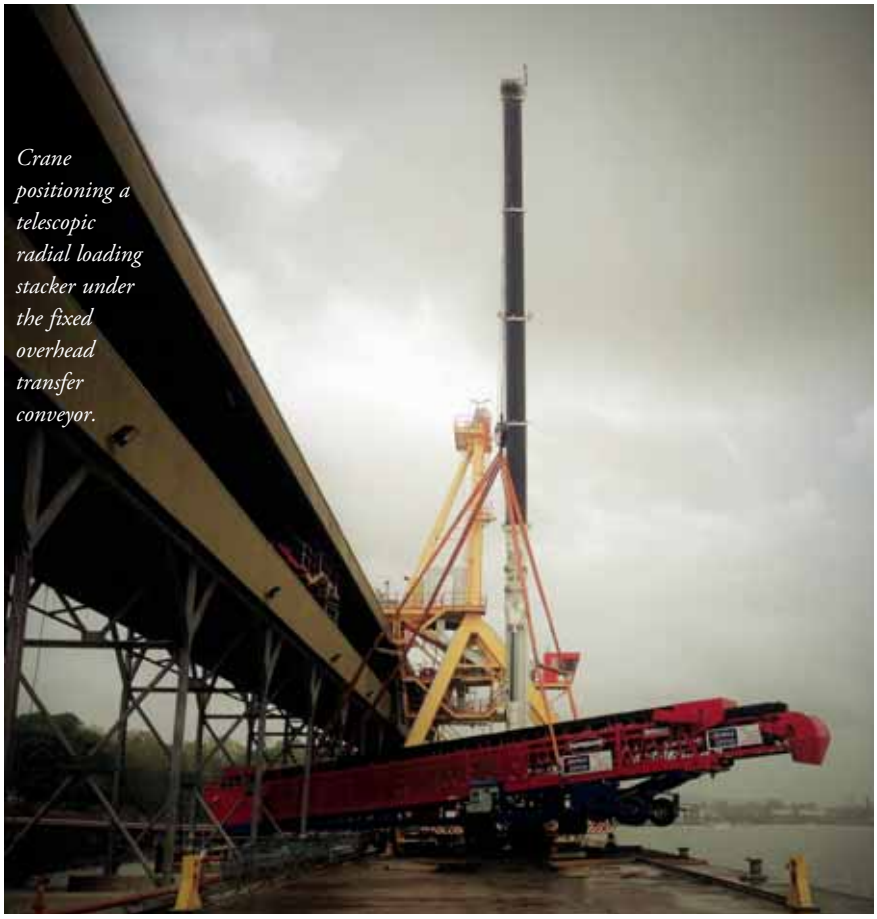
MCS developed what is believed to be a world first tri-bay truck unloader for spoil handling on a major infrastructure project, and this is now being assessed for a long-term shiploading application.

## When fixed shiploaders fail

MCS has been called in on a number of occasions when fixed shiploaders have had an accident, require major repair or fail to meet throughput expectations. On some occasions, MCS has used a tripper and down chute from the overhead transfer conveyor for the fixed shiploader to feed its mobile conveyors.

Access is often difficult and, on one occasion, skates and the radial travel wheels were required to manoeuvre the telescopic stacking conveyor into position. The difficulty didn't end there: a crane lifted the stacker and turned it through 90° to position its feed under the overhead conveyor, with the stacker base supported on steel plate between two headstocks on the fixed conveyor wharf.

At times, shiploading solutions tailored to the application have required fabrication of equipment that is not available off the shelf or modification of existing equipment; and this is becoming an increasing part of the business. MCS also has ship-unloading experience as well as experience loading and unloading barges. Across all applications, MCS has handled product as diverse as iron ore, magnetite, grain, fertilizer, mineral sands, wood chip, wood pellet, silica sand, coke, coal fines and rock up to 800mm.



*Crane positioning a telescopic radial loading stacker under the fixed overhead transfer conveyor.*

*Down chute from the overhead transfer conveyor feeding an MCS track-mounted link conveyor that fed a telescopic radial loading stacker.*

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# Optimizing belt cleaner tension to maximize performance and life

## Advice for cleaner, safer, more productive conveying

Given the number of conveyor-related accidents that occur during routine maintenance and clean-up, every bulk material handler has a vested interest in technologies to help reduce hazards and prevent injuries. Seemingly mundane tasks such as adjusting belt cleaners and removing spillage often require employees to work in close proximity to the moving conveyor, where even incidental contact can result in serious injury in a split second. Further, spillage can contribute to the risk of fire by interfering with pulleys and idlers and by providing potential fuel. 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 table (right) illustrates, spillage in an amount equal to just one sugar packet (about four grams) per hour will result in an accumulation of about 700 grams (1.5 pounds) at the end of a week. If the rate of escape is four grams per minute, the accumulation will be more than 45kg (nearly 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 more than 225kg (nearly 500 pounds) of fugitive material every day.

**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) |

*Material loss from conveyors.*

## Belt cleaning to reduce carryback

Although there are a number of belt cleaning technologies available to conveyor operators, most designs in use today are blade-type units of some kind, using a urethane or metal-tipped scraper to remove material from the belt's surface. These devices typically require an energy source — such as a spring, a compressed air reservoir or a twisted elastomeric element — to hold the cleaning edge against the belt. Because the blade directly contacts the belt, it is subject to abrasive wear and must be regularly adjusted and periodically replaced to maintain effective cleaning performance.

## Tensioning

The ability to maintain the proper force required to keep the blade edge against the belt is a key factor in the performance of any cleaning system. Blade-to-belt pressure must be controlled to achieve optimal cleaning with a minimal rate of blade wear. There is a popular misconception that the

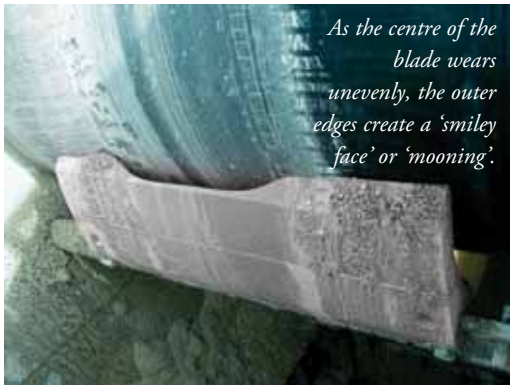
harder the cleaner is pressing against the belt, the better it will clean. But research has shown that there is actually an optimum range of blade pressure, which will most effectively remove carryback material. Increasing tension beyond this range raises blade-to-belt friction, thus shortening blade life, increasing belt wear and increasing power consumption — without improving cleaning performance.

Operating a belt cleaner below the optimum pressure range also delivers less effective cleaning and can actually accelerate blade wear. A belt cleaner lightly touching the belt may appear to be in working order from a distance, whereas in reality, excessive amounts of carryback are being forced between the blade and the belt at high velocity.

This passage of material between the belt and the blade creates channels of uneven wear on the face of the cleaner. As material continues to pass between the blade and the belt, these channels increase in size, rapidly wearing the blade to a jagged edge.

A common source of blade wear that often goes unnoticed — even with a properly installed and adjusted cleaner — is running the belt empty for long periods of time. Small particles embedded in the empty belt's surface can create an effect like sand paper, increasing the wear rate of both the blade and the belt. Even though the cargo may be abrasive, it often has moisture in it that serves as a lubricant and coolant.

Another potential source of wear is when the cleaner blade is wider than the material flow, causing the outside portion of the cleaning blade to hold the centre section of the blade away from the belt. As a result, carryback can flow between the belt and the worn area of the blade, accelerating wear on this centre section. Eventually, the process creates a curved wear pattern sometimes referred to as a 'smiley face' or 'mooning'.



*As the centre of the blade wears unevenly, the outer edges create a 'smiley face' or 'mooning'.*

As urethane cleaner blades wear, the surface area of the blade touching the belt increases. This causes a reduction in blade-to-belt pressure and a corresponding decline in cleaner efficiency. Therefore, most mechanically-tensioned systems require periodic adjustment (re-tensioning) to deliver the consistent pressure needed for effective carryback removal.

To overcome the problem of the blade angle changing as the blade wears, a radial-adjusted belt cleaner can be designed with a specially-engineered curved blade, known as 'CARP' for Constant Angle Radial Pressure. With this innovative design, the changes in contact angle and surface area are minimized as the blade wears, helping to maintain its effectiveness throughout the cleaner's service life.

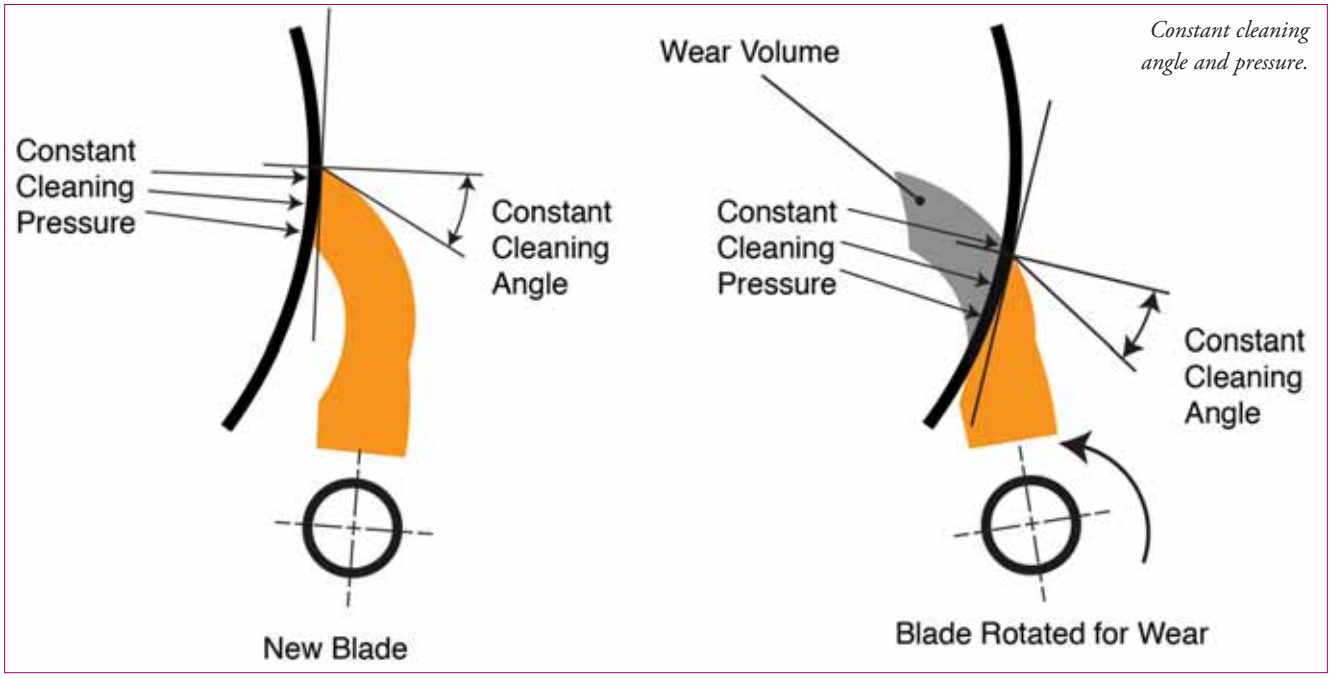
## Air tensioning

New air-powered tensioning systems are automated for precise monitoring and tensioning throughout all stages of blade life, reducing the labour typically required to maintain optimum blade pressure and extending the service life of both the belt and the cleaner. Equipped with sensors to confirm that the belt is loaded and running, the devices automatically back the blade away during stoppages or when the conveyor is running empty, minimizing unnecessary wear to both the belt and cleaner. The result is consistently correct blade tension, with reduced power demand on start-up, all managed without operator intervention. For locations lacking convenient power access, one self-contained design uses the moving conveyor to generate its own electricity, which powers a small air compressor to maintain optimum blade pressure at all times.

## Maintenance

Even the best-designed and most efficient of mechanical belt cleaning systems require periodic maintenance and/or adjustment, or performance will deteriorate over time. Proper tensioning of belt-cleaning systems minimizes wear on the belt and cleaner blades, helping to prevent damage and ensure efficient cleaning action. Belt cleaners must be engineered for durability and simple maintenance, and conveyors should be designed to enable easy service, including required clearances for access. Service chores that are straightforward and 'worker-friendly' are more likely to be performed on a consistent basis.

The use of factory-trained and certified speciality contractors can also help ensure that belt cleaner maintenance is done properly, and on an appropriate schedule. Further, experienced service technicians often notice other developing system or




*Constant cleaning angle and pressure.*

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

- Henry Ford

*Ease of service should be a key element in any belt cleaner tensioning system.*

component problems that can be avoided if they are addressed before a catastrophic failure occurs, helping conveyor operators avoid potential equipment damaging and expensive unplanned downtime. By setting the cleaning goal necessary for each individual operation and purchasing a system adequate for those conditions as laid out in CEMA standards, it's possible to achieve carryback control and yet obtain long life from belt cleaners. The bottom line is that properly-installed and adjusted belt cleaners help minimize carryback and spillage, reducing risk and overall operating costs.

# Modular conveyors reap rewards from installation through to operation

With the first installation of its new, modular conveyor system in Indonesia, Siwertell shows that innovation is a welcome aspect of the bulk handling industry.

Some machines work so well that their technology is often not revisited. Belt conveyors, which quickly transfer goods from one location to another, are one of them.

This straightforward technology, with its impressive operational expenditure profile, means that today, moving sidewalks are used at airports to convey people only slightly faster than walking speed.

However, even as other original equipment manufacturers take belt conveyors for granted, Siwertell's engineers believe that any technology, even the most widely-accepted and implemented, can be improved. Last year, Siwertell completed the first installation of its new, modular conveying system at a coal intake terminal in Cilegon, Indonesia, operated by industrial chemical producer, Asahimas Chemical.

Used to transfer bulk cargoes from unloaders to depot, this modularized version of Siwertell's standard belt conveyor system was developed in late 2014.

It comprises precision-engineered, lightweight, prefabricated frame modules, which can be designed horizontally, or to various inclines. Once these are mounted in place, a conveyor belt is installed along the entire length of the modules; different belt widths are available, ranging from 1m to 2.6m in 200mm increments.

## Substantial time savings

The Siwertell system at Cilegon includes one ST790 D-type ship-unloader and two belt conveyors, each capable of unloading cargo at 1,400tph (tonnes per hour). The unloading system is designed for handling coal, destined for use at a local power production plant, which was recently commissioned by Asahimas. The coal is transferred to the warehouse via the two parallel 21m-long belt conveyors, forming an integral part of the total cargo handling system that supplies coal to the power plant's boilers.

Components of the system were transferred to the site under the supervision of Siwertell. With the help of an assisting crane, Siwertell supervisors were able to complete the pre-assembly

phase of the installation, involving the assembly of the 18m prefabricated module sections, in the space of only two days.

"All frame parts had temporarily been assembled during manufacturing, which facilitated the entire pre-assembly and installation processes," explains Fredrik Gustavsson, Siwertell Surveyor, who worked on-site in Indonesia during the project as an assembly supervisor. "The main advantage of our modular belt conveyor system is the massive reduction in the time it takes to pre-assemble and install the modules. In many ways, it reminds me of building with Lego.

"Our modular system components are also comparatively light weight," Gustavsson continues. "This makes them much easier to transport."

Siwertell also undertook commissioning, testing, and training as part of the agreement, as well as supplying a stock of essential spare parts.

## Continuous, clean cargo flows

Belt conveyor systems offer many efficiency and capacity advantages over other types, making them an excellent choice where large-scale bulk handling capacity is required.

Sometimes they are the only choice, as with very high-capacity applications, such as coal handling, where Siwertell's largest screw-type unloader system is capable of discharging at a rate in excess of 3,000tph.

Where scrupulously clean operations are essential for handling dusty dry bulk materials, and cargoes such as sulphur and biomass, where contact with the outside environment must be kept to a minimum, Siwertell's market-leading range of totally-enclosed screw-type conveyors are an ideal choice. However, full containment is not always necessary, and a simple conveyor belt system, whether large or small, can prove to be an excellent alternative.

To keep dust creation to a minimum, Siwertell's modular conveyor system incorporates a dust collector on the belt, and when required they can also be equipped with additional containment measures such as optional covers, spillage plates, and water sprays. While these do not provide full enclosure, they offer ample protection for a large number of bulk cargoes, saving costs both at the purchasing and the operating phases.

A Siwertell belt conveyor, even a large one, also offers a quiet operating profile. While many ports were originally situated some distance away from urban environments, cities have since sprawled toward them, making noise pollution a key concern. While Siwertell today considers noise pollution at the design stage, putting it on a par with any other engineering imperatives such as loading capacity and spillage reduction, belt conveyors produce very little noise during operation and in some scenarios can be preferable to other material handling methods, depending on cargo type.

## In-built reliability

A major strength of a Siwertell conveyor is its reliability; a continuous motion at a steady rate, and minimal moving parts, contribute to a 'fit-and-forget'-style of investment. In its bid to improve the system with a new, modular design, Siwertell's engineers have ensured that the long-established reliability of the belt conveyor has not been compromised.

"Ultimately, belt conveyors have been around since the industrial revolution, and there is a reason for this – simply, they just work," concludes Gustavsson. "But Siwertell is not about the adequate solution, but the best one; just because it is a well-known mature design, does not mean that, with centuries of combined expertise and knowhow, we cannot improve it. With the invention of a lighter and more cost-effective design using prefabricated modules, we believe we have achieved this."

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# Conveying systems from Buttimer Polska / Buttimer Engineering

*Buttimer Poland supplied equipment for the complex soymeal import and rapeseed export project at the Port of Swinoujscie for Bunge, Poland; Buttimer's equipment is used for truck and wagon loading and unloading.*

Buttimer Polska, together with its parent company in Ireland — Buttimer Engineering — takes pride in over 40 years of experience in the engineering, design, and manufacturing and supplying equipment for the mechanical handling and storage of dry bulk material, cleaning lines for seed industry and feed milling.

One of Buttimer's core specialities is in dry bulk materials handling and high quality steel fabrication. As a part of Buttimer Engineering with its offices in three locations: Tipperary, Ireland (head office); Birmingham, UK; and Warsawa, Poland, the company offers design and engineering

*MTMG (Morski Terminal Masowy Gdynia Sp z o.o.) awarded a contract to Buttimer for a turnkey soybean meal handling import terminal, at the Port of Gdynia, Poland.*

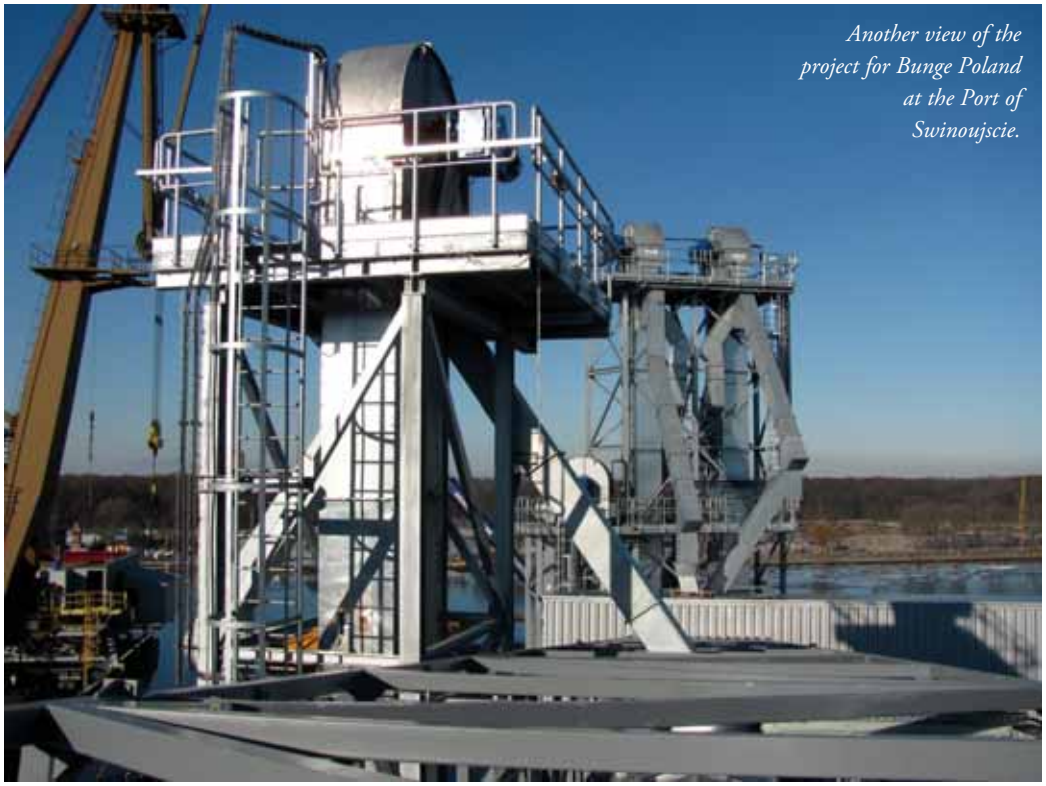
expertise to projects internationally.

From the very beginning, Buttimer has striven to meet its client's expectations, and to offer them designs for complete and custom-built solutions specifically suited to their needs and local conditions. Buttimer offers turnkey services, from a general design and equipment detail design, to procurement, installation, maintenance and project management.

*MTMG conveying equipment at the Port of Gdynia.*

The principal method of transporting is a belt conveyor which allows for the biggest capacity of carried products. For so-called heavy products, such as coal and aggregates, Buttimer engineers have designed specialized conveying equipment. The company also designs and supplies loading conveyors, telescopic stackers, shiploaders and unloaders, plus all associated equipment for ports.

Manufacturing is located both in Poland and in Ireland. The components used, such as drives, bearings or belts, are delivered by reputable world suppliers. The conveyors' capacities are adjusted according to the clients' needs, with typical capacities ranging from 800tph (tonnes per hour) up



*Another view of the project for Bunge Poland at the Port of Swinoujscie.*

to 2,000tph for product mass of up to 1.6t/m³. Buttimer also supplies the market with equipment from the reputable Danish company, Cimbria, for so called lightweight products, such as cereals, extracted meals, and biomass. Cimbria is represented by Buttimer, both in Poland and in Ireland. The Cimbria equipment is renowned for its minimal energy consumption, relatively 'small' dimensions in relation to the capacity, and also for its simple and reliable construction enabling for a quick assembly and easy service.

One of the company's core activities is the development of complex solutions for such activities as unloading, reloading, transport and bulk storage. Therefore, within the ship-unloader sector, Buttimer has launched its own-brand DOCKSOLID loading hoppers for loading and unloading of trucks, wagons and belt conveyors.

The equipment can be used for dry bulk unloading, with both heavy and lightweight products. It is delivered in various configurations and sizes, depending on the application. The DOCKSOLID Bulk Handling Equipment brand has been developed through years of experience unloading bulk products of different characteristics, developing state-of-the-art dust prevention and suppression techniques and designing innovative equipment features such us patented DOCKSOLID steering, suspension and drive system.

The company can supply loading conveyors, telescopic stackers, shiploaders and unloaders, plus all associated equipment for ports.

As Buttimer predominantly deals with bulk handling at ports and terminals, its conveying systems have to be as efficient and functional as possible. Buttimer's completed projects include:

- **Bunge Poland: Port of Swinoujscie.** The complex installation is intended for soymeal import and also for export of rapeseed cake, which is the by-product from Bunge plants in Poland. Ship outloading capacity, using two cranes and two rail-mounted loaders as well as conveyors, elevators and weighing equipment is 800tph and can handle ships up to Panamax type. Export capacity is 500tph. Buttimer's equipment is used for truck and wagon loading and unloading. The main conveying equipment was supplied to Buttimer by Cimbria.
- **MTMG (Morski Terminal Masowy Gdynia Sp z o.o.), part of the ATIC Services Group.** The contract was awarded to Buttimer, for the provision of a turnkey soybean meal handling import terminal, at the Port of Gdynia, Poland. The terminal included Panamax vessel unloading, conveying, storage and dust-free out-loading to trucks. The bulk terminal provides first class materials handling services for the clients of MTMG.
- **GBT (Gdansk Bulk Terminal) in Gdansk, Poland.** Provision and installation of steel bottom-flat bins along with dry bulk handling equipment.

Buttimer Engineering serves clients in Ireland, Poland and the UK, always scrutinizing the possibilities and advising as to the most efficient and most cost-effective solutions to its clients, because it believes that as a company, it doesn't just work *for* its clients, it works *with* them.

*Buttimer conveying equipment.*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# Saving money with ROXON's conveyor belt automated condition monitoring system

Condition monitoring and measuring have become increasingly important in industrial maintenance. This has also made condition monitoring a significant means to enhance profitability. The greatest benefits are achieved through an automated belt condition monitoring system is based on optical 3D measuring technology.

The need for constant monitoring of conveyor belts was recognized in 2008 in the mining industry, where unexpected breakage and ripping of the conveyor belt could result in major financial losses. At first, belts were monitored manually during inspection rounds, but this to be proved impossible. There was no equipment available at the time that would enable continuous monitoring and be able to detect all types of belt damage in both fabric and steel cord conveyor belts — and even today, there is only one such system on the market. All other available solutions for monitoring the condition of conveyor belts are less accurate than 3D scanning. ROXON HX270 was developed to provide a solution for the problems detected in these other solutions. Optical 3D measurement enables fully automated and continuous overall monitoring of conveyor belts. The system is also capable of detecting all types of damage with millimetre accuracy in all smooth belt types (fabric and steel cord belts).

## Aiming at efficient material flows

Transferring large volumes of material quickly and reliably by means of conveyor belts enables efficient production. Conveyor belts are, however, subject to hard wear: loading of materials onto the conveyor belt, sharp materials, bending and stretching, and the location in challenging conditions tests the durability of the belts. The condition of the belt reduces over time due to the stretching and wearing of the material, and the stress placed on the belt by constant use. A belt that is in poor condition also wears other parts of the conveyor and increases the number of risks related to material transfer. Belt breakage causes undesirable disruptions in the operations of the production plant and in material deliveries. In addition, it can pose a hazard to the staff, other equipment, and the environment.


## A risk that can be managed — completely automatically

Management of production plants involves profitability monitoring and recognizing and

managing risks. When conveyor belts run at full speed, monitoring is often challenging and the optimal timing of servicing is subject to guessing. This challenge can be addressed through modern technology. Automated real-time 3D scanning of conveyor belts by ROXON HX270, enables continuous monitoring of the belts and prediction of servicing needs. The condition of both the top and bottom surfaces of the belt is being scanned constantly in order to monitor their wear and tear.

The most critical parts of the belt in terms of damage are the loading and unloading points. It is essential to monitor their condition. Even a belt that is reaching the end of its lifespan can be used for as long as possible when its condition is monitored. When the monitoring system detects a problem or a major deformation in the conveyor belt, it can stop the belt at the predetermined inspection or servicing point (belt repair station) for repairing. The monitoring system stops the belt automatically if critical damage is observed or there is a risk of belt breakage.

## Savings in maintenance expenses

Automatic monitoring works untiringly around the clock, for which reason no staff are needed for monitoring the conveyor belt. The user interface of the system is installed in the control room on the computer that is used to operate it. The system works automatically and does not require any action from the operator in normal use. If anything out of the ordinary is observed in the belt, the system reports this to the operator. The scanning is completed as part of each belt cycle. There is no need to stop the conveyor belt

for inspection, allowing it to be operated productively around the clock. The system detects any new damage on the belt or changes in old damage, and reports them to the operator through messages displayed on the screen. Replacing the belt can be prepared for, removing the need for expensive emergency servicing. This enhances work safety and creates savings in servicing and staff expenses.

## Avoiding production losses and savings in warehousing

One unexpected conveyor belt breakage at a mine or a material processing plant has the potential to cause damage worth millions of dollars. Expenses that reduce productivity are caused by the unexpected belt breakage, damage to equipment, and unexpected disruption of operations — not to mention possible personal injuries. Conveyor belts are often located in places where detecting the damage or repairing the belt is difficult, expensive, and even dangerous. At mines, conveyor belts can be located hundreds of metres below ground level or high above the production facility.

Automatic 3D scanning of the belt also makes the work of the person responsible for company finances easier, as capital no longer needs to be tied to spare belts stored in the warehouse. The number of spare belts can be reduced because the need for belt replacement can be predicted more accurately. This can be included in the savings facilitated by the automatic system.

## Commencement of the system

Automated condition monitoring can be integrated with both new and old systems. The monitoring equipment can be taken into use either in a single line or in the entire conveyor system. The installation of the conveyor belt monitoring system is quick: if no structural changes are needed in the line, the average downtime required by the installation is only one day. The width of the belt to be monitored can vary between 800mm and 2,500mm [from 34" to 95"]. The maximum rotation speed of the belt is 10m/s [1,968ft/min].

## Case study: LKAB Malmberget: world-class mining and iron ore processing in Scandinavia

Luossavaara-Kiirunavaara AB publ is abbreviated to LKAB. LKAB is a Swedish company and is one of the world's foremost producers of processed iron ore products used for steelmaking. LKAB has three mines in Northern Sweden, namely Kiruna, Malmberget and Svappavaara, together with two harbour storage depots in Narvik and Luleå. LKAB mines 78% of the iron ore in Europe and is thereby Europe's largest iron ore producer.

In 2017 LKAB, which has a reputation for high quality, was able to produce 27.2mt (million tonnes) of finished iron ore products. The iron ore pellets contain about 67% iron, and the fines produced by the Malmberget mine are considered to be among the world's best. Malmberget is the world's second-largest underground iron ore mine, and the Kiruna mine is the world's largest and most modern. The iron ore mining in Malmberget takes place at several levels, and the ore is transported on conveyor belts to hoists located 815 metres below the ground level. From there the ore is then hoisted to the surface and fed by more conveyors into the processing plant.

### Investing in belt condition monitoring is essential

"Condition monitoring and proactive maintenance of all production critical machinery is crucial, and belt conveyors are one of those", says Malmberget's Mine Maintenance Engineer Peter Gustavsson. "We have a 'red-line' in iron ore transfer. Production critical belt conveyors transfer the valuable ore to the processing plant. About 85% or about 14mt of the annual ore production in Malmberget is being transported on these conveyors. Continuous failure-free operation of these conveyors is crucial for the mine production."

"As an example, in August 2014 and before the ROXON HX270s were installed, we had critical belt damage on the first conveyor in the 'red-line'. There was an about 150m belt split that cost us roughly 27 million SEK (approximately €2.9 million) in lost profits due to the unplanned stop. On top of the loss of production comes the cost of the conveyor belt and repair work. It's clear that investing in belt monitoring is essential", concludes Gustavsson.

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**Fast return on investment**

"We had a belt monitoring system, which was not working efficiently. It was based on sequential detection of conductive wires vulcanized inside the belt surface rubber. Wires got broken without any belt damage and conveyors were stopping. Replacing those wires all the time was not possible. That technology is not suitable for hard rock mining," points out Gustavsson.

"After we had installed the first ROXON HX270s and assessed the performance and value of the system, it was an easy business decision to acquire more 3D belt surface scanners. We invested in the ROXON HX270 for all three critical conveyors on the 'red-line'. Now a total of seven belt condition monitoring units have been installed. The return of investment can be rationalized in many ways. Prevention of unplanned production stoppages caused by critical belt damage pays back the investment quickly. One case alone can be enough."

"In addition, storage of belts can be reduced. We have value of about 28 MSEK (approximately €3 million) of running belts in the 'red-line'. Without automatic real-time optical 3D belt surface scanning we should have an entire belt set in storage to secure our production in every case. That amount of belt production lead time is several months and still, if we would need to replace a whole belt, in the worst case of the longest 1.7 kilometre conveyor, it would take about four weeks. That would cost way too much in terms of production. Also belt storage is not that easy. Setting up an underground warehouse where the belts can be stocked in the right temperature and humidity would be a quite big effort."

"With the ROXON HX270 we can have about 25% of the total spare belt. That can be considered as an instant return of investment in our case. These cost savings will continue also in the future, since the spare belt on stock should be renewed due to belt aging in every five years to maintain reasonable remaining running lifetime for the belt."

"In addition, ROXON HX270 enables proactive belt maintenance, which increases belt lifetime. Due to its automation, there is no need for manual belt inspections anymore, which together with the efficiency of belt repair is saving money continuously", concludes Gustavsson.

## ROXON

ROXON is the brand of NEPEAN Conveyors Oy. NEPEAN Conveyors Oy offers under ROXON brand materials handling projects and equipment, conveyor components and customer services.

Typical challenges related to alternative monitoring solutions:

- Transversal metal wires immersed inside the belt for rip detection. These are only capable of detecting long rips (several dozens of metres in length). Do not detect holes, ruptures, and other critical local damage. In addition, the lifespan of the metal wires inside the belt is limited and often cause unnecessary stopping of the belt.
- Monitoring the cords of steel cord belts. Only detects cord damage, no damage in the rubber. Not suited to fabric belts.
- Digital x-ray. Detects several different types of belt damage but not all types of rubber damage. Equipment can only be installed on the return belt, meaning that damage at the loading point, such as longitudinal rips in the belt, are not detected.
- CCTV solutions. The belts are monitored by means of CCTV cameras. These solutions are not automated, as humans are responsible for interpreting the footage. In addition, the solution is sensitive to variations in the reflection properties of the belt surface (dirty/clean belt, wet/dry belt: the picture looks different depending on the conditions).

ROXON HX270 belt condition monitoring system:

- monitors the condition of both sides of the belt;
- stops the belt when critical belt damage is detected;
- early detection of damage enables the planning of predictive repair measures;
- based on optical 3D measurement technology suited to monitoring both fabric and steel cord belts;
- automatic operations without constant monitoring by the operator: an alarm is triggered when an error is detected;
- the modular structure consists of one or, where required, several measurement modules; and
- applications for one conveyor and for an entire conveyor system.

# LKAB Malmberget invests in efficiency deep down


As the mine in Malmberget reaches depths below 1,250 metres, it becomes increasingly important to maintain an efficient flow of ore and high availability, *writes Uno Sundelin - Manager, Mining & Materials Handling Hägglunds Products & Solutions*. There is simply no room for breakdowns.

"We know that we have to maintain cost-effectiveness at depth. This is something we are continually working to improve," says maintenance engineer Pär Sundqvist.

LKAB Malmberget is an impressive iron ore mine in more ways than one. First, it is a high-tech facility that houses an entire underground community, including roads, mining operations, offices and canteens. And second, the mine has several ore bodies that are spread across the site. It is a full eight kilometres from one end of the mine to the other, which naturally places big demands on logistics and cost-effectiveness.

The fact that the mine is doing well, despite tough competition from open-cast mines around the world, is attributed to the high level of efficiency together with a high-quality product, good environmental awareness and highly skilled personnel.

One essential improvement in availability involved a 338-metre-long conveyor belt. This was not living up to its task as the 'main line' for carrying 80 percent of all the ore from the mine. A new drive was installed during a scheduled shutdown in May 2016, with Pär Sundqvist as project manager. By that time LKAB Malmberget had been looking at alternatives for a couple of years.

## Plenty of challenges in a harsh environment

Sundqvist and his colleagues looked at everything from the latest electric drives without gearboxes to hydraulic drives, at other plants where these were in use. The only thing they knew for sure was that they did not want any gearboxes. This was partly for reasons of space, and partly to reduce the risk of breakdown.

"We already had some dual gearboxes and it was difficult to find spares for them. The old conveyor belt was like a patchwork quilt after all the hard starts and stops, and after a small fire. On average we had one breakdown each year that led to an unscheduled shutdown of three to five days. This usually happened in the week after New Year, when it is coldest of all," says Håkan Hansson, who is a field mechanic.

This loss of production was naturally unsustainable in the long term. A visit to LKAB in Kiruna gave very positive feedback on Hägglunds' direct hydraulic drives.

## A solution with multiple benefits

The choice fell on two Hägglunds' CBp motors with an installed power output of 2 × 630kW and a maximum capacity of 3,000 tonnes per hour. The reason for choosing Hägglunds' CBp motors was a requirement for compact design and maximum efficiency.

They have not regretted the decision. The biggest benefit of all, according to Sundqvist, is the built-in redundancy and high operational reliability. The belt is driven by four Hägglunds Drive Units, and a standby pump now makes it possible to maintain operation even if one of the units stops.

"We have not had a single incident, everything has just worked the way it should," he says.

"There was no need for any construction changes to install the new drive, so we completed everything during the May shutdown."

Most of the contact with Hägglunds' specialists was for support with programming the control system.

"They have been very helpful in every way. Without the support we got from them we would never have achieved such an effective system. We visited their factory in Mellansel and they have visited us. We also had electrical planning meetings by Skype once a fortnight

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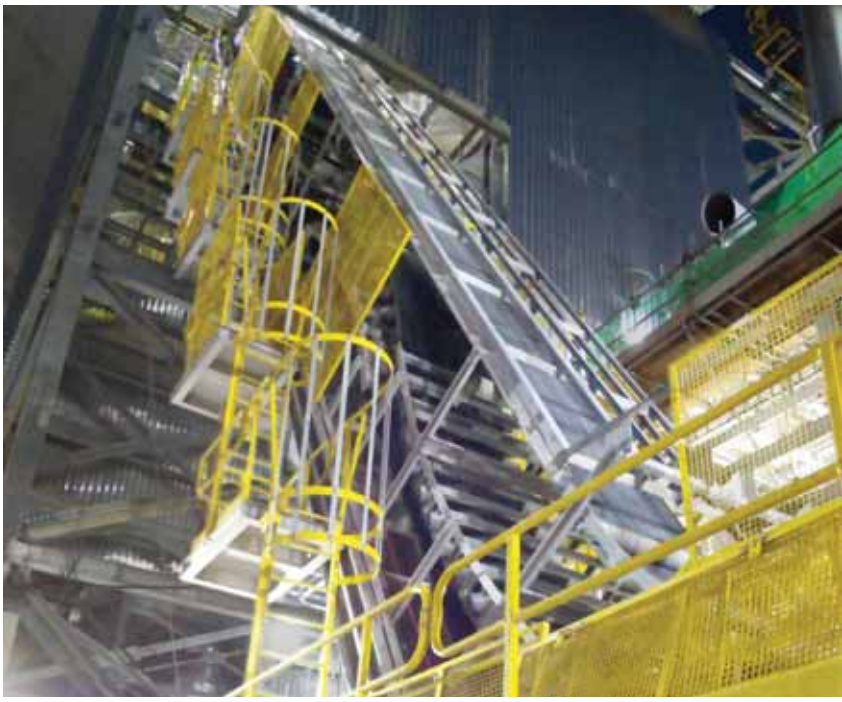

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throughout the project. It has all worked perfectly," says Sundqvist.


## A TROUBLE-FREE SYSTEM

Automatic load sharing is another benefit, which leads to reduced vibration and wear in the drive chain compared to before, when there was a much higher load and demand on the single gearbox.

"The drive system works so well that you almost forget it is there. It just keeps on running. The only thing we have had to do is replace filters," says field mechanic Håkan Hansson.

The hydraulic drive is specially designed for dusty environments, and all the hydraulic components are isolated from the electric motor. The system is now easy to service, lightweight and easy to keep clean, according to Hansson.

"With the old 6,000V motors and gearboxes, it was not possible to wash off the ore dust with water, so we had to vacuum-clean them regularly," he says.

The soft start of the hydraulic drive is gentler on the mechanical components when you start up. But the best feature of all, according to Hansson, is the creep drive.

"It's very useful when we need to inspect the belt for damage from reinforcing bar and other scrap that sometimes gets caught up from rock reinforcement. Now we can gradually advance the belt to the point of damage and check it," he says

The emergency stop function is also appreciated, as it enables the Hägglunds' CBp motors to stop the belt in less than one metre from full speed.

"The process was analysed in detail and we carried out a thorough risk analysis. Naturally we want to be able to stop the belt as quickly as possible to prevent any injury to employees," says Sundqvist.

In July 2018 the conveyor belt had an availability figure of 99.5% and ran for 23–24 hours per day.

"The few stoppages we had were just caused by iron scrap along the belt. Now it is important that we carry out routine maintenance so that there are no problems in the future either. The big problems always arise after a breakdown, so we need to eliminate them completely," concludes Sundqvist.

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# Pipe conveyor systems from Bedeschi grow in popularity

The pipe-conveyor market is growing every day, especially because of the growing need for overland conveyors (for distances longer than 1km).

Bedeschi's R&D department works to continuously improve said equipment, providing up-to-date solutions and improving performances in terms of spillage reduction and maintenance costs in the design, turnkey supply and service of conveyors. Bedeschi's technical team is composed of engineers with considerable experience in the design of pipe conveyors, and the team is led by skilled engineers coming from major players in the handling equipment market, with strong experience in the design of pipe conveyors.

Thanks to Bedeschi's knowledge in terms of equipment and port engineering, it has been able to develop extremely high quality technical solutions, and has a range of mobile conveyors on rubber tyres for use in ports.

Bedeschi is strongly involved in innovation and applicability of its bulk material handling portfolio in the industry. One of these is the totally enclosed conveyor, well known as a tube or pipe conveyor, which completely encloses the material being carried.

These conveyors are also well known for their ability to handle properly tight vertical, horizontal and compound curves in difficult overland topographies or congested plant areas, and they are environmentally friendly.

The pipe conveyor is an innovative, modern transport system that solves several serious transport problems in training, scattering, spillage of materials and the limited angle of inclination etc…, associated with conventional conveyor systems. At the loading point, the pipe

conveyor is open in a conventional rough form, after which it is formed into a pipe shape for the transport length with the material completely enclosed.

In that case, before the system is stopped, a few metres will be completed with material inside and, in order to in-load it, it is necessary to pull back the system; Bedeschi has studied a solution which includes semi-panels could be removed in each position on this area.

Alongside the pipe's running, the entire system is covered on the upper-lateral side with several systems, depending on the site conditions and the requirements of the customer; in any case wire panels will be installed to comply with safety at work of the operator, such as electrical devices for emergency.

At the end of the transport run and just before the discharge pulley, the belt again opens thus allowing materials to be discharged in traditional way. The main points of the pipe patent include:

- forming the conveyor belt into tubular cross-section;
- arrangement of conveyor idlers to maintain a tubular cross-section; and
- maintaining stability of tubular section during travel.

Of course, each installation is developed according to the layout, capacity of transport and material characteristics. As for the power needed in the pipe conveyor, it has been repeatedly verified that it is little more than of the traditional system. All the power required to overcome friction due to the strength of the mat, then the power is very close to the traditional one.

## Case studies

### Batisöke Söke Cimento Sanayii T.A.S

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# Conveyors form an integral part of Ukraine's Yuzhny Commercial Sea Port bulk handling facilities

Ukraine's Yuzhny Commercial Sea Port ranks first for bulk cargo handling among Ukrainian public stevedoring companies. In 2018, the cargo turnover was 12.3 mt (million tonnes), and the company's technologies have not changed significantly since last year.

Sea Commercial Port 'Yuzhny' operates six berths of 1,540.5 m length. The depth of the approach channel and the inner harbour channel (21m) mean it is possible to handle large-capacity vessels including Panamax, Capesize, Newcastlemax with draughts of 18.5m and more than 200,000dwt.

The handling of export cargo involves the specialized car dumper complex and portal crane technology to handle vessels. Open wagons with bulk cargo are discharged with two rotary car dumpers. The complexes are equipped with five units of defrosting facilities, which heat (defrost) cargo in low temperature conditions. The conveyor belt system (the total length of one route conveyor belt is 1,750m) transfers the cargo to the berths and then the cargo is piled with two stackers. Portal cranes equipped with grabs are used for loading vessels. The main cargo handling equipment is portal cranes, in particular from the brands Tukan and Liebherr. Producing power and capacity of this equipment ensure the loading rate up to 1,500 tonnes per hour. The boom outreach enables the uniform loading of Capesize vessels at the berths without additional manoeuvres of the vessel, which reduces handling time. In addition to the three Tukan cranes, industrial areas are equipped with modern portal cranes from Liebherr, Sokol, Kondor, Gants and Mark-45, which provide efficient cargo handling.

Handling of import cargo is more demanding. Portal cranes equipped with grabs are used to handle vessels. The cargo is stacked up and loaded into open wagons. After weighing, open wagons are formed into a cargo train and sent to consignees by rail. The universal crane technology makes it possible to handle various breakbulk cargoes (rolled steel, equipment etc.) in both directions.

conveyor for Batisöke Söke Cimento Sanayii T.A.S. – Izmir Turkey. The unit has the following main characteristics:

| | |
|---|---|
| **Material:** | crushed limestone |
| **Flow rate:** | 1,200tph (tonnes per hour) |
| **Conveyor length:** | 1,180m approx. |
| **Conveyor lift (drop):** | 135m approx. |
| **Pipe diameter:** | 400mm |
| **Belt width:** | 1,600mm |
| **Belt speed:** | 3.15m/s |
| **Installed power:** | 400kW |

Bedeschi ONT was awarded the contract from Batisöke on October 2016, and the machine was delivered on July 2017, Erection activity by client under Bedeschi ONT's supervision finished on March 2018 and the pipe conveyor has now been successfully commissioned and started-up.

The peculiarity of this installation is the big curve, about 90°, and the fact that the conveyor is a lowering conveyor with regenerative VFD (variable-frequency drive) to use power generated from the conveyor to feed the crushing house at the quarry.

**Punta Catalina, Banì, Paravia, Dominican Republic.**

The supply includes the complete material handling equipment set from coal receiving rail mobile hopper on the jetty up to coal storage and delivery up to loading point at boiler area.

Project environmental conditions were restrictive, and led to an extremely challenging design phase of equipment and structures due to very heavy wind (hurricane and tsunami area), soil (instability and potential liquefaction) and earthquake conditions.

The Bedeschi Group participated with five of its companies in all the project phases (engineering, procurement, construction, expediting and delivery).

- project management, design, procurement and fabrication of ten conventional belt conveyors, two feeders, diverter valves, structural design, procurement and fabrication of all steel structures in the scope;
- design procurement and fabrication of two reclaimers, two crushers, five trippers, one mobile hopper, logistics and expediting;
- design, procurement and fabrication of seven bag de-dusting filters; and
- Bedeschi design of pipe conveyor D.700 (one of the few biggest in the world with a capacity of 3,000tph).

The commissioning of the pipe conveyor line and the complete loading cycle of two ships have been recently carried out with successful results.

## More Bedeschi deliveries

- supply of 5km-long belt conveyor for HolcimLafarge and a lowering pipe conveyor — 1.2km long with a capacity of 1,200tph for limestone (Turchia); and
- through KRK Latinoamericana, the supply of one 850m × 1,500tph pipe conveyor for soy and grain bean to Renova for the new Terminal Rosario, Argentina; start-up is expected to take place on 20 April this year.

For more than a century, Bedeschi has been providing effective and reliable solutions in a wide variety of industries (bulk handling, marine logistics and mining), capitalizing on synergies and cross competences. Diversification is major group asset to nourish its attitude of continuous innovation in products and service to tailor-make its products according to the needs of the customer.

The company takes care of each step of the project execution from the engineering phase to the assembly, installation and start up.

# STM: Italian expertise to handle bulk materials

The Italian company STM specializes in the engineering and supply of belt conveyor systems for bulk materials handling facilities. Since 1979, when it was set up as a family business, STM has provided worldwide innovative integrated solutions in order to increase efficiency, reliability and cost savings for its customers' production processes.

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

Thanks to an efficient and breakthrough Engineering Department, it is possible to optimize the design, the industrialization time and the information exchange with 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, tunneling conveyors, crushing plants conveyors, batching plant conveyors and waste to energy plant conveyors.

## How STM is able to remain competitive

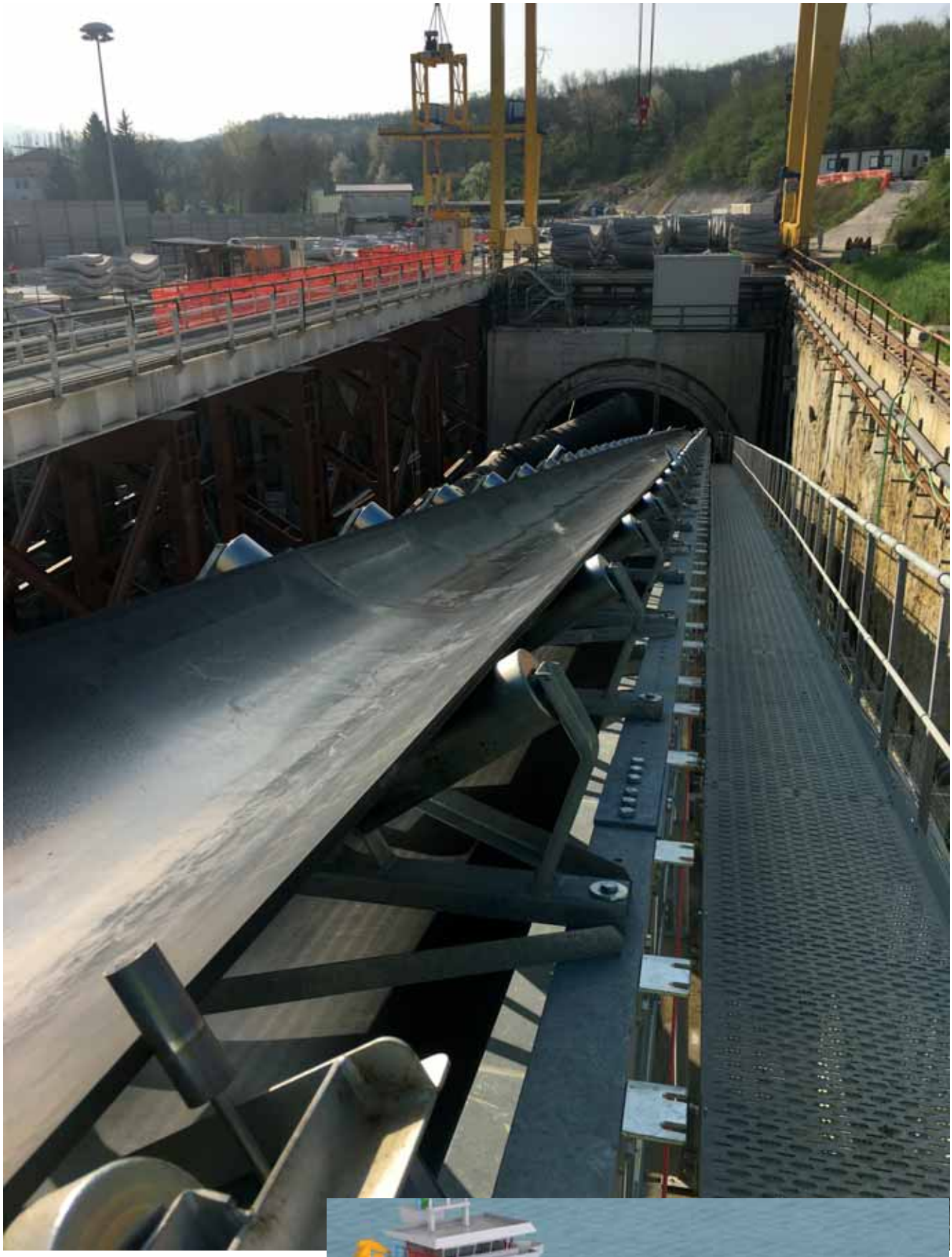
Over the years, STM has worked to keep a high level of competitiveness in order to face a market that is becoming more and more aggressive, especially in terms of pricing. The strategy has always focused on

continuous improvement and re-design, to find new savings on production costs. At the same time, it has also been focusing on the widening of its product offering, to enable it to meet all new and latent customer's needs.

Currently, the main areas of improvement relate to the services offered (e.g. remote assistance, management of the plant during start-up and ramp-up of production, long-term maintenance service), or the global expansion of STM's supply chain. Even if the level of purchasing is low compared to the whole cost of production for STM — since all the production operations are located in STM's plant — in today's business world, it is mandatory to have the ability to source globally any kind of component, for price reasons as well as lead time reason. Of course, the company's internal organization is something that is constantly adapting to new contexts, keeping as much flexibility possible in order to ensure a lean business structure and adequately face the market.

## Recent technological developments

One proof of STM's proactive approach on the market has been the development of a new product family. In 2013, STM approached the market of underground conveying systems, focusing on TBM Continuous Conveyors. This kind of application provides a conveyor system able to increase its length as the tunnel excavation advances (carried out by the TBM – tunnel boring machine). Since the costly TBMs are mainly used in cases of tunnels of significant length — even more than 15km — the conveyor line will have the same kind of length with only one item



(since has to be continuously increased in length, there will be same conveyor belt for the entire length). The development of a single conveyor of tens of kilometres imposes a need to change the approach on the design of some features, as well as to look for new kind of components to reach outstanding performances

This kind of application seems far away from dry cargo field; however several projects are involving this kind of technology. For example the mining company Sirius Minerals is carrying out a project in the UK that provides a tunnel excavation in order to handle the material from the mine to the dry terminal.

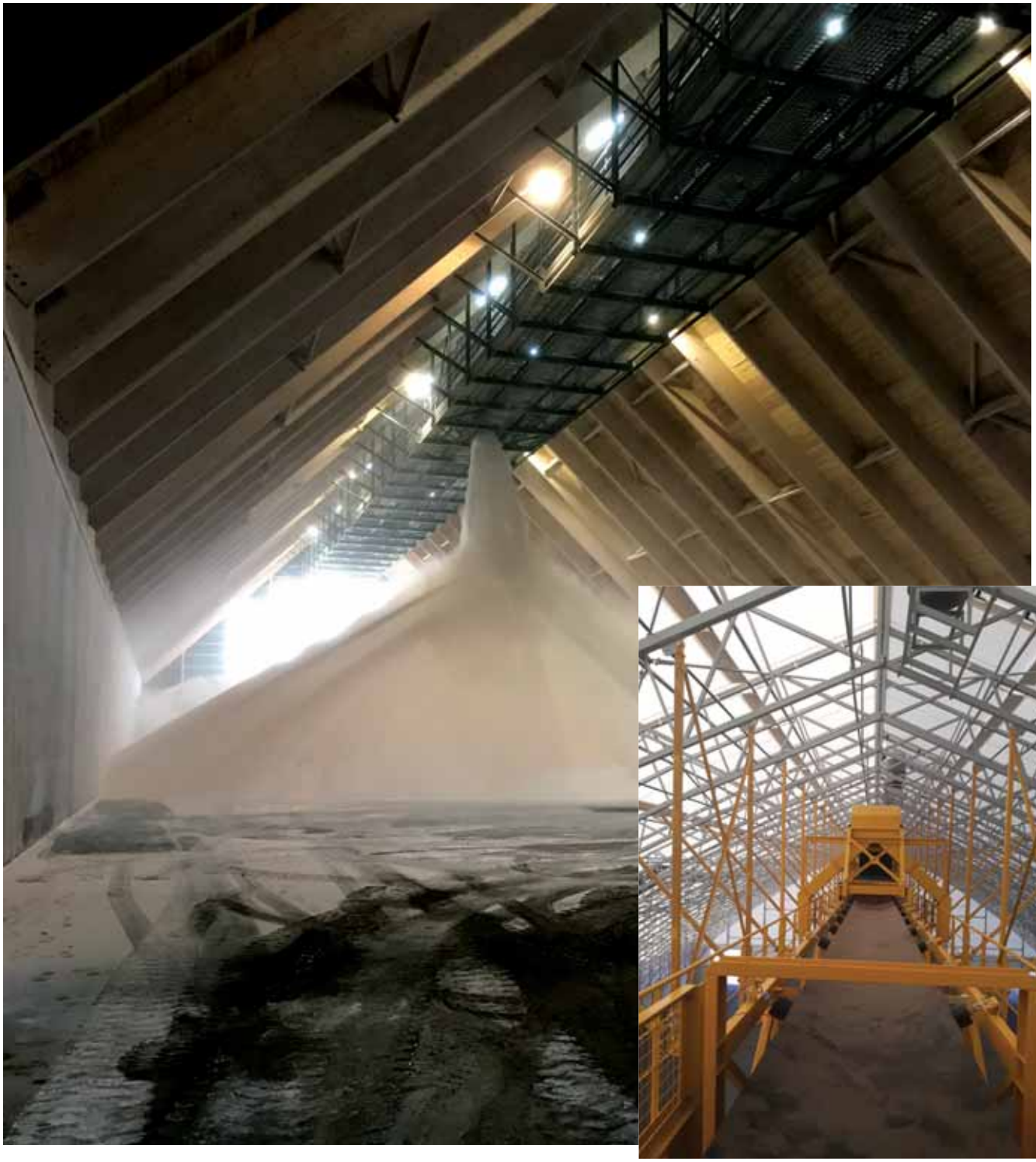
## Specific conveying system for each material

The material emerging from the excavation of a tunnel can include rock, clay, basalt, and some other materials that are often unexpected. This means it is necessary to design the conveyor with several devices able to face different kinds of material. Fortunately, in its 40 years of existence, STM has gained a lot of experience in this matter, conveying a variety of rare materials besides the most common like coal, cement, clinker, urea, petcoke.

- **RCC concrete:** a good example of a particular material (that could expose the conveyor to dangerous troubles) is the Roller Compacted Concrete. STM has gained great experience in the concrete delivery systems, particularly in the delivery of RCC concrete used in the gravity dam construction. This experience has been gained operating in many projects worldwide (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. In particular, in the RCC dam field, STM developed the whole material handling process, both for the aggregates to cooling and batching plant, both for RCC concrete from batching plant to the dam site.

STM succeeded in reaching these outstanding achievements thanks to its distinguishing features: expertise in every area of activity, strong focus on the customer, passion for innovation and improvement and particular attention to the quality.

# Major conveyor system forms part of NK Tehnologija project for Finnish fertilizer company



NK Tehnologija has further strengthened its long-term business relationship with Finnish fertilizer handing company Fertilog Oy, with the design, manufacture and installation of basic equipment for its new flat warehouse. Fertilog Oy handles fertilizer at the sea port of Hamina-Kotka in Finland. The scope of supply included a 70m-long suspended belt conveyor, 50m-long extension to the existing conveyors system, with the rotary product flow diverters, as well as a bucket elevator with a capacity of 500tph (tonnes per hour).

The newly opened automated warehouse is the fourth in a row to be built with the assistance of NK Tehnologija. It is capable of accommodating up to 30,000–35,000 tonnes of dry bulk fertilizer (mainly urea), which is delivered to the terminal by railcar from commodities plants located in Russia.

The ribbon-cutting ceremony was attended by the Mayor of Kotka, the state Port Company's CEO, as well as the CEO of VR Group (Finnish Railways). These important guests gave a high seniority level to the event and reflected the project's importance to the authorities and the local business environment.

With the third mobile shiploader (loading rate: 1,000tph), completely assembled and started-up by NK Tehnologija in February 2019, the terminal is now ready to reach its maximum throughput capacity of 2.5 million tonnes per annum.

# Conveying the cost benefits of IPCC


What are the real benefits of recent FLSmidth acquisitions to customers and to the market? Primarily, complete pit-to-plant coverage means highest-quality solutions throughout the mining process chain, as well as knowledge and optimized practices that can deliver new possibilities for customers to improve productivity and lower costs.

A central element in the recent expansion is customers can now access the deepest range of In-Pit Crushing and Conveying (IPCC) options in the mining industry through one provider. The range of high quality excavators and IPCC solutions provide uniquely compact, flexible, and fully mobile/relocatable options, allowing customers to improve throughput and productivity and lower CAPEX, OPEX and other operating costs.

"We are now the only OEM on the market that can provide the full value chain. This brings value to customer processes and allows us to work closely with the customer throughout their operations to find the best possible solutions that are underpinned by a harmonized optimization from the pit through to the plant. Being active in the processing side as well as the mining side combines two very important aspects of the mining value chain. We can add to the productivity gains that our customers are looking for and closing productivity gaps that we currently see on the market," explains Thomas Jabs, Global Head of Mining Projects.

There will be improved synergy and coherence between products in the process line, allowing the potential for additional productivity. It is also easier to optimize the entire pit-to-plant process as it can be delivered from one source, explains Alexander Lehner, Director Service Line Management Lifecycle Enhancement: "All aspects of the equipment fleet are now available to customers through us. This gives them one single point of contact, which in turn helps to decrease interfaces and friction losses along the supply chain. Customers can decrease operational costs through special spare part programs and machine availability services, while increasing the equipment lifetime through dedicated life enhancement services covering everything from upgrades, retrofits and refurbishment of their material handling equipment."

## A smooth integration

As well as making a seamless range of surface mining and minerals handling technologies and resources for high-capacity mining operations, newly acquired competences, resources and technologies will also benefit customers across the global market.

"The integration has been very easy as those employees that joined as part of the acquisition have been working for a company with a similar DNA as FLSmidth. They have similar traits; they are all out of the box thinkers and focused on collaboration, for instance, and characteristics like these mean they have fit very well together during the integration process," comments Jabs.

## Considering conveyors as an economical alternative to trucks

The benefits that can be delivered through IPCC solutions, however, are clearly something that Jabs believes can immediately bring cost savings to customers: "Cutting truck fleets is one of the main reasons customers are looking at IPCC solutions. Conveyors are a very economical alternative to trucks and operators are increasingly seeing how this can be the most economical approach when transporting material from A to B.

"Previously operators looked at shovel-to-truck. Full stop. Now it is totally different — every greenfield project, every expansion project and even brownfield operations are investigating alternatives to shovel and truck. The most interest is coming from mining companies that have already introduced conveyors previously — they fully understand the savings that can be made. They are also not afraid of any changes in the maintenance regime compared to those operating trucks. There

# AGUDIO: INNOVATION THAT SHORTEN DISTANCES.

**FLYINGBELT, CABLE CRANES, MATERIAL ROPEWAYS, CUSTOMIZED CABLEWAYS.**
Since 1861 reliability, performance and innovation are our values. Agudio: a leading brand in engineering and construction of rope-hauled material transportation systems.

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is also growing interest from greenfield operators, who have not previously introduced any conveyors. We are working with them to show the potential cost benefit and productivity gains that a conveyor system can deliver; i.e., lower OPEX, more robust operations and less downtime."

### Time to push the digital advancement

Even though the potential for financial savings and productivity enhancements can be obvious for some customers that are thinking of switching to conveyors, there can be other blockages in terms of making the commitment. The switch requires changes in the ways a mine operates and affects mine planning on the operator's side.

But for Jabs change is inevitable: "It is fairly obvious that what has worked thus far will not work in the future due to changing conditions in mining. Mines will need to examine alternatives and we, as an OEM, have the responsibility to produce these solutions for our customers or develop them together. And already we are coming up with new solutions as we see some current limitations. The mechanical side is advanced but innovations are possible and likely in this area but the big steps forward will come through digitalization, automation, intelligent systems (smart IPCC) and in the feedback of information to the control centre. We are prepared to push the digital advancement in mining and work with our customers so we present solutions that fit their unique requirements, risks and conditions — and ultimately increase their productivity."

Vice President, Minerals Engineering & Technology, Marnus Fick, echoes Jabs, commenting: "Access to the complete range of key technologies all through the process simply allows engineers to digitalize the full value chain and improve the utilization of new and existing technologies. When monitoring the complete process journey from pit to plant, we are able to strengthen process-joints, align our technologies and improve productivity in the process."

### Optimizing the whole mining value chain — together

Much has been made of FLSmidth's full flow sheet acquisition from the equipment and solution perspective — but customers will also see an integrated approach when it comes to analysis and identification of areas that can be improved. Not only can FLSmidth look at how well one piece of equipment is performing but it can see how its performance is affecting other parts of the flowsheet downstream.

The example given by Jabs is in crusher selection and implementation. "Crusher selection is a key discipline in introducing IPCC. If you do not get it right you will run into a lot of problems. FLSmidth has a lot of experience in this area and works closely with our customers. But we also know that crusher selection is not the end of the story — we look closely at how crusher selection will influence the downstream processing of the material as it can vary if it is going to the mill or to secondary/tertiary crushing or to the waste dump or tailings.

"Since we also deliver downstream solutions, we are very familiar with the whole process, meaning we can deliver credible and integrated solutions to the customer that do not only focus on the IPCC element but also the downstream equipment. What we are striving for is to look at optimizing the customer's whole mining value chain — the whole comminution and processing chain — to the very end."

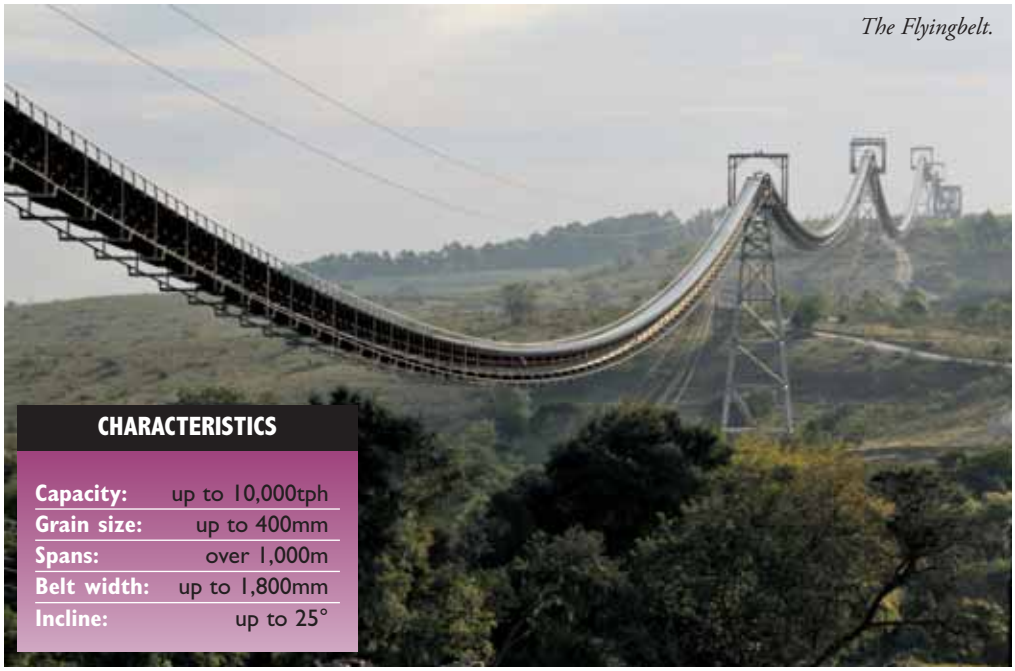
## Agudio: supplying rope-hauled systems for material transportation since 1861

In the world of rope-hauled transport systems, few projects can be replicated because different material and working conditions require customized design and construction solutions.

In its Turin-based headquarters, a team of engineers works on the development of unconventional rope-hauled transport systems: ropeways, Flyingbelt, cable cranes, cableways and funicular for material transportation.

Agudio is now part of an international group together with companies such as Leitner ropeways, POMA, Prinoth, Leitwind, Demaclenko and MiniMetro. Over 60 branches all over the world, more than 3,300 employees and an annual turnover amounting to over €850 million.

Today, as result of the several projects successfully implemented, Agudio is a respected brand in the design and construction of ropeways and Flyingbelts for material transportation in difficult environmental conditions, the most cost-effective solution to reduce distances, overcome obstacles such as valleys and rivers, or fly over forests and protected areas with almost no environmental impact.



*The Flyingbelt.*

**CHARACTERISTICS**

| | |
|---|---|
| **Capacity:** | up to 10,000tph |
| **Grain size:** | up to 400mm |
| **Spans:** | over 1,000m |
| **Belt width:** | up to 1,800mm |
| **Incline:** | up to 25° |

### Agudio Flyingbelt — technology with no barriers

**Cement plants, mining, ports**

The Flyingbelt is a patented system combining the advantages of conveyor belts and rope-hauled systems into a unique product for its efficiency and reliability, ideal


*The Ropeway in operation.*

**CHARACTERISTICS**

| | |
|---|---|
| **Capacity:** | up to 800tph |
| **Bucket volume:** | up to 2m³ |
| **Speed:** | up to 6m/s |
| **Incline:** | over 100° |
| **Working life:** | over 40 years |

for the mining, extraction and cement fields, as well as big construction sites.

As the Flyingbelt is not affected by the soil morphological conditions, it can be used in any context, with a considerable reduction in the costs resulting from civil works, excavations and supporting structures usually required by conventional transport systems.

The adoption of standard components used also for traditional conveyor belts enables the Flyingbelt to be a highly innovative system, but at the same time, ordinary for its operating and maintenance methods and costs. Moreover, the Flyingbelt can be used for hybrid systems, where the same belt can run both hanging on ropes and on traditional supports laying on the ground.

## Agudio ropeways — the evolution of species

Ropeways have always been the most cost-effective, rational and environmentally friendly solution to transport materials over long distances, steep slopes or poorly accessible areas.

Nowadays, Agudio ropeways represent the highest expression of this sector technology, with completely automated systems, which do not need personnel for material loading and unloading operations and can guarantee a high-level performance. They represent an ideal solution for new installations or revamping of existing ones.

## Agudio cablecranes — performance and Innovation

**Dams, quarries, viaducts.**

It is where the other means of transport cannot reach that Agudio technology shows its superiority.

Agudio cablecranes are designed with a double track rope having reduced diameter, easier and faster to be installed and more stable during operation, also in adverse climate conditions.

Agudio cablecranes, with loading capacities of up to 50 tonnes, traverse speed up to 8m/s and lifting speeds up to 4m/s, reflect the state of the art in this technological sector and make it possible to manage complex sites in a simple and advanced manner, with considerable advantages in terms of implementation costs and timing..

The year 2018 has been an active one for Agudio, due to the start of important construction sites around the world. These include:

- **in Germany:** a 500m-long Flyingbelt for the transport of 400 tonnes of aggregates now flying over the Lippe River, north of Düsseldorf.
- **in Portugal:** two radial cablecranes of 28 tonnes of useful capacity (385 metres of span and 160 metres of lowering of the hook) for the construction of the dam of Daivoes, in the hydroelectric complex of the Tamega River
- **in Portugal:** two parallel cablecranes of 28 tonnes of useful capacity (620 metres of span and 200 metres of lowering of the hook) for the construction of the dam of Alto Tamega, again in the hydroelectric complex of the Tamega River.
- **in Ethiopia:** the repositioning of the radial cablecrane used for the constructions of the Gibe III's dam to the new construction site for the Koysha's dam. The cablecrane has been revised and upgraded to achieve a transport capacity of 35 tons.

Furthermore, at the end of 2018, a new contract was signed with a major international cement plant manufacturer for the supply of a Flyingbelt in Brazil, the second one in this country. The suspended conveyor belt will connect the cement factory in a straight line with the new

# Benefits of using Agudio systems

- **Innovation:** the design of Agudio material transportation systems combines over 150 years of expertise in this sector with the investments in R&D for the creation of innovative transport systems like the Flyingbelt.
- **Low energy consumption:** rope-hauled systems for material transportation can carry materials for long distances, exclusively by means of electric motors. Energy consumption (or generation) only depends on the system features and type (one- or two-way), but anyway it is lower than road haulage systems.
- **Low $CO_2$ emissions:** rope-hauled systems for materials transportation do not generation $CO_2$ directly as these systems are powered by highly efficient electric motors whose $CO_2$ equivalent emissions are lower than the transport systems using directly fossil fuels, with savings up to 90%.
- **Low maintenance costs:** the maintenance costs of a rope-hauled system for material transportation designed by Agudio are extremely low, due to the use of standard components, but very reliable and of high quality, as well as programmed maintenance plans, which can be carried out directly by the system operating personnel.
- **High level of automation:** rope-hauled systems for material transportation are designed with a high level of automation to ensure the constant system control and operations and to synchronize the material loading and unloading systems with the line speed.
- **Long system working life:** rope-hauled systems for materials transportation are designed according to the most advanced guidelines and the expertise gained by Agudio in over 150 years of design, construction and maintenance of such systems which, nowadays, can reach up to over 40 years of working life, thanks to the suitably programmed maintenance plans.
- **Safe and reliable systems:** as a result of the high automation level and the component quality, rope-hauled systems for material transportation can ensure the highest levels of safety and reliability, thus offering a top performance and minimizing material transport specific costs.
- **Low dispersion of dust particles:** rope-hauled systems for materials transportation can be designed with specific dust particle containment systems, according to the type of materials, in order to minimize dust dispersion in the air during loading and unloading operations, as well as along the line.
- **System operation regardless of weather conditions:** rope-hauled systems for material transportation are designed according to the experience gained in the design of systems for the transport of people in the mountains, and therefore subject to difficult weather conditions in terms of temperature and wind. For this reason, their safe operation is guaranteed also in unfavourable weather conditions.

limestone quarry, crossing a wide valley with a span over of 800 metres, reducing the transport distance from 9km (road) just to 1.7km.

The projects in the portfolio represent important feedback from main players in cement, mining and construction sectors, which continue to recognize in Agudio a reliable partner able to offer innovative, safe and customized solutions, with low environmental impact and significant cost reductions in material transport systems.

**CHARACTERISTICS**

| | |
|---|---|
| **Hook lowering until:** | 400m |
| **Payload:** | up to 50 tonnes |
| **Traverse speed:** | up to 8m/s |
| **Lifting speed:** | up to 4m/s |
| **Span:** | up to 2,000m |

*Agudio's cablecranes in action.*

# Gambarotta Gschwendt's full-service conveyor offering includes upgrades

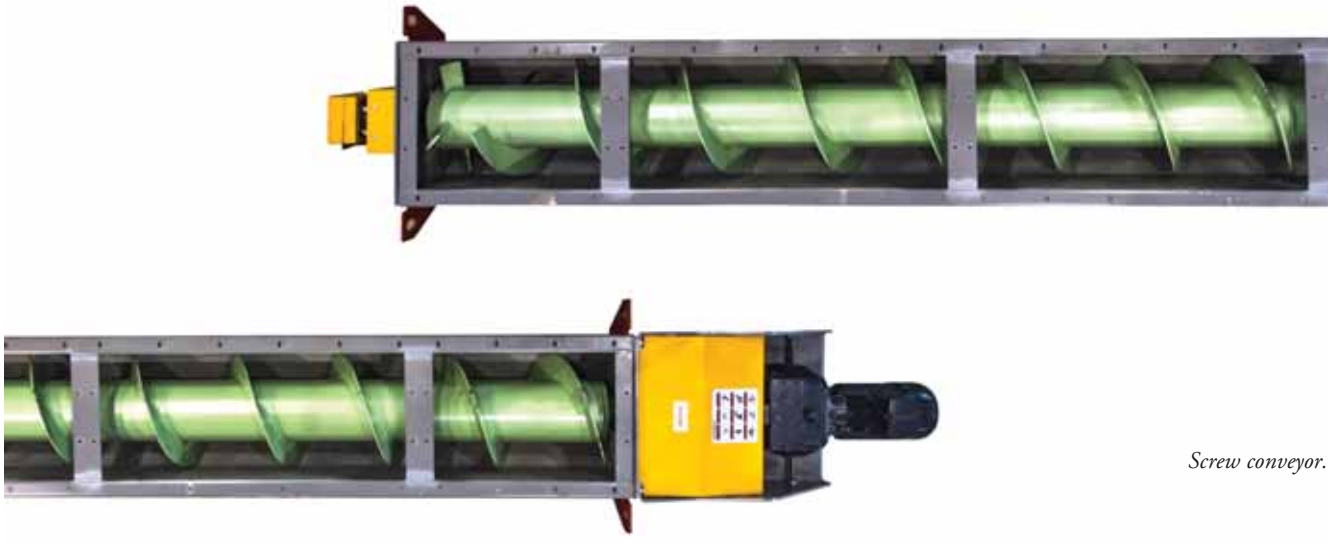
Gambarotta Gschwendt is world-renowned in the design, construction and installation of equipment for the elevating and transport of solid materials in the cement industry, such as bucket elevators, conveyors and high capacity feeders for any type of use.

All around the world, the company's countless plants are witness to the success of its winning working philosophy, which has always characterized the company since its beginning in 1919, yet continuously kept updated according to Kaizen techniques: of course, it is able to meet any customer's need. Moreover, it is often ahead with innovative and technologically advanced projects, thanks to the synergies put in place internally, with partners and with major research centres throughout Europe.

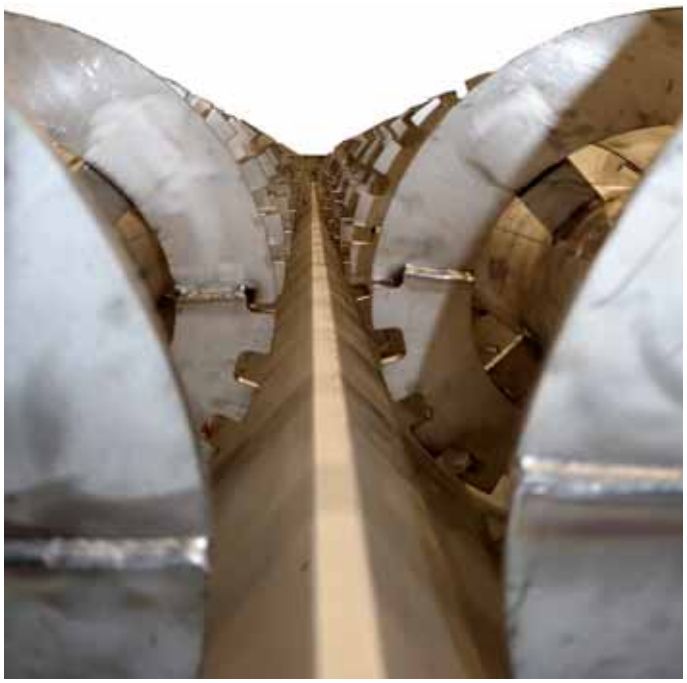
Quality and reliability have always been the strength of Gambarotta Gschwendt's, attested by numerous certifications including ISO 9001, EN1090, EN ISO 15609, ISO 9606 and ATEX standard.

Gambarotta Gschwendt's extensive and specific expertise leads to highly reliable machines on a daily basis, thus meeting every requirement in full compliance with the strictest international standards. All equipment is the result of excellent design departments, statutory procedures, continuous exchanges between the internal divisions of the company and the customers on-site, on the rapid prototyping of new devices and the use of the best quality materials and components available on the market, able to withstand high levels of wear with a favourable impact on maintenance costs and timing.

*Bucket elevator.*



*Screw conveyor.*



*Screw conveyor with intermediate supports.*

## GAMBAROTTA GSCHWENDT'S PRODUCTS

- heavy duty apron feeder/apron weigh feeder;
- high-capacity bucket elevators up to 3,000tph (tonnes per hour);
- bucket elevators for large-size material;
- drag chain conveyors/ armoured chain feeders;
- screw conveyors/mass flow screw feeders; and
- self cleaning cell feeders.

*Screw conveyor.*

## GAMBAROTTA GSCHWENDT'S SERVICES

- spare parts supply for its conveyors and for those of other brands;
- upgrades/refurbishment of its conveyors and of conveyors of other brands, keeping existing structure/casings and replacing internal parts such as chains, sprockets etc.;
- measurements of existing site dimensions/layout (civil and steel works), 3D creation and proposal of customized new conveyors/feeders;
- periodic inspection of conveyors with reporting and evaluation of each component's life expectancy; and
- maintenance supervision and assistance when replacing spare parts.

## GAMBAROTTA GSCHWENDT OFFERS FURTHER UPGRADE SERVICES

Gambarotta Gschwendt technicians are available at the customer's site to suggest improvements in the process, increasing productivity, increasing the process reliability and reducing the amount of maintenance needed.

## WHY UPGRADE A PLANT?

Compared to a new installation there are several advantages:

- reduction in the investment: structures, intermediate casings, electrical installation, etc. can be (sometimes only partially) reused;
- reduction in transport costs: if some parts are reused, transportation costs can be reduced;
- reduction of down time of the plant: only some parts of the old plant have to be disassembled;
- reuse of existing parts: saving in design time, production, dismantling, reassembling
- reuse of space: modernizing an existing machine can increase the productivity per square metre without increasing the size of the plant;
- increase of low-maintenance intervals: most of the time, an upgrade means using new updated motors, bearings; and
- conformity to safety and environmental regulations: during the operations all the protection devices will be updated.

# Van Aalst Bulk Handling: pneumatic conveying expertise

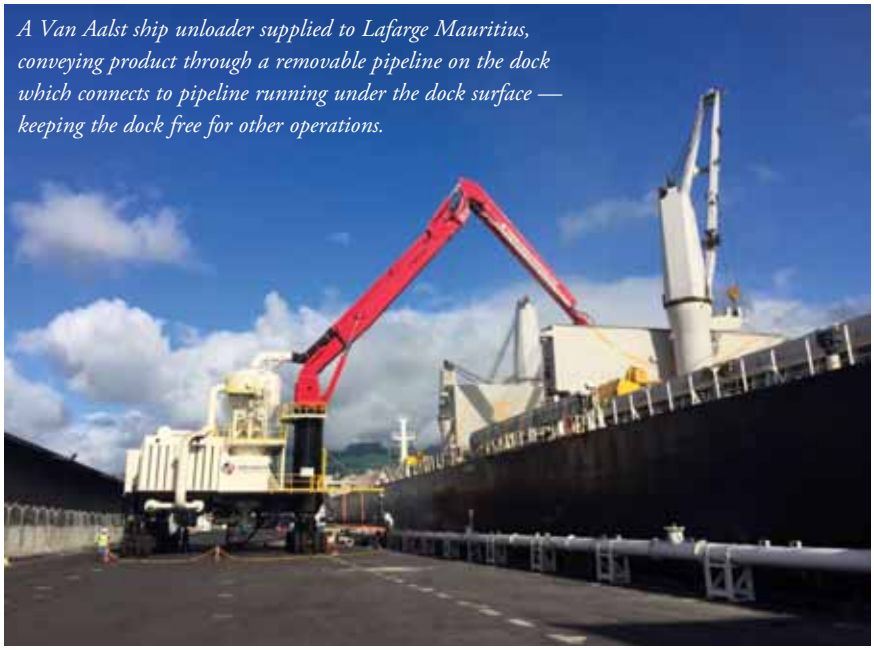
Van Aalst Bulk Handling is based in the Netherlands, and is a flexible organization focused on assisting its international customers with tailor-made solutions for their dry bulk loading, unloading, storage and pneumatic conveying projects. Van Aalst Bulk Handling provides complete designs, equipment manufacturing and supply, and provides training services to operating personnel. Its customers can rely on its experienced and reliable team of bulk handling specialists.

## Conveying the Van Aalst way

During its long history, Van Aalst Bulk Handling has developed a unique way to pneumatically convey dry abrasive materials such as cement, fly ash, granulated slag, china clay and alumina. It has supplied and installed hundreds of conveying installations to cement manufacturers and suppliers, the alumina industry and power plants all over the world.

As its primary bulk conveyor, Van Aalst Bulk Handling uses pipelines. Pipelines are a low cost, extremely durable and flexible means of conveying bulk products. The advantages of using pipelines to convey dry bulk products are plentiful:

- a pipeline has a minimal footprint, ideal for ports and plants with limited space available for bulk conveyers. Pipelines can be easily put beneath the ground,



*A Van Aalst ship unloader supplied to Lafarge Mauritius, conveying product through a removable pipeline on the dock which connects to pipeline running under the dock surface — keeping the dock free for other operations.*

*Four 5,000 metric tonne silos supplied by Van Aalst Bulk Handling for Thomas Armstrong import terminal in Sunderland, England, complete with vertical convey pipelines. The horizontal section of the pipeline runs underneath the dock to the quay, making the dock easily accessible for Van Aalst road mobile unloaders.*

keeping your dock or plant surface free of any obstacles. Wherever conveying pipelines run above ground it requires a minimal support structure. Given its minimal footprint, it is possible to route pipelines along existing support structures, further reducing installation costs and space required;

- pipelines are virtually maintenance-free. A pipeline has no moving parts that will wear and require maintenance. Once installed, the pipeline will have an operational life time exceeding any other interfacing equipment. When conveying very abrasive materials, the pipeline bends can be fitted with replaceable wear backs;
- pipelines can convey bulk product horizontally as well as vertically, in a single continuous conveying pipeline. Using a pipeline as bulk conveyer eliminates the need for additional conveying stations, dust collection systems, etc, typically seen in bulk handling terminals where mechanical bulk conveyers are used; for instance when transitioning from horizontal conveying by means of a belt conveyer to vertical conveying by means of a bucket elevator;
- pipelines can be segmented into parts and integrated in a (re)movable frame, allowing it to be placed and removed by a forklift when its needed. This is an ideal solution for unloading barges and ships in ports where the dock has multiple uses and the dock surface must remain free for other operations;
- pipelines are completely enclosed, guaranteeing 100% dust free bulk conveying; and
- pipelines are perfectly scalable. Conveying pipelines can be used for conveying capacities from 10 to 2000 metric tonnes per hour, conveying product over distances ranging from 20 to 1,000 metres in a single continuous pipe run.

*An 80tph conveying unit installed underneath a silo for MI Cement, Bangladesh.*

*A 90tph Van Aalst conveying unit installed underneath a conveyer belt for Fresh Cement, Bangladesh*

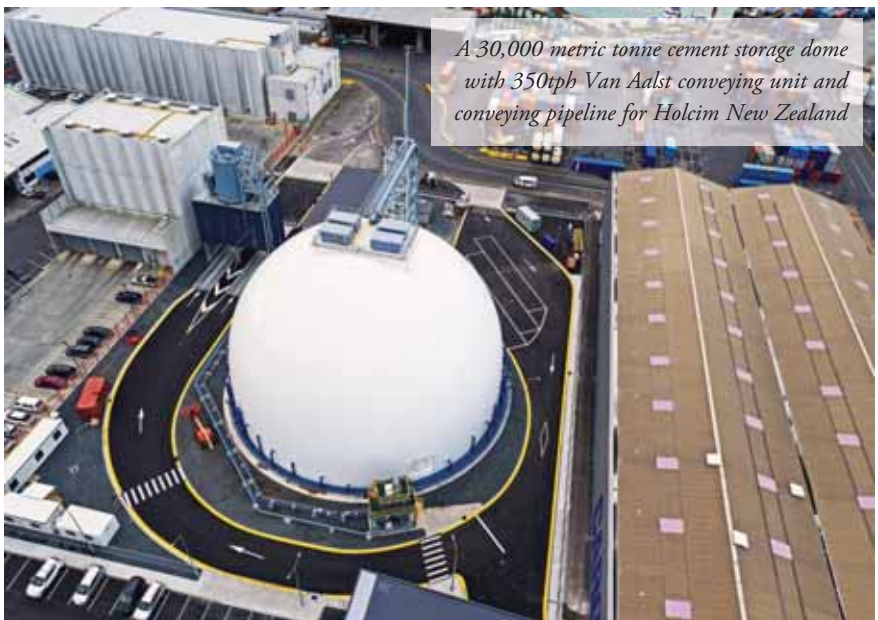
## Pneumatic conveying units — the powerhouse behind the pipeline as bulk conveyor

As the pipeline is used to contain and guide the bulk product from its pick-up point to its destination, a pneumatic conveying unit by Van Aalst Bulk Handling provides the power to move the product from A to B.

A pneumatic conveying unit from Van Aalst Bulk Handling consists of one or more transfer vessels that are filled and emptied sequentially. The process starts with filling the vessel. Once the vessel is filled, it is brought under pressure by an air compressor. When sufficient pressure has been built up in the vessel, a discharge valve in between the conveying unit and conveying pipeline will open and the bulk product is discharged from the vessel to its destination due to the pressure difference that exists between the vessel and the pipeline exit. A conveying unit with two or more transfer vessels is able to convey product in a continuous process. When one vessel is being filled, the other vessel is being discharged, and vice versa.

A conveying unit with multiple transfer vessels allows the operators to perform maintenance on one vessel while still being able to convey product with the other vessel, which reduces down time. This makes Van Aalst Bulk Handling's conveying units uniquely efficient and reliable.

Just like the pipeline, the Van Aalst Bulk Handling conveying units are compact and have a small footprint, allowing them to be installed in tight spaces underneath silos, adjacent to domes or integrated into flat storage facilities. The conveying units are tailor made to suit the customer's conveying needs, whether its for small capacities and short conveying distances or large capacities and long conveying distances. Van Aalst Bulk Handling delivers it all.



*A 30,000 metric tonne cement storage dome with 350tph Van Aalst conveying unit and conveying pipeline for Holcim New Zealand*

# RopeCon®. An efficient link to new mining areas

The RopeCon® system, which transports platinum ore from Booysendal South to the existing processing plant, has recently gone into operation. The South African mining company Booysendal Platinum (Pty) Limited, a subsidiary of Northam Platinum Limited, is relying on technology by Doppelmayr for its expansion project at the Booysendal concession. Every hour, at least 909 tonnes of material will be transported over a distance of approximately 4.8km through hilly terrain.

The terrain between the new mining areas to the north of the Booysendal concession and the existing processing plant is challenging in terms of topography. In a straight line, a distance of approximately 4.8km and a difference in elevation of 530m must be covered. For the expansion of the Booysendal mine, a cost-effective, reliable and safe means of transport was required, and Booysendal Platinum (Pty) Limited opted for a RopeCon® system to tackle the challenge of transporting 909 tonnes of platinum ore.

RopeCon® is a technology developed by the ropeway manufacturer Doppelmayr. The system offers the advantages of a ropeway and combines them with the properties of a conventional belt conveyor. It essentially consists of a flat belt with corrugated side walls. Just as on conventional belt conveyors, the belt performs the haulage function. It is driven and deflected by a drum in the head or tail station and fixed to axles arranged at regular intervals to carry it. The axles are fitted with plastic running wheels which run on fixed anchored track ropes and guide the belt. The track ropes are elevated off the ground on tower structures.

The material mined at Booysendal South is loaded onto the RopeCon® belt via a silo and two chutes. In the vicinity of the processing plant, the RopeCon is linked to the existing conveying equipment. A switch chute allows for the material either to be transferred directly onto a feeder conveyor to take it to the processing plant, or to be discharged onto a stockpile via a second, smaller RopeCon® thus creating a temporary puffer.

Booysendal was also particularly careful to choose a transport system that would minimize the environmental footprint of the mine. Because RopeCon® is guided over towers, the only space required on the ground is for these structures, which, in the case of Booysendal, amounts to no more than 12. At the same time, the system does not represent an insurmountable obstacle for wildlife or humans. The track crosses a number of roads, and even wildlife can roam freely underneath the RopeCon®.

Construction of the RopeCon® commenced in January 2018. Eleven months later, and perfectly on schedule, commissioning began. Since 20 December, 2018, the installation has been transporting approximately 20,000 tonnes of platinum ore per day over a distance of 4.8km between the mining area and the existing plant.

As part of an additional expansion programme, Booysendal awarded to Doppelmayr the contract for a second RopeCon®, which will connect with the first system and enable transport from another mining area north of the concession. The second system is designed to transport 400 tonnes per hour over 2.8km and a difference in elevation of –160m. It is due to start operating in early 2021.

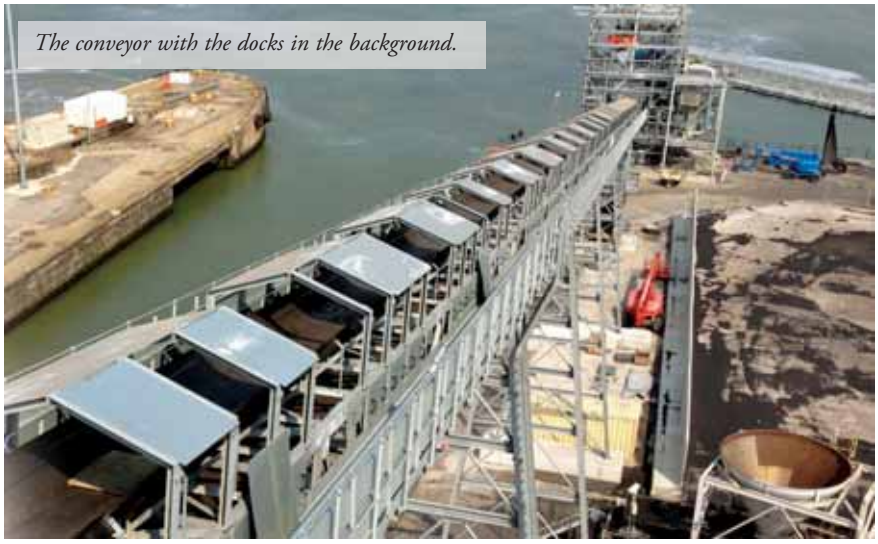
Doppelmayr Transport Technology GmbH is a 100% subsidiary of the international Doppelmayr Group with headquarters in Wolfurt, Austria. Within the group, Doppelmayr Transport Technology is the point of contact for the transport of goods and materials. Doppelmayr is the technology pioneer in ropeway engineering and is also present in other lines of business. Apart from material transport systems the group also designs, plans and manufactures passenger ropeways for winter and summer tourism as well as for the urban transit sector, rope propelled APMs (e.g., the systems currently operating at the airports of Toronto and Mexico City) or fully automatic high rise warehouses.

**TECHNICAL DETAILS**

| | |
|---|---|
| Length | 4,767m |
| Difference in elevation | 530m |
| Conveying capacity | 909tph |
| Speed | 4.2m/s |
| Number of towers | 12 |
| Motor rating cont. | 2,400kW |
| **Stockpile feeder** | |
| Length | 185m |
| Difference in elevation | 25m |
| Conveying capacity | 909tph |
| Speed | 3.0m/s |
| Number of towers | 1 |
| Motor rating cont. | 100kW |

# Biomass handling facility relies on Talentum Flame Detectors for conveyor safety

## Flame detectors work in tandem with watermist system to protect over 700 metres of conveyors



*The conveyor with the docks in the background.*

### Problem

As part of the conversion of Ironbridge power station in Shropshire from coal to biomass, E.ON Energy has constructed a biomass handling depot at Gladstone Docks in Liverpool. This allows the delivery and transfer of biomass (in the form of wood pellets) from anywhere in the world to Ironbridge via train.

The Liverpool depot consists of three conveyors totalling over 700 metres in length, taking the biomass direct from ship to train or from ship to a large storage building. Due to the highly flammable nature of biomass, the fire and safety plan required an extensive fire detection and suppression system on all three main conveyors.

### Solution

The solution was based on FFE's Talentum flame detectors and a high pressure watermist system from Hydramist©. The complete system was designed and installed by FFE contractor Fireworks.

Each conveyor was divided up into fire zones, with each zone having a dedicated Talentum flame detector, zone valve, fire control panel and set of water pipes and spray nozzles. The flame detectors and nozzles were installed inside the conveyor covers to provide optimum protection of the biomass. The watermist system operates from a central high pressure pump set with 100% redundancy.

The entire system was then linked to a side-wide addressable fire panel which allows further automatic controls to be programmed, ensuring the desired number of zones will automatically operate when required and that the conveyors will stop as soon as the fire system operates.

Fireworks trained E.ON staff to operate the system and carry out fault-finding and remedial actions if required. The entire system requires minimal maintenance and is on constant standby 24 hours a day when the biomass handling depot is in operation.

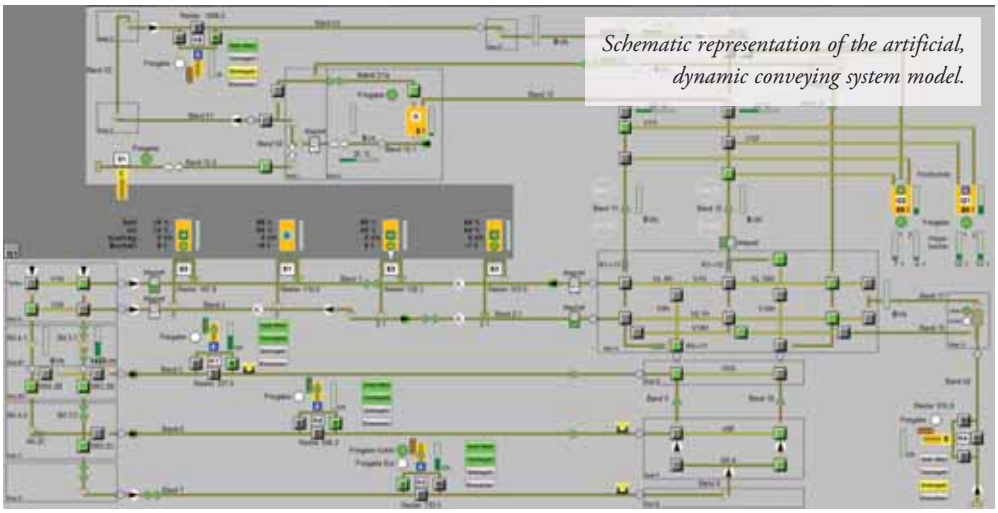
"FFE's Talentum optical flame detectors are ideal for this type of application. By utilizing infra-red (IR) sensing technology, they detect flames within seconds, irrespective of any dust, steam or smoke present. With the addition of an ultraviolet (UV) sensor the detector also becomes immune to false signals such as sunlight," commented Dr Daniel Waldron, a research scientist at FFE.

### About FFE

FFE is a UK-based, global design and manufacturing business, dedicated to supplying specialist detection products to the fire industry. The company's two leading brands are the Fireray optical beam smoke detector, with over half a million units installed worldwide, and the Talentum flame detector, one of the world's most respected flame detector brands. FFE also has a highly respected position on the global market in providing fire extinguishers for aviation use and produces a range of vibration switches for industrial applications. It is a Halma Company.

*Talentum flame detector within the enclosed conveyor.*

# Bulk handling with iSAM's Advanced Conveyor Load Controller (ACLC)



*Schematic representation of the artificial, dynamic conveying system model.*

iSAM has developed and implemented a scalable load controller, which offers optimized equipment utilization and maximum comfort to the operator, when tracking and controlling complex blending orders in today's busy bulk export and import terminals.

Bulk export and import terminals typically have extreme levels of equipment utilization. At most locations, the equipment is utilized 24/7 and waiting times create a considerable impact on the profit margin. To ensure the best interaction of the available machinery, perfect timing and a high level of co-ordination has to be realized.

For work orders which are limited to a certain amount of material, e. g. hatch loading of sea going vessels, it is mandatory to stop the material source in due time to prevent excessive material on the conveyors, unnecessary stopping and starting of loaded belts and time-consuming repeat orders.

To offer a wider range of products, it is common business to blend materials of different quality grades. For this, it is not only important to monitor the total amount of material on the belts, but also to maintain the required ratio of the different materials.

In general, yard and port machines are equipped with belt scale systems to monitor the material flow. Ground conveyors have belt scales at strategic positions, too. Nowadays those systems often deliver information to a central operator, who then instructs the individual machine operator to start/stop or adjust the material flow, but only a permanent analysis of all available inputs combined with the knowledge of the current work order can result in optimal performance and time savings.

iSAM's Advanced Conveyor Load Controller (ACLC) relieves the operator from the individual conveyor control by grouping material sources, destination and necessary conveyor belts together. It controls the material amount and guarantees the perfect material blend.

To date, most conveyor belts have been operated at a fixed speed the whole time. The utilization of the conveyor belts, also called conveyor load, is often far below their nominal utilization for a variety of reasons. As the ACLC knows the current material distribution on all conveyor belts of a production group, it dynamically optimizes and controls the belt speed for conveyors equipped with variable-speed drives to ensure the optimum utilization. The reduced conveying speed produces real benefits through the reduction in energy consumption as well as on noise emissions and in particular in the maintenance of the belts; 50% slower means approximately 75% less wear and tear.

The ACLC also has a hatch and train loading module to automatically pause the material flow according to the loading plan allowing the shiploader to change hatches or the train loadout to receive the next train. In the automated mode, the machines will first be set to pause and then automatically continue the material feed without any operator action. For non-automated machines, the ACLC can give the necessary information feedback to the machine operator.

The iSAM Advanced Conveyor Load Controller provides the perfect link between individual automation solutions of the iSAM port automation portfolio, like the fully automated train loadout or ship loading. It helps reduce human interaction to the process to a bare minimum and hence makes it not only possible to control the entire loading process from a remote location, but also to provide an unprecedented level of automation, enabling one operator to feed several ship or train loaders from multiple, blending capable sources easily from a central control room.

The latest system has been recently installed and commissioned at Hansaport, Port of Hamburg, Germany, where it tracks and controls all material flow throughout the terminal. The iSAM Advanced Conveyor Load Controller is fully operational also in the Port of Rotterdam and can be implemented in virtually every other export and import terminal.

## Advantages of the ACLC

- maximization of conveyor utilization; i.e. minimization of idle times;
- load-based speed control reducing power consumption, noise emission and wear and tear;
- grouping of conveyors, material sources and destination into production groups;
- full conveyor control and automated starting / stopping of production groups;
- position-based tracking of material amounts;
- dynamic setpoints for material sources to guarantee the perfect blend;
- feedback to machine operators during manual operation of stockyard equipment; and
- complete programming inside a central programmable logic controller (PLC) of any brand by customer's choice

## About the company

iSAM AG, Gesellschaft fuer angewandte Kybernetik, located in Muelheim an der Ruhr, Germany, develops and implements automation solutions that enable industry, commerce and service suppliers to increase their performance. iSAM's team includes specialists from the engineering, computer science and physics sectors as well as business economics, focusing on increasing customer value. The company's customers can be found all over the world and in almost every industry, such as mining, bulk handling, transport and logistics, steel and metal manufacturing and processing, tube welding and pipeline construction, mechanical engineering and plant building, electronics and aerospace.

# Rapat Corporation offers full line of enclosed conveyors to address new OSHA regulations

Rapat Corporation's complete line of enclosed conveyors helps eliminate dust emissions, providing a solution for industries looking to meet OSHA's updated silica-related regulations that went into effect in June 2018.

Perfect for silica sand, the Rapat Series ECTR is an industrial-duty, enclosed-frame conveyor with CEMA troughing and return idlers, which provide increased employee safety, even in the toughest of environments.

Features include, tool-less top covers, which can easily be removed, and bolt-on bottom covers for a totally enclosed system and a greater ability to control dust.

The Rapat Series ETR is a totally enclosed-frame conveyor with CEMA troughing idlers and a self-cleaning UHMW slide belt return. The ETR performs in extreme environments to ensure the capture of dust emissions. Also ideal for silica sand and other construction materials, the ETR Series features tool-less top covers and inspection doors, which make for easy maintenance.

With its self-cleaning UHMW slide belt return and external bearing spool idlers, the Rapat Series RR is the optimal solution for moving a wide range of products. Designed to perform in tough environments, the RR series protects the product from weather conditions while capturing dust emissions.

Each system is easily customized and built to meet the needs of each specific application. Whether it's limestone, cement or silica sand, Rapat will design and build the exact equipment required for the bulk material being handled to ensure that the job gets done right.

"For several years, we've produced enclosed-frame conveyor systems for those companies with a vested interest in being good neighbours in their communities or to provide a better work environment for their employees," said Justin Koenig, Industrial Sales Manager for Rapat. "But now with the new OSHA regulations, companies that need to handle bulk materials must find ways to comply. And we're working to provide the right systems to match any operation."

Rapat Corporation provides engineered solutions for industrial and agricultural material handling needs. DCi

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# Mideco equipment safeguards workers' health

*Before using the Bat Booth®.*

*After using the Bat Booth®.*

## How to minimize dust exposure on worker's lungs at port terminals

Port workers are constantly exposed to different occupational hazards due to a complex workplace and a wide range of transported products. One of the main challenges is occupational dust exposure during the handling of bulk materials such as grain, coal, fertilizers and similar.

While some types of dust irritate skin and eyes and cause respiratory conditions, others might lead to serious diseases like silicosis, chronic obstructive pulmonary disease and kidney disease. Handling silica containing products also increases the chances of developing lung cancer.

In addition to dust pollution during handling and transportation of bulk materials, dust exposure can occur in clean areas through transfer via contaminated clothing. Studies have found that once clothes become contaminated, they are a continual dust source until cleaned and create a tenfold increase in worker dust exposure.

To protect workers' lungs, the business owners are legally responsible to maintain air quality at a workplace via the use of appropriate dust extraction equipment and PPE.

An Australian company Mideco has developed a unique dust extraction device. Mideco's Bat Booth®, launched in 2014, is a personnel de-dusting booth that permanently removes up to 80% of dust in seconds.

Its design is simple but efficient. Bat Booth® uses compressed air to blow dust off the contaminated clothing. The dust is then captured and contained via a dust filtering system. The process takes only 10–12 seconds and tests have shown a 50% improvement in dust removed from clothes over other methods. The competitive solutions where a single point air hose method is used usually provide only temporary relief.

One of the most valuable Bat Booth® features is that it can be used frequently throughout the day without causing delays to work processes. This is particularly important as in addition to reducing staff's overall exposure it prevents dust from


entering clean areas. As workers can use Bat Booth® during their breaks and after shifts, it stops dust from contaminating common areas, offices, staff's vehicles and homes.

Using Bat Booth® at the working site protects not only workers handling dusty cargoes but their families and other company personnel.

Bat Booth® is equipped with powerful HEPA filters which comply with the latest American NIOSH standard and are currently the most efficient filters commercially available. As the filter system captures dust inside the boot, the device can be installed at any site — inside a building or out in the open air. This is particularly useful for port operators that employ different types of cargo unloading.


Bat Booth® comes with full engineering support and undergoes regular maintenance. It could be used for a variety of applications, comes fully assembled and requires minimum installation: compressed air and three-phase power.

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

Ports and shipping terminals are constantly on a look out for reliable and cost-efficient dust control methods to prevent air pollution and protect their staff. The efficiency and simplicity of Bat Booth® design make this PPE device a perfect dust control solution for staff handling dry bulk material in ports and wharves. DCi

# Getting a grip on grain

## grain handling solutions

*With many types of silos in operation, T-Grão Cargo loads several ships per day.*

Louise Dodds-Ely

## Grain terminal controls dust emissions at Brazil's busiest port

Regulations on fugitive dust emissions in Brazil can be strict, particularly in high traffic or densely populated areas, eventually yielding fines and potential downtime if not properly addressed, *writes Rodrigo Trevenzolli, Engineering Manager / Martin Engineering Brazil*. Although common fugitive dust particles from dry cargo such as coal and limestone can lead to respiratory issues, grain dust emissions possess allergenic properties over and above the common air quality concerns, potentially causing further irritation.

To prevent impacting the local community and adjacent docks with dust caused by the transfer of agricultural commodities, T-Grão Cargo, located at the Port of Santos in São Paulo, Brazil, sought solutions to help them mitigate the issue. "We have a complicated geographic position, because we are between a passenger terminal to the north and the Brazilian Navy to the south, and across the street from the port authority," explained Vinicius Pina, Operations Director for T-Grão.

### Port and terminal

The Port of Santos is the busiest port in Latin America, spanning approximately eight square kilometres (three square miles). With nearly 1,500 people working in the port on a daily basis and 1.1 million passengers boarding and disembarking ships annually, the area is always bustling, so authorities monitor air quality closely to ensure safety.

Operating since 1998 at Terminal 26 on the Northern end of the quay closest to the passenger terminal, T-Grão manages the import and export of over four million short tons (3.6mt [million metric tonnes]) a year of malt, wheat, soy and maize. Unloading vessels using two industrial vacuum units with an offload capacity of 330stph (short tons per hour) (300tph — metric tonnes per hour) each and a loading capacity of 1,433stph (1,300tph), the company manages 42 concrete silos and eight massive metal silos, totalling 126,000 short tons (114,000 metric tonnes) of storage capacity.

Spanning only 150,000ft$^2$ (14,000m$^2$) of dock space, the company is considered one of the smallest grain terminals in Brazil, but processes more grain per square metre than larger competitors, making it the most

*Dust and fines piled along the belt path, fouling rolling components.*

efficient operation of its kind in the country. Offering customs clearance, cargo delivery and reception, logistics and warehousing services, T-Grão serves a variety of customers from international importers to farmers across the State of São Paulo.

"As our production has increased over the years, so have fugitive dust emissions," said Pina. "We've worked closely with regulators and neighbours to address air quality issues."

## Particles and people

Environmental controls are important in grain transport to not only prevent dust from escaping, but also to protect against excess moisture, which can lead to mould growth. Receiving cargo from trucks in an enclosed area, the material is quickly carried on covered conveyors to the proper silo to be stored for eventual loading and export.

*Prior to the upgrade, dust exited the back of the chute, fouling the tail pulley and affecting visibility.*

The biological purpose of grain pollen is to travel long distances on atmospheric air currents, but processing adds light dried material, which significantly increases the volume of emissions during industrial handling. According to a study by the University of Wisconsin conducted on grain particulate emissions at harvest time, breathing in grain dust impacts the health of producers as well as others who work in the industry.[1] Low levels of exposure can cause chest tightness, sore throat, nasal and eye irritation. Long term exposure can produce ongoing congestion, and can be a significant problem for those with asthma.

Transfer points at T-Grão range between 32-50 feet (10-15 m) in height. As dry organic material was dropped from one belt to the next, the impact created turbulent air pressure that forced dust out of openings in the chute. The fugitive emissions significantly lowered air quality and visibility in the immediate work areas, forcing workers to wear protective masks when working around any part of the conveyer system. The dust often travelled beyond the site line.

The Santos Estuary — the waterway that serves the port — is partially protected from high winds off the Atlantic by a wind shadow created by high-rise buildings and hilly terrain along the coast. The placement of Terminal 26 in the northern part of the port, however, leaves it exposed to wind travelling up the estuary. Depending on the direction and force of the wind, dust created at the transfer points had the potential of travelling long distances.

*[1] Shutske, John; Esker, Paul; Kirkhorn, Steve, MD; "Human Health Concerns from Grain Dusts and Molds During Harvest", University of Wisconsin, College of Agricultural and Life Sciences. Madison, WI, USA. July, 2017. http://fyi.uwex.edu/agsafety/confined-spaces/grain-storage-and-handling/human-health-concerns-from-grain-dusts-and-molds-during-harvest/*

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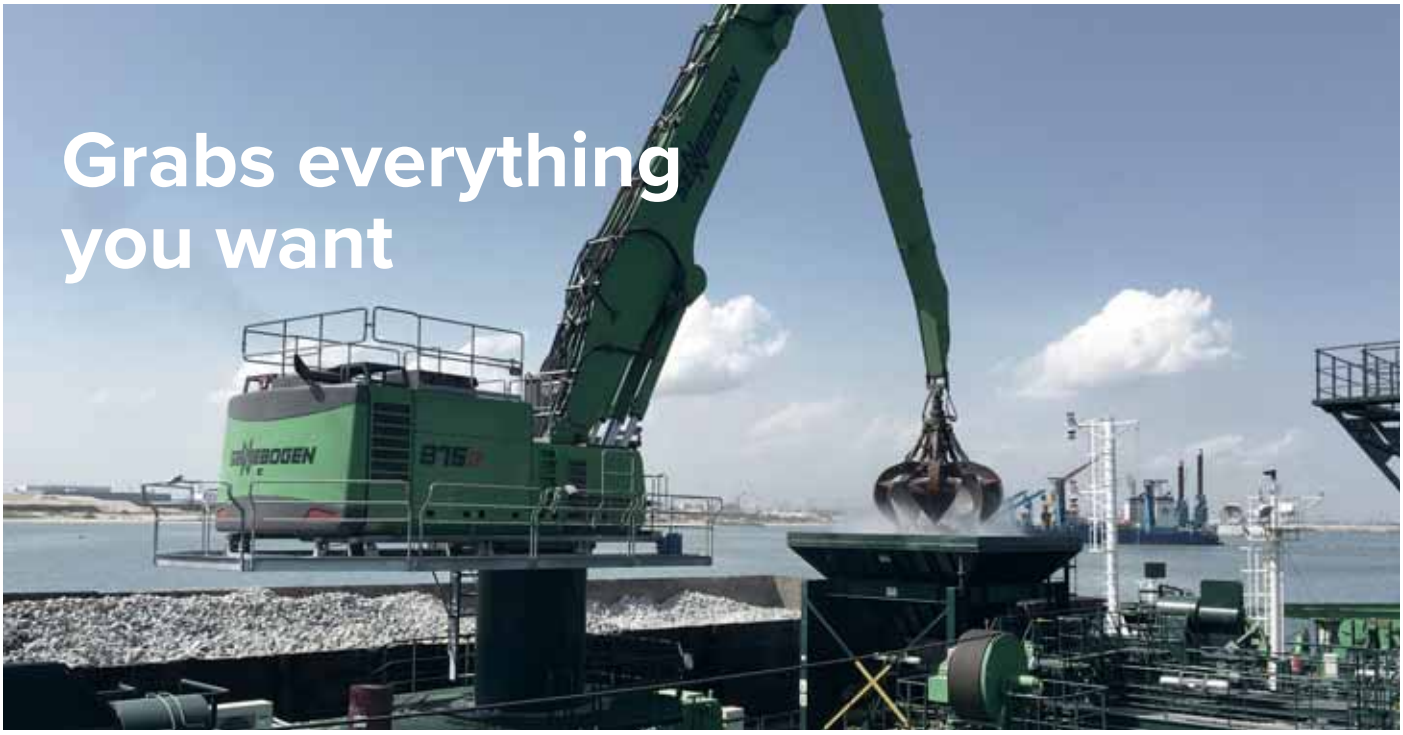

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*Wearing a protective mask, a worker inspects the outer transfer chute.*

*The EVO® Skirtboard Cover is shown with two dust bags.*

"Complaints were fairly common, and our proximity to the port authority allowed an immediate response from inspectors," Pina said. "When we received a complaint, we acted to address the issue right away, but we needed a long-term solution."

## Battling dust

Utilizing a cleaning crew of 45 workers for 24 hours per month, the inner and outer areas were thoroughly cleaned. However, according to managers, grain particulates must be cleaned and deposited correctly. "Investment in cleaning equipment just to control dust buildup was high," Pina explained. "Along with using brooms and other basic equipment, we purchased an expensive Italian-made sweeper. Cleaning occupies labor from other operations, spans large areas of the dock and warehouse, and ends up creating dust while it's being done."

Operators first sought an answer to the dust by bringing in an equipment manufacturer that installed a transfer chute. This was intended to contain dust from the discharge flow as it fell onto the belt. What it did not do was control emissions at the loading zone where the impact would cause plumes of dust to escape. The dust filtration system attached to the settling zone chute was inadequate, due to the volume of emissions and a poor chute design.

"In any given week, the dust system required


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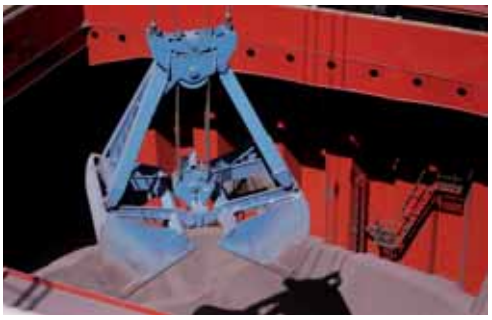

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*The customized tailbox minimizes emissions at the back of the chute.*

maintenance one day and broke altogether the next," said Pina. "At one point, a breakdown caught us unprepared at a critical moment and resulted in costly unscheduled downtime."

## Rethinking the transfer point

With complaints still periodically coming in from neighbours and ongoing internal air quality issues, T-Grão turned to three suppliers to propose solutions within their budget. Technicians from Martin Engineering examined every component of the conveyor system, from efficiency to safety and discovered that, due to the height of the transfer chute, dust created by the impact of material was most turbulent at the loading zone. When cargo hit the belt, pressure within the loading chute increased, pushing particulates at a high velocity out of any gap that was not sealed. Moreover, because of inadequate cleaning of the belt's surface at the discharge zone, fines clung to the belt causing carryback on the return side, which led to spillage and dust along the entire conveyor path.

The result was large amounts of fugitive dust in the area, reducing air quality and visibility, settling on all surfaces and fouling rolling components. Seizing idlers contributed to belt mistracking and spillage, further increasing operating costs for cleaning, maintenance and downtime.

Technicians made a series of transfer point recommendations for controlling air flow and reducing carryback, which is essential for decreasing dust emissions. After preparing a detailed report and proposal, T-Grão managers agreed that a total transfer point solution was needed. Beginning with a tail sealing box, the solution included a skirt board cover, dust bags, impact cradle, slider cradles, track-mount idlers and a belt tracker, completed by a heavy-duty belt cleaner.

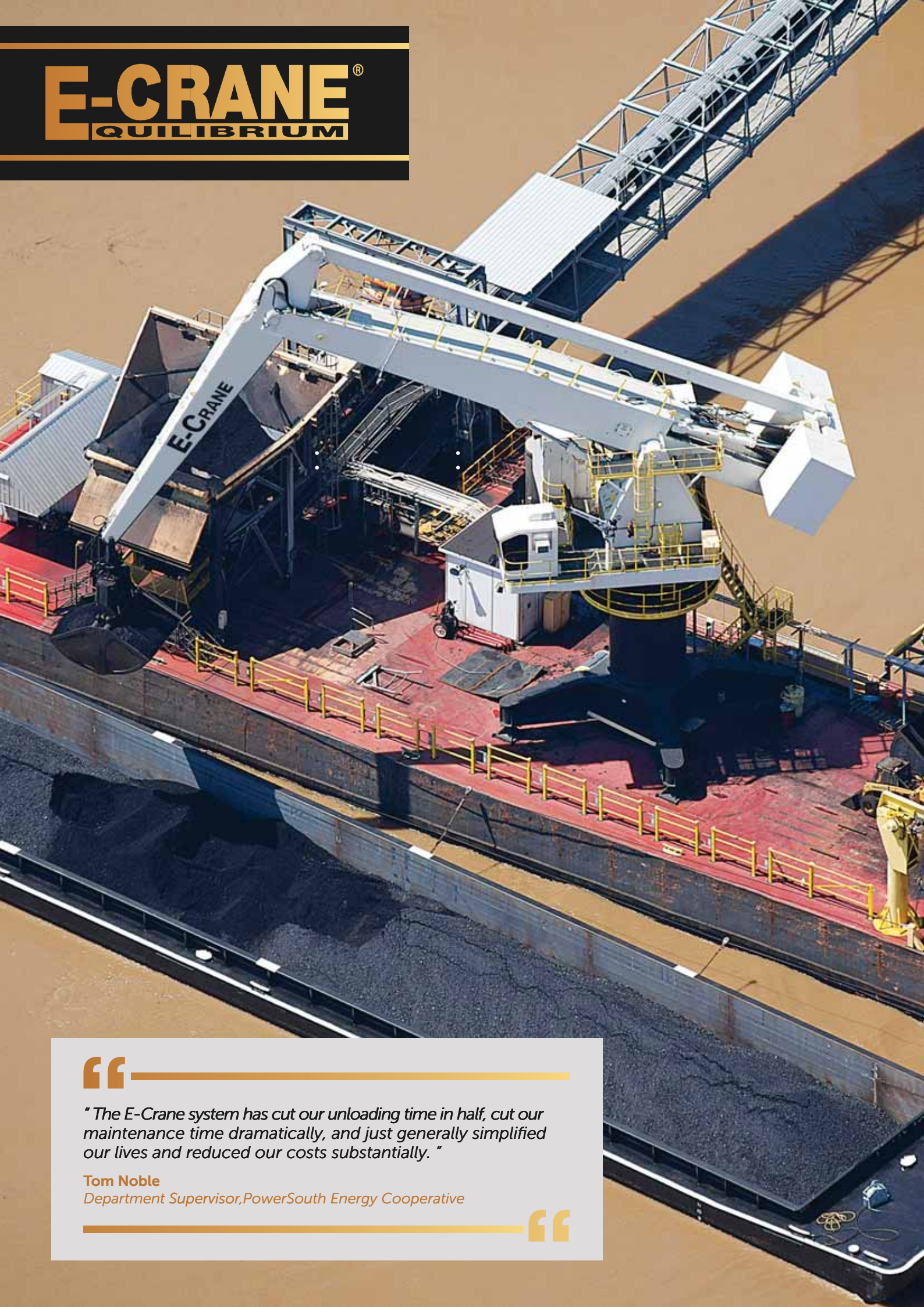
## Controlling airflow

Uncontrolled airflow and improper sealing through the loading and settling zone is the main culprit in the creation of dust and spillage in the transfer area, and it starts with the tail pulley. Protecting the tail pulley is important, because fouling of the pulley's surface can lead to belt slippage and drift as the belt is entering the loading zone. Uneven loading worsens mistracking and breaks the belt seal with the skirt board, causing serious spillage and dust emissions. Installed on the rear of the chute work, the tail sealing box effectively stops dust emissions from the rear of the chute, protecting the pulley.

A vital component of the design was containing, lengthening and increasing the interior space of the settling zone. Along the entire length of the chute is externally maintained skirting, mitigating dust emissions and spillage due to turbulence and cargo shifting. The cover placed on top of the skirtboard reduces environmental problems posed by 'shedding' debris and material by enclosing it in a safe area away from moving parts. The structure controls airflow so fine particulates are directed toward the two dust bags installed above the chute, while heavier airborne dust is given space to travel and settle without leaving the chute environment. Material entering the dust bag is retained until the airflow subsides enough for the bag to relax and the load to drop back onto the belt.

To control the turbulent pressure buildup from material dropping onto the belt, the heavy duty impact cradle features a top layer of slick UHMW polymer moulded to a base of impact-absorbing SBR rubber, all reinforced with a steel support structure able to withstand as much as 17,000 pounds (53.4 to 75.6kN) of force. Suffering no abrasive damage to the edge as the belt glides over the polyurethane bars, the cradle protects against impact wear on

# E-CRANE® QUILIBRIUM




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

**Tom Noble**
*Department Supervisor,PowerSouth Energy Cooperative*

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the belt and mainframe, with no rolling components to break down, which reduces maintenance and prolongs operational life.

Extending from the impact cradle down the length of the settling zone are cradles that slide in and out for easy maintenance while retaining a tight belt seal and a smooth path though the settling zone to mitigate dust creation. Using a smooth UHMW 'box bar' engineered to prevent heat buildup, the unique design provides dual-wear surfaces for extended equipment life. By supporting the edges of the belt to eliminate sag, the cradles prevent spillage, stabilizing the belt's path and helping the skirting retain a tight seal. To offer further belt support, supplemental idlers are placed in the tight spaces between cradles to retain a straight belt profile, preventing 'pinch points' that can damage the belt over time and sag points that allow spillage. Utilizing sliding frames on a stationary base, rolling components on the idler are easily installed and serviced.

After the belt leaves the settling zone, a modern tracking system controls belt mistracking caused by uneven cargo. Using a rotating troughed idler connected to sensitive extension arms with rollers that ride both sides of the belt edge, the unit detects slight variations in the path and adjusts the idler before the belt drifts. Precise alignment keeps the belt from contacting the mainframe and causing edge damage and spillage, ensuring that the belt properly enters the discharge zone for optimal cleaning.

To conclude the project, technicians installed heavy duty belt cleaning system with a primary blade and spring tensioner designed to keep a tight seal across the blade profile with minimal wear on the belt or splice. Utilizing a curved blade design, the system maintains the most efficient cleaning angle through the life of the blade. Mounted with a minimal footprint on the mainframe, the cleaner improves discharge of fine material, reducing carryback, spillage and dust emissions along the return path.

As a compliance measure, technicians also installed safety guards along the system to prevent reach-in hazards. To inspect and monitor the operations of the system, sealed access hatches allow safe observation and maintenance of components.

## Results

When the system was activated, operators immediately observed significant results. As material moved through the system, particulates remained within the enclosure and either collected in the dust bag or settled back into the cargo flow. Along with less carryback on the return side of the belt, dust was drastically reduced in the immediate area around the conveyor system at both the loading and discharge zones.

"It was a substantial improvement over the previous design," Pina said. "The staff no longer needs to wear protective gear just to enter the area, and visibility is improved."

After a lengthy observation period, operators report that there has been less downtime for cleanup and maintenance, as well as improved workplace safety. In addition, managers have enjoyed a reduction in complaints from neighbours and less scrutiny from authorities inspecting the port for air quality.

"Our dust control efforts have set an example that is now being considered by terminals up and down the port," Pina concluded. "We are now planning to install a similar design on several of our other transfer points."

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 more than 20,000 print copies in circulation around the world. The entire 500+ page volumes can also be downloaded as free PDFs from the Martin website. Martin employees take an active part in ASME, SME, VDI, CMA and CEMA, and the firm 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 18 Martin facilities, including factory-owned business units in Australia, Brazil, China, Colombia, France, Germany, India, Indonesia, Italy, Mexico, Peru, Russia, Spain, South Africa, Turkey, the USA and UK.

*The Martin® Impact Cradle HD, Slider Cradle and Trac-Mount™ idlers create an effective control system.*

# Cotecna, global provider of quality assurance services for the grains industry

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

Grain products are an essential source of staple food for humans and livestock, and their global trade is highly dependent on various factors such as weather, crop yields, input prices, political decisions, demographics and diet trends. In order to minimize the impacts of this variability and to protect end-consumers, the grains industry requires integrity, safety and sustainability.

Cotecna, a proud member of the Grain and Feed Trade Association (GAFTA), offers a seamless access to a high-calibre and comprehensive suite of customized agriculture inspection and testing services to help industry players closely monitor their activities in accordance to these principles. Cotecna thereby performs verification, weighing and sampling, plus testing and certification of grain products and processes across the entire supply chain. Each service is designed to assist the industry in confidently producing, handling, transforming and commercializing their products, while maximizing profitability, ensuring contractual conformity and greater transparency.

Cotecna is present in all key grain markets, where it offers its specialized services covering all types of grains such as wheat, corn, barley, rice, sorghum, oats, pluses, etc. These services range from independent assessments of the quality and quantity of the product to monitoring of transport and storage conditions.

From field to end-users, Cotecna's experienced inspectors and analysts can establish the complete traceability of a grain shipment, thus protecting the interests of both producers and traders, and reducing exposure to risks that can arise due to delays, damages and losses. It allows clients to react swiftly at every stage of production.

Inland, Cotecna's specialists perform on-site grading, weighing and testing. Silos and warehouses intake and outtake services can also be offered, as well as crop monitoring.

*Grain silos.*

At load ports, Cotecna provides numerous services such as quality and quantity pre-inspections, holds inspections, loading supervision, weight determination surveys using shore scales and/or draft surveys and marine surveys. The resulting quantity and quality determinations are then certified and used for the financial settlement of the sale contract covering the cargo. A constant monitoring of the loading process including sampling is essential. Samples are analysed in accredited laboratories according to the required national and international standards, which are specific to the transaction.

During loading, express analyses are performed to monitor the main parameters, and Cotecna informs its clients immediately in case of any quality deviation. A monitoring of the fumigation process can also be offered. Before the voyage, Cotecna's inspectors will seal the holds of the vessel.

At discharge ports, Cotecna's intervention typically includes weight determination, as well as sampling and analysis. When opening the holds, the cargo is visually inspected, especially in order to detect water damages and other types of contamination.

When it comes to storage, Cotecna can offer stock monitoring services in order to improve access to financing for borrowers. It covers a large range of bespoke services, going from the pre-inspection of storage units to the monitoring of deliveries of stored goods to end-users, going through regular checks of stocks and even full-time supervision of stored goods. Thus, Cotecna mitigates transaction risks for lenders and assist in compliance with the requirements of the Basel frameworks for traders.

To stay competitive in this market, Cotecna is continuously investing in modern facilities and cutting-edge equipment, including in the fields of proximate chemistry, molecular-genetic and phytosanitary expertise, especially by developing its own phytosanitary research and analysis department to meet increasing demand for such services, for example related to Egypt. Cotecna is thereby reinforcing its capabilities by strengthening its network coverage as well as laboratories and field capabilities through both acquisitions and organic growth.

In 2017, Cotecna acquired NofaGroup, headquartered in Rotterdam, which runs a state-of-the art laboratory for agricultural products and recently received an accreditation from the RvA (Dutch accreditation council) to analyse 3-MCPD and glycidyl esters. Cotecna has recently opened new facilities and operational bases for inland and at ports inspections and testing in North America (USA — including a brand-new ISO 17025-accredited laboratory — and Canada), in Asia (Indonesia, Myanmar), and in Bulgaria. In September 2018, Cotecna also completed the acquisition of Shiva Analyticals (India) Private Limited, one of India's foremost analytical testing laboratories.

Combined with Cotecna's established international network, these acquisitions and organic developments have widened the scope of services Cotecna provides to its clients worldwide, both geographically and in terms of services offering.

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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.

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# Yet another record-breaking year for Cimbria in the Baltics

*Turnkey silo plant in Estonia: chain conveyers,bucket elevators, pre-cleaner Delta 159, continuous flow dryer (80tph), storage silos, hopper silos.*

Cimbria dealer in the Baltic states, Dotnuva Baltic, is a prominent provider of agricultural solutions in Lithuania, Latvia and Estonia, with more than 20 years business. For Cimbria and Dotnuva Baltic, the year 2018 was extremely busy in the Baltics with the number of projects being almost doubled. After a wet and complicated harvesting season in 2017, farmers, co-operatives and grain trading companies in the Baltic States decided to invest in grain drying and storage facilities in order to be prepared for the coming season. Cimbria has a good reputation and is well known in the Baltic as a supplier of high quality and reliable equipment, and it is thus to be expected that grain growers will continue to choose this equipment, since it is recognized as being amongst the best in the market.

Dotnuva Baltic reports that interest in grain handling equipment was huge in all three Baltic States: Lithuania, Latvia and Estonia.

As in the previous year, most of the installations were built in Lithuania. The total capacity of the grain silos built by Dotnuva Baltic UAB in 2018 exceeded 135,000 tonne. The majority of the silos were installed for co-operatives and grain trading companies, as farmers invested primarily in drying plants.

Also on the Latvian market, Dotnuva completed two silo plants, with a total capacity of 34,000 tonnes.

Dotnuva Baltic in Estonia succeeded in

*15,000-tonne silo plant in Rezekne, Latvia: chain conveyers, bucket elevators, pre-cleaner Delta 146, continuous flow dryer, storage silos.*

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securing a nice order for a turnkey silo plant with Cimbria's biggest continuous flow dryer in the Baltic (80tph [tonnes per hour]). The project was successfully implemented — Dotnuva Baltic was responsible for the entire project, all the way from design/ engineering, foundation construction and equipment supply to installation and automation works.


*20,000-tonne silo plant in Pasvalys region, Lithuania: chain conveyers, bucket elevators, pre-cleaners, continuous flow dryer, storage silos, hopper silos.*

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 the AGCO corporation. 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, 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.

# Optimizing grain handling with solutions from Standard Industrie International

Environment, productivity, and profitability are at the heart of every industry; there are many alternatives to choose from that are either short or long-term on the market. Standard Industrie International offers a wide range of bulk handling solutions, quality products, advanced technology with over forty years of experience as a key partner providing long-term and effective solutions for today's market.

Standard Industrie International solutions can help plants with grain handling and storage issues to optimize the performance of their production tools while reducing their operating and maintenance costs.

An illustration of Standard Industries' solutions is shown with the following projects carried out in the agricultural industry:

## Improving the flow of product from the hopper with AIRCHOC®

Standard Industrie installed two AIRCHOC® air cannons on each of ten hoppers with balanced food for cows in a food production plant in Mexico.

### What was this customer's problem?

The mixture for the cow's feed that contains maize, sorghum, grass, flour, nutrients, soybean paste and mineral salts, caused flow problems in the storage hoppers. If this mixture remains more than eight hours or one night inside the hopper, the morning after it is very difficult to extract the mixture. The cows have to eat at specific times to gain the necessary weight; if they don't eat at the correct times, the process of selection and fattening takes longer and costs more. Indeed the cow spends more time in the farmyard than expected before being slaughtered. Another important point is that if the cows don't eat on time, it causes stress which is not good for the quality of the meat. The cows should remain relaxed all the time for the taste and the softness of the meat. The company's main activity is export of premium meat, and the food plant is an important part of the process in order to get good meat.

Each hopper has two outlets. So Standard Industrie installed one air cannon per outlet and now the customer does not face any more ratholing or bridging in the hoppers and the cows eat on time.

### Why is the AIRCHOC® solution efficient?

Ninety-three per cent of clogging or concretion problems in silos and hoppers cause a total shutdown of production. Airchoc® prevents 100% of manual intervention accidents on clogging issues in storage units. Since Standard Industrie filed for the patent for the air cannon system in 1978, more than 50,000 Airchoc® have been

NEGRINI
since 1967
S.R.L.

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

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sold in 90 countries.

## Unclog flour in silos with GIRONET®

Standard Industrie International was contacted by its customer, which specializes in pig breeding, because the customer wanted to clean clogged silos and reduce flour dead stock. The clogging of the flour created ratholing issues on more than six 25-metre-wide silos.

Safety is essential for the customer, which is why the GIRONET® was of interest. Standard Industrie's team carried out a cleaning intervention during several days on site with an engineer in order to make the clogged flour blocks fall from different silos with a certified ATEX GIRONET®.

The flour was very old, and the contact with humidity made it really hard. The client was very impressed by the manoeuvrability, the safety and the efficiency of the GIRONET®.

### Why is the GIRONET® solution efficient?

Standard Industrie's intervention team introduced the Gironet into the silo. The GIRONET®, thanks to the rotation of the brass chains (ATEX certifications – NFPA), make the material fall out of the silo.

## Improving the loading of grains with LIFTUBE®

Standard Industrie International equipped its agro-food customer in France with eight metres of LIFTUBE® ATEX and one-metre of hopper hood and antistatic lateral curtain

### What were this customer's problems?

- product loss;
- dust emission;
- high height chute; and
- belt mist racking.

Since the LIFTUBE® installation, no cleaning has been planned for this area, no more mistracking, after loading 30,000 tonnes of product, the height of the chute is completely compensated for by the consignment.

### Why is the LIFTUBE® solution efficient?

The LIFTUBE® is an efficient solution developed by Standard Industrie International in order to optimize the sealing of conveyor belts, and to improve their safety.

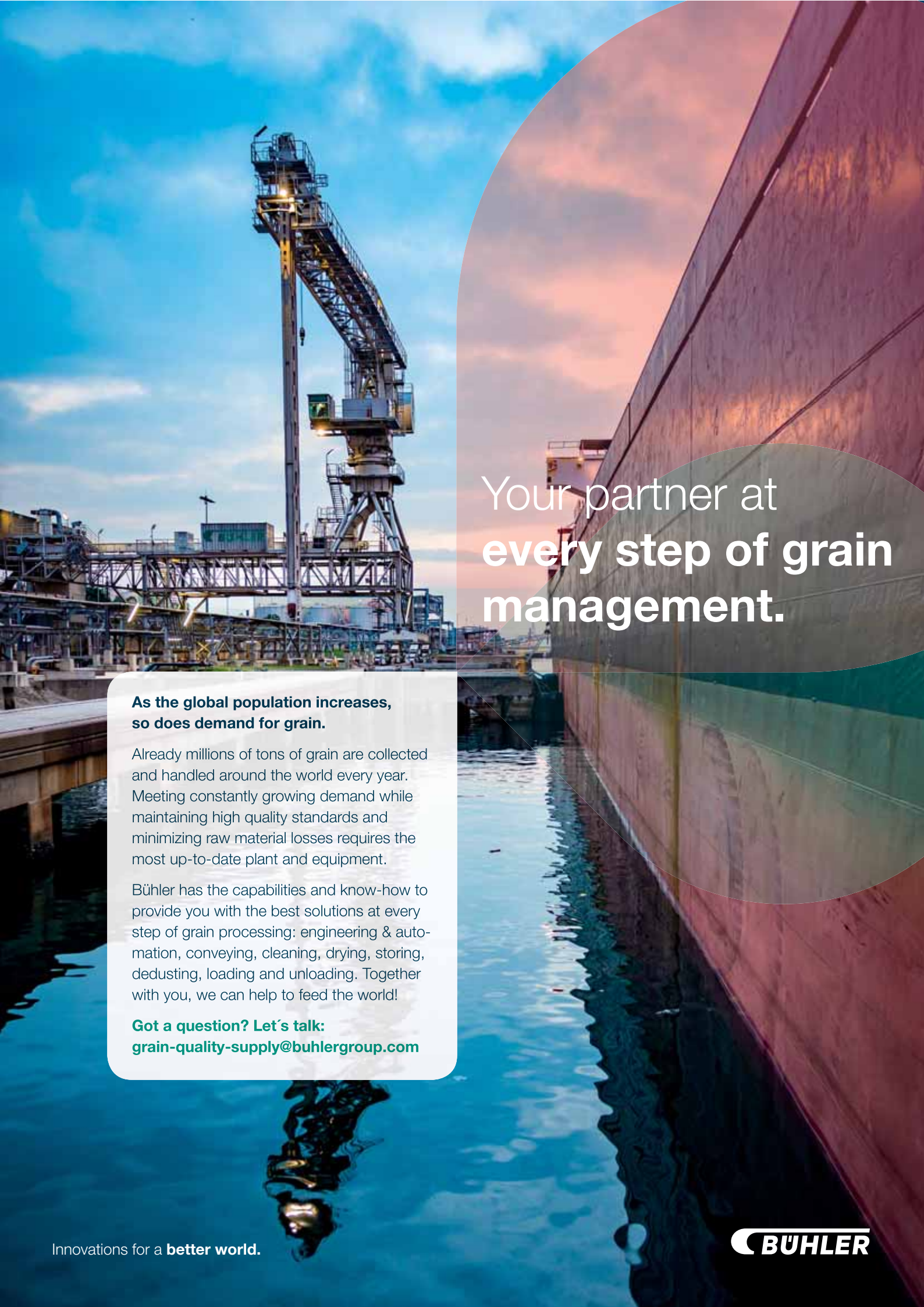
The patented system ensures significant reductions of dust emissions and spillage, improvement of maintenance service, safety of the workers. The LIFTUBE® is designed for rubber belts up to 54" width and can support material up to 572°F with particle size up to 20".

Main advantages:

- **Modular:** adaptable on existing or new conveyor, can fit on all or part of the conveyor.
- **Safety:** a complete protection of pinch points avoiding any physical contact with the belt. Moreover, reduction of dust emission improves health, safety and working conditions for the employees.
- **Environment:** drastic reduction of dust at the transfer points and chutes areas.
- **Maintenance:** tilting glide-boards and tilting idlers, easy access for quick maintenance without dismantling the entire structure.
- **Payback/cost efficiency:** reducing the loss of added value product or raw materials, LIFTUBE® allows a quick ROI as it doesn't need a major transformation of existing conveyor design.

LIFTUBE® is also available for ATGEX rated-zone, food-grade and self-extinguishing options.

The Standard Industrie International range of solutions is extensive, and covers any cleaning or optimizing need for existing failing conveyors.



# Your partner at **every step of grain management.**

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Already millions of tons of grain are collected and handled around the world every year. Meeting constantly growing demand while maintaining high quality standards and minimizing raw material losses requires the most up-to-date plant and equipment.

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# Economic advantages follow Dome Technology innovations and key benefits

*Global commodities merchandizer and agricultural-goods processor Louis Dreyfus selected a 22,500 metric tonne dome for canola-pellet storage in Yorkton, Saskatchewan, Canada.*

Selecting a new grain-storage solution is a big decision, but with it comes the opportunity for big company growth, *writes Rebecca Long Pyper for Dome Technology*.

Dome Technology builds bulk-storage domes with economic advantages that come from steel-reinforced concrete construction. A dome's strength provides a few key benefits that combine to potentially improve a company's bottom line:

**1. Large capacity.** Often, those who buy land on a port get less property for their money, requiring decisions on how to achieve the necessary storage on a smaller parcel of land.

Because of its height, a dome allows companies to stack product deeper, taking up less property at the site. The double curvature of a dome lends itself to the ability to build up, rather than out, and that curve provides strength at all points of the structure, even near the apex. The entire interior of a dome, then, can be used to contain product.

**2. Increased throughput.** The dome tolerates frequent loading and unloading, outperforming steel structures over time. The dome's tolerance for cyclic throughput is high because of its structural integrity. Filling and emptying will stress any structure, but a dome's rebar accepts the load without fatigue problems; the stress is not channelled to weak spots like bolts or seams because there aren't any. The robust nature of a dome doesn't require regular maintenance, and the concrete shell's lifespan is indefinite.

**3. Increased mix and blend.** For processors, shuttle loaders and exporters, blending is essential. The strength of the dome makes blending or mixing and blending possible. A dome is cost competitive with silos when providing the ability to pull from multiple gates, an option limited with steel tanks. "Domes allow you to maximize blending capability, giving companies the opportunity to maximize profits and efficiencies," Dome Technology sales manager Heath Harrison said. "The grain industry operates on tight margins, so sometimes throughput and mix and blend are all we have to increase the bottom line. Domes and DomeSilos will maximize that bottom line."

In addition to these benefits, recent construction advances are yielding better results for grain companies. For instance, Dome Technology has pioneered round explosion panels that channel pressure out of the structure, preventing structural damage in the event of an explosion.

Companies eager to secure no-entry options can explore different reclaim systems that make this possible; Dome Technology's in-house engineers work closely with customers to determine reclaim that delivers necessary throughput and keeps employees safe.

Lastly, for companies moving product from barge to storage to truck in short order, the Drive-Thru DomeSilo might be the answer. Dome Technology has pioneered the Drive-Thru DomeSilo, a tall, skinny dome with drive-through capability that stores more product on a smaller footprint than a silo of comparable dimensions and allows for direct load-out.

The Drive-Thru DomeSilo incorporates all structural, mechanical, electrical and control systems to provide a complete turnkey solution from receiving to vessel loading. "Companies can save on building a single drive-through storage facility by eliminating the need for multiple mechanical systems, operators and structures," Dome Technology sales manager Lane Roberts said, noting that the Drive-Thru DomeSilo complete package is less expensive to build than a silo-centric system of similar capacity.

The model debuted in the cement industry in the summer of 2018 but is now available for grain companies too.

# Legacy Building Solutions

## meeting the challenge of storing fertilizer


*Flat storage buildings cover multiple operations.*

## When flat storage solutions are the best choice

When storing bulk materials, including fertilizer and commodity crops, there are two primary storage methods: horizontal and vertical.

Although both storage methods are widely used, bulk flat storage has several advantages over vertical storage solutions, including:

- increased capacity; and
- flexibility for multiple operations.

### Flat storage buildings have higher capacity

Storing bulk material in a building means more room to pile product. The diameter of vertical storage space limits the amount of product that can be stored in a bin or silo.

Bulk storage buildings with clearspan space have plenty of room for product piles. It is easy to change the height, number and size of piles to accommodate any amount or type of product.

Legacy Building Solutions designs bulk storage buildings to have the highest possible capacity. The steel frame of the structure allows wider or longer buildings with more available floor space. There are no interior columns or supports.

The rigid steel frames are engineered to support all live and dead loads on the structure, including conveyors, conditioning equipment and ventilation. Hanging these structures from the building frame keeps them off the ground and out of the storage area. Every inch of increased capacity makes the building more efficient and cost effective.

Precast concrete panels are an efficient and cost-effective way to create storage bins. The panels allow product piles to the very edges of the building, and can be relocated when storage needs change — easier than adding a new silo or bin.

### Flexibility for multiple operations

Flat storage buildings can be used for mixing, loading and distributing products. Covering these operations keeps the stored product dry, and allows for year-round work. Few businesses are purely devoted to storage. Enclosed flat storage buildings have space for handling, blending, maintenance, retail and even office space.


*Overhead conveyors simplify filling and loading.*

*Custom building design maximizes any storage operation.*

endwall vents. Warm, moist air moves higher in the building before exhausting out peak vents. Endwall vents are sometimes added to increase the airflow inside.

Overhangs and peak vents comprise a gravity ventilation system, which requires no electricity or maintenance costs. Buildings with higher ventilation requirements may also include an active ventilation system with fans and powered vents, which produce a specified number of air turns.

Flat storage buildings are optimized to create a lower per-tonne storage price. With additional options for operations, ventilation and building design, Legacy Building Solutions has created some of the most cost-effective storage options on the market. DCi

The inside of a bulk storage building can be used to store multiple products, or to separate bulk and bagged material. Bagging and packing can be done under the membrane cover for increased efficiency, protection and maintaining product quality.

## Ventilation

A good ventilation system maintains the cool environment needed to preserve the quality of stored commodities. Ventilation keeps cool, fresh air circulating around the building and prevents moisture build-up.

Legacy buildings intake air via overhangs with mesh soffit. Eave intakes run the length of the building, without the dead spots in the centre that often result from

*Bulk storage and loading facility.*

# Starlinger: 10,000 circular looms built in China

Austrian quality manufactured in China: the Chinese branch of the Austrian Starlinger Group has been producing circular looms for plastic fabrics since 2006. In autumn 2018, Starlinger Taicang reached a milestone with the 10,000th circular loom.

Starlinger Plastics Machinery Taicang currently has a workforce of around 75 employees at the 9,400m² plant in the Chinese province of Jiangsu near Shanghai. The factory is a local branch of the Austrian Starlinger Group, which early on recognized the potential of the Chinese market and the importance of a global presence. Already in 2006 — one year after its foundation — Starlinger Taicang took up production of circular looms; today, these looms are in use in large parts of the world. With more and more machines being manufactured every year, the factory's annual production is presently at around 1,000 machines.

*Starlinger customers produce plastic fabrics with circular looms type RX. ©Starlinger*

The first models produced at Starlinger Taicang were called Omega 6 and Omega 1000. In 2013, the Starlinger Group set the course for the future with the development of the cost-optimized circular loom series RX, which is produced exclusively in China. The successful series was gradually extended and currently includes the models RX 6.0, RX 6.1 and RX 8.0 II. These models feature extremely low production costs per square metre of fabric and are well ahead of the competition with top production speeds. "With the RX 6.0, we have the circular loom with the best price-performance ratio worldwide on the market," says plant manager Franz Höpflinger, who in November 2018 was delighted to record the 10,000th circular loom built in China. "But Starlinger Taicang does not only produce machines; as a sales and service center, we are also an important hub in the Asian region."

With this statement, Höpflinger alludes to numerous events that Starlinger organizes in Taicang. Over the past years, the site has not only been the venue of an open house which takes place every second year in parallel to Chinaplas exhibition in Shanghai, but has also hosted regional sales meetings as well as the information event AD*STAR Days. Especially for Asian customers, such events offer the opportunity to gain a comprehensive insight into the entire Starlinger product portfolio.

As the world's only supplier of the entire technology for the production of woven sacks, big bags, or technical textiles from plastic tapes, Starlinger offers a whole range of complementary machinery — made in Austria. Apart from circular looms, the portfolio includes tape extrusion lines, winding machines, lines for coating, printing and conversion as well as recycling machines for production scrap and post-consumer waste.

Starlinger will be at Chinaplas, Guangzhou/China, May 21-24, 2019, Hall 9.2, Stand B41.

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

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

Sales and service centres in Brazil, China, India, Indonesia, Mexico, Thailand, Russia, South Africa, USA and Uzbekistan ensure quick and professional technical support and service.

# Steel industry optimism may be premature


## Subdued automobile sector may lead to steel workforce cuts

World steel prices — and also in major producing and consuming countries such as China and India — are principally driven by fluctuating demand for the metal and procurement cost of raw materials, especially iron ore, coking coal and coke, *writes Kunal Bose*. Interestingly, the price trajectory of long and flat steels finding different applications is, most of the time, not identical. While the state of the construction and building industry, and launches of new infrastructure projects, will have an impact on demand and prices of long steel products, the health of automobile, household appliances and sections of engineering industries will have a bearing on prices that hot rolled (HR) and cold rolled (CR) will fetch.

China claims the top seat in the world ranking of automobile manufacturing countries, and there is a huge gap between its output and that of the US which comes second. The country which with steel production of 928.3mt (million tonnes) in 2018 had a 51.3% share of the world output of 1.808bn tonnes went on rapidly raising the flat steel capacity and much of that of auto grade requiring employment of high technology. Flat steel now accounts for about half of China's total steel output, up from roughly one-third at the start of this millennium. The country's auto sector uses nearly 30% of the local supply of HR coils and the further value-added products derived from it. The world saw a turnaround in fortunes of the steel industry last year and that prompted Chinese steelmakers to create new HRC lines of around 20mt capacity to be commissioned this year.

HRC makers in China on average saw their profit margins climb sharply to over 1,100 yuan ($164.37) a tonne last year as benchmark futures prices breached 4,000 yuan a tonne. This was good enough reason for them to invest in new capacity building. But much to their disappointment the overall steel profit margins sank 60% in the past three months. The shrinking profitability will result in thickening of the industry's debt overhang and trimming investment in new technologies and product development. What is even more worrying is that steelmakers may soon start cutting the workforce. From the record high in the third quarter of 2018, HRC margins for Chinese steelmakers have slipped into the red for the first time since 2015.

China's economic growth has been


*Demand for steel has been negatively affected by lower car sales.*

slowing in recent years to hit the lowest in 2018. GDP growth at 6.5% could still be seen a breakneck pace compared with anything in the developed world. But this is about half the rate China racked up for more than 20 years before slowdown started. That period of economic ebullience saw the country creating massive expansion of steel (1.2bn tonnes), aluminium and copper capacity. But that kind of capacity is no longer in sync with the country's present economic reality. For example, for the first time in two decades, automobiles sales in China contracted in 2018. A Reuters report says that HR coils are now "trading at a rare discount to steel rebar, reflecting market expectations that demand of the metal used to reinforce concrete and in construction will rise because of reported stimulus spending by Beijing."

The automobile outlook to remain subdued will mean misery in terms of oversupply of HR coils resulting from capacity overbuilding in times of weak demand. Mind you this is happening at a time when raw materials costs are up sharply. According to an analyst with research & consulting firm CRU, profit margins as the percentage of EBITDA (earnings before interest, taxes, depreciation and amortization) will likely to be down to 6% this year from 15% in 2018. Among all steel products, the best margins in normal times are available in HR and CR coils. This is the reason why leading companies across the world are all focused on making HR and CR coils.

Steel's performance will always be linked to the behaviour of local economy, especially if the concerned countries happen to be China and India. In contrast Japan and South Korea make steel as much for local consumption as for selling in the world market. Seaborne trade in steel dwarfs in size compared with iron ore and coal. The Caixin China General Manufacturing PMI for February did rise to 49.9 from a near three-year low of 48.3 in January and against market expectations of 48.5. Riding on the back of 'slight' expansion of manufacturing activity and return of new orders, the February PMI reading was the highest in three months. But read the warnings that exports slipped back into contraction and capacity pressures continued to build. Based on all this, the near-term outlook for steel in the world's biggest market looks uninspiring.

The very strong growth at double-digit that the Indian automobile industry had experienced in the recent past encouraged the steel industry leaders in the country to go on creating more and more flat capacity. Not only Tata Steel, JSW Steel and Essar but smaller entities which came in late such as Bhusan Steel and Bhusan Steel & Power have their capacity dedicated to flat steels. In order to go up in the value chain of flat steel to meet the more demanding applications in the automobile (where making of luxury cars is involved) and defence applications, Tata Steel has made an alliance with Nippon Steel and JSW Steel with JFE Corporation of Japan. The partnerships are working to the satisfaction of all the parties.

Passenger vehicle sales recording a low single digit growth of 5.3% during 2018 after a good start in the year beginning became a major concern for Indian producers of flat steel. Vehicle demand continues to remain tepid even though car companies have tried all the tricks in their bag from launching new models, claiming improvements in existing models and offering hefty discounts. This is far cry from boom times in the auto industry when car and two-wheeler sales would record growth rates of 20% to 30%. High cost of fuel is leading many to use public transport instead of buying cars. Whatever it is, supply of flat steel still falls short of demand as in India's import basket for the metal, flat steel has considerably bigger share than long steel.

India remains a net importer of steel. In the first ten months of the current financial year to end in March, India's imports of finished steel grew 1.5% to 6.55mt on a year-on-year basis. India's steel ministry's statistics wing Joint Plant Committee says between April and January, steel exports were down 37.3% to 5.15mt from 8.22mt in the corresponding ten months of 2017/18. Trade protectionist policies in major importing countries, including the European Union were responsible for the setback in Indian overseas steel shipments. Until trade disputes between the US and China are resolved — talks so far have made slow progress — the outlook for liberal trade in major metals, steel and aluminium in particular will remain uninspiring.

India, which is targeting steel capacity building of 300mt by 2030/31 to lift the *per capita* steel consumption from about 70kg to 158kg, raised crude steel production by 4.9% to 106.5mt in 2018. In the process,

the country has overtaken Japan (104.3mt, down 0.3%) to become the world's second-largest steel producer next only to China. But Japan, which owns the world's best technologies in auto and electrical grades of steel remains well ahead of India in terms of per unit value of the metal produced. It is because of the ownership of such exclusive technologies, Japanese companies are highly selective in choosing partners in China and elsewhere for making special grades of steel.

The partnership subject finds good narration in the proposed joint venture between the world's largest steelmaker ArcelorMittal and the government owned Steel Authority of India Limited (SAIL) to build a 3mt auto grade cold rolled flat steel. The understanding is SAIL will supply HR coils from its newly modernized and expanded Rourkela mill to the JV for which technology will come from Luxembourg headquartered ArcelorMittal. It is only to be expected that the group to provide closely held technologies will insist on a long-term non-exit clause — in this particular JV for 30 years after which the parties will have the option to either sustain the partnership or dissolve it. Explaining the stand of ArcelorMittal, an industry official says: "Not many companies in the world have ownership of high end auto grade technologies and don't expect ArcelorMittal to leave room for the partner to abruptly end the union."

A former steel secretary of government of India says: "It was in May 2015 that the agreement was signed between SAIL and ArcelorMittal to build a cold rolling mill and other downstream finishing facilities. The project has the promise of opening a new chapter in indigenous production of high quality automotive steel for which India is still largely import dependent. It is also designed to help in India's quest to make steel of highly demanding quality for niche segments of infrastructure and manufacturing sectors." It does not speak well of a public sector enterprise that in nearly four years it could not sort out the issues holding back implementation of a JV project that promises to usher in technologies not found in the country.

SAIL is not unaware that ArcelorMittal is inching closer to getting the 10mt Essar Steel having put the highest bid for the insolvent but highly well-structured producer of flat steel. Once that massive acquisition is through, ArcelorMittal will get busy in taking Essar to higher capacity and likely also building a new mill leaving it little time for the JV with SAIL. Essar, along with a few other insolvent steel companies with aggregate capacity of 30mt, were put on the block so that the proceeds from sale could be used to cut the non-performing assets (NPAs) of banks. Surprisingly, the steel industry alone has close to one-third share of total bank NPAs.

The resolution of steel assets not able to service bank debts under the country's Insolvency and Bankruptcy Code 2016 through calling for bids created opportunities for profitable groups from both within and outside India to acquire capacity. So Tata Steel got Bhusan Steel where capacity is to be upped to 5.5mt, JSW Steel bagged 3.5mt Bhusan Steel and Power and Vedanta acquired 2.5mt Electrosteel Steels expandable to 5mt. ArcelorMittal is awaiting a favourable decision for its highest bid for Essar Steel. A steel crisis with serious ramifications for banks has, however, created condition for the much desired steel capacity consolidation.

Lakshmi Mittal, the majority shareholder of ArcelorMittal, has been an early proponent of steel capacity consolidation for the industry to have the right kind of pricing power. Where ArcelorMittal is today with capacity of around 120mt in 19 countries is mainly by way of mergers & acquisitions and brownfield expansions at different sites. The Luxembourg based company is still on the hunt for acquisition. The strategy has come for emulation by many others, including by some in China and India.

## Brazil's steel exports affected by EU anti-dumping measures

With its economy growing extremely slowly in the past few years, Brazil has been forced to export more than half of the 35 or so million tonnes of steel produced there each year, *writes Patrick Knight.*

The latest worry has been the decision by EU countries, which normally buy more than 2mt (million tonnes) of Brazilian steel each year, to impose anti-dumping tariffs on some of Brazil's shipments. The EU's curbs have been introduced because much of the steel China previously exported to the US, is ending up in Europe instead.

As far as exports to the United States are concerned, most of what goes there are heavy slabs, produced at low cost in Brazilian mills, and which steel companies in the US process into finished products, so this trade has not been affected so far.

Because the Brazilian mills mainly use ore mined in Minas Gerais state, they will be affected by the decision by Vale to cut ore production in the state, following the collapse of a dam at the Brumadinho mine, which caused the death of more than 350 people. Immediately following the disaster, Vale announced that ten mines in Minas, able to produce 40mt, would be shut down, some immediately, most over a ten years period. But fears of more such disasters — and 230 similar dams are at risk — may force Vale to cut ore production further and sooner. Other ore producers, notably the CSN company and Arcelor-Mittal, may also be affected.

Sixty-five per cent of the seven million tonnes of steel made each year at mills in the Tubarao complex normally goes to either the US or the EU. There is a glimmer of light in the fact that China has shut down, probably permanently, some 150mt of its 800mt steel making capacity. The government in China is also worried about the slow down of the economy there, so a boost may be given to extra spending on selected infrastructure projects.

It seems that both the US and China have decided that their trade spat has already caused considerable harm to their economies so they are edging towards agreement.

All Brazil's major steel companies have sold assets they acquired in the good times, prior to 2014, to keep afloat. Gerdau, CSN and Usiminas have sold mills in Europe, the United States and elsewhere.

The motor industry in Brazil is crucial to the steel industry, as it is by far its leading market. Although Brazil's economy only grew by about 1% last year, 6% more cars were made there in 2018 than in 2017, despite only 630,000 units being exported, 18% fewer than in 2017.

The weakness of the economy of neighbouring Argentina, destination of 70% of Brazil's vehicle exports, was the main reason for the fall in exports and sales to Argentina are unlikely to improve again this year.

It is hoped that with a new government in charge in Brazil, and with the confidence of investors increasing, domestic sales in Brazil will grow again this year. There are 43 car plants in Brazil, however, and an industry which has capacity to make five million units a year, is using only 50% of it. This is better than the performance of the steel industry has been in the past few years, as only 40% of its capacity is now being utilized. Numerous mills have been shut down and some may not re-open.

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# Impact of Brumadinho mine collapse remains unclear

What the full impact of the collapse of the dam at the Brumadinho mine, in Minas Gerais state will be, is not yet clear, *writes Patrick Knight*. Public opinion is pressing for more mines to be closed.

With fears that many more dams containing mining waste could fail, the full impact of the collapse in mid January of the dam at Vale's Brumadinho mine, which claimed more than 350 lives, is not yet known. Immediately after the accident, Vale said that ten of its mines in Minas Gerais state, source of 37% of the 400mt (million tonnes) of ore exported from Brazil last year, would be closed. Some immediately, the rest over a ten-year period. The shortfall in supply from Minas this year would not exceed 40mt, predicted Vale, and this would be compensated for by raising output at Vale's Carajas mines in Para state, and by running down the 30mt the company holds in stock in China and Malaysia.

But as pressure from tens of thousands of people who feel threatened by similar accidents increases — and the serious Mariana dam breech at the Samarco mine, occurred only two years ago — the shortfall could now reach 70mt this year, analysts suggest. The world price of ore has already risen to more than $90 a tonne, a rise of 15%, and some suggest it could go to $100. Although Vale insists the hike will be temporary.

Most of the ore mined in Minas state, which generates 30% of the revenue of the state government there, has a lower ore content than the 62% content of that mined at Carajas, and the ore goes to different customers. Much of the lower-quality ore from Minas is now blended with Carajas ore at destinations, but this will not so easy in future.

All of Brazil's pellet-making capacity, which is 10% of the world total, is located at mills in Minas Gerais state, as is the country's 28mt-capacity pig iron industry, and both will be affected. Brazil's own steel mills, which made 35mt last year, use mainly ore from Minas and two companies, CSN and Arcelor-Mittal, use ore from their own mines. Ore exports are a major source of revenue for CSN.

The recent dam failure has drawn attention to the fact that there are 839 dams holding back mining waste in Brazil, 370 of them in Minas Gerais state. 223 of these have been classified as being high risk. 400 dams belong to mines which have been abandoned altogether, now left to their own devices. The cause of the failure at Brumadinho was the fact that heavy rains, normal at this time of year, raised the water level of the lake to the point that the drainage system could not cope, causing the dam to breach. The problem of excessive rain water, and inadequate drainage of lakes affects many dams in Brazil, where summer rains are extremely heavy.

Brazil's leading railway company, MRS, will be badly affected by the disruption. An estimated 70% of the company's revenues comes from transporting iron ore from mines in Minas to ports, and rolling stock will be redundant. The value of Vale's shares has fallen by about 20% since the accident, which is causing great damage to flora and fauna as the waste flows downstream towards the Atlantic.

Some steel companies hope that the country's construction industry, which unlike the motor industry, showed no growth at all in 2018, will now start making a recovery. Opinions differ about this, however, as many buildings remain unsold and unemployment remains high. If growth returns to the construction industry, it will mainly benefit long products, most made by Gerdau, rather than the flat products which form most of what the car makers, as well as makers of consumer durables, use.

Another unknown is what will happen to the exchange rate. The strength or weakness of Brazil's currency, the real, is in part dependent on what happens to the US dollar, as well as the world economy, which affects demand for Brazil's exports, half of which are now commodities. Brazilian-made steel costs domestic buyers 15% less than the imported equivalent. Forty per cent of what Brazil imports now comes from China, compared with about 2% of it in 2,000. Brazil's steel mills, most located in Minas Gerais, Rio de Janeiro or Sao Paulo states, also pay far less for their iron ore than companies abroad.

Many pay as little as $10 per tonne for ore, while the CSN company is a major producer and also exporter of the ore mined its Casa da Pedra mine in Minas Gerais state. Brazil's production of pig iron has not varied much in the past few years and 28.4mt was produced in 2018, virtually the same as in the previous year. The new government is anxious for the state to dispose of as many nationalized companies as possible, and for them to be able to invest and expand as soon and as much as possible, free from the present constraints. DCi

# Bringing out the big guns

## the challenges of handling project cargo


*AAL's A-Class carrying blades and towers (wind energy).*

**Jay Venter**

## Versatility the key in breakbulk shipping

### Introduction

There is a close and interesting relationship between the breakbulk sector and the world of dry bulk shipping, *writes Kyriacos Panayides, Managing Director, AAL Shipping*. This is true on a practical level, with modern multipurpose (MPP) vessels being equipped to carry a variety of dry cargoes — and in many cases, well placed to pick up backhaul opportunities for dry bulk, following the movement of heavy lift or project cargo.

The synergies between project cargo and dry bulk go deeper than this though. The fortunes of the two sectors are closely linked to global economic and industrial trends, as well as serving as a good barometer for trends in individual sectors and regions. For example, the expansion of renewable energy capacity worldwide was led by the growth in the movement of renewable energy cargoes — something AAL is heavily involved in. Similarly, economic growth in the Middle East and Africa's emerging markets is being led by major infrastructure investment — with the close involvement of the MPP sector.

### Global outlook

Following a turbulent 2018, with tariffs, trade wars and slowdown in emerging markets, the global outlook in 2019 offers reasons for cautious optimism. US–China relations appear more stable, global unemployment levels remain low and growth forecasts look reasonably healthy. The same is true in key vertical markets. For example, in the mining sector, modest growth is expected, with Fitch Solutions' forecasting an average 2.4% annual growth for the next decade in global production of major minerals.

This more positive global outlook also bodes well for the MPP sector in 2019 — and not before time. The year 2018 was another tough one for MPP operators, with a number of players ceasing operations following massive losses, as well as many defaulting on their financing contracts and becoming financiers' distressed assets. Although the market remains tough, there are some more positive signs emerging.

Oversupply of vessels has been a long-standing problem and there has been a need to reduce tonnage oversupply for some time now. Combined with slow demand growth for project cargo and competition from other sectors such as bulkers, RoRos and even container carriers, this led to record low freight rates, far below break-even levels. The good news is that the sector's orderbook is finally at a manageable level. In fact, the orderbook across all MPP categories is at a record low. Encouragingly, a substantial part of the orderbook is planned for

*Wind energy discharge from AAL vessel.*

replacement of older tonnage only and will not contribute to supply growth.

There has also been seen significant consolidation activity in the MPP sector, with acquisitions, mergers, alliances and other co-operations becoming routine in the past couple of years. As a result, there are now fewer players in the market. The overall outlook is marginally improved, but if 2019 is another year of peaks and troughs, it would not be a surprise to see this consolidation continue. If this is the case, it may take the form of alliances and co-operation between operators as they seek new ways to cut costs and find new synergies, rather than M&A activity.

## Winds of change

One of the great virtues of a modern MPP vessel is its versatility. From giant oil & gas components to yacht transportation, mining equipment to dry bulk, the range of cargo types that can be transported by these vessels is incredibly diverse — and this is not just about the size and weight of the cargo but also the requirements for the loading, safe stowage and discharging of the cargo. As such, versatility is also about more than the technical capabilities of the vessel. It also requires the engineering expertise to understand the specific requirements of each cargo and how it can be transported safely and efficiently.

A great example is wind energy cargoes. AAL has an unrivalled track record for the movement of wind energy cargo components. This is based not just on AAL's modern, versatile vessels, but also the expertise and experience of its engineering team.


*Kyriacos Panayides, Managing Director, AAL Shipping.*

Last year, for instance, AAL successfully shipped completed three sailings into Adelaide, with 45 windmill blades, turbine generators and related components on each sailing, for the AGL Silverton wind farm in New South Wales. Comprising 58 turbines, the wind farm will reduce $CO_2$ emissions by 655,000 tonnes annually and produce 200MW each year — enough power to maintain more than 137,000 Australian homes. Carried on AAL's 'Mega-MPV' 31,000dwt A-Class vessels, these 63-metre blades were longest ever to be shipped into Australia.

Through extensive preparatory work and calculations on loading and stowage plans, AAL was also able to safely load, stow and transport 45 blades on a single sailing — an industry first. By maximizing the cargo intake, AAL reduced the number of total sailings, which in turn cut costs and saved time for the customer.

## MPPs and dry bulk

Although the typical image of an MPP vessel in action will be transporting giant cargo — such as wind blades — it is a misconception to think this is all that they can carry. The clue is in the name — multipurpose! As well as breakbulk cargo, AAL's fleet is carefully designed with dry cargoes in mind. This includes large, convenient and hatchway-accessed box holds, equipped with dehumidifiers that can transport a wide variety of bulk commodities. Working for customers that span bulk traders, steel traders, forestry product companies and more, the commodities that AAL carried last year include granite, coal, logs, fertilizers, rice, steel scrap, sulphur and copper, zinc and nickel concentrate.

Another point of overlap between the breakbulk and dry bulk sectors occurs when AAL moves the equipment required for the extraction and processing of commodities. These are typically very heavy, highly valuable and over-sized items of equipment — as well as being increasingly sophisticated — and the mining equipment market is expected to grow substantially.

A technological leap forward is also

expected in mining operations, as more advanced and energy-efficient equipment is introduced. This will see the introduction of smart technologies, including remote monitoring, IoT sensing, GPS locating and 3D imaging. Many leading mining companies are expected to upgrade and retrofit these technologies in the coming years. This will support the demand for the equipment transportation, particularly to growing markets. Asia-Pacific and Latin America are earmarked as the two biggest markets for mining equipment in the future.

*AAL vessel and mining dump trucks.*

## The importance of specialist knowledge

Whatever the cargo, what matters most is the safe, secure and timely movement of those components or commodities. As a multipurpose operator, not only does AAL operate vessels that are intrinsically versatile, it is in the company's DNA to treat every cargo as unique — because they genuinely are. AAL knows that some of the world's biggest engineering and infrastructure projects rely on it doing its job properly — and that the integrity of project timelines, budgets and supply chains depend upon the safe movement of their cargoes. That is why, at a time when container lines and RoRo operators are attempting to win project cargo business, AAL is at pains to stress the risks of handing over a high value cargo to an operator that lacks the vessels, the knowledge or the engineering expertise to move them safely. Sometimes the cheapest option on paper can be the costliest of all.

Looking forward, there are plenty of other factors that will shape the fortunes of the MPP sector and the wider shipping industry this year — for better or worse. Politically, AAL hopes that the worrying trend towards greater protectionism between nations and trading blocs will de-escalate. From a regulatory standpoint, it hopes for a smooth introduction of the 2020 sulphur emission limits, and AAL will ensure its full compliance with this important environmental measure.

Finally, from a commercial and operational perspective, there may be further consolidation among MPP operators, whether via acquisitions or alliances, but as long as common sense prevails when it comes to adding new tonnage, AAL believes the market will remain stable.

With improvement in other sectors, it is possible that RoRo and bulker operators will return to what they do best — and AAL certainly does not fear the competition from its peers in the MPP sector. Its goal is to remain true to its values and what serves its customers best; investing in its people and its engineering expertise, operating a best-in-class fleet of vessels and offering flexible, creative and competitive cargo solutions.

*S-Class discharging giant 'ESP' unit (mining sector).*

# $25 million state-of-the-art cancer treatment equipment moves through JAXPORT


Highly trained stevedores recently moved state-of-the-art cancer treatment equipment worth $25 million through JAXPORT's Talleyrand Marine Terminal in Florida, USA.

The proton therapy equipment, which was unloaded in three pieces, is en route to the University of Florida Health Proton Therapy Institute in Jacksonville where it will be used to provide an advanced form of radiation treatment. The equipment represents the largest expansion of cancer treatment capabilities in the facility's history.

The pieces have a combined weight of nearly 200 tonnes and measure between 12 and 32 feet in length. The shipment arrived at JAXPORT aboard the Spliethoff general cargo vessel *Snoekgracht* from the Port of Antwerp, Belgium. Freight forwarder ABL DISSACO oversaw the move as skilled master riggers with stevedoring company Patriot Ports transferred the cargo from the ship to speciality multi-axle trailers.


The use of Talleyrand's facilities provided skilled and experienced labor along with efficient access to the equipment's ultimate destination in North Jacksonville.

Talleyrand Marine Terminal offers 4,780 linear feet of berth space and on-dock rail facilities with service from Norfolk Southern and CSX rail lines. The terminal is only 25 minutes from Florida East Coast Railroad's intermodal ramp, and is conveniently located within minutes of interstates I-95 and I-10.

# 2019: A Year to Celebrate

## Forth Ports Group reflects on growth agenda and the anniversary of a key asset

Bill Clinton's successful 1992 presidential campaign coined the phrase it is "the economy, stupid".

For ports like Tilbury — London's major port — the link between its success and the state of the domestic and global economies is well understood.

All UK ports are creatures of business, consumer and investor confidence, with economic growth linked to the state of national GDP.

The continuing USA–China trade war and the Brexit economic headwinds provide challenging conditions for all British port operators.

For the UK's fastest-growing port, diversity of cargo flows, a varied asset base and proximity to Europe's largest market are its strength.

In aggregates, bulks and grain, Tilbury is the market leader and the wider Forth Ports Group has a significant presence, too.

Across these areas, the Group is investing heavily to improve that position further — from delivering Britain's largest construction processing hub, expanding Tilbury's grain terminal to creating a new major agri-hub at Rosyth.

As part of the Tilbury's £1 billion investment, on 13 March the 12 month build programme commenced on a new port terminal, Tilbury2.

When operational in 2020, Tilbury2 will be the UK's largest unaccompanied ferry port and, crucially, the country's biggest construction processing hub, with AEO-trusted trader status and a rail terminal that can accommodate the longest freight trains of 775 metres.

Expansion will satisfy rising demand for materials and aggregates from Britain's construction sector, as well as an increase in commercial ferry traffic to northern Europe.

In Tilbury's grain terminal's 50th year of operation, a new flat store is being added to grow its capacity by 16,000 metric tonnes — or 12% — for the import and export of wheat.

The terminal currently handles over 1.4 million tonnes annually of combinable crops for the export and UK markets for the likes of Frontier and Millford Grain.

The new six metre high flat storage facility will be adjacent to the existing terminal utilizing the mill gallery conveyor system with overhead conveyors feeding the new storage unit automatically.

At the Port of Rosyth, agricultural specialist, Cefetra, is expanding its Scottish expansion.

The purpose-built handling facility is projected to develop an annual throughput in excess of 500,000 tonnes for a range of agricultural products.

The Port has deepened the alongside water depth to provide a deep-water operation capable of accommodating vessels carrying up to 50,000 tonnes of cargo.

While in dock facilities are important, so is onward connectivity.

To support its substantial estate growth, Tilbury has revived its rail freight offering by, amongst other measures, creating a dedicated bulk rail terminal.

This has subsequently been expanded to facilitate growing cullet glass and aggregates traffic movements for URM and FM Conway, respectively.

To add to the Group's rail footprint across its operations at Dundee, Grangemouth and Rosyth, it is projected that up to five bulk trains a day will utilize the rail connection at Tilbury2.

With assets at prime locations on the Forth, Tay and Thames and a shareholder appetite to invest for the future, the Forth Ports Group sees further years of significant expansion ahead.

*An aerial view of The Port of Tilbury.*

# GRAHAM appointed to deliver new London port, Tilbury2

The Port of Tilbury, the UK's fastest-growing port, has appointed GRAHAM to deliver its new multimillion pound port terminal, Tilbury2. The port received development consent from the Secretary of State for Transport to build the new port in the third week of February 2019 and will now work with GRAHAM to begin construction of the port immediately.

The contract involves the creation of a new port terminal and associated facilities on land at the former Tilbury Power Station on the north bank of the River Thames.

GRAHAM has been awarded the contract for both the terrestrial and the marine package. The terrestrial contract incorporates a roll-on/roll-off (RoRo), highway works, the relocation of the existing railhead, and a fixed structural steel bridge to the linkspan. The marine contract includes works within the tidal estuary beyond the existing sea wall/flood defences, including a floating pontoon, link-span/articulated bridge, associated pilings and river bed preparation for the berth.

Charles Hammond, Chief Executive of Forth Ports Group (owners of the Port of Tilbury), said: "Tilbury2 is a significant project for our business and our customers. We are very pleased to have the expertise of GRAHAM to help us create this new port for London and the south east. GRAHAM are experts in what they do and have demonstrated this in their recent maritime projects in Hull, Grimsby and in Folkestone. There is a great deal to do over the next 12 months and we look forward to opening our new port in 2020."

Commenting on Tilbury2, Michael Graham, GRAHAM Executive Chairman, says, "The Tilbury2 project is a complex scheme that will facilitate the expansion of the Port of Tilbury and support its continued local, regional and national economic growth. We look forward to working collaboratively with the Port of Tilbury and local stakeholders to deliver this transformational scheme.

"At GRAHAM, we are committed to delivering lasting impact and the Tilbury2 project is an example of a development programme that will not just enhance the port's offering to importers and exporters, but will deliver long-term regeneration and create significant new employment opportunities."


### Tilbury2 will comprise:

- a roll on/roll off ferry terminal for importing and exporting containers and trailers to northern Europe, in partnership with P&O Ferries;
- a facility for importing, processing, manufacturing and distributing construction materials;
- a strategic rail terminal which can accommodate the longest freight trains of 775m; and
- a storage areas for a variety of goods, including exported and imported cars.

Tilbury2 is central to the Port of Tilbury's £1 billion investment programme during 2012–20. Tilbury has doubled the size of its business in the past ten years and is projected to double the volume of cargo across the quay (from 16mt [million tonnes] to 32mt) and increase direct employment (from 3,500 to 12,000 jobs) over the next 10–15 years.

### About the Port of Tilbury

Forth Ports Ltd owns and operates Tilbury, alongside seven other commercial ports on the Firth of Forth and the Firth of Tay: Grangemouth, Dundee, Leith, Rosyth, Methil, Burntisland and Kirkcaldy. In October 2018, PSP Investments became majority shareholder in Forth Ports Limited, to along with other minority co-investors, GLIL Infrastructure, First State Super, Construction and Building Unions Superannuation.

The Port of Tilbury is the number one UK port for forestry products, construction materials, paper, grain, recyclables and warehousing space. The port has a strong market presence in bulk commodities, ro-ro, cars and cruise vessels. The Port's London Container Terminal handles a mix of short and deep sea services, is the UK's number four port for containers and has the greatest reefer (refrigerated container) point connectivity in Europe.

Tilbury's strategic location makes it a natural point for distribution, with nearly 20 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 in excess of 1,000 acres (850 acres and the London Distribution Park, in addition to the Tilbury2 site) and is well positioned to access the M25 orbital motorway and the rest of the UK's national motorway network. In addition, there are direct rail connections within the port and dedicated barge facilities to central London.

Following Brexit, Authorised Economic Operator/AEO (customs, safety, security) trusted trader accreditation, combined with its IT systems, security systems and frontier agency facilities at the port, should limit border formalities and friction. AEO allows the port to waive duty guarantees for goods held at its facilities and could also speed up the process of applying for other types of customs accreditations in the future.

### About GRAHAM

GRAHAM is a privately owned company that specializes in the delivery of award-winning building, civil engineering, interior fit-out and facilities management.

A national business, with an annual turnover of £767.6 million (2018), it operates from 23 regional offices throughout the UK and Ireland and employs over 2,200 people.

Proudly 'delivering lasting impact' since 1798, it is currently completing over 100 live projects across a range of key sectors including education, healthcare, commercial, retail, highways and rail. GRAHAM has demonstrated its technical expertise and deep understanding of the port, and maritime, sectors delivering schemes of national significance, such as Green Port Hull (£114 million) and Immingham Renewable Fuels Terminal (£120 million).

Winner of the Major Contractor of the Year at the 2017 Building Awards, GRAHAM was the first contractor in the UK to achieve Investors in People (IIP) Platinum and IIP Wellbeing accreditation.

It was also the first UK wide company to achieve the British Standards Institute (BSI) Kitemark™ certification for both BIM Design and Construction (PAS 1192-2) and Asset Management (PAS 1192-3).

# Morska Agencja Gdynia / Poland: Sea of Solutions

MAJA, *heavy floating lift crane, Port of Gdansk.*

With a presence of more than 65 years on the Polish and international transport and logistics market, Morska Agencja Gdynia (MAG) is an experienced partner, which guarantees the delivery of cargoes to any place in the world — by sea and on land. MAG organizes transshipments in all sea and inland ports all over the world.

## Project cargoes (oversize cargoes) — transport by sea, road, rail and river

MAG offers sea transport of oversized cargoes and heavy goods — particularly demanding from the logistical and technical perspectives. The company has its own fleet of trucks and co-operates with shipowners which have extensive experience in carrying such objects and operate specialist 'heavy life'-type vessels. The cranes on board these ships have load capacities of up to a thousand tonnes.

For many years, MAG has been acting as an intermediate in the transport of large cargoes, such as heavy construction elements or vessel hull units. They safely reach destination ports on pontoons, towed by sea-going tugboats. These comprehensive services in the field of organization and management of transport and the logistics chain of project cargo type goods in export, import and transit are provided to Polish and foreign customers. Each transport operation of this kind is different and requires close cooperation with customers, openness to creative solutions and a number of detailed technical arrangements.

Morska Agencja Gdynia organize transport of project cargoes by road, rail, rivers and sea.

It operates its own customs agency, chartering/brokerage department and ship's agency. It also provides emergency agency services for international insurance companies, supporting them in the process of damage adjustments in road, railway and sea transport.

Morska Agencja Gdynia has greatly contributed to logistics solutions for large projects in the wind power sector, including the offshore sector in Poland. MAG's range of successes comprises logistics services for the first and largest wind farms in Poland. It also deals with A–Z organization of complex operations such as handling turbines in ports and their

*Wind turbine blades loading operation, Swinoujscie Port.*

*Gdynia Port, wind turbine blades.*

transport by sea and road. To this end, MAG employs state-of-the art engineering solutions. Regular shipments of components to wind farms, handling heavy items, specialist lashing on board and adequate tonnage freights are tasks of Morska Agencja Gdynia — services it provides to the largest wind turbine producers in the world.

## Warehousing

Morska Agencja Gdynia operates its own warehouses in strategic locations in Poland. Recently, it launched new storage space of 4,500m² located in Gdynia. Storage space can function like bonded warehouse, temporary storage warehouse or reloading place under customs supervision. MAG offers premium quality storage space at a distance of 300m from the Port of Gdynia.

The company launched new storage space of 3,400m² in Gdansk offering 1,000 places on the storage racks, 2500 places on the block storages, as well. The building provides eight ramps and functions like a bonded warehouse, temporary storage warehouse and reloading place under customs supervision. Clients are now able to store and handle cargoes in Gdansk.

MAG's warehouses are adapted for shipment of products transported by sea, road and rail and the agencies are equipped with modern solutions, high storage systems and shelving, meeting all safety standards.

The company operates its own universal terminal, in the middle of the coastline in Darlowo with its own handling wharfs, where it offers storehouses and hard-surface storage yards with a total surface area of more than 17,000m². In the port, MAG organizes the handling and storage of cereal grains, fertilizers, wood, aggregates, coal, steel as well as palletized and bagged goods. Due to its location the terminal is dedicated as hub for offshore wind farms in Polish waters. Darlowo terminal has the ISO 9001 certificate, and storehouses meet both sanitary standards and GMP standards.

Range of offered services connected with warehousing include:

- storage
- handling and transshipment of project cargoes/heavy goods, bulk goods, general cargoes;
- collection;
- co-packing;
- domestic and foreign distribution; and
- Security and safety:
  - A plus class buildings
  - fenced areas
  - equipped with alarm and fire protection system with smoke vents;
  - warehouse with automatic heating system;
  - HACCP certified;
  - fully insured.

To strengthen the company's position on the competitive market, it focuses on complex cargo services in international transport, comprehensively operates in many different areas and is always open to new projects.

MAG's whole team comprises almost 300 people, including shipowner agents who have command of several foreign languages and specialists oriented towards execution of the most demanding logistics tasks.

*MAG's warehouses are strategically located throughout Poland.*

# Cuxport handles heavy cargo using multimodal services


*With a deck entrance height of eleven metres and a ramp capacity of 220 tonnes, the 'Ville de Bordeaux' is very suitable for shipping heavy goods (picture source: Cuxport GmbH).*

The terminal operator Cuxport managed a heavy-lift project involving multimodal transport and handling operations on behalf of the Bohnet freight forwarder at the beginning of February.

A machine frame weighing 95 tonnes was first transported from Plochingen to Cuxhaven on board an inland waterway vessel, before being moved on to a truck at the Cuxport Terminal and finally shipped from there to Saint-Nazaire in France by ferry.

The journey for the machine frame for the aviation industry started in Ravensburg with a short truck journey to the inland waterway port at Plochingen. The item then arrived in Cuxhaven 13 days later. Cuxport completed the transshipment from the inland waterway vessel on to a ten-axle low loader with a four-axle tractor unit at its multi-purpose terminal.

The loaded truck, which weighed 150 tonnes in all, was then driven on board the *Ville de Bordeaux* using the Ro/Ro method. The machine frame arrived at its destination in Saint-Nazaire from Cuxhaven two-and-a-half days later. The route via Cuxhaven was selected because stringent conditions and time-consuming permit procedures would make any alternative transport by road very difficult.

"When handling heavy shipments of this size, it's often necessary to find alternatives to just moving them by road — whether this is because of the dimensions of the consignment, the road conditions or the savings in time. We can offer excellent conditions as a handling site for heavy cargo at Cuxhaven because of our links to the inland waterway network, suitable transshipment equipment and our network of scheduled shortsea services," says Roland Schneider, Head of Business Development at Cuxport.

The *Ville de Bordeaux*, which is operated by the LD Seaplane shipping company, has been regularly calling at the port of Cuxhaven since May 2018. The vessel is very suitable for shipping heavy items with its ramp capacity of 220 tonnes and deck entrance height of eleven metres. The ship mainly carries parts for the aircraft industry between Saint-Nazaire, Cuxhaven and Hamburg. The *Ville de Bordeaux* is due to call at Cuxhaven during its next voyage on 21 February.

## About Cuxport

Cuxport GmbH operates a multi-functional handling terminal at the deep-water port of Cuxhaven. Cuxport not only offers extensive port handling facilities, but also has an ideal geographical location for all kinds of maritime traffic and the best possible links to destinations further inland. The company is a joint venture where Rhenus SE & Co. KG holds 74.9% of the shares and HHLA Container Terminals GmbH 25.1%.

The Rhenus Group is a logistics services provider with global operations and annual turnover of €4.8 billion. Rhenus has business sites at over 610 locations worldwide and employs more than 29,000 people. Hamburger Hafen und Logistik AG (HHLA) is one of the leading harbour logistics companies at the North Sea ports.

# Challenges and new solutions in pipe handling

The safety and efficiency of handling pipes is crucial. In the majority of cases, pipes are handled manually with slings and chains by men needing to connect hooks. This is dangerous and slow. A new safer and faster way is ready.

Pipes come in a variety of designs, diameters, lengths, coatings and thicknesses. They are also easy to damage. Both of these factors made them hard to handle automatically.

RAM has developed an automated pipe handling system (PHS) for yard and ship loading without the need for manual intervention. The pipe handling spreader removes the need for men to attach hooks to pipes on the quay and remove them in the hatch.

## Conventional load & discharge

Pipe handling at ports is generally carried out conventionally with a combination of using rudimentary fix metal frames, slings, chains and hooks. The same method applies when discharging pipes from a truck to yard, and then yard to ship, or vice versa.

**Conventional pipe handling carries with it some operational and safety drawbacks:**

- only one or two large-diameter pipes can be handled at once;
- up to 12 workers in total are needed to handle pipes from a truck to frame handler and in the vessel's hold; and
- a swinging long load in a hatch can result in safety risk for employees.

Pipe handling must be done as slowly as possible to reduce the safety risk to workers, trucks and vessels from swinging pipes.

## RAM Universal Pipe Spreader for improved pipe handling

To improve pipe handling, RAM Spreaders has developed a pipe spreader, adding to its product portfolio of more than 50 different crane attachments supplied worldwide.

The RAM Universal Pipe Spreader is designed for use on ship cranes and mobile harbour cranes (MHC), and is capable of handling a variety of pipe diameters and lengths, thanks to its specially designed separating telescopic quad beam system.

### With open arms

**At the end of each adjustable hydraulically operated telescopic beam, end grippers with pipe protection plates provide safe and secure handling of a wide variety of pipes, during lifting operations.**

### Lights – camera – action

Optional features include the very latest innovative technology to provide the crane operator vital data and information during lifting and manoeuvring operation.

Optional features include, height indication system. camera monitoring system, LED lighting for low light operations and a gyroscope sensor detecting angular rate and velocity and diagnostic panel for spreader status.

### Power Up

The RAM Pipe Handling Spreader is powered by the crane's power supply, or as an option, it can be supplied with a self-powered diesel powered unit. The controls for the spreader can be either by remote control or in the crane cabin.

### Technical Specs

**Type:** Universal Pipe Handling Spreader
**Application:** MHC/ship crane/offshore crane
**Power:** electro-hydraulic
**Control:** Wireless Remote Control
**SWL:** 60 tonnes
**Beam Type:** eight detachable telescopic beams
**Pipe diameter lifting capacity:** 4 x 14–18inch | 3 x 19-35inch | 2 x 36-60inch. DCi

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