DC: DRY CARGO international

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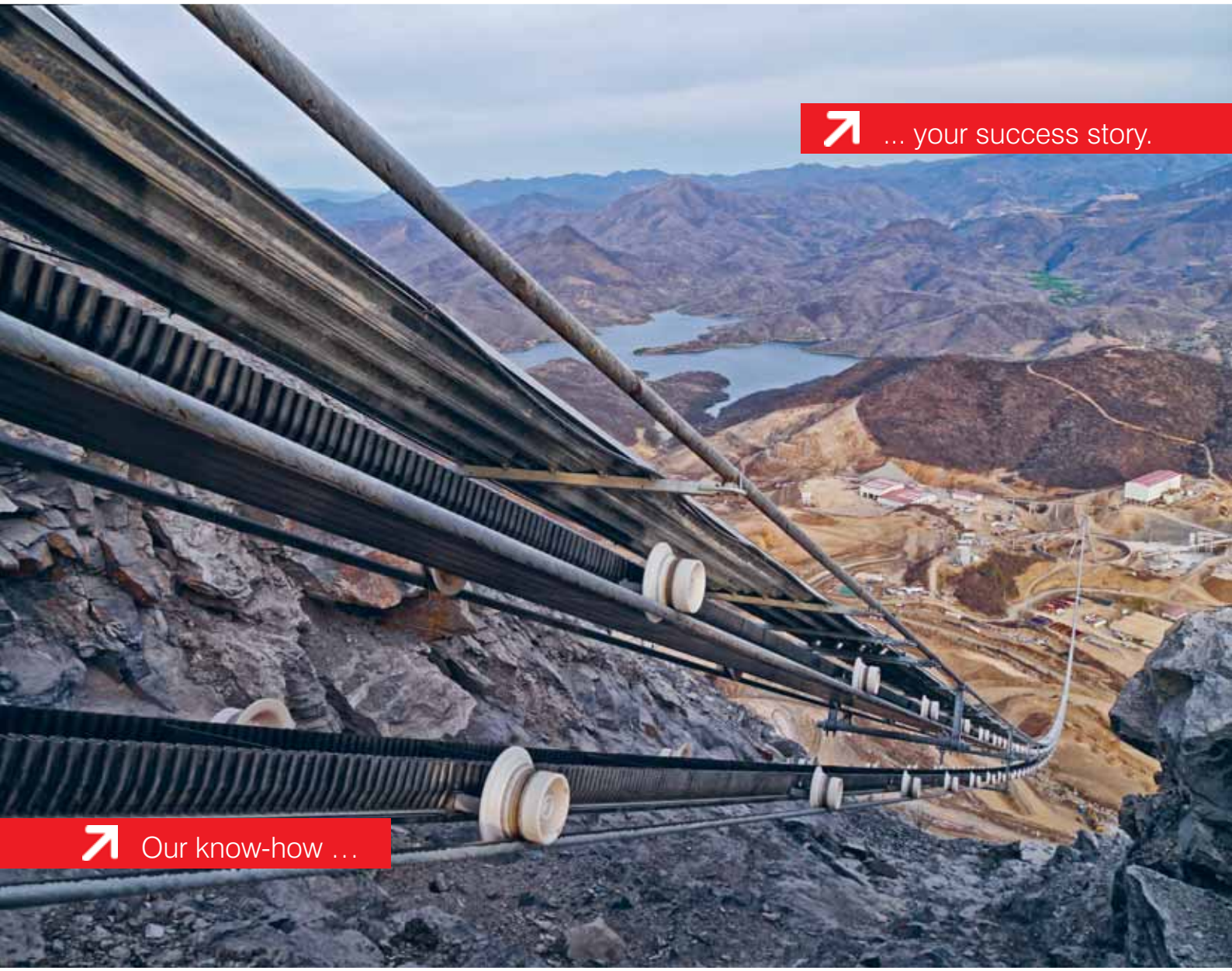

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Dry bulk trade could increase modestly

Cautious optimism about prospects for further growth in world seaborne dry bulk trade during the year ahead seems justifiable. Signs of rising commodity import demand are visible in a number of countries around the world, although some positive indications are quite tentative.

The broad global economic growth trend, affecting commodity trade, is widely seen as remaining lacklustre, although a limited improvement may occur this year. Recent IMF forecasts suggest that GDP growth in the advanced economies group (mainly USA, Europe and Japan) could edge upwards from an estimated 1.6% last year to 1.9% in 2017. Emerging and developing economies, including China, could average 4.5% expansion this year, after 4.1% in the previous twelve months.

Iron ore

This year world seaborne iron ore trade, the largest commodity movement, is likely to continue expanding. A 2% increase to 1,445mt (million tonnes) is estimated in 2017 (as shown in table 1), mainly resulting from further growth in China's imports, together with limited additional purchases by several other buyers. Some forecasters suggest that faster growth is achievable.

Higher steel production among major raw materials importers Japan, South Korea and the European Union, could strengthen iron ore consumption. China's steel output, by contrast, may be reduced by faltering internal and external demand but a sustained decline in domestic iron ore production probably will benefit import requirements. Replacing domestic supplies with foreign ore is a key driver for Chinese purchases but is not a significant influence elsewhere.

Coal

After a weakening trend during the past three years, seaborne coal trade may remain flat or possibly resume growth this year. The 2017 total is estimated at 1,118mt, a marginal 1% rise. However, there is great uncertainty about both the direction and magnitude of changes in several key importing countries, including India, China and the European Union.

A central aspect of the uncertainty affecting coal trade is the likely but unquantifiable negative impact of environmental policies among prominent importing countries. These policies are especially prominent in the steam coal segment, comprising over three-quarters of the total. Long term transitions towards cleaner energy sources are well under way, but precise effects on annual changes in coal import demand are difficult to predict.

Grain

Forecasts of global seaborne grain trade (wheat, coarse grains plus soyabeans) in the period ahead are always speculative. At present, based on cautious assumptions, a small increase may be seen in 2017, raising the total to about 475mt. However, views may change when the results of mid-year domestic harvests in northern hemisphere importing countries (greatly influencing import demand) become clearer.

Grain trade estimates are highly tentative, because calculations are based partly on unpredictable weather conditions affecting importing countries' harvests as well as production in exporting countries. One negative influence currently evident is weaker import demand for grain (but not soyabeans) in China, reflecting high corn stocks and an official policy of reducing these to more acceptable levels.

Minor bulks

The varied and extensive group of minor bulk commodities comprises over one-third of all dry bulk trade. Commodities related to construction and manufacturing comprise the largest part, with the remainder related to agriculture. Last year the global total apparently increased slightly, reaching over 1800mt, and some movements may see further growth in 2017.

Bulk carrier fleet

Growth in the world fleet of bulk carriers remained slow last year, as shown by table 2. Deadweight capacity in 2016 increased by 2.3%, reaching 794m dwt at year-end. New vessel deliveries and scrapping of old ships were similar to volumes seen in the previous twelve months. Another, but possibly smaller fleet increase seems likely during 2017, when much lower newbuilding deliveries combined with substantial scrapping could result in a minimal 1% addition.

TABLE 1: WORLD SEABORNE DRY BULK TRADE IN 3 MAJOR COMMODITIES (MILLION TONNES)

	2012	2013	2014	2015	2016	2017*
Iron ore	1,105	1,183	1,330	1,356	1,410	1,445
Coal	1,111	1,193	1,176	1,121	1,107	1,118
Grain (including soyabeans)	361	390	428	455	470	475
Total 3 major bulks	**2,577**	**2,766**	**2,934**	**2,932**	**2,987**	**3,038**
% growth from previous year		7.3	6.1	-0.1	1.9	1.7

source: Bulk Shipping Analysis estimates and forecasts **forecast*

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

	2012	2013	2014	2015	2016	2017*
Newbuilding deliveries	100.4	62.9	48.2	49.3	47.8	34.0
Scrapping	33.4	23.2	16.3	30.5	29.2	24.0
Losses	0.1	0.5	0.1	0.2	0.2	0.2
Other adjustments/conversions	–1.3	0.1	–0.1	–0.5	–0.9	0.0
Net change in fleet	65.6	39.3	31.7	18.1	17.5	9.8
Fleet at end of year	**687.4**	**726.7**	**758.4**	**776.5**	**794.0**	**803.8**
% growth from previous year		5.7	4.4	2.4	2.3	1.2

source: Clarksons Research (historical data) & BSA 2017 forecast *forecast

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China's dry bulk imports growth resumes

One of the more surprising aspects of global dry bulk commodity trade, last year, was a robust upturn in China's vast imports. Following a slight decline in the China total during the previous twelve months, there were no signs of a vigorous pick up at the beginning of 2016. But both iron ore and coal, the biggest elements, proved much stronger than generally expected.

Large changes in China's import volumes greatly affect global trade. About one-third of all world seaborne dry bulk commodity movements consists of these imports. For some individual commodities, the proportion is higher. A prominent example is iron ore, by far the largest component, now exceeding one billion tonnes annually, which comprise over two-thirds of world iron ore trade.

What are the prospects for Chinese imports in the year ahead? Some signs point to continued overall growth in 2017, but possible restraining influences are clearly visible. The outcome partly depends upon government policy measures (especially affecting coal consumption and imports), changes in which are not always easy to predict and may alter expectations.

Slowing economic activity is having a moderating impact on consumption of commodities, affecting import demand. Chinese government policy aims to limit economic output growth, while rebalancing the economy. Consumer spending and services have been accorded higher priority, shifting the emphasis away from capital investment spending and manufacturing.

Further gradual economic output deceleration is expected by most forecasters. The latest (mid-January) International Monetary Fund predictions point to 6.5% growth in China's GDP in 2017, compared with 6.7% in 2016. When growth seemed to be slipping too rapidly early last year, more stimulus measures were implemented to provide support, a pattern which could be seen again.

Resurging iron ore imports

Optimism about the upwards trend in China's iron ore imports faded after an abrupt slowdown in 2015, when there was just a 2% increase. At the beginning of last year, the annual growth rate seemed likely to be marginal, with a possibility of a small reduction occurring.

The outcome was much brighter. Iron ore imports of in 2016 expanded by 71mt (million tonnes) or over 7%, compared with the previous year, exceeding the symbolic one billion tonnes level to reach 1,024mt. But it is not entirely clear whether this robust growth is sustainable through the twelve months ahead: some of the positive influences seem unlikely to remain as strong as seen recently.

Although steel production increased by only 1% last year, further replacement of high cost domestic iron ore supplies with imports boosted foreign buying and stockbuilding also contributed. In 2017 some signs suggest reduced steel output, amid diminishing domestic and export demand. Replacement of domestic iron ore with imports may not continue at the same pace, while additions to inventories may cease.

Rebounding coal imports

Following a continued but steeper 30% decline in coal imports into China during 2015, pessimism about future volumes was widespread. Another sizeable reduction seemed predictable but, instead, the 2016 total (including low-quality lignite) increased strongly by 51mt or 25%, reaching 256mt. Nevertheless, prospects for a continuation of this revival are surrounded by great uncertainty.

Government intentions affecting domestic coal production and consumption are likely to have a big influence on foreign purchases. Coal mining and its relationship with imports was affected by policy changes last year. There was renewed emphasis on cleaner sources of energy — hydro electricity, gas, nuclear power and renewables, especially wind turbine power — intended to drastically cut air pollution.

China's domestic coal production was down by 9% last year, to 3.64 billion tonnes, resulting from the government's efforts to cut capacity and output. But shortages ensued, especially in the first half, raising prices and encouraging import purchases. Some measures cutting output were temporarily reversed later.

Lower grain, higher soya purchases

Grain imports arranged by Chinese buyers were lower in 2016, while the upwards trend in soyabeans imports continued. The volume of wheat, corn, barley, sorghum and other grains imported fell steeply by 11mt (37%) to 18mt. Soyabeans totalled 83mt, a 2% increase.

The soyabeans trend remains strong because meal and oil consumption in livestock feed and food manufacturing is still rising, and domestic soyabeans output supplies only a limited part of the market. Consequently imports in 2017 may increase again.

Imports of wheat and coarse grains are surrounded by greater uncertainty and currently, further weakening is foreseeable. Good domestic harvests in China over the past few years have resulted in stocks, particularly of corn, becoming excessive. The government's policy is to reduce these, implying adverse effects on grain imports.

Mixed changes in other commodities

Other dry bulk commodity imports into China, a broad category estimated to total over 250mt last year, consists of forest products, steel products, fertilizers, various ores and minerals and some agricultural bulks such as sugar. In such a varied category, shaped by many factors, changes are often very mixed in magnitude and direction.

Among the larger elements, bauxite/alumina imports totalled 55mt in 2016, a 9% reduction. Nickel ore volumes were also down by a similar 9%, at 32mt. By contrast, key items of forest products (woodpulp and woodchips) increased by 10% to 33mt and steel products saw a 5% rise to just over 17mt. *Richard Scott*

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

	2012	2013	2014	2015	2016	% change**
Coal*	288.9	327.2	291.6	204.2	255.7	+25.2
Iron ore	745.5	820.3	933.1	953.4	1024.7	+7.5
Soyabeans	58.4	63.4	71.4	81.7	83.2	+1.8
Grain	11.6	12.3	16.9	29.3	18.4	–37.2
Bauxite/alumina	45.1	75.4	41.8	60.8	55.1	–9.3
Nickel ore	65.0	71.2	47.7	35.2	31.9	–9.3

source: China Customs, BSA **coal includes lignite* *** 2016 compared with previous year*

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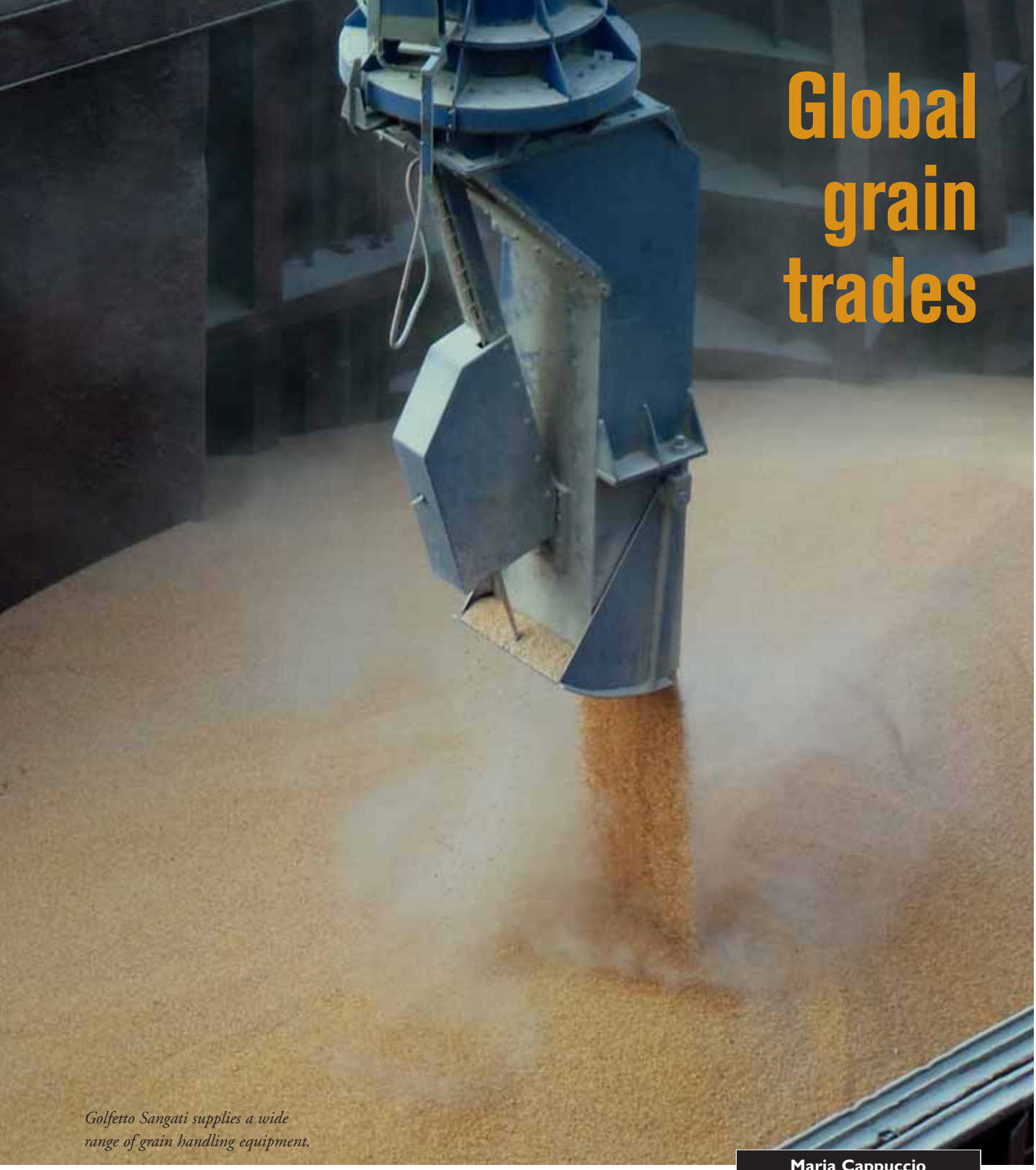
Global grain trades



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Maria Cappuccio

Prospects for a substantial harvest to weigh on prices in 2017

The International Monetary Fund (IMF) expect economic activity to pick up pace in 2017, by contrast to the lacklustre performance last year, with economic growth undermined by geopolitical risks including, the Brexit vote, Middle East tensions and the US election, among others. The primary factor underlying the strengthening global outlook is the projected pick-up in emerging market and developing economies, with global economic growth forecast to rise to 3.4% in 2017 and 3.6% in 2018. In advanced economies the US is likely to see the largest rise, with increases also noted for Germany, Japan, Spain and the UK. The IMF point to a number of possible outcomes surrounding the projections, given the uncertainty surrounding the policy stance of the new US administration and its global ramifications, and expects this to become clearer later in the year; although most analysts agree, that a rise in protectionism is the biggest risk to the global outlook, which could end the era of multinational trade agreements, restrict international trade and harm global growth.

In the agricultural sector, record high crops of grains and oilseeds has seen production outpacing consumption over the last four years, none more so than in the current crop year, with output forecast to rise to 2.7bn/t. But even with shrinking returns in some producing countries preliminary forecasts point to a substantial global harvest in 2017, with more soybeans, less corn and marginally lower wheat output, likely to grow global stocks and weigh on prices in 2017 and in 2018. The World

Bank expects agricultural prices to increase modestly this year with variation across commodities, grain prices expected to decline while oils and meals are expected to increase

Grain vessel at the Port of Dunkerque in France.

Global wheat harvest marginally lower in 2017

Prospects for the 2017 winter crops in the northern hemisphere remain mostly favourable. Only a small fall in the global wheat harvested area is anticipated, with consumption unlikely to rise sufficiently to reduce record wheat stocks, while prices are unable to rise when global production is rising faster than consumption. Farmers in some countries have switched to other crops to improve returns, in others firm domestic prices and attractive levels of government support, likely to underpin sowings. Despite a notable fall in the US planted wheat area and in Canada, the EU is expected to maintain a similar acreage to last year, while in Russia, Ukraine and North Africa, sowings have increased. The International Grains Council's (IGC) projects a slightly smaller global crop at 735mt (million tonnes) due to a fall in average yields, 2% below last year, while the UN's Food and Agricultural Organization (FAO), preliminary estimate pegs the global wheat crop at 745mt.

GLOBAL WHEAT PRODUCTION 2013–2017 (MT)

	2013	2014	2015	2016	2017
Europe	149	161	164	150	155
EU	145	157	160	145	150
E.Europe	4	4	4	5	5
CIS Baltic's	104	113	118	130	128
Russia	52	59	61	73	74
Ukraine	22	25	27	27	25
N &C America	99	88	87	99	83
US	58	55	56	63	50
Canada	38	29	28	32	29
S America	20	24	21	25	25
Argentina	11	14	11	16	16
N East Asia	42	35	42	42	41
Turkey	19	15	20	17	21
F East Asia	249	258	251	253	261
China	122	126	130	129	129
Africa	27	25	26	24	24
North Africa	20	17	20	17	17
Australia	25	24	25	35	28
Total	**715**	**728**	**736**	**758**	**735–745**

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

Sharp fall in North American plantings in 2017

Wheat production is forecast to decline in the US and Canada, mostly reflecting price-induced cuts for winter wheat sowings. USDA forecasts lower US wheat plantings at 46m/acres (32.4m/acres of Hard Red Winter (HRW) and Soft Red Winter (SRW) Hard Red Spring (HRS) 10.6m/acres, durum 2.3m/acres, 700,000/acres for other spring wheats), down by 5m/acres and the lowest seeded area for over a hundred years. Crop condition has improved, although lower than last year, with dryness noted in the US southern Plains. Canada's Department of Agriculture and Agri-Food (AAFC) forecasts Canada's wheat sowings at 9.15m/ha with average yields indicates a smaller crop of c.29mt-with wheat returns depending on the grade, to be some $5-7/t lower, due to exceptional harvests in Australia and South America likely to cap export values.

EU soft wheat crop forecast at 144mt

The EU is anticipated to show a marginal increase in area, with a recovery in yields, output is expected to rise. Strategie Grains pegged the soft wheat crop at almost 144mt in 2017, up 6% year-on-year, based on normal conditions after last year's exceptionally poor French harvest. Lower-than-normal rainfall levels since the beginning of January have reduced soil moisture reserves in large parts of southern Germany, southern Sweden, the Czech Republic and the Baltic countries but these conditions do not present an immediate concern.

Russia's winter wheat output to rise

Wheat fields in Ukraine and Russia experienced sub-zero temperatures this winter. Most of the ground had snow cover, except some southern parts of the Ukraine, where it was limited. Russia's winter cereals are forecast up 17.4m/ha in 2017, with only 4% of the planted crop in poor condition, wheat production is forecast at 74mt. In the Ukraine plantings of winter cereals is lower at 6.1m/ha — 80% of plantings in good or fair condition, with wheat output c.25mt; any fall in winter output is typically offset by an increase in spring plantings. In Kazakhstan, winter wheat quality in some areas affected by weather issues expected to reduce output to 13.5mt; while




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GLOBAL WHEAT SUPPLY & DEMAND

2013–2017 (mt)

	2013/14	2014/15	2015/16	2016/17	2017/18
Production	715	728	736	751–758	735–745
Consumption	698	706	712	741	737
Trade	162	162	172	178	—
Stocks	195	218	240	250-257	255-265
China	65	76	97	111	121
Major Exporters	54	64	67	77	—

Source: USDA/FAO/IGC

spring wheat and other spring-sown crops, the major proportion of production, to be sown later in May.

China, India and Pakistan wheat output to rise

Strong government incentives support a moderate increase in China's wheat plantings projected by FAO at 129mt in 2017. Sufficient water supplies, good conditions helping crop development in India, with increased plantings and production forecast at 95.5mt; a return to trend yields, likely to offset some of the large increase in plantings, with wheat imports expected to remain at 5mt next season, to replenish depleted stocks. Wheat output in Pakistan is forecast at a record level of 26mt reflecting some increase in plantings, good supply of water, fertilizers and herbicides, anticipated to increase yields.

Argentine wheat acreage to increase in 2017

Agriculture Minister Ricardo Buryaile expects even more land to be devoted to wheat this year, boosted by the recent 'exceptional' harvest, forecast at 16mt, although said to be higher, increasing supplies for export to c.11mt. Buryaile said the encouraging results were achieved because "predictability" had been returned to producers. Farmers planted nearly 20% more wheat for the 2016 season, supported by a sharp devaluation of the local currency, resulting in higher domestic prices, and less tax and restrictions on exports.

Lower sowings in 2017 to reduce Australia's output

Following an exceptional harvest, Abares forecasts Australian wheat sowings for 2017, which will start in April, to fall to 12.92m/ha, favourable returns from canola, pulses and sheep expected to result in increased competition for acreage. With seasonal conditions expected drier and yields returning to trend levels, after the 'exceptional' conditions across most of Australia for the harvest recently completed, production in 2017 is forecast down from 35mt to 24mt. Although premature at this stage worth noting the Australian Bureau of Meteorology point to the emergence of *El Niño* in winter this year, associated with hotter and drier conditions in eastern and northern Australia

Steep cut in US wheat acreage to support new crop prices

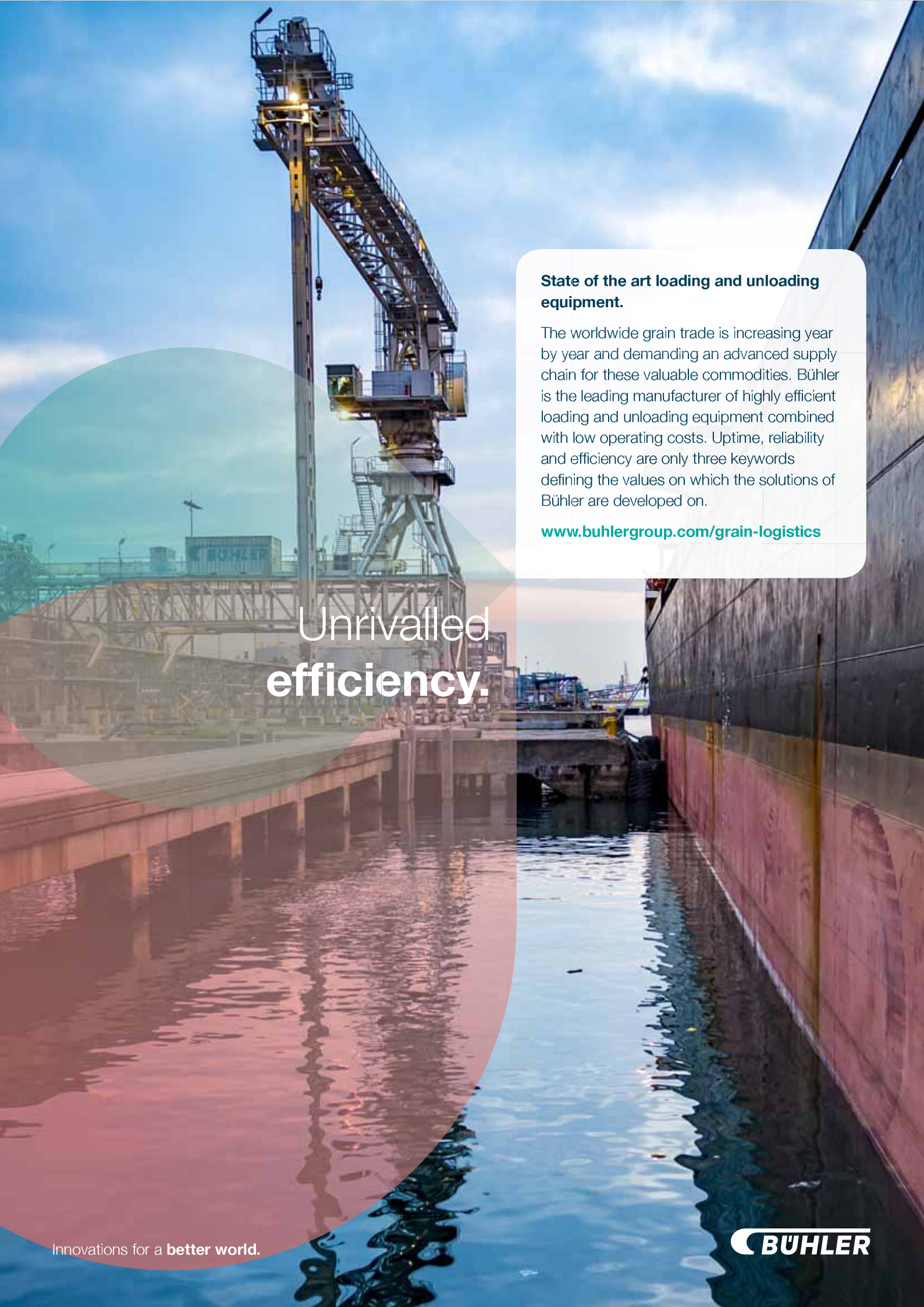
While record yields and improved exports have helped US producers to partially offset the low prices in 2016/17, USDA expect the sharply reduced winter wheat acreage should help firm up domestic prices and lend support to new-crop season average wheat prices, forecast at $4.30/bu ($158/t), up nearly 12% from last year. CBOT May wheat contract closed at $4.405/bu ($161.84/t), Paris May contract Milling Wheat E171.75/t ($182.86), UK May contract feed wheat £148.20/t ($179.87/t) (10 March 2017).

Record 758mt wheat crop boost stocks in 2016

With most of the wheat crop harvested, FAO forecasts global wheat production to be the largest crop on record with wheat production in Russia, US, Canada, Australia and Argentina at record or near record levels, offsetting the steep fall in EU production lifting wheat output to 758mt.

Food/industry and feed use to rise

Large wheat supplies, coupled with generally lower prices, are behind an almost 28mt increase in wheat use to 740mt in 2016/17, driven by a 17mt rise to 591mt for food/industry and an 11mt increase to 145mt for feed use underpinned by increases in China, North America and Russia. Southeast Asian wheat imports have more than doubled over the past decade as diets shift towards more wheat products and rising demand from the livestock, poultry and aquaculture sectors. While food use is expected to continue to rise, growth of feed use is forecast to slow. Indonesia and Thailand to import less feed wheat due to policy restrictions on imports, while in Thailand, increased use of rice for feed from surplus stocks. Lower imports for Indonesia and Thailand offset by surging feed grain



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COARSE GRAIN SUPPLY & DEMAND

2013–2016/17 (mt)

	2012/13	2013/14	2014/15	2015/16	2016/17
Production	1137	1280	1308	1249	1342
Consumption	1135	1233	1272	1250	1333
Trade	132	165	174	185	182
Stocks	164	211	247	246	255
China	68	83	102	112	103
Major exporters*	59	82	91	86	97

*Source: USDA — *major exporters Argentine, Australia, Brazil, Canada, EU, Russia, Ukraine, US*

imports for Vietnam, to meet growing demand.

Smaller EU wheat exports improves outlook for competitors

Reduced EU wheat supplies, provided a boost to exports from the US 27.5mt, Australia 24mt, Argentina 11mt and to the CIS countries, where exports are forecast to rise to 52.5mt (Russia 28.5mt, Kazakhstan 7.5mt and Ukraine 16.5mt), although the pace of Russia's wheat shipments slowed. Black Earth Farming flagged the potential for a revival in Russian exports with the onset of milder weather, with farmers accepting weaker rouble prices to finance spring sowings and to free-up storage for the 2017 harvest.

Wheat trade rises to a record 180mt in 2016/17

Larger purchases by India, Brazil, Morocco, Turkey and Vietnam are forecast to lift global wheat trade up by 8mt to a record 180mt in 2016/17. Egypt the largest single buyer has been active with a flurry of tenders buying 360,000mt of wheat at $207-$209/t (300,000/t Russian and 60,000/t Ukrainian wheat) prices slightly up by $1–3/t and the highest prices for the season. While Russia's large wheat, supplies have dominated General Authority For Supply Commodities (GASC) purchases, so far this season, accounting for 3.6mt of the 5.1mt purchased, the rise in the rouble, up more than 5% this year against the dollar, undermined Russian competitiveness. In the 1 March 535,000/t tender, 120,000/t of French wheat was offered by Cargill at $197/t ex. freight. The cheapest Russian offer, from AOS, priced at $197.94/t ex. freight, while US HRW wheat offered at $197.50/t the bid proved uncompetitive with the addition of $22/t freight costs.

Wheat stocks remain burdensome

Prices were mixed during February and March at the prospect of a sizeable harvest in 2017, to add to burdensome stocks expected to weigh on prices through 2017 and 2018. CBOT May contract closed lower $4.376/bu ($160.88/t); Paris Milling Wheat E173.50 ($185.13/t), UK Feed £149.15/t ($182.21t) — 10 March 2017.

Lower corn sowings expected in the US and China in 2017

For the US, the decline in corn sowings is driven by a number of factors that point to soybeans being the more profitable option for growers this season. The IGC forecasts the US harvested area dropping to 33.6m/ha (83m/acres), slightly higher than USDA's preliminary forecast of 82.4m/acres. Using corn yields of 170.7/bu implies a US crop of 357mt-360mt; USDA forecasts the season average farm price for corn at $3.50/bu slightly above last year, although weather conditions, changes in prices and input costs between now and time of planting to determine the final planted acreage and better understood by the end of March. In China, the corn harvested area is forecast lower at 36m/ha, resulting in a decline in plantings for the second successive year due to the lack of government support for corn, expected to encourage growers to switch to other crops.

Global corn output lower with record stocks by end 2017/18

Global corn output is forecast to fall by 26mt to 1,023bn/t in 2017, according to the IGC. The estimate reflects a potential decline in sowings in China, the US and South America expected to offset increases in the EU, Russia and Ukraine where improved seed quality is encouraging expansion. While global corn stocks by end of 2017/18 are expected at a record 221mt, with stocks in major exporting countries rising by 18mt to 75mt.

Coarse grain harvest forecast at a record 1.34bn/t

With better crops in several countries, the global coarse grain harvest is forecast at 1.34bn/t in 2016/17, the largest crop ever recorded, mostly due to a huge corn crop, smaller barley and slightly larger sorghum output. Strong demand for coarse grains up by 83mt to 1.33bn/t in 2016/17 the year-on-year expansion led by food and industry, forecast to rise by almost 50mt to 536mt with feed use up by 33mt to 797mt. Global trade is expected to fall by 3mt to182mt this season, reflecting smaller imports into China.

Strong demand drives global corn use

Record high corn production is forecast at over 1,049/bn/t, boosted by a huge 385mt US corn crop and larger crops in the EU 60mt, Russia 16mt, Ukraine 28mt, Serbia 13mt, India 25mt, South Africa's 13mt crop recovering from last year's drought and a smaller crop in China 220mt. Prospective forecasts for South America's corn crop keep rising, USDA pegs the Argentine crop at 37.5mt, with the Brazilian crop at 91mt due to record yields and larger safrinha acreage, likely to pressure US corn exports. The increase in global corn consumption led by food and industrial use up by over 48mt to 409mt; the rise in feed use up by 31mt to 630mt is driven by livestock demand-the US and China, accounting for well over half the anticipated increase.

Ethanol use to increase in 2017

The US ethanol industry made headway in 2016, profits improved, domestic ethanol production increased, exports of ethanol rose to 1bn gallons with 12mt of animal feed products and the Environment Protection Agency (EPA) finally set the controversial Renewable Fuel Standard (RFS) volume requirement. The higher RFS volume requirement of 19.28bn/gallons in 2017 includes ethanol set at 15bn/gallons, 500m/gallons larger than last year. According to Scott Irwin University of Illinois, surging ethanol export demand was the most likely factor responsible for the upswing in profits, especially during the second half of last year.

Projected corn use for ethanol to rise in 2017/18

Since January, ethanol markets have remained weak, and profits sharply lower, coinciding with a steep hike in China's ethanol tariff, up to 30%, on imports of ethanol from 1 January, likely to reduce US ethanol exports to that market. USDA projects corn

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use for ethanol in 2017/18 at 5,400m/bu (137mt), up over 1mt on last year when output of ethanol, according to the Renewable Fuels Association (RFA) rose to 15.25bn/gallons, with 42mt of livestock feed (37mt Distillers Dried Grains and Solubles (DDGS), 5mt Corn Glutenfeed/meal, with almost 12mt of DDGS exported to several countries, expected to partially offset declining sales to China in 2017.

Potential change to biofuels policy sparks confusion

The US biofuels industry was the latest to experience uncertainty following exchanges with the new US administration, based on rumours that a pending executive order would shake-up the rules governing the blending of ethanol with gasoline. Explanations only served to increase confusion, exposing division within the US biofuels industry's lobby group, the Renewable Fuels Association (RFA), and also in the wider agricultural community, while temporarily lifting corn and soy values in Chicago, which on the back of burdensome grain and oilseeds supplies, were expected to fall. At the heart of the matter was who should be responsible for the blending of ethanol in gasoline. Currently it is undertaken by US refiners but it was understood a proposal was to shift responsibility to fuel blenders, a move vehemently opposed by most members of the US biofuels industry. Following White House confirmation that no executive order exists, corn and soy values on the Futures markets shed previous gains. Meanwhile a decision on the possible renewal of the tax credit for biodiesel (allowed to lapse last year), is still awaited. Any change to the US biofuels policy, comes at a critical time as US farmers decide what spring crops to grow; currently, the official line is for US corn to contract in favour of soy.

Cut in China's corn acreage too large?

The removal of the Chinese government's support for corn is expected to lead to smaller sowings and lower output in 2017 as it tackles the 102mt stockpile. Xi Gensheng, Director of macroeconomic research at China's Ministry of Agriculture Rural Economics Research Centre, acknowledged that while China's corn prices are over 32% lower than at the start of 2015, yet despite large stocks, domestic corn prices have risen; he flagged the sharp 30m/mu decline in the corn area, to be well above the ministry's 10m/mu (c.6.7m square km) target, being responsible for rising prices. Corn May contract on the Dalian Commodity Exchange Rmb1, 596 ($231/t — 10 March 2017).

With Beijing keen to shift the burden of farmer support to the provincial level, some provinces, like Heilongjiang, Jilin and Liaoning are already providing subsidies to feed processors of between 300yuan/t ($43.49), 200yuan/t ($28.99) and 100 yuan/t ($14.50) respectively, to process corn stocks, and petitioning for more funds, as the government considers other ways including, ethanol, sweeteners and plastics, to transform and reduce the poor quality stocks. Steep tariffs on cheaper feed ingredients like DDGS, sorghum and barley, have more than halved imports into China to 12mt in 2016/17, expected to decline further in 2017/18.

Delays short feed grain supplies to Asia

Snow storms and excessive ice caused by the La Nina weather pattern disrupted rail supplies for corn moving from the Midwest and other corn growing regions to US Pacific North West elevators, delaying corn cargoes to be shipped to Japan, Taiwan and South Korea. Traders switched cargoes late last year to the US Gulf — a longer route taking 40 days-or to Black Sea ports-underpinned prices at the ports. To cover the shortfall, Taiwan bought corn from South Korea, Japanese traders bought corn FOB China northern ports at prices c.$220-$225mt, or part cargoes from Korea or Vietnam to meet demand, while obtaining permission from the Japanese government, to tap into ring-fenced 330,000mt emergency corn supplies, to plug the gap. South Korea being the least affected, due to subdued demand following a severe bird flu epidemic that caused a massive poultry cull, late last year.

Falling export quotes reflect abundant supplies

Global corn trade in 2016/17 is similar to last year at 145mt, due to better crops in North America, Asia and Europe. US exports are forecast to rise by 6mt to almost 57mt, largely on reduced supplies from Brazil, with larger exports from Argentina, Ukraine and Russia. While global corn stocks are expected to rise by 10mt to 221mt in 2016/17, increased use of domestic supplies and small exports are expected to reduce China's corn stocks by 9mt to 102mt, while US stocks, following an exceptional harvest are expected to hit a record 59mt.

Average export prices US Gulf FOB Corn (yc3) supported at the beginning of March, by delays at PNW ports subsequently fell by $9/t to $162/t (10 March 2017). Argentine corn (up river) quoted at $165/t (10 March 2017). Corn rallied sharply at the beginning of March, on changes in biofuels policy before retreating when no changes were announced. CBOT Corn Futures May contract closed lower at $3.642/bu (10 March 2017).

Modest rise in global barley plantings in 2017

Global barley plantings are expected to rebound in 2017 to 48.1m/ha, mainly due to increases in North Africa, especially in Morocco up to 1.7m/ha where 2016 output was severely damaged by drought. A small increase to the EU's barley area at 12.5m/ha with a projected crop of almost 63mt, up 5% year-on-year; spring plantings in France advancing well, with approximately 70% planted in the south and up to 10% further north with Germany and the UK starting spring plantings. Russian barley area is forecast lower at 7.8m/ha, while Ukraine's, spring barley plantings estimated at 2.6m/ha to be sown to barley, below 3.1m/ha last year. While the recent bumper 13mt Australian barley harvest has enough supply to meet nearly all the demand from key markets in Asia, as well as other major importing countries with EU prices struggling to compete. This season rising imports of 11mt to Saudi Arabia mostly responsible for the increase in global trade in 2016/17 — average spot price for barley-EU France Feed (Rouen) ($163/t).

Steep rise in China's sorghum acreage in 2017

While the global sorghum area in the US is expected to fall in 2017, China's sorghum sowings, due to the removal of support for corn, are seen rising by 32% to 760,000/ha reflecting a switch from corn, in areas where sorghum is predominately irrigated. Sorghum production in 2016 increased by 3mt to 63mt, a smaller US crop, offset by better crops in Sudan, Nigeria, India, Ethiopia, Burkina, Brazil, Argentina and China. Trade is forecast over 2mt lower at 7.5mt in 2016/17, mainly due to reduced demand in China; sorghum prices tracking corn – US sorghum (April) FOB-Nola $173.02/t (10 March 2017).

US soybean acreage gains over corn

USDA forecasts the US soybean plantings to rise by 4.6m/acres to 88m/acres in 2017, at the expense of corn. Based on a

GLOBAL MAJOR OILSEED PRODUCTION

2013–2016/17 (mt)

Oilseeds	2012/13	2013/14	2014/15	2015/16	2016/17
Production	475	504	537	521	558
Soyabean	269	283	320	313	341
Trade	118	134	147	153	162
Crush	397	420	440	447	469
Meal use	265	279	294	300	312
Oil use	159	167	172	178	184
Stocks	68	78	93	89	94
Soyabean	55	62	78	77	83
US	4	3	5	5	12
S.America*	35	41	51	50	51

Source: USDA/Meal use excl. fishmeal c.5mt

SOYABEANS MAJOR PRODUCERS

2013–2016/17 (mt)

Countries	2012/13	2013/14	2014/15	2015/16	2016/17
US	83	91	107	107	117
Brazil	82	87	97	97	108
Argentina	49	53	61	57	56
China	13	12	12	12	13
India	12	10	9	7	12
Paraguay	8	8	8	9	9
Canada	5	5	6	6	7
Others	16	16	19	18	20
Total	269	283	320	313	341

Source: USDA

number of contributory factors including, lower winter wheat seeding, lower cost of production and the improving soybean-to-corn price ratio. Even with the anticipated higher acreage, soybean production is expected to fall to 113.8mt (4.180bn/bu), down by 3mt, as lower yields of 48bu/acre more than offset larger harvested area, with US soybean supplies at the start of 2017/18 at 125.9mt (4.625bn/bu).

Higher US soybean exports and crush

US exports are forecast higher at 57.8mt (2.125bn/bu) up on last year, while domestic crush and soybean oil use are expected to increase 1% each. By the end of 2017/18 stocks are forecast to close at 12mt. USDA forecasts the soybean season-average farm price, to rise slightly to $9.60/bu.

Sharp price falls as Brazil's soybean crop outperforms

Soybean futures hit a two-month low, after US officials raised their estimate for the Brazilian crop to 108mt, well above market expectations. Brazil is the world's second-largest soybean grower, competing with the US in the global market as prices turn lower. Soybean CBOT May contract touched $10.065/bu (10 March 2017), a drop of 1.5% on the day, taking the contract's decline above 7% from a high of $10.838/bu (18 January 2017).

Meal and oil demand lifts global trade in 2016/17

Global oilseed output is expected to reach 558mt in 2016/17, 37mt more than the previous year, boosted by record soybean output in major exporting countries, led by the US, Brazil and Argentina, and either harvested or being harvested in early 2017. Soy production is forecast to rise to 341mt with increased production for most crops including, sunflower seed 45mt, cottonseed 39mt, groundnut 42mt, palm kernel 17mt and copra 6mt, the exception being rapeseed where the crop is almost 2mt lower at 68mt. Global crushings are forecast to rise by almost 22mt to 469mt, especially in China, India, US and Argentina, driven by strong demand for meal 312mt and oil 184mt. Trade is forecast up at 162mt and stocks by end of 2016/17 to rise by 5mt to 94mt.

Brazil's exports higher but wet weather rain causes delays

Excessive rains hampered harvest progress in the eastern half of Argentina and coupled with a 24-hour strike (6 March) at the Port of Rosario resulted in delays. During February, Brazil

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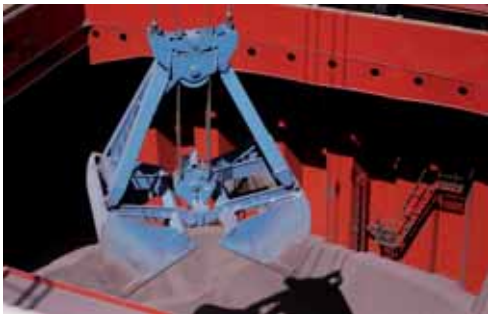

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OILSEEDS AND MEAL SUPPLY/DEMAND 2015/16 (MT)

	Oilseeds				Meal		
	Prod	Trade	Crush	Stocks	Prod	Trade	Use
Soyabeans	337	140	291	80	228	68	225
Sunseed	45	2	41	2	18	7	17
Rapeseed	68	14	67	5	38	6	38
Copra	6	*	6	*	2	1	2
Palmkernel	17	*	16	*	9	7	9
Peanuts	42	4	18	2	7	*	7
Cottonseed	40	1	30	1	14	*	14
Total	554	161	469	91	316	90	312

*USDA: *less than 300,000/t. Meal totals excl. fishmeal*

exported a record 3.5mt (Jan–Feb 4.4mt) of soybeans, higher than last year, but below expectations due to relentless and excessive wet weather slowing the harvest in some areas and affecting roads to northern ports, which delayed deliveries. Brazilian grain companies also found difficulties in sourcing enough soybeans to meet export demand, despite a record crop; with farmers reluctant to sell, due to a stronger real (R$ 3.14 to the U$), preferring to take advantage of private storage facilities, anticipating better prices later in the year.

Feed demand fuels growth in global trade

Global soybean trade is raised by 9mt to 141mt in 2016/17 due to rising Asian imports of soybeans and meal forecast at 102mt. China is expected to increase soybean imports to 87mt. While larger imports are expected for Malaysia 2.4mt Philippines 2.8mt, Taiwan 2.6mt, Thailand 5.8mt, Indonesia 7mt, and Vietnam due to growing demand in livestock and aquaculture sectors. Vietnam's imports of soybean and soybean meal, expected to increase to almost 7mt (5.2 meal/1.8mt beans), some 0.4mt up on last year, and expected to continue in 2017, raising total protein feed consumption by 10%.

Brazilian soybeans drive prices lower

China's demand for US soybeans is muted with crush margins negative while China seeks cheaper South American beans. Futures International's Terry Reilly flagged the 'rapid shift of soybean exports from the US to South America as Brazilian prices start to develop notable discounts to the US. Brazil is forecast to export 61mt soybeans, US 55mt and Argentina 9mt. Export bids in March fell by over $16/t, following revised estimates by CONAB, which raised output potential for South American crops, as prices turned lower at key export ports — Argentine (up river) $380/t, Brazil (Paranagua) $381/t, US 2Y Gulf) $380/t (10 March 2017).

US Biodiesel tax credit may support domestic industry

With markets focused on crop size and prospective plantings one aspect of the biofuels policy, the tax credit on biodiesel still awaits a decision by government on whether it is to be renewed, revised, or scrapped.

Recent discussions have centred on the tax credit being revised and switched, from the blender, to the producer. Should this revision go ahead, it will not apply to a substantial quantity of imports that the US imports mostly from Argentina but also from Canada and Germany, while handing an advantage to the domestic industry. Scott Irwin at the University of Illinois said that while President Trump "won't touch the Renewable Fuel Standard," he may "prohibit foreign biofuel additives from accessing US tax credit." The change, along with an expanding advanced RFS mandate, may improve production capacity of the US biodiesel industry and boost profitability. DCi

SOYABEAN & SOYABEAN MEAL MAJOR PRODUCERS 2013/14–2015/16 (MT)

	Soybeans			Soybeanmeal		
Importers	2014/15	2015/16	2016/17	2014/15	2015/16	2016/17
EU	14	15	14	20	19	20
Asia	92	98	102	19	20	21
China	78	83	87	—	—	—
L. America	2	2	3	6	6	6
N. America	5	5	5	3	4	3
Mexico	4	4	4	2	2	2
MidEast/Africa	7	7	7	7	9	8
Others	4	6	6	5	5	5
Total	124	133	138	61	62	64

Source: USDA

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Dutch tug and workboat company Herman Senior orders its 12th Damen vessel

Damen Multi Cat 2712 will join the fleet in March

The Dutch family-owned tug and workboat company Herman Senior BV has ordered its 12th Damen vessel, a Multi Cat 2712. Given the very short delivery time, the new vessel will already be officially launched and christened *Panda* on 23 March. Herman Senior has a tradition of naming its ships after famous bears.

Based in Dordrecht, Herman Senior serves the dredging market, offshore wind farms and the oil & gas industry, with services including towage, plough dredging, anchor handling, geotechnical services, diving support and salvage & anchor recovery, amongst others.

Jack van Dodewaard, Herman Senior Managing Director, comments: "The new Multi Cat 2712 has the big advantage that she is suited for deepsea work and can sail worldwide under her own keel. At the moment we have our vessels in Latin America, Australia, the Middle East, North Africa and Europe so this new addition will add to our flexibility. "Our current Damen Multi Cat *Yogi* has a working limit of 30 miles offshore. She has been active in South America for three years so in the first instance we had to go to the expense of transporting her over there."

Coupled with this, Damen is aiming for a very fast delivery of just four weeks so the *Panda* will be ready for her first project, he adds.

The Multi Cat 2712 has a bollard pull of 32 tonnes and two 290 tonnes/metres cranes on board with a lifting capacity of 11.5 tonnes at 16.5 metres, so is suitable for a wide range of tasks. *Panda* is largely a standard Damen vessel, which has been built for stock, although some extra navigational equipment has been added.

Van Dodewaard stresses: "Although we have a long history together, if Damen didn't deliver the quality and service levels we expect, then we would look for another shipyard. A major advantage is that Damen understands our specific requirements. The drawings are automatically adapted each time and updated for the next vessel."

Jos van Woerkum, Managing Director of Damen Shipyards Hardinxveld, says: "I have personally known Jack for more than 40 years, when I was just starting my career at Damen. We are very pleased to be able to assist the company with its latest fleet expansion. It is great that he is still a satisfied customer all these years later. We have a relationship based on trust, they know if we promise to do something, we do what we say."


Contract signing.

Damen Shipyards Group

Damen Shipyards Group operates 33 shipbuilding and repair yards, employing 9,000 people worldwide. Damen has delivered more than 6,000 vessels in more than 100 countries and delivers some 180 vessels annually to customers worldwide. Based on its unique, standardized ship-design concept Damen is able to guarantee consistent quality.

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

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

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

In addition to ship design and shipbuilding, Damen Shiprepair & Conversion (DSC) has a worldwide network of 16 repair and conversion yards with dry docks ranging up to 420 × 80 metres. Conversion projects range from adapting vessels to today's requirements and regulations to the complete conversion of large offshore structures. DSC completes around 1,500 repair and maintenance jobs annually.

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Leading Indian shipping company mulls future of shipping industry

How the global shipping industry and in turn shipbuilders will fare will always depend largely on how well or badly the world economy performs. While the rise and fall in global trade, which generates dry bulk and liquid cargoes for ships is linked to gross domestic product, growth in developed, emerging and developing economies, trade policies pursued by major nations and blocs such as the European Union, NAFTA and ASEAN have a bearing on the fortunes of shipping groups. The World Bank forecasting a moderate pick up in global economic growth to 2.7% in the current year from 2.2% in 2016, the slowest since the 2008/09 economic crisis that unsettled banks and financial institutions everywhere does not bring cheers to the community of shipping companies and shipbuilders.

Whatever marginal improvement in growth expected this year will be driven mainly by emerging markets and developing economies. World economic growth in 2018 is pegged marginally higher at 2.8% by the Bank. What is particularly disturbing for the shipping industry nursing surplus capacity in all segments was small 1.2% growth in 2016 in world trade volume, which incidentally was the third-lowest in the past 30 years. The world is witnessing a clear break with the pre-2008 phenomenon of trade growth rate being higher than GDP growth rate. The Bank points out that trade restrictions reached a post-financial crisis high in 2016. As for the current year, "protectionist measures" that the US might pursue as were suggested by Donald Trump during presidential campaign, then as president elect and finally in his presidential acceptance speech and trade uncertainties that the UK's decision to exit the EU has spelt could further rock free global movement of goods and services.

Emerging and developing economies expected principally to fuel economic growth will be most affected if new trade barriers come up. "It is against the continuing dismal global economic outlook you need to take a view of BIMCO's (Baltic and International Maritime Council) *Road to Recovery Report* which says the dry bulk sector of shipping could return to profitability in 2019 provided there is at least 2% annual global trade growth. Since this is unlikely to happen when protectionism is raising its head, it will be well into 2020s that dry bulk carriers could make a breakout from losses," says a spokesperson for a leading Indian shipping company.

The official, however, puts the caveat that recovery in working of shipping companies and all linked activities in the upstream such as shipbuilding and downstream such as those engaged in the long chain of assembling and moving goods from crop growing fields, mines and factories will depend on zero addition of tonnage. This becomes possible if tonnage scrapped is more or at least equal to fresh deliveries. Last year was marked by the container segment of the shipping industry "biting the bullet" by way of mergers, planning of new alliances, limiting placement of new orders with shipyards and consigning large capacity for scrapping. Hanjin filing for bankruptcy should be seen as an inevitable fallout of severe industry strains. BIMCO recommends that the dry bulk segment should replicate in 2017 all that its container counterpart went through last year.

A recent report by Clarksons Research says while there were any numbers of "record breaking facts and figures to report (relating to shipping) across 2016 unfortunately mostly of a gloomy nature," one redeeming feature was year-end steep fall in orderbook on tonnage basis both for bulk carriers and tankers. As for bulk carriers the year on year decline was 34.9% to dwt from 131.5m dwt and for tankers it was 27.3% to 75.8 dwt from 104.3m dwt. What, however, remains a point of concern is that ship owners are still to show the desired enthusiasm in sending old vessels to scrapyards.

For example, in 2016 28.9m dwt of bulk carrier was sent for demolition against 30.5m dwt in the previous year, a fall of 5.2%. Tankers sent for scrapping last year saw a rise of 6.9% to 2.6m dwt from 2.4m dwt in 2015. The difficult state of global shipping becomes starkly evident from the ClarkSea index for 2016. The average for the year was $9,441 per day, down 35% year on year. The report says with OPEX (operating expenses) for the basket of ships considered for the index at $6,394 per day, the margins for shipping companies "were thin or non-existent." The weighted average of daily revenue earnings of bulk carriers was down 12.3% to $6,218 in 2016 from $7,092 in the earlier year.

In a situation marked by excess capacity and non-profit yielding freight, dip in new building orders is inevitable. Let's consider the 2016 experience of China, which like in so many industries has global leadership in shipbuilding. According to China Association of National Shipbuilding Industry, new shipbuilding orders received by the country's shipyards last year were down 32%. The industry impacted by insufficient work and tight cash flow also reported a 15.6% fall in completed tonnage. China's 2016 shipbuilding figures showed that the completed tonnage, new orders received and order backlog accounted for 35.6%, 65.2% and 43.9%, respectively, of the global market share.

Like China, shipyards in Japan and South Korea which swapped places in world ranking in the industry last year, suffered a setback on important parameters such as tonnage completion, orders receipts and orders backlog in 2016. With the rapid rise of shipbuilding industry in China and South Korea in better times, Japan intelligently got focused in high end technology oriented vessels making. Strange things happen in recession times. After a break of 17 years, surprising industry watchers, shipyards in Japan ended 2016 with a larger order backlog than their South Korean peers.

According to Clarksons Research, South Korea's end-year backlogged orders were estimated at 19.91m compensated gross tons (CGT) compared with Japan's 20.64m CGT. China, which too saw fall in new orders, nevertheless maintained a big lead over the nearest competition with backlog orders of 30m CGT. The orders fall for South Korea was rather steep since it had a sustained annual order backlog of 30m CGT throughout 2015. Last year was marked by shrinkage in backlog orders every month. The order backlog for Japan was down from 25.55m CGT in December 2015 though it experienced a less pronounced fall than South Korea.

Analysts say that as was the case last year, shipyards in South Korea and Japan will come under pressure in the midway to consider by how much they are undershooting the 2017 new order targets due to continuing tough macro economic conditions, global vessel glut and competition becoming fiercer from Chinese rivals.

The majority of shipyards have suffered considerable capital erosion since 2008/09 economic meltdown and it will not be soon that they could return to profits. The continuing gloom in the industry is standing like a wall against the ambitions of India, Vietnam and others to meaningfully expand their shipbuilding and repairing yards.

Kunal Bose

Save our souls – and our ships

working towards greater safety in the maritime environment

DNV GL: using big data and modern technology to improve safety at sea

Over the last several years, DNV GL has used its big data capabilities to evaluate operational experience from nearly 1,000 bulk carriers. The findings may be surprising to many shipowners — namely that cost-cutting is leading to more frequent Class and Port State Control (PSC) deficiencies and more detentions and repairs involving downtime, which may ultimately be counterproductive to lowering operating costs. *Morten Lovstad, Vice President and Business Director for Bulk Carriers at DNV GL – Maritime* shows how the classification society uses data analytics to identify the major safety risks, and has put together a set of recommendations for bulk carrier owners on how to mitigate these risks, as well as to avoid deficiencies, losses and detentions.

Safety, measured in terms of "serious bulk carrier accidents per 1,000 ship years" has shown a positive trend since 2009. Also, ship losses due to structural failure have decreased, showing the positive effect of enhanced design standards (IACS Common Structural Rules – CSR) and improved condition monitoring (Enhanced Survey Program). The introduction of the mandatory provisions of the IMSBC Code in 2011 has also contributed to raising operational safety levels. Even so, a recent safety survey conducted by DNV GL showed that bulk carrier owners and operators were growing more concerned about safety levels.

Could it be that this increased concern is related to the operational cost-cutting we have seen over the last years, and a fear that this may have an impact on both general ship maintenance and overall safety levels? Could it also be that despite the introduction of the IMSBC Code, that cargo liquefaction is still an area not well enough addressed?

What we learned from analysing Port State Control and Class findings

At DNV GL, we looked at more than 33,000 PSC and class findings from the last five years for the DNV GL bulk carrier fleet, equivalent to modest average of 4.2 findings per ship per year. The main conclusion is that there has been a slightly negative trend in the overall maintenance level for the bulk carrier fleet.

Over the past two years the number of conditions of class (CC) has increased; and the number of postponed CCs has increased significantly. The DNV GL study looked at 9,648 inspections resulting in 15,917 deficiencies and 205 detentions. The average deficiency rate per inspection for the DNV GL bulk carrier fleet was 1.67, and about 2% detentions per inspection. Even so, this is better performance than for the bulk carrier fleet of any other class society.

The top deficiency categories found by PSC inspectors on the DNV GL bulk carrier fleet are:

- fire safety;
- safety of navigation;
- certificates and documentation; and
- life-saving equipment.

The deficiencies in these categories represent more than 50% of PSC deficiencies. Furthermore, over the last few years we have seen that there has been a much stronger focus on International Safety Management (ISM) Code compliance because of the New Inspection Regime (NIR) in the biggest PSC regimes (Paris and Tokyo MoUs).

Number one safety concern in dry bulk – cargo liquefaction

Over the last eight years, more than a hundred seafarers have lost their lives on vessels that have capsized and sunk as a result of cargo liquefaction and loss of stability, mostly from southern Asian ports. The vessels have been Handymax (~57k dwt) or smaller, with traditional bulk carrier cross-sections. Some of the vessels had only been in service for a few years, so no

relationship between the age and condition of the ship and the risk of liquefaction is observed.

Although there are vessel design options that reduce the risks of cargo liquefaction, the main improvements are operational. DNV GL has therefore developed a guideline which describes such operational recommendations. Some of these recommendations include:

- in case of unprocessed ore cargoes, it is critical that the correct transportable moisture limit (TML) and the moisture content (MC) are determined before loading commences;
- the metacentric height (GM) of the vessel should be carefully considered when carrying cargoes that may liquefy; and
- when carrying cargoes that may slide, the cargoes should be trimmed as necessary to ensure that they are reasonably level.

Identified improvement area, and DNV GL recommendation — anchor and chain loss prevention

Our analysis reveals that there has been a distinct increase in the number of anchor chain and anchor losses in the bulk carrier fleet in recent years. Winch break failures and detached D-link securing bolts are top technical failures.

Roughly 50% of anchor and chain losses appear to be related to operational issues, such as lack of knowledge about the environmental limitations of anchoring equipment, staying at anchor in overly heavy weather, anchoring at excessive depth, and failure to secure the anchor chain properly while at anchorage.

We responded to these findings by developing a special awareness campaign jointly with the P&I clubs Gard and Swedish Club. Training material has been developed for use by customers during officer meetings or other awareness initiatives and for self-training on board vessels.

Identified improvement area, and DNV GL recommendation — damages to hull structure

The sides are a single-skin bulk carrier's most vulnerable elements. Damage records indicate that side frame deformation is the key challenge while corrosion is the second most frequent observation. Regular inspections are crucial to reduce the risk of hull damages. A deformation in the hull side, for instance, could be modest, but it is essential for the crew to be trained properly in inspecting and reporting deformations of side frames which may severely affect frame strength.

DNV GL is the first classification society to have introduced the use of drones fitted with a camera to conduct surveys. Using drones to check the condition of ship cargo holds can significantly reduce survey times and staging costs, avoid damage to the tank coating, while at the same time improve safety for surveyors. A camera-equipped drone allows surveyors to examine difficult-to-reach structural areas and components using video streamed to a tablet.

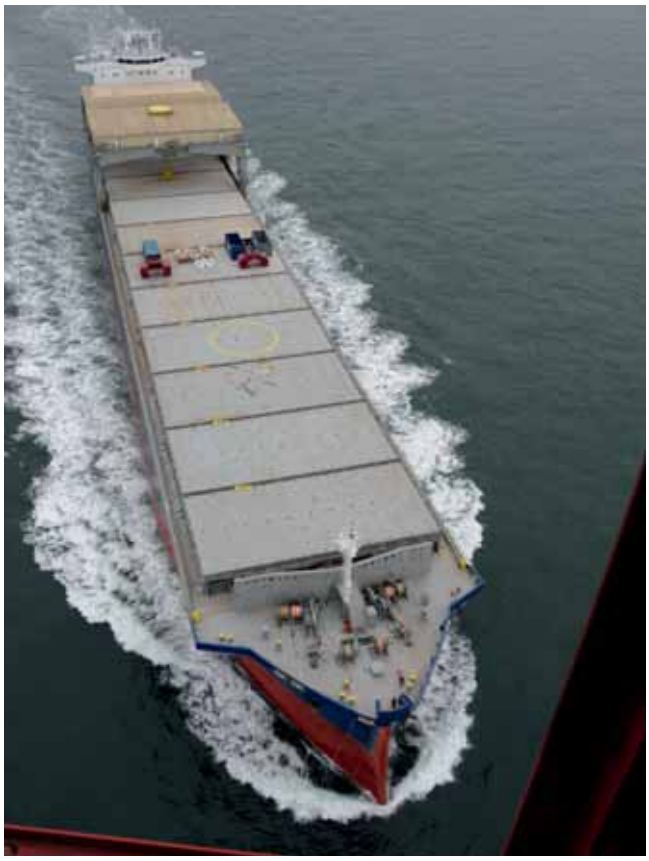
Identified improvement area, and DNV GL recommendation — fire safety

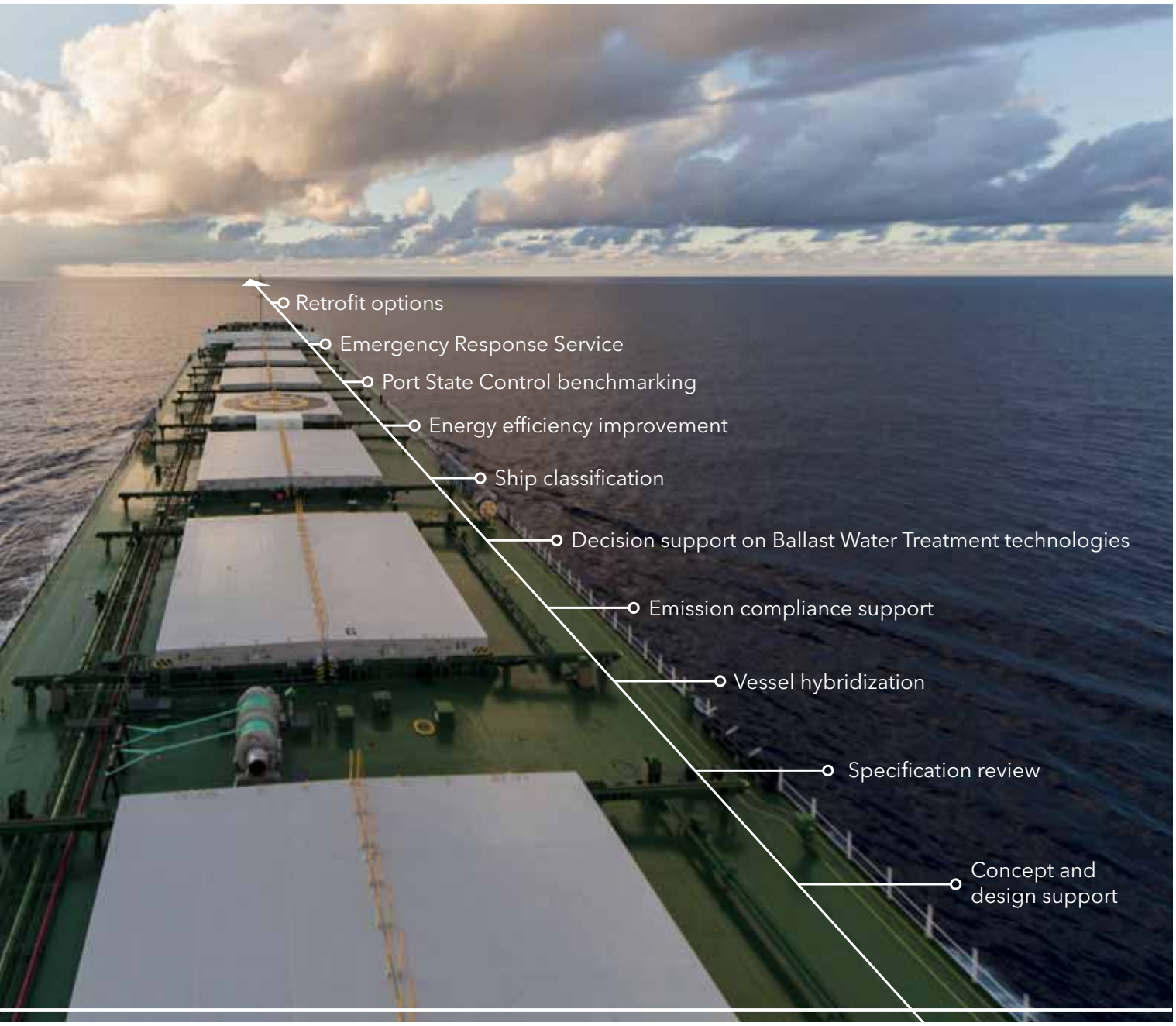
Fire safety is of utmost importance for the protection of the crew, the ship and its cargo. Inadequate maintenance of fire safety equipment comprises the risk of PSC deficiencies and detentions, and issues related to fire safety are the most common findings on the DNV GL bulk carrier fleet, including fire detection and alarm systems, fire-fighting equipment, fire dampers, fixed fire extinguishing installations, and fire prevention structures.

Many of the PSC findings related to fire safety are typical maintenance issues, therefore it is recommended to carefully review the planned maintenance system (PMS) and ensure that the proper maintenance procedures are implemented. To support such awareness campaigns, DNV GL has issued a special guidance document and an instruction video on fire safety in the engine room.

Crew training a crucial factor

The common denominator for improving performance related to maintenance and safety is to ensure that the crew is properly trained and that regular maintenance procedures are in place and adhered to. By focusing on the human factor and leveraging targeted campaigns to address the most frequent findings from PSC and Class, shipowners can keep their costs under control and avoid downtime, while at the same time improving safety at sea.





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VIKING Saatsea introduces 24/7 onboard ISPS Code courses

Shipowners hoping to save training costs, reduce risks and increase the efficiency of ISPS Code maritime security compliance can now take advantage of new, computer-based training from VIKING Saatsea.

VIKING Saatsea, the maritime e-learning unit of marine and offshore safety equipment supplier VIKING Life-Saving Equipment (VIKING), has released a new set of 24/7-accessible, train-at-your-convenience courses to make ISPS Code (the International Ship and Port Security Code) training more efficient and affordable.

Shipowners operating internationally are required to ensure their crews have a range of competencies for dealing with maritime security situations such as piracy or terrorist attacks. Three levels of skills are mandated, depending on the duties and ranking of crew or ship's officers. VIKING Saatsea's ISPS Code e-learning courses were developed as a response to customer requests and tested in close co-operation with a major shipping line.

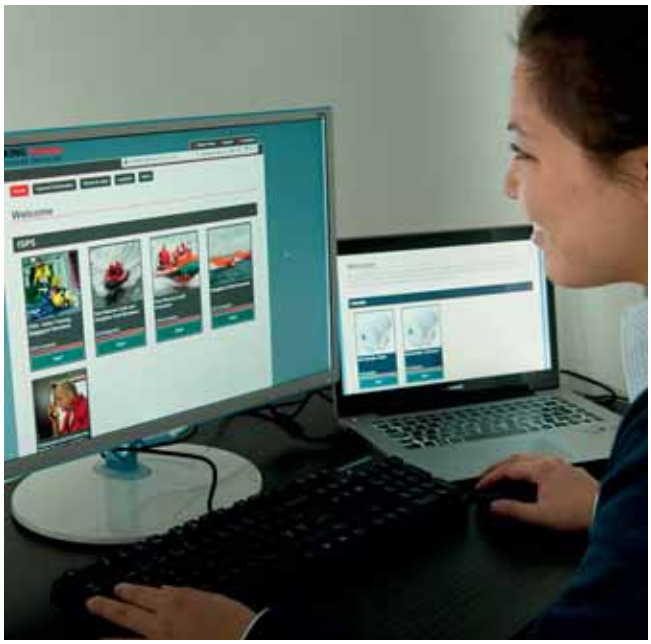
VIKING Saatsea's CEO, Kim Baarsøe, promises significant savings for shipowners — both in time and direct expenses. "ISPS courses take up to two days of land-based training," he explains. "That's a significant expense and a hassle for operations. But given that this type of training is almost entirely theoretical, it can easily be conducted on board. Our new courses bring greater flexibility with much lower impact on operations."

According to VIKING Saatsea, shipowners stand to save as much as half of the normal costs of such training. But training cost-efficiencies are, of course, not the only priority for the e-learning provider. Under multi-year agreements, the new courses can be re-taken at any time, such as before entering a high-risk region. This enables crew to refresh their skills to remain alert to, and prepared to cope with situations that may compromise onboard security.

VIKING Saatsea's solution is largely unaffected by land-to-sea connection status, enabling it to run either online or offline — and can be accessed both at sea and from land-based locations for administration purposes. Moreover, the here-and-now training flexibility receives greater acceptance from crew being trained, because they are able to undergo training while at sea rather than in their home periods. Training status can be tracked at individual or vessel levels.

Shipowners and operators aren't the only market for the new ISPS Code courses. Seasoned seafarers and new entrants to the industry will also be able to sign up for one-time access, enabling them to obtain training as part of their efforts to find employment.

For many, adopting the VIKING Saatsea platform, with its growing range of courses, is a first step to a single point for all onboard training. A Course Creator module is also available – a fully customizable version of the company's onboard training solution that enables companies to design courses for theoretical or practical exercises, with the inclusion of company-specific equipment for greater relevance. By choosing from a variety of standard templates, shipowners or operators can create, implement and administrate courses that, for example, introduce crew to new equipment or HSEQ procedures.



About VIKING Saatsea

VIKING Saatsea is a joint venture with leading marine and offshore safety equipment and service provider VIKING Life-Saving Equipment. It provides a unique onboard training and administration platform to help ship and offshore asset owners and operators improve their training capability. The advanced platform helps the company's customers to avoid the delays, exposures to liability and financial losses that can result from inefficient, outdated solutions to the issue of maritime competency management and training.

About VIKING

VIKING Life-Saving Equipment is a global market supplier in maritime and offshore safety, providing and servicing safety and fire-fighting equipment for passenger and cargo ships, offshore installations, fishing vessels, the navy, fire departments and leisure yachts.

VIKING is a privately held corporation founded in 1960 with group headquarters in Esbjerg, Denmark. Products are manufactured in Denmark, Norway, Bulgaria and Thailand. VIKING offers a broad range of off-the-shelf and tailored safety solutions and systems certified in accordance with the latest requirements of the IMO, SOLAS, EU and USCG.

The product portfolio includes chute and slide-based marine and offshore evacuation and crew transfer systems, liferafts, lifejackets, immersion suits, fire suits, work suits, pilot suits, helicopter transportation suits, MOB boats, davits, pilot ladders, signs, and other lifesaving appliances. VIKING Shipowner and Offshore Safety Agreements offer uniquely customizable concepts that incorporate safety products, global servicing, single-source management, and financing in a variety of fixed price structures.

With 2,000 employees worldwide, the unique VIKING network of branch offices, agents, 260 certified servicing stations and worldwide stock points makes VIKING a truly global provider at convenient locations in all significant markets.

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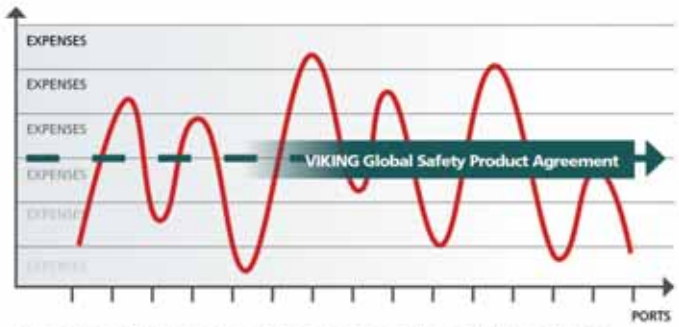

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ABB's Digital Services increases reliability, safety and efficiency of cargo ships

Where shipping is historically seen as a traditional and somewhat conservative industry, it cannot be denied that digitalization of the shipping industry is in full effect. Ships are increasingly connected to the internet and software is starting to play a dominating role in how ships are operated on a day-to-day basis.

ABB recognizes and embraces the importance of digital solutions for ships and provides a comprehensive and integrated Digital Service offering for the global marine industry. The total offering consists out of several important elements, being the OCTOPUS software for safety and comfort and energy efficient operations, and remote diagnostics technology that preventatively and continuously monitors critical equipment onboard of a ship. "Through our Integrated Operations Solutions and Centers we aim to be one of the leading and recognized digital solution providers for the shipping industry by 2020," said Kenneth Nakken, Vice President Digital Services, at ABB's Marine & Ports business. "We develop all our digital solutions with the customer in mind and we believe current and future services will strengthen the shore side operations of all involved."

For more than 15 years OCTOPUS has been the industry standard when it comes to route optimization for sea-going vessels based on prediction of vessel motions. The primary goal of the launch of the software when introduced to the market for the first time, was to ensure safety of the crew and her cargo during operations at sea. To generate a motion-based route advice, the OCTOPUS system takes into account the vessels hydrodynamic particulars, in combination with the sensor data such as loading condition, GPS & Gyro and the on-board weather forecast. The result of all this is that the master and his crew will receive a clear advice on the OCTOPUS monitor on the bridge of the ship, with safe heading sectors and speeds, so that maximum allowable motions are not exceeded.

More than 300 (heavy) cargo ships around the globe are currently utilizing the OCTOPUS system. Amongst them the world's biggest container-shipping company, Maersk Line. In 2015 ABB together with the weather forecasting specialist MeteoGroup equipped 140 of their vessels with motion-based route optimization. Once fitted on Maersk Line ships, OCTOPUS technology will enable captains to define on-board loading conditions, and more accurately determine areas of the ocean where their ship's motion is likely to exceed threshold values. Routes can then be optimized automatically to skirt adverse conditions, ensuring cargo arrives safely and on-time at its destination port.

Another important field for the OCTOPUS software is the usage of the system onboard semi-submersible heavy cargo ships. When looking at these kinds of vessels, more than 80% of these giants of the sea are equipped with the OCTOPUS motion forecasting system. Back in 2013 the biggest semi-submersible vessel in the world, the Dockwise Vanguard, was also outfitted with the OCTOPUS system. In addition to the motion forecast functionality, a three sensor motion measurement set-up is in most cases installed on heavy cargo vessels. The set-up allows the system to measure motions on the vessel and her cargo — this information can then be seen in real time by both shore-side by the shipping company and owner of the cargo.

Kenneth Nakken goes on: "ABB strives to offer the most complete digital portfolio to our customers. We optimize vessel operations in every thinkable way and make ships ready for a future that will be characterized by a digital revolution. This can be by just putting a system onboard of a ship that helps our client to be compliant with emission regulations and cutting their fuel bill, all the way to smart predictive and analytics platform enabling customer to work on their sensor and inspection data in house, supported by ABB's analytics team."

Within ABB, the OCTOPUS software plays a role in much broader product portfolio that one hand aims provide ship-owners and -operators with solutions that make their ships more energy efficient, and at the same time help them to meet and support the increasing demands from environmental regulations such as the IMO Ship Energy Efficiency Management Plan (SEEMP) and future European Union Monitoring, Reporting and Verification (MRV) rules. A sound example of one these solutions is the Torductor Marine, which works seamlessly with the OCTOPUS software . This torque measurement system optimizes engine and fuel efficiency of sea-going vessels. Contactless sensors are mounted facing the propeller shaft that sends the information to OCTOPUS, which visualizes the data. ABB recently got an order from Torvald Klaveness to equip three of its new build combination carriers with OCTOPUS reporting software in combination with the Torductor Marine, in order to help Klaveness to meet emission regulations (see below for more details). Examples of other integrated efficiency solutions are ABB's Cylmate for continuous & real-time monitoring system for two-stroke diesel engines — reducing the cost for fuel, maintenance and unplanned engine stops — and Coriolis Fuel mass flow meters. These flowmeters manage fuel consumption responsibly, considering ecologic, economic and legal reasons, requires an innovative fuel management system based on reliable, highly accurate and durable flow sensors.

About ABB Ability

ABB Ability brings together for the first time all of the company's digital products and services, each built from its unique combination of sector knowledge, technology leadership and digital expertise, to create real business value for its customers.

Torvald Klaveness selects ABB's OCTOPUS marine software to help comply with environmental regulations

ABB's OCTOPUS marine software will be installed on three new Torvald Klaveness vessels to help them meet incoming emissions regulations. The OCTOPUS reporting software is compliant with the IMO Ship Energy Efficiency Management Plan (SEEMP) and supports future European Union Monitoring, Reporting and Verification (MRV) rules. OCTOPUS gathers information from onboard sensors and gives insight into key performance parameters, such as fuel efficiency, allowing Klaveness to optimize fleet-wide performance. Document Link Icon

The purpose of a SEEMP is to establish a mechanism for a company and/or a ship to improve the energy efficiency of a ship's operation. OCTOPUS aids this process by measuring and displaying important vessel fuel consumption and torque related Key Performance Indicators. Data are shown in real time to the operating crew and can also be visualized and further analysed at the ship-owner's onshore operations department, by using the OCTOPUS fleet portal. In addition, the fleet management tool uses historical data to create benchmarks for future performance and ensure the most efficient profile is used in

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further operations. For this purpose, Torvald Klaveness' Fleet Performance Centre will use OCTOPUS to monitor the performance of its ships.

As well as the OCTOPUS software monitoring and reporting functionality, the recently launched Torductor Marine will increase the efficiency of the vessels. This torque measurement system optimizes engine and fuel efficiency of sea-going vessels. Contactless sensors are mounted facing the propeller shaft that sends the information to OCTOPUS, which visualizes the data.

OCTOPUS screenshot.

"ABB has a tremendous focus on making sure that our customers meet regulations issued by the European Union and the IMO," said Juha Koskela, Managing Director of ABB's marine and ports business. "Our marine software has a vital role to play in meeting regulation and raising efficiency across whole fleets."

Christian Hovden, Project Manager at Torvald Klaveness said, 'Klaveness wants to improve the very nature of shipping. Embracing digital technology like ABB's OCTOPUS Marine Software will help us realize our vision by allowing us to operate our vessels in a more efficient and sustainable way while complying with environmental regulations."

The three new combination carriers will be built at YZJ Shipyard in China.

Balancing act: delivering cost-effective safety at sea with PSM

The last decade has seen huge improvements in bulker safety whilst, at the same time, ever-more stringent safety regulations have been introduced to reduce accidents and losses at sea. Notwithstanding, the AGCS Safety and Shipping Review of 2016* reports the loss of 36 cargo ships in 2015, just over 40% of all vessel losses.

Another report by EMSA** cites equipment failure as being responsible for 20% of accidents and human erroneous actions the major contributing factor at 62%. These findings underline the importance of regular preventative maintenance and effective monitoring systems.

The continuing weakness of the global economy, accompanied by falling commodity prices, compounded by market oversupply, has led to dwindling orders for larger bulk carrier ships. Encouragingly, we are now seeing new orders coming through for monitoring and measurement systems. Increasingly, the demand is in equipping smaller, specialized ships now being built to meet dedicated applications rather than the more mature market for large carriers.

PSM Instrumentation is a specialist in marine control instrumentation and marine protection systems. Recent contracts secured by PSM include an order for four 5,000dwt vessels in Germany. PSM also has have an ongoing contract with a Dutch shipyard to supply systems for single-hold bulkers now being built.

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 a supplier, PSM is 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.

There is additionally a growing concern among insurers and safety bodies that the current pressure on costs may depress not only the supply market but also the industry's investment in vessel maintenance and repair, which could impact cargo safety, especially where maintenance intervals are increased.

Where vessels are laid-up to remove surplus capacity from

Safety and Shipping Review 2016 Allianz Global Corporate & Specialty (AGCS)

** Annual Overview of Marine Casualties and Incidents 2016 European Maritime Safety Agency (EMSA)*

fleets the AGCS Review* observes, there is also a danger that, as and when vessels are returned to operational use, their systems will be technologically outdated.

In the face of market uncertainties and rising operational costs, the driving force at PSM has been to develop total replacement solutions which can help maintain a balance between cost-effectiveness and reliability. PSM's systems have been engineered to offer fast installation and easy integration with existing equipment, to minimize replacement and repair costs and shorten turnaround times. Its objective is to support operators in maintaining capacity in line with changing operational demands and reduced fleet sizes. In addition, PSM ensures that systems are designed with real world operation in mind, ensuring mandatory functional tests for class inspection can be undertaken from the deck with no additional services or access to the cargo hold needed.

Among the most common hazards on board cargo ships, liquefaction is recognized as a continuing risk. The latest reported casualty, which prompted an IMO warning, the ten-year-old Bahamas-based *Bulk Jupiter* sank in January 2015 while carrying 46,400 tonnes of bauxite and resulting in 18 fatalities.

Liquefaction occurs where cargoes are compacted, typically due to the ship's motion and engine vibrations which may be 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. The resultant free-flow of cargo can cause instability, leading to listing, with the potential to capsize the vessel.

PSM's experience in testing and safety processes required in the shipping and mineral ore cargoes is behind the development of Bulksafe, a water ingress detection and alarm system which is designed to detect the presence of water in cargoes such as iron ore, nickel ore and various mineral concentrates. Through constant monitoring, the 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.

Another area for concern which affects all types of vessel including bulk carriers is the potential for flooding. PSM has developed BilgeSafe, a ship flood detection system for watertight spaces which meets SOLAS regulation I-1/22-1. Combining a marine approved bilge switch with a continuous monitoring system, BilgeSafe detects and alarms water ingress in bilge, void and other watertight spaces on ships.

The marine industry plays an essential part in the international economy, accounting for over 70% of the world's trade. International bulk carriers are major contributors, with dry bulk cargoes covering a wide range of staple products. Ensuring the safe passage of these vital goods and their crews through improved vigilance is critical. Technology developments in the form of monitoring systems which can eliminate human error and provide early alerts can provide reassurance both economically and effectively.

Dry bulk carrier safety and maintenance solutions

Cargo holds are the revenue earning spaces of dry cargo vessels, *writes Michael Hindmarsh, Business Development Manager at AkzoNobel's Marine Coatings Business, the supplier of International® coatings*. However, without the protection of an adequate coating they can suffer damage while operating in harsh environments, significantly impacting the safety and profitability of a vessel.

Multiple forms of impact, abrasion and mechanical damage can occur during the loading and carriage of dry cargoes. The most notable examples are gouging due to cargo 'settlement' during sailing, which can cause severe damage at the cargo/coating interface, and 'shooting damage' which is becoming increasingly frequent on dry bulk vessels following the introduction of high-speed belt conveyors at major ports. High-speed conveyor belts provide quick and efficient loading of cargo such as coal and iron ore, but in doing so the cargo is 'sprayed' at hold coatings, causing an abrasive impact likened to grit blasting. This loading technique has the potential to severely limit the lifespan of cargo coatings, causing coating detachment, exposure of steel and corrosion in worst-case scenarios, which can lead have severe implications for a vessel's safe operation.

Responding to high-speed conveyor belt loading

In response to the increasing use of high-speed conveyor belt loading, AkzoNobel's Marine Coatings Business, the supplier of International® coatings, invested in the development of an internal testing method to stimulate the effect of shooting damage in cargo holds. The data from the results led to the development and launch of Intershield 803Plus, specifically developed to offer improved resistance to impact damage from high-speed loading equipment and aggressive cargoes in cargo holds. In addition to providing protection against corrosion caused by cargo abrasion and shooting damage, Intershield 803Plus has several key benefits, including: preservation of cargo hold integrity and promotion of asset protection, reduced downtime and maintenance spend, a high gloss finish for easy cleaning, low temperature application, high volume solids, and FDA compliance.

Rapid curing properties also ensure earliest possible return to service following application. The original Intershield 803 is still available for the same level of protection of cargo holds where high speed conveyer belt loading will not be used.

Also available is Intergard 7020, a dedicated cargo hold coating for all bulk carrier types that has been developed or operators who may not require advanced levels of protection technology, it offers good abrasion resistance and long-term corrosion protection combined with many of the features normally associated with more expensive products, bringing increased flexibility and choice to the hold coatings market.

Available in red and grey, Intergard 7020 is an aluminium-containing, low-VOC, pure epoxy coating that can be applied to surfaces prepared to a minimum of Sa2. Applicable at temperatures between –5°C and +35°C, it has a smooth, glossy, easy-clean surface, is grain certified and is ready to carry even the harshest cargoes after only ten days of curing.

Intershield 803Plus, Intershield 803 and Intergard 7020 are part of a range of cargo hold coatings that meet all operator requirements in a very demanding and competitive market. The range also includes Interbond 201, a surface tolerant, modified epoxy, cargo hold coating with a long in-service history that is available in both temperate versions, and with a low temperature curing version for use at temperatures down to –5°C (23°F).

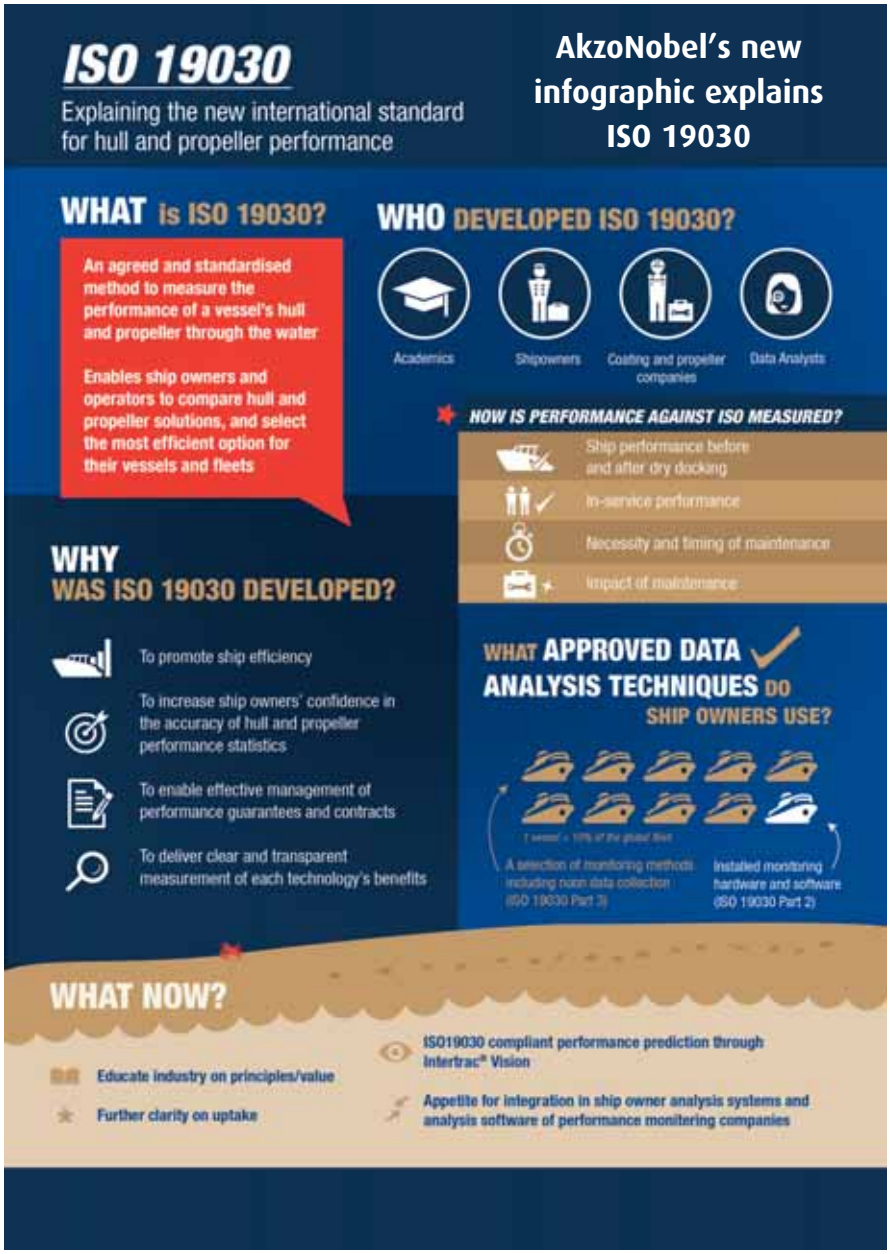
Coatings Safety

Choosing the right coating is of vital concern to dry bulk owners and operators. However, it is also necessary for crews to understand the wider safety ramifications of marine coatings application, maintenance and safety. Ships' crew will understand the many health and safety procedures for everyday vessel operations, but they are also aware of the specific hazards of painting and paint handling.

The key things to consider are:

- Ships are hazardous working environments, but crew must be very aware of the additional risks associated with surface preparation and paint. Care must be taken and it is essential that a study is made of the relevant paint product Safety Datasheets and Safety Advice Sheets to understand the risks and what PPE and precautions are required.
- Paints, paint rags, equipment and empty containers, are all potentially combustible. Solvent vapours could also become a source of explosion.

- Paint should be stored in dry, shaded conditions away from sources of heat and ignition. Storage should be off the floor so that the base does not corrode and cause spillage.
- When painting in confined spaces, if not adequately ventilated, the concentration of vapour can build up until the air is saturated. This could lead to low levels of oxygen, posing risks to health which could be life-threatening. This situation could also result in an explosion hazard. The crew should be very careful when entering a confined space. They should not enter unless they are absolutely sure it is safe to do so.



RECOMMS

One particular area of safety for all vessel types is the inspection of coatings in enclosed spaces, which can come with a range of hazards. Recognizing the need to address this issue, AkzoNobel has partnered with Barrier Group, a major oil and gas tanker operator, and drone specialists DroneOps to develop a drone capable of remotely inspecting ballast water tanks (including those on dry cargo vessels) and offshore wind farms, significantly improving accuracy and efficiency, as well as the health and safety of ships' crews and inspection personnel.

The project, code named RECOMMS (Remote Evaluation of Coatings and Corrosion on Offshore Marine Structures and Ships), will use advanced virtual reality technology and semi-autonomous operation of a drone to deliver safer, more accurate evaluations of ballast water tanks and other enclosed or difficult to access spaces/areas on vessels and offshore structures, including inspections of coatings and corrosion. Traditionally, these inspections are carried out by crew, surveyors or independent inspectors. Such inspections are a risky activity that represents one of the most common causes of work-related fatalities in the industry.

By replacing human inspections with a drone, routine maintenance can be monitored remotely in real time by office-based staff, with instant feedback available to the vessel or offshore structure's superintendent.

Michael Hindmarsh, spokesperson for RECOMMS and Business Development Manager at AkzoNobel's Marine Coatings Business, said: "Surveys of enclosed spaces and ballast water tanks are an essential part of routine maintenance on board vessels and offshore structures, and are increasingly critical for ship owners. However, inspecting these areas thoroughly can require working at height, entering confined spaces, and negotiating slippery services that could be poorly lit, all of which are high-risk activities that the maritime industry is keen to address."

ISO 19030

The RECOMMS project shows the value that can be achieved by collaboration throughout the industry. Another example of this is the recent introduction of the international standard ISO 19030 Ships and Marine Technology – Measurement of changes in hull and propeller performance. AkzoNobel was instrumental in developing this standard, which was finalized in 2016 following three years of development by a wide range of industry stakeholders including coating and propeller manufacturers, academics, ship owners and data analysts. For the first time, it enables ship owners and operators to compare hull and propeller solutions, and select the most efficient option for their vessels and fleets — a vital concern for a the dry cargo industry, where the need to find operational efficiencies without compromising safety remains a key priority.

As these developments show, coating suppliers must understand the wider context of safety and operational efficiency in which their products function, and work collaboratively with their customers and users to innovate new solutions. Not only does this enable the development of products to suit the needs of individual sectors, but new initiatives, technologies and collaborations can lead to breakthroughs that will enhance safety across the industry.

Ensuring hatches are weathertight with Cygnus Ultrasonic Leak Detectors

Cygnus Instruments Ltd sold an astonishing number of ultrasonic hatch cover leak detectors in December 2016 alone, to two leading ship management companies based in Singapore.

Cygnus is well known and trusted across the marine industry as a leader in high quality ultrasonic solutions that are extremely durable and simple to use. The 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 that want to test covers quickly, accurately and cost effectively.

In December 2016, Cygnus Instruments sold an incredible 74 Cygnus Hatch Sure Ultrasonic Leak Detectors to two Singapore based ship management companies: PACC Ship Managers Pte Ltd who manage a fleet of dry bulk carriers, product tankers, chemical tankers, container feeder vessels and multi-purpose vessels; and MTM Ship Management Pte Ltd who manage a fleet of over 60 vessels for owners in Japan, Hong Kong, Indonesia, USA and the UK.

The Cygnus Hatch Sure system is comprised of two main components: a powerful ultrasound transmitter with 19 × 40KHz elements and a hand-held receiver.

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

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. The transmitter is powerful enough to saturate the largest cargo hold with ultrasound. And the unit has variable output with six selectable power levels — allowing the unit to also be used in confined spaces, in holds that are full with cargo and for ancillary applications such as the testing of watertight doors.

The conventional technique for testing weather tightness of hatch covers is hose testing which uses large volumes of water sprayed at the rubber seals; but this technique has many limitations when compared with using ultrasound. Hose testing can't be used in sub-zero temperatures; it often does not identify the precise damaged area of seals as water can run along seals and enter the hold at other points and the surrounding area can be polluted to contaminated water running overboard.

Other methods include:

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

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. When the Hatch Sure displays higher percentage of leak it is indicative of a lower level of compression and could indicate a seal which will leak when the ship is in rough conditions.

Poor maintenance of hatch covers, seals and coamings can result in water entering a ship's hold which can lead to highly expensive or even dangerous consequences, so testing the weather tightness of these areas is a fundamental requirement for preventing damage to cargo and ensuring the safety of a vessel and its crew.

Ultrasonic hatch cover 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.

Cygnus Hatch Sure is Type Approved and accepted by all P&I Clubs. It is entirely designed for ease of use and powered by standard rechargeable batteries. The whole system is extremely light and aircraft friendly for passenger cabin transportation. DCi

New bulk terminal for Mejillones

In Chile, the Mejillones Port Complex (CPM) has sent the project to build a $100 million dry bulk terminal for environmental assessment. The three million tonne facility would be built to the north of the bay, in the region of Antofagasta.

If built, it will join the established terminals of Puerto Angamos and Terminal Graneles del Norte. It will absorb projected future demand from the surrounding mining industry.

According to CPM, environmental aspects of the terminal are crucial. As a result, sealed warehouses will be built to take delivery of inbound consignments, with take away conveyors totally enclosed to prevent dust pollution. Furthermore, storage warehouses will have air extraction system that will prevent leakage of materials, with filters in place to capture dust. Even on the quayside, consignments will be moved through sealed tube conveyors.

CPM managing director Álvaro Arroyo says that the new terminal will "consolidate CPM as the major port logistics hub for the north of Chile."

CPM belongs to the major Chilean copper producer Codelco. *Barry Cross*

Puerto Cortés terminal inaugurated

Honduran president, Juan Orlando Hernández, has inaugurated a new dry bulk terminal at Puerto Cortés, which has absorbed investment of $78 million. Construction was undertaken by the Mexican company Grupo Logra, which is located in Yucatán and operates across México, Central America and the Caribbean.

The new facility is able to accommodate vessels of up to 44,000 tonnes. During the opening ceremony, it was revealed that the terminal, the first dedicated dry bulk facility in the country, will effectively guarantee food security for Honduras.

Grupo Logra director Gerardo Díaz Roche pointed out that the terminal will allow Honduras to become the leading nation for the handling of dry bulk in the region, given that quayside equipment is capable of discharging consignments at a rate of 12,000 tonnes per working day.

Some three years previously, an older terminal on the same site handled 72-80 vessels a year, generating some one million tonnes annually of dry bulk, but was losing competitiveness.

Now, the new terminal will not only allow much deeper draught vessels to access the port, but also provided on-shore storage facilities, in the form of both silos and covered warehouses.

Noted the Honduran president, "Puerto Cortés is one of the main links in the development of logistics that will allow Honduras to take off. We have one of the world's most privileged locations. We are workers par excellence. And what we see today is a good job well done." *BC*

A banner year for Santa Marta dry bulk in 2016

Santa Marta Port Company, in Colombia notes that, in 2016, it handled 7.3mt (million tonnes) of agribulk. Furthermore, overall imports increased by 11% and exports by 6%.

Export growth was mainly driven by bulk shipments of bananas, which increased by 11.6% to around 25 million boxes. Coffee exports also went up, by 59%, to more than one million sacks. The main destinations were the US, Japan, France, Switzerland, the UK and Germany.

As for imports, these were mostly traditional dry bulks, such as wheat, corn, soya, beans and gluten distillates. The 2016 figure of more than 2mt of dry bulk imports is a record.

Throughout 2017, investment will continue, with one project due to reintroduce freight train services between Santa Marta and La Dorada, Caldas. *BC*

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Tiplam opens more berths in Santos

VLI's Santos subsidiary Terminal Integrador Portuário Luiz Antonio Mesquita (Tiplam) has inaugurated an initial berth in what is the expansion area of its existing operations in the Brazilian port. A second berth is due to open shortly that will be dedicated to the handling of bulk sugar.

In total, the expansion of the Tiplam facility will involve the construction of three new berths, two of which will specialize in bulk sugar consignments, while the third will handle fertilizer. This will bring to four the number of berths operated by Tiplam, the initial facility already handling inbound sulphur, rock phosphate, fertilizer and ammonia.

With investment due to be completed by the end of the year, capacity at the terminal will increase from 2.6mt (million tonnes) to 14.5mt, boosting Santos' overall capacity by 12mt.

VLI's director of ports and terminals, Gustavo Serrão, says that he expects the first of the dedicated sugar berths to commence operation by the end of March or early April. The second berth is due to become available as of May, being used to export fertilizer.

Nevertheless, draught restrictions in the Piaçaguera Channel limit access to vessels drawing no more than 9.8 metres of water, effectively preventing much larger bulk vessels from being deployed. VLI is therefore dredging this area to around 13.5 metres.

Significantly, while the first two of the new berths — 2 and 3 — will have alongside draught of 12 metres, these too will later be dredged to a depth of 13.5 metres. *BC*

Vanino to gain two new bulk terminals

In Russia, Prichal LLC, which is a subsidiary of Rysal, is to build a alumina terminal with a capacity to handle 1.5 million tonnes. This will be located in Vanino, forming part of the Free Port of Vladivostok (FPV), and costing $85 million.

Toki Brickyard LLC is also going to build a new facility for production of construction materials at a cost of $250,000, while Carbon-DV LLC is to build a waste wood processing plant costing $3 million.

To date, Vanino has managed to attract 19 projects as part of the overall FPV development; these have absorbed investment of $1.47 billion. *BC*

Vostochny Port takes delivery of shiploading conveyor

Vostochny Port JSC, which is Russia's largest stevedoring company and forms part of Port Management Company LLC, has taken delivery of an innovative ship loading conveyor (SLC). This was built by Mitsui Miike of Japan in partnership with Vostochny Port under an agreement with the Marubeni Corporation to enable coal to be loaded aboard bulk carriers.

The new SLC is due to replace one of four existing conveyors at Vostochny Port's coal terminal. It has a aggregate capacity of 1,800 tonnes.

"The main requirement of Vostochny Port JSC was the reliability and operational efficiency of a ship loading conveyor. The new machine is more powerful and more automated with enhanced hydraulics," said Mitsunori Mori, Deputy General Manager of Industrial Plants Division, Marubeni Corporation.

He added that two similar machines will be delivered later as part of the project's Phase 3.

The new conveyor system can load Capesize bulk carriers of up to 180,000DWT. It, in turn, is fed by a system of conveyors, allowing coal to be discharged directly into the vessel's hold. The SLC has a 46-metre outreach, with an angle of elevation of between –15° and +15°.

According to Anatoly Lazarev, Managing Director of Vostochny Port JSC, "The new Vostochny Port SLC is unique for Russia. It is equipped with an additional system of final cleaning of the coal before it is loaded into a ship. Powerful neodymium magnets ensure the highest degree of coal cleaning without affecting the loading rates."

The new SLC, which was due to start operation in February, is part of an ambitious investment project centred around construction of the coal terminal's Phase 3. New terminal facilities will be put into operation in 2017, boosting port capacity to 39 million tonnes by 2019. The coal will be mainly sourced from the Kuzbass area. *BC*

L&T wins Paradip contract

In India, Larsen & Toubro has been awarded a contract to build an iron ore handling terminal at Paradip Port. This includes 30m deep sheet pile driving, wagon tippler construction using cofferdam technology and ground improvement for a stacker reclaimer. *BC*

Pasha Stevedoring and Terminals, professional cargo handling

PST is a privately held, professional breakbulk cargo-handling company that provides expert stevedoring, vessel loading and unloading services for the global maritime transportation industry in the ports of Los Angeles and Long Beach, California.

The Omni Terminal

The omni-terminal concept involves a terminal designed to accommodate a multitude of commodities in addition to standard ocean-going containers. As breakbulk specialists, PST's team of professionals maintain the highest productivity, while offering customers the flexibility necessary to accommodate such a diverse range of cargo.

Operations

Vessel operations

Stevedoring mixed steel products arriving from all parts of the globe, PST efficiently discharges overweight coils and steel slabs with its swift gantry cranes.

PST continues to bring the 'California Stow' to more locations around the world, providing specialized stowage training for shippers.

As a stevedoring group, PST provides vessel services at other facilities in addition to the terminals it operates. This enables PST to provide ancillary resources for other operators and expand its expertise to non-traditional commodities, such as bulk scrap.

Terminal operations

Three of PST's facilities provide a combined 89 acres of valuable open land, ideal for segregating multiple sorts of beams, pipe, rod tubing and plate. These facilities are well lit for night operations for the vessel, yard and terminal delivery.

Flexible delivery times

PST allows trucking companies to schedule appointments for night deliveries, thereby increasing truckers' productive times, averting traffic congestion and saving fuel costs, while at the same time contributing to improved air quality.

Extensive covered storage.

PST's warehouses, protected by 24-hour guard service, provide nearly half-a-million square feet of combined covered storage for steel coils, top hats, banded sheet and other weather-sensitive cargoes until ready for delivery.

Container operations

Amongst others, PST's container operations offer the following services and benefits:

- Three 41 metric tonne gantry cranes serve container and breakbulk vessels calling at PST's omni-terminal, Berths 174-181.
- A radically new container terminal design and operation offers significant improvements to receiving and delivery turn times and transshipment interchanges.
- Third-party container stevedoring services for major carriers, having recently built a new start-up terminal to handle one's transition period.

Capabilities

General and project cargo

PST handles multiple cargoes together – containers, breakbulk and project cargo. The successful movement of project cargo is related to the proper execution of the intricate details involved. Explicit and thorough pre-planning by supervision, steady labour and gearmen is key. Gear specialties are examined and secured or fabricated in advance to ensure smooth operations.

PST dedicates the necessary time, working with consignees and trucking firms to ensure seamless processing in transit for fragile and high-value project cargo. Special hours are arranged to accommodate inland transportation so that trucks can make late-night curfews for over-the-road inland transportation.

Whether cargo is loaded ex dock or discharged direct to water, rails or trailers, PST has the experienced professionals and equipment to do the job right.

Forest products and newsprint

To avoid damage to forest products, yet maximize production during vessel discharge, newsprint is moved by vacuum lifts and plywood is handled with lumber blades as they are transported into warehouses for storage, sorting and truck delivery.

PST currently has a total of five spacious warehouses (close to half-a-million square feet), ideal for weather-sensitive forest products, such as newsprint, linerboard, and plywood because even in Southern California, covered storage is needed to protect these shipments from occasional weather elements.

Steel slab and rails

PST achieves continuous, simultaneous vessel discharge, railcar

loading, terminal operations and truck delivery.

After discharging 13- to 44-ft-long, 10- to 27-tonne steel slabs using the shore gantry crane, its extra-long wheelbase heavy-lift Taylor forklifts transport them to the 100-tonne Mi-Jack RTG bridge crane, which proceeds to load them onto railcars that were jointly designed specifically for this operation by the BNSF Railroad, California Steel Industries and PST.

Vessel to Rail

The new 52.5-ft-long cars, 12.5ft shorter than the older cars, handle loads of 240,000 lb, compared to the older limit of 180,000 lb. The new cars are built with safety uprights to eliminate slab shifting or rotating, often called 'helicoptering'.

These improvements offer many advantages for both the operator and the public as they increase capacity, production, and safety, while shortening overall train lengths. Through BNSF's special investment, these new cars allow more slabs per train, more weight per car and more safety for the community. PST also invested in new tractors and equipment to support the higher production and capacity of the cars.

Safety and equipment

Security and safety

PST was at the forefront in recognizing the need for enhanced physical security on cargo terminals. PST lead the way in the development of security measures and wrote the guidelines that are being utilized in the ports of Los Angeles and Long Beach, ensuring port security within the nation's busiest port complex. These guidelines were also adopted nationally for breakbulk terminals.

Interactive programs train for safety

PST values safe working conditions and believes careful cargo handling is paramount. Therefore PST is ever-vigilant in maintaining crucial safety standards and working conditions at all times.

The company provides on-going safety training for management, staff and union labor to ensure federal and state OSHA requirements are not just met, but are surpassed.

A safe and green environment

PST was one of the first terminals to employ emulsified diesel fuels in a test environment. Pasha will be working closely with the ports in their on-going efforts in this direction.

Equipment

The 'safety first' philosophy is embodied by Pasha Stevedoring & Terminals company-wide for both physical security and operational safety. Client services include M&R and monitoring containers, chassis and refrigerated cargo systems in compliance with the FHWA/State of California BIT programme.

Berths

Berths 153–155

Cargoes include newsprint, cut paper, linerboard, coils, wire strand, crates, forest products, project cargo, machinery, construction equipment, and other specialized or weather-sensitive commodities.

Large warehouses protect weather sensitive cargo

PST utilizes this 12-acre facility for all types of cargo that require a clean, smooth surface and protection from the elements. The configuration of the dock space and warehouse loading doors are ideal for achieving high production while maintaining cargo integrity and avoiding damage. A separate outside staging area is designed to accommodate large and project cargoes.

Twenty-seven truck loading bays span the length of the dock.

Productivity

The spacious interior of the warehouses allows sorting ex vessel, an important feature to eliminate double handling and thereby keeping costs down, production high and quality intact.

Location:	Turning Basin North End, Main Channel, Port of Los Angeles
Berth space:	1,700 linear feet
Depth at MLLW:	32–35ft
Land Area:	12 acres, plus five additional available
Operation:	Breakbulk
Warehouses:	180,000 square feet in two buildings, 27-door, full-length loading dock
Features:	Rail access nearby
Operator:	Pasha Stevedoring & Terminals L.P.

Berths 174-181

Cargoes include steel products, such as coils of sheet, wire rod coils, square tubing, pipe, and rebar; breakbulk; forest products; heavy machinery and equipment; yachts; rolling stock; project cargoes; steel slabs; and containers.

This 40-care facility is the only true omni-cargo terminal in the port. PST has perfected this combo operation, offering shippers, trucking companies and consignees alternatives in order to keep their costs down and delivery times flexible.

Global connections.

Located in the heart of the busiest port complex in the United States, Berths 174-181 operated by Pasha Stevedoring & Terminals have quick access to the freeways and infrastructures that carry cargo to the rest of the nation.

One-stop shipping capabilities

The expansive land area configuration of Berths 174-181 allows simultaneous containers and breakbulk operations of multi-purpose and cargo-specific vessels along with yard3, rail and truck operations. Three 41 MT gantry cranes are available to work heavy steel as well as containers.

Perfect for weather-sensitive cargo

In addition to wide-open terminal and storage space available for dock subsorting and various cargoes, two large transit sheds/warehouses, measuring 255,000 square feet, provide ample room to segregate weather-sensitive cargo.

Location:	Fries Avenue, East Basin, Port of Los Angeles
Berth Space:	3,300 linear feet
Depth at MLLW:	Container Berths: 45ft (14.7m)
General Berths:	35 feet (10.7m)
Land Area:	40 acres
Gantry cranes:	Three 41 metric tonnes capacity
Operation:	Customer-owned, Omni-Terminal
Rail access:	Four parallel tracks, each 1,000 feet
Features:	Truck scale
Mi-Jack RTG:	100 LT
Shuttle life:	60 LT
Operator:	Pasha Stevedoring & Terminals L.P.

Record throughput of grain at the Prince Rupert Grain Terminal

Prince Rupert Grain Ltd offers an ideal route for Canadian grain bound for Asian and mid-east markets. Opened in 1985, the terminal was built to improve Canada's ability to export grain and oilseeds. The facility has an annual export capacity in excess of 7mt (million tonnes), offering the highest throughput of any grain-cleaning elevator in Canada.

The bulk of Prince Rupert Grain's cargo is comprised of wheat and canola, the latter making up a growing share of the commodity mix over the past five years. However it also handles other bulk grains, the volumes of which fluctuate from year to

PRINCE RUPERT STATISTICS

2016						
Barley	0	0	0	65,553	257,039	–74%
Canola	208,640	107,242	95	2,160,056	2,214,104	–2%
Grain pellets	0	0	0	4,200	10,130	–59%
Oats	0	0	0	104,806	31,329	235%
Wheat	330,199	381,935	–14	3,742,047	3,742,492	0%
Total for terminal	538,839	489,177	10	6,141,723	6,255,094	–2%
2015						
Barley	0	0	0	257,039	214,606	20%
Canola	107,242	172,020	–38	2,214.104	1,759,595	26%
Grain pellets	0	5,290	–100	10,130	9,290	9%
Oats	0	0	0	31,329	0	0%
Wheat	381,935	235,027	63	3,742,492	4,472,818	–16%
Total for terminal	489,177	412,337	19	6,255,094	6,456,309	–3%
2014						
Prince Rupert Grain						
Barley	0.00	47,250.00	–100.00	214,605.78	342,141.63	–37.28%
Canola	172,020.00	141,010.58	21.99	1,759,595.00	1,401,389.90	25.56%
Grain pellets	5,290.00	0.00	0.00	9,290.00	16,000.00	–41.94%
Oats	0.00	0.00	0.00	0.00	3,252.00	–100.00%
Wheat	235,026.81	183,720.00	27.93	4,472,817.85	3,373,819.28	32.57%
Total for terminal	412,336.81	371,980.58	10.85	6,456,308.62	5,136,602.80	25.69%

year. This state-of-the-art terminal cleans grain as fast as it can be unloaded from rail cars, in excess of 13 cars/hour. The eight shipping bins and three tower-mounted loading spouts can load up to 4,000 tonnes/hour into vessels.

In 2014 Prince Rupert Grain saw a record 6.45mt of throughput, a 25% increase from 2013 volume and the first time the terminal had handled over 6mt in its 30-year history. In 2015 it saw its second-best year with 6.25mt, and in 2016 shipped 6.14mt.

Prince Rupert Grain Ltd. is jointly owned by Richardson, Viterra and Cargill, and primarily operates as a surge facility for these companies who each have export capacity at terminals in the Port of Vancouver. The terminal boasts the highest throughput of any grain cleaning elevator in Canada, with the following performance statistics:

- annual throughput capacity: 7 million tonnes;
- storage capacity: 202,000 tonnes;
- ship loading rate: 4,000 tonne/hour;
- single berth depth: 14.5 m (low tide);
- ship size limit: 145,000dwt (Suezmax);
- on-terminal rail trackage: 17km; and
- can unload 13 rail cars/hour.

New tug regulations come into force in Antwerp

The new Tug Regulations for the port of Antwerp came into force on 1 January 2017. They were introduced for a number of reasons. First and foremost, providing a high-quality tugging service is a priority for the Port Authority, as laid down in the 2014–18 Business Plan. Furthermore the nautical challenges have become greater in operational terms over the past few years. In particular there has been a rapid increase in the size of ships. The Port of Antwerp has demonstrated that it is perfectly capable of receiving and handling the largest ships in the world. Indeed the Port Authority in partnership with the Flemish government has invested heavily in major infrastructure projects such as the Kieldrecht lock, the largest in the world. It goes without saying that the introduction of this huge lock has created new conditions for shipping traffic, and the associated services have to be adapted accordingly.

Finally, there have been legislative changes both in Flanders and at European level. For example, the Flemish Ports Decree specifies that port authorities are responsible for organizing those services that they define as "public port services". Antwerp Port Authority has declared tugging to be such a public service. The reason behind this is that the Port Authority considers tugging to be a vital service, as laid down in the Business Plan. Similarly, the new EU port regulations that are due to be introduced in future define tugging services as an economic activity and clarify the role played by port authorities in this and other service areas.

In the case of Antwerp, the new Tug Regulations define the context in which tugging services are made available. Below the locks it has been decided to introduce a system of permits. This applies both to the existing service providers and to any newcomers, who can always apply to the Port Authority for a permit. Above the locks, however, the Port Authority's own tugging department remains the sole operator, with tugging services offered to port users on an exclusive basis.

With these new regulations the Port Authority seeks to make operation of the nautical chain even more efficient and secure, so as to provide smooth, safe and punctual shipping traffic to, from and in the port. To achieve this the new Tug Regulations also impose conditions to ensure a sufficient number of operational tugs.

Dry bulk volumes mostly stable across the Baltic

Moving bulk product with a Sennebogen material handler at the Port of Lübeck.

Barry Cross

Ports on the eastern and southern shores of the Baltic Sea had a relatively difficult 2016, with many ports struggling to retain formerly high levels of traffic

At Lübeck, though, traffic showed little signs of volatility last year. The port, which is located in Schleswig-Holstein, is the third-largest port in Germany and is a core port in the TEN-T Transport Network ScanMed Corridor.

Lübeck, which means 'Gateway to the Baltic', performs a key transshipment role in the southwestern part of the Baltic Sea, thanks to a dense network of liner services. Cargo is rotated out to west, central and southern Europe, as well as to Scandinavia, Finland, the Baltic States and Russia. Today 98% of all harbour traffic from the port has origin/destination within the Baltic Sea, where it is handled at 13 terminals located along the river.

Lübeck Port Authority (LPA), which since January 2008 is solely responsible for the management of all port infrastructure and finance as well as the operation of the port railways, reports that the various dry bulk operators in the port handled a total of 1,335,155 tonnes of dry bulk last year out of the port's total traffic of 23.9mt (million tonnes). In 2015, the figure for dry bulk had been broadly similar at 1,324,983 tonnes, with a 0.8% growth rate occurring in 2016.

"As you can appreciate, dry bulk is not the main business," said Michael Siemensen from the port authority's planning division, adding that there are four small port operators and two harbour factories dealing in various dry bulk commodities, hence differences in volumes from one year to the next are negligible.

"Our main dry bulk commodities tend to be grain, fertilizer, feedstuff, oilseeds, gravel and sand," noted Siemensen, pointing out that landside movement can be by road, rail or inland waterway.

"The choice of transport depends normally on the places where bulks come from. However, I should point out that Lübeck is the only German Baltic harbour with an inland waterway connection," said Siemensen.

Indeed, the port is linked to the three-lane A1 motorway, which connects it not only to Hamburg, but to all the other

main economic centres in Europe. As for the rail network, this is highly efficient in terms of both wagon load and combined traffic. Finally, the Elbe-Lübeck-Canal provides a direct link into the European inland waterways network.

Vessels conveying consignments vary between 3,780dwt and 75,798dwt, effectively ranging from coasters to Handysize and Panamax, with size being dictated by waterway restrictions.

"As for investment in infrastructure, development of dry bulk facilities is ongoing. However, as the port authority, we cannot say what the maximum capacity of the terminals is; this is very much a question for the terminal operators themselves," said Siemensen who also noted that value added activities are also undertaken by some of the terminals.

A total of 89% of all cargo traffic at Lübeck is handled in the public port area by Lübecker Hafen-Gesellschaft mbH, which among other traffic also handles forestry products, such as paper and cellulose, as well as more conventional dry bulk.

The other 11% is shared out between five smaller operators.

Of these, Lehmann handles commodities, such as gravel and sand, building materials, paper and cellulose. Lagerhaus Lübeck handles grain, fertilizer, scrap metal and secondary feedstock. ATR Landhandel almost solely handles dry bulk, consisting of grain, fertilizer, feedstuffs and oilseeds. Rodenberg Waldkontor specializes in wood logs and chips, while Burmann handles bulk grain and fertilizer.

Another significant role played by Lübeck is that of the largest transshipment and distribution centre for the Swedish and Finnish paper industry in Europe. This is down mostly to its geographical location, giving the shortest distances to the main markets for goods flowing south. LHG and Lehmann have also developed dedicated terminals specifically with this traffic in mind.

In neighbouring Poland, the combined ports of Szczecin-Świnoujście reported a 4.1% hike in overall traffic to 24mt. Those commodities showing most growth were fuel, grain and break bulk.

In the case of fuel, this rose 32.4% last year to 2.3mt. Grain also posted some spectacular figures, increasing by 17.4% to 2.04mt. Even breakbulk had a good year, going up by 9.9% to 12.34mt. Breakbulk being moved by ferries was particularly buoyant, growing by 7.8% compared to 2015, accounting for 8.7mt.

"The excellent results were made possible due to the establishing of an LNG terminal in Świnoujście and the Ewa grain silo in Szczecin, which is operated by Szczecin Bulk Terminal," noted a spokesperson, adding that the rise in ferry-transported break bulk is due to the fact that the specialist ferry terminal is a leader in handling services to and from Sweden. There are 11 ferries daily in each direction, of which six go to Ystad and five to Trelleborg.

However, 2016 continued the downward trend in dry bulk traffic, with coal, ore and other bulk all in decline. Coal traffic dropped 6% to 2.9mt, while ore declined 16% to 1.55mt compared to the previous year. Other bulks went down 15% to 2.91mt.

In contrast, containerized traffic, which does include some dry bulk shipments, increased by 3.5% on the year, reaching 90,869 TEU.

"The Ports Authority expects that the growth trend will continue in 2017, reaching 25mt by the end of the year. However, we need to remember that market behaviour may change due to factors beyond the control of the Ports Authority to impact the volume of cargo handled," noted the spokesperson.

Nevertheless, both the Ports Authority and port companies say they are focusing their efforts on attracting cargo flows, including investing in port infrastructure. According to plans drawn up for the 2014-2020 EU budget, investment in the ports of Szczecin and Świnoujście should reach one billion Polish zlotys ($246 million). Moreover, improvements to the navigability of the Oder Waterway will also help to attract additional cargo volumes to the ports.

Further east, at Gdynia, Maritime Bulk Terminal Gdynia Ltd (MTMG) reported buoyant traffic overall, although many dry bulk commodities struggled.

The terminal is located adjacent to the main entrance of the port, with direct connections to both road and rail networks. Within the structure of the Gdynia, MTMG functions as a common user terminal, providing stevedoring services on the quay, as well as offering open and covered storage possibilities.

The combined ports of Szczecin-Swinoujscie reported a 4.1% hike in overall traffic to 24mt.

Maritime Bulk Terminal Gdynia Ltd reported buoyant traffic overall, although many dry bulk commodities struggled.

Additional value-added services, such as big bagging and sorting, are also available for dry bulk cargo.

A spokesperson told *Dry Cargo International* that MTMG, which works 24 hours a day, currently handles coal, coke, grain and feedstuff, minerals, fertilizers, biomasses, ores and other dry bulk, as well as some liquid bulk and general cargo.

"In terms of quality standards, we have already obtained ISO 9001:2008, ISO 22000:2005 HACCP and OHSAS 18001:2007 certificates and keep investing to increase qualitative and safety standards at our terminal, not just with our clients in mind, but also for our workers' safety," said a spokesperson.

MTMG also focuses on being an environmental friendly terminal as part of its MTMGreen programme, which involves investment in dedicated equipment, such as dust prevention solutions.

"To protect the environment and local neighbourhood, MTMG has invested in modern systems for protecting stockpiles from releasing excessive amounts of dust by covering commodities with thin layer of cellulose using a Dustcrusterliquid installation."

As for terminal traffic, overall this went up by 8.5% to 4,012mt last year. However, dry bulk commodities struggled, with the main increase coming from liquid bulk.

Coal and coke volumes, for example, went down by more than 13% to 866,000 tonnes. Similarly, agribulk slipped 6% to 1.798mt and other dry bulks declined by 56% to 146,000 tonnes. As for general cargo, this remained almost unchanged, leaving it to crude oil and derivatives to demonstrate an impressive growth of 58%.

"Dry bulk consignments arrive either by road or by rail to the terminal. Road carries around 50% of the total volume, being mostly agribulk and other bulks. The other half, including all coal and coke traffic, moves by rail," noted the spokesperson, who added that the lack of an inland waterway connection meant the use of barges was not possible.

Overall, last year, there were 292 vessel calls, compared to 304 calls in 2015. The size of bulk carriers remains unchanged.

Finally, in terms of dry bulk storage, MTMG has 160,000m^2 given over to covered storage and 370,000m^2 to open stockpile areas.

It was a different story all together at Gdansk. In 2016, it registered a 4.9% increase in dry bulk cargo, which was mainly the result of more coal being handled. Indeed, coal traffic amounted to more than 5mt, up 13% over 2015 and significantly higher than totals for recent years.

The record was set in 2005, when the Port of Gdansk handled nearly 7mt. Since then, transshipment of this commodity group has been very uneven, fluctuating between 1mt in 2008 and 4.6mt in 2013. The direction of trade has also changed considerably. In 2015, for example, Gdansk mainly exported coal and coke, which constituted 57% of the total; last year it was only 38%.

Within the past 12 months, very good transshipment results have also been achieved in the other dry bulks category, which amounted to 3.3mt (excluding ore) i.e. 1.5% more than a year earlier. Since 2014, the turnover of other dry bulks (i.e. non ore and non coke/coal) has been relatively stable: in 2014, it was 3.5mt, and, in 2015, 3.2mt.

The commodity structure among other dry bulks has also remained broadly similar. As was the case in 2015, last year saw around half of other bulks accounted for by aggregates, which amounted to 1.66mt. Almost half a million tonnes of granulated sulphur and nearly 200,000 tonnes of feldspar also passed through the port. A large — over 70% — increase in the

MTMG, works 24 hours a day.

PORT OF GDANSK STATISTICS (TONNES)

	2015	2016	difference
TOTAL	**35,913,639**	**37,288,969**	**103.83**
including:			
Liquid bulk	15,057,063	13,112,773	87.09
General cargo	11,600,036	14,467,118	124.72
Dry bulk	9,256,540	9,709,078	104.89
including, among others:			
Coal	4,487,902	5,080,910	113.21
Ores	84,941	202,394	238.28
Cereals	1,455,339	1,147,953	78.88
Other dry bulk*	3,228,358	3,277,821	101.53
including, among others:			
Fertilizers	346,899	281,498	81.15
Aggregates	1,522,927	1,656,704	108.78
Granulated sulphur	435,883	424,195	97.32
Feldspar	171,414	170,314	99.36
Soda	162,435	279,706	172.20

** scrap iron, steel, fertilizers etc*

amount of soda was posted last year, with a total of 280,000 tonnes handled.

The year 2016 proved to be another successive one in which iron ore volumes increased. A year earlier, about 85,000 tonnes were handled, while in 2016, the volume exceeded 200,000 tonnes. The operator predicts similar growth in the coming years.

Within Poland, dry bulk is mainly transported by rail. In 2016, 68% of dry bulk was transported by rail and the rest (32%) by road which was quite typical for Polish trends concerning land transportation of dry bulk cargo.

In 2016, the average DWT of the vessels transporting dry bulk at Gdansk amounted to 15,158, which is up 11.2% on 2015.

Last year saw a steady upward trend in vessel size (across all types of cargo). While in 2015, the average size of vessels calling at the port for trading purposes was 16,910 GT, in 2016, this increased by further 8%, reaching 18,304 GT.

This is an increase in commercial vessel size by as much as 123% within a decade, and it can be expected that this will continue this year as well, the port predicts.

In 2015, the port authority signed a 30-year lease on a plot of land located in the most promising area of the Port of Gdansk — in the Outer Harbour, where a deepwater transshipment terminal will be built on a 26ha area that will be used to handle agricultural commodities, i.e. grain and fodder.

According to the Port of Gdansk, the construction of the terminal will be a large-scale investment that will have an impact not only on the port and the region where it will be located, but also on the entire Polish economy. In accordance with obligations agreed by both parties, the annual target handling capacity of the terminal will amount to not less than 2mt, while the final tranche of investment will be made around 2018/2019.

At the moment, the total handling capacity of the Port of Gdansk amounts to 99mt of which around 24mt is accounted for by dry bulk. In practice, it means that, in 2016, approximately 40% of dry bulk cargo handling capacity was used.

Some value added services are provided at the deep-sea dry bulk terminal, which handles import and export coal. Here, they frequently blend the coal and afterwards despatch it by sea to other countries.

As regards the predictions for 2017, port expects that, this year, port will surpass the magical 10mt mark for dry bulk, which would mean an 8% increase. This year will particularly generate quite large amounts of aggregates, cereals and coal.

On the eastern shoreline of the Baltic, 2016 was similarly a difficult year.

Freeport of Riga Authority reports that 22.4mt of dry bulk cargo was handled, which was down 3.7% on the previous year, due mainly to reduced Russian coal transit shipments in 2016.

Indeed, coal now accounts for 59.4% of dry bulk traffic, with 13.3mt handled in 2016, down 8.5% over 2015.

"As 90% of coal cargo at the Port of Riga is Russian coal exported to European markets, volumes depending heavily on both demand for and on the price of Russian coal in Europe," says Vita Gerharde from the port authority's marketing department.

In the first half of 2016, coal traffic went down by 21% due to low prices, falling demand and decreased Russian coal export flows transshipped via the Baltic Sea ports. In contrast, in the second half of the year, from September onwards, the volume of coal handled at Riga started to increase. This was driven by increased coal demand in Europe, the sharp rise in coal prices in the European markets and growing Russian coal exports.

October proved an all time record for coal tonnage, reaching 1.5mt.

The second largest dry bulk commodity at Riga is mineral fertilizer, amounting to 2.8mt last year, which is a record for the port.

The third largest dry bulk commodity by tonnage is wood pellets, which is growing in importance and is viewed as being a major Latvian export in the context of 'green' energy development in the European market.

Last year, the port handled 1.44mt of wood pellets, down (–0.9%) just slightly on 2015, although last year's stagnation is explained by the low prices of traditional fossil fuels in Europe and by a delay in putting into operation planned pellet-fired power plants across Europe. This levelling out of demand is expected to continue in 2017, although more growth is forecast for 2018.

Significantly, wood pellets are currently being handled by no fewer than ten terminals in the port of Riga.

Another landmark in 2016 was a new record established for cereals, with the port handling1.3mt, an increase of 23.6% more than in 2015.

In terms of landside delivery, dry bulk mostly arrives by rail. The two largest commodities — coal and mineral fertilizer — are inbound from Russia and entirely moved by rail. This is possible, since both Latvia and Russia share the same rail gauge (1520 mm rail gauge), making Riga a convenient transit port for Russian dry bulk cargo, since most European countries have standard gauge track.

As for cereals, shipments arrive by both by rail and road.

The Port of Riga can accommodate up to Panamax size vessels, with a maximum draught of 14.5 metres available at the dry bulk berth. The largest dry ever bulk vessel to be handled was the *UBC ONSAN*, which conveyed a cargo consisting of 111,700 tonnes of coal. Last year, the 66,000 gross tonne bulker *MINI* arrived with a cargo consisting of 107,800 tonnes of anthracite coal.

According to Gerharde, "The average size of dry bulk vessels calling at Riga increased significantly in 2012. During the last few years, average size has not changed much."

Nowadays, around half of all bulk carriers calling at Riga average 50,000dwt.

In theory, Riga has capacity to handle up to 35mt of dry bulk

The Port of Riga can accommodate up to Panamax size vessels.

annually and this is viewed as sufficient. At present, around 64% of capacity is needed to cope with existing flows, with all terminals having spare capacity.

"Neither investment more new projects at the port are directed towards expanding our dry bulk capacities, but more towards adapting to market development, environmental challenges and customer requirements. Both the port authority and private operators contribute to the overall investment portfolio of the port," says Gerharde.

According to development plans, dry bulk operations - and especially coal handling — are to be transferred from the city centre to Krievu Island, which is closer to the estuary of the Daugava river, by 2019. Implementation of the project, she says, will be mutually beneficial for both the city, as it will remove industrial operations from city centre, and for the port, which would benefit from all round improved performance when handling transshipment cargo and be able to accommodate much larger vessels.

The infrastructure on Krievu Island — consisting of four new deep-water berths, rail track access and communications — are all now in place, co-finance by the EU's Cohesion Fund. These entered operation at the end of 2015. Currently, the private sector is building and equipping terminals for cargo handling, with planned total capacity of 12–15mt per year.

Two berths have also been rebuilt by private operator Riga Universal Terminal (RUT). It is one of the most successful and fastest-growing terminals at the port, offering a variety of dry bulk and general cargo handling services. In 2013, RUT was purchased by a subsidiary of Mitsui & Co. — the Singapore-based company Portek International Pte. Ltd.

According to RUT CEO Ricky Yong, "We need to develop the company in order to remain competitive and meet customer requirements in the future as well. In order to optimize costs for the transport of cargo, clients are using bigger vessels. This trend applies to all cargo segments. We have to grow along with customer requirements and be able to accommodate larger vessels at appropriate berths."

In terms of adding value, the various terminals offer a variety of services, such as coal crushing, grading and magnetic treatment (cleaning), as well as the bagging of cereal products for fodder.

"Some of our terminals indicate that they are carrying out the packing and weighing of dry bulk commodities, too," says Gerharde.

Finally, as for expectations for dry bulk traffic in 2017, she says that Riga could be looking at a 5–10% decrease in dry bulk, almost entirely down to a decrease in Russian coal transit via Port of Riga.

In 2016, the leading Lithuanian port of Klaipeda also reported a slight decrease in dry bulk traffic, which fell from 17.23mt in 2015 to 16.62mt last year. The 3.6% drop was equivalent to handling 615,800 fewer tonnes, although dry bulk continues to account for 41.4% of total traffic at the port.

The most important commodity handled is fertilizer, which last year accounted for 11.26mt, followed by agricultural products at 3.57mt, although this is mainly grain (2.83mt). There is also traffic in building materials, metals, scrap metal, iron ore, peat and sugar.

As with most Baltic States ports handling dry bulk, the majority of landside movement is by rail, which accounts for 75–80% of all handled cargo in Klaipeda Port.

For last year, the total number of vessel calls decreased by 2.3%; however overall cargo volumes increased by 4.2 % or 1.63mt and gross registered tonnage increased by 5.4 % (3,029,004 tonnes), which indicates that the size of ships is increasing in Klaipeda Port.

In terms of bulk carriers, 201 fewer vessels called at the port, equivalent to a drop of 8.9%, while dry bulk volumes decreased by 615,800 tonnes or 3.6%. Gross registered tonnage decreased by 10.1 % or 1,744,382 tonnes.

Krievu Island at the Port of Riga.

In terms of improvements, dredging work, which boosted water depth to 15.5 metres in the main access channel, were completed last year. This made it possible to increase the maximum permissible draught in part of Klaipeda port to 13.8 metres.

Finally, when quizzed as to forecast traffic levels in 2017, a spokesperson told *DCI* that Klaipeda aims to handle 17mt of dry bulk, which is a slight increase.

Port of Kokkola named ESPO's Port of the Month in March 2017

The Port of Kokkola was named the European Sea Ports Organisation (ESPO)'s Port of the Month in March 2017. The Port of Kokkola is Finland's biggest bulk port; it runs three port-terminals and functions as a 'tool port'. ***ESPO took a closer look at this interesting port:***

ESPO: *Can you briefly tell us about the Port of Kokkola? What are its main characteristics and challenges?*

Port of Kokkola: The Port of Kokkola is, calculated in cargo volume, the third largest multipurpose port in Finland, specialized in dry bulk. The port operates three port-terminals: the Deep, Silverstone and General port. Each one is dedicated to different tasks.

The Deep port, founded in the mid-1980s, is dedicated to what we call dark bulk, mainly iron-based raw materials for export, but also import of raw materials for the chemical-metallurgical industry in the vicinity of all three port areas. In the Deep port, we can handle both Panamax and Capesize ships. The average ship size is 75,000dwt, while the largest ship that called at the port so far is 180,000dwt. Based on volumes, the Deep port is by far the largest of the three port-terminals.

The Silverstone port, founded only ten years ago, handles what we call light bulk, including lime stone and different phosphates. In recent years, the Silverstone port area has been in intense development.

The General port, originally founded in 1825, is dedicated to containers, general and project cargoes, while also some light bulk is still being handled.

The Port of Kokkola, operating as a 'tool port', is like many other similar ports cooperating closely with a range of associations i.e. port and terminal operators, shipping companies, pilots and agencies. Thanks to these co-operations, the cargo traffic on railway is exceptionally high even for Finnish standards, with a range of railway-related companies and associations. In addition, the port provides for the larger part of crane and warehousing services, including quays and operational areas which are all in common use. In this type of context and taking into account the heavy increase in cargo traffic, the challenge is the coordination of operations by the port while providing an efficient and safe environment for all parties to operate. For a couple of years now, we have succeeded in arranging a weekly and partly daily integrated coordination of operations that helps to smooth the work on all three terminals in both summer and wintertime conditions.

ESPO: *The Port of Kokkola is Finland's biggest bulk port. How is this business evolving? What are the challenges?*

Port of Kokkola: For more than 50 years, the port's strategy has included the provision of services for the mining and metallurgical industry. The challenges are plenty, but at the same time, they are not different from any other similar port or commercial enterprise. The world market and its drivers and the desire to stay up to date are the main keys to a successful operation. Of course, it is crucial to provide the right services at present and more challenging for new customers at the time when it's needed — with the right capacity and equipment in place. Besides these commercial challenges, other challenges are more related to providing for efficient and more environmentally friendly handling of these commodities. For the port, this means ongoing investments in automating operations as investments for example in washing facilities for cars and heavy duty rolling equipment at terminal gates.

ESPO: *The Kokkola Industry Park accommodates the largest concentration of non-organic chemical industry in northern Europe and is located in close vicinity of the port. How is the port involved in developing Kokkola Industry Park's potential?*

Port of Kokkola: The Kokkola Industrial Park (KIP) offers employment to approximately 2,000 persons in over 70 companies, which are involved in value added production of importing raw materials and exporting commodities or intermediate products. Over 40% of the port's throughput is generated from this area. Being far from main markets, it is very important to have adequate logistics, both in summer as in winter. The first priority is that the port can operate efficiently 365 days per year and at all times with sufficient capacity. In winter that means keeping 70ha of operational area free from snow and sand. The port provides for icebreaking in port areas and state icebreakers on main fairways and sea areas. The cranes and other handling equipment in the port can operate in temperatures as low as –25°C. This means that we seldom stop working, no matter what the conditions are. This is naturally a prerequisite for the producers at the KIP area.

ESPO: *The Port of Kokkola is an important import and export port.*

To get the goods to the desired destination, good access between the port and the hinterland is needed. Could you briefly tell us how the port is connected with the hinterland?

Port of Kokkola: Finland's main north-south railway line runs through the city of Kokkola. The port is connected to this main line. The lines to the ports are electrified to the yards outside each of the ports terminals. The main railway line has several connections to the middle part of Finland and via these connections all the way to the Russian border. The Finnish and the Russian railway have the same rail gauge. This provides industries in the middle part of Finland as well as Russian customers with the opportunity to use the services of the Port of Kokkola. The main flow of goods to and from the port is rail-based. Altogether, 60% of the port's total cargo volumes were transported by rail in 2016 and over 95% of the cargoes originated from outside Kokkola. The road network is well functioning, with a new main road to the port. Most of the container traffic is road-based.

ESPO: *What are the main investment projects in the Port of Kokkola for the upcoming years? Could you briefly describe the importance of these investment projects for the port and the city? Are you benefitting from EU funds (e.g. TEN-T)?*

Port of Kokkola: The port is currently not benefiting from EU funds such as TEN-T or others. However, some of the previous investments, especially in the 90s, were partly EU-funded.

The port has recently finished a €100 million investment programme, mainly for increasing the port capacity. The investments included new port areas in the Silverstone and Deep port, new and more rails and new warehouses, cranes and other handling equipment. The present commercial situation seems to require more investments to the same extent in the coming next few years — so to say a positive problem. The port is providing for the port investments within the economical structures of the port company, generating a yearly profit for the owner: the City of Kokkola. That being the direct benefit, the larger benefit can be looked at from the point of view of providing the Kokkola Industry Park, the industry in the middle part of Finland and the logistical sector in Finland participating in the Russian transit traffic with more, better and more efficient logistical possibilities.

ESPO: *Transit traffic to and from Russia is an important trade for the Port of Kokkola. Is this trade currently under challenge for the port?*

Port of Kokkola: According to the 2016 Finnish port statistics, the Port of Kokkola is the main transit traffic port in Finland for Russian cargo, based on tonnes. Of course, the port monitors closely the present economic and political environment. To this date, there hasn't been any difficulties or constraints. The explanation for this can be found in the cargo type that is transported, which is mainly non-strategic iron-based raw materials, and in the associates and persons we prefer to deal with.

ESPO: *The EU Sulphur Directive came into force on 1 January 2015, creating a Sulphur Emission Control Area (SECA) in the Baltic Sea, North Sea and English Channel and limiting the maximum sulphur content of fuels used by ships sailing these waters. How has this been of impact for your port and the environment?*

Port of Kokkola: The SECA and the Directive behind it are very good for the environment, which is and should be our main concern. We strongly recommend that other parts of the European Union follow as soon as possible the example of the Baltic and North Sea and the English Channel. Thanks to the current oil price levels, the costs have not been too high.

ESPO: *The 2017 ESPO Conference in Barcelona will focus on climate change. In this context, can you briefly tell us more about the port's environmental policies?*

Port of Kokkola: During the last 20 years, the port has expanded fast to meet the growing goods flow. Since the policy is to be a sustainable and safe port, we are an active player in these fields. When building infrastructure, we are continuously seeking for new methods to make the port even safer and more sustainable.

For example in 2010-2012, we together with Sweden and some other ports in the Baltic were a partner of the SMOCS (Sustainable Management of Contaminated Sediments) project led by the Swedish Geotechnical Institute (SGI). The aim was to convert contaminated dredged sediments into sustainable building material. The new area in the Deep port of Kokkola is built of these stabilized sediments. This method is now spread to other parts of Europe.

Another project we take part in is a programme of measuring the ship emissions. Based on the ship type for each berth and the distance from the port boundaries, we measure since 2008 the CO, HC, NO_x, PM, CH_4, N_2O, SO_2 and CO_2 emissions of ships. Additionally, we have air quality controls once a year.

The waste management system in the port has been a focus for many years and now all waste is sorted and all waste from vessels can be handled.

All in all, in everything that we do, we try to combine the economical goal with the environmental and safety goals to make the port even more sustainable.

Climate change, however, is not seen as a severe risk for the Port of Kokkola within the next 20 years. Since the land is rising in this area by 1 cm/year, the rising sea levels are not seen as a high risk and the quays are high enough to meet this challenge. Heavy rains sometimes delay the vessels with sensitive cargo. The All Weather Terminal in the Port of Kokkola provides excellent service for these vessels, which can load and unload the cargo under roof without interruption.

ESPO: *ESPO is a partner of PORTOPIA, an FP7 project that aims to measure port performance. What is the Port of Kokkola's approach for measuring the port's performance?*

Port of Kokkola: The port performance is followed with a range of different indicators. We monitor cargo volumes, vessel statistics, financial indices, environmental indices and operations efficiency.

We measure for example usage of berths, cranes, loading and unloading efficiency per crane/ship/cargo or per cargo type for any range of time usually from shift to one day to yearly averages for a specific cargo type. Additionally, we measure unloading of railway wagons. All measures are then generated into monthly and yearly specific and consolidated reports. Logistic chains are more difficult for the port to monitor because we don't have access to all information, but we are aware of different commodities round-trip from origin to destination.

Market trends and structure is not measured but thoroughly monitored through different sources. For the environmental part, the established practice of measuring can be found in areas like air and seawater quality, which are continuously measured. User perceptions, safety and security are an ongoing process and are audited regularly.

After 15 years, and 70,000 hours — E-Cranes still going strong for Venezuela customer

As everyone knows, tensions are high in the country of Venezuela due to staggering inflation, food and medicine shortages. In spite of the crisis, E-Crane likes to keep in touch with its friends and clients. Using social media, E-Crane's Mark W. Osborne occasionally chats with Luis Mok and Enzo Carlucci (managers at the Global Venezuela bauxite unloading site on the Orinoco River). He recently told Mok about the steady growth of the E-Crane Worldwide Group.

He replied; "Hi Mark, I'm not surprised that E-Crane has grown continuously, your cranes are excellent!! The best proof is that Global's cranes are still operating after 15 years without doing the proper maintenance during the last seven years due to the lack of money to buy spare parts".

E-Crane appreciates its clients and wish nothing but the best for its Venezuela friends !

TECHNICAL SPECIFICATIONS

Type	1264 PD-E
Location	Puerto Ordaz
Application	Barge unloading
Mount	Barge
Lift Capacity	19 metric tonnes/ 20.9 US tons
Reach	26.4m/86.5ft
Attachment	6.5m³/8.5yd³ hydraulic clamshell grab
Power Source	200kW/300hp electric motor

E-Crane has 'PdD credentials' says pleased customer

In 2002 and 2003, two E-Cranes were installed at Global Materials Services in Venezuela. Both material handling E-Cranes are installed on a floating platform on mile 182 of the Orinoco River in Puerto Ordaz. The E-Cranes unload barges of bauxite into two hoppers also mounted on the floating platform.

> **For equipment to hold up as well as the E-Crane in this environment, I would say it has PhD credentials!**
>
> Luis Mok, Global Venezuela

Global Materials Services is contracted by the Bauxilum Company, which mines bauxite in central Venezuela. The bauxite is loaded into barges and shipped 350 miles downstream to Puerto Ordaz where the E-Cranes offload the material. This raw material is processed into alumina, the first step in the aluminium-making process.

The E-Cranes at Global handle about 5.3 million tonnes of bauxite annually, but the material handling all takes place within seven months, as the Orinoco is too shallow for barge transportation during the dry season.

The E-Cranes replaced two ship-unloaders which required a lot of maintenance and could not achieve the production requirements. Global was in need of a faster and more efficient solution when the E-Cranes were chosen to replace the shiploaders.

The Operations Manager at Global, Louis Mok, states: "This is the real test for material handling equipment.

We operate 24 hours a day, 7 days a week, for seven months straight. For equipment to hold up as well as the E-Crane in this environment, I would say it has PhD credentials! I really like the E-Crane concept and execution. The machine is easy to operate and maintenance friendly."

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Tom Noble, Department Supervisor, Powersouth Energy

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RDS Technology shows LIFTLOG, LOADMASTER & iSOSYNC at Multimodal 2017

At the upcoming Intralogistex show 2017 which will take place in Coventry, UK, in mid-March this year, RDS Technology will be exhibiting its range of on-board weighing systems for Forklift trucks — the LIFTLOG 100+, the NEW LIFTLOG 1000 and the SOLAS method 2-compliant LOADMASTER 100.

The LIFTLOG systems offer load monitoring and weighing functions with an internal alarm to warn when load threshold is approached and at the overload point. They also offer a totalizing feature, making it ideal for applications where multiple pallets are to be check-weighed or loading storage systems where weight limits are to be adhered to. Negating the need to travel to a floor-mounted platform scale often sited in a remote part of the warehouse, the LIFTLOG range provides a time-efficient means of check weighing.

The NEW LIFTLOG 1000 is the latest product in the LIFTLOG range, designed to offer ±0.5% accuracy for forklift trucks operating in the fastest loading environments.

It is a cost-effective weighing instrument that reduces loading cycle times and maximizes tonnes per hour performance.

Also on show will be the LOADMASTER 100 for SOLAS-compliant container weighing and iSOSYNC PC software for the transfer of load data.

RDS Technology, a Topcon Positioning Group company, supplies over 100 original equipment manufacturers worldwide with custom solutions, as well as supplying standard 'retro-fit' products through a network of specialist independent distributors in over 30 countries where customer service is the highest priority. Headquartered in Minchinhampton in the United Kingdom, RDS pioneered the use of electronics for agriculture and continues to lead in other in other sectors of mobile machinery.

Geroldinger successfully completes urea fine dosing project

Due to sheer volumes required, chipboard panels are among the most popular products in the timber industry. FunderMax, a renowned supplier of wood-based and compact laminate solutions, sets great store in high-quality manufacture. To guarantee this, FunderMax engaged Geroldinger, the Upper Austrian bulk goods specialist.

When it comes to storing difficult bulk goods, building materials manufacturers like FunderMax do well to come to GEROLDINGER. For its chipboard production, FunderMax requires not only that storage facilities are watertight, but also that they are able to handle urea, which is extremely difficult to store.

Since urea is a very hygroscopic bulk good that may form hard crusts because of its capacity to absorb water, it is normally kept in Big Bags or open in warehouses. Because of possible clumping and crust formation, storage in silos is seen as very risky.

"The challenge with this project consisted of controlling the dosing from a large volume of urea down to a very small volume so as to best supply the subsequent process," is how Managing Director Walter Geroldinger describes the main task.

GEROLDINGER set itself this challenge and for the storage of 60 tonnes of urea (about 2 silo trucks) it created a space-saving, environmentally-friendly solution with an octagonal Multigon silo (65m^3). This special silo facilitates easier crust breakup thanks to its flexible walls and, with the aid of the tried-and-tested 'Oszillomat' system, it allows for even discharge of the urea.

To avoid variations in volume and to guarantee constant bulk goods delivery for inclusion in the customer's process, dosing screw conveyors were installed to ensure the required urea micro-dosage.

With its flawless storage and materials flow design of the flame retardant, which is also required, GEROLDINGER ensured the successful completion of this major project and was able to hand over a turnkey plant.

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SAMSON Materials Handling UK and AUMUND France win unloader contract

SAMSON Materials Handling UK and AUMUND France secure order to provide second Samson® truck unloader to STAMA, Tunisia

In co-operation with SAMSON Materials Handling (under the umbrella of the AUMUND Group of companies), AUMUND France has secured an order with STAMA (Société de Transit d'Agence Maritime et d'Affrètement) — its second order for a Samson® 450 Super Series to be employed at the Port of Sousse, Tunisia. This equipment is designed to receive salt and sand with a bulk density of 1.4t/m³ to 1.6t/m³ and will discharge directly to an ongoing conveyor system at an output feed rate of 500m³/h.

Samson® Mobile Material Feeder to handle salt and sand (photo SAMSON).

The Samson® Mobile Feeder is fitted with a horizontal loading section which will receive salt and sand directly from 40-tonne-capacity trucks. Additionally there is a 35-tonne buffer holding capacity which enables drivers to reposition subsequent discharging vehicles without pausing equipment operation.

To ensure top performance rates, material is conveyed on a belt supported by trapezoidal shaped apron bars situated at every chain pitch thus providing maximum balanced support during conveying. Flexible side seals help the directionality of the material travelling along the belt and minimize spillage risk. At the transfer point, the material is discharged to the ongoing conveyor at a controlled volumetric rate by passing through a levelling blade.

Mounted on polyurethane filled tyres and fitted with a towing facility the Samson® Feeder can be towed free of the area when not required or relocated across the port as required.

About the AUMUND Group

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

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A conversation about grain storage domes

When it comes to grain bulk storage there is one major consideration: moisture. Grain is meant to be stored dry and if moisture is in the storage facility, it can ruin the commodity. Professionals in the dry storage field have grappled with this issue. One solution to the problem is the monolithic dome, an effective storage facility for all bulk storage, especially grain.

A monolithic dome is a concrete structure constructed by inflating a membrane known as an airform. While that membrane is inflated, polyurethane foam is sprayed to the interior surface. Steel reinforcing rebar is attached to the foam using a specifically engineered layout of horizontal and vertical rebar. Finally shotcrete, a spray mix of concrete, is applied to the interior surface of the dome. The structure is one solid piece, giving it several advantages over traditional square structures.

The foam inside the structure creates great insulation and allows the dome to be energy efficient. "Inside a dome we can control the moisture content more easily than any other building," stated Gary Clark, vice president of sales for Monolithic Constructors, Inc. With the humidity so easily controlled, Clark stated the grain stores and moves better than in regular structures. This is advantageous because, according to Clark, "the dryer you can store grain the longer it will store."

Another advantage provided by monolithic domes is the versatility of the structure. Clark stated the dome is more versatile than the traditional silo. "We can cover more ground than a silo could. We can build in different sizes to accommodate the size of the load," he said. For example, a dome can be built wide with a low profile or narrow and high with a dome on top, depending on the storage needs.

These structures are also impervious to weather and natural disasters, keeping the commodity safe inside. If a fire were approaching the dome, the concrete structure would keep the fire out and leave the grain inside safe. If a fire were started inside, the dome would safely contain it. These domes have also been known to survive hurricanes, tornadoes, earthquakes, and other natural disasters. They are often built in tornado-prone areas to protect communities from those storms.

In addition to these major benefits, monolithic domes provide small benefits as well. These structures can be easily outfitted with any type of conveyor and reclaim system. It is mounted in the structure right off the dome, because "the dome itself can support the weight of the conveyor," Clark stated . In addition to this, animals are easily kept out of the structure. "Because it is constructed in one solid piece, protection form vermin can more done easier," Clark said.

John LeGrand was the owner of one of these structures and used it store grain. He owned Wheeler Grain Company near Rogersville, Alabama, USA. He oversaw the company until he sold it in 1994. Located at this company was a monolithic dome and it was used for commercial grain storage. Before he sold the company, he had been using this dome for ten years. He stated that the dome "had been very satisfactory" to his company's operations.

Further attesting to the advantages of the dome, LeGrand recounted how a fire broke out inside the structure at his company. The fire started not due to the structure, but rather the failure of the lessee to maintain the temperature sensing system. However, he recounted that the structure "survived an internal explosion with moderate damage." When asked if he would recommend these structures to other professionals in the industry, he replied, "Yes, I liked it very much. It did a fine job of storing grain."

Monolithic domes began with David B. South and his interest in dome building. By 1976, he and his brothers Randy and Barry built their first dome. That project resulted in a patent for the process and launched an innovative construction system for monolithic domes. Several domes have been built around the world, and the uses include homes, schools, churches, and sports facilities.

The Monolithic Dome Institute was founded to promote the dome building industry as a whole. Its purpose is to educate and promote monolithic domes around the world. Headquartered in Italy, Texas, USA, it also holds special events such as workshops on how to build domes. Information about monolithic domes and the industry are updated on its website. The organization offers concept evaluations and feasibility studies for those interested in building a monolithic dome.

Kingfisher provides wear-resistant solutions for steel manufacturer

Handling, storing and conveying high moisture content iron ore for manufacturing needs can be quite a challenge. One such type of iron ore is a well-known product used within the steel manufacturing industry, with natural high moisture content. The import terminal and blending plants of a UK steel manufacturer were both experiencing major issues with the material build-up and blinding of their conveyor chutes. Plant engineers were able to identify that, as the ore escalated through the manufacturing process, the moisture content increased, leaving the material to become 'clay'-like. This further caused serious blockages and material build-up as the ore then sticks to other equipment throughout the process, such as conveyors, idlers and screens. Engineers onsite attempted to resolve this problem by utilizing water jets to clear existing equipment from material build-up and bridging, but it was evaluated this just added to the problem of increased moisture content thus causing more problems for manufacturing further down the line.

Previously the steel producer had installed a dirt box on its existing conveyor chute, an idea adapted by the suppliers of the raw material as dirt boxes help protect against high levels of wear and abrasion, but a poor system when it comes to eliminating constant material build-up and bridging. Thus Kingfisher's collaboration with the end-user was to primarily increase the flow promotion as well as provide a solution which would sustain the levels of wear and abrasion being experienced.

Following the modifications suggested by engineers at Kingfisher, it was proposed all dirt boxes be removed, and replaced with an adjustable baffle lined with Kingfisher K-ALOX ceramic lining system. The results of a review that took place six months after installation showed that the constant bridging and material build-up issues had been eliminated. There had, however, been an increase in wear, but this was managed by applying an increased thickness of the K-ALOX ceramic lining in the high impact areas.

Kingfisher's Sales Manager Kenny Fergie commented, "We have provided repair and maintenance solutions for the steel industry for many years. Kingfisher adds significant value to its customers' assets, ensuring processes remain operational and on-line producing. Since the modification, the customer has confirmed they have had no blockage issues. As part of our free onsite inspection service, our engineers are equipped with the skills and knowledge required to assist customers and provide an unbiased solution, fit for their process and budgets. Kingfisher specializes in maximizing the service performance of process plant and equipment, such as transfer chutes, cyclones, hoppers, vessels and process pipework used to convey, store or process bulk solid materials within utilities, primary manufacturing and process industries.

These 'before' photographs illustrate the extent of the blockages.

After: the modifications by Kingfisher, the problems have been resolved.

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DELACHAUX GROUP

On track for success

conveyor systems take centre stage

"The monitoring system Conti MultiProtect helps to detect damage such as longitudinal slitting or splice faults on the conveyor belt at an early stage during operation and repair the damage in good time. This helps us to avoid extended downtimes," explains ContiTech application engineer Patrick Raffler. (photo: ContiTech)

Louise Dodds-Ely

ContiTech: increasing digitalization in the industrial sector is a growth opportunity

International technology company and industry partner ContiTech is experiencing considerable growth potential thanks to increasing connectivity in the industrial sector. "Digitalization is a major opportunity for us to work with our customers to generate added value on a lasting basis. Because we are part of the overall value chain, we can establish the conditions this requires as a supplier and industry partner, and play a key part in shaping the industrial infrastructure. Intelligently connected systems, machinery and equipment pave the way for this. Which is why we're working tirelessly to make our products and systems smarter and offer end-to-end solutions," explains Hans-Jürgen Duensing, member of the Continental Executive Board responsible for the ContiTech division. From April 24 to 28, ContiTech will be presenting its smart solutions at the Hannover Messe trade fair, under the strapline 'ContiTech. Smart Solutions Beyond Rubber'.

One of the distinguishing features of the fourth industrial revolution is the intelligent connectivity of production and maintenance processes. Key data is now being made available in real time on a global scale. "This is giving rise to a number of new business opportunities. Going forward, predictive maintenance — the anticipatory maintenance and repair of machinery and equipment — will be a key driver of growth and efficiency in a large number of the industries in which we operate," adds Duensing. The Hannover Messe trade fair will see ContiTech unveil its permanently installable and digitally connected monitoring system for steel cord conveyor belts for the first time.

Predictive maintenance reduces downtimes and maintenance costs

Whether in open-pit or underground mining, for steep inclines or across distances spanning kilometers — conveyor belts are the beating heart of many industrial sectors. In harsh operating conditions, they transport loads weighing several tonnes not to mention sharp, hot, oily and greasy goods. Smooth running of these belts is crucial for cost efficiency. If the belt system experiences an extended downtime, the entire production chain frequently collapses. This, in turn, results in considerable sales losses for the operators. To allow conveyor belt systems to run free of faults and cost-effectively in the long term, even when subjected to high loads, the operators are focusing more and more on prevention. Innovative electronic monitoring systems make it possible to identify the exact condition of the conveyor belts at any time.

"More serious damage such as longitudinal slitting or splice faults on the conveyor belt can have serious consequences for system operation, and lead to total failures in a worst-case scenario. The monitoring system Conti MultiProtect helps to detect such damage at an early stage during operation and repair the damage in good time. This helps us to avoid extended downtimes," explains application engineer Patrick Raffler. The way it works is that rip inserts implanted into the conveyor belt are checked for longitudinal slitting by means of their characteristic magnetic fields. Using RFID (radio-frequency identification) chips, ContiTech has been able to optimize localization of longitudinal slitting on the belt. Conti MultiProtect is also able to monitor the condition of the joints and identify damaged spots within the carcass. The user-friendly system has an intuitive operating design that uses a graphical interface.

"This permanent monitoring gives us a detailed picture of the condition of the conveyor belts at all times without having to interrupt operations. This allows cover repairs to be scheduled preventively in good time, thereby reducing maintenance costs," says Raffler, outlining the advantages further. ContiTech is using software developed in house. "We're putting our longstanding expertise to good use in the development of intelligent software solutions. This enables us to assist our customers in the best way we can. The new system permits more-accurate-than-ever monitoring of steel cord conveyor belts," says Raffler.

Other product highlights at Hannover Messe

ContiTech will also showcase a new development for its ViProtect app designed for iOS and Android systems at this year's Hannover Messe. The app allows users to analyse vibrations in driver cabs, engines and other industrial devices using a smartphone. Excessive vibrations put too much strain on the components, and this can result in expensive and time-consuming downtimes and repairs.

Taking accurate measurements helps to assess the vibration behaviour of industrial vehicles and machinery. The app uses this data to find the right solution and suggests options for a suitable bearing system — thereby helping to increase service life and comfort over the long term.

The company will also be presenting its latest development for intelligent surface materials. The integration of digital functions in decorative surfaces is featuring more and more on customers' radars. Light integration is a vital development step in this respect. The translucent cover material Acella Hylite produces special lighting effects that can be used, for example, for backlighting a vehicle door. Varying light sources can be used to create customized colour effects or to light up warning signals.

ContiTech will be presenting its strategic solutions and product highlights at a press conference taking place on April 25 from 10:30 a.m. to 11:30 a.m. at the trade fair stand.

Continental develops intelligent technologies for transporting people and their goods. As a reliable partner, the international automotive supplier, tyre manufacturer, and industrial partner provides sustainable, safe, comfortable, individual, and affordable solutions. In 2016, the corporation generated preliminary sales of around €40.5 billion with its five divisions, Chassis & Safety, Interior, Powertrain, Tires, and ContiTech. Continental currently employs more than 220,000 people in 55 countries.

As a division in the Continental Corporation, ContiTech is one of the world's leading industrial specialists. Its customers can be found in key industries such as machine and plant engineering, mining, the agricultural industry, and the automotive industry.

With around 43,000 employees in 44 countries, the company uses its development and material expertise for products and systems made of rubber, plastic, metal, textile, and electronic components to combine these with individual services. ContiTech always thinks in terms of customer-friendly and environmentally-friendly solutions — going well and truly beyond its roots as a producer of rubber products. With sales of €5.4 billion (2015), this international technology partner is active with core branches in Europe, Asia, NAFTA, and South America.

The monitoring system Conti MultiProtect helps to detect damages at an early stage. Rip inserts implanted into conveyor belts are checked by their characteristic magnetic fields. (picture: ContiTech)

Conveyors form major part of LNK Industries service offering

Today, environmental considerations and developing port facilities for the transshipment of various cargoes are growing trends in the maritime industry. For the former, it is necessary to ensure that transshipped cargoes have a minimum impact on the environment — an excellent way of doing so is to separate the cargoes from the outside. For example, coal, fertilizers and other cargo transshipment terminals are today designed as closed loop transfer systems.

The second aspect is multifunctionality — terminal equipment for the flexible transshipment of different kinds of cargo, according to the current demand for port logistics.

LNK Industries works in the construction and manufacturing sector, offering a full construction cycle. This includes design, the provision of optimal and unique engineering solutions, construction of complex facilities as well as manufacture of technological cargo transportation equipment. In addition, the company has experience in construction of hydrotechnical objects and bridges. Conveyor systems are a major, and important, part of the company's portfolio.

LNK Industries offers a full, end-to-end service in the construction of manufacturing facilities, transshipment systems and other technological equipment. It is able to do so as its facilities enable the production of reinforced concrete and metal structures, as well as non-standard technological plants and automatic equipment. For that reason, LNK Industries is able to offer end-to-end cycle products for marine terminals, production complexes and 'smart' buildings.

To the best of our knowledge LNK Industries has no competitors in the the field of the turnkey projects (deisgn, construction, manufacturing and installation of the equipment, automation) for the marine terminals. Usually, there is a split between the equipment and the construction parts that are done by totally different companies. All this, in its turn, leads to problems with warranties and fuctioning since neither builders nor equipment manufacturers understand and are motivated to co-ordinate the mutual solutions or work together. At the same time, LNK Industries has highly qualified staff in house, which releases the client from the above-mentioned headache.

Being a flexible company, LNK Industries does not limit itself with the narrow borders of turnkey projects only, but challenges as the competitors the big international companies in the tenders where the works are split. Often it co-operates in joint ventures or as nominated subcontractor for a certain part of work.

Within LNK Industries are special construction design, manufacture and construction facilities including the ones implementing the manufacture of metal structures, hydrotechnical, industrial and civil engineering, manufacture of transportation technological systems as well as years of experience in design in all of the abovementioned areas, which enables it to offer an important product on the market — commercial implementation of the project — construction of all kinds of terminals on a turnkey basis.

LNK Industries solutions

LNK Industries is characterized by its high-quality, complex solutions and short timeframes. Its services include not only the designing — but also the construction of — berths, access roads, bridges, warehouses and cargo transportation systems.

The company has already implemented several major projects such as the coal terminal in Ventspils (Baltic Coal Terminal), the Alpha Osta mineral fertilizer transhipment terminal in Riga, as well as passenger and cargo terminals of the Port of Klaipeda. The latest large-scale projects are construction of the fertilizer transhipment

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- Other equipment for sea ports, mines and bulk cargo warehouses
- Our equipment can be used to handle coal, mineral fertilizers, ore, cement and other similar bulk cargo
- Supply both separate conveyors and whole complex equipment systems

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and temporary storage terminal Riga Fertilizer Terminal, dry bulk cargo, including grain cargo, transshipment terminal Riga Bulk Terminal, and grain and other agro-industrial cargo transshipment terminal (Voleri, Latvia).

The company specializes in the design and construction of modern, automated port terminals, including the design, manufacture and installation of transportation systems for all kinds of cargo: bulk, container and chemical. The company uses components produced by the best Western manufacturers: SEW, Rulmeca, Metso, Sandvik, Bosch-Rexroth, Festo, etc. The transportation technology systems plant within produces a wide range of industrial equipment.

The plant produces hi-tech transportation systems for seaports, cargo terminals and airports, equipment for primary and advanced timber processing, conveyor systems for the mining industry and electric power stations, domestic and industrial waste recycling, biological fuel production.

The plant has a full production cycle from the design stage to the implementation of the customer's idea in metal. This allows LNK Industries to implement the produced equipment into the existing industrial technology processes and ensure high quality, reliability and durability.

LNK Industries is are able to provide the client with a wide range of services — including complex marine construction works, the construction of surface structures, warehouses, office premises, etc. and the establishment of systems to ensure the loading and unloading of different types of products: from railwagon to warehouse to vessel and in reverse mode for different types of products.

It is the provision of the end-to-end cycle of works for the construction of terminals, as well as the ability to offer complex solutions, that allows the expansion of the company's activities in Scandinavian countries.

The joint venture of LNK Industries and PIRS SAS has unique experience in the design and construction of dome-shaped warehouses.

Dome-shaped warehouses have an indisputable advantage over warehouses of traditional shapes as storage facilities for homogeneous loose goods. In addition, the dome-shaped form is optimal for loading/ unloading when the loading mechanism of the conveyor system brings cargo to the upper part of the dome, while the unloading mechanism of the conveyor system carries it through hatches in the floor and special tunnels directly to transportation means (a vessel, a railway car, a truck, etc.).

LNK Industries: company background

LNK Industries is a leader in the design and implementation of large-scale production and construction projects in Northern Europe. The company's vast experience, extensive knowledge and innovative approach ensure efficient solutions and turnkey project implementation.

LNK Industries specializes in building multi-functional sites, i.e. terminals, infrastructure and production, hydro-technical and civil engineering buildings, as well as in the installation of self-designed and produced conveyor systems at these sites.

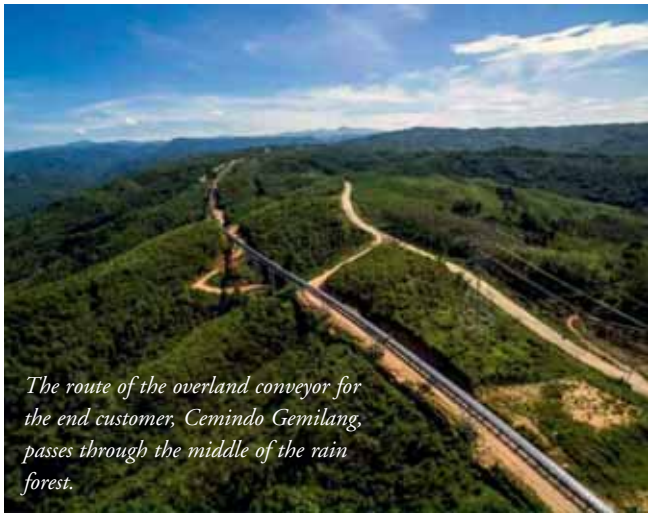
The company guarantees accurate and fast performance of work, and reliability, as well as quality in compliance with EU standards, because all its systems and technological equipment are certified under the standards of ISO quality management systems.

The uniqueness of LNK Industries derives from the fact that the company is successfully able to fulfil complicated design and construction assignments by relying solely on its internal resources. Therefore, it can guarantee the high quality of all construction elements and technological equipment, ensure timely performance of jobs and assume responsibility for compliance with financial liabilities.

LNK Industries implements projects not only in Latvia, but also in other European Union and CIS countries.

'We have to listen closely': system customization with BEUMER

An interview with Dr. Andreas Echelmeyer, Director Conveying & Loading Systems, BEUMER Group

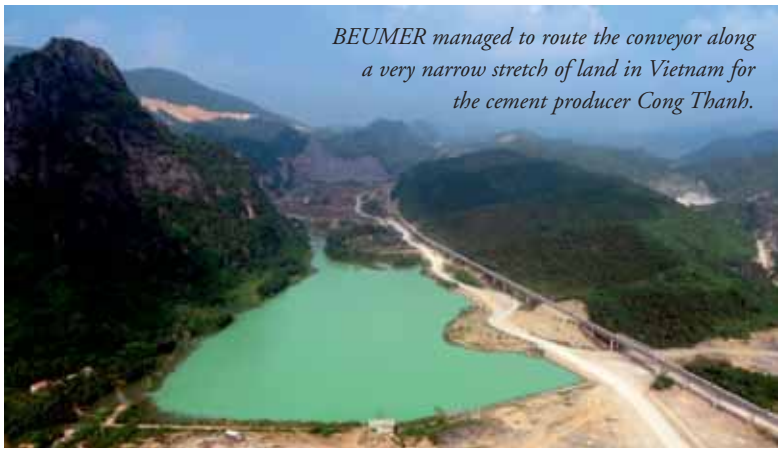


The route of the overland conveyor for the end customer, Cemindo Gemilang, passes through the middle of the rain forest.

Q: *Dr. Echelmeyer, you have been Director of Conveying & Loading Systems at BEUMER Group in Beckum for some time now. What are your responsibilities and what would you like to achieve?*
Dr. Andreas Echelmeyer: Since August 2015, I have been the head of the new Center of Competence (CoC) for Conveying & Loading Systems (CL Systems) segment. Under the leadership of the CoC, we would like to globally develop and implement complex system solutions for various industries, such as the mining and raw materials industries, and port handling. In order to achieve this, the customers have to notice us in those fields. BEUMER is known for providing innovative intralogistics solutions. Some are still surprised to learn how fast the BEUMER Group has grown in recent years. Today, Beumer now also offers complex system solutions in the raw materials industry, a sector in which business was traditionally limited to sales of single machines. Our goal is to become internationally known as a reliable partner in the area of plant engineering as well. We have fewer inquiries from Germany, and increasingly more from Australia, the Far East, Africa, South America and the US. Our mission is to build an international team for Conveying & Loading Systems that works together on specific projects. In order to ensure a high standard internationally, we must get qualified colleagues from all our local companies on board in all regions.

Qualified means that they have to understand the customers in order to precisely communicate their needs with us and develop the perfect solution together with our team in Beckum. This means that we need to stay curious and open-minded for this type of teamwork.

Q: *What has changed now for BEUMER Group with the introduction of the CL Systems segment?*
Dr. Andreas Echelmeyer: We are rooted in material handling, which is specifically about the efficient movement of bulk materials. Each industry we serve has very specific requirements however. The cement industry, for example, relies increasingly on alternative fuels and raw materials to reduce the use of expensive primary fuels, such as coal and oil. This can also be achieved with household waste that is processed for a particular application. Due to the differing composition of this material, its handling is often very complex. We consult with our customers based on our extensive knowledge of system solutions and provide entire systems, starting from receiving the material at the factory gate, to storing, mixing, conveying and introducing it into the cement production process via the main burner or calcinator.



BEUMER managed to route the conveyor along a very narrow stretch of land in Vietnam for the cement producer Cong Thanh.

Q: *How do you define expertise in system solutions for your work?*
Dr. Andreas Echelmeyer: In order to customize a solution, we have to listen very carefully and ask the right questions. These are often questions the customer has not even thought about. Some customers can also have very specific ideas about the solution. Together we analyse the task, and in this dialogue the user learns that we can supply the perfect system solution that can sometimes differ considerably from the original ideas. Our main goal is to understand the user. Another important prerequisite for us as a system manufacturer is flexibility. In order to successfully tackle specific tasks, we sometimes have to learn to let go of established solutions and find an entirely new approach, depending on the application.

Q: *How do you get in contact with the users?*
Dr. Andreas Echelmeyer: Our globally operating colleagues are in close contact with our customers. We are constantly exchanging ideas. Our local colleagues are familiar with the country-specific customs, speak the language and know the market and customer-specific requirements. They can pinpoint the relevant potentials and priority areas. Ideally, the customers themselves approach us at an early stage. Together, we then develop the perfect system. If a new customer comes to us, we will send out experts from our Beckum site in Germany. A team from the local company, accompanied by experts from the CoC, will then discuss the problem in detail with the customer. As a third possibility, the customer sends us a request for quotation. We analyse and examine the request in regards to completeness, and whether all of our questions have been sufficiently answered, and then we evaluate the request. Together with our local colleagues from the responsible group company, we then develop a fitting solution.

Q: *Your administrative field is called Center of Competence (CoC), the globally centralized organization within a matrix structure. Do you also work together with other CoCs?*
Dr. Andreas Echelmeyer: In the case of orders from the cement industry, for example, we work closely

with our colleagues from the CoC Cement. We can mutually benefit from our respective expertise. Those collaborations are always project-specific.

Q: *From which industries do you get requests?*
Dr. Andreas Echelmeyer: This can vary a lot, because our system solutions are used wherever you need to transport large quantities of bulk material. This is particularly the case for the ore and raw materials industry, but we also deal with applications outside of these core areas, such as food transport. In ports, for example, we ensure that different materials are efficiently loaded onto ships.


Dr. Andreas Echelmeyer, Director Conveying & Loading Systems, BEUMER Group.

Q: *What skills are you looking for in your colleagues?*
Dr. Andreas Echelmeyer: As you can imagine, the engineers for this task are very experienced and highly qualified, and are able to think outside the box. Often they need to find new ways in order to find the perfect system solution. Particularly with large conveyor systems, the demands on engineers are becoming increasingly complex. Public acceptance of road transport by truck is declining throughout the world, which means that our conveyors have to deal with greater and greater challenges in overcoming topography. For example, we are designing systems with a length of more than 12km that transport material over extremely steep inclines and declines — and without transferring material on the way.

If we don't want to send an expedition team first, we will have to use special software that allows us to merge satellite and aerial images of different resolutions with the respective topographical data. The challenge now for my colleagues is to estimate and analyse the project, in order to make a concrete offer to the customer. We usually don't have a lot of time for this. It is only possible with an excellent global team.

Q: *What experiences do you bring into your new position?*
Dr. Andreas Echelmeyer: I am familiar with the system manufacturing side, as well as the user side. I was working in the cement industry for eight years. As production manager, I had to oversee complex systems that manufacture more than 13,000 tonnes of steel per day. This is how I am familiar with the demands on system manufacturing coming from the users. I then switched sides and have now worked in systems manufacturing for 12 years. During this time I have set up a global customer support division, among other activities, and I therefore know the expectations of customers: they have ever-increasing demands on machine availability and, therefore, on customer support.

Q: *How would you assess the current development for plant design in mining?*
Dr. Andreas Echelmeyer: The prices for raw materials like iron ore or copper have been extremely low for the last two or three years now. This is why the market situation is very difficult at the moment. We feel the effects of companies cutting investments and stopping projects. We expect this low level of investment to continue for another two, three years, until the market stabilizes. What else has changed? There is a general trend towards larger tonnages and throughputs because larger production facilities are more efficient. Many users don't want to set up several parallel systems, but want to cover their entire requirements with one line or as few as possible. This trend influences considerably the development of our systems.

Q: *Today, the trend is towards a comprehensive product portfolio in order to offer complete solutions for the entire production process to the customer. Do all components come from BEUMER?*
Dr. Andreas Echelmeyer: We want to offer comprehensive services to our customers, so that we can also avoid unnecessary interfaces. This is why we deliver everything from one single source. For many of the components that are not part of our portfolio, we always ask ourselves whether to purchase or manufacture them in-house. For gear units and electric motors, as well as systems to quantify material flows, we use selected partners. We also attend trade shows to get a clear picture of the current market developments. It's the only way to make sure to provide the perfect solution to our customer in terms of profitability. It is not uncommon for plant manufacturers to purchase many of the components. This way we focus on our core competence and always provide the perfect solutions. Our goal is to always supply turn-key systems that allow the customer to work efficiently.

Q: *Are you planning on becoming an EPC (Engineering, Procurement and Construction) company for bulk material — or even an EPCM (Engineering, Procurement and Construction Management) supplier for large-scale plants, also in order to avoid interfaces?*
Dr. Andreas Echelmeyer: Not necessarily. As plant manufacturers, we want to focus more on the required system solutions and less on industrial construction, excavation and concrete construction. In addition, climate conditions and legislation can vary greatly from China to Tierra del Fuego, Australia or Alaska. This is why for every project we decide if we will be the single provider or if we will work together with a reliable partner in the region. Local partners are familiar with their environment and the pricing, and are usually well connected. We always want to be well aware of the interfaces. We usually decide on a case by case basis whether or not to use a local partner. We keep a very close eye on the EPC topic, however.

Our customers appreciate that we are a competent expert. They don't want to buy a tunnel or a foundation. They want a system that solves their problems.

About BEUMER

The BEUMER Group is a renowned international manufacturer in the manufacture of intralogistics systems for conveying, loading, palletizing, packaging, sortation and distribution. Together with Crisplant a/s and Enexco Teknologies India Limited, the BEUMER Group employs 4,000 people worldwide, and achieves an annual turnover of about €700 million. With its subsidiaries and sales agencies, the BEUMER Group serves customers around the globe, across a wide range of industries.

STANDARD INDUSTRIE's LIFTUBE® eliminates need for dust-control measures

For nearly 40 years, STANDARD INDUSTRIE International has played a major role in the design and manufacture of equipment to facilitate the handling of bulk materials. The group's foremost priorities include respect for the environment and safety.

The innovative and reliable solutions developed by STANDARD INDUSTRIE's engineering department have been adopted by many industrial companies in various sectors such as mines and quarries, cement plants, glass industries, incineration plants and many others.

International group STANDARD INDUSTRIE has great expertise and experience in the transport of material on conveyor belt, and it recommends its product LIFTUBE®. This product is suitable for conveying systems with the following characteristics:

- belt width: 18 to 54in (500 to 1,400mm);
- belt speed: 16ft per second maximum (5m per second);
- density of the product transported: up to 4;
- maximum particle size: 19.75in (500mm approximately); and
- maximum operating temperature: 572°F (300°C).

LIFTUBE® is a solution which has many advantages. These include: decreases risk of mistracking; noticeable noise reduction; prevents material overload (material spillage). These advantages all reduce downtime and operating losses. Furthermore, productivity and safety are optimized between loading and unloading sectors with help of the LIFTUBE®.

A Europe-based plant producing manganese, a very

LIFTUBE®

& Efficient Inexpensive

Why? pay more

- BLOCKAGE & BUILD-UP REMOVAL
- INDUSTRIAL VACUUM CLEANING
- CONVEYOR BELT OPTIMIZATION
- SILO & HOPPER CLEANING SERVICES

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abrasive and dense product, faced daily issues with their belts, thus making maintenance harder and increasing cleaning operations. The material losses due to leakages present in the foot pulley caused many stoppages. Access to this area had become difficult, increasing the operators' risk of danger.

By installing self-extinguishing and high-temperature 46ft (14m) LIFTUBE® version for a belt width of 25.5in (650mm), STANDARD INDUSTRIE International has been able to adapt to the characteristics of manganese dust. Since the installation of the LIFTUBE® in 2016, dust removal problems have been eliminated, as the system is perfectly sealed. There is no need for additional cleaning. Moreover, due to the sealing, noise has been reduced by approximately 15 to 20% thus offering a more comfortable working environment for the operators. An expert in its field, STANDARD INDUSTRIE International offers cost-effective, efficient, and reliable technical solutions with a short payback.

In another application, in a cement plant in Austria, two conveyor belts carrying limestone, clay, sand, or additives (crushed tile, ashes ...) generated a lot of dust emissions. The generated airborne dust was mainly due to the chute height drop and the conveyors' inclination, leading to excessive product loss.

STANDARD INDUSTRIE International recommended the installation of two LIFTUBE® applications: one of 13ft (4m) and the other of 16ft (5m) for a 25.5in (650mm) belt width. The feed chutes were integrated into the LIFTUBE® casing. Inside this structure, the side flaps (side curtain) as well as the centreing plates, made it possible to channel the material and to reduce belt mistracking, ensuring an optimal sealing.

Since the installation of this equipment, the customer has been fully satisfied: 90% of material loss and airborne dust are now eradicated. Following these excellent results, the customer would now like to install two other conveyors: one of 197ft (60m) in the raw material storage area and the other one of 39ft (12m) dedicated to the loading of the additive.

LIFTUBE® is an ideal solution for conveying fine particles, but also ideally suited for the transport of larger particle size products.

For instance, in Belgium, a metal recycling group that handles household and industrial wastes has also improved its performances thanks to LIFTUBE®. Scrap iron, car frames and old televisions are products that this factory processes every day. Previously, this type of scrap regularly blocked the rollers of the conveyor and occasionally tore the belt.

This patented system that channels material deep in the trough, has been installed over 65ft (20m) and now prevents the scrap from tearing the belt; it also reduces maintenance interventions to bare minimum. Convinced by this solution, this customer opted for this equipment in other areas of his plant and now has more than 656ft (200m) of LIFTUBE®.

Many other installations around the world demonstrate the effectiveness of this innovative solution, evolving with environmental standards and restrictions. Mining and quarrying, thermal power plants (coal and biomass), cement and lime kilns, glass processing, waste management ... these are all areas where LIFTUBE® improves working conditions while optimizing production.

Make lifting child's play with innovative device from Flexco

Maintaining conveyor belts ergonomically with Flexlifter from Flexco

Flexco has developed an innovative device for the ergonomic maintenance of conveyor belts in coal mines, steelworks and wood-processing mills. The Flexlifter enables service personnel to hoist the tensioned belt on the system to the required height without physical exertion. The belt lifter can be loaded with up to three tonnes and is available in three sizes. And because of its particularly lightweight construction, the technician can move it about with ease.

The conveyor belt is quickly and easily hoisted to the appropriate height with the Flexlifter. Personnel can carry out all necessary maintenance work in comfort. (Photo: Flexco Europe GmbH)

Depending on the application, conveyor belt systems transport heavy, pointed or sharp-edged materials. In doing so, they are subjected to dirt and dust as well as atmospheric conditions such as temperature variations, moisture and sunshine. Under these conditions, belts have to be regularly maintained to avoid premature machine failures and to ensure availability at all times. To enable technicians to renew connectors, for example, or to replace tension rollers, they raise the conveyor belt at the appropriate point on the system to a suitable height. This work is not only accompanied by a significant risk of injury. It takes time and is physically very strenuous. With the Flexlifter, the Flexco range now includes an ergonomic belt lifter for this gruelling activity.

The device is available in three sizes: 'Medium' for belt widths from 900 to 1,500mm, 'Large' for 1,200 to 1,800mm and 'XL' for 1,800 to 2,400mm. The largest version can accommodate up to 2,700kg. Being made of anodized aluminium, the belt lifter is particularly lightweight and resistant. It is therefore easy for the user to transport and position on the conveyor belt. The powerful scissor lift platform raises the belt safely to a height of 350 to 400mm without damaging the belt. If more height is required, the Flexlifter can be fitted with extendable feet. After assembly, these rest securely on the conveyor structure. The personnel can now slide the belt lifter over the conveyor belt and position it at right angles on the system. The Flexlifter can be used on both the top belt and on the return belt.

To raise the belt to the required height, the technician operates the Flexlifter with a manual ratchet or hammer drill. The belt lifter is fitted with a two-rail system in order to handle the high loads safely and stably.

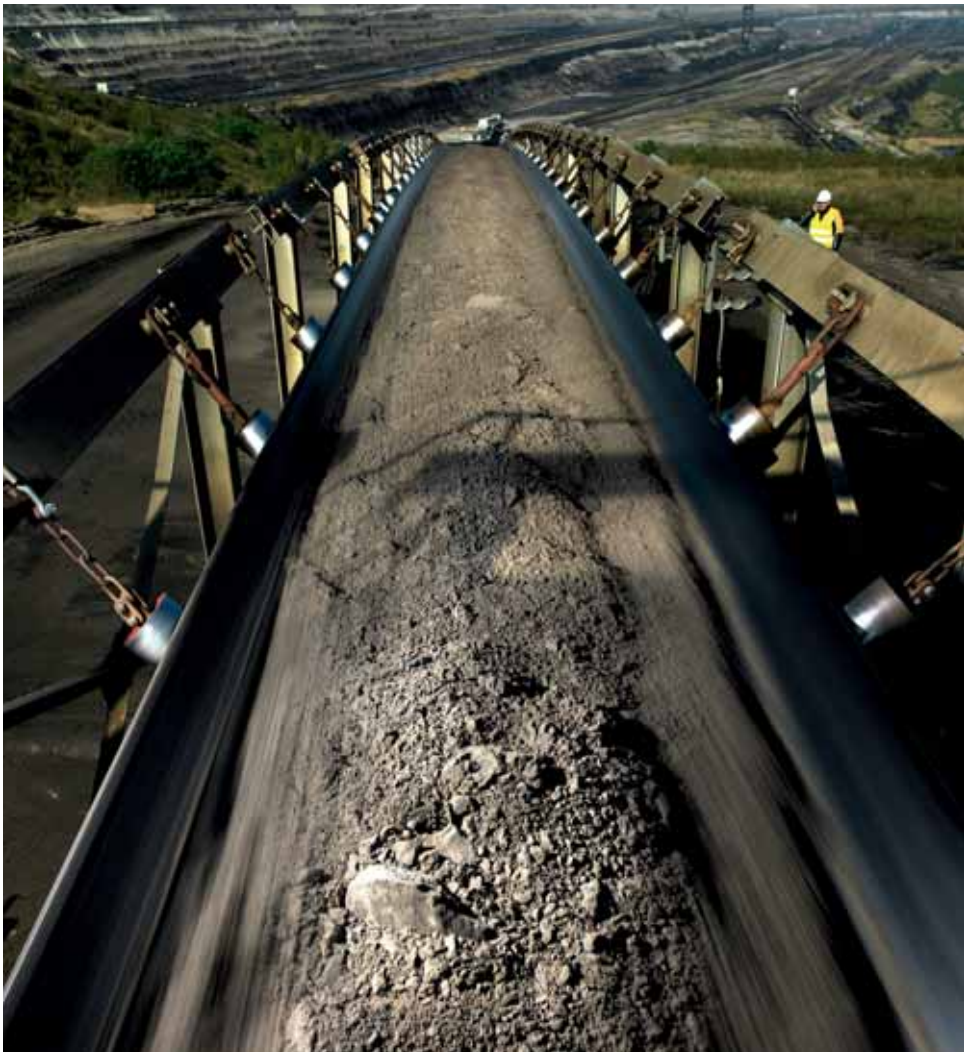
To enable operators to use the Flexlifter even in the exceptional conditions found in underground mines — such as Arctic cold or extreme heat — Flexco also supplies the components designed to CEMA standard. And so that they know they can work safely with this innovative device, the Flexlifter now also has a CE certificate.

FLEXCO

Flexible Steel Lacing Company (FLEXCO), headquartered in Downers Grove, Illinois in the USA, is the leading international specialist for mechanical conveyor belt fastener systems, belt cleaners, belt positioners, impact beds and pulley lagging for light- and heavy-duty applications. With the company's innovative solutions, end-users can substantially reduce downtime and increase productivity. FLEXCO Europe GmbH is the German subsidiary of FLEXCO, and is headquartered in Rosenfeld, where the company currently has 60 employees.

ContiTech strategically reorganizes conveyor belt business for industrial

- **Greater product diversity for bulk material industries and in the off-highway sector provides new opportunities**
- **New Industrial Belting Solutions segment combines expertise**
- **Service solutions and advice for customers developed further**



ContiTech has strategically reorganized its conveyor belt business to focus more on its industrial applications business in the future. For this purpose, the conveyor belt specialist has created the new segment, Industrial Belt Solutions. "Our conveyor belt portfolio for industrial applications is growing steadily. Service and digitalization also offer the business further potential. Furthermore, many of our customers are merging into increasingly larger units, meaning that our way of thinking and working is taking on new dimensions to meet their changing

Dr. Michael Hofmann leads the new industrial sector of the ContiTech Conveyor Belt Group.

needs and requirements," says Dr. Michael Hofmann of the ContiTech Conveyor Belt Group, who has taken on the role of segment head.

Industrial application business

ContiTech wants to cater for conveyor belt customers in the raw-materials-processing industry more purposefully and directly and has therefore reorganized its industrial application business with the creation of the Industrial Belting Solutions segment.

ContiTech is therefore combining its skills from the industrial business and expertise from the development of special conveyor belts. The clear objective of the new industrial segment in the conveyor belt business is to cater for customers more purposefully and directly, focusing primarily on the raw-material-processing industry, power and cement plants, steel manufacturers, port operators, and the recycling and wood industries. With a portfolio of products comprising harvesters and work machines, the off-highway industry forms a second key pillar of the new segment.

Intelligent solutions, for belt and temperature monitoring as well as planned and preventative maintenance for example, open up additional opportunities for growth. In the future, new digital offerings will offer customers a greater choice, therefore also supporting sales. With products such as connection kits for conveyor belts, service materials and accessories, ContiTech is focusing on supporting its industry customers on site. "We will combine our skills in these areas to an even greater degree," explains Hofmann, who, together with his segment, accounts for around a third of the sales of ContiTech's conveyor belt business.

In particular, ContiTech customers benefit from personalized advice. In the future, they will be supported by a central contact person, who will provide them with information about the entire ContiTech conveyor belt portfolio.

REMA TIP TOP strives for strong market position in Brazil

REMA TIP TOP, a globally operating system provider of services and products in the field of conveying and treatment technology as well as tyre repair, has acquired Norte Sul Serviços de Vulcanização (Norte Sul Serviços), a conveyor maintenance provider in Brazil. Through the acquisition, REMA TIP TOP increased its global footprint and is now present in Brazil with a wholly-owned subsidiary.

"The acquisition complements our service focus very well," says Thorsten Wach, CEO of REMA TIP TOP. "The takeover strengthens our position as a full solutions provider. It extends our global service team, while it also marks an important step in our expansion strategy in growth markets. It ensures a nation-wide coverage in Brazil with service and stocking locations in Sao Paulo, Canaã dos Carajás, Nova Lima, Vitoria and Belo Horizonte."

REMA TIP TOP is an established global system provider with an integrated and closely interlocked services and product portfolio. The company continuously expands its network through acquisitions, further strengthening its global service offering. In 2016, these included the French COBRA, the German Gulich, the Australian ConvaTech and the Norwegian Flexpro.

With a strong team of service technicians, engineers and specialists around the world, REMA TIP TOP offers customer-oriented services on six continents. The service teams focus on improving system availability by increasing operational readiness and prolonged system life-time. These goals are ideally aligned with those of Norte Sul Serviços as a sophisticated conveyor maintenance business in Brazil. The joint organization will be particularly well positioned to meet the rising expectations of its customers.

REMA TIP TOP will provide the new Brazilian subsidiary with financial, project management, engineering, product and service resources. The local project team will be supported by the REMA TIP TOP global response team of experienced engineers from the service competence centres in Germany, the rest of Europe, South Africa, Australia, Chile and Brazil. Via Norte Sul Serviços, REMA TIP TOP will also introduce its service processes and technologies to the Brazilian market, including the innovative REMA M³ remote monitoring system.

Rafael Mashiba, Managing Director of Norte Sul Serviços, says: "The new partnership offers Norte Sul Serviços access to a broad network of experts as well as global resources, technologies and financial strength of the REMA TIP TOP group, allowing us to provide our customers in Brazil with even better and more professional services."

Norte Sul Serviços employs approximately 220 people, comprising a service force with 180 technicians, 20 engineers and 20 administrative employees.

About REMA TIP TOP

REMA TIP TOP is a globally operating system provider of services and products in the field of conveying and treatment technology as well as tyre repair. The company provides a global service network and offers a broad range of rubber and elastomer based products, linings and coatings for the industrial as well as for the automotive sector. In almost 100 years of corporate history, the company gained unique expertise in material development and industrial services, and is active in the business divisions Material Processing, Surface Protection and Automotive.

In the financial year 2015, REMA TIP TOP generated sales of more than €800 million. The company employs over 5,500 people (as of the end of 2015) and has in excess of 140 subsidiaries and participations — including notable brands like Dunlop Belting Products South Africa, Cobra/Depreux or Asplit.

STM: conveying bulk materials the Italian way

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

STM offers its customers a full range of project services: engineering, fabrication and commissioning. At every step, it develops flexible, individual and effective solutions. Therefore, STM is able to create equipment of any size and complexity, which fully meets its customers' needs.

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

Thanks to STM's efficient and innovative engineering department, it is possible to optimize the design, the industrialization time and the information exchange with customers. 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.0

Over the years STM has gained extensive knowledge and expertise operating in many fields, with specific and innovative solutions for each applications: mining conveyors, RCC (roller compacted concrete) conveyors, tunnelling conveyors, crushing plants conveyors, batching plant conveyors and waste to energy plant conveyors.

Coal handling: from mines to power stations

In the case of the conveyors used in mines, these need to have a specific configuration to follow the development of the excavation site. STM's systems can expedite, optimize and economize the process of overburden removal, redistribution and stacking. The conveyors for this application are designed for long lifetime and for minimizing extraordinary maintenance and downtime risk. STM is committed to delivering high-value performance and to meet customers' needs for excellent reliability, investment cost, delivery time, lower operating costs, high standards of safety and

sustainability. Thanks to its flexibility and long experience in this field, STM succeeds in creating and managing equipment of any size and complexity, including mobile plants . This configuration satisfies the plant owner who wants to have freedom to move the plant after limited time usage in determined area.

It is also necessary to have an efficient coal handling system in thermal power generation plants, the most conventional source of electric power. Conventional plants produce electricity by burning fossil fuels, such as coal, in order to have pressurized high temperature steam and to use it to rotate a turbine, with electricity production as result. Handling those kind of materials in a complex power plant necessitates a design that offers exceptional reliability, to avoid any kind of shutdown over decades. STM is able to provide a complete engineering service, including specific back-up solutions, limited maintenance devices, best-in-class components manufacturers.

Specific conveying system for bulk material

STM has also gained experience also in the handling of other materials to produce energy, such as petroleum coke or waste. Petroleum coking is an environmentally responsible recycling process used in some oil refineries to make the most use of hydrocarbon residuals that otherwise would go to waste. Enclosed conveyors are often used to move the petcoke into a storage building and then onto docks for loading, onto barges, ships or to land-based transportation loading facilities. The conveyor used in this field is known as flow dynamic conveyor and has very particular features. Indeed this system does not have rollers and the rubber belt closes itself as a pipe and moves on air cushions, avoiding any friction it can reach high speed.

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

Conveyor systems provide an efficient, reliable, cost-effective and lower-risk method of removing muck and spoil from tunnelling excavation sites. STM's core competencies and expertise allow it to continually update the technology used so that it can offer customers its on continuous conveyor solutions. This equipment is specifically engineered to smoothly handle the transport of materials from the tunnel excavation site to the surface and beyond. Large belt conveyor storage capacity increases TBM (tunnel boring machine) utilization, reduces construction time and results in lower costs.

STM owes its success to its approach: expertise in every area of activity, strong focus on the customer, passion for innovation and improvement and particular attention to quality.

The world's most powerful conveyors

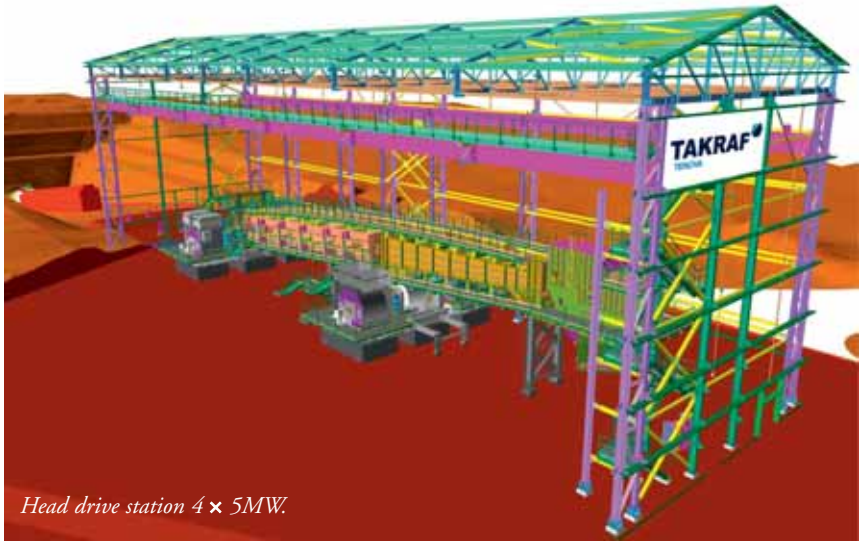
A NUMBER OF WORLD FIRSTS:

- highest drive power ever to be installed on a belt conveyor (20MW per flight); and
- very first conveyor system to employ the newly developed ST 10,000 premier steel cord belt technology.

TAKRAF direct drive assembly with integrated ABB gearless motor.

Tenova TAKRAF was recently awarded a contract to supply the principal ore transportation system for Chuquicamata's Underground Mine Project by CODELCO, Chile's state-owned mining company and the world's leading copper producer.

Chuquicamata, located in the Atacama Desert 1,031 miles (1,650km) north of Santiago (Chile) is one of the largest open-pit copper mines and second deepest open-pit mine in the world. The 'Chuqui' mine, which has been operating since 1910, is looking to extend operations another 40 years via the Underground Mine Project which is being developed to access an ore body situated beneath the existing open pit. The new section is scheduled to commence operations in 2019.



Head drive station 4 x 5MW.

TAKRAF's innovative belt conveyor system, developed with the support of CODELCO specialists and leading power and automation group, ABB, will overcome the significant technical challenges faced by considerable elevation change and high capacity in an underground environment.

The overall conveyor system will include two high-capacity uphill tunnel conveyors that transport ore from underground storage bins to the surface, an overland conveyor feeding into an existing conveying system, and a variety of feeder conveyors for a total system length of some 7.9 miles (12.7km). The principal components forming part of TAKRAF's scope include:

- 2.1 mile (3.3km) tunnel conveyor with 1,623 feet (495m) of lift, 20MW of installed drive power, and ST 10,000 belting;
- 1.9 mile (3.0km) tunnel conveyor with 1,509 feet (460m) of lift, 20MW of installed drive power, and ST 10,000 belting; and
- 3.3 mile (5.2km) overland conveyor with 951 feet (290m) of lift, 15MW of installed drive power, and ST 6,300 belting.

TAKRAF's scope also includes an array of disciplines, various components supply, and extensive site assistance.

The main conveyors will be powered by advanced and proven gearless drive technology provided by TAKRAF's electrical and automation technology partner, ABB, who will provide a complete power and automation solution including integration with the company's flagship control systems. The two tunnel conveyors will boast four drives of 5MW each — the highest power ever installed on a single conveyor! Gearless drives eliminate the gearbox, hereby increasing efficiency and reliability and greatly reducing wear thus lowering maintenance requirements and the need for spare parts. Further advantages include considerable reduction in drive footprint and the amount of instrumentation required.

Another significant achievement will be the first installation of the newly developed ST 10,000 steel cord belt developed by CONTITECH and the strongest belt in existence.

Safety, as well as the speed and ease of maintenance are critical success factors for a project of this nature. As such, TAKRAF's innovative chute maintenance solution will allow for all regular maintenance to be performed from outside the chute, with no one having to enter the internals. This is a particularly important safety point, especially in an underground environment.

With the system boasting an impressive design capacity of 11,000 (metric) tons per hour, the supply of a large cooling facility was also included in the project scope so as to ensure appropriate dissipation of the intense heat generated by the powerful drive systems located underground.

"Completion of this assignment will become another significant milestone for TAKRAF in the Chilean copper industry and an important step forward in supporting CODELCO in their aim of being a leading global supplier of copper. Our industry-leading conveying technologies and proprietary material handling equipment are widely used by customers around the world and they are increasingly demanding innovative and cost-effective solutions to global issues as ore reserves are depleted, ore grades diminish and mines are required to dig deeper," says Dr. Frank Hubrich, Tenova TAKRAF CEO.

Tenova TAKRAF is an integrated solutions provider to the global mining, bulk material handling, minerals processing and beneficiation industries, offering innovative technological solutions as well as process and commodity knowledge along the industry value chains. With the integration of the well-known DELKOR and, more recently, the Tenova Advanced Technologies (formerly Bateman Advanced Technologies) brand of products into TAKRAF, our portfolio for the mineral processing and beneficiation sectors has been considerably enhanced.

Tenova is a worldwide partner for innovative, reliable and sustainable solutions in metals and mining.

Keeping product moving with Kiepe conveyor monitors and controllers

In the bulk goods industry, the brand Kiepe Elektrik is well known for its robust and reliable premium-quality products. These products, all made in Germany, monitor and control conveyor systems.

Since the late 1960s, an estimated 50,000km of conveyor systems all over the world have been equipped with Kiepe products. With its worldwide distribution capabilities, Kiepe is close to all of its customers' — and potential customers' — operating areas.

Kiepe products are made for heavy duty safety and monitoring applications such as mining, storage and handling of ore and coal, bulk material seaports, power plants, steelmaking and cement production.

The company specializes in:

- pull rope emergency stop switches;
- belt misalignment switches;
- limit switches;
- speed monitoring devices; and
- belt wear monitoring.

Scope of Kiepe products

Pull rope emergency stop switches HEN/NTS/SEG (see pic 1, below)

Function: heavy duty pull rope switch for emergency stop with latching and snap-action function, manual reset lever

Design features

- robust aluminium alloy, cast iron or UV-stabilized, fibreglass-reinforced plastic enclosures;
- protection class IP 65/67;
- positive opening, cam-operated contacts;
- horizontal trip force maximum 40N; and
- detection of pull rope break with external compensation springs.

Optional

An extended temperature range of –40°C, Signal lamp, 2-wire-long distance Bus-Modul, ATEX, Accessories for installation of pull rope system.

Pic. 1

Pic. 2

Misalignment switches HES/SLS/SEL (see pic 2, above)

Function: heavy duty switch for detection of unacceptable belt drift to prevent damage and destruction of belt and machine.

Design features

- robust aluminium alloy, cast iron or UV-stabilized, fibreglass-reinforced plastic enclosures;
- roller rod -stainless steel;
- positive opening, cam operated snap action changeover contacts; and
- adjustable switching points.

Optional

An extended temperature range of –40°C, two-wire-long distance Bus-Modul, ATEX.

Limit switches HER/SLR/REL (pic 3, below)

Function: heavy duty switch-off for application in any bulk handling system.

Design features

- robust aluminium alloy, cast iron or UV-stabilized, fibreglass-reinforced plastic enclosures;
- positive opening, cam-operated snap action changeover contacts;
- adjustable switching points, prewarning.

Pic. 3

Optional

An extended temperature range of –40°C, two-wire-long distance Bus-Modul.

Speed monitoring devices (pic 4, top right)

Function: switches, sensors and monitoring for rotational speed and standstill of drives.

Design features

- variants of enclosures, couplings and beads;
- signal generation by electromechanical, opto-electrical or inductive pulse transducers; and
- monitoring possibilities: standstill, under- or overspeed, start-up delay.

Pic. 4

Belt wear monitor (pic 5, below)

Function: disconnectable electromagnetic or inductive sensor to detect protruding parts of the belt.

Design features

- 10..30V DC or 230V AC;
- protection class IP 67; and
- installation material included.

Pic. 5

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DemcoTECH Engineering: designing conveyors for optimal materials handling

Materials handling and niche process plant specialist, DemcoTECH Engineering applied its engineering expertise to the construction of the new fly ash silo for leading South Africa-based cement producer, NPC-Intercement's Simuma Plant in KwaZulu-Natal. The fly ash silo contract was a continuation of the business relationship DemcoTECH has enjoyed with NPC, having previously successfully completed a 40,000-tonne clinker silo for the plant in a venture with Kantey & Templer.

The 1,000-tonne steel fly ash silo, completed in 2016, was executed on a turnkey basis with DemcoTECH providing the detailed design and layout as well as being responsible for the structural, mechanical, electrical, control and instrumentation engineering. The silo is part of NPC's strategy to include fly ash as an additive in the cement production process. Using pulverized fly ash (PFA), an important and cost-effective supplement in the production of Portland cement concrete, is an environmentally-friendly solution that enhances performance specifications for cement.

The newly completed silo receives fly ash imported from nearby boilers, transported in road tankers to Simuma and offloaded pneumatically from the tankers into the silo. The fly ash is then removed from the silo using a rotary valve feed system and transported to a surge bin via two newly installed 20tph (tonnes per hour) tandem screw conveyors. The fly ash is subsequently loaded onto the existing belt conveyor at a predetermined tonnage as specified by the operator.

"Screw conveyors are widely applied in such applications," says DemcoTECH Engineering General Manager, Paul van de Vyver, "and are versatile and cost-effective mechanical conveyors for handling dry bulk solids. Other benefits of the screw conveyor, which is essentially a screw mounted in an enclosed U-shaped tubular housing, is the ability to transfer materials horizontally or at a small incline.

"As fly ash is a fluidizable material, it flows like a liquid when aerated and an aeration system has been employed on the 20m-high, 10m-diameter silo to ensure consistent and controlled flow of the fly ash and to prevent any blockages.

"As dust is generated at any point where fly ash is moved or transferred, an effective dust extraction system was therefore included."

DemcoTECH's conveyor expertise is underpinned by an extensive materials handling track record covering a broad range of materials from coal through to gold ore, iron ore diamondiferous material, tailings and industrial products such as cement.

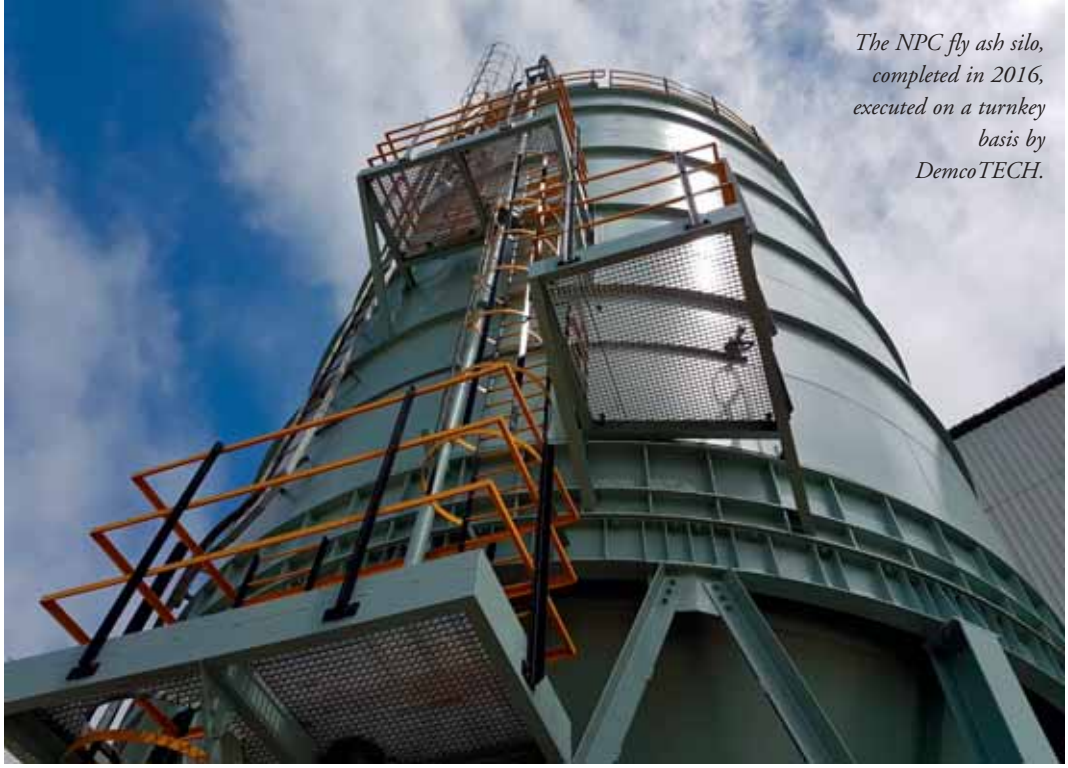
Detail of surge bin at the bottom of the NPC fly ash silo.

"For an operation to be profitable, the entire materials handling system must be optimized and reliable, based on a thorough understanding of the specific material flow characteristics of the product to be conveyed," says van de Vyver. "In addition to offering access to the latest technologies such as AeroConveyors™, pipe conveyors and pneumatic conveying systems, DemcoTECH utilizes advanced testing and modelling/simulation tools to design efficient, fit-for-purpose handling systems. Critical elements include determining the chute geometry to give the desired capacity, providing a flow pattern with acceptable characteristics, and thorough design and detailing of the conveyor plant.

"Our conveyor design and dynamic analysis capabilities, together with Finite Element Analysis skills, are underpinned by our in-house developed design packages, which are based on ISO and CEMA standards," adds van de Vyver.

Recent projects range from the turnkey contract for a shuttle conveyor for a mining house in South Africa and the detailed design for an import terminal at Port of Ploce in Croatia, handling both iron ore and coal,

NPC fly ash silo: 20tph tandem screw conveyors.



The NPC fly ash silo, completed in 2016, executed on a turnkey basis by DemcoTECH.

through to a large contract for the multimillion-dollar iron-ore import/export facility in Lumut, Perak, Malaysia, for Brazilian major mining group Vale. Taking a number of years to complete, this giant complex includes an ore storage yard and a marine terminal with a 60-million-tonnes-a-year capability.

In earlier work, DemcoTECH was responsible for the materials handling portion of the expansion to Grindrod's multi product terminal at the port of Richards Bay in South Africa. The scope of the contract covered providing the materials handling to convey various materials, but mainly rock, phosphate and coal, from the three Richards Bay terminal sites: Navitrade, Kusasa and Valley. Both belt and pipe conveyors were employed at this brownfields site at one of the largest terminals in the world.

In 2013, DemcoTECH completed the expansion of a manganese export facility for local manganese miner Assmang at its Cato Ridge Alloys plant, in KwaZulu-Natal, while DemcoTECH's conveyor expertise has also been widely proven in challenging diamond tailings handling applications through a decade long working relationship with Letšeng Diamond Mine in Lesotho.

Contracted first in 2008 for the tailings disposal system, DemcoTECH has continued to service the mine's expansion initiatives, with its most recent work focused on upgrading part of the mine tailings materials handling capability. In addition to upgrading the ROM (run of mine) stacker as a turnkey contract,

DemcoTECH completed the conveyor design and expansion layout to increase the tailings dam to handle the expanded throughput.

The system DemcoTECH originally supplied for the mine included a conveyor with fixed tripper and multiple discharge points, a 1.6km overland conveyor and a 1km-long tail-driven downhill extendable conveyor with a rail-mounted tripper and boom spreader, as well as an emergency dump system. The route of the overland conveyors had to accommodate Lesotho's mountainous terrain, requiring special engineering solutions, such as the inclusion of a regenerative braking system on the tail pulley of the extendable conveyor to prevent the conveyor from running away. The system was also required to operate at ambient temperatures ranging from +30°C to –25°C in wind speeds higher than 100km/h on a very exposed site.

1,000-tonne NPC steel fly ash silo.

About DemcoTECH

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

TMSA

Ship Loaders

TMSA are specialists in the design and manufacturing of ship loaders for a vast variety of bulk materials, ranging from agricultural to mineral commodities. Our In-House Design Engineers are Experts in Loading Solutions, and will meet every customer unique equipment requirements.

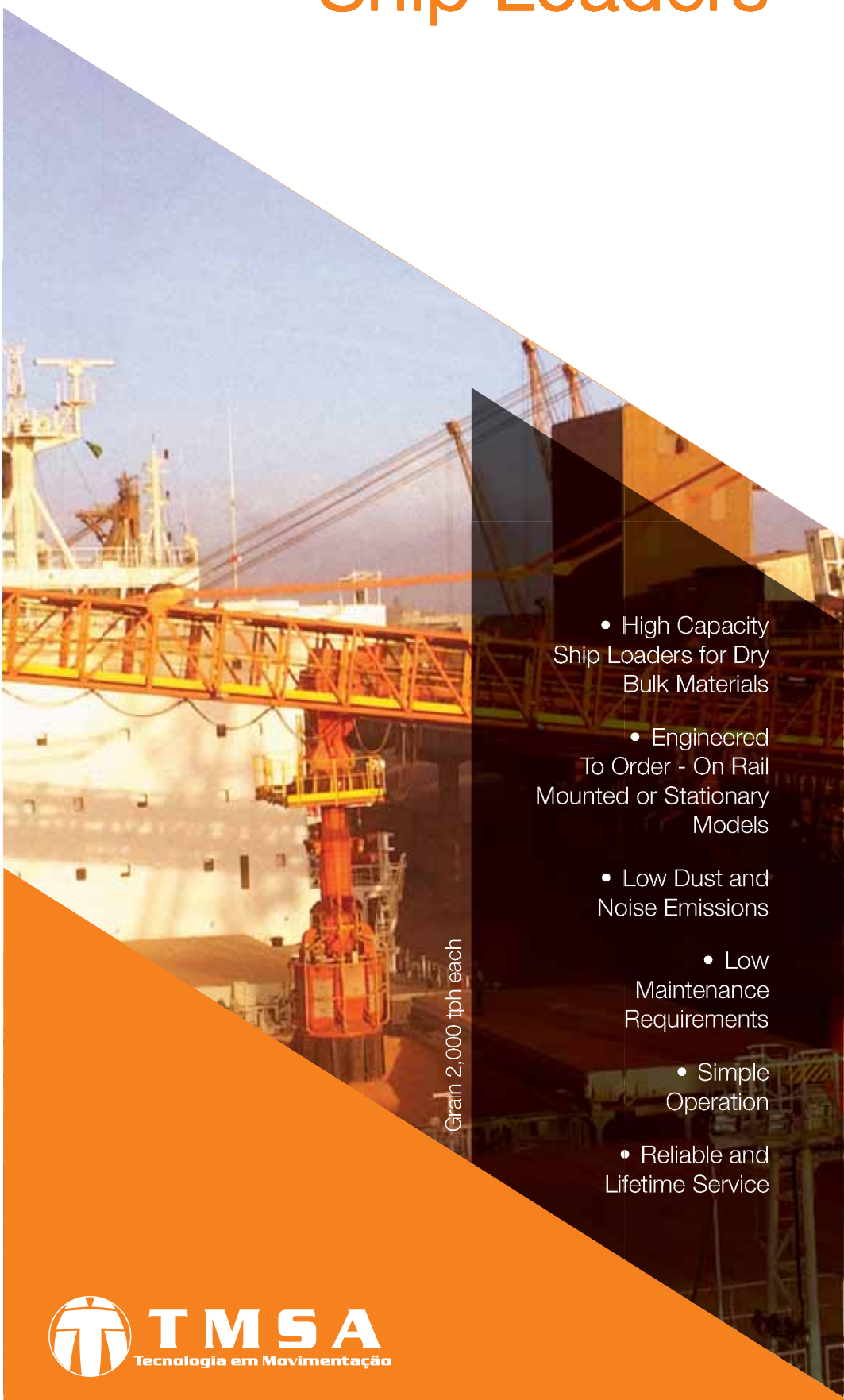
Iron Ore 4,000 tph

Grain/wood chips 2,500 tph

Grain 1,500 tph

Grain 2,000 tph

Sugar 3,000 tph



Grain 2,000 tph each

- High Capacity Ship Loaders for Dry Bulk Materials
- Engineered To Order - On Rail Mounted or Stationary Models
- Low Dust and Noise Emissions
- Low Maintenance Requirements
- Simple Operation
- Reliable and Lifetime Service

TMSA
Tecnologia em Movimentação

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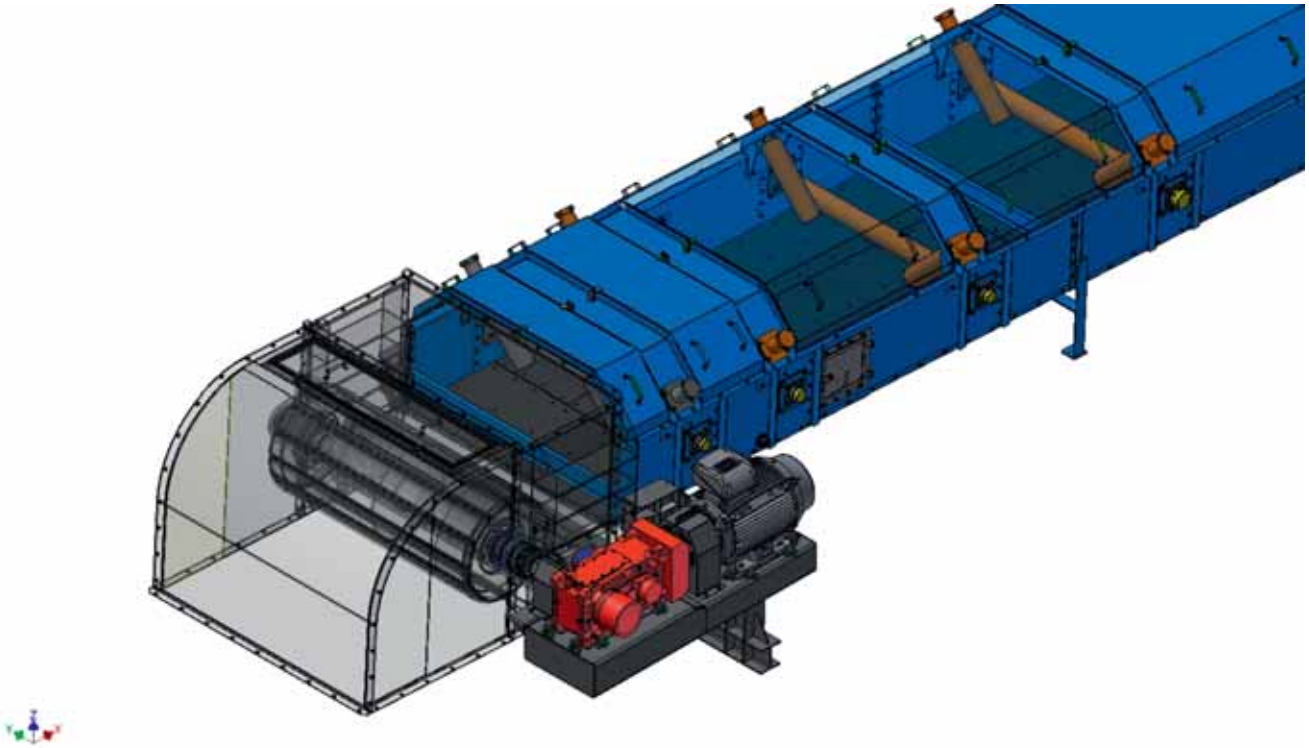
TMSA enclosed belt conveyor: safeguarding the environment



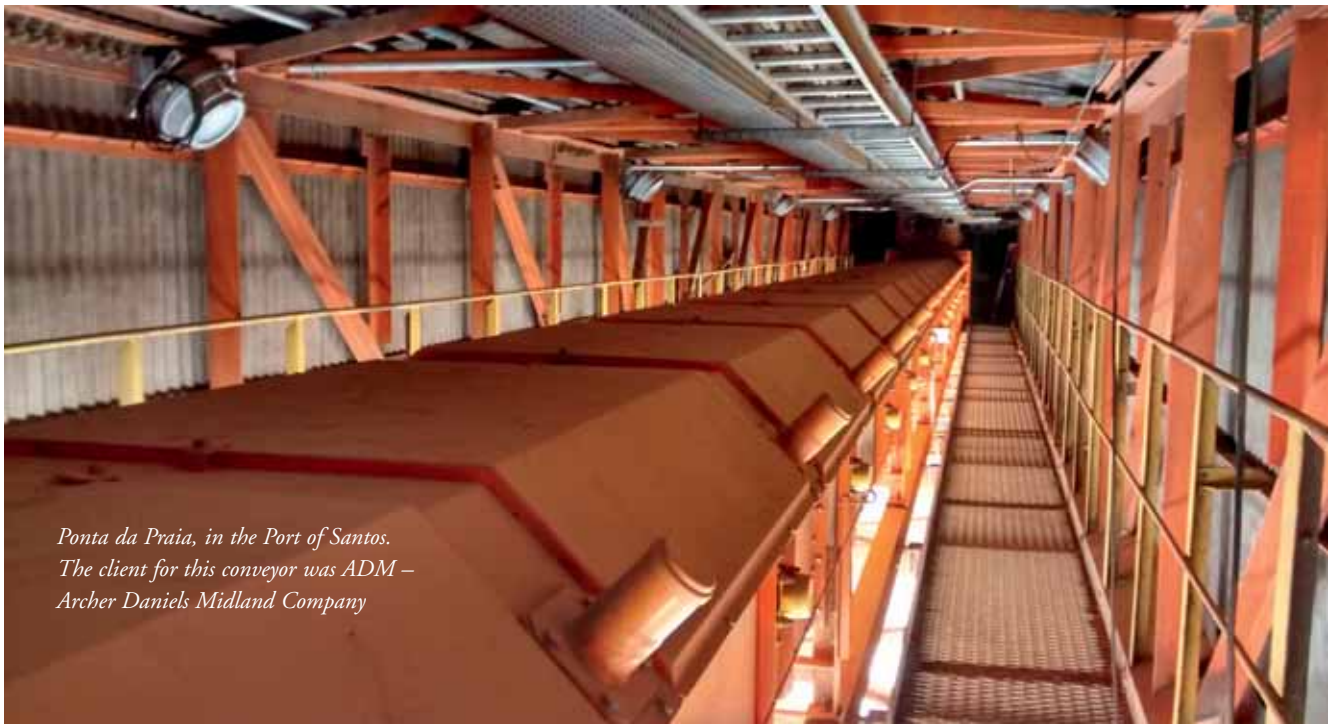
Brazilian company expertise contributes to major environmental solutions in port terminals within urban centres

TMSA — Tecnologia em Movimentação — has been in business for 50 years. During that time, the company has, through its own developments as well as in partnerships with globally recognized names, offered worldwide standard integrated solutions, customized to the needs of each customer

In each and every project in which it is involved, TMSA's work stands out in terms of reliability, safety and durability. Every project takes account of all cost, environmental, social and infrastructure issues.

Headquartered in Brazil with branch offices in Latin America in the United States, TMSA's business strategy is focused on innovation and diversification of products and markets, with a particular emphasis on port terminals, the agroindustry, mining, thermoelectric plants, fertilizers, and renewable energy (biomass).

By using its expertise from previous projects, and by employing highly skilled engineers, TMSA has designed fully enclosed belt conveyors, which are used to transport vegetable seeds/meal in bulk, with minimum impact on the environment. In its last expansion work located at Ponta da Praia, in the Port of Santos in Brazil, the client ADM – Archer Daniels Midland Company opted to replace its existing conventional belt conveyors with this new technology. This technology promotes an important environmental solution, in favour of a high income residential and urbanized region, thus improving the relationship with the local community. The main characteristic of the project developed by TMSA in the Port of Santos is a non-pollutant structure that streamlines the fully-closed bulk transportation, avoids load wastage, and meets all the national and international safety regulations. Another key differential is the flexibility of



Ponta da Praia, in the Port of Santos. The client for this conveyor was ADM – Archer Daniels Midland Company

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maintenance, and the low demand for investments in protection, as it not requires any other external, additional accessory.

Enclosed conveyor for horizontal or inclined configurations

Compared to the conventional conveyors already on the market, enclosed conveyors for horizontal or inclined transport have many advantages, depending on the characteristics of the installation site. Among these advantages is a higher load capacity, due to the possibility of increasing the conveying speed — higher than conventional conveyors, whose speed is lower due to dust generation during transfers between equipment. The long-distance conveyors may be used in all applications of vegetable seed processing and storage units, including in port facilities installed on shiploaders.

High capacity combined with lower infrastructure costs

The enclosed belt conveyors vary in dimensions and shapes, and they can achieve a maximum capacity of 3,500tph (tonnes per hour). As they are supplied in virtually complete modules, there is a marked reduction in assembly costs/time. There is also a lower infrastructure cost, as the conveyors do not require any external safety protections, when installed into tunnels and galleries. Also, these enclosed conveyors also not require an outer cover, withstanding exposures at any temperatures and weather conditions of the site.

Safety and risk reduction

This equipment differs from that offered by some other manufacturers, in that it has the benefit of not polluting the environment, prevents load wastage, and complies with all national and international safety standards. Being totally enclosed, the volatile dusts remain within the conveyor, generating a hazardous accumulation. Therefore, in order to avoid any ignition risk, all heat-susceptible components, such as bearings, are externally assembled onto rails, and only the rotary roller remains inside the conveyor.

Simplify disassembly and maintenance

As for maintenance, all components requiring periodical inspection are externally mounted with easy access, also for any eventual replacement of the assemblies. The inclined rollers are monoblock-type with all integrated components, enabling easy replacement in case of necessity. The flat rollers are also easily removable laterally to the rails. The same conveniences are provided in case of eventual requirement to replace the lower sliding plates, with the simple dismounting of the rail bottom.

TMSA has worked on more than 1,000 projects in 50 years

TMSA, responsible for constructing the first port system for soyabean loading in Brazil, in 1972, develops alternatives for optimizing the cost:benefit ratio in the construction of port terminals and warehouses for solid bulks. Millions of tonnes of goods are stored and handled by its own equipment or through systems supplied by joint ventures that TMSA has entered into with major partners in its projects in almost all continents — the total number of projects developed by the company since 1966 is over 1,000.

PROVEN
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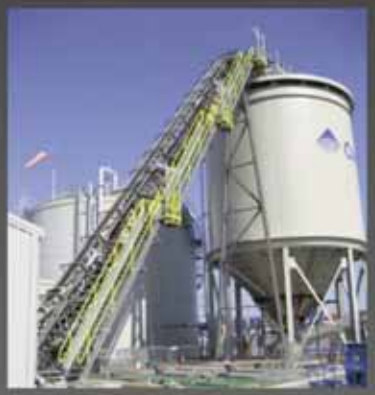
WORLDWIDE



Dos Santos International is the world's foremost authority on high angle conveyor applications and design of sandwich belt high angle conveyors. With more than thirty years of materials handling and engineering experience, we offer the most advanced high tech conveying solutions. DSI's high angle solutions have been proven over the last thirty years, elevating millions of tons at installations all around the world. Users will tell you it's the most reliable, low cost and low maintenance conveyor system available. But the expertise does not stop there...

REMEMBER: THE GREATER THE LOAD • THE HIGHER THE LIFT • THE BETTER WE LOOK

DOS SANTOS
INTERNATIONAL

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DSI conveyor technology minimizes environmental impact

There are many ways to convey bulk materials — something Dos Santos International knows very well. Dos Santos International is a renowned authority on high angle conveyor applications and design of sandwich belt type high angle conveyors. The flagship systems of Dos Santos International are the DSI Sandwich Belt High Angle Conveyors. These systems sandwich materials between two belts with a gentle, yet firm, hugging pressure. Materials can be elevated to the highest of angles (to 90° vertical), through 'C' and 'S' shaped profiles, and other unique profiles. Not only are the systems versatile, they have proven to be economical, reliable and 'green'. The foresight of the Dos Santos International conveyor technology established an environmentally friendly method of conveying bulk materials simply by its advanced design. With increased pressure on the mining industry for environmentally conscience materials handling, DSI has already set the stage for those solutions.

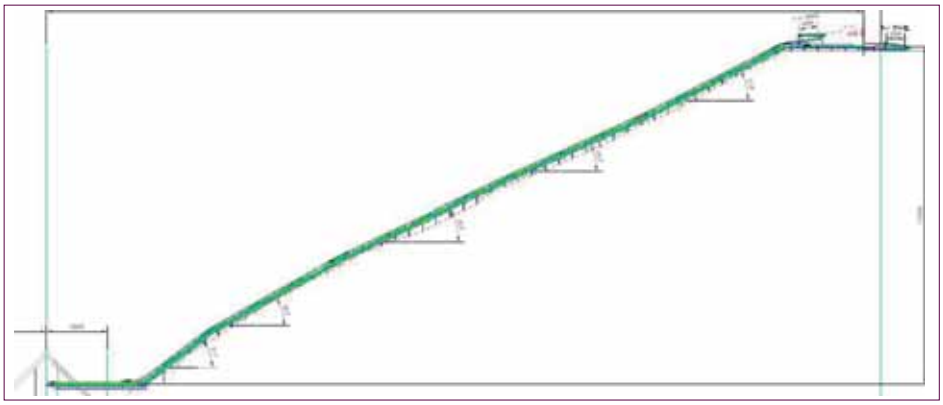
Twenty years ago, 'going green' wasn't quite the popular phrase that it is today. However, that is when Joseph Dos Santos, President of Dos Santos International was presented with a challenge to go green like no other. The challenge was to use the least amount of space possible to process and separate one of Earth's greatest treasures…diamonds. The picture to the right shows the processing plant of Canada's first completely underground diamond mine, Snap Lake. Snap Lake was the motivation for the DSI Snake Sandwich Belt Conveyors in the Northwest Territories.

The Snap Lake ore body is a dyke that dips an average of 12–15° from the northwest shore down under the lake. Kimberlite, the diamond bearing ore, is brought to the surface to the processing facility where the diamonds are extracted. Due to the hostile environment, the facilities must be enclosed and heated. A smaller footprint for the plant was determined to be the optimal way to minimize environmental impact and cost. This led to pursuit of the DSI Sandwich Belt High Angle Conveyors because of their designed space saving features. In the process building, the kimberlite must be elevated then discharged into the various crushing, screening and sorting functions. The original concept was to use a multitude of Sandwich Belt high angle conveyors to minimize the facilities. This was ultimately rationalized to require only two DSI high angle conveyors, which now define the facility's minimal footprint. These units utilize the DSI Snake Sandwich design where the material hugging is derived from the belt tension along the engineered serpentine path. The DSI Snake Sandwich Belt Conveyor's ability to convey at any high angle made it idea. The sandwich belt technology imparts a gentle yet firm hugging pressure on the material in the belt sandwich. This allows the precious gems within the kimberlite to be elevated at high angles, gently and without spillage.

The Snap Lake project incorporates two DSI Snakes, each travelling to opposite ends of the building. The units were standardized at 36" belt width to simplify spare parts inventory. Design of the units included provision for future upgrade, from 275tph (tonnes per hour) to 524tph, merely by

increasing the belt speed. By operating at the lower speed until the upgrade is required the Snakes' optimal energy efficiency is preserved.

The Snap Lake Mine is operated by DeBeers with a commitment to maintain the highest environmental standards. It is the only diamond mine in the Northwest Territories that certified its environmental management systems to the high international standard, ISO 14001 through advanced exploration, construction and pre-operations.



The success of the Snap Lake system then led to the incorporation of DSI Snake Conveyors with confidence into the Victor Project in Northeastern Ontario. This continued success at the Victor Project, Ontario's first diamond mine, incorporated three operational DSI Snake Sandwich units. Simplification of inventory was further exercised at the Victor Project with all units at 42" belt width. However, tonnage requirements for these units vary from a low of 185tph at unit 11 to a high of 422tph at unit 12. For prolonged equipment life and energy conservation, unit 11 is run at a slower speed than the other units.

There can be no finer example of DSI's ability to exceed all customer requirements than their latest system at the Los Filos gold mining site. In January 2010, DSI completed the start up for an overland conveyor system at Goldcorp's Los Filos Project. This gold mining project is located in the Nukay mining district of central Guerrero State in southern Mexico, and promises to be one of the largest open-pit mines in the country.

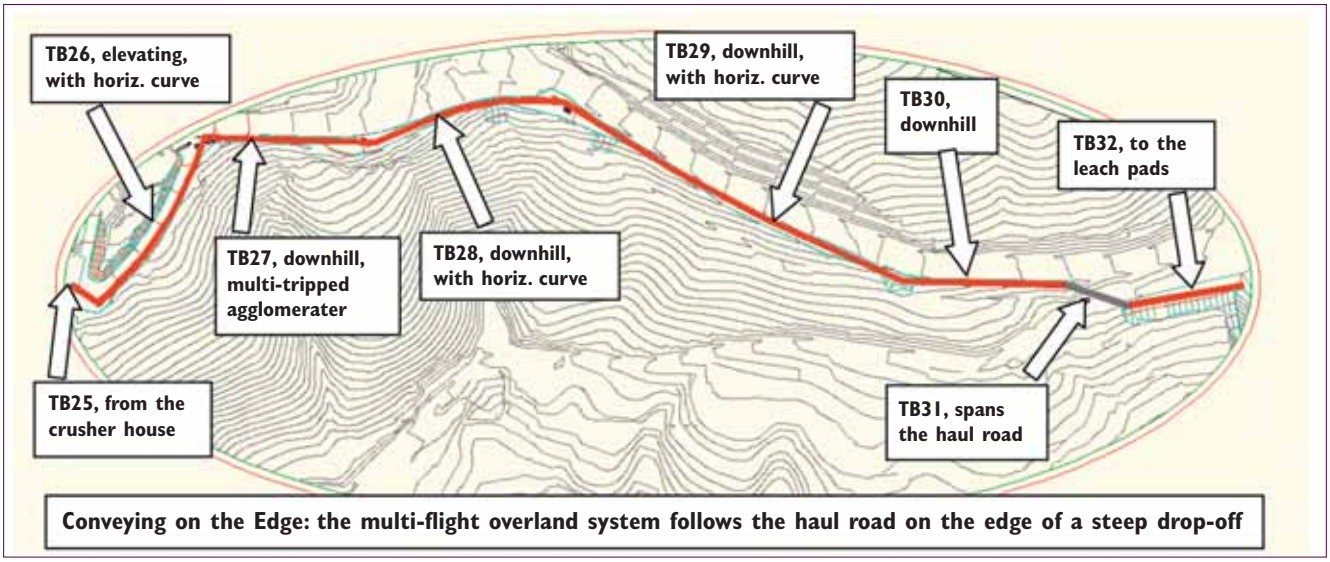
Los Filos is a heap leach operation. The ore size is reduced at the crushing plant and then it is hauled to the valley where it is stacked on engineered pads. A chemical solution is sprayed onto the ore, which extracts and absorbs the gold as it trickles through the ore. To regulate seepage rate, agglomerate (cement) is mixed into the ore for optimal ore exposure to the solution. Ultimately, the solution is directed to the plant where the gold is precipitated out.

A previous short-lived system conveyed the ore from the crushing plant to the leach pads via a glory hole ore pass and an underground conveyor, through the hill. An agglomeration drum mixed in the agglomerate before final delivery to the leach pads. This conveying system experienced material flow problems right from the start, especially during heavy rains. The sticky ore tended to plug up the ore pass. Geological instability ultimately collapsed the ore pass, putting the transport system out of service only four months into its operation.

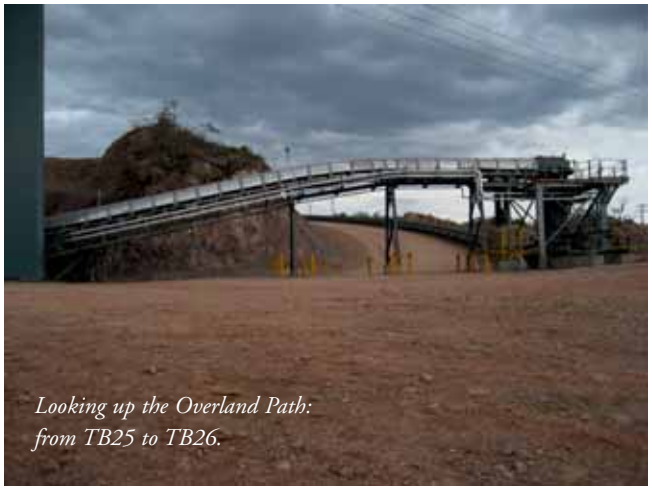
Against this background, M3 Engineering of Tucson, Arizona, USA was tasked with developing an alternate conveying route quickly since all haulage was now by truck and very expensive. The logical, most direct and economical path was over the same hill (rather than under). The path required a down-hill high angle conveyor; thus, Dos Santos International was approached about its DSI Sandwich Belt High Angle Conveyor. Being the best solution, DSI was awarded the contract in March 2009 for a downhill high-angle conveying system which they dubbed the DSI G.P.S. (Gently Pressed Sandwich) High Angle Conveyor. The downhill GPS profile is depicted in the figure to the right.

Concerns with geological instability remained, especially along the path of the DSI GPS. Further geological scrutiny led to abandoning this path altogether, thus abandoning the DSI GPS as well. M3 was again tasked with developing an alternate conveying path. This time a conventional conveyor system was developed, following the already developed truck ramps. Dos Santos International again submitted their proposal for the project, now a ten flight overland conveyor system. The project was awarded to DSI on May 19, 2009. The Dos Santos International proposal included two important commitments solely for the customer's benefit:

- DSI would maximize use of the conveying equipment and structure, already at the mine, from the collapsed and



Conveying on the Edge: the multi-flight overland system follows the haul road on the edge of a steep drop-off



Looking up the Overland Path: from TB25 to TB26.

Looking up TB26.

Looking down the Overland Path: from the tail of TB27, the agglomerating conveyor.

Looking down TB28.

abandoned through-the-hill conveying system.

- The awarded ten-flight system appeared to be a candidate for further rationalization and cost reduction, using horizontal curves to amalgamate successive conveyor flights. The DSI proposal included an amalgamation study as the first order of business.

Both commitments were fulfilled reaping substantial cost savings to the customer. In the former case, the first conveyor flight dubbed, 'TB25', was engineered to use all existing conveyor equipment and structure. Though the arrangement is entirely new, the equipment and support steel are reused from the previous system. The head drive terminal is the only component of TB25 that has new equipment. New steel at the support bents, minor framing, and a new discharge chute make up only a small portion of the total structure. In the latter case, the amalgamation study revealed that six conveyor flights could be reduced to three when joined with horizontal curves. The ten flight system was reduced to the seven flight system that is depicted above. TB26, TB28 and TB29, each with a horizontal curve, are products of the study.

The DSI expertise thus proved particularly advantageous using the horizontal curves to simplify the system and to reduce both capital and operating and maintenance costs. Additionally, the third conveyor flight, TB27 is especially engineered to accomplish the agglomeration by mixing through five intermediate tripped transfers. The en-route agglomeration, conceived by Goldcorp, results in substantial savings by eliminating the need for the additional agglomerating drum.

The overland conveying path is predominantly downhill. While this presents the normal controlled starting and stopping problems, it also presents great savings opportunities. The downhill flights are decisively regenerative. The drive motors, now functioning as generators, feed power back into the grid that powers the other mine equipment. These carefully engineered conveyors are equipped with variable frequency drives to ensure operation at maximum efficiency.

As necessity is the mother of invention, DSI was offered once again the opportunity to provide a solution that turned into an environmental advantage. In June 2015, DSI commissioned its Sandwich Belt High Angle Conveyor for a cement factory in the municipality of Pitimbu, on the coast line of Paraiba, Brazil in 2016. The plant has a capacity of 3,000tpd (tonnes per day) of clinker and 1mtpa (metric tonnes per annum) of cement.

The DSI Sandwich Belt features an extended loading zone which is fed by five separate conveyors and chutes and included a material analyser and magnetic separator to ensure that only the correct feed mixture is transported to the cement making

While the sandwiching feature of the DSI Sandwich High Angle conveyor is sufficient to hug and contain most materials, there is the occasional very runny material that tends to move laterally toward the belt edge resulting in minor leakage. Many years ago, Dos Santos discovered that a light moistening of the belt's surface was sufficient to arrest any lateral movement of such materials. This moistening, at each of the belt's edges, also has the added benefit of reducing any dust expulsion at the sandwich entrance, where the sandwich is formed. This is the origin of the DSI Wet Brush, now a featured product of the DSI Sandwich Shop.

Because of the widely varied materials that are part of the cement plant raw feed, the first commercial wet brush was incorporated preemptively into the Dos Santos Sandwich Belt High Angle Conveyor at Paraiba.

The DSI Wet Brush uses exact water flow control and measurement that reacts to precise monitoring of the bulk material flow rate. A sonic, broad level sensor at the bulk material feed point, along with a belt speed monitor provide all of the information required to control the wet brush system.

System interlocking maintains a perfectly dry system when there is no bulk material or the feed belt speed is zero. Material flow is measured continuously, and the wet brush automatically adjusts moisture for optimal response.

The Pitimbu project provided DSI with the opportunity to supply their flagship conveyor system that offers not only a smaller footprint, but also improved raw material handling and improved containment of materials.

Dos Santos International is pleased to be on the forefront of offering material handling systems that are not only efficient and cost effective, but can also be included in contributing to the environmentally conscience companies. The DSI conveyor technology in the DSI Sandwich High Angle Conveyor offers options for a smaller footprint, better ways of handling raw material and offering a competent and reliable conveyor system.

DCi

process.

To accommodate protected areas and reduce the plant's environmental impact, the customer requested a conveyor system with a small footprint. As a result, it chose the DSI Sandwich High Angle Conveyor because of its ability to convey material at higher angles. The DSI Sandwich Conveyor is designed to elevate 720tph of limestone, iron ore, sand and clay at a 60° angle.

Grain handling solutions

latest market developments

Louise Dodds-Ely

Efficient grain handling at the Danish Port of Fredericia

Located at the entrance to the Baltic Sea, the Danish Port of Fredericia offers modern equipment and a newly built warehouse capacity for dry bulk handling.

The Port of Fredericia — in the middle of Denmark — is an attractive dry bulk hub, especially for grain operations between the European and overseas markets.

Modern storage facilities for dry bulk

Millions of Danish Krone (DKK) have recently been invested at the Port of Fredericia in facilities that support the trend towards larger dry bulk shipments — especially grain — to and from overseas markets. With newly built facilities ADP A/S offers a total warehouse capacity of 40,000 tonnes. Furthermore, shipping companies at the Port of Fredericia have a warehouse capacity of more than 114,000 tonnes — a significant warehouse capacity which gives customers optimum conditions when collecting or contributing to part loads for large shipments.

Ideal facilities for transshipment operations

The open quay areas and the large water depth at the Port of Fredericia are ideal for transshipment from large ship loads to smaller vessels that can dock at ports of the region with lower water depth and vice versa. Dry bulk operations are moving towards larger ships and the Port of Fredericia is ready to welcome and handle these types of ship operations.

Easy operations and a water depth of 15 meters

Customers in the Baltic region are operating in a highly competitive market and are seeking to optimize their business.

The Port of Fredericia offers prime navigation conditions with easy access to the international deep-water route in the Great Belt, a water depth of 15 metres and ice free waters. Additionally, the port offers considerable quay and hinterland areas as well as warehouses dedicated to dry bulk.

Deep water expansion

The Port of Fredericia is the deepest commercial port in Denmark, and plans of a further deep water expansion may offer even more optimum operation conditions for all of dry bulk ships even Capesizes.

Effective dry bulk operations

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

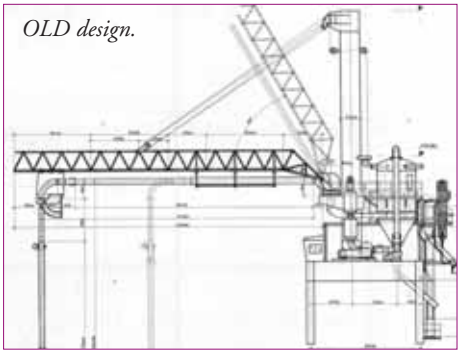
Associated Danish Ports A/S (ADP)

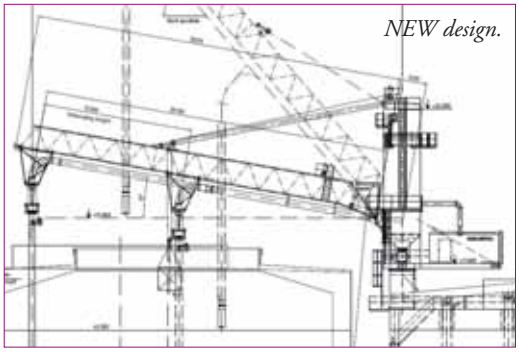
ADP owns and operates the ports of Fredericia, Nyborg and Middelfart. Each of the ports has a unique central location, good logistic conditions and international standards in capacity and water depth. Its commercial activities range widely — from container handling, miscellaneous cargo, heavy lift, dry and liquid bulk carriers, ro/ro and in the case of Fredericia, cruise liners.

ADP has established Denmark's Multimodal Transport and Logistic Centre, DMTC, at Taulov near Fredericia — and in addition owns and operates Fredericia Marina.

Neuero 'designs away' the drawbacks of the old pneumatic systems

'Old' versus 'new': solving past problems


OLD design.


NEW design.

Right now, there is a resurgence in the popularity of pneumatic unloaders. For years, these were considered noisy, requiring high levels of power, and not handling products sufficiently gently. While all this is correct, it relates only to the OLD pneumatic technology, which is based on rotary piston blowers. However, none of it is correct when using turbo blowers.

With the use of turbo blowers, these negative aspects have either disappeared or, at least, been greatly minimized. Noise, for example, was extreme expensive and difficult to reduce using rotary piston blowers because of the low frequency at which these machines run. Turbo blowers run at high speed and respective high frequency. The result is an easy noise reduction using simple silencers (10 to 20 times lighter and cheaper).

Many old systems were high power consumption, with values over 1.5kW/tonne. Today the turbo blowers run at 50% of this power. This is still higher than other mechanical systems, but the efficiency of the machines offsets this difference.

In the past, equipment was designed by dividing the equipment by function — like boom and filter. The graphics show the difference. In the new design, the boom is added to the filter, and allows lower breakage. In the old design, at the end of the horizontal conveying line, the material hit a short diameter bend with high direct impact. In the new design, the material leaves the horizontal conveying pipe and the expansion at the filter acts as a brake. Also, the design ensures that material hits on material, minimizing the damage. Weight is reduced by using the machinery house as counterweight.

Product degradation is also reduced because more attention is paid to the design today, avoiding gaps in flow direction and impact product on product at intakes.

As past experience guides many decisions, Neuero has learned that some differences really matter in the same technology. As time is invested to learn and understand the differences and, more importantly, to see new installations, there is a resurgence in pneumatic technology — using the new design.

The first result came a few years ago from Senalia Rouen in France, which replaced a grab crane with a pneumatic model.

Today the new machines differ in the design and technology from the old ones, therefore it is also reasonable to compare new machines and not old ones.

For example, Neuero's our latest Multiport M600 delivered to Salalah Mills in Oman incorporates the following:

- turbo blowers with direct drive — design with failure redundancy at blowers;
- all steering travelling system with electric drive;
- Neuero winches;
- ability to lower the boom to the ground for inspection and maintenance;
- three truck outlets;
- auxiliary 15-tonne payloader winch; and
- separate room for airlock, blowers and electric.

This machine started work in January 2017.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Bühler builds partnerships with science to address mycotoxin risks

Bühler R&D.

Advanced grain cleaning solutions significantly reduce mycotoxin levels

Mycotoxins, produced by fungal mould, are a growing health threat to people and animals. With a quarter of the world's agricultural produce currently contaminated, according to the FAO (Food and Agricultural Organization). Mycotoxins ranks a third most important threat after bacteria and pesticides, which is why maximum tolerance levels permitted in food and feedstuff are becoming crucial for food and feed producers. Meeting these requirements is possible with the right processes in place. Academic studies within the European project MycoKey and practical experience confirm that a very effective means to significantly reduce mycotoxin levels is via cleaning and optical sorting processes. Bühler solutions improve food and feed safety and product quality, helping customers adhere to regulatory requirements while achieving higher margins.

The need to protect the health of humans and animals by limiting exposure to mycotoxins from grains is increasingly imperative, particularly in light of a recent United Nations (UN) report which confirmed the impact of climate change on food safety and security. It's evident that extreme environmental conditions such as drought and rising temperatures have triggered an upsurge in toxic crops. This dangerous progression was identified as an "emerging environmental issue of our time" by UN Environment Programme (UNEP) in a 2016 report (Toxic Crops and Zoonotic Disease). Previously more prevalent in tropical and sub-tropical regions, mycotoxin contamination is now on the rise in temperate regions — meaning it will increasingly become a food safety issue for Europe even if global temperatures can be limited to an increase of only 2°C, which UNEP deems unlikely. Climate change is increasing the prevalence of aflatoxin, one of the most poisonous mycotoxins.

Mycotoxin scares have already been making headlines in Central Europe, such as a scare caused by aflatoxins in 2012–2013. At that time, headlines were dominated with the news that unsafe levels of the toxin were found in milk intended for human consumption as a result of dairy cows feeding on contaminated maize. For example, aflatoxins have been found in Italy, Hungary, and Romania. Mycotoxin levels in grain are a frequent reason to reject raw material for food and feed processing. Scarcity of raw materials, on the other hand, requires the industry to look for new solutions along the value chain.

Knowing that just a few highly mycotoxin-contaminated kernels could make an entire grain lot unsafe for further use, it's essential to implement post-harvest measures which reduce mycotoxin levels to ensure safe products, while ensuring economical yields and reducing losses. "Ultimately, it's the prevention and reliable removal of mycotoxins as early as possible in the value chain that ensures the safety of foodstuffs produced for all consumer groups," explains Matthias Graeber, expert in mycotoxin reduction and data analytics within Bühler's Corporate Technology Group.

Finding solutions to mitigate such food and feed safety issues is of critical importance to Bühler. The company invests roughly 5% of its turnover in research and development every year — creating breakthrough technologies and market-specific solutions to help its customers achieve long-term commercial success despite growing regulatory requirements and regardless of incoming product quality. Bühler has been partnering with science and applied research for many years in order to learn more about the value of integrating cleaning measures along the value chain. One such collaboration is with the experts from the European

Horizon2020 project, MycoKey, which was initiated in mid-2016 to develop solutions for reducing major mycotoxins in economically important food and feed chains. The €6.4 million project has partners from 32 organizations from a total of 14 countries in Europe, Asia and Africa. Together with Bühler and some of its customers, MycoKey, has run multiple, large-scale field tests to collect valuable data on the performance of grain cleaning solutions.

A recent research activity specifically looked at the case of ergot alkaloids (EAs): to support its industrial milling customers in managing the growing risks associated with mycotoxins, Bühler initiated a study performed at two German rye mills to establish how the level of EAs can be influenced by grain cleaning and milling processes. The study was carried out by Bühler with two industrial partners, a large milling group and an independent food safety laboratory. Applying the official sampling guidelines of the European Union, ten rye lots at 12 tonnes each were tested at two mills. "Effective reductions of EA concentrations were found for the processing steps: separation by size (Combi cleaner, rotary screen), optical sorting (SORTEX), and surface treatments (scourer with aspirator). By far the highest statistical significance of EA reduction could be obtained by optical sorting," Graeber explains. "This confirms the central importance of optical sorting in the rye supply chain, both at grain reception facilities and in mills."

The case for reducing levels of mycotoxins of any kind is clear considering the implications on consumer and animal health as well as to the commercial success of milling companies. Bühler technologies help achieve commercially viable yields — regardless of incoming product quality. For example, in a specific case the company has helped an Italian corn producer to recover 70–80 percent of contaminated maize and boost it from biomass to feed grade quality. Besides the obvious commercial sense of utilizing Bühler processes, they also make an important contribution to reducing post-harvest losses on a global level.

Matthias Graeber joined Bühler in 2010 and since then has held various positions in corporate strategic innovation within Bühler's Corporate Technology Group. He is an expert in mycotoxin reduction, online sensors and data analytics, and currently leads the build-up of a data science team for Bühler's Internet of Things (IoT) initiative. A physicist by education, he received his Master's Degree from the State University of New York at Buffalo, USA and his PhD from the University of Basel in Switzerland.

About Bühler

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

Bühler is a major force in processing grains, rice, cocoa, coffee, and other raw materials. Also, it is a renowned solution provider of die-casting and surface-coating technologies in high-volume application areas, such as automotive, optics, and inks. As a leading technology group, Bühler invests up to 5% of its turnover every year in Research & Development.

In 2016, Bühler's 10,640 employees in over 140 countries generated a turnover of CHF 2.45 billion. The globally active Swiss family-owned company Bühler is particularly committed to sustainability.

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Cimbria supplying malting business

Cimbria has been involved in the malting industry in UK for over 40 years and is a leader in supplying drying, cleaning and transport equipment for malting barley and dry malt processing equipment. There are five main malt production companies in the UK and they all have three or more sites producing malt for UK brewers and the distilling industry in Scotland. Cimbria equipment was installed on three projects in the malting sector in different areas of the malting process.

Starting at the beginning of the malting process — barley dressing

Crisp Malting Group needed to replace its old barley dressers and hoped to improve the sample at the same time; it chose the Cimbria Delta cleaner for the project. The building was quite restricted in terms of space, but due to improvements in cleaner design, it was able to get greater screen area and a more effective aspiration system to clean out the dust and barley awns more effectively with the new cleaner. Improved quality of malting barley going to steep was achieved at a capacity of up to 23tph (tonnes per hour). Additionally, a Cimbria Delta cleaner for cleaning malt at 30tph was included within the scope of this project.

The dressed malting barley then goes to be steeped, changing the density and flow characteristics of the barley. Moisture content is increased to 45% with some germination already taking place.

Bairds at Witham, one of Cimbria's longstanding malting customers, had a wet pumped blow line system for conveying steeped barley to the germination vessels that needed to be replaced. The Cimbria proposal was to use 6 × Contec screw conveyors of the type SUH 500, discharging the steeps at 90tph using low flight speeds to reduce damage to the germinating malting barley. De-watering outlets remove excess water from the screw conveyors, whilst hinged lids allow the machines to be cleaned down manually by pressure washer between batches.

The customer is pleased with the robust equipment. Discharge capacity has exceeded expectations and the system has helped improve germination yield of the malting barley.

Cimbria Combi Cleaner at Simpsons Malt.

Steeped barley then germinates in vessels to become green malt and is kiln-dried to become the final product — malt. The malt is de-culmed and dressed prior to going out to customers in bulk or bag.

Simpsons Malt wanted to upgrade its existing 20tph malt dressing plant. The existing equipment was not fast enough, so Cimbria proposed 2 × 146 Combi Cleaners mounted back-to-back, which would easily give 60tph dressing and polishing of the malt prior to bulk discharge for delivery to its customers.

Cimbria continues to develop equipment for the malt production process and recognizes the importance of this sector to its business.

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 GSI group, a worldwide brand of AGCO corp. Cimbria offers equipment and processing plants for the grain and seed industry and transport and conveying equipment for bulk handling.


Contec screw conveyor at Bairds in Witham.

Golfetto Sangati's grain handling systems benefit from over 90 years' experience

Golfetto Sangati is an Italian company which provides a wide range of grain handling solutions. The company designs, builds and installs: turnkey durum plants; wheat mills; maize mills; animal feed plants; rice mills; shiploading and unloading systems; storage for raw materials and finished products. It is a strong industrial entity that meets market needs in a competitive way and with technologically advanced solutions that are developed from extensive research, experience and expertise in all the relevant processes.

Golfetto Sangati has over 200 employees working in different departments, from the first design development to the final building. The project team is a highly skilled group working in the company's offices and manufacturing facilities, which cover 35,000m^2 in area.

To date, Golfetto Sangati has installed more than 5,000 plants in 130 different countries and since 2010 has been part of the Pavan Group, one of the worldwide leaders in the design and engineering of technologies and integrated product lines for cereal based food.

Equipment manufactured

Golfetto Sangati has developed advanced technologies for the cleaning, handling and storage of cereals and other free-flowing or non-free-flowing commodities.

With its brand BERGA, the company has been a point of reference for the development of complete shiploading and unloading systems for harbours having a leading role in the technological progress from the first pneumatic towers to the latest mechanical systems.

The wide range of loading and unloading towers takes into account the best building solutions, offering fixed and mobile solutions, on wheels or tracks with handling capacities ranging from 50tph (tonnes per hour) to 2,000tph, for ships of up to 120,000dwt.

In terms of storage solutions, Golfetto Sangati is a leading player in the development of plants for the storage and dosing of coffee.

Commodities handled by Golfetto Sangati equipment are free-flowing and non-free-flowing materials, including: wheat, corn, barley, soybean, sunflower seeds, rapeseed, coffee, sugar, rice and soya meal.

Major clients for Golfetto Sangati solutions include governmental entities and private or multinational companies which own or manage harbour facilities and plants for the storage and distribution of commodities.

Recent contracts

- The **'Brown Bear' Project** in the Egyptian port of Alexandria, provides for the design and manufacturing of high capacity chain conveyors (1,400tph loading/700tph unloading) and storage steel silos (54.000 tonnes). Chains have been selected in order to assure the remarkable durability required by the client: 2 × 550mm-wide chains with breaking load of 55,000kg

DESIGNED, ENGINEERED AND BUILT

WITH 90 YEARS OF EXPERIENCE AND EVOLUTION

Golfetto Sangati is an Italian company who designs, manufactures and installs turnkey plants for grain handling and milling. Part of the Pavan Group, is a strong industrial entity answering to the market`s requirements in competitive way and with technologically advanced solutions, originated from extensive research, expertise and know-how.

Golfetto Sangati is the owner of Berga brand: with more than 50 installations done and having a leading role in the technological progress from the first pneumatic unloaders to the latest mechanical loaders/unloaders, Berga is a point of reference for the design and construction of complete ship loading and unloading systems for ports.

The Berga product range, completely designed and assembled in Italy, is composed of handling and storage systems, loading and unloading systems on wheels or tracks with handling capacity ranging from 50 to 2000 t/h.

GOLFETTO SANGATI
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each assure the correct power transmission. The drive is granted by 110 to 160kW with shaft mounted gearbox and hydraulic coupling.

- The **Canopus Project** is a contract for the design, manufacture, deliver and start-up a new shiploading terminal in the Port of Costanta (Romania); the client is a JV Company formed by Cargill (USA) and TTS (Romania). The scope of supply includes one TRANSLOAD mobile shiploader rated at 800tph and the relevant handling equipment from truck intake to storage and ship load-out. All equipment has been designed and built according to the specific requirements of the client.
- The **Rostov Fluvial Port Project** in Russia is the refurbishment of an existing plant to increase initial handling capacity up to 400tph. The scope of supply incorporates chain conveyors, belt conveyors and bucket elevators all designed in compliance with the local environmental feature (–25°C).
- The **Lesiolo Project** in Kenya consists of the extension of storage silos (18.000 tonne) and mechanical handling system rated at 100tph and bulk load-out system for truck loading with the installation of special dust suppressor combined with gross flow measurement system.
- The **Grandi Molini d'Italia Project** in Livorno in Italy is a contract for the design, manufacture and construction of a mechanical unloading tower with a rated capacity of 600tph designed to unload ships up to 50,000 tonnes, storage in two silos with capacity of 33,500 tonnes, the wagon and truck intake and the material cleaning section before milling plant.
- The project in the **Port of Yuzhnyi** (Ukraine) for the client MV Cargo provides for the design, manufacture, delivery and start-up a new shiploading terminal. The scope of supply includes one TRANSLOAD mobile shiploader rated at 2,000tph, with a conveying route inside the machine comprising belt conveyors with a width of 1,800mm. During the design process, the outline of the steel structure has been optimized to take account of the significant loads of the various components

Staying competitive

Golfetto Sangati has a strong focus on research about construction materials, on the careful selection of components and on innovative plant developments to become advanced solutions enabling the optimal use of the energy resources and to achieve the performance required.

In order to drive the continued innovation of its systems and technologies, the company's team cooperates with its clients during the running phase of the plants, studying and optimizing the behaviour of the plants in operation.

Its proposed solutions are designed with the aim of:

- complying with the required technical features;
- ensuring an efficient and reliable plant;
- proposing a very competitive price for its systems;
- granting a cost-effective power consumption;
- granting a reduction of maintenance and repair costs; and
- ensuring a dynamic customer service that can rely on a personalized service, capable of solving any problem

One of the most important ways to stay competitive is the expert evaluation of each specific situation and the creation of constant feedback loop between the Golfetto Sangati's team and its clients, allowing the company's technical department to personalize and rationalize the plants according to the clients' requests.

Recent technological developments

Some results of the development and engineering activities at Golfetto Sangati include:

- efficiency across vessel unloading higher than 70% of the rated capacity (tph);
- higher peak capacity, 10% to 15% higher than rated capacity;
- self regulating dust suppressor system during loading;
- simple steel works design for fully equipped towers, from power connection point to loading/unloading point;
- a wide range of customizable technical and operational configurations;
- high flexibility for electrical interface;
- use of materials reducing internal friction;
- control and optimization of the humidity and temperature to avoid wasting energy.

Golfetto Sangati has been in business for over 90 years. Thanks to the experience and expertise it has gained during this time, it is able to propose flexible and customized solutions that meet the specific requests of its customers.

Dustless grain loading with Cleveland Cascade's unique loading chutes

Based in the UK, Cleveland Cascades employs a dedicated team of experts in design, manufacture, assembly and commissioning of bespoke loading chutes for the handling of dry bulk materials.

The unique Cleveland Cascade chute originated from an in-house project developed at a bulk handling facility on Teesside in the early 1990s. The facility had faced pressure from port operators and surrounding businesses relating to the safe and efficient loading of potash. The success of the system saw the idea patented and sold worldwide, handling a vast variety of dry bulk materials, from large lump iron ore and, coke and coal, granular products including grains, through to fine powders such as soda ash, phosphate, alumina.

The Cleveland Cascade system allows a controlled, yet efficient transfer of materials from conveyor to ship, silo or stockpile. The material is loaded at a low velocity, yet high volume and this means products can be transferred with minimized generation of dust emissions, and also minimized degradation and stockpile segregation of product. Such is the low environmental impact of the Cascade chute, Cleveland Cascades Ltd is the only loading manufacturer in the world, that offers a guarantee that it can produce less than 5mg per cubic metre of air from its Cascade Chute, something that is very important for the operators in the transfer of material like grain.

The unique Cascade chute achieves its performance by using a series of oppositely inclined cones, optimally sized and arranged at a specific spacing and inclination. When the correct Cascade arrangement is loaded with a specified tonnage feed of bulk material, the cone arrangement becomes back-filled or semi-choked to amass a body of material inside of each cone supported on its running surfaces. The material then slides on itself reducing impact wear within the cones and liners to a minimum. The result is called 'mass flow' a large volume of material loaded at a very low velocity, and the results from loading materials in mass flow are minimization of dust emissions, product degradation and stockpile segregation to the greatest possible extent.

The results of the Cascade chute have proven to be so good, the chutes do not require any dust extraction or suppression systems. This results in the overall loading systems having less capital equipment costs, and lower maintenance costs over the working life of the operation.

Where stringent dust controls are not required by the operator, Cleveland Cascade offers design and manufacture of a more cost effective conventional telescopic chutes, together with a range of smaller chutes for truck, tanker and rail loading operations. These chutes are robustly constructed, and well-engineered to withstand the day to day use in their respective environments. Materials of construction are bespoke to the application and special requirements are catered for. The design is such that these products will give many years of trouble free service.

In addition, the company has also developed and supplied Cascades transfer chutes to solve the dust emissions problem created at conveyor transfer points. This represents a logical step for the business, as for years it has provided the means for

working in conjunction with Telestack was installed in the Ukraine. Using one of Telestack's mobile ship loaders, Cleveland Cascades supplied a free-fall chute of 16.5 metres in length. The system will handle up to 650tph with an annual tonnage of 980,000 tonnes.

Finally, one of Cleveland Cascades' optimum grain loading solutions was installed for the Port of Newcastle, Australia. Siwertell, the Swedish specialist in dry bulk handling systems, designed a telescoping shuttle boom conveyor which needed a loading chute to effectively control dust emissions and minimize material degradation. Having worked together on many projects together, Siwertell, part of the Cargotec group, is familiar with Cleveland Cascades' specialist expertise in this field. The system supplied to the Port of Newcastle, Australia has a capacity of 2,800m³/hour, through a 31-metre-long chute. It has auto raise-lower capability and is fitted with a fixed head chute and upper deflector in order to interface with the Siwertell shuttle boom conveyer.

Having achieved Awards for Environmental Engineering, and the Queens Award for Environmental Achievement and Export Achievement, there is no doubt that Cleveland Cascades Ltd is proficient in bulk loading solutions, using its unique cascade system.

Cleveland Cascades Ltd continues to remains at the forefront of innovative design within the bulk industry, taking its technology and experience, and tailoring it to meet the demands of individual customer needs.

materials loading from the conveyor to receptor, ship, rail wagon or tanker etc. And so now it is providing materials loading in the same controlled manner between two conveyor belts.

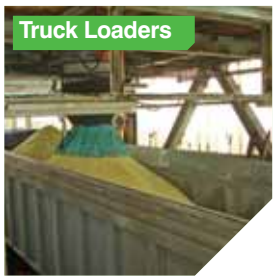
With over 653 systems operating worldwide with applications in ship, silo, road, rail and tanker loading, the company's key to success is its proven ability to provide a well-engineered solution with professional spares, commissioning services and committed support.

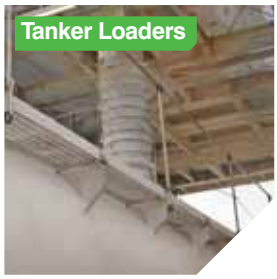
Moving forward the challenge for Cleveland Cascades is no longer to prove the systems abilities with loading grain to achieve these desired results, but grow the system in size to accommodate larger handling rates. Cleveland Cascades has now extended its size range to accommodate loading rates from 50m³/hour up to 7,000m³/hour for all dry and free flowing bulk materials, and bespoke chutes of 45 metres plus are now being requested.

Cleveland Cascades has completed over 53 grain-specific chutes around the world. Some recent grain projects completed and awarded to Cleveland Cascades include, working alongside Iskar Muhendislik in the Derince Port of Turkey with its Cascade shiploading chute. Throughput was at 2,000tph (tonnes per hour) the highest loading rate of grain the company has provided. This 18-metre-long chute handles just short of 1,000,000 tonnes per annum. Another project awarded and

Cleveland Cascades Ltd

Global leader in bespoke dry bulk loading chutes





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

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

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

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

Contact Cleveland Cascades Ltd

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Better grain handling: how a dome and its systems help protect product

Grain storage is steeped in decades of tradition, *writes Rebecca Long Pyper for Dome Technology*. Grain producers have long relied upon multiple low-maintenance metal bins or silos that each hold a small capacity of grain with varying degrees of purity. Keeping product separate allows for easier mixing and selling.

But for companies bringing in and pushing out a high volume of grain or milled product through a port, a dome is a better fit for many reasons. As more companies are discovering, a reinforced concrete dome is cost-competitive with silos and delivers increased protection over storage facilities with seams. In fact, the continuous dome shell provides greater ability to regulate internal conditions, including humidity and temperature control and pest protection.

Case study: Recent grain dome allows company to increase storage and shipment

In 2016 Dome Technology completed construction on a grain dome and its handling systems for a major grain producer located along the Mississippi River.

The dome will function as a daybin with employees filling it during the day and emptying it at night. "They will fill this dome and unload trucks all day long, and at night they will load the barges out of the dome," said Dome Technology project manager Darryl Cunningham. The model also allows multiple products to run through the site at the same time through split receiving systems.

The dome contains equipment that monitors temperature, humidity, approximate level, and insects; systems also control aeration by determining run conditions for fans.

How domes mitigate major grain concerns

Since wheat, corn, canola, soybeans, and the like are sensitive to moisture and temperature changes, an airtight structure that wards off water and controls the interior environment is the best way to ensure quality control. Here are a few considerations when planning a grain-storage facility:

1. Increased and improved storage

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.

"If a port does not have height restrictions, which some do, the most efficient thing is to go vertical instead of horizontal," Dome Technology sales manager Lane Roberts said.

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 at the apex. The entire interior of a dome, then, can be used to contain product.

2. A structure that lasts

Facilities storing grain should be robust enough to tolerate frequent loading and unloading. "The storage facility needs to be able to hold a high volume and be able to handle its throughput. A dome can handle that because of its structural integrity, (but) steel bins after a certain amount of time wear out. Steel bins are not built for high throughput," Dome Technology sales manager James Stoker said.

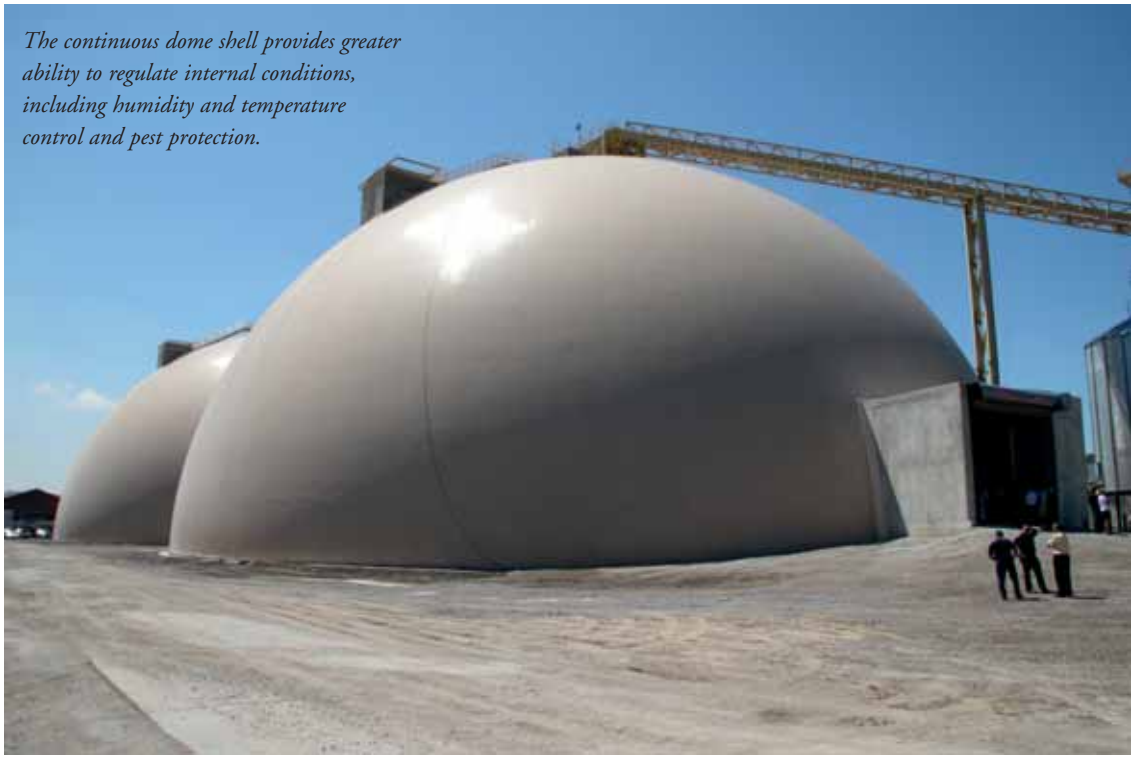
That's because steel bins are built with fasteners or welded seams to secure metal sections together. Frequent loading and unloading cycles fatigue the bin at bolt holes or weld imperfections until a crack develops at these locations and causes structural failure. Filling and emptying will stress a dome too, but a dome's rebar can accept the force without the same fatigue problems; the stress is not channeled to weak spots like bolts or seams because there aren't any.

3. Superior product protection through climate control

Insulation doesn't come standard with traditional storage facilities like bins and silos, and fluctuations in external and internal temperature, plus the possibility of moisture or condensation inside the structure, can compromise product integrity and pose a danger for volatile materials.

In contrast, a dome staves off some boundary issues other structures face. First, the airform covering the entire dome prevents water and moisture from seeping in. Important for moisture-affected products, this feature eliminates introduction of outside water into the pile.

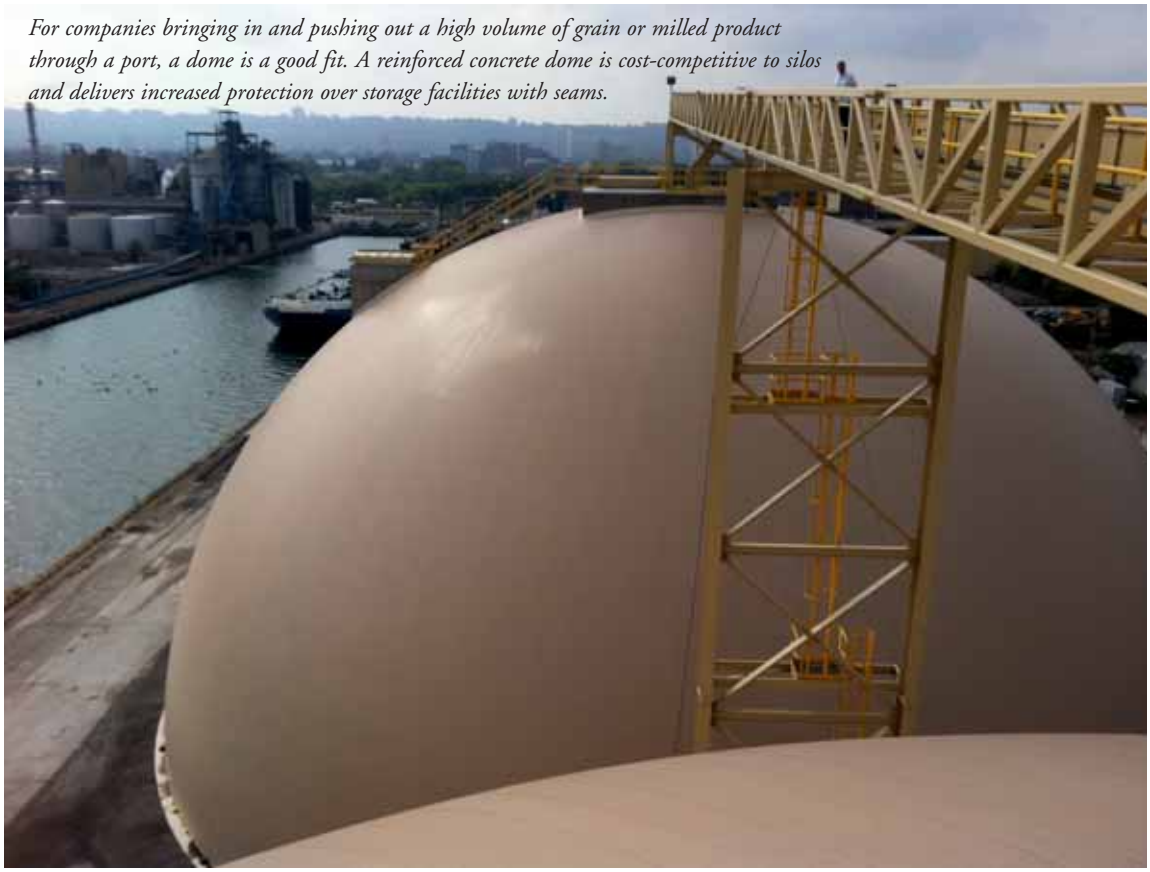
Secondly, the combination of waterproof membrane, reinforced



The continuous dome shell provides greater ability to regulate internal conditions, including humidity and temperature control and pest protection.

concrete shell, and continuous layer of polyurethane foam prevents extreme interior temperature fluctuation; these features reduce heating and cooling of the walls and air inside, preventing condensation.

Aeration systems and a cable array of moisture meters and temperature cables ensure internal conditions are ideal.



For companies bringing in and pushing out a high volume of grain or milled product through a port, a dome is a good fit. A reinforced concrete dome is cost-competitive to silos and delivers increased protection over storage facilities with seams.

4. Heat, fire and explosion

Heat spoils grain, which spoils a company's bottom line. But grain can also be combustible — the dust especially — and explosion happens when an ignition source lights a dust cloud generated by moving product.

"The dust is very explosive, so you're trying to control ignition sources through correct wiring methods, making sure it's rated for the area or minimizing the amount of electrical equipment in the area," said engineer for Dome Technology Adam Aagard. Dome Technology's team of experts will help customers identify the right equipment for a dome and the ideal places to put it.

5. Food-safe finishes and materials

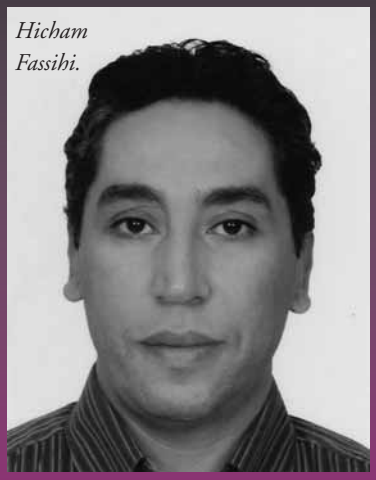
Food-safe paint is necessary when storing products intended for human consumption. It's an expensive but necessary finish for food products headed directly to customers. The paint creates a barrier between product and concrete.

For optimal grain storage on a port, a dome provides the best in protection and the most capacity in storage. Dome Technology's team of engineering and construction experts will walk customers through the planning process to ensure a dome is built to meet needs and exceed expectations.

Cimbria sets up new office in Morocco

In line with the CIMBRIA sales strategy of having a local representation in all primary markets, CIMBRIA has set up a new office in Casablanca, Morocco as of 1 February this year.

CIMBRIA has already several references in Morocco in both the private and public sector. With the new office, the company aims to increase sales activities and ensure an even better service and after-sales service for its clients.



Hicham Fassihi.

The daily management of the office in Morocco is carried out by Hicham Fassihi, electro mechanical expert with almost 20 years of experience in Italy in the agro-industrial field, including four years as SEA optical sorters technical support.

CIMBRIA is one of the world's leading companies within industrial processing, handling and storage of grain and seed, as well as animal feed and foodstuffs and other bulk products.

CIMBRIA offers project design, engineering and process control — as well as the development, manufacturing and service of individual machines, customized systems and turnkey installations.

In all solutions, CIMBRIA focuses on increasing quality and profitability while reducing energy consumption. In this way, the company can achieve maximum profitability of the machine with minimal environmental impacts.

Sennebogen

smooth operation with electrically driven material handlers

In early 2016, the first mobile SENNEBOGEN 870 E-Series was delivered to the Elzinga Group in the Netherlands.

SENNEBOGEN was founded in 1952 to develop and produce machines for the agricultural industry. The company has now established itself as a full-service provider and quality provider in crane technology and material handling.

As an international company, SENNEBOGEN develops and produces complete model ranges for duty cycle cranes, crawler cranes, telescopic and harbour cranes, material handlers, telehandlers as well as base carriers. In addition to flexible machines from series production, SENNEBOGEN also designs individual specialized machines in close collaboration with its clients.

SENNEBOGEN is a major material handler manufacturer which provides solutions to customers that handle dry bulk products. This can be better illustrated by highlighting a few projects done in recent years.

Port handling on a large scale: Elzinga relies on new SENNEBOGEN 870 E-Series

In early 2016, the first mobile SENNEBOGEN 870 E-Series was delivered to the Elzinga Group in the Netherlands. The material handler is used in the port with impressive handling performance and a maximum reach of 24m.

Since SENNEBOGEN and the Elzinga company from Eemshaven, Netherlands can look back on many years of successful co-operation, it is no surprise that the first mobile port material handler of the new 870 generation went to the Netherlands. In the north-west of the country, Elzinga Group handles around three million tonnes of bulk goods and cargo in Eemshaven annually. Especially when large ships have to be unloaded in a very short time, fast cycles and safe working are decisive criteria for operators and the people responsible for the machine park. With the new 870 material handler, which is handled by the sales and service partner Kuiken B.V, the company is prepared for all eventualities.

SENNEBOGEN 830 in port handling operation (Netherlands)

For its client Buijs Groot-Ammers Overslag B.V., SENNEBOGEN material handlers are indispensable. The new addition, 830 electric material handler, is already the ninth green material handler owned by the Dutch company.

The machine's predecessor at the pier in the Dutch town of Veghel, an electric material handler 825, had clocked up approximately 15,000 operating hours within a short period of time without any problems. There was demand for more handling capacity and a wider boom range. Therefore, the need for a SENNEBOGEN 830 electric material handler became apparent. The decision was easy: 'Once electric, always electric'. A machine like the electrically driven SENNEBOGEN material handler, which runs flawlessly, with little maintenance, always compares well in the marketplace.

The new 830 E-Series is located directly at the pier on top of a four-point sub-structure. The material handler is equipped with a 17m boom and arm structure and a double-shell grab to unload ships carrying mainly raw materials for the feed industry.

In addition to saving approximately 50% in operating costs when compared to a diesel-powered machine, this electric material handler has even more benefits. The customer decided to purchase an electric material handler again because its operation is significantly quieter, it is completely emission-free and, ultimately, it saves money.

The elevating and comfortable Maxcab provides operators with the best possible view of the entire working range. Four cameras and a comprehensive lighting system package provide further support. Thanks to its simple design, SENNEBOGEN machines allow smaller maintenance operations to be carried out by the owner's personnel without external assistance. For other tasks, SENNEBOGEN full-service provider is available on short notice, supplying spare parts or bringing experienced

technicians to the site to ensure optimum availability of the machine.

Maximum efficiency due to Green Hybrid energy recovery

In the new generation, the SENNEBOGEN 870 E-Series comes with a 261kW diesel engine that meets the requirements of the TIER 4f exhaust regulation. An energy recovery system ensures that the installed power can be lower and that energy can be efficiently saved with each stroke. For this purpose, a third cylinder is mounted on the boom. When the equipment is lowered, the oil that it contains is displaced. The obtained energy is temporarily stored in four nitrogen accumulators in the rear, to be made available again to support the next stroke. This results in operating cost savings of up to 30%.

In addition to the innovative energy recovery system, the machine also impresses with the height-adjustable Skylift cab elevation. The spacious Mastercab, which also has a trainer's seat in addition to generous space for the operator, can be adjusted over a height of 10m upwards and 7m forwards. An uninterrupted view into the ship's hull during loading and maximum safety in daily work are the important advantages, operator Andries Vriesema confirms. It can also be comfortably and safely entered from the ground.

Innovative modular concept for customer-specific design

SENNEBOGEN traditionally offers a variety of equipment variants to adapt each machine individually to customer requirements. With various cab elevations, equipment lengths, or undercarriage variants, the machines can be individually configured in over 1,000 variants. Whether with a crawler chassis or as a mobile version, the 870 can be configured with very different undercarriage variants depending on the intended purpose. The mobile undercarriage with four-point swivel support outrigger that Elzinga operates is particularly impressive. The supports can be folded in for travelling and thus offer maximum mobility for applications over the entire port area. When standing, the supports ensure a large outrigger area and maximum stability even with large reaches of up to 24m. As a further example of machine customization, the SENNEBOGEN 870 was equipped with an extensive seawater package. This includes, for example, a maritime climate-resistant varnishing and coated hydraulic cylinders.

The elevating and comfortable Maxcab provides operators with the best possible view of the entire working range.

In Eemshaven, Elzinga uses the new SENNEBOGEN 870 with 24m-long equipment primarily for loading ships. The upper carriage is elevated by a 2m mast, and a perimeter gallery creates optimum accessibility for maintenance and servicing. DCi

For its client Buijs Groot-Ammers Overslag B.V., SENNEBOGEN material handlers are indispensable. The new addition, 830 electric material handler, is already the ninth green material handler owned by the Dutch company.

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SENNEBOGEN

Steel trades

is China really the villain?

During the US presidential election campaign, Donald Trump played his cards in a way that ensured support from the committed as also from groups whose income and jobs were allegedly under threat from low priced imports and American business-related work outsourced to countries such as China and India where per hour wage cost is significantly lower than in the US, *writes Kunal Bose*. Trump's success in the rust belt states such as Pennsylvania and Ohio had got much to do with the rousing call he gave to infuse life in the American steel industry, which has greatly shrunk in capacity over the years mainly because of cheap imports. According to the International Trade Administration, the US has persistently remained deficit in steel products trade.

Because of the protests heard in every steel producing country of any significance and its recent annual exports in excess of 100mt (million tonnes), China is seen as the principal villain in selling steel in different markets at below production cost. But what is important to note is that a lot more steel flows in to the US from countries such as Canada, Brazil, South Korea, Mexico and Turkey than China. At 35.5mt, the US accounted for close to 9% of total global steel imports in 2015, thereby claiming the top spot among all importing countries. The shrinking of the US steel industry on production basis from 97.427mt in 1999 to 78.845mt in 2016 was as much due to high imports as because of some ageing high cost mills falling by the wayside in an increasingly competitive environment.

For identical reasons, the once formidable industry entities in many European countries, including the UK had perished. During this period China's production grew from 123.709mt to 803.825mt. Rapid rises in Chinese steel capacity were for years supported by stunningly high rates of GDP growth. Steel was meeting with high demand as China rapidly became a factory to the world and infrastructure and house building claimed large investments. But 2012 proved to be the watershed year for both the Chinese economy and steel industry. Beijing, in an attempt to reorient the economy towards domestic consumption and away from investment and exports, would seek GDP growth of 7.5% in 2012.

Defending the lower growth trajectory, the then Chinese prime minister Wen Jiabao said: "The key to solving the problems of imbalanced, unco-ordinated, unsustainable development in China is to accelerate the transformation of the pattern of economic development... This is both a long-term task and our most pressing task at present." Well ahead of China making a strategic shift in growth strategy, its steel mills were accounting for half the global production of the ferrous metal. With demand growth in steel slowing down in the wake of China veering away from industrial exports, the industry came under pressure to dispose the huge surplus steel in the world market at any cost. China allegedly selling steel products backed by hidden and not-so-hidden subsidies rendered steelmaking capacity idle in many places.

Take India, for example,. Here, before New Delhi started intervening by way of safeguard duty, minimum import price and finally anti-dumping duty on as many as 124 steel products, imports from China, Japan and South Korea were eating up almost the entire local steel demand growth. Steel surplus countries, particularly in Asia took advantage of low import duty regime in India prior to government interventions on repeated urgings of the injured local producers to sell as much metal as possible here. According to the World Steel Association (WSA), India's imports during 2015/16 were 11.71mt, up 25.6% on

9.32mt in the previous year, making it the world's third-largest producer one of the ten largest importers. But post-New Delhi's trade actions, all conforming to World Trade Organization rules, imports of finished steel fell by 37.8% to 6.097mt during April–January 2016/17 on a year on year basis. In the same period, exports were up 71.1% to 5.85mt.

A fall in imports and a simultaneous spurt in exports along with rises in steel prices brought relief to Indian steel mills, which during this period had to contend with a tepid 3.5% growth in domestic steel consumption to 68.892mt when production grew 9% to 80.716mt. The Indian steel demand growth is trailing WSA forecast by two percentage points. Justifying steel-related Indian trade actions, Tata Steel managing director TV Narendran says: "Over the years at huge investment India has built capacity of over 120mt. Why should it be made to suffer at the altar of unfair trade? Yes, exporting countries, including China have reacted strongly to New Delhi's moves to stop dumping of predatory priced steel here. But we are ready to deal with any such reactions."

Tata Steel managing director TV Narendran.

Slapping of anti-dumping duty by any country is by regulation preceded by thorough official inquiries into complaints by injured parties of imports well below production costs but benefiting from government subsidy, open or otherwise. If the US and European Union are found more efficient in bringing select steel products under anti-dumping duty than India, it is because of close working relationship between government agencies and the industry, which supports complaints with thorough research. Maybe seeing how fast relief from 'predatory imports' has come the way of the US and EU steelmakers, Narendran is giving a push to leading Indian producers doing their homework ahead of asking government intervention in imports related matter.

A combination of political and economic developments, including the sudden deactivation of high denomination currency bills accounting for 86% of total note value on 8 November has slowed down India's GDP growth rate by more than a percentage point this financial year ending March 2017. A fallout of that is deceleration of steel demand in the face of a good volume of new steel capacity coming on stream and production rising at a high clip. In the face of growing complaints from all over about unrestrained imports originating in China, that country's Iron and Steel Association has turned aggressive in saying that efficiency and not subsidy has scripted the industry's success.

Trade restrictions do not help China which, over the years, has built capacity in steel, aluminium and other industries to degrees whose successful operation demands free movement of goods across the frontiers. But haven't many foreign businesses complained about rise in protectionism in China? Aware of this, Chinese President Xi Jinping chose the World Economic Forum in the Swiss resort of Davos to present himself as a champion of globalization and open markets. He said without naming Trump that "no one will emerge as a winner in a trade war," and China "will keep its door wide open and not close it."

A senior Indian steel industry official says that Trump's harangues during the campaign trail would normally mean an impending trade war with China. One will be tempted to describe his outpourings at the hustings against imports as a call to the world's largest and most powerful economy to become inward-looking. Trump said: "It will be American steel that will fortify the country's crumbling bridges. It will be American steel that sends our skyscrapers soaring into the sky... We are going to put American-produced steel back into the backbone of our country." From being a manipulator of currency to flouting of global trade rules, Trump heaped many criticisms on China threatening a 45% tariff on its exports. Noises made during election campaign to win sympathy of voters in a democracy are mostly forgotten when one ascends to power. What is true for the US also holds good for India. In any case, China is no longer quashing its currency to secure competitive edge for export of goods and services. Instead, it is strengthening. To go by what the White House website says, the Trump Administration instead of slapping a big blanket tariff on steel products and other goods originating in China and otherwise will "use every tool" at the disposal of the government to end trade abuses.

Trade actions besides, Trump's signature proposal of $1 trillion investment in infrastructure has the potential to boost demand for locally made steel, especially of long products. Consultancy Jefferies estimates a 6% increase in US steel consumption will follow a $100bn of increased annual infrastructure spending. But this will be conditional on the US moving to block imports of low-priced steel, particularly from China without appearing to be protectionist. Tom Gibson, president of the American Iron and Steel Institute, said he was looking forward to work with the new administration "to ensure a level playing field for the steel industry." Months ahead of Gibson, Tata Steel's Narendran said "Indian steelmakers are not seeking protection but a level playing field." Incidentally, some Indian producers, including Tata Steel and JSW Steel, rank among the more efficient and cost effective steelmakers in the world.

The two major worldwide criticisms that the Chinese steel industry has been facing relate to overcapacity at around 1.3bn tonnes and production amounting to half the world output.

Investment banker Morgan Stanley says rising trade cases in several countries against its dumping will put pressure on China to curb production. Steel and coal industries have been served notice by Xi Jinping to care for environment and shut the polluting mills and mines. Morgan Stanley is confident of China achieving its 150mt permanent capacity cut target by 2020. This is backed by the country scrapping around 70mt capacity in 2016, far exceeding the year's 45mt target. Ideally, China should be having a target of shedding around 300mt capacity since it is said to host half of the world surplus capacity of 600mt.

Unlike the EU, which has ArcelorMittal to uphold for benefits merger offers and Japan Nippon Steel & Sumitomo Metal Corporation, China woke up to the need for capacity consolidation only recently. But the fundamentals of the Chinese industry will significantly improve once the merger between Baosteel and Wuhan Iron and Steel happens and regional consolidation plans take off in a meaningful way. What is happening in China could in turn improve the return on equity in the global steel sector to 12% by 2020 from 2.9% in 2015, says Morgan Stanley.

Consolidation remains an ongoing process in the EU. Take the heavy loss making 10mt Ilva. The Italian government nationalized Ilva "temporarily" in the hope of finding a consortium of buyers which will not only turn it around but also ensure that its production turns environment friendly. The two serious consortium bidders for Ilva are one led by ArcelorMittal and the other by India's JSW Steel. In the meantime, Tata Steel, which recently sold its UK speciality steel business to Liberty House is seeking to merge its European assets with ThyssenKrupp. But the German group will not agree to the marriage till Tata Steel is able to get the regulatory approval to spin off the 15bn pound pension scheme into a standalone entity.

Unlike China, which invites criticism for building capacity considerably in excess of domestic requirements, India's plan to create 300mt capacity by 2030 against the present 120mt is based on a realistic assessment of future steel use by different sectors. *Per capita* steel consumption in India at 60kg compares unfavourably with global average of 208kg. India will need growing quantities of steel as it aims to build a global class infrastructure and become the second-largest factory to the world after China. In support of this, the chairman of Steel Authority of India Limited (SAIL) PK Singh says: "The government plans to raise the country's *per capita* steel use to 160kg by 2030/31. And for meeting this level of consumption, the industry capacity is to be lifted to 300mt." Expect both Tata Steel and JSW Steel to become 40mt capacity enterprises by then. SAIL with a big land bank at its disposal and also captive iron ore mines is targeting crude steel capacity of 50mt from 21.4mt to be achieved this year on completion of its ongoing modernization *cum* expansion programme.

Brazilian steel industry in the doldrums as economy struggles

Brazil's steel industry struggles, as its two leading markets, the construction and motor industry, are hit hard by stagnant economy

With the Brazilian economy set for very low growth in 2017 for the third year running, the country's steel industry is not expected to use more than half its 60mt (million tonnes) capacity once again, *writes Patrick Knight*. In the past few years, mills have only been able to sell about 20mt of the 30mt of steel they make each year, in Brazil itself. Last year, companies exported only 12.5mt, far less than the historic average.

The two leading markets for Brazil's steel are the construction industry, and the vehicle assemblers, and both are in deep trouble. The average car manufacturer, of which there are now 43 in Brazil, is using only half its capacity, while tens of thousands of new houses and apartments remain unsold. With consumer debt at record highs, and with unemployment high and rising, confidence is at a low ebb, and so is spending.

Intense competition from surplus steel made in China, and from other countries as well, means finding markets for exports is extremely tough, and not very profitable anyway. One compensation of the weakness of the economy, is that imports of steel, which were running at high levels during the decade prior to 2013, when growth was strong, have now become much more expensive. Imports are handicapped both by weak demand, and by the weakness of the Brazilian currency, so have slowed sharply.

Although many blast furnaces and processing mills have been halted, there are a few bright spots. The Tubarao company, part of the Arcelor-Mittal group, whose mills were designed to make low-cost slabs to be processed into sheet steel in mills in the United States and Europe, continues to export 65% of the 7mt of slabs it makes each year. Demand is also strong for medium diameter steel tubes made in Brazil, popular with the booming shale oil industry in the United States. The Acesita stainless steel mill, another company in the Mittal group and the only one of its kind in Latin America, which make a million tonnes of stainless products each year, is also proving able to sell well to the hydroelectric industry, which is building several new giant power plants in the Amazon region, and to the electrical components industry.

The problems facing Brazil's steel industry have their roots in the excessive optimism engendered during the left wing adminstrations of President Lula da Silva between 2003 and 2011. Benefiting from the fact that Lula's predecessor, President Fernando Henrique Cardoso, succeeded in bringing Brazil's chronic high inflation under control, Lula took advantage of the favourable economic climate to set about distributing the cake, rather than attempting to make it grow, as his predecessors had done. Year after year, the minimum wage paid to most workers was raised by more than the rate of inflation or the growth of GDP, which put more money in people's pockets. Pensions were also raised, while special cash grants were given to less well off families. Restrictions on credit, which was almost unobtainable when inflation was high, were eased and mortgages became available. Numerous low cost housing schemes were set up. A building boom started, which increased demand for the 'long' products needed by the construction industry, and many companies expanded output to meet the new demand. Mills made major investments.

Attracted by the fact that relative to many other countries, the *per capita* level of car ownership in Brazil is relatively low, motor manufacturers rushed to build new plants. Companies from all over the world were attracted. While 25 years ago Brazil was home to only four vehicle assemblers, there are now 43 of them. Few of them make and sell sufficient vehicles to make a decent profit, even when times were good, which was the case until 2013. In the past three years, the motor industry has not been able to use more than 50% of its capacity, and thousands of workers have been laid off. The new companies had all taken advantage of generous incentive packages aimed at encouraging them to build

plants in less attractive parts of the country. But should they now close these plants, they would have to pay this money back, which few are prepared or able to do.

The situation is little better for the construction industry. There are tens of thousands of unfinished homes on the market, while many house owners have walked away from properties they cannot afford to pay for. The building programme has come to a complete halt, and is not expected to get going again for several years, until private and state finances are in a better state.

Given that the domestic market is so weak, and expected to remain so for several more years, exporters of farm commodities, minerals and manufactured goods, have repeatedly called on the government to ensure that spending on infrastructure, such as roads, railways and ports, kept pace with the increased demand for Brazilian goods. But with tax revenues falling, while spending on social schemes is still rising, very little has been done to compensate for the downturn in demand from the private sector by an increase in spending by state, or municipal authorities, all of which are in poor shape.

At a recent meeting of executives of Brazil's Instituto de Aco, the steel industry's trade association, more optimistic delegates suggested that a return to growth would start in 2018. Some say they have detected demand for new cars showing a slight increase. Car exports have risen slightly, mainly because models made in Brazil are more up to date than their competitors from Asian countries. Perhaps because of this, the price of the sheet steel used in the motor industry, has increased by more than that of the long products more commonly used in the construction industry. The more pessimistic of delegates suggested that real growth would only return in about 2020, once the laborious business of restoring the finances of the state sector at all levels, had made progress.

It has been possible to raise steel prices in the past few months, after up to three years when they had not risen at all. This was because the price of iron ore, and also of coal, has increased, forcing consumers to accept higher prices.

Plans by a large Chinese state company to build a 10mt-capacity mill in the northerly state of Maranhao, where it would have easy access to the very low cost, high quality ore being produced locally at the Carajas mine by the Vale company, were strongly criticized by industry delegates. Despite the eagerness of the authorities in the state of Maranhao to encourage the building of the mill, expected to cost $8 billions, industry executives claimed that being state owned, such a mill would not need to make a profit. Steel from such a mill would drive down prices, and displace Brazilian steel from neighbouring countries, the natural markets for Brazilian steel. When fully operational, the new mill would need to buy about 15mt of Carajas ore, available locally, for less than $10 per tonne. But it would also have to import about 5mt a year of metallurgical coal, of which there are no reserves in Brazil.

Delegates at the Steel Institute's latest conference, had mixed feelings as to whether the plans of the Trump administration in the United States, would favour Brazil's steel industry or not. The largest company in the industry, Gerdau, has bought numerous mills in the US in the past 20 years, and most are doing well. The majority of steel is now made in electric arc mills in the US, and these use mainly scrap metal, rather than ore as a raw material. Gerdau suggests that more steel would be needed for the various infrastructure projects the new president aims to use to re-vivify the economy. But because the US is not a major user of iron ore, and plans to take steps to penalize imports, many delegates are less optimistic. Arcelor Mittal, on the other hand, anticipates steady strong demand for its slabs, while the fact that fossil fuels are likely to be back in favour in the US, should mean demand for pipes by the oil and gas industry will remain strong. DCi

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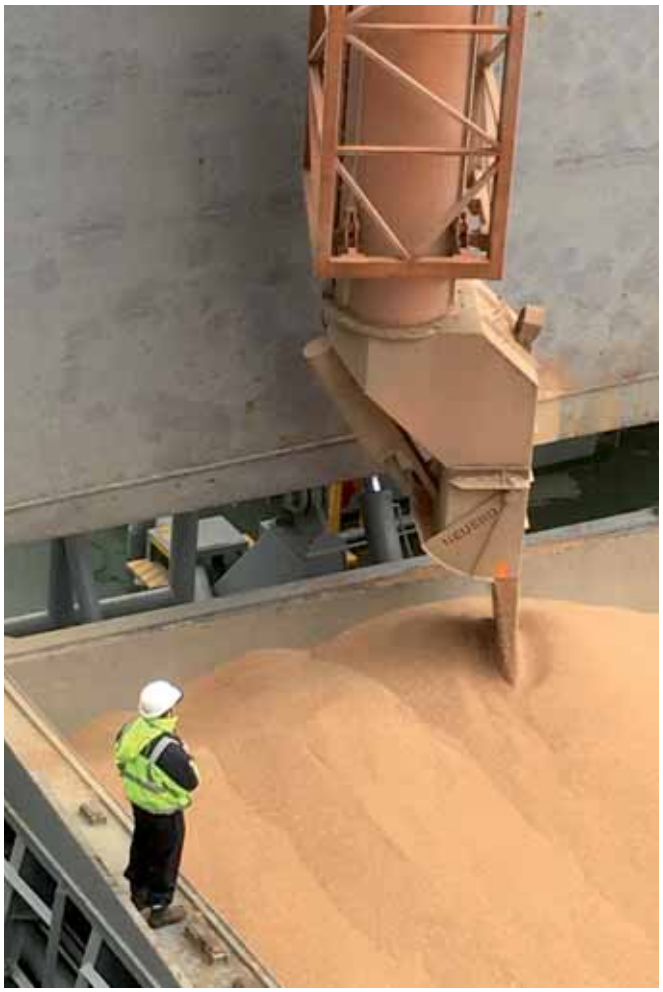





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