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SEPTEMBER 2024 issue

featuring...



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Dry bulk trade embracing further growth

Strengthening influences have been buoying commodity import demand elements in some countries and could remain advantageous. Consequently world seaborne dry bulk trade in 2024 as a whole looks set to continue growing.

Economic activity in the main regions or countries affecting global import demand for cargoes carried by bulk carriers is providing support. But the impetus derived from ongoing trends has not been especially notable. Signs of gross domestic product growth in the second and third quarters of 2024 seem to be consistent with the International Monetary Fund's latest estimate of no acceleration in world GDP growth this year, compared with the 3.3% rate achieved in 2023.

GRAIN & SOYA

A prospective mixed pattern of grain trade in the new 2024/25 marketing year now beginning is revealed by tentative US Department of Agriculture calculations. After a strong performance in the previous twelve months, when 6% growth was seen, a downturn seems likely. In a forecast published a few weeks ago, wheat plus corn and other coarse grains trade is estimated to fall by about 4%, to 432mt (million tonnes).

Figures included in table 1 show forecasts for the main importing regions, combining separate USDA data for wheat (July to June year) with coarse grains (October to September year). In 2024/25 grain imports into east and

south-east Asia, comprising over a third of the world total, are expected to decline by 9mt or 6% to 146mt. Lower imports into China could be seen. Reduced imports into Europe and the Middle East are also weaker elements envisaged, but volumes into Africa could rise.

COAL

Despite projections indicating a longer term downwards trend potentially beginning soon, global coal trade currently remains well supported. Although prospects for an import demand boost in 2024 seem limited, recent forecasts suggest that the total could be equal to or slightly higher than last year's volume.

Nevertheless there are components for which short term prospects are unclear, especially for China's massive purchases (over a quarter of world trade). In the 2024 first seven months China imported 296mt, including land movements but mostly seaborne, a 13% increase from last year's same period. This performance follows a 62% annual rise in 2023. Signs suggest that this remarkable upwards trend may not continue much longer, and a cutback could begin emerging in the months ahead.

IRON ORE

Global seaborne iron ore trade is apparently expanding again this year. The trend breakdown is uneven, however. Several of the largest importers are experiencing negative influences,

amid lower steel production, leading to estimates of annual ore import reductions for some of these during 2024.

Crude steel production in the European Union during the 2024 first seven months was 1% higher than seen in last year's same period, at 78mt, according to World Steel Association statistics. Elsewhere volumes were lower. China's output was down by 2% at 614mt, while in Japan and South Korea reductions of 3% to 50mt and 6% to 37mt respectively were recorded. These decreases have affected iron ore usage and imports, although in China ore stockpiling at ports and other influences contributed to imports rising.

MINOR BULKS

Seaborne trade trends in the huge and diversified minor bulks segment, comprising an estimated two-fifths of the world dry bulk commodity trade total, are often hard to monitor and assess precisely. Indications emerging in recent months suggest that the category is still growing, assisted by growing bauxite, steel products and forest products movements.

BULK CARRIER FLEET

Capacity enlargement in the world fleet of bulk carriers in 2024 could be similar to that seen last year at 29 million deadweight tonnes, as shown by table 2. Newbuilding deliveries and scrapping, the main influences, are expected to be stable, resulting in fleet growth of about 3%.

TABLE 1: MAJOR GRAIN IMPORTING AREAS (MILLION TONNES)

	wheat and coarse grains, crop years ending June (wheat), September (coarse grains)					
	2019/20	2020/21	2021/22	2022/23	2023/24*	2024/25*
East Asia	69.1	106.0	96.5	89.7	104.6	97.4
Southeast Asia	47.5	46.3	45.3	43.2	50.9	48.6
European Union	24.2	21.2	26.2	37.8	34.6	30.6
Middle East	65.2	59.7	68.5	64.6	56.7	54.7
North Africa	51.5	49.5	46.7	45.8	50.7	52.2
Sub-Saharan Africa	30.9	30.3	30.8	27.9	32.4	33.1

source: US Department of Agriculture *forecast, as at 12 August 2024

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

	2019	2020	2021	2022	2023	2024*
Newbuilding deliveries	41.7	49.2	38.4	31.5	35.3	34.0
Scrapping	7.9	15.3	5.2	4.3	5.4	5.0
Losses	0.1	0.5	0.1	0.1	0.0	0.0
Other adjustments/conversions	0.0	0.0	-0.1	-0.1	-0.1	0.0
Net change in fleet	33.7	33.4	33.0	27.0	29.8	29.0
Net at end of year	879.9	913.3	946.3	973.3	1,003.1	1,032.1
% growth from previous year	4.0	3.8	3.6	2.9	3.1	2.9

source: Clarksons Research (historical data) & BSA 2024 estimate *forecast

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weigh on feed prices in 2024/25

Grain facilities (photo: Vancouver Fraser Port Authority, John Sinal).



Maria Cappuccio

The International Monetary Fund (IMF) most recent assessment of the global economy forecast global economic growth at 3.2% in 2024 and 3.3% in 2025 as lower interest rates support household disposable incomes and encourage spending. The downgrade in 2024 reflected weak growth in the US with consumption under pressure from rising unemployment. In 2025, consumption and economic growth are expected to increase across most major economies, such as Japan, the EU and southeast Asia, supported by lower inflation. The European Central Bank and

Bank of England, lowered interest rates earlier in the year, with the US Federal Reserve expected to significantly lower interest rates ahead of the US Presidential election in 2024 and in 2025. This is likely to reduce the strength of the US dollar and in turn import prices for many economies, encouraging other central banks to lower rates and stimulate growth.

A modest increase for global wheat and coarse grains output at 2.29bnt (billion tonnes), reflects better crops for wheat, corn, barley and sorghum; with a record 687mt (million tonnes) for oilseed crops in

2024/25. A small rise in consumption to a new peak of 2,313mt with the strongest growth in industrial use. Global grains trade is projected to contract to 449mt, with stocks falling to 591mt in 2024/25, with the sharpest year-on-year declines in wheat and corn.

OUTPUT RISES FOR FEED CROPS DESPITE DIFFICULT GROWING SEASON

A small increase in global wheat output forecast at 797mt reflects different growing conditions in the major exporting countries. Most of the recent increase

GLOBAL FEEDSTUFFS — PRODUCTION, USE, FEED & STOCKS 2023/24-2024/25 (MT)

	Prod 23/24	Prod 24/25	Use 23/24	Use 24/25	Feed 23/24	Feed 24/25	Trade 23/24	Trade 24/25	Stocks 23/24	Stocks 24/25
Wheat	791	797	799	805	160	152	224	217	265	257
Coarse grains	1,499	1,502	1,494	1,508	920	933	242	232	339	334
Total grains	2,290	2,299	2,293	2,313	1,080	1,085	466	449	604	591
Oilseeds	658	687	*545	*557	**361	**371	205	208	131	151

Source: FAO, USDA, IGC

stems from better-than-expected results in the US, Canada, Kazakhstan, China, Argentina and Australia. Persistent wet weather cut the EU's wheat output by over 10mt especially in France and Germany; in Russia, adverse weather cut yields and output by 7mt. Despite a small increase in global wheat production, wheat use expected to outpace supply and lower the stocks-to-use ratio.

NEAR RECORD CORN, LARGE BARLEY, SORGHUM CROPS RAISE OUTPUT TO 1.5BNT

USDA forecast a near record US corn crop 386mt due to improved weather conditions and better yields; large corn crops are also anticipated in Brazil and Argentina. Part of the recent corn rally was due to low moisture and hot dry weather occurring in key growing areas of Brazil, where farmers began to plant their first corn crop; by 11 September, 15% of the crop had been planted-dry weather conditions continues to support corn and other feed grain prices. Global barley output is raised to 144mt and sorghum 62mt.

RECORD OILSEED CROPS IN PROSPECT 2024/25

USDA pegged the global oilseeds crop at a record high of 687mt, underpinned by a large crop in the US with large crops anticipated for Brazil, Paraguay and Argentina.

FEED USE OF GRAINS AND OIL MEALS TO RISE IN 2024/25

While wheat for feed use is expected to fall to 152mt, coarse grains feed use is expected to rise by 13mt to 933mt, with more corn, barley and sorghum fed in

GLOBAL WHEAT PRODUCTION 2021/22–2024/25 (MT)

	2020/21	2021/22	2022/23	2023/24	2024/25
EU	127	138	134	135	124
UK	10	14	17	14	11
Other Europe	4	5	5	5	4
CIS Baltic's	140	134	144	141	136
N & C America	88	71	83	85	92
S America	28	33	27	28	32
N East Asia	42	34	36	44	44
F East Asia	277	283	276	285	296
Africa	25	31	27	26	26
Oceanic	32	37	41	27	32
Total	773	780	790	791	797

Source: FAO, USDA, IGC trade-totals may not add due to rounding.

GLOBAL WHEAT SUPPLY & DEMAND 2020/21–2024/25 (MT)

	2020/21	2021/22	2022/23	2023/24	2024/25
Production	773	780	789	791	797
Consumption	786	791	791	799	805
Trade	199	205	218	224	217
Stocks	284	273	274	265	257
of which China	139	137	139	135	135
World	145	136	135	130	122
Key exporters *	62	61	65	59	56

Sources: IGC, USDA — Production — mainly harvested Jul-Dec/Local marketing years

*Argentina, Australia, Canada, US, EU, Kazakhstan, Russia, Ukraine

2024/25. Global oilseed crush is increased by 12mt to 557mt, with oil meals rising to 371mt to meet rising demand for feed and oils for renewable biofuels.

TRADE FOR WHEAT, COARSE GRAINS LOWER, MODEST UPTICK FOR OILSEEDS IN 2024/25

Reflecting better crops in some countries, global wheat trade expected to fall to 217mt driven by reduced sales to China, Indonesia, the EU and Turkey — where

import restrictions prevail. Trade in coarse grains forecast lower at 232mt; oilseeds 208mt in 2024/25.

AUSTRALIA ON TRACK FOR BUMPER 30MT CROP

Australia's wheat crop is developing under generally favourable conditions with wheat output pegged at 32mt. Increased moisture levels at the time of planting improved Argentina's wheat crop forecast at 18mt. The anticipated increase in global wheat



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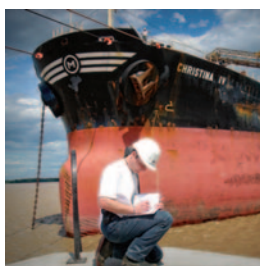
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production in key exporters, US, Canada, Kazakhstan, Argentina and Australia is expected to outweigh smaller harvests in the EU, Russia and Ukraine.

FEED WHEAT USE TO FALL IN 2024/25

Global wheat consumption is raised to 805mt due to an increase in food/seed/industrial use (FSI) rising over 14mt to 653mt driven by consumption growth in low to middle-income countries in Asia and Africa. While wheat for feed use is forecast to fall by over 8mt to 152mt. Less feed wheat used in the EU, Kazakhstan and Ukraine as feed users switch to other coarse grains.

WHEAT TRADE LOWER AT 217MT IN 2024/25

Reduced imports by the EU, China, Egypt, Indonesia and a number of countries outweigh an uptick in wheat imports into Morocco, Mexico, Uzbekistan, Sudan, Colombia and others.

RUSSIAN WHEAT OFFERS AT \$218-\$220/t

Turkey has a large wheat crop and abundant wheat stocks but introduced a ban on wheat imports of c.7mt in late June

GLOBAL COARSE GRAIN SUPPLY & DEMAND 2020/21–2024/25 (MT)					
	2020/21	2021/22	2022/23	2023/24	2024/25
Production	1,445	1,502	1,452	1,499	1,502
Consumption	1,462	1,487	1,459	1,494	1,508
Trade	235	237	221	242	232
Stocks	326	342	334	339	334
of which China:	208	210	207	213	212
Key exporters*	68	86	84	90	88

Source: IGC/USDA * US, Argentina, Brazil, Russia, Ukraine, EU, Australia, Canada

GLOBAL CORN SUPPLY & DEMAND 2020/21–2024/25 (MT)					
	2020/21	2021/22	2022/23	2023/24	2024/25
Production	1,132	1,218	1,160	1,224	1,219
Consumption	1,149	1,200	1,171	1,218	1,220
Trade	184	194	181	199	193
Stocks	296	314	303	310	308
of which China:	206	209	206	211	211
Key exporters*	42	46	49	54	58

Source: IGC/USDA * Argentina, Brazil, Ukraine, US

to mid-October, to protect domestic wheat producers. With the Turkish market closed, pressured Black Sea wheat prices, more than would normally be the case, coupled with harvest pressures and weak demand saw Russian FOB (Free on Board) wheat

export prices quoted at \$218/t-\$220/t.

Futures markets CBOT December contract — soft red winter wheat (SRW) closed \$5.637/bu (11 Sept '24), continue to be impacted by low-priced Russian wheat near \$220/mt FOB, despite rises in values



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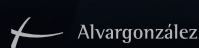
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for other exporters including, Argentina Grade 2 (Up River) \$259/t FOB, EU France Grade I (Rouen) \$245/t FOB, US No 2 SRW \$246/t FOB (11 Sept '24).

TIGHT WHEAT STOCKS IN 2024/25

Global wheat stocks forecast at 257mt (World 122mt China 135mt) are at their lowest level in five years, with major exporter stocks likely to fall to c.56mt in 2024/25.

NEAR RECORD OUTPUT FOR COARSE GRAINS IN 2024/25

A modest rise foreseen for coarse grains output to 1,502mt, with larger crops anticipated for corn, barley and sorghum.

COARSE GRAIN FEED DEMAND TO RISE IN 2024/25

USDA forecast global demand for feed, food/industry use of coarse grains, to rise by 14mt to 1,508mt in 2024/25. The main bulk of the increase is for feed use — corn, barley and sorghum increased by 13mt to 933mt with a small rise for food/industry to 575mt.

TRADE IN COARSE GRAINS TO FALL IN 2024/25

Global coarse grain exports are forecast 10mt lower to 232mt in 2024/25, mostly due to lower imports into China, with coarse grain stocks expected to be lower at 334mt (world 122mt, China 212mt)

CORN OUTPUT FORECAST AT NEAR RECORD 1,219MT IN 2024/25

Despite continuing weather challenges global corn output is forecast at 1,219mt,

boosted by a near record US crop c.386mt, EU 59mt, Ukraine 27mt, China 292mt, Brazil 127mt (CONAB forecast Brazil's corn crop 120mt with corn exports 34mt in 2024/25) and Argentina 51mt.

According to the Buenos Aires Grain Exchange (BAGE), Argentine farmers are likely trim hectareage for corn and plant more soybeans in the current season, after the last corn harvest was hit by a devastating leafhopper pest infestation and drought.

MODEST RISE IN FEED USE IN 2024/25

Total corn use is forecast at 1,220mt, with feed use expected to rise by 5.6mt to 772mt and food/industry lower at 447.6 mt in 2024/25. China continues to be the largest consumer of coarse grains, especially corn, significantly influencing global feed demand in 2024/25. With lower corn prices it is expected to make-up a large share of China's feed mix for poultry, cattle and aquaculture, offsetting lower use for pig feed.

GLOBAL MEAT TRADE TO REBOUND IN 2024

Following two consecutive years of contraction, global trade in meat/meat products, led by poultry, is expected to rebound will be driven by solid import demand expected in all regions, especially in North America. Although, the outlook may be tempered by trade restrictions stemming from the spread of animal diseases, geopolitical factors and reduced consumer spending.

Global meat production to expand to 371mt in 2024 with increases anticipated in

all regions, except for Asia, most notably pig meat in China.

Poultry meat rising to 146mt in 2024 with output anticipated to improve in all regions. The expansion for poultry meat is driven by strong consumer demand, due to affordability, the impact of low food costs on prices, given risks stemming from highly pathogenic avian influenza (HPAI) outbreaks and high operational costs in the top producing countries.

Beef and lamb output to rise to 77mt and 17mt respectively in 2024 with ample supplies of slaughter-ready cattle; however, consumer spending power and relatively high bovine meat prices are likely to limit demand and impact production growth prospects.

Global pig meat output is to shrink by c.123mt in 2024, due to an anticipated decline in China. The government faces a number of challenges in its efforts to deal with disease issues, contain oversupply, maintain domestic price stability by reducing the breeding sow numbers to 40.41m/head (-5.4%) and lowering the target for the national swine stock. Extremely low pork prices in China since early 2023, are said to have weakened demand for imports. Many major foreign suppliers including the EU, Brazil and the US find it difficult for their pig meat exports to remain competitive in the Chinese market given low domestic prices.

CHINA'S COARSE GRAINS IMPORTS ARE FORECAST AT 39.1MT IN 2024/25

China's large pig herd, poultry and aquatic sectors and strong consumer demand for meat, suggest that corn imports at 21mt

and other coarse grain imports barley, sorghum, oats and rye c.18.1mt) are required to supplement insufficient domestic feed production.

LARGE CORN SUPPLIES CAP FEED GRAINS PRICES IN 2024/25

Growth in global corn supply is driving down world prices for feed, food/industry and ethanol production while incentivizing major corn producing countries like US and Brazil towards greater industrial consumption.

PRICES FALL ON AMPLE SUPPLIES

With large global corn stocks of 310mt (World 97mt, China 213mt) pressured prices at major export ports, which have fallen further since last year. Brazil Feed (Paranagua) fob \$201/t (11 Sept '24); Argentina Feed (Up River) fob \$191/t (11 Sept '24); US 3YC (Gulf) fob \$205/t (11 Sept '24).

BARLEY FOR FEED USE TO RISE BY ALMOST 7MT TO 104MT

Modest cut in the global barley area to 45.7ha, coupled with improved yields across major producing areas including the EU and Australia more than offset lower output in Russia and Argentina-the global barley crop is forecast at 144mt, 2mt up on

WORLD — MAJOR OILSEED SUPPLY & DEMAND 2020/21–2024/25 (MT)

2020/21	2021/22	2022/23	2023/24	2024/25	
Production	610	612	638	658	687
of which (soybeans)	369	360	379	395	429
Crush	512	512	526	545	557
Consumption meals*	342	342	350	361	371
Trade meals*	94	94	95	102	103
Trade seeds	192	180	201	205	208
Stocks	114	112	120	131	151
of which (soybeans)	64	52	64	64	81
key exporters**					

Source: USDA/*Meals cons/trade-excl. fishmeal

**Argentina, Brazil, US

the previous crop year. Feed use to rise by almost 7mt to 104mt, food/industry use at 44.6mt unchanged from last year. Greater uptake for barley seen in the EU, UK, Saudi Arabia, Iran and Australia.

GLOBAL BARLEY TRADE LOWER IN 2024/25

Trade in barley lower by c.3mt to 27.8mt, mainly due to falling imports to China from 15mt to 10.5mt this season, partially offset by increased imports of barley into Saudi Arabia, Iran, Jordan and some other countries. Argentina Feed (Up River) fob \$205/t (11 Sept '24); France (Rouen) fob \$213/t (11 Sept '24).

SORGHUM OUTPUT TO RISE TO 62MT IN 2024/25

Mostly due to an increase in Nigeria, Sudan, Argentina, Australia, Niger, EU, Burkina Faso and some other countries. Global sorghum exports are forecast at 8.9mt. China is the largest market with imports at 7.2mt slightly below last year for the feed industry-pig, poultry and for baijiu (a national spirit beverage) made by fermenting cooked sorghum. Major sorghum exporters include the US 5.2mt, Argentina 1.2mt and Australia 2.1mt. Sorghum values, like other coarse grains have fallen — Texas FOB \$234.14 (11 Sept '24)

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GLOBAL OILSEEDS OUTPUT TO RISE TO 687MT IN 2024/25

Despite drought, floods, inclement weather conditions, and falling prices, global oilseed output is expected to rise to 687mt in 2024/25.

HEFTY SOYBEAN CROP 429MT FORECAST IN 2024/25

With a significant increase in the global planted area for soybeans, oilseed production is forecast to rise to 687mt in 2024/25. This increase in output driven by



Groundnuts.



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rising soybean output primarily in the US, Brazil and Argentina. USDA forecast the global soybean crop to rise to 429mt; this includes a large US crop 125mt, Brazil 169mt (CONAB 166mt), Argentina 51mt, and Paraguay 11mt. Better crops are also anticipated for groundnuts 51.4mt, cottonseed 42.2mt, palm kernel 20.7mt, partially offsetting lower output for rapeseed 87.6mt — mainly in the EU, and for sunflower seed 50.6mt — mainly in Ukraine and copra 5.8mt. With large crops to be harvested in the US, and South America's drought status impacting plantings-soybean prices likely to see upward movement when Brazil's soy crop is planted.

BRAZIL'S PRESIDENT VISITS AN AMAZON COMMUNITY

While visiting an Amazon riverside community near the city of Tefe in September, Brazilian President Luiz Inácio Lula da Silva said, "The Amazon is currently experiencing the worst drought in 40 years." Scientists believe much of the crisis, can be explained by climate change, driving temperatures higher and making rainfall more unpredictable. While also acknowledging it has been exacerbated by the deforestation of the Amazon, which has

the potential to disrupt rainfall patterns across much of South America.

EU'S DEFORESTATION REGULATION (EUDR) TAKES EFFECT FROM 30TH DECEMBER 2024

This regulation requires companies, if selling within or exporting from the EU to be EUDR compliant. This means showing that forest-based products like, coffee, cocoa, palm oil and rubber, are legal, not sourced from deforested land and do not contribute to degradation. While the EUDR takes effect in December, the EU Commission have yet to publish the guidelines.

FOOD, FEED AND BIOFUELS STIMULATE DEMAND FOR OILSEEDS

Global production of oilseeds has risen over the recent past to 429mt due to their multi-purpose use. In 2024/25, global crush for major oilseeds led by soybeans is forecast to rise by 12mt to 557mt. Feed use of oil-meals to rise to 371mt, with oils 224mt for food and biofuels.

EU'S RENEWABLE ENERGY DIRECTIVE (RED III)

The consumption of biofuels and sustainable aviation fuel (SAF), have been

incentivized due to a range of EU environmental policies-including, RED III, which provides a 29% renewable energy target for transport by 2030.

MODEST FALL IN CHINA'S SOY IMPORTS TO 109MT IN 2024/25

China is projected to remain the world's largest soybean buyer with imports forecast year-on-year slightly lower at 109mt in 2024/25. Falling soybean prices, driven by large soybean crops, led China's crush margins to turn positive, which together with an improvement in Chinese average swine prices, above the breakeven point of RMB 15.2/kg, may incentivize producers to expand production. Larger imports of major oilseeds are also seen in a number of other countries including the EU, Mexico, Turkey, Thailand, Egypt, Iran and Indonesia.

LOW WATER LEVELS IN THE PARANA RIVER, CAUSES DELAYS

Brazil's soybean exports are forecast at 105mt, US 51mt, Argentina 4.5mt and Paraguay 7.3 mt. Ships calling at Argentina's major inland river port of Rosario to load grains and oilseeds are taking on less cargo as water levels drop to near record lows, due to a major drought upstream in Brazil, pushing up costs and transport times. In September, the Argentine Naval Prefecture confirmed the level of the Parana river at Rosario was 0.38 metres, versus the normal level of 2.5 metres.

GLOBAL OILSEED STOCKS TO RISE TO 151MT IN 2024/25

With forecasts of potential large harvests, oilseed stocks are expected to rise by 20mt to 151mt in 2024/25. Lower prices of soybeans — Argentina (Up River) \$415 FOB (11 Sept '24), Brazil (Paranagua) \$428/t FOB (11 Sept '24), US 2Y (Gulf) \$411/t (11 Sept '24) — CBOT Futures contract soybeans closed up \$10.06 (11 Sept'24).

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China steel exports

unsettling world prices



Kunal Bose

Faced with demand recession at home, China is selling growing quantities of steel abroad. As such exports are made at less than production cost, depressing steel prices globally, they are causing harm to steelmakers everywhere.

How has China become an awe-inspiring manufacturing powerhouse backed by crude steel capacity of 1.078 billion tonnes and aluminium smelting capacity of 45.19mt (million tonnes)? Any number of dissertations on the subject analysing the economic and political factors propelling the country's rapid industrialization since the late 20th century are available. All scholarly inquiries into the subject will credit the 'economic miracle' — communist party officials feel comfortable in describing the makeover of the economy as 'socialist market economy' to Deng Xiaoping, the unquestioned leader of the People's Republic of China for over a decade up to November 1989. The architect of modern China created favourable conditions for foreign

investment through an 'open door policy.' China's ascendance to being the world's second-largest economy is largely due to Deng-era reforms.

India has been for some time also nursing the ambition to become a factory to the world. In the pursuit of this goal, New Delhi is hoping that the 'China plus one strategy' of US corporations (to start with, but now also being pursued by business groups in Japan and Europe) will see many enterprises in these regions building factories in India.

For nearly three decades, companies in the West and Japan had been investing heavily in China to take advantage of its low labour and manufacturing costs. But over time, as that advantage started fading, geopolitical tensions and trade-related disagreements centred around Beijing grew. The wariness resulting from all this has convinced foreign investors about the risks of high supply chain dependency on China by remaining too heavily invested in one country. In their attempts to reduce excessive dependence on China outfits,

which may be seriously disruptive of their overall operations in times of crisis (say a real time conflict arising from Chinese designs on Taiwan and claims over South China Sea), the worried companies are moving parts of China-based capacity to southeast Asian countries and India, among others.

The other day, India's G20 Sherpa Amitabh Kant didn't mince words when he said China's emergence as a powerful manufacturing nation was due largely to the US. "If you look at the top 30 companies there, 95–98% of their manufacturing is outsourced to China," he said. And the rub lies in this level of dependence on a country with which the West has growing differences on a raft of political and trade-related issues. Besides helping them to source components and semi-finished and finished products for their own use, a large domestic market was an important consideration for building factories in China by the multinationals based in the West and Japan. But domestic demand in China is no longer growing in

the same way as in the past. A recent finding by the American Chamber of Commerce in Shanghai says US companies working in China are reporting record low profits and also a sharp fall in business confidence. Of the working of 306 companies analysed by the Chamber, just around 66% was found profitable in 2023. No wonder at least 25% of US firms have cut investment in China operations shifting focus to countries such as Vietnam, India and Malaysia and Latin America.

At the recent global steel conclave held in New Delhi under the auspices of the Indian Steel Association, participants reflected at length how a saturated real estate market, along with the liquidity crisis faced by property developers and a decline in steel-intensive urbanization, are leaving China with growing surpluses of steel which the country is disposing of in the world market to the detriment of Chinese steel receiving countries. 'Evolving with Steel,' a report prepared by McKinsey & Company says: "As structural changes move China away from steel-intensive development, demand (domestic) is expected to decline from around 900mt in 2023 to around 800–850mt by 2035." Developed economies with ideal infrastructure in place and demand for housing largely fulfilled have expectedly experienced a fall in steel demand.

Much to the disappointment of other steelmaking countries, they have only seen reduction of Chinese steel capacity to 1.078mt in 2023 from 1.116mt by way of elimination of outdated and polluting mills. Going forward, the country, which is allowing only capacity replacement but no net addition, is to experience capacity settling down in the range of 1.030 and 1.060 billion tonnes by 2035. The dual carbon emission goals of China are: carbon emission peak by 2030 and carbon neutrality by 2060. This, however, will not be easy to achieve considering that the steel industry there emits over two tonnes of carbon dioxide for every tonne of metal it makes, which is more than double than is the case in the US and is also significantly above the global average CO₂ emissions. The Chinese steel-linked emission problem is largely because of two factors: first, the source of energy for the industry is mostly fossil based fuel coal. Second is the prevalence of old technology on a large scale. But as old mills are scrapped, the industry is witnessing a 'gradual' shift to electric arc furnace (EAF)-based steelmaking.

McKinsey expects EAF share of Chinese steelmaking capacity to grow from 16% in



2022 to 20 to 25% by 2035. At the same time, producers of steel through BF-BOF route will remain under government pressure to modernize, use more and more renewable energy, including hydro electricity and install carbon capture, utilization and storage (CCUS) facilities. While the rest of the world would have welcomed a far greater degree of capacity pruning and faster modernization of the Chinese steel industry, it stays gravely concerned about rising exports from the country with over half the global steel production. In the first eight months of 2024 up to August, China's steel shipments to foreign shores rose 20.6% year-on-year to 70.58mt. Never since 2016, have exports happened in such large volumes. A rapid rise in exports so far this year has led McKinsey to forecast 2024 exports exceeding 100mt, compared with 93mt in 2023. Some research agencies think Chinese steel exports could exceed 110mt driven by domestic demand recession and likelihood of worsening trade conflicts.

Not only China, but also South Korea, Japan and rather surprisingly Vietnam continue to sell so much steel to India lured by a market where use of the metal jumped 13.6% to 136mt in 2023–24. Not only is China's predatory marketing a factor responsible for India becoming a net importer of steel, but it is also making steel exports from here difficult. India's steel imports last financial year were up 38% to 8.3mt when exports climbed 11.5% to 7.5mt. India's steel imports continue to be buoyant causing injury to domestic industry and making New Delhi sit up and

consider measures to foil imports at less than production cost.

The impact of Chinese predation by way of steel exports has been well summed up by Tata Steel CEO & MD TV Narendran who said that Indian steelmakers must have an EBITDA margin of 15 to 20% so that they could fund new capacity building. But because of high imports, steel prices in India have come to their lowest in more than three years. China burdened with surplus steel is exporting its 'problem' to the rest of the world. "This is a problem we faced in 2015, which is now revisiting us. China is selling steel at prices where even they are losing money. Other countries are taking steps to address this issue. India should certainly consider taking action as well." Besides direct exports by China, it is suspected of routing supplies to the world, including through some southeast Asian countries.

McKinsey says: "Over the last seven to eight quarters, the steel industry has faced margin pressure across the globe. As countries step up exports to address domestic surplus capacity, margin pressures are expected to continue across the world, including India." In a situation like this, the Indian steel industry, which has the world's most ambitious growth plans, will be faced with the difficult task of generating surpluses to fund new projects. This has been forcefully underlined by Narendran and other industry leaders on a number of occasions. The three principal factors that will propel steel demand growth in India are: continuous focus on building a robust infrastructure that will be supportive of manufacturing and at the same time progressively bring logistics cost down; second, the country is expected to add 140m new middle class households by 2030 with an annual income of over \$10,000 and that will be demand generative for steel and other metals; third, government policies are directed to make the country a hub of industrial activity like what has already happened in China.

Likely erring on the side of caution, McKinsey has forecast Indian steel demand to be in the range of 240–260mt by 2035, based on a CAGR of 6%. The industry, according to this consulting & research agency, has — in order to meet the incremental demand — announced fresh capacity building of up to 80mt in the "next decade, mostly through the currently prevalent coal-based integrated BF-BOF route." In this endeavour, all the leading steelmakers from Tata Steel to JSW to ArcelorMittal-Nippon Steel to SAIL are participating.

Anemoi partners with NAPA to maximize Rotor Sail benefits with voyage optimization

Anemoi Marine Technologies Ltd. (Anemoi) has signed an agreement with NAPA, the Finnish-based global maritime software, services and data analysis expert, to bring its weather routing and voyage optimization tools to users of its award-winning Rotor Sails.

The partnership between the two maritime technology companies will enable all vessels fitted with Anemoi's Rotor Sails to access critical weather and voyage optimization data, enabling shipowners and operators to choose routes that will increase the performance of vessels equipped with Rotor Sails and reap the maximum fuel savings and emission reductions possible.

Under the terms of the agreement, NAPA software will be included as an option in all future sales of Anemoi's Rotor Sails, including both newbuilds and retrofits.

NAPA Voyage Optimization software generates tailored route suggestions based on the unique 3D performance model of each vessel including sail configurations. By integrating weather routing, route networks, and port data, the software proposes routes that account for wind speeds, wave conditions, currents, water depth, and safety parameters. This data-driven approach empowers ship captains to select voyage routes that enable onboard Rotor Sail technology to work at its maximum efficiency.

Rotor Sail technologies are increasingly being sought after by vessel owners as a critical energy saving technology in order to meet international emission reduction targets, including Energy Efficiency Design Index (EEDI), Energy Efficiency Existing Ship Index (EEXI), and the Carbon Intensity Indicator (CII). Anemoi's industry-leading Rotor Sails have been shown to save up to 30% in harmful carbon emissions from vessels operating on routes that have good wind conditions.

Kim Diederichsen, CEO of Anemoi, said, "Our partnership with NAPA is yet another step in improving the efficiency and effectiveness of our Rotor Sails for global shipowners. Crucially, it shows the importance of how data can be used to improve the decarbonization efforts of global shipping. Anemoi has long advocated for the combination of wind-propulsion technology and data through our Fuel Saving Assessment methodology to accurately predict fuel and emissions



*Anemoi Rotor Sails
Credit: Anemoi Marine Technologies.*

savings. This latest collaboration will take this data-driven approach to decarbonization to the next level."

Mikko Kuosa, CEO of NAPA said, "This partnership with Anemoi exemplifies NAPA's commitment to leveraging advanced data analytics to drive maritime efficiency and sustainability. By integrating NAPA Voyage Optimization software with Anemoi's Rotor Sails we equip shipowners and operators with the necessary tools to fully harness wind power for greater efficiency and sustainability."

ABOUT ANEMOI MARINE TECHNOLOGIES (ANEMOI)

Anemoi Marine Technologies is a leading provider of Rotor Sails to the shipping industry. The energy saving technology offers significant reductions in fuel consumption and lowers CO₂, SO_x and NO_x emissions to deliver more efficient ships.

Following extensive research and

development, Anemoi has commercialized the product for widespread adoption by the global merchant fleet. With a background in the bulk carrier sector, Anemoi's patented design addresses operational considerations, proving it can work for the majority of sectors.

Rotor Sails play a key part in addressing industry environmental targets and creating a sustainable future of shipping.

ABOUT NAPA

NAPA is a leading provider of software and digital services for the global maritime industry, harnessing data science to enable safer, more sustainable and future-proof shipping. Founded in 1989 to provide smart solutions for ship design, NAPA is now the global reference in shipbuilding, with over 90% of new vessels built by NAPA customers. Today, the company's expertise spans the entire lifecycle of a ship, from shipyards to operational safety and efficiency at sea.

Loss prevention must be a prerequisite to achieving climate change goals, argues IUMI



On 18 September in Berlin, at its 150th anniversary conference, the International Union of Marine Insurance (IUMI) made the link between loss prevention and the reality of society meeting its decarbonization goals.

Pascal Dubois, Chair of the IUMI Loss Prevention Committee reiterated the enormous challenge faced by society and highlighted three key requirements to effect change: financial investment, innovation and long-term political will. However, he argued that this would not be enough unless backed by a comprehensive programme of loss prevention.

"Climate change continues to impact our daily lives. As a Frenchman living in Paris, I've seen floods devastating my homeland making certain areas of France uninhabitable. We are all being impacted by changes to our environment," Dubois said. "I believe society has the potential to be overwhelmed by the challenges it faces unless we develop and implement loss

prevention as a prerequisite to tackling climate change. Without loss prevention, the capital investment required will simply be too high and political will might wane as a result."

"Shipping has pledged to become carbon-neutral by 2050 and this will require a step change in innovation, technology and global co-operation. Participants will want to de-risk their activities as much as they can and this means their insurers will need to provide suitable cover. It will only be through fully understanding these new risks and implementing broad loss prevention measures that shipping will be in a position to invest, innovate and make the required changes."

IUMI's role is to interact and engage with international bodies such as the IMO to ensure the voice of the marine insurer is heard and to reinforce the role of insurance as an enabler of change. Additionally, IUMI — through its Loss

Prevention Committee — is key to sharing knowledge on loss prevention activities and initiatives.

"Loss prevention is fast becoming much more important than ever before", said Dubois. "If implemented intelligently, it will help us maintain a step ahead as we transition to a manageable low carbon future."

ABOUT IUMI

The International Union of Marine Insurance e.V. (IUMI) is a non-profit association established for the purpose of protecting, safeguarding and advancing insurers' interests in marine and all types of transport insurance. It also provides an essential forum to discuss and exchange ideas, information and statistics of common interest for marine underwriters and in exchange with other marine professionals.

IUMI currently represents 42 national and marine market insurance and reinsurance associations.

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MacGregor pioneering highly automated crane operations with ESL Shipping.



MacGregor highly automated crane system proves optimal for ESL Shipping

A highly automated crane system from MacGregor is helping ESL Shipping to optimize safety and efficiency while assisting crew with their workload in cargo-handling operations.

As automation becomes increasingly widespread in shipping, MacGregor is playing a significant role in bringing the benefits of artificial intelligence-assisted processes to cargo-handling operations. In September 2023, the company successfully demonstrated its robotic container-handling system for the European Union-funded MOSES and AEGIS programmes, with testing for a third EU-back programme, SEAMLESS, scheduled for 2026.

In the bulk-handling segment, MacGregor's automated crane technology is already in commercial use. In 2018, ESL Shipping, a very prominent dry bulk cargo carrier for the Baltic Sea region, contacted MacGregor to discuss a project to implement driverless crane operations aboard its then-newbuild dry cargo ship,

Viikki. The Finnish company makes extensive use of cranes in its daily operations and sought a solution for enhancing efficiency while reducing crew workload.

"We operate our cranes extensively — perhaps for 10 or 15 times more hours per year than the industry average — and our crew handle most of the driving," says Mikki Koskinen, Managing Director, ESL Shipping. "While this has been a strategic asset to us, allowing us to load and discharge cargo independently, we recognized the need to balance our reliance on crew with working-hour regulations — without compromising operational efficiency."

Koskinen explains that MacGregor was the natural choice to partner ESL on the project given the two parties' long-standing relationship and MacGregor's position as the market-leading supplier of automated cargo-handling solutions. "We knew that MacGregor had already developed

technology that could be used for this kind of application," he adds.

THE FIVE LEVELS OF AUTOMATION

MacGregor categorizes its automated crane systems according to five levels of automation/autonomy. At level one — 'assisted' — the human driver has full control of the crane, with the system's 'anti-pendulation' and 'anti-collision' sub-functions helping the driver to perform their duties with optimal efficiency and safety.

At level two — 'partially automated' — the system uses its 'auto-motion' feature to execute driving tasks in a defined area, although the crane still requires constant monitoring. In addition to anti-collision and -pendulation sub-functions, MacGregor's partially automated crane systems offer an 'auto-grip' feature whereby, through machine learning, the grab adapts to different material properties to prevent overloading. Level two also introduces a



'bridge monitoring' sub-function allowing crew to monitor all connected cranes from the vessel's command centre.

With the technology behind levels four and five — 'fully automated' and 'autonomous' — still in development, level-three or 'highly automated' crane systems are the most advanced MacGregor currently offers.

Executing driving tasks in a defined area and requesting the human operator's intervention when they reach their performance limits, level-three systems eliminate the need for constant monitoring. They introduce three new sub-functions. 'Bridge control' allows users to initiate the cargo-handling process and manually drive cranes from the bridge; 'cargo scan' displays the topography of material inside the hold to support more accurate picking; and 'power-balance mode' saves energy and is especially effective when used in conjunction with electric cranes.

"With our highly automated crane technology, companies benefit from increased safety and efficiency as the crane works within a defined framework to prevent collisions and minimize human error," comments Mikael Hägglund, Sales Manager, Self-Unloading Systems and Cranes, MacGregor. "Maintenance requirements are also reduced as the smaller, smoother motions of an automated crane minimize wear and tear to the motors and mechanical structure."

A SUCCESSFUL COLLABORATION

ESL vessel *Viikki* features three MacGregor electro-hydraulic cranes, each equipped with MacGregor's highly automated crane

system. Commissioning was delayed due to travel restrictions resulting from the Covid-19 pandemic, but the project was brought to a successful conclusion in 2023 following thorough onboard testing.

"ESL gave us time on board the ship to install the solution and test its operation," notes Christian Nordin, Software Designer, Cranes, MacGregor. "We had performed simulations at our own facilities, but the ability to verify the technology on real cranes, on board a real ship, was invaluable, and we were able to finalize testing and commissioning last year."

With the solution having now been in service for several months, ESL has adopted a hybrid approach to operating its cranes, says Timo Kosunen, Captain, *Viikki*: "We use either manual or automation mode depending on the situation. Manual mode is faster but requires three or four experienced operators, while automation mode allows one operator to run all cranes simultaneously. When not in a hurry, we use automation mode to discharge more cost efficiently."

To optimize performance and safety, ESL also uses features and sub-functions of the highly automated system during manual operations. In addition to utilizing the auto-grip function to help new operators learn how to avoid overloading with heavier cargoes, Kosunen says, ESL relies on the camera attached to the jib when manually discharging from other vessels: "We use manual mode in ship-to-ship operations where the environment is more dynamic, but we have found the camera on top of the jib to be very useful in these situations."

Kosunen explains that when

transferring cargo from one ship to another, ESL uses excavators positioned in the hold of the larger vessel, but because of the height difference between the two ships and the small hatch openings, the crane operator is normally unable to see inside the hold. "Thanks to the camera, the operator can see into the other vessel's hold and has a visual of the excavator inside, which improves accuracy and helps to prevent damages," he says.

However, according to Mikki Koskinen, the major benefit of the solution is that it allows ESL to make the best use of its crew's limited working hours. "The automated system helps us to keep our operations running smoothly without encroaching on our crew members' mandatory rest time," he says. "This is critical in the Scandinavian market, where the focus on work/rest hours is particularly strong. Moreover, with the technology taking on much of the burden in cargo handling, crew can focus on other tasks on board the vessel, such as maintenance."

Looking ahead, Koskinen says ESL is exploring the possibility of installing MacGregor's automated crane system on board *Viikki*'s sistership, *Haaga*, which features the same MacGregor electro-hydraulic cranes, with all the necessary wiring already in place. "Beyond that, we will look to implement the solution on board our forthcoming vessels, which will be equipped with MacGregor's fully electric cranes. We look forward to extending our partnership with MacGregor as we continue to reap the rewards of automated cargo-handling processes," he concludes.

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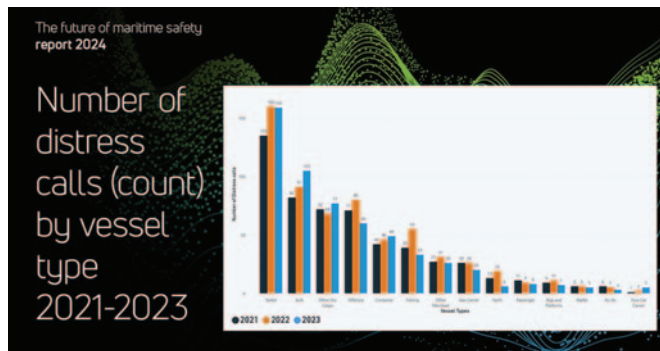
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Inmarsat Safety Report – bulk carriers



Heatmap of bulk carriers GDMSS distress calls, 2023.



Bulk carriers are number 2 on this list of distress calls.

Inmarsat recently published *The Future of Maritime Safety Report 2024*. The report suggests that the maritime industry is beginning to overcome some operational challenges linked to the Covid-19 pandemic, such as limited inspections and disrupted maintenance schedules. However, with the emergence of potential new safety risks associated with future fuels — particularly in the context of the industry's transition to more sustainable practices — and escalating geopolitical tensions, the industry must intensify its efforts to mitigate preventable safety issues.

The Future of Maritime Safety Report 2024 not only provides a snapshot of current safety metrics but also serves as a call to action for the maritime industry to embrace data sharing and collaborative problem-solving as the industry strives to navigate through significant changes, including the transition to greener propulsion technologies.

Below is an excerpt from the report, focussing on bulkers:

"The global bulk carrier fleet increased by 2.8% between 2022 and 2023 to 973,743 thousand dwt (per the UNCTAD Review of Maritime Transport 2023¹) and the fleet's average age was 11.6 years, the lowest average age of any vessel type. The incremental growth rate and relative age of the fleet belies the abrupt rise of GMDSS distress calls received in 2023. Responsible for 105 calls, bulk carriers made the second-highest number of calls by vessel type in 2023, after tankers, and fourth highest by rate of distress calls (79 per 10,000 vessels) after tankers, gas carriers and container ships. This compares unfavourably with the 91 incidents recorded in 2022 and the 82 incidents in 2021 and is even starker when compared with the average of 46 calls made between 2018 and 2020."

Notwithstanding the number of distress calls, INTERCARGO's *Bulk Carrier Casualty*

*Report 2014-2023*² shows a trend of declining losses of bulk carriers over 10,000 dwt engaged in international trade. Although it should be noted that smaller bulkers and those on cabotage are not within the scope of the report. The report cites grounding as the cause of most bulk carrier losses (nine losses or 42.9% of the total lost over the past ten years) and cargo liquefaction remains the greatest contributor to loss of life (55 lives over the past ten years).

Shipping has taken positive steps to reduce the latter and amendments 06-21 of the International Maritime Solid Bulk Cargoes (IMSBC) Code³ entered into force on 1 December 2023. While it is too early to discern impact, it is hoped that the requirement for more accurate cargo information and the inclusion of the term 'dynamic separation', concerning moisture-related cargo failure, will reduce the incidence of cargo liquefaction.

Incidents involving bulk carriers occur globally, but analysis of 2023 GMDSS data analysis suggests a distinct concentration of incidents between the East China and South China Seas, the Straits of Malacca and Singapore, the Black Sea and the Eastern Mediterranean.

The comparatively high count of GMDSS distress calls during 2023 suggests that potential safety issues around repurposing bulk carriers to transport containers, for example, stability, securing cargo and firefighting may still be a factor. Extreme weather and security incidents are also likely responsible.

Off the coast of China, Typhoon Saola reportedly sank the *Hua Hai 601* and *Zheng He 9* on 28th August 2023, with all crew members reported safe⁴. Another bulk carrier, the *Yong Xing 56*, suffered a hull breach after colliding with an ice floe in the Tatar Strait. Despite salvors' efforts, the ship sank on 1 March but fortunately, all 21 crewmembers were rescued by a passenger ferry⁵.

Bulkers were disproportionately affected by piracy and armed robbery against ships in 2023. The trading patterns of bulk carriers in East and Southeast Asia appear to correspond with the increase in security incidents. ReCAAP reported against such vessels (48% of incidents), and likely contributed to the overall increase in GMDSS distress calls. IMB also reported that 45 of the 120 incidents it recorded globally were against bulkers, one of which included the attack on the bulk carrier *Ruen* on 14 December by Somali pirates. The vessel remains off Somalia.

Piracy is not the only security threat. After Russia withdrew from the Black Sea Grain Initiative, Ukraine established a route along the western shores of the Black Sea. By 28th December 2023, 386 outbound ship voyages had carried approximately 12.5m tonnes of agricultural and iron ore products from three ports⁶, but such transits are not without risk. On 27 December 2023, the bulk carrier *Yssos* struck a naval mine in the Black Sea. Two crew members were injured, and the master intentionally grounded the vessel to prevent it sinking⁷.

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ITOCHU, Nihon Shipyard, ClassNK and MPA, signed MoU for joint study of ammonia-fuelled bulk carriers

ITOCHU Corporation, ClassNK, Nihon Shipyard Co., Ltd., and Maritime and Port Authority of Singapore (MPA) have signed a Memorandum of Understanding (MoU) regarding a joint study for the design and safety specifications of ammonia-fuelled ships which are under development by ITOCHU and partners.

Ammonia is advancing as a viable marine fuel solution for the decarbonization of the maritime sector. The discussion for a specification of ammonia-fuelled ship with governmental body related to their operation is essential for a social implementation of ammonia-fuelled ship.

As one of parties of the MoU, MPA, the government agency overseeing the world's busiest bunkering hub, will review and provide their views to the designs of the

ammonia-fuelled ships to ensure their safe operations.

This MoU is based on the premise that 200,000 deadweight tonne class bulk carriers will be built by Nihon Shipyard with an ammonia dual-fuelled engine by applying alternative design approval¹ process in accordance with the 'Integrated project for development and social implementation of ammonia-fuelled ships' which was adopted under the 'Green Innovation Fund Project/Development Project for Next-Generation Ships/Development of Ammonia-Fueled Ship', a project publicly offered by New Energy and Industrial Technology Development Organization (NEDO) in October 2021. The necessary clarifications of the specification for the ammonia-fuelled ship to carry out ammonia bunkering in

Singapore will be conducted among parties of this MoU, for the commercialization of ammonia-fuelled ships.

As a classification society, ClassNK is responsible for providing insight from the perspective of safety and environmental protection as well as information on alternative design approval process. ClassNK is committed to participating in various initiatives towards decarbonization and will continue to contribute to society through safety assessments and information provision.

¹ Alternative design approval is to prove that the ship is as safe as a ship built in accordance with existing international regulations and to obtain approval from the competent authorities when the ship is designed without any international guidelines.

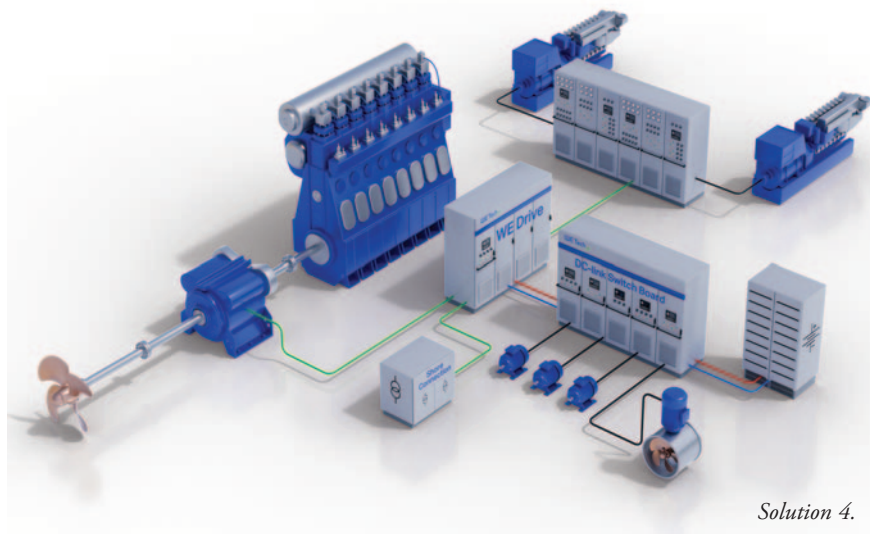
Successful retrofitting of shaft generators: revolutionizing energy efficiency

WE Tech Solutions is revolutionizing energy efficiency in the maritime industry with successful retrofitting of shaft generators on a series of bulk carriers for a Norwegian shipowner.

WE Tech Solutions is a pioneer in the industry, providing modern and patented permanent magnetic shaft generator solutions which offer superior efficiency and energy utilization. This solution can be applied to both newbuilds as well as retrofits and comes in various levels starting from power-take off (PTO) solutions to full electric propulsion including eg. shore connection and batteries. The company clearly demonstrates that reduction in fuel consumption and emissions is the way forward.

While many in the industry focus on alternative fuels, WE Tech Solutions' shaft generator solutions provides an immediate, cost-effective way for ship operators to optimize energy production by centralizing it to the main engine. This innovation allows vessels to generate power at the lowest possible cost while significantly improving overall operational efficiency. The solutions can also include features like load peak shaving, black-out prevention and black-out start.

Since 2010, WE Tech Solutions has provided efficiency upgrades to more than 200 vessels, from ferries to LNG carriers and to large bulk carriers and many other



Solution 4.

ship types. The tailor-made solutions include shaft generators, drives, battery packages, shore connection capabilities, and other smart systems. The retrofit solutions have resulted in lower fuel consumption, reduced emissions, and extended machinery life by reducing the running hours on auxiliary gensets. By using power directly from the main engine through the propeller shaft, ship operators can leverage the efficiency difference of up to 60-70g/kWh between a two-stroke engine and a traditional four-stroke genset.

Petter Bodman, sales manager at WE Tech Solutions, explains how the customers have become more aware of

the benefits of modern shaft generators. The utilization of shaft generators as such is an old concept, however, WE Tech Solutions are offering the most modern technology which is based on permanent magnet technology. This is a game changer. With the extended utilization rate, thanks to variable speed as well as the possibility of various modes and features, the company has been able to deliver solutions which is a new chapter of more efficient energy utilization onboard.

WE Tech Solutions is successfully guiding the path towards zero emissions in the shipping industry, aiming for a green future.

Oldendorff Carriers partners with Procureship to enhance procurement capabilities for its global fleet of dry bulk vessels

Procureship, provider of the world's leading e-procurement platform, has partnered with German shipowner Oldendorff Carriers to supply its technology in order to support the procurement capabilities of Oldendorff's fleet of dry bulk vessels.

The partnership will leverage Procureship's innovative e-procurement platform, which utilizes automation and Machine Learning, to increase the efficiency of Oldendorff Carriers' procurement operations, provide access to a greater number of global marine suppliers and service providers and bolster its data-driven decision-making capabilities.

The move comes as Oldendorff Carriers, which operates over 675 bulkers and transports about 380 million tonnes of bulk cargo annually, continues to drive the sustainability efforts of its fleet of Capesize, Panamax, Supramax, Handysize, and Transshipment vessels to reduce its carbon footprint and cut costs.

With the addition of Oldendorff Carriers to the platform, Procureship now has more than 2,000 vessels from over 80 fleet owners and operators utilizing their system, making it one of the world's fastest growing digital platforms in the maritime space.

"Our latest partnership with Oldendorff Carriers is a testament to the extensive growth Procureship has seen over the past few years. We continue to see more and more vessel owners

enhancing their operational capabilities by using the right digital tools and using real-time data to improve their decision-making. Procureship enables shipping companies to improve their procurement models, making processes cheaper, faster, and more secure, as well as improving their sustainability credentials. We're delighted to welcome Oldendorff Carriers to the Procureship platform and look forward to many years of close collaboration together," said Grigoris Lamprou, Co-Founder and Chief Executive Officer of Procureship.

"In a fast-paced purchasing environment, it is important that we have access to efficient and intuitive software. We believe that we have found this with Procureship, and we are looking forward to the collaboration," said Henning Wegner, Head of Procurement at Oldendorff Carriers.

Oldendorff Carriers is the latest German shipowner to utilize the Procureship platform, following Neu Seeschiffahrt, Orion Reederei, TB Marine, and Zeaborn Ship Management, as the Greek e-procurement provider continues to collaborate with more European ship owners, operators and managers.

ABOUT PROCURESHIP

Established in 2016, Procureship is an innovative e-procurement platform based in Athens, Greece, with regional offices in Denmark and Singapore. The company manages a network of trusted suppliers

across all major ports and regions, connecting them to over 80 buyers representing over 2,000 globally trading merchant vessels.

Procureship makes purchasing critical components, supplies, and services for vessels easier, faster and more streamlined. Its automated platform optimizes the procurement process by eliminating unnecessary manual work and recommending suppliers through its unique machine learning algorithm and service providers marketplace. The platform also offers unique features including IHM maintenance documentation, e-invoicing and upcoming vendor management, tenders/contracts management, and freight forwarding optimization. Procureship offers an unparalleled level of customer support with its team of dedicated account managers that offer daily support to all buyers and suppliers.

ABOUT OLDENDORFF CARRIERS

Since its establishment in 1921, Oldendorff Carriers has grown into one of the world's leading dry bulk owners and operators. Today it boasts 103 years of one-stop shipping, assuring the service quality and responsiveness that its clients require. Each year, it carries about 380 million tonnes of bulk and unitized cargo around the world. The company performs approximately 15,000 port calls in 118 countries, and on average, operate about 700 chartered and owned ships at any one time.

Lauritzen NexGen – growth ambitions

J. Lauritzen has established Lauritzen NexGen to actively invest in the decarbonization of the shipping industry. The company is currently building three Kamsarmax bulk carriers with methanol dual-fuel engines, which have been taken on long-term time-charter by Cargill.

J. Lauritzen's ambition is to grow Lauritzen NexGen through further investments in zero-emission capable assets, preferably in partnerships with charterers, shipyards, financiers and potentially also equity partners.

To support this initiative, Lauritzen NexGen has teamed up with Ulrik Uhrenfeldt Andersen, who will work with J. Lauritzen in the coming months to identify growth opportunities and strategic partnerships for the company.

Ulrik Uhrenfeldt Andersen has extensive maritime industry experience, and he most recently worked as CEO for Golden Ocean Group, Norway and Avance Gas, Norway. Before that, Ulrik Andersen was Head of Shipping for Petredec, Singapore and Managing Director for Neu Gas Shipping, Germany.

ABOUT J. LAURITZEN

J. Lauritzen is a Danish maritime investment company established in 1884, which is fully owned by the Lauritzen Foundation. Today it acts as a value creating owner of Lauritzen Fonden's portfolio of maritime and maritime related investments, except the Foundation's controlling interest in DFDS. J. Lauritzen has nine investments in its portfolio with a total market value of about US\$600 million.

Hempel introduces Hempaguard Ultima; the next generation of its groundbreaking high-performance silicone hull coating system

As the maritime industry faces increasing pressure to decarbonize, Hempel proudly introduces its groundbreaking new two-layer coating system, Hempaguard Ultima. Building on the success of Hempaguard X7, which has been applied to more than 4000 vessels and is third-party verified and validated for its performance and decarbonization efforts by DNV, Hempel has invested in further developing its cutting-edge innovation. With the introduction of Hempaguard Ultima, customers are better able to navigate the increasingly strict regulatory environment and move the maritime industry closer to meeting its decarbonization goals.

"Hempaguard Ultima is our most significant innovation in a decade and an important step forward in our ability to protect and improve our customers' most important assets. It has been designed to safeguard vessels from fouling with a unique two-layer system, enabling our customers to reach their sustainability objectives while also achieving operational excellence. I am excited to introduce this ground-breaking innovation to our customers and look forward to following its success and impact in the market," says Alexander Enström, Executive Vice President and Head of Marine at Hempel A/S.

Hempaguard Ultima combines the tried-and-tested performance of Hempaguard X7 with Hempel's revolutionary new biocide-free silicone topcoat, Hempaguard XL, preventing growth of marine organisms while ensuring long-lasting hull protection. By choosing

Hempaguard Ultima, vessel owners and operators can reach their decarbonization goals swiftly whilst benefitting from reduced operating costs. With Hempaguard Ultima, customers can expect:

- ❖ Up to 21% fuel savings
- ❖ 160 fouling-free idle days
- ❖ Only 0.9% speed loss on average¹
- ❖ 6% immediate out-of-dock performance increase²

Diego Meseguer Yebra, R&D Director Marine at Hempel A/S comments "With Hempaguard Ultima, a vessel's hull is able to achieve a more stable surface smoothness, even into the fourth or fifth year of the docking cycle³. This reduces the risk of fouling after long service periods, even when the coating's hydrogel and biocide can start losing some effectiveness. At the same time, the Hempaguard XL topcoat acts as a modulator for the release of biocide from Hempaguard X7, allowing a lower biocide amount per square metre to last longer."

ABOUT HEMPEL

As a prominent supplier of trusted coating solutions, Hempel is a global company with strong values, working with customers in the decorative, marine, infrastructure and energy industries. Hempel factories, R&D centres and stock points are established in every region.

Across the globe, Hempel's paints and coatings can be found in almost every country of the world. They protect and beautify buildings, infrastructure and other assets, and play an essential role in

Hempel's customers' businesses. They help minimize maintenance costs, improve aesthetics and increase energy efficiency.

At Hempel, the company's purpose is to shape a brighter future with sustainable coating solutions. Hempel firmly believes that it will succeed as a business only if it places sustainability at its heart. Not only is it the right thing to do, it will strengthen its competitive position, make it more resilient and reduce its risk.

Hempel was founded in Copenhagen, Denmark in 1915. It is proudly owned by the Hempel Foundation, which ensures a solid economic base for the Hempel Group and supports cultural, social, humanitarian and scientific purposes around the world.

1 Speed loss measurements are used to monitor how much a ship's speed has decreased compared to its optimal or expected speed. This is typically done by comparing the ship's current speed under certain conditions (like a clean hull and calm seas) to its speed after some time in operation, when the hull might be fouled. Speed loss is important because it directly impacts a ship's fuel efficiency and operational costs.

2 Out-of-dock speed increase refers to the boost in a ship's speed that typically happens after it has undergone maintenance, particularly after its hull has been cleaned, repaired, or repainted while the ship is in dry dock.

3 Generally ships have a five year docking cycle, meaning they operate mostly at sea and come into dock every five years to be cleaned and have coatings re-applied.

HarborLab data shows global impact of rerouting

Geopolitical challenges in the Red Sea have plagued the maritime sector for the past 12 months, leading to unpredictability in the market and fluctuating freight rates. This has led to a notable impact on port expenses and overall ship financing dynamics as vessels choose to reroute to avoid issues in the Suez Canal.

Rerouting is a major financial risk for ship operators and charterers. By extending their voyage for up to 14 days by opting for routes around the Cape of Good Hope, vessels accrue more costs, such as increased fuel use, additional insurance cover and impacted cargo costs. However, rerouting is also having an impact on the Suez Canal itself, as well as ports

around Africa.

According to data from HarborLab, the Greek port disbursement accounting software solution provider, the Suez Canal has experienced a 15% rise in transit expenses for Suezmax vessels despite a total drop in traffic and husbandry calls of 94%. In addition, HarborLab's data show a drop in husbandry calls, covering everything from crew changes to getting spare parts onboard, has resulted in a fall of more than 40% this year for the Canal compared to the same time in 2023.

Conversely, ports in North Africa are seeing growing demand for vessels seeking bunkering and restocking services. According to HarborLab data, certain

North African ports have seen a 45% increase in husbandry calls since November 2023, while ports such as Las Palmas have seen a 2.2% increase in tariffs due to heightened demand from vessels rerouting from the Red Sea.

"What we are seeing is that while many vessels are still choosing to use the Suez Canal rather than divert, they are not choosing to make their husbandry calls at regional ports in great numbers. Instead, they are choosing to make these calls at alternative ports, spurred on by the growing transit expenses," said Antonis Malaxianakis, founder and Chief Executive Officer of HarborLab.

This means vessels are docking at ports

or regions that they might not have experience in, therefore risking further costs related to unknown or fluctuating disbursement fees. As a result, ship managers are seeking digital disbursement accounting (DA) platforms as a way of accessing real-time port data and bridging the transparency gap to make more informed decisions about where the vessel should call or seek the best value.

Disbursement fees are the second-largest expense of any commercial voyage after bunkering and are essential for precise voyage calculations. Port expenses are costs such as port dues, canal transit fees, towage and pilotage costs that are based on official port tariffs, issued by the port authorities for vessels making use of the port's infrastructure and services. In addition, principals pay port agent fees, as well as handling fees for services port agents offer to their vessel, while it undergoes cargo operations, like crew changes, crew transportation and accommodation, husbandry services, and spare part logistics to name but a few.

"All of these add up and, when time is money and margins are razor thin, the importance of real-time data to secure the



best disbursement fees for your vessel is critical amid the ongoing uncertainty in the market. When you combine this with a modern process that removes the cumbersome nature of traditional, paper-based disbursement processes, ship managers and charterers are starting to see the added value that a digital DA analysis service can bring," said Malaxianakis.

"At HarborLab, we understand the need for our users to have access to the most accurate data available to remain profitable. We continue to work closely with ports and agents to collect real-time and reliable data that enables our users to

make better decisions and help them mitigate the financial impacts of geopolitical disruption," he added.

In May 2024, HarborLab secured US\$16 million Series A funding from European VC Atomico to help broaden its software by expanding its team and adding new features to provide a more streamlined approach to all aspects of port calls. With more than four million port calls taking place annually, the need for a streamlined and transparent approach to DA calculations will go a long way to ensure the maritime industry remains the most cost-effective and efficient method of transporting goods globally.

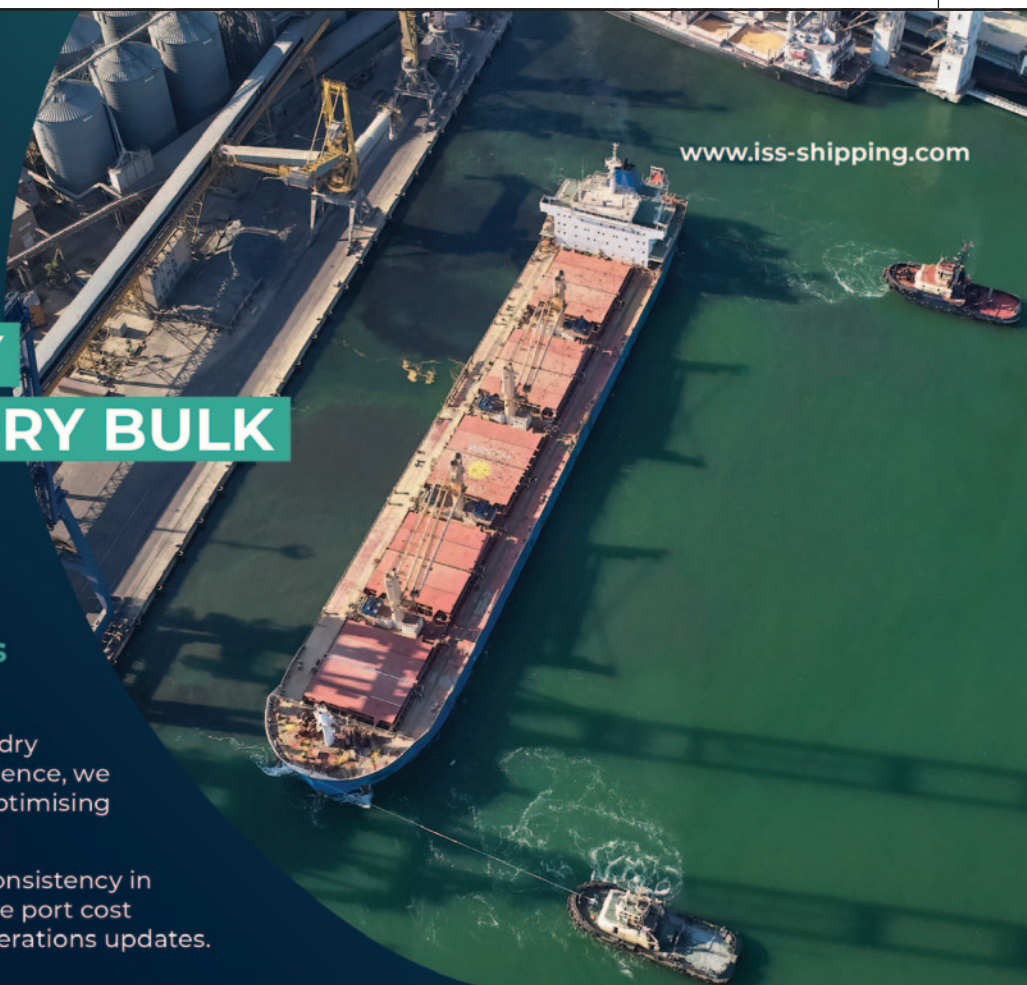


A SEAMLESSLY CONNECTED DRY BULK EXPERIENCE

**With extensive coverage
from 247 local offices across
the globe.**

Inchcape provides the highest level of dry bulk handling, and with years of experience, we can anticipate and negate risk while optimising port and voyage procedure.

Our agents operate with the utmost consistency in safety and compliance, from pre-fixture port cost calculations to accurate daily cargo operations updates.



PDA & PORT REGULATION TEAMS IN ALL REGIONS • EXPERIENCED PORT AGENCY CO-ORDINATION

• GENERAL SURVEY SERVICES • DOCUMENTATION PROCESSING • DRY CARGO SURVEY & INSPECTION SERVICES • KPI TRACKING
• SPECIALIST GUIDANCE • PROCUREMENT • LOAD TO DISCHARGE VOYAGE MANAGEMENT • COST MANAGEMENT ANALYSIS • 24/7
CANAL TRANS AGENCY • & MORE

What is the outlook for bulkers for the rest of the decade?



High demand for dry bulk commodities and restrained supply of bulk carrier tonnage are expected to boost freight rates not only as a seasonal variation in Q4-24, but also in the next five years. This in turn is expected to lead to a surge in newbuilding activity. Morten Løvstad, VP and Global Business Director for Bulk Carriers at DNV, provides an overview.

POSITIVE OUTLOOK FOR BULKERS AS DEMAND OUTPACES SUPPLY

Strengthening demand and limited supply are expected to boost freight rates and increase the profitability of bulker operations over the next five years. Energy efficiency and sustainable biofuel will likely be the key focus for the decarbonization of both the fleet and newbuilds.

Growing global demand for commodities and a sluggish newbuild market up until 2023 have set the stage for bullish growth in the bulker market. Bulker owners are taking advantage of these favourable market conditions and starting to invest. Still, due to limited yard capacity for the bulk carriers, today's orderbook stand at record-low 9%, even after close to 600 bulkers were ordered in 2023!

INTERNATIONAL DEMAND FOR DRY CARGO IS INCREASING

Although high interest rates and inflation have hampered the global economy over the past few years, demand for dry cargo remains strong, increasing by over 5% in 2023, led by key commodities.

CHINA DRIVES DEMAND FOR BULKERS

China, the largest global importer of dry bulk commodities, has been dictating the strength of the bulker market for years.

The Chinese economy seems to be picking up again after the Covid-19 pandemic. Demand for steel is now less dependent on the construction sector, instead, 'machinery' (cars, equipment etc) and infrastructure now account for close to 50% of steel demand.

Demand is also being reinforced by the need to secure energy supply. In 2023 we saw a record number of new coal-fired power plants constructed, driving continued high demand for coal imports.

LONGER DISTANCES LEAD TO INCREASED TONNE MILES

High demand for dry bulk commodities means more tonne miles, which has been reinforced geopolitics.

The Ukraine conflict and Red Sea attacks have altered trading patterns, leading to longer shipping routes.

Further, large new mines and port infrastructure has been developed in Guinea by China, where the ambition is to ramp up export of bauxite to 80 million tonnes per annum.

On top of this, two large mining areas in Simandou, home to one of the largest iron ore reserves in the world, are scheduled to start export in 2025. All of this is likely to lead to a substantial increase in tonne-mile demand in the next years.

STRONG FREIGHT RATES FOR BULKER OWNERS

All these factors have pushed freight rates up. And although these rates softened during Q2 and Q3 of 2024, we believe they will remain quite firm, and strengthen again, especially that the normal seasonal variations will again drive rates up in Q4-24 and onwards.

BULKER OWNERS KEEN TO REINVEST PROFITS IN NEWBUILDS

The appetite for reinvestment in newbuilds is high, DNV observed an increase in new orders in 2023, especially for Ultramax and Kamsarmax orders, while ordering in 2024 has been shifting more towards the bigger vessels.

NEW BULKER ORDERS STRUGGLING TO KEEP PACE WITH RETIRING VESSELS

Although the proportion of vessels on the orderbook compared to the entire fleet has risen to around 9%, this is still low. With the continued strong demand increase, this ratio should be higher — around 15–20% — for the market to be in balance, especially as older vessels are phased out over the next five years.

So far in 2024 few Handysize orders have been accepted by yards, who are favouring larger vessels. But Newcastlemax orders have been stronger than expected, largely driven by the increase in tonne-miles for the Cape trade in the coming years, driven by exports out of West Africa.

According to DNV estimates, between 400 and 500 bulkers will be ordered on average every year over the next five years. However, this will be restricted by availability of yard space, while the time it takes from order to delivery means that it will be at least three years before supply begins to catch up with demand.

WHAT IS THE PATH TO DECARBONIZATION FOR BULKERS?

A range of factors cause bulkers to lag behind some other segments when it comes to decarbonization. Bulk carriers are also optimized to carry heavy cargo at a moderate speed. This already makes them more energy efficient than other segments, with a lower carbon footprint per tonne mile, reducing the urgency to decarbonize.

LOW UPTAKE OF ALTERNATIVE FUELS FOR BULKERS

The uptake of alternative fuels for bulkers, has also been by the unpredictable and

diverse 'tramping' routes, which reduces the predictability of bunkering options, especially for smaller vessels. This is a particular challenge for fuels like ammonia or methanol where supplies are not ubiquitous.

Therefore, DNV predicts that virtually all newbuilds will still utilize conventional fuels over the next five years, but there will be a heavy emphasis on energy efficiency measures, combined with the use of biofuel as a drop-in fuel.

ENERGY EFFICIENCY OPTIONS FOR BULKERS

Several energy efficiency options are already being applied to bulkers, for example including design optimization, changes to operations, and an array of energy-saving devices, such as shaft generators, variable-frequency drives, and wind-assisted propulsion systems (WAPS). There are already 11 vessels with WAPS in operation, with a further 10 in the orderbook. WAPS are especially promising for larger gearless bulkers, due to the availability of deck space

and longer open seas routes where wind conditions are more favourable.

Bulkers can also take advantage of digitalization solutions, such as DNV's Steel Load Planner app, which can help to reduce emissions by optimizing the utilization of space in cargo holds.

WHAT WILL BULKERS OF THE FUTURE LOOK LIKE?

The majority of newbuilds will be optimized for low fuel consumption at lower speeds — typically 10 to 12.5 knots. Combined with energy-saving technological solutions and drop-in biofuels, this is likely to be the most cost-efficient and widespread decarbonization path over the next five years.

Bigger vessels and smaller specialized or coastal ship could be powered by alternative fuels, primarily LNG, but with a small share utilizing methanol and ammonia powered. Further down the line, technologies like on-board carbon capture and storage could also play an important role.

The new generation of efficient, sustainable and safe bulk carrier operations



As more bulk carriers engage in the global and regional trade of bulk cargoes such as ores, logs, coal and steel products, the operational complexities within their business continue to grow as well.

Transporting bulk cargo entails much more than simply shipping ore or coal from one port to another. Bulk trade involves numerous parties that require important information exchange, including the ship operator, the ship, the cargo seller as the shipper, the cargo buyer as the receiver, a possible charterer, the insurer, agents, and of course, the port. With its vital role in driving global trade, the industry continues to seek out technology that helps it sustainably move essential cargo. Safe operations from loading, through sailing to cargo discharge remain of paramount importance. Without skilled planning, monitoring and execution, any of these steps can result in a situation that causes devastating loss of human life or ship. Lost cargo, reputational damage, and profitability impacts can also result.

The Bulk Carrier Package from Navis

Carrier & Vessel Solutions helps bulk carriers address the complexities in their business by balancing safe and efficient loading operations while complying with emission regulations and keeping all business parties informed. The Navis package accomplishes this by:

- ❖ Checking the stability and strength of the vessel with Loading Computer MACS3.
- ❖ Optimizing cargo distribution and automating the loading/unloading sequences according to BLU code with the Loadman Module.
- ❖ Ensuring that load limits set by classification societies are not exceeded through Bulklim Module.
- ❖ Calculating the strength of a vessel according to IACS 17 via the Bulkstrength Module.
- ❖ Monitoring and ensuring the ship's stability while loading and transporting steel coils.
- ❖ Automatically calculating the total CO₂ emissions for each parcel of cargo in the Bluetracker Sea Cargo

Charter Module.

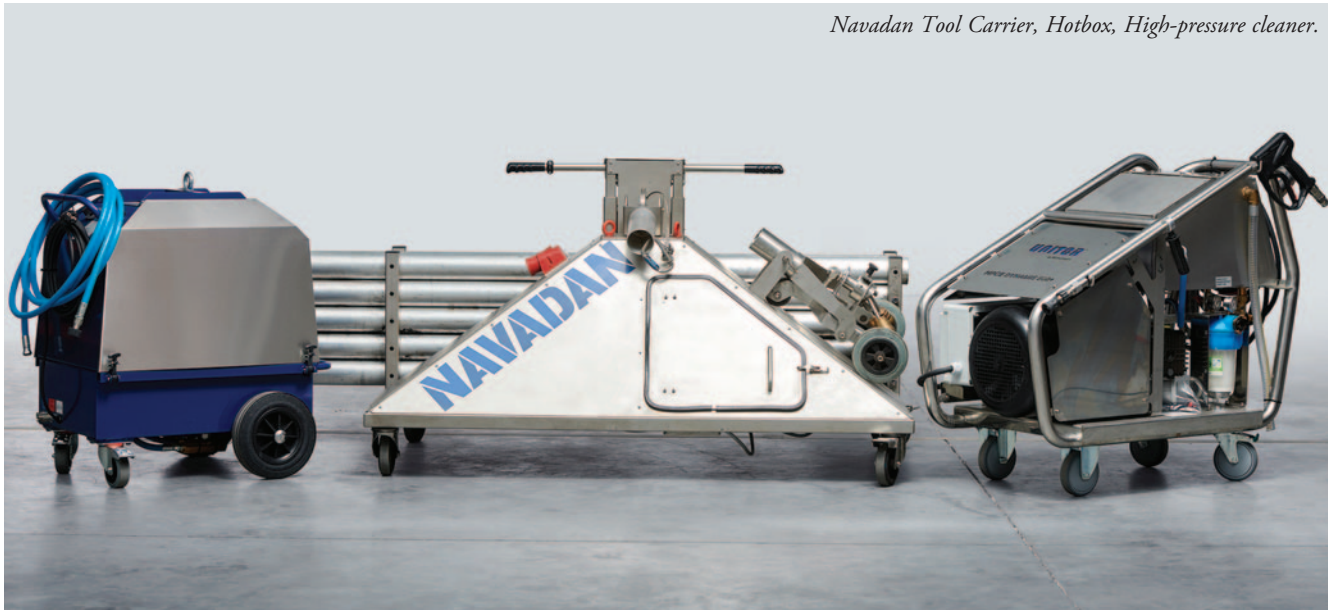
- ❖ Mirroring the actual onboard situation on shore — anytime, anywhere — through MACS3 Connected, which stores loading computer data in the cloud. This tool allows carriers to share cargo data via the cloud with all relevant business parties.

The Navis Bulk Carrier Package complies with IMO A.749 by calculation of intact stability, the latest amendment of IMSBC, Grain Stability of SOLAS 74, US and port regulations, and to IACS UR S17. It furthermore already considers the new IACS UR E27 cyber security compliance regulation, thereby preparing Bulk Carrier operators for the future.

The Bulk Carrier Package is set up to help ship owners and operators to navigate the new dry bulk shipping environment in which smart business operations, cyber security compliance, a shared visibility of cargo data and ship data and lean emission compliance processes play a crucial role.

Bulk Carriers can learn more by visiting KALERIS' website.

Revolutionizing tank and hold cleaning across the maritime industry: Wilhelmsen Ships Service introduces world class solutions under the new brand "Navadan™ by Wilhelmsen"



Navadan Tool Carrier, Hotbox, High-pressure cleaner.

Founded in 1861, Wilhelmsen has become a uniquely comprehensive maritime network, with the ability to reach more than 2,200 ports globally. Wilhelmsen Ships Service, a subsidiary of the global maritime group, is pleased to announce the successful integration of Stromme and Navadan into its portfolio.

"Our customers face tough challenges in maintaining compliant and efficient operations. Navadan™ by Wilhelmsen illustrates our commitment to assist them in achieving the highest standards of compliance and safety, all while minimizing downtime and operational cost. I know our dedicated technical experts, who are ready to tailor solutions to customer's needs, will make a significant impact on their day-to-day operations. I can't wait for our customers to try us!", says Kjell André Engen, President for Wilhelmsen Ships Service.

The strategic acquisitions of Stromme, a leading provider of cargo hold cleaning solutions as well as Navadan, a dedicated team of tank and cargo hold cleaning specialists was fully in line with the strategy to expand, grow and further develop market presence within these segments. 'Navadan™ by Wilhelmsen' strengthens capabilities in the tank and cargo hold cleaning market, further enhancing the product and solution offerings.

The integration of Stromme and Navadan into Wilhelmsen Ships Service has resulted in a new expert advisory service in combination with a specialized product portfolio under the brand 'Navadan™ by

Wilhelmsen'. This combined portfolio represents the best offerings from all three companies. Effective cleaning of tankers and bulk carriers requires fast and efficient removal of cargo residues. Our specialists can facilitate complex cleanings by providing guidance on procedures and quality products. For example, they advise on how to manage challenging transitions such as dirty petroleum products to clean petroleum products on very large crude carriers.

The new product portfolio is designed to deliver unparalleled benefits to customers, including:

- ❖ **A wide range of high-quality products:** a diverse selection of top-tier products tailored to customer specific requirements.
- ❖ **Leading technical expertise:** access to a team of industry experts with deep knowledge and experience in cargo hold and tank cleaning, helping customer with a solution that is best for them.
- ❖ **Global availability:** an extensive network covering over 2,200 destinations ensures that Navadan products and services are available to customers wherever they need them.
- ❖ **Fast response time 24/7:** a team of local and global experts committed to providing timely solutions to meet customer needs around the clock.
- ❖ **Unmatched distribution and local blending:** going globally local, the aim is to excel in delivering of operational needs for customers through efficient

distribution and local blending capabilities.

- ❖ **Compliant and safe solutions:** Navadan products and services adhere to the highest standards of compliance and safety.

Wilhelmsen remains committed to taking competence, sustainability, innovation, and unparalleled customer experiences one step further. With thousands of colleagues in more than 57 countries, the exploration and development continues to develop new opportunities within the energy, offshore, and maritime industries.

ABOUT WILHELMSSEN.

Founded in Norway in 1861, Wilhelmsen is now a comprehensive global maritime group. Committed to shaping the maritime industry, through its products, services and support, Wilhelmsen also seeks to develop new opportunities in renewables, zero-emission shipping, and marine digitalization.

ABOUT WILHELMSSEN SHIPS SERVICE

Wilhelmsen Ships Service provides a wide range of maritime solutions coupled with expert advice.

Supplying marine products under trusted brand names, including Unitor™, Nalfleet™, Timm™, Unicool™ and Navadan™, it ensures smooth maritime operations with its ability to reach 2,200 port destinations.

By constantly developing new solutions for its customers, Wilhelmsen Ships Service is shaping maritime for the future.

Laskaridis Shipping Co. Ltd., Cares and Metis to find realistic pathways to shipping's low carbon future

A research project which brings together The Cambridge Centre for Advanced Research and Education in Singapore (CARES), Laskaridis Shipping Co. Ltd and Metis will evaluate the real impacts of the fuels offered to solve shipping's decarbonization dilemma.

THE LASKARIDIS VESSEL 'ICARUS'

The International Maritime Organization's strategy for greenhouse gases aims at ships reaching net-zero GHG emissions by around 2050 and ensuring uptake of near-zero GHG fuels by 2030. However, reliable real-world data regarding the impact of different low-carbon fuels is elusive.

The three-way collaboration will make high frequency data captured by analytics and performance evaluation specialist Metis from the Laskaridis Shipping Co. LTD in-service bulk carrier *ICARUS* available to CARES.

With funding from Singapore's National Research Foundation, data scientists at CARES have developed tools to model ship lifecycle pathways towards decarbonization. These include the lowcarbonship.com online calculator, which helps users to compare vessel performance across a range of fuel and decarbonization options, including Heavy Fuel Oil, on-board carbon capture and others.

Professor Nondas Mastorakos from CARES said: "We are fortunate to collaborate with Metis and Laskaridis Shipping Co. LTD, who have kindly agreed to give us fuel consumption, weather and routing information. This will allow us to apply our modelling tools and provide "what if?" answers based on realistic data. In this way, effective decarbonization strategies can be developed quickly."

Integrating individual vessel characteristics such as weight, volume and cargo displacement into the modelling, as well as energy consumption and emissions data, generates realistic inputs to develop an accurate picture of a ship's future performance across a range of fuel options. The collaboration will create an invaluable database for projecting ship CO₂ reductions, based on a granular analysis that goes far beyond estimates based on average fuel consumption and routing.

"The maritime sector is considering many decarbonization options to reduce its environmental footprint," said Panos Theodossopoulos, Chief Executive Officer,



The Laskaridis vessel 'ICARUS'.

Metis. "However, no single option is emerging as a clear winner. Consensus suggests that shipping's carbon neutral future will rely on a range of alternative fuels, supply chains and technologies.

"This research provides key examples of the way digitalization and advanced analytics will help ship owners develop successful pathways towards decarbonization which balance their commercial and sustainability imperatives."

Laskaridis Shipping Co. LTD. has prioritized investing in digitalization and data analytics in order to achieve greater ship efficiency and measurable progress towards decarbonization across its fleet.

Nikolaos Tsoulakos, Innovation & Technology Manager of Laskaridis Shipping Co. LTD, emphasized: "The high-frequency data collection systems installed on our vessels serve as the foundation for harnessing the potential of AI. Through collaboration with CARES and Metis on this initiative, our aim is to contribute to the scientific community by sharing data and providing valuable insights to the maritime sector through data analysis and performance analytics. Our objective is to achieve operational excellence, reduce the carbon footprint, and advocate for the widespread adoption of digitalization among maritime enterprises."

Last year, Metis and Laskaridis Shipping Co. LTD. collaborated to secure the first Bureau Veritas (BV) DATAINFRA notation, recognizing the bulk carrier *LETO*'s data infrastructure for reliable collection, transmission, storage and sharing data. *LETO* also received BV's SMART (EnEI-W, -S, -Em) notation for the smart functionality on board covering energy efficiency, speed optimization, weather routing and emissions monitoring.

ABOUT LASKARIDIS SHIPPING CO. LTD

Laskaridis Shipping Co. Ltd manages and operates a large fleet of high-quality modern bulk carriers, prioritizing human safety, environmental sustainability, and

property. The company adheres to and surpasses shipping industry safety standards, with vessels equipped with high-frequency data collection systems and staffed by skilled seafarers and operated by highly skilled and trained shore personnel. Laskaridis Shipping Co. Ltd conducts its business in a socially responsible manner, with strategic investments in research and development, operational efficiency, and continued excellence. A key focus of the company is the study of transitional and operational risks associated with transitioning to a low-carbon economy, which forms an integral part of its daily operations.

ABOUT CARES

The Cambridge Centre for Advanced Research and Education (CARES) was established in 2013 as the University of Cambridge's first overseas research centre, bringing together researchers from the University of Cambridge, Nanyang Technological University, and the National University of Singapore. CARES has expanded its scope from the initial Cambridge Centre for Carbon Reduction in Chemical Technology (C4T) programme which focused on decarbonizing Singapore's chemical industry. C4T now includes additional themes such as digital transformation, and sectors such as the maritime industry.

ABOUT METIS

Metis specializes in High Frequency Data Acquisition, and Advanced Performance Evaluation Analytics for the maritime Industry. Metis develops transparent and forward-looking digital solutions that enable people and organizations in the maritime industry to expand their capabilities, adapt to changing environments and embrace opportunities with a creative mindset.

Established in 2016 in Athens, Metis is majority-owned by the maritime-focused environmental engineering group ERMA FIRST.

BAR Technologies expands WindWings® offering with new 20-24m models following global success of initial launch

BAR Technologies is expanding its WindWings® portfolio with the launch of new 20m and 24m models, designed to save 0.7 tonnes of fuel per day per WindWing® on average, on worldwide routes. Building on the global success of the 37.5m WindWings®, which set new environmental and efficiency standards in shipping, these new models will make wind-assisted propulsion (WAP) technology accessible to a broader range of vessels, including handysize bulkers, chemical tankers, and other smaller ships, effectively increasing the target fleet size by nearly 50%. Weighing less than 30 tonnes, the new range are extremely economic and simple to fit on both newbuilds and retrofits.

WindWings® fuel-saving capabilities were first independently validated by DNV-Maritime in May 2024. Their deployment on vessels such as the Pyxis Ocean and Berge Olympus has already demonstrated a 32% reduction in energy use per nautical mile, solidifying WindWings® as a reliable and independently validated choice for shipowners. With the International Maritime Organization's (IMO's) 2030 target of reducing GHG emissions from international shipping by 20-30% only 5.5 years away, WindWings® are now essential for helping shipowners achieve these goals.

John Cooper, CEO of BAR Technologies, said: "The incredible success of our 37.5m WindWings® model has proven that wind-assisted propulsion is now a validated and trusted solution for increasing fuel savings and reducing emissions in international shipping."

"The expansion of our WindWings® offering is a direct response to the growing demand from shipowners who have seen first-hand their environmental and economic benefits, as they work to achieve the IMO's emissions reductions targets. With these new models, we are making this technology accessible to an even wider range of vessels, ensuring that more of the global fleet can contribute to the crucial goal of decarbonization."

Working directly with shipyards and shipowners, BAR Technologies' introduction of the new WindWings® models responds directly to the needs of the market, particularly those with mixed fleets that include smaller vessels.

As a result, some of BAR Technologies' existing customers, recognizing the significant potential for efficiency and



Renders of the new 20-24m WindWings on a Handymax.

sustainability gains, have already begun expressing strong interest in adopting the new models of WindWings® for their current fleets. Several customers are now in advanced discussions to integrate these new models — with announcements scheduled for the coming months — signalling a robust market validation of the company's forward-thinking approach.

The new 20 and 24m WindWing® models offer the same best-in-class performance as the original 37.5m, whilst their compact design allows for greater operational flexibility.

20-24M WINDWINGS® KEY FEATURES INCLUDE:

- ❖ **Maximum thrust and fuel savings:** the patented three-element rigid wingsail with passive boundary layer control does not require suction fans or a continuous power supply.
- ❖ **Foldable and non-foldable variants:** designed for operational flexibility, the wings can be compacted to minimize their footprint during navigation in pilotage and port operations.
- ❖ **Electric-powered operations:** the wings operate entirely on electrical power, simplifying installation and ongoing operations while maintaining high performance.
- ❖ **Fail-safe design:** with a self-feathering mechanism, the wings can withstand extreme weather conditions, enduring up to 100 knots of true wind speed.
- ❖ **Full-turnkey solution:** providing comprehensive support from initial concept to ongoing maintenance, ensuring seamless integration and operation.

The new models are projected to

deliver 0.7 tonnes of fuel savings per WindWing® per day on average on worldwide routes, representing a substantial contribution to global decarbonization efforts. With the introduction of the new models, BAR Technologies continues its leadership in shipping innovation, technology, and sustainability, providing scalable and adaptable solutions that meet a broad range of needs across the global fleet.

The new models will be manufactured in China and Spain from next year, aligning with the growing global demand driven by regulatory measures such as the EU Emissions Trading System (ETS), with similar policies anticipated in South Korea and Turkey.

The maritime sector faces increasing scrutiny over its environmental impact. Technologies like WindWings® are not just beneficial — they are essential.

ABOUT BAR TECHNOLOGIES

With an impressive heritage, having originally spun out from the former British, America's Cup Team, BAR Tech provide a wide range of design and engineering consultancy services with a focus on four key sectors: Workboats and Commercial Vessels, Shipping, Special Projects and Leisure Marine and Yachts. BAR Technologies offer a cohesive team of world lead naval architects and optimization specialists; fluid dynamists; mechanical, structural and composite engineers; control strategy and system specialists; they offer data and simulation engineers with access to the latest commercial knowledge, using bespoke in-house design tools.

Innovations in hull coatings offer a solution to bulk carrier's decarbonization challenge

DCi Ship owners and operators are facing significant challenges from different influences across the maritime industry as changes to decarbonization goals put pressure on commercial models and profits, writes Kazuaki Masuda, Corporate Officer, Technical Division Director, Nippon Paint Marine. The introduction of new regulations designed to achieve the IMO's 2050 net-zero targets has meant the industry is having to explore new and innovative means of reducing their vessel's carbon emissions, whilst maintaining operational efficiency. Many owners and operators fear this approach may mean the costly adoption of novel technologies.

The European Union's extension to shipping of the Emissions Trading System (ETS) in January 2024 has placed even greater emphasis on the industry's need to rapidly decarbonize. The full impact of the EU ETS will be realized in 2027, at which point, all shipowners will be required to surrender European Emissions Allowances (EUAs) to cover 100% of their CO₂ emission for their voyages between EU ports, and 50% for those between an EU and non-EU port.

This external pressure is particularly acute within the bulk carrier market, where the very design of these non-regular, itinerant vessels — which visit to more ports in the world than most other sectors within the maritime industry — represents a significant challenge to its efforts to decarbonize.

Despite the urgency to reduce carbon emissions, many emerging technologies have yet to achieve maturity, let alone full market viability, and in many cases, the cost of implementation is significant. As an alternative that can deliver near-term results, ship owners and operators should engage with available technologies that have been proven to secure significant savings on fuel emissions, whilst not compromising on performance. Market leading antifouling coatings represent such technology. They are a cost-effective solution that can deliver an immediate impact to a vessel's operational efficiency.

Nippon Paint Marine is no stranger to technological innovation and has a strong reputation of supporting the bulk carrier sector by providing the latest in industry leading hull coatings. The company's FASTAR antifouling solution is one such solution, that includes the company's patented HydroSmoothXT™ water-trapping



FASTAR is Nippon Paint Marine's fourth generation antifouling coating, which incorporates a sophisticated self-polishing system to reduce the level of bioorganic adhesion on to the hull's surface.

technology that smooths water flow around the hull to reduce hydrodynamic drag on customers' vessels and lower fuel consumption.

FASTAR is Nippon Paint Marine's fourth generation antifouling coating, which incorporates a sophisticated self-polishing system to reduce the level of bioorganic adhesion on to the hull's surface. This technology is combined with a hydrophilic and hydrophobic nano-domain structure which enables a wider diffusion of the biocides across the coating's surface, creating an enhanced antifouling performance. Furthermore, by providing this nanodomain technology on the coating surface, the amount of biocide elution can be reduced by up to 50%.

Since its release in 2021, FASTAR has been applied to over 1,000 vessels — as of the end of July 2024 — helping customers to achieve better hull performance as well as more sustainable and efficient operations. The coating has helped users

achieve fuel savings of up to 14% due to an average speed loss of just 1.2% over a 60-month period, compared to the market average speed loss of 5.9%, over a similar time period.

As the industry adapts to a more stringent regulatory environment, it will look to increasingly innovative solutions to achieve compliance with tightening environmental regulations. Even while some of the short-term goals set for achieving the IMO's long-term net-zero target appear challenging, achieving them need not be cost-prohibitive for operators. Technologies available today can help ship owners and operators adapt their operations in the short terms and deliver immediate emissions reductions without the need to invest in costly novel technologies.

With the support of industry leading hull coatings, such as FASTAR, bulk carriers have the key that will unlock greater full efficiency and compliance, today. **DCi**

Ports of Indiana celebrates opening first new dock in 20 years

\$6 MILLION BERTH TO SERVE OCEAN VESSELS AT LAKE MICHIGAN PORT

On 5 September local officials and port workers celebrated the opening of a new \$6 million dock that will serve ocean vessels at Ports of Indiana-Burns Harbor. Partially funded by a U.S. Maritime Administration (MARAD) FASTLANE Grant, the project involved constructing more than 500 feet of new dock space that will handle bulk shipments via ocean vessels, lake carriers and river barges at the Lake Michigan port.

The celebration took place on the new Berth 5 dock, located on the port's northeast harbour, and was held in junction with a special Labor Appreciation Picnic for members of the port's workforce, including the International Longshoremen's Association and the International Union of Operating Engineers.

"Today marks a historic day for this region, our workers and this port," said Ports of Indiana CEO Jody Peacock. "This is the first new dock Ports of Indiana has opened in 20 years and it signifies our commitment to support economic growth for our state. This new dock will provide critical global connections for Indiana companies and farmers as well as important jobs for local workers and their families. But the best part is, this new dock is just the beginning of our major growth plans for this port, and there is much more development to come."

Berth 5 is one piece of \$77 million in new investments currently under construction at the port. Projects are already underway to double capacity for truck traffic accessing the port, increase rail storage by 1,200%, add two additional docks, and develop Indiana's first sea cargo container terminal.

"This port is well positioned to grow business and provide critical freight solutions for a variety of industrial and transportation sectors," said Port Director Ryan McCoy. "The combination of our outstanding workforce and top-notch infrastructure creates a sustainable competitive advantage for our customers. This new dock will help bulk cargo shippers serve the road salt, agriculture, steel and construction markets in Indiana, Michigan and the greater Chicago area."

The new dock was constructed to handle self-unloading bulk ships and to quickly transfer cargoes to railcars, trucks, barges and nearby ground storage. Cargoes handled by the port that will likely use this dock include salt, fertilizer, limestone, taconite, foundry coke, grain products, and various aggregates.

The project also introduces a 'green shipping' alternative by offering customers the option to use an all-water supply chain connecting ocean vessels with river barges to reduce emissions. For comparison, one ocean vessel can carry 1,200 truckloads of cargo and a 15-barge river tow can carry 1,000 truckloads. About one third of the port's shipments are carried on barges and two-thirds are carried by ships.



Ports of Indiana CEO Jody Peacock addresses the Berth 5 opening guests.

ABOUT PORTS OF INDIANA

Ports of Indiana is a statewide port authority operating three ports on the Ohio River and Lake Michigan. Established in 1961, Ports of Indiana is a quasi-governmental enterprise dedicated to growing Indiana's economy by developing and maintaining a world-class port system, and by serving as a statewide resource for maritime issues, international trade, and multimodal logistics.

Quequén posting record traffic figures for 2024

In Argentina, one of the country's largest ports, Puerto Quequén, posted record traffic figures for the month of July, reveals its management body, Consorcio de Gestión de Puerto Quequén.

For the month in question, a total of 47 bulk carriers were handled in just 30 days, which in itself was a record. The largest dry bulk operation involved a consignment of 955,056 tonnes of export grain. Furthermore, the accumulated figure of 4,901,612 tonnes for the first seven months of 2024 also broke the previous record in that respect.

Official figures released for the first two quarters, show traffic had reached 3,946,556 tonnes, carried in 155 vessels.

The main dry bulk commodities exported were: barley with 1,552,897 tonnes in 43 vessels (1,090,798 tonnes for fodder and 462,099 tonnes for breweries); corn with 843,519 tonnes in 37 vessels; soybean with 663,953 tonnes in 23 shipments; and wheat with 542,637 tonnes in 23 vessels.

Shipments are regularly made to China, Vietnam, United Arab Emirates, Malaysia, India, Brazil and the United Kingdom.

Barry Cross

Euroports handles new iron ore traffic in the Port of Tarragona



Vale, one of the largest producers of iron ore, has chosen Euroports and the Port of Tarragona in Spain for its new logistics operations to supply the Mediterranean market, specifically serving steel mills in the region. This milestone was marked by the arrival of the first ship, *The Magsenger 10*, with a length of 254 metres and a beam of 43 metres, carrying more than 110,000 tonnes of iron ore from Ponta da Madeira (Brazil) to the Port of Tarragona.

Vale selected the Port of Tarragona and Euroports for its expertise in handling bulk minerals and the quality of the port's infrastructure. The involvement and support of the Port Authority, the Captaincy, and Customs, along with Euroports' investments in operations and environmental initiatives, were key factors in Vale's decision.

Euroports Tarragona will serve as the entry point, storage facility, and re-shipping hub for iron ore from Brazil, replacing the current coal volumes, in line with the transition to a more sustainable economy.

The iron ore arriving in Tarragona is destined for steel production, a fundamental material in industries such as construction, automotive, and machinery manufacturing.

Euroports brings essential goods to the world. Its Tarragona operations have a strong track record in handling bulk minerals. Euroports has adapted its terminal to accommodate iron ore, ensuring the best service for Vale and its clients. It is delighted with this new partnership and looks forward to building a sustainable future with all parties involved.



With over 87 years of experience, at GRUPO ETE we have become a recognised logistics organisation, combining efficiency and know-how, providing customized solutions in Shipping, Port Operations, Inland Waterways, Shipping Agents, Logistics and Engineering, Ship Building and Repair, all over the world.

Thanks to our international presence in 9 countries - Belgium, Spain, United Kingdom, Portugal, Cape Verde, Mozambique, Dubai, Colombia and Uruguay - we create new business opportunities and value-added services to our clients.

Find out more at www.ete.pt



GRUPO ETE

Brazil completes five new terminal auctions

On 21 August, the Brazilian government held its most recent auction, consisting of five port terminal concessions. This had originally been scheduled for May, however had to be put back due to disastrous flooding that took place in Rio Grande do Sul state at that time.

With the awarding of the new concessions, it is expected that private sector investment of \$13.26 million will be made by the new concessionaires on upgrades. Nevertheless, each concession is limited to just ten years, with no possible renewal, hence the comparatively low levels of forecast investment.

The Port of Recife will absorb the lion's share of new investment, with a projected \$10 million to be spent across three terminals. There, Liquiport Terminal Portuário, has been awarded the 7,156.09m² REC 08, which handles dry vegetable bulk, with malt, wheat and corn as its main cargoes. At present, the area's

partially paved areas need urgent upgrading, as well as new handling equipment. It is mostly an import facility, and has promised investment of \$9 million.

In the same port, the concession for REC09 went to Usina Petribú, which won with a modest bid of \$100,000. This facility focuses mainly on handling rice, but will require \$400,000 of investment for the renovation of a warehouse (R2) and administration building, as well as the acquisition of a number of items including a v-shaped conveyor system, a bagging machine, a 2.5-tonne FLT and a wheel loader. The 7,759.39m² area mainly deals with coastal shipping, with cargo arriving by inland waterway and road. Following upgrades, it is expected that capacity will reach 142,560 tonnes per year.

The nearby REC10 concession was awarded to SCS Armazéns Gerais, which was specifically put together by the brokerage firm Guide Investimentos to

manage the facility. The winning bid amounted to \$650,000. The 4,462m² area mostly handles inbound dry bulk and general cargo by sea, with onward dispatch by road. Currently uncovered areas will be paved, warehouses remodelled, and new handling equipment purchased.

The fourth terminal, RDJ06, is in the Port of Rio de Janeiro, and concentrates on liquid bulk, while the fifth, RIG10, at the Port of Rio Grande is expected to maintain, repair, replace and renovate equipment used for the movement and storage of general cargo.

A second block of auctions is scheduled for October 2024, with four additional areas up for grabs.

Silvio Costa Filho, Minister for Ports and Airports, explained that, "Our goal, during President Lula's government, is to hold auctions for 30 port areas, generating development in the Brazilian port sector."

Barry Cross

Silopor announces record profits

In a year in which it made record profits, Lisbon-based silo operator, Silopor, continues to make warning noises regarding its future. The private company's concession expires in June 2025. According to its 2023 financial report, the company noted, "We can state that we do not see any entity in the national market equipped, either in terms of storage or unloading capacity in locations with appropriate funds, that could replace Silopor, or any public or private entity to which the operation of said equipment could be transferred."

Silopor has concessions for the Beato and Trafaria dry bulk food terminals. These handled around 25 million tonnes

in 2023, albeit a drop of 2.8% compared to the previous year. It now has a market share of 49.34%, its 53% 2022 figure eroded by the Port of Aveiro and Port of Setúbal, which both expanded traffic.

Silopor additionally notes that 14 vessels of over 50,000dwt were unloaded last year, and this number is expected to increase in line with freight cost increases. This, it claims, raises questions "for national supply, especially since there are still no alternative structures in Portugal for unloading ships of this size, either because they are not deep-water or, if they are, they are not equipped with unloading equipment

and the end consumers are located outside their hinterland."

Despite the loss of some traffic to alternative ports, in 2023, Silopor made a net profit of €5.45 million, its best ever, being a year-on-year increase of 42.3%. Further, despite moving less tonnage, turnover grew 12% to €22 million, while its EBITDA of €9.1 million was up 32.6%.

Nevertheless, overall, Silopor's financial situation has been mixed, effectively being in liquidation for around two decades and attempts have been unsuccessfully made to privatize the business. Currently, it has no liabilities and has been posting positive net results in the past few years.

BC

Ukrainian grain traffic recovering at Valencia

Valencia is slowly regaining imported grain traffic from Ukraine that had been lost because of the Russian invasion.

In the first six months of this year, the Mediterranean port registered a 123% increase in consignments from Ukraine compared to the previous year. Between January and June 2024, it handled a total of 661,861 tonnes of grain and cereals from Ukraine, up from the half year figure of the previous year that totalled 296,795 tonnes.

Overall levels of imported grain from Ukraine are recovering. In 2022, the naval blockade of Ukraine's Black Sea ports resulted in the arrival of just 241,000 tonnes of grain and cereals at Valencia. Then, for 2023 as a whole, imports from Ukraine grew to 772,276 tonnes.

To date, February has been the leading month this year for grain consignments, with 181,000 tonnes, followed by May, with 145,169 tonnes, and June, with 123,500 tonnes.

BC



East is east

North American East Coast



Louise Dodds-Ely

Significant rise in bulk throughput at Port of Tampa Bay

Port Tampa Bay is Florida's largest cargo tonnage port handling over 35mt (million tonnes) of cargo per year and is one of the most diversified ports in the USA. Its business includes a diverse mix of bulk, break-bulk, container, ro-ro cargoes, as well as being a major cruise homeport and a hub for shipbuilding and repair. These diverse lines of business support the port's continued strong financial performance which recently resulted in an upgrade to an 'A+' Rating with a stable outlook by Fitch Ratings. The port has an economic impact of over \$17 billion supporting over 85,000 jobs.

Dry bulk cargo is a significant segment of Port Tampa Bay's business, last year amounting to 10.7mt.

Among the port's major dry bulk tenants and customers are:

- ❖ **for cement:** Cemex, Gaetano Cacciatore and Titan America;
- ❖ **granite and limestone:** Martin

Marietta, Titan America and Vulcan Materials;

- ❖ **phosphate fertilizer and sulphur:** The Mosaic Co.;
- ❖ **grain:** Ardent Mills;
- ❖ **gypsum:** National Gypsum; and
- ❖ **salt:** Cargill.

Stevedoring companies also handling dry bulk commodities include Logistec and Pangaea.

Port Tampa Bay's dry bulk cargo was up by 23% for the first six months of the fiscal year, led by increases in such commodities as cement, up 11%, limestone up 20%, phosphate up 151%, and grain up 109%.

Port Tampa Bay's Board of Commissioners recently approved three separate lease agreements to expand operations at its Port Redwing terminal facilities. The agreements were approved with AJAX Paving Industries of Florida, LLC, Redwing Terminals, LLC, and Pangaea Florida, LLC to expand the handling of a

variety of aggregates, including limestone, granite, and crushed concrete; cementitious products and several others. These materials will support roadbuilding, infrastructure, and construction projects to keep pace with and serve Florida's rapidly expanding population.

AJAX Paving Industries of Florida is a privately owned company with more than 42 years of experience in paving and road construction building Florida's highways and infrastructure. Ajax currently operates eight asphalt plants in Florida and six asphalt plants in Michigan. The port's board approved a lease agreement with AJAX for ten acres of land at Port Redwing, with conveyor access to Berth 302 for the importation of aggregate.

Redwing Terminals is the aggregates import division of Blue Water Industries, LLC, a construction aggregates producer. Formed in 2018, Blue Water employs more than 300 people throughout the Southeast



United States, including South Carolina, Florida, North Carolina, Tennessee, Alabama, Mississippi and Virginia.

Blue Water currently owns and operates 20 rock quarries and five sand mines. Products include crushed limestone, rip rap, gravel, concrete and asphalt sand, gabbro, and granite. The board approved a lease with Redwing Terminals for approximately 14.0 acres of land, with conveyor access to Berth 302 for the importation of aggregate.





Finally, Pangaea Florida is a wholly owned business unit of Pangaea Logistics Solutions' port terminal and stevedoring division, expanding its Florida activities with operations at Port Redwing, in addition to its operations at Port Everglades and Palm Beach. Pangaea Logistics Solutions, Ltd is a publicly traded company headquartered in Newport, RI, and established in 1996. Pangaea operates a fleet of 60–70 dry bulk vessels in the Supramax, Ultramax, Panamax, and Post-

Panamax classes, 25 of which are owned. Pangaea employs more than 125 people shoreside and approximately 550 officers and crew members at sea, onboard its owned ships. The port's board approved a lease agreement with Pangaea for approximately two acres of land with conveyor access to Berth 302 for the importation of aggregate and other commodities.

"Port Tampa Bay, and especially Port Redwing, continues to diversify its

operations to best serve the fast-growing region and state. The recently approved leases with AJAX, Redwing Terminals, and Pangaea Florida will bring in new bulk and aggregate businesses that will create new jobs and spur future economic development," explained Paul Anderson, Port Tampa Bay President and CEO.

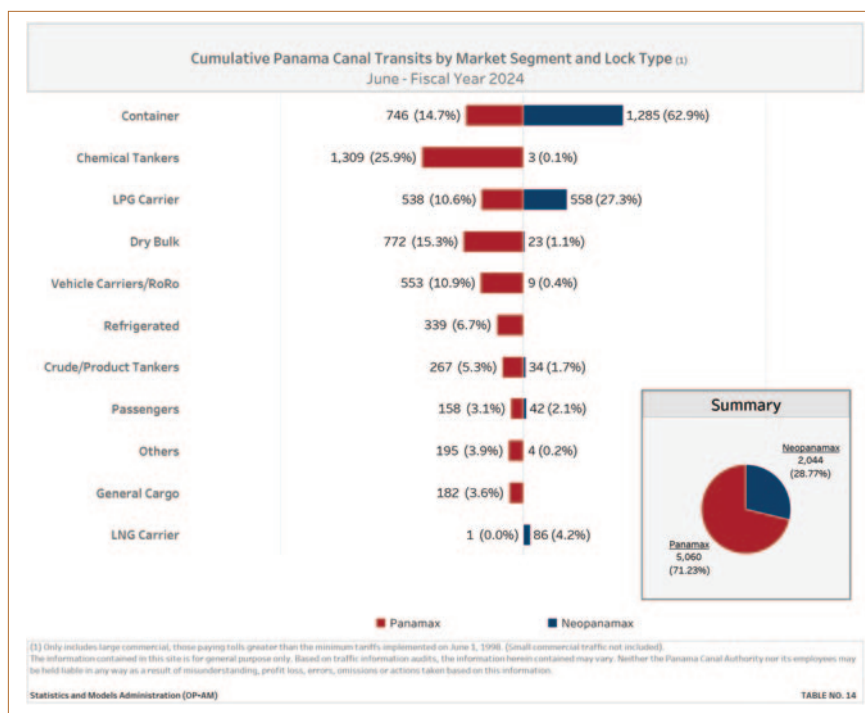
To support this growth, Port Tampa Bay is constructing a new berth 301 at Redwing that will result in a total of over 2,000 linear feet of berth apron.



Modern wonder: the Panama Canal has revolutionized bulk cargo transits

The Panama Canal is an artificial 82km waterway in Panama that connects the Atlantic Ocean with the Pacific Ocean, cutting across the Isthmus of Panama, and is a conduit for maritime trade. Locks at each end lift ships up to Gatun Lake, an artificial fresh water lake 26m above sea level, created by damming up the Chagres River and Lake Alajuela to reduce the amount of excavation work required for the canal. Locks then lower the ships at the other end. An average of 200 million litres of fresh water is used in a single passing of a ship. The canal is threatened by low water levels during droughts.

The Panama Canal shortcut greatly reduces the time for ships to travel between the Atlantic and Pacific oceans, enabling them to avoid the lengthy, hazardous route around the southernmost tip of South America via the Drake Passage or Strait of Magellan. It is one of the





largest and most difficult engineering projects ever undertaken.

Colombia, France, and later the United States controlled the territory surrounding the canal during construction. France began work on the canal in 1881, but stopped because of lack of investors' confidence due to engineering problems and a high worker mortality rate. The US took over the project in 1904 and opened the canal in 1914. The US continued to control the canal and surrounding Panama Canal Zone until the Torrijos–Carter Treaties provided for its handover to Panama in 1977. After a period of joint American–Panamanian control, the Panamanian government took control in 1999. It is now managed and operated by the Panamanian government-owned Panama Canal Authority.

The original locks are 33.5m wide and

allow the passage of Panamax ships. A third, wider lane of locks was constructed between September 2007 and May 2016. The expanded waterway began commercial operation on 26 June 2016. The new locks allow transit of larger, Neopanamax ships.

The American Society of Civil Engineers has ranked the Panama Canal one of the Seven Wonders of the Modern World.

DRY BULK ON THE PANAMA CANAL

Dry bulk transits represent about 20% of total Panama Canal transits as per Fiscal Year 2023 (October 2022 to September 2023). Of the total dry bulk transits, the East Coast USA and Gulf represent 31.5% of this total.

By far, grains (including soyabeans) and the coal and coke category are most often carried in dry bulkers out of the US East

Coast and Gulf, representing 76.2% of total cargo in dry bulkers in FY 2023.

On 11 June, 2024, the Panama Canal announced increases in the number of daily transits from 32 to 33 transits effective 11 July 2024, and then to 34 transits beginning 22 July 2024, based on the projected level of Gatun Lake and a promising rainy season underway. As of 8 July 2024, the level of Gatun Lake has been on an upward trend since the end of April 2024. This is an opportunity for the dry bulk transits to recover.

The Panama Canal Authority can plan and construct a new water reservoir in the Indio River, a project expected to last roughly six years with a total cost of \$1.6 billion, following Panama's Supreme Court decision on 2 July 2024, regarding the limits of the Canal watershed.



Constant development lies behind A.R. Savage & Son's success

For four generations and over 75 years, A.R. Savage & Son has served as a valuable resource to the ocean shipping industry, providing a wide array of services — from ship's agency services to ocean freight forwarding — to the maritime community. It is one of the oldest ship agency, ocean freight forwarding and maritime advisory services companies in the country, serving clients in the United States and abroad.

This article focuses on A.R. Savage & Son's ship's agency expertise.

To professionals of the maritime industry, what a ship's agent does — co-ordinate all compliance and logistical arrangements to get a ship into port, discharged and/or loaded, documented, and out of port as efficiently as possible — is well understood.

The value proposition that an agent brings — working with USCG, CBP, terminals and port authorities, taking care of the crew and required paperwork (statements of facts, shipping manifest, stowage plan, bill of lading, etc.) and a myriad of other issues — is often more nuanced and not immediately recognized until emergent situations arise.

Because of this, it's important for a ship

agent to understand the many facets of the port, the cargo, and the vessel. For instance, A.R. Savage & Son works with a great deal of phosphate-based fertilizers and related products in Tampa Bay, so understanding how this cargo is loaded and unloaded, which berths are suited to accept them — including, perhaps most importantly how their schedules and berth rotations are prioritized/deconflicted — and any intricacies about the vessel in terms of docking or loading are necessary to effectively serve clients. The money saved in efficient operations and turnaround time far exceeds the fees of a premium service provider like A.R. Savage & Son — the company's core customers understand and appreciate that.

In the last few years, A.R. Savage & Son has increased its capabilities with large investments in IT tools. These investments have improved its abilities to more effectively and efficiently serve its customers. During the height of the Covid-19 pandemic, the company's tools and training allowed its people to work from home, with careful visits to the ports and ships, and its managers to monitor all inquiries, work in progress and billing while

all staff were kept safe, and the ships moving. High-performing ships and their crews know that having a high-performing support team ashore is key to consistent success and in turn, profits.

A.R. Savage & Son's services extend far past its internal capabilities with an extensive list of capable vendors. Its vetting process focuses on capabilities, certifications, safety, risk management and price. The company's highly sought-after database of terminal facts is a resource that saves its customers time and money. If ships have a need, A.R. Savage & Son has a solution.

Headquartered in Tampa Bay, A.R. Savage & Son is busy being an advocate for its customers to promote and protect their interests. As one of the families that first brought shipping to Tampa Bay in 1846, A.R. Savage & Son also spends a tremendous amount of time promoting and protecting its ports, their competitiveness and their value to the region. It regularly speaks and publishes newsletters to special interest groups to help them understand the economic value ports bring to central Florida. For instance, Tampa Bay's cargoes relates to dry



Special movements like this SSV require expert knowledge of local resources, regulations, restrictions and vendor capabilities and the ability to co-ordinate a whole-effort approach to problem solving. Agents at A.R. Savage & Son are well equipped to handle these challenges.

A.R. Savage Company, LLC celebrates strategic investment from Agunsa USA

TWO PREMIERE SHIPPING EXPERTS WILL EXPAND FURTHER INTO PORTS TO COVER ALL OF THE AMERICAS

Founded in 1945, the Tampa-based maritime services firm A.R. Savage Company LLC is pleased to announce that it has accepted a substantial investment into three of its operating companies from the international shipping services company Agunsa USA, AGS.

This includes investments in the A.R. Savage & Son organization that operates a premiere ship agency, as well as Tampa Bay Ship Services that provides line handling services, waste removal, hold cleaning and other port services, and A.R. Savage & Son Advisory Services that provides seasoned counsel to logistics and transportation firms across the nation.

In recent years, the company's leadership team has helped fuel an expansion of these services from Tampa Bay to a dozen U.S. ports.

"Our customers have come to know they can rely on our companies for exceptional service, tremendous value and objective advice," said A.R. Savage Company President & CEO Arthur Savage. "Now the same high-quality ship agency services will be available to them throughout the nation, as we remain focused on superior port call management that brings them the best results."

AGS, based in Florida, operates as the subsidiary of AGUNSA for North America and is an integral part of GEN Companies, a publicly traded corporation with more than 90 years of experience in the logistics, maritime, and port sectors. AGS and AGUNSA provide specialized maritime agency services in more than 20 countries, covering the Americas, Asia, and Europe. In addition, they expand their offerings with infrastructure concession services, logistics operations, and air solutions, among others.

Both companies, A.R. Savage Company and AGS AGUNSA, stand out for sharing a strong foundation of ethical values and commitment, focusing on integration and service excellence to clients, with the goal of exceeding their expectations.

"We are excited to help Agunsa expand into United States markets," Savage said, "especially as this growth will originate from our headquarters right here in Tampa."



bulk such as coal, granite, limestone, fertilizers (DAP, MAP, MESZ, ammonium nitrates, potash, and urea), salt, cement, fly ash, slag, scrap metal, and bauxite. The other is liquid cargoes, with the balance being breakbulk, containers and cruise.

Challenges to ports around the world are many. Constant new regulations, cost increases, urban growth and development into waterfront areas, push the maritime industry and associated jobs farther away or, in some cases, out altogether. Those issues have gained steam in recent years here in Tampa and A.R. Savage & Son, along with the Tampa Port Authority, and industry advocacy groups, are at the

forefront of mitigating any negative impact to the maritime industry and disruption of trade in general.

Over its history, A.R. Savage & Son has been asked to represent customers in other ports. In the last few years, its expanded capabilities have allowed it to consider and confidently accept the representation of several accounts in other ports and centrally manage them from Tampa. This has allowed it to showcase its value while customers generate requirements elsewhere and consequently, have asked it to scale up to fulfill their needs on a national scale. Because of this, A.R. Savage & Son has engaged in

agreements with other Association of Ship Brokers and Agents (ASBA) quality-certified agents to join in servicing those accounts on its behalf. Those additional ports are in Virginia, Louisiana and Delaware, which are additive to port expansions that it has completed since 2020.

From a global perspective, A.R. Savage & Son was honoured to join the DynaRep shipping consultants network. Coupled with its ASBA credentials, FONASBA network, and MultiPort duties, membership in these organizations is very much aligned with the company strategy, mission and long-term goals.

Kaleris offers terminal operating systems tailored for dry bulk operations



Kaleris offers a portfolio of terminal operating systems (TOS), which includes the Navis General Cargo TOS. This solution is specifically designed to handle all types of bulk cargo, especially dry bulk. Bulk cargo terminals have tended to rely on manual processes because their operations are specialized, and most general TOS solutions are built for container processes — processes that don't replicate for dry bulk or breakbulk. As inflation puts pressure on terminals to tightly manage operating costs, more and more bulk and general cargo terminals are exploring how to digitalize manual processes using a terminal operating system. A purpose-built terminal operating system delivers business value by increasing operational agility across all terminal areas.

WHY A BULK TOS IS AN IDEAL SOLUTION

Carlos Lopez Barbera, VP of Product Management at Kaleris, explains how a tailored TOS can revolutionize bulk cargo operations.

“Although more cargo is containerized today than ever before, some goods simply do not fit into a container. Given the excessive cost, time and effort that would be required to make them fit, general cargo terminals continue to play a crucial role in the global economy by serving the specialized shipping requirements of dry bulk, liquid bulk, breakbulk, forestry products, project cargo, automobiles and RoRo.

“Operating in a niche space has its own host of challenges, including high labour costs for specialized skills, different types of cargo with various handling requirements that make standardization difficult, intense regional competition from container terminals and for spot cargo, frequent weather events such as strong winds, rains and hurricanes that affect cargo stored outside, and technology neglect.

“A lack of technology solutions that cater to the specialized needs of general cargo terminal operations has meant that many bulk, breakbulk and mixed cargo terminals rely on pen and paper, basic spreadsheets, or in-house solutions cobbled together years ago to manage their daily operations. On the surface, these options may seem passable. In reality, they are difficult ways of working

every day. They are inefficient, prone to human error and often result in missed revenue. None of these ‘solutions’ are purpose-built for the specialized needs and business realities of bulk, breakbulk and general cargo terminals.

“A truly effective operational solution for a terminal meets this key requirement: It makes it easy and efficient for the terminal to maintain accurate inventory.

“The software solution should track inventory in real-time as it moves through its lifecycle at the terminal. It should support the Over, Short and Damaged (OS&D) Process. It must be adaptable and flexible to multiple commodity types that can change seasonally, causing the yard layout and planning strategy to shift as well. In addition to managing volume volatility, the solution must be equipped to handle the complexities of various packaging for



different types of cargo. And it must track value-added services in real-time, preventing terminals from experiencing revenue leakage by failing to capture all the work done accurately.

“Efficiently managing the end-to-end flow of cargo through the terminal using modern software can either feel exhilarating or daunting depending on the current ways of working. Regardless of where your terminal falls in that spectrum, the benefits of embarking on or continuing a digital transformation journey are proven to pay dividends. By adopting a terminal operating system that is powerful, easily configurable, and accessible from a desktop or mobile device, general cargo terminals can solve the complex problem of managing a variety of cargo within one system.

“A purpose-built terminal operating system delivers business value by increasing operational agility across all terminal areas. Terminal staff can leverage it to strategically manage cargo in real-time and eliminate time-consuming manual tasks. For example, the terminal operating system can take in vessel manifests via Electronic Data Interchange (EDI), which terminal staff can use to plan and execute harbour and yard operations thereby maximizing space utilization and storage efficiency. A terminal operating system helps terminals ensure compliance with the specialized handling needs for certain cargo by building these activities into the operational workflow. With integrated rail and gate operations, a terminal can also efficiently schedule and manage the inbound and outbound flow of cargo, preventing these areas from becoming congested bottlenecks. Real-time charging also ensures accurate billing for every service and timely invoicing.

“When the burden of manual tasks is lifted and transformed into efficient technology-enhanced workflows, terminals can accelerate vessel turnaround, gain better visibility of operational data, and improve customer satisfaction driving loyalty and preference,” Barbera concludes.

SOLVING THE MAIN CHALLENGES OF A BULK TERMINAL WITH A CUSTOMIZED TOS

The movement of cargo across ports and terminals is a complicated process. A variety of operations happen simultaneously, such as the arrival and departure of ships, allocation of berths, cargo loading and unloading, and the movement of cargo around the terminal via cranes, trucks, and other equipment.



Regardless of the type of cargo being transported, efficient and reliable operations are critical to maintaining the continuous flow of cargo, avoiding delays, and supporting economic growth.

TODAY'S KEY CHALLENGES

While there are many challenges associated with terminal operations and many of them are intertwined, the most pressing issues for terminal operators in the general cargo and bulk segments today include:

- ❖ manual processes and record-keeping;
- ❖ the absence of automation and standardization;
- ❖ a lack of system integration;
- ❖ inefficient co-ordination;
- ❖ a lack of data centralization;
- ❖ underutilized yard space;
- ❖ evolving trade patterns; and
- ❖ cybersecurity

The impact of these challenges are significant and wide-ranging.

In terms of **vessel activities**, scheduling berths and planning loading/unloading time to expedite turnaround relies on efficient communication with the vessel for its ETA. Manual communication via back-and-forth emails and phone calls does not provide information in real time. Delays in vessel communication can lead to reactive and inefficient decision-making on berth and resource allocation.

For **yard and quayside activities**, inefficient management of limited yard space results in lost business opportunities, especially for competitive spot cargo. Scheduling and managing the use of yard equipment can be difficult especially when trying to connect this with yard and gate operations. Equipment failures and unexpected downtime, or truck or vessel delays exacerbate the issue.

Tracking various packages and forms of cargo in the terminal is difficult and cargo often goes missing.

Manual records of **harbour activities** can lead to incorrect billing and loss of revenue for the terminal.

With **gate operations**, vehicles entering and leaving the terminal through the gate must be closely monitored and permission granted. Manual checking is lengthy and prone to human error. Insufficient truck management may lead to long transfer times, affecting vessel loading/unloading and turnaround.

In **rail operations**, inefficient train scheduling can affect a vessel's turnaround time. Manual document handling increases time to transfer cargo.

The solution to all these issues is a TOS. A TOS is like a central nervous system for a terminal. It co-ordinates, synchronizes, and optimizes operations from the arrival of cargo to its departure. It receives, processes, and analyses data from the terminal, giving operators full transparency across their operations and helping them to make data-driven decisions.

THE SOLUTION

By using real-time data, a TOS automatically co-ordinates available berths, the deployment of equipment, human resources, and yard space, regardless of the type of cargo or vessel.

Key areas addressed by a TOS are:

- ❖ asset optimization;
- ❖ process automation & standardization
- ❖ interoperability; and
- ❖ cybersecurity.

For terminal operators looking to deploy a new digital technology or set of systems, the first challenge is determining where and how to start. For terminal operators



that have yet to digitize or digitalize their operations, the idea of a full digital transformation or TOS rollout is overwhelming. Starting small, laying the right foundations, and digitizing and digitalizing slowly is key. If done correctly, the rewards, growth and competitive advantage can be substantial.

Terminal operators need to understand first where their process inefficiencies lie. Many operators turn to digital technologies and solutions to improve operational efficiency without a clear idea of where and why these inefficiencies exist. Once you understand where the inefficiencies lie, you can work to standardize your processes to bring efficiencies into your terminal.

Kaleris advises operators to start with the 'quick wins'. The project will achieve greater momentum by starting with the quick wins — areas where straightforward action achieves impactful results. Terminals with a 'growth mindset' seek to facilitate data movement, generating connectivity with port communities and trading partners that enhance communication and efficiency.

Being patient is also important. Implementation and ramp-up challenges are inevitable. Operational upgrades require a time investment, which is why some sites only undertake them every two decades. Fostering a growth mindset will pay dividends by helping staff to see that they can take proactive, preventative action instead of reactively putting out fires.

Deploying proven technologies is also helpful. Proven technologies are widely used in the market because they work. Proven technologies are reliable and

produce the desired results, and ultimately reduce risk. But it's important to ask for references and case studies and be open to learning from others' experiences.

It is important to focus on configuration over customization. Kaleris advises opting for a solution or system that is highly configurable as this will offer a robust feature set that can be readily used as-is and adjusted by you as the user over time to suit your specifications and changing requirements.

CONCLUSION

When compared with the container market, general cargo and bulk terminals appear to still be relying on manual and paper-based record keeping. This is largely due to the specialized cargo that is handled and the variety of formats the cargo is shipped in. Unlike standardized containers that can be easily tracked, cargo shipped in drums, bags, boxes, or pallets, for example, is much harder to trace. In turn, this makes it difficult to establish a digital record or centralized hub of information. This reduces the ability to share data and create visibility on the movement of cargo. Information becomes locked up in different departments and decisions regarding specific terminal activities are made in silos of other departments and are often based on incomplete information.

However, those that have embraced the digital transformation and deployed digital solutions such as Terminal Operating Systems (TOS) have reaped the rewards. A TOS enables a holistic approach to terminal management, optimizing assets, driving process automation, improving interoperability and terminal connectivity,

and ultimately facilitating a more cyber secure terminal.

With many digital solutions on the market today, it can be an overwhelming task to begin. It's important to lay the foundations first.

Determine where your inefficiencies lie and why and decide what you want to achieve in the short and long-term.

Start digitizing simple, repetitive processes to achieve the quick wins, then move onto the bigger digitalization projects alongside a vendor that understands where you want to go with your digitalization efforts.

Clear goals and a steady implementation will increase the chance of a successful digital transformation.

ABOUT KALERIS

Kaleris is an innovative company, dedicated to customer excellence and improving the world around with its award-winning cloud-based supply chain execution and visibility technology solutions.

Many of the world's largest brands rely on Kaleris to provide mission-critical technology for yard management, transportation management, maintenance and repair operations, terminal operating systems, and ocean carrier and vessel solutions. By consolidating supply chain execution software across nodes and modes, the Kaleris platform leverages operational data directly from yard management, transportation management, maintenance, and repair, port and terminal, and vessel operations to eliminate data gaps and dark spots within pivotal execution points. The platform then connects that operating data to workflows within the execution ecosystem, resulting in high-value outcomes for shippers, carriers, terminals, and asset owners, including:

- ❖ reduced non-performance time;
- ❖ increased operating visibility to shipment status and operating events; and
- ❖ improved planning and scheduling to improve efficiency and utilization

Through the platform, shippers gain real-time visibility of cargo status, enabling them to drive predictable, timely operations and take prompt action to reduce dwell times, demurrage and impediments. Terminals can reduce rehandling moves, container dwell time, and truck and rail turnaround times to increase productivity. Carriers and asset owners can increase asset maintenance and performance, maximize revenue per trip, reduce operational costs, and deliver better service to shippers.

Port Everglades: Florida's powerhouse global gateway

Port Everglades, located in South Florida, USA, works creatively and competitively to expand the revenue positions of its trade, cruise and energy customers which in turn creates economic social and environmental value for the community.

CARGO

Most people associate South Florida with sunshine. There's a select group, however, that identifies it with speed. That group consists of more than 20 shipping lines and 14 terminal operators. For them, the fastest and most strategic course for their cargo is Port Everglades.

Port Everglades has rapidly established itself as one of Florida's leading seaports for containerized cargo, serving more than 150 ports in 70 countries. The port is number one in the perishables market in Florida and the 15th busiest container port in the United States.

Port Everglades is also active in the bulk handling market, primarily moving cement and other aggregates. The port is perfectly positioned for companies that conduct business in Central America and South America, the Caribbean, Europe and the Far East.

The privately owned terminal operators at the port can move their goods through quickly/efficiently. The port is part of a thriving global transportation network that counts among its attributes:

- ❖ a favourable location less than one mile from the Atlantic Shipping Lane;
- ❖ direct access to multi-modal inland links through Florida's interstate and highway systems;
- ❖ near-dock FEC Railway's Intermodal Container Transfer Facility (ICTF);
- ❖ a location that is just two miles from

BULK CARGO THROUGHPUT AT PORT EVERGLADES

FYTD2024 (thru June)			FYTD2023 (thru June)		
Import	Export	Total	Import	Export	Total
1,213,485	10,226	1,223,711	1,770,159	7,448	1,777,606

Fort Lauderdale-Hollywood International Airport (FLL), one of the fastest-growing airports in the nation

TOP COMMODITIES AND SOURCES

CEMENT

Cement — a major cargo for Port Everglades, is mostly imported from Turkey. The top four importing countries (almost all of the volume at Port Everglades) are Turkey, Vietnam, Spain and Mexico.

SLAG/ORES

This is also mostly imported from Turkey, and also from China, Spain and the Netherlands. This year, Port Everglades has seen new volumes of slag from Germany, Japan and Guyana.

CURRENT TRENDS AND PROJECTIONS IN DRY BULK

Figures for (fiscal year to date) FYTD2024 vs. FYTD2023 (see table) shows that Port Everglades is down 6% overall in dry bulk tonnage. The port is down 5% overall in FY2023 vs. FY2022. Both cement and slag volumes have been down in all markets. "The port's location at the nexus of a key global crossroad for trade makes it extremely attractive for imports and exports to the

tune of \$27.6 billion for 2023," said Joseph Morris, CEO and Port Director. "Despite the dip in dry bulk tonnage, the port and our terminal partners remain prepared for when the dry bulk market makes an upward shift."

Port Everglades' two main dry bulk companies are CEMEX and HM Southeast Cement (formerly known as both Lehigh Hanson Cement and Continental Florida Materials). Each has its own Cement Terminal that is over four acres each. Both companies have handling equipment that can take the cement directly from the vessels into their terminals and silos, which are then moved into specialized trucks that will haul the cement to its final destination.





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Tipping the scales, one bag at a time



For millions of families across West Africa, rice isn't just a staple – it's a lifeline. Though a single grain might seem small, together, they have the power to feed families, fuel economies, and secure brighter futures. IMGS Group recognizes the critical role that rice distribution plays in ensuring food security throughout the region, especially during times of great need.

FROM PORTS TO PLATES

Côte d'Ivoire is a vital hub in West Africa's rice supply chain, with its extensive road and railway networks enabling the efficient distribution of rice to landlocked neighbours like Burkina Faso, Mali, and Niger.

Recently, IMGS Group partnered with USAID in a major operation to manage the bulk handling, bagging, and distribution of rice throughout the region. From the initial discharge to on-site bagging and the final delivery to neighbouring countries, its team ensured every step was executed precisely and efficiently.

This operation highlights the company's unwavering commitment to enhancing food security throughout West Africa, where the need for reliable and efficient distribution is most urgent.

FAST TRACKS TO SUCCESS

Rice is crucial for West Africa, where food insecurity remains a significant challenge. Yet, logistical hurdles and infrastructure limitations can hinder the availability and affordability of this vital staple. To address these issues, strategic partnerships and government initiatives are actively working to improve trade routes, upgrade infrastructure, and streamline regulations.



These efforts are focused on reducing transportation costs and ensuring more reliable access to essential commodities like rice.

During its recent operation, IMGS Group's high-speed mobile bagging solutions and well-coordinated distribution management were key in overcoming logistical hurdles. By ensuring that rice was efficiently handled and delivered, it minimized delays and reduced costs, demonstrating its value as a reliable partner in regional supply chains.

SOWING THE SEEDS OF A RESILIENT FUTURE

The impact of rice distribution extends beyond immediate food relief; it contributes to regional stability, economic growth, and sustainable development. Côte d'Ivoire's strategic role in rice logistics, supported by government investments and IMGS Group's innovative solutions, ensures that vital agri-commodities are distributed effectively throughout West Africa. By promoting efficient agricultural distribution and fostering economic resilience, IMGS is building a sustainable future for the people, the economy, and the region as a whole.

Environmental solutions for production plants

Filter for Jaw Crusher
© Quarry Mining LLC.



Screening and crushing always creates dust, this is the nature of the production process. It's impossible to crush material without dust, but how to reduce the dust development to a minimum and how can you even benefit from it?

Quarry Mining provides a wide range of environmental solutions. Dust emission and spillage from conveyors is a major concern for many screening and crushing plants. The environmental production requirements are getting more stringent from year to year. It is not only in regard to the environment, but also the operation personal that need to be protected. With dedusting plants from Quarry Mining the company ensures the reduction of dust emission to a minimum. Furthermore the final product is cleaner in regards to fines.

Using highly efficient and latest state-of-the-art filter systems from ELMA Favorit Filter (Germany) as a key component for its systems Quarry Mining ensures the highest availability and well proven systems to its clients. "With many years of experiences, we can provide a solution for every application." says Ing. Christian Drewes, M. Sc., B.Eng., Deputy General Manager, Technical Manager, Quarry Mining LLC. He continues "Using self-cleaning bag filter systems, the maintenance costs are at

a very low level, same as the operation costs. With over 45 plants in operation we are able to source from a huge range of experiences and can provide the right solution for your application."

Dust is not always an unwanted waste product, there are also many applications requiring such fines. "Beside the environmental protection usage of such a system the fines can be used for some special applications, such as mortar and plaster fabrication. Some industries pay a very high price for such fines. In combination with an optional sifter system it is possible to produce a real value product, which can be sold at high prices." explains Drewes.

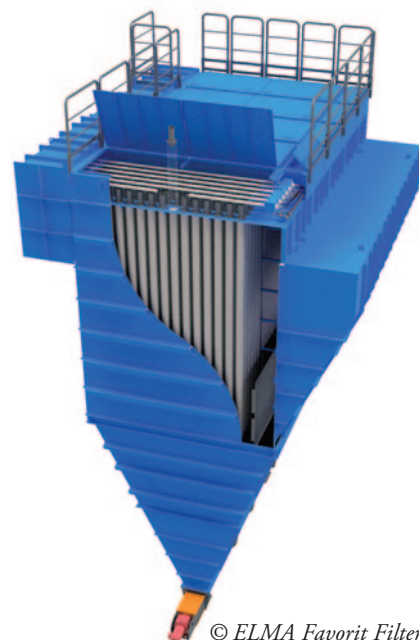
All of Quarry Mining's systems are compatible with its standard plants and can be integrated to every individual plant as well.

ABOUT QUARRY MINING LLC

Quarry Mining LLC designs and manufactures screening and crushing plants in compliance with European standards, while adhering to the same safety standards and features that you would expect of equipment produced in Europe,

Quarry Mining LLC (QM) is certified for quality management with ISO

Certificate 9001:2008 and for environmental management with ISO Certificate 14001:2004 from the German Technical Inspection Association TÜV Rhineland/Germany, and include the continuous integration of all upgrades. Located in United Arab Emirates QM can supply high quality plants with very competitive prices.



© ELMA Favorit Filter.

ORTS Grabs

higher quality means higher throughput –
and improved performance



For 50 years now, ORTS GmbH Maschinenfabrik has been delivering to customers all around the world. In 2024 these customers came from Southeast Africa, the near and middle East, eastern Mediterranean, North America as well as Sweden and, of course, Germany.

The company's main customers are shipping companies with their bulk carriers, which know that they can rely on the performance, speed and reliability of ORTS grabs for many, many years. This is the case even under the rough conditions of sea-going vessels. Additionally, terminal operators, stevedore companies and heavy industry companies (e.g. steel works) value

the quality of ORTS grabs.

Specialized dry bulk handling equipment that can move large volumes quickly and efficiently is needed for handling dry bulk cargoes, including grains and sugar. While not being as fast as vacuum discharge systems, grabs are a multi-purpose equipment and allow the operator to use the same equipment for unloading other, heavier materials, which would be too heavy for vacuum discharge systems. Products that are capable of this belong to the core competencies of ORTS GmbH.

ORTS grabs have a lower deadweight than most other grabs, therefore leaving more of the crane capacity for the actual

load and improving the discharge rate. If requested, these clamshells can be constructed with teeth, to reduce the amount of load falling out at the bottom. For the loading and unloading of grain these grabs are perfectly suited.

The complete range of grabs is offered, from electro-hydraulic grabs and radio-controlled diesel-hydraulic grabs to mechanical rope grabs. Each grab is manufactured directly by ORTS Maschinenfabrik. This is visible at first sight, because of the unique construction design. It is not enough to just replace the block and tackle construction in the middle of a mechanical rope grab with a hydraulic

cylinder, e-motor or hydraulic pump to get an electro-hydraulic grab. If you install a six-cylinder engine in a tractor, you don't get a racing car.

Therefore ORTS electro-hydraulic grabs and the radio-controlled diesel-hydraulic grabs look different. And they do not only *look* different, but they *are* also different: They offer lower dead weight and higher closing force, while being fast and reliable. The construction surrounding the drive-unit (hydraulic parts, e-motor, control block etc.) is easy and safe to reach for the service engineer/seaman. The escutcheons can be opened from two sides of the grab and used as a working platform straight in front of all important parts of the grab.

Unique and innovative grabs, like the radio-controlled diesel-hydraulic technology, came from ORTS.

The idea of this grab was born over 30 years ago in the technical offices of ORTS GmbH. Since then, the radio-controlled diesel-hydraulic grabs from ORTS (type DHS-B, DHM and DHZ) have been manufactured in the workshop near Lübeck in Northern Germany.

It is impossible to overstate the important of this kind of long-term experience with this specific grab type. Over the years, since 1995, ORTS diesel-



hydraulic grabs have become flexible, reliable and high-performance 'workhorses', thanks to continuous improvements in co-operation with the company's customers. ORTS's DHS-B (two-clamshell design) and DHM (orange-peel clamshells) are in operation on all continents, in all climate zones.

ORTS was also one of the very first grab makers to construct and manufacture environmentally friendly grabs with enclosed clamshells in the 1980s,

specifically to address environmental concerns and to reduce dust formation and spillage.

All the grabs by ORTS (diesel-hydraulic, electro-hydraulic and mechanical ones) are well-known for their effectiveness (high discharge-rates), reliability and the long lifetime over millions and millions of tonnes. The purchase price for a grab becomes less and less important the longer the grab is working for the owner/operator. Quality, reliability and performance are more important and are the characteristics that really pay off over the years. A cheap grab can become a very expensive grab very quickly: when the grab needs spare parts after only a short time of being in operation, has breakdowns during operation or takes more time for loading/unloading operations because the clamshells do not work at full capacity. ORTS Grabs do not suffer from these issues.

ORTS still supplies customers with spare parts for grabs, even when those are 25–30 years old. One of the first radio-controlled diesel-hydraulic grabs is still functional after 25 years now. This is truly quality 'Made in Germany' exemplified by the company slogan 'The best link between ship and shore'.

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Tru-Trac belt scale at KwaZulu-Natal-based AfriSam Coedmore Quarry.

Louise Dodds-Ely

Tru-Trac belt scale wins the day for AfriSam Coedmore Quarry

Following worrying discrepancies in the monitoring of production output, sales and inventory, a belt scale from Tru-Trac is winning the day for KwaZulu-Natal-based

AfriSam Coedmore Quarry in South Africa. With groundbreaking static calibration accuracy error levels as low as 0.06%, the belt scale provides reliable data for sound

decision-making.

Over the years, AfriSam Coedmore Quarry has had issues with stock capturing and evaluation. “Accurately measuring



Tru-Trac's flagship TTR FI-4 belt scale system installed at AfriSam Coedmore uses a fully floating pivotless weigh frame supported by four load cells.

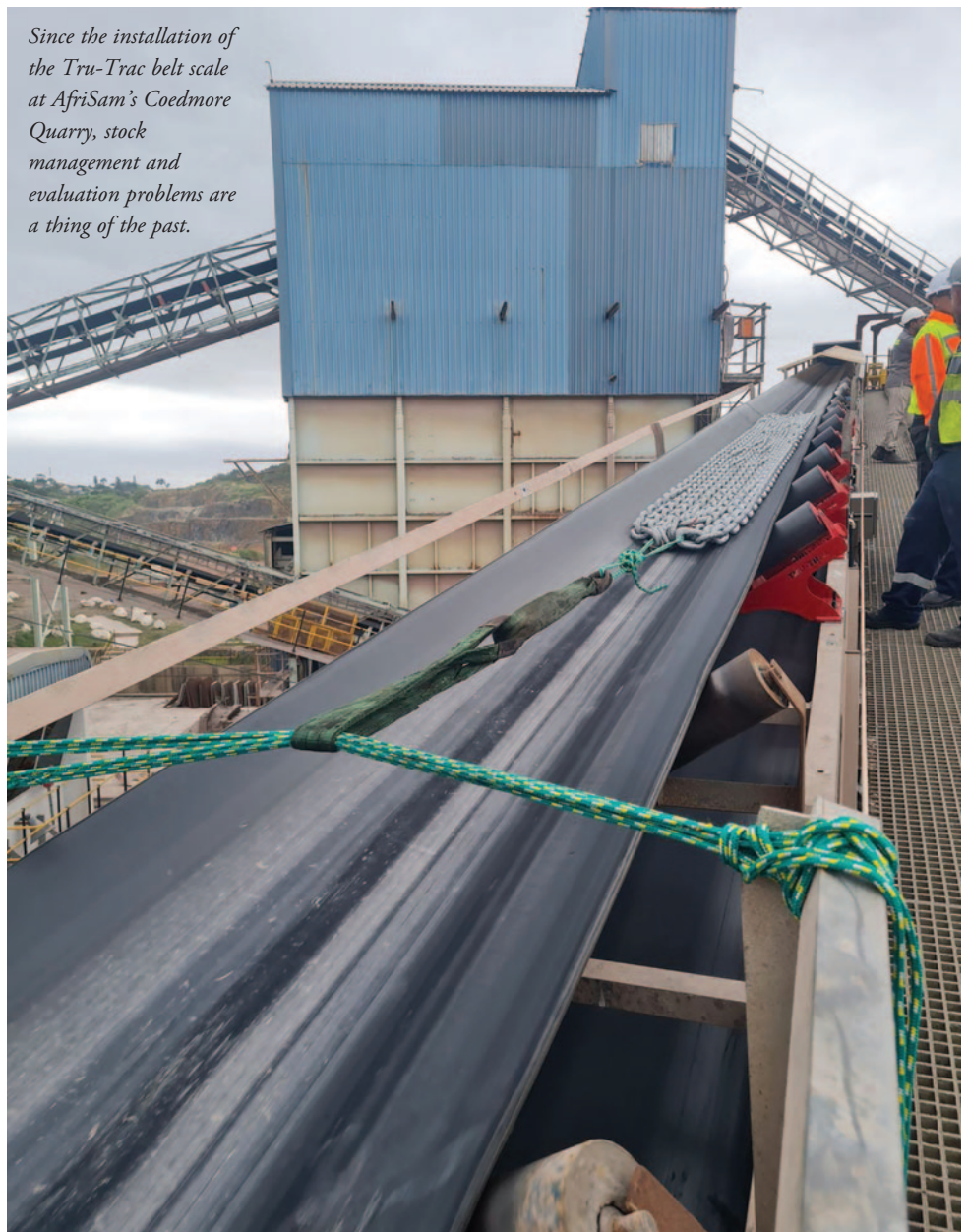
production, sales and stock levels is critical for effective management and efficient operations," says Lloyd Maringa, Works Manager at AfriSam Coedmore Quarry.

"Traditionally, we conduct quarterly stockpile surveys though an independent third-party to gauge the levels of stock on the ground. It was during these surveys that we would always encounter huge discrepancies between what we had produced, what would have been sold and what should have been on the floor."

In some instances, the variations were as high as 70,000 tonnes. In the quest to resolve the problem, the operation resorted to monthly surveys instead of the usual quarterly routines. The more frequent surveys, however, did not yield different results. Further investigations eventually pinpointed issues with the existing belt scale between the intermediate stockpile and the secondary crusher. Despite several interventions, including regular calibrations by the supplier and even the installation of a second belt scale, the challenge persisted.

"We therefore went into the

Since the installation of the Tru-Trac belt scale at AfriSam's Coedmore Quarry, stock management and evaluation problems are a thing of the past.



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market for a new belt scale supplier,” explains Dustin Naidoo, Maintenance Superintendent at AfriSam Coedmore Quarry. “Tru-Trac proposed a proof-of-concept approach, whereby they installed a belt scale on a trial basis for a month. Upon evaluation of the results, we were impressed by the high levels of accuracy.”

Since the installation of the Tru-Trac belt scale, the stock management and evaluation problems are a thing of the past. “We have now reverted to the usual quarterly stockpile surveys, which saves us both time and money,” says Maringa.

Tru-Trac’s flagship TTR FI-4 belt scale system installed at AfriSam Coedmore uses a fully floating pivotless weigh frame supported by four load cells, making it ideal for high-precision applications. It is a simple and extremely accurate system engineered to produce precise data. With a proven accuracy margin under 0,1%, the belt scale sets industry standards in metallurgical accounting.

“In addition to the accuracy of the technology, we are equally impressed by the service provided by Tru-Trac. Although they taught us to do in-house calibrations, a technician visits our site every month. Choosing Tru-Trac has proven to be one of the best business decisions we have made in recent times,” concludes Naidoo.

Installation of the Tru-Trac belt scale at AfriSam’s Coedmore Quarry in KZN.



KwaZulu-Natal-based AfriSam Coedmore Quarry has found a fitting solution in Tru-Tracs’ belt scale.

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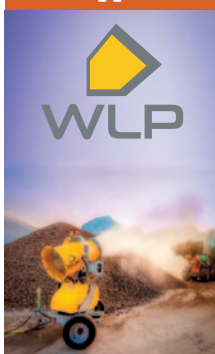
Material ropeways



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Conveying equipment selection - why it goes wrong, what are you risking, and what can you do about it?

INTRODUCTION

Bulk material handling is the single largest industrial activity in the world, so whatever manufacturing industry you're involved in, bulk material handling is probably an essential part of your operations, writes *Josh Marion, Senior Project Engineer, Jenike & Johanson, Inc., Tyngsboro, MA USA*. Regardless of whether your facility handles only one bulk material or dozens of unique materials, it is essential that your equipment for handling and conveying those bulk materials 'works' properly. After all, none of us wants to buy something that doesn't work, let alone be responsible for dealing with the consequences of it not working once you have it.

This is, of course, plainly obvious to everyone, including engineers and managers of operations where it's critical to achieve production rates up to tens of thousands of tonnes per hour. Accordingly, during the front-end engineering stage of a project before selecting and purchasing equipment, engineers are fundamentally responsible for two basic tasks: (1) define what it actually means for the process to 'work' successfully, then (2) try to figure out,



select, and design the equipment that's required to make this happen.

For part (1), 'working' typically means being able to meet the required production rate/capacity of the final product, and, of course, doing so safely and efficiently.

The most common approach we see engineers use when selecting and designing bulk material handling equipment for part (2) is to start by measuring — or assuming in some cases — each material's basic

properties such as bulk density, particle size, and angle of repose, then making sure the handling equipment for that material has sufficient capacity to meet the required production rates. Next, they approach equipment vendors for bids, expecting that the vendors will figure out what equipment should work based on their past experiences and/or with small-scale physical trials using their equipment. Eventually, the engineer winds up selecting the vendor whose quote is the least costly and/or has the fastest timing. The engineer assumes that this should be fine since they're a reputable and experienced company, and they performed physical trials at their facility to 'prove' it works. As a result, this should be the fastest, easiest, and least-costly approach to select and design what bulk material handling equipment to use for your process...right? The vendor did run successful physical trials at their facility, after all...

WHAT CAN GO WRONG?

Consider that your material may be different than the vendor has prior experience handling (not all iron ores,

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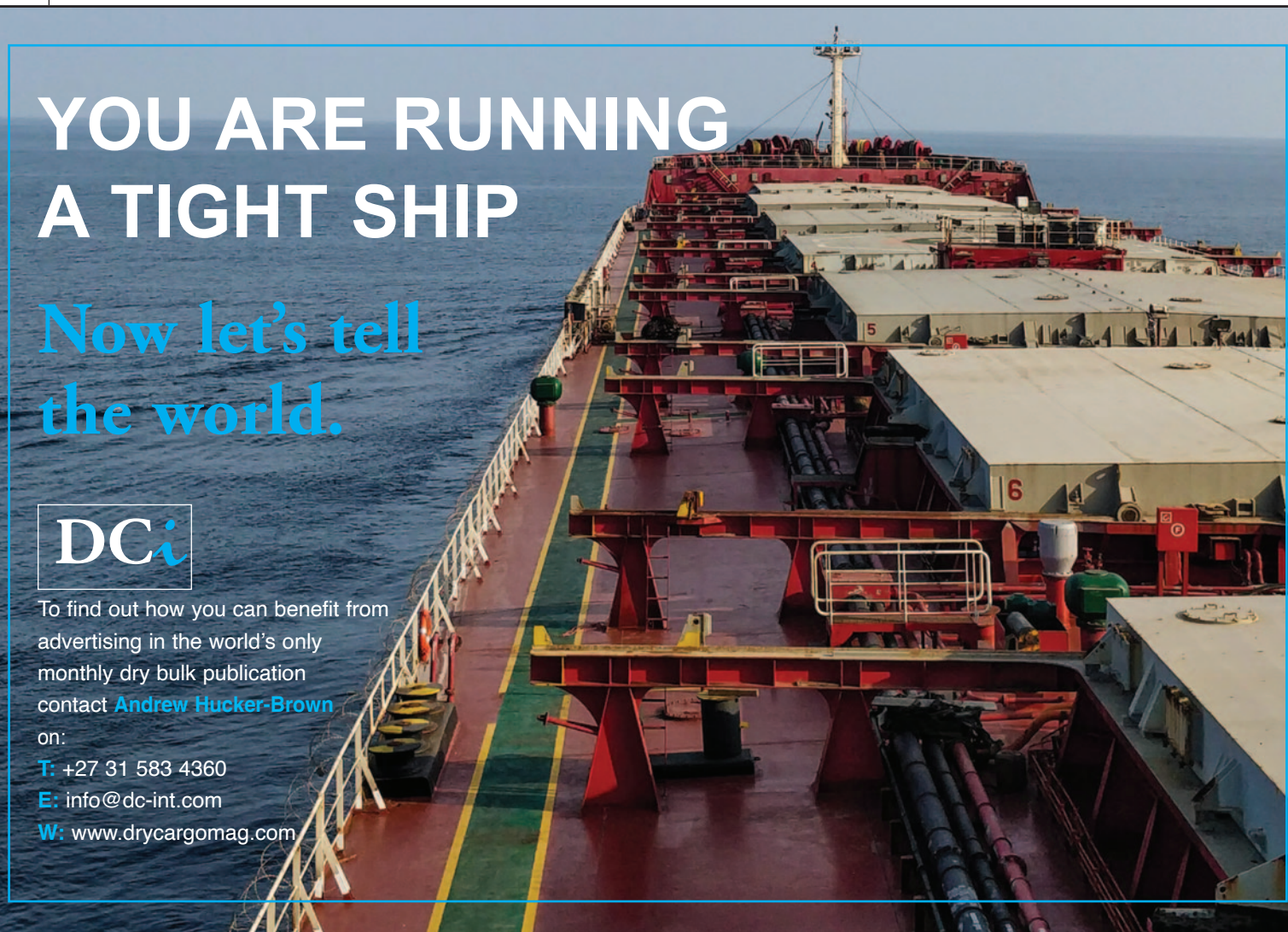
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sugars, grains, etc. are the same), or your application conditions may be different than their previous projects with that material (maybe your site is more hot and humid, or your process is run at a higher temperature). Even if the vendor ran physical trials with your specific material at their facility to prove out their equipment/technology and those trials were at least nominally successful, it's important to remember the limitations of those trials. They were run at small-scale (not at full production/commercial scale), they were run for a short amount of time (and so may not have been able to capture potential problems that accumulate over time such as abrasive wear or build-up), they may not have been run under representative conditions, or they were performed in a way that doesn't mimic how your process will operate (maybe they trialed your material in a drag conveyor by slowly dumping buckets into the feed hopper without ever building a level, whereas your feed system may be run completely full).

When companies prioritize minimizing up-front capital costs and getting started up as fast as possible by using the 'fast-cheap-easy' approach, the process and equipment may wind up working acceptably well in some (or even many) applications... but it

frequently doesn't. Unfortunately, all too often this approach tends to fail and the equipment does not work as intended once it's installed, creating severe issues in the process after startup. This leaves the owner/operator with equipment that isn't able to meet production goals, creates significant amounts of lost/out-of-spec product that can't be sold or used, doesn't operate safely and efficiently, and/or requires frequent maintenance and operator intervention. The lost revenue from unrealized production and increased operating costs that can occur as a result of these issues may ultimately wind up being 10x or more higher than the equipment's up-front capital cost over the life of the process.

MAIN CAUSES OF FAILURES

Generally, we find that in the unfortunate applications where these failures happen, the main causes tend to be mistakes during the basic up-front engineering stages where the equipment was not properly selected and designed to ensure success, for any number of possible reasons. Perhaps some critical aspects of the material properties weren't measured and considered during design. Maybe the material is more cohesive, sticky, and prone to plugging than initially thought, it cakes up under process

conditions, or it tends to segregate. Perhaps the properties and handling requirements may be different than the initial design basis because of how the material changes as it moves through your process, or because the raw material source/supplier changed entirely. Maybe the type of conveyor selected was not suitable for the material and application, leading to issues in both the conveyor itself and downstream equipment.

As just a few examples of some of the factors that can lead to massive changes in a material's properties that could cause the conveying and handling equipment to fail, consider:

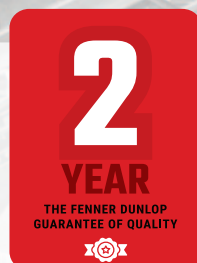
- ❖ Changes to the raw material upstream, such as changes from the material supplier (e.g., swings or upsets in the material's moisture content, particle size, composition, or grade changes), or even changes to a completely different supplier altogether.
- ❖ Changes to the material as it goes through a process, such as how ores/minerals may start as large, run-of-mine (ROM) rocks then go through numerous processing steps (e.g., crushing, grinding, classification, separations) that can cause significant changes in their particle size, shape,

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moisture content, composition, etc.

- ❖ How materials like plastic pellets may soften and become more cohesive and prone to flow issues when exposed to elevated temperatures during handling, e.g., in positive pressure pneumatic conveying lines without post-blower/compressor cooling.
- ❖ How many fragile/friable materials (e.g., pebble lime, potash, urea prills, salt, granular sugar) tend to experience

unintended particle breakage/attrition during handling, primarily due to impact or shear during conveying, with high-velocity impacts during pneumatic conveying or belt-to-belt transfers usually being the most aggressive. This unintended attrition and excessive fines generation often causes additional severe problems, such as:

- ❑ Frequent production bottlenecks due to flow stoppages in

downstream equipment, since fines are likely to cause build-up and plugging;

- ❑ Product that is out-of-spec due to excessive fines content;
- ❑ Customer/end-user complaints, due to material regularly arriving caked up in packages during shipment, and/or due to flow issues in their own process when handling product with high fines;

TABLE 1: GENERAL COMPARISON OF VARIOUS CONVEYOR TECHNOLOGIES, WITH 'STANDARD' FEATURES; CONVEYORS IN EACH CATEGORY MAY HAVE SPECIALIZED DESIGNS/OPTIONAL FEATURES WITH MORE CAPABILITIES

Consideration	Pneumatic – dilute phase	Pneumatic – dense phase	Belt	Screw	Bucket elevator	Tubular drag (cable/chain)	Drag chain	Vibratory
#Materials conveyed	Most	Limited #	Most/all	Most	Limited #	Limited #	Most	Most
Capacity (tph)	Low (<30)	Moderate (<300)	Extremely high (<5,000)	High (<600)	Very high (std. <1,000-2,000)	Low (<100)	High (<100)	Low (<1,000)
Distance (ft)	Long (<1,000)	Very long (<2,000)	Extrm'ly long (nr unlimited)	Moderate (<100)	Moderate (<150)	Moderate (<300)	Long (<500)	Short (<50 std.)
Vertical lift	Excellent	Excellent	Poor	Poor	Very good	Good	Moderate	Very poor
Layout flexibility, horiz. turns/ corners possible?	Excellent	Excellent	Very poor	Poor	Very poor	Good	Very poor	Limited
Cohesive, sticky materials	Good	Very poor	Excellent	Moderate — good	Moderate (avoid digger designs)	Very poor	Moderate	Fair-Good
Highly abrasive materials	Very poor — poor	Moderate	Excellent	Moderate — good	Good (avoid digger designs)	Very poor — poor	Good	Excellent
Dust containment	Excellent	Excellent	Fair, if enclosed	Very good	Moderate	Excellent	Good — moderate	Poor
Toxic mat'ls materials	Excellent	Excellent	Very poor	Very good	Moderate	Moderate	Moderate	Poor
Particle degradation	Very poor	Fair — good	Good	Poor — fair	Poor	Excellent w/cable poor — fair w/chain	Poor	Excellent
Cleanable/sanitary	Excellent	Excellent	Poor — moderate	Poor	Very poor	Good — excellent	Very poor	Excellent
Maintenance requirements	Very low	Low	Moderate	Moderate	High	Moderate — high	High	Very low
High temperatures	Excellent	Excellent	Very poor	Excellent	Excellent	Fair	Excellent	Excellent
Ability to use inert gas	Excellent	Excellent	Avoid	Good	Good	Excellent	Good	Poor — moderate
Cross-contamination/cleanout	Excellent	Excellent	Good	Very poor	Poor — good	Good	Very poor	Very good
Multiple inlets possible?	Excellent	Poor	Excellent	Excellent	Very poor	Excellent	Excellent	Very poor
Multiple outlets possible?	Excellent	Excellent	Poor — good	Good, w/gates	Very poor	Excellent	Good, w/gates	Very poor
Steady/continuous feed	Excellent	Poor	Excellent	Moderate	Poor	Moderate	Good	Excellent
Up-front capital cost	Low	Moderate	Moderate — high	Moderate — high	Moderate	Moderate	Moderate — high	Moderate
Specific energy cost	Very high	Moderate	Very low	Low	Low	Low	Low	Very low



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- ❑ Increased dust generation, which may overload the dust collection equipment or release hazardous fugitive dust;
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Clearly, there can be some significant consequences if you don't get conveying 'right'. Depending on your material, application, and type of conveyor you've selected, you may experience production bottlenecks, flow stoppages/pluggages, poor or inefficient transport, product degradation or particle breakage, rapid abrasive wear, segregation and product variability, spillage, dust release, excessive maintenance requirements, or a number of other issues.

CONVEYOR SELECTION

Considering all the different bulk materials you may deal with and how much the characteristics of each material could potentially change for some of the reasons mentioned above, and the potential consequences of those changes, how do you know how to select, design, and specify the handling and conveying equipment throughout your process? And with all the different types of conveying equipment that are out there, many of which are marketed as a 'one-size-fits-all' solution for moving your bulk solid around, how do you cut through vendor claims so you can mitigate risk of your process experiencing these issues. In other words, how do you know that you're selecting the 'best' type of conveyor for your application from the start?

Selecting the improper type of conveyor or failing to account for the material's characteristics — and what the conveyor may do to the material — often leads to poor operation of the conveyor itself as well as severe problems downstream.

Conveyors come in a wide variety of shapes, sizes, and configurations, with some of the most common being belt conveyors, screw conveyors, bucket elevators, drag chains, vibratory and pneumatic conveyors. Regardless of what type of conveyor you use, it should meet the following requirements:

- ❖ Reliable transfer of the material from the feed point(s) to the delivery point(s), at the required flow rate, with no pluggage or build-up within the system.
- ❖ Minimal product degradation and/or particle breakage, if required.
- ❖ Minimal abrasive wear.

- ❖ Reasonable power/energy consumption.
- ❖ Safe operation with minimal spillage and dust release.
- ❖ Sensible maintenance intervals, with minimal operator intervention required between intervals.
- ❖ Sufficient flexibility to fit within the available space.

When selecting what type of conveyor to use in your process, it's important to start by measuring your material's flow properties, then considering whether the conveyor is suitable for your material and for the application. Table I provides some general selection criteria and some of the strengths and weaknesses of common conveyors for a range of material properties and ability to meet different process requirements. Note that Table I is based on a 'standard/typical' conveyor in each category. Many conveyors have specialized designs and/or optional features that can improve various aspects of their performance and functionality vs. their 'standard' designs.

For example, for conveyance of a fine powder such as cement that tends to be highly aeratable, a belt conveyor wouldn't normally be appropriate due to the potential for the fluidized powder spilling over the edges. However, if the cement is fed onto the belt in a deaerated condition and skirts are added on the belt sides, spillage should not generally be a problem. If you handle a material that is heavy, cohesive, sticky, and abrasive such as wet ore fines, maybe a belt conveyor would be appropriate. However, if you also need to elevate the material several meters or more, belt conveyors may not be appropriate unless you have space/footprint available for a long belt inclined at no more than about 15° from horizontal. Lastly, consider both the up-front capital cost (CapEx) as well as the operating cost (OpEx) over the life of the equipment. It's almost always less costly to invest additional capital when purchasing equipment than to compromise on functionality/performance by purchasing the wrong type of conveyor. Ultimately it's a balancing act where you need to consider what's more important to your operation.

To minimize project risk and ensure the process 'works' successfully and is able to meet the project goals from the start and for a long time, it is critical to consider your process requirements and what constitutes success for your application during the engineering stage when selecting and designing the handling and conveying

equipment. You generally need to know much more about the material than just 'basic' properties such as bulk density, angle of repose, and particle size for ensuring proper equipment selection and design. It is also often important to measure how the material changes as a result of processing or changes in the process conditions. In many applications, you should also try to 'future-proof' as much as possible by considering the potential for changes in the material supplier or in the process requirements. If your organization decides to increase the production rate significantly in a few years, can the equipment accommodate the increased rate?

CONCLUSIONS

Ultimately, the best approach is to spend a little more time, energy, and thought up-front to measure the material's flow properties so as to ensure that the material handling and conveying equipment is properly selected and designed. In that way, reliable, safe, and efficient production is achieved from the start. An expert solids handling engineering firm can support you in ensuring your success.

ABOUT THE AUTHOR

Josh Marion is a Senior Project Engineer with the bulk material handling equipment engineering consulting firm Jenike & Johanson, Inc. In more than ten years at Jenike, Marion has worked on hundreds of engineering projects across all major manufacturing industries for custom-designing new systems — and troubleshooting and modifying existing system — for ensuring reliable bulk material handling, storing, feeding, and conveying. Marion received his B.S. and M.S. in Chemical Engineering from Northeastern University in Boston, MA.



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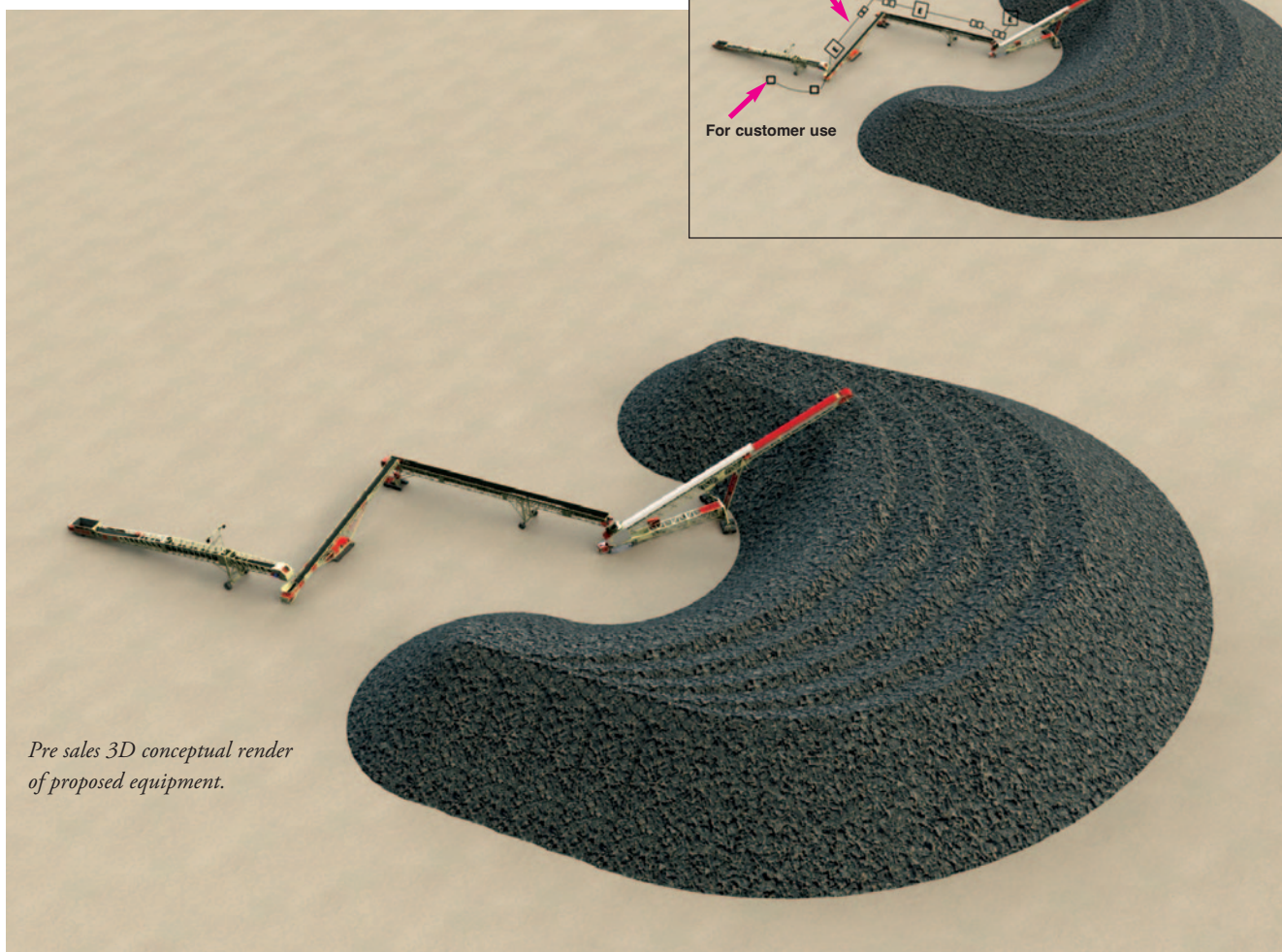
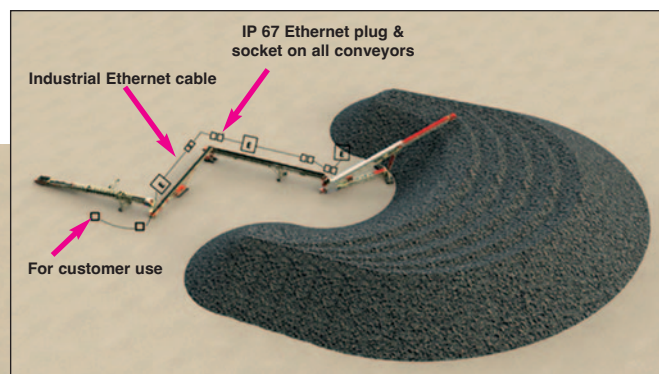
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Its principal operations are located in Krasnoyarsk Territory, Irkutsk Region, Magadan Region and the Republic of Sakha (Yakutia) and include five operating mines, alluvial operations and several advanced





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development projects. Polyus Aldan was recorded to be the third gold producer in the world in 2020 (*Mining Intelligence*, 2021).

Previously, locally manufactured equipment had proved unreliable and unable to stand up to the harsh climatic and material conditions resulting in too much downtime.

Telestack was awarded the tender for this equipment based on the company's references in the heap leaching sector, and its ability to customize to clients' requirements and quality of equipment offered.

APPLICATION

STAGE 1

In this application Polyus Aldan sought the expertise of Telestack to replace this equipment to help achieve maximum production rates whilst keeping production costs low. The installation comprised of three units. Firstly a TCL 1031 Tracked 'Cross' conveyor, an HIC 40 horizontal index conveyor and also a TS 1042 radial telescopic stacker. These products are used in the heap leaching application to stockpile gold ore at rates of up to 1,000tph (tonnes per hour) with maximum lump size of up to 150mm.

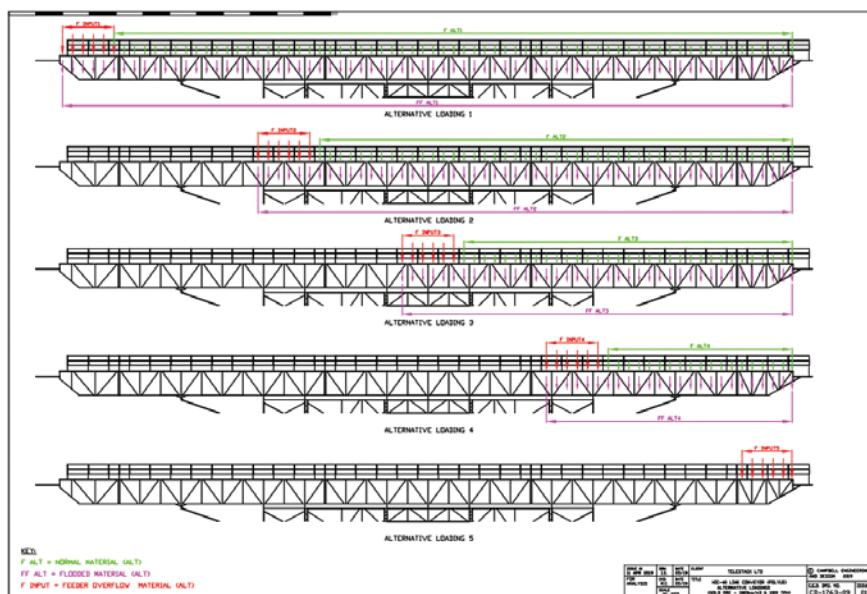
The process starts out at the primary crusher where run-of-mine gold ore is fed into a crusher hopper by dump trucks. After being crushed and further processed, the ore is fed through a series of ground conveyors to the leach pad.

At the leach pad a series of wheeled Link conveyors then transfer the material to the stacking area.

STAGE 2

The gold ore is then transferred fed onto the TCL 1031 track-mounted 'Cross' conveyor. This unit features hydraulic adjustment at the rear and front of to adjust transfer height, therefore making it easy for the operator to set up and decreasing movement times by utilizing the crawler-mounted chassis. The TCL 1031 transfers the material onto the full length feedboot of the HIC 40.

The HIC 40 is also track mounted to enable quick movement during repositioning. The unit has full length feedboot complete with liner plates enabling the unit to be fed along full 40-metre length of the conveyor. The conveyor incorporates full impact protection by means of centre impact rollers and closely spaced idlers. This unit also features dual access walkways to allow operators access for maintenance along full



Third party structural audit of the Horizontal Index Conveyor

length of the conveyor. This unit was fully structurally analysed due to unique nature of the application.

The gold ore is then fed onto a TS 1042 track-mounted Radial Telescopic Stacker. This final unit of the system is a 42m radial telescopic stacker which stockpiles the gold ore to a height of up to 14 metres at 18°. The customer opted for the double-bogie radial option with quad drive along with low ground pressure tyres to minimize the compaction on the leach pad. The stacker features a fully automatic stockpiling programme controlled by a Siemens PLC. All conveyors were VSD

(variable speed drive) driven and linked together using Ethernet cables for communication.

Russia is expected to become the world's top producer of gold by 2029 (*Mining Intelligence*, 2021). In response to the forecasted growth, Polyus Aldan trusted Telestack's expertise and industry knowledge, to reinforce its position in the evolving landscape of the gold mining industry.

ABOUT TELESTACK

Telestack is renowned throughout the globe for its personalized service. The team of engineering and sales specialists work very closely with clients throughout each stage of the process from pre-sales and pre-engineering to ensure that the equipment is specific to the project. The company's product portfolio is vast as is its application knowledge. Its experienced sales personnel is happy to discuss any project with potential clients. Telestack has a range of global reference sites in multiple applications.



Conveyor belt warranties – why they are important

Industrial conveyor belts are critical components and a significant capital outlay. For most organizations that use conveyors, their day-to-day performance, reliability and longevity has a huge impact on operational success. A warranty is usually regarded as a key factor in the selection of virtually all significant purchases such as TVs, white goods and cars. However, when it comes to the selection of a component that is as critical and costly as a conveyor belt, the significance and importance of a manufacturer's warranty strangely seems to carry very little weight. Conveyor belt specialist *Jeremy Clark* investigates the reasons and explains why warranties are actually far more important than most people seem to realize.

LOW PROFILE

In most walks of life, a warranty or quality guarantee provides the buyer with 'peace of mind'. A well-used sales phrase perhaps, but nonetheless true. Consequently, warranties and guarantees are usually

promoted as a benefit to the would-be buyer as a reflection of the product they are purchasing and the reassurance that the goods will be replaced or repaired at the suppliers cost if the product should prove faulty within the warranty period.

My first, and rather surprising observation when I began to research this subject, was that of the eighteen manufacturers and traders that I was looking at, hardly any mention the subject of warranty on their website or sales literature, let alone promote it as a benefit. It was distinctly treated as a low-profile subject rather than a selling point by the majority. Indeed, for many, there was not even mention of terms and conditions on their websites.

Whether this reflects the belief that the supplier has in the quality of their product or simply a subconscious attempt to avoid complaint is hard to say. Certainly for me, and quite possibly for many others, it does not inspire confidence.

WARRANTY DURATION — A QUESTION OF CONFIDENCE?

The same could be said for the length of the warranty. Of the conveyor belt manufacturers and traders I surveyed, Fenner Dunlop Conveyor Belts (The Netherlands), Kale (Turkey), Trelleborg/SAVA (Slovenia) and SIG (Italy) offered 24-month warranties. Amongst those four, only Fenner Dunlop clearly and strongly promoted its quality guarantee. For the remainder, including other big names such as Contitech, Sempertrans and Rema Tip Top, the standard warranty period was limited to 12 months.

For me, the significance of the duration of warranty is that faults are usually either discovered as soon as a belt is fitted (belt not straight for example) or they slowly become apparent as the months pass, by which time it is often too late.



Only Fenner Dunlop seems to strongly promote its warranty.

PRIMETRACKER

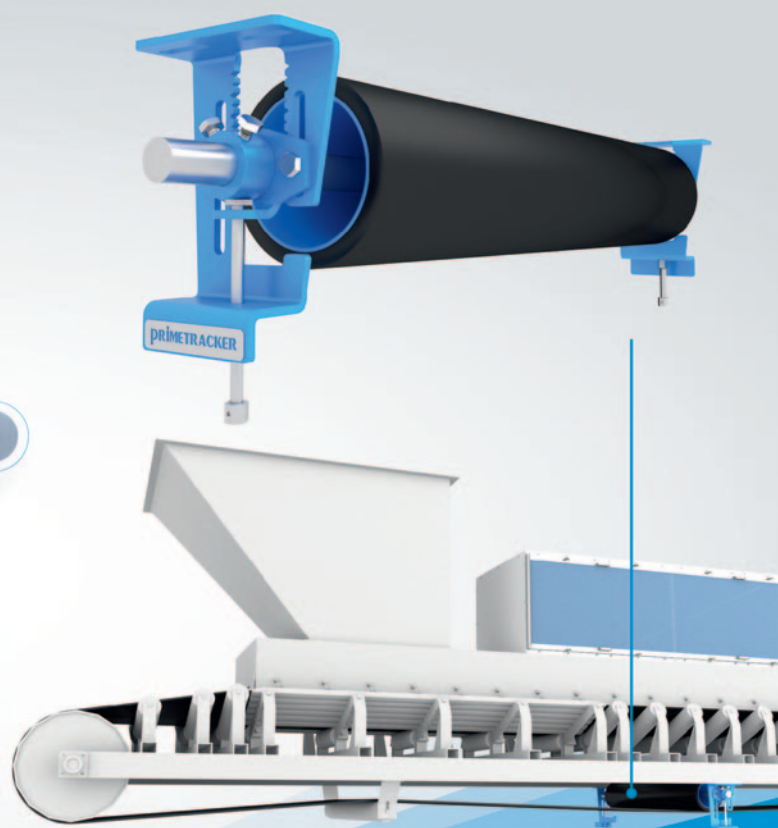
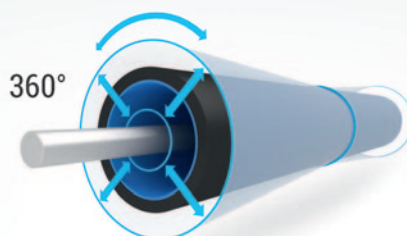
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Understandably, most warranties have conditions that specify a 'reasonable period' in which to report an issue. However, it is almost impossible to comply with this stipulation when the symptoms of the problem slowly reveal themselves and worsen gradually. It can also give the supplier the opportunity to reject the claim on the basis of 'fair wear and tear'.

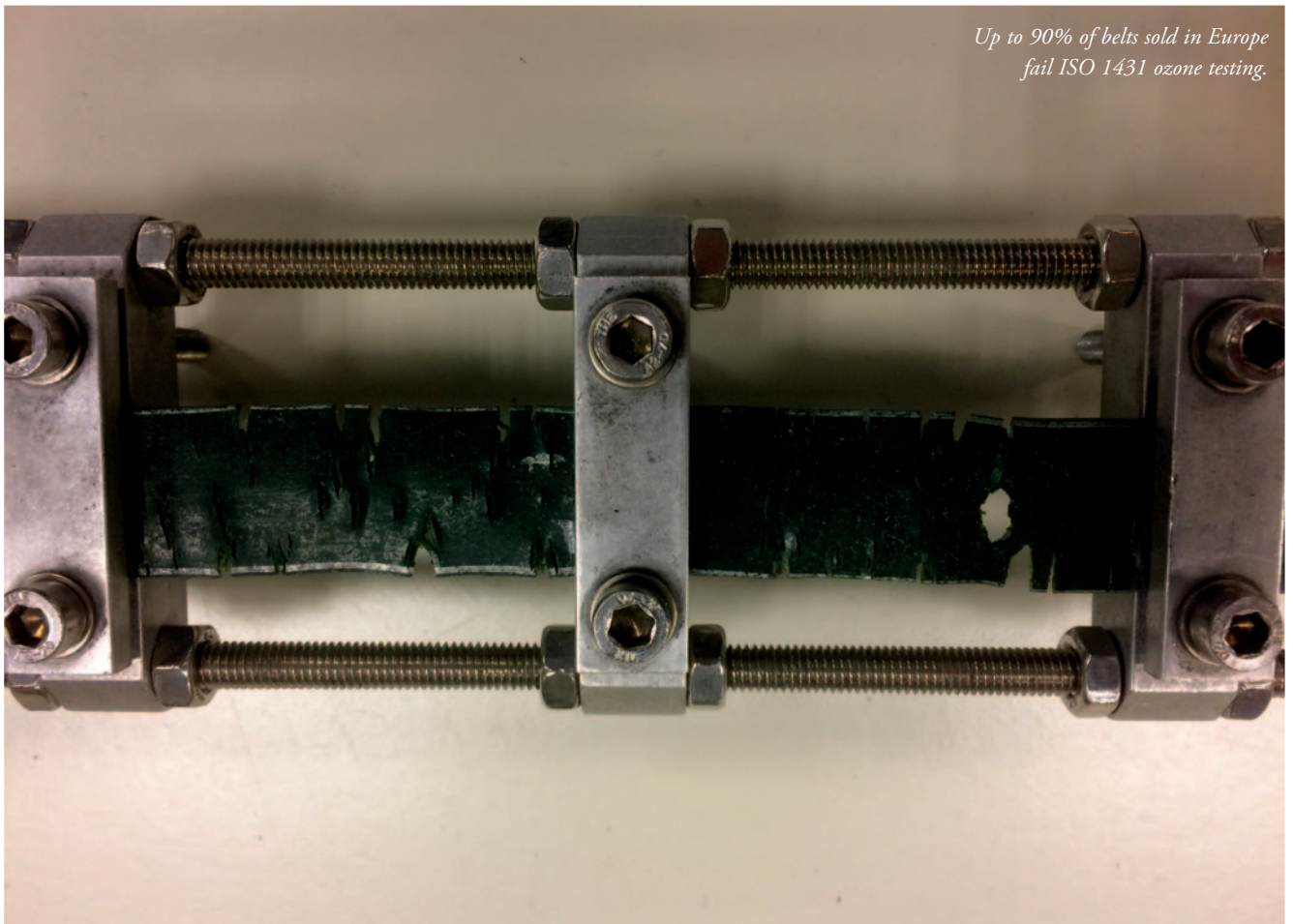
SLOW BUT SURE

One of the most common but most unrecognized causes of gradual belt deterioration is degradation caused by ozone and ultraviolet light. At low altitude, ozone becomes a pollutant and is created by the photolysis of nitrogen dioxide (NO_2) from automobile exhaust and industrial discharges. The reaction, known as ozonolysis, affects the molecular structure of rubber.

The first visible sign is when cracks start to appear in the surface of the rubber. These continue to steadily grow until they complete a 'circuit' and the product separates or fails. Its 'partner in crime' is ultraviolet light from sunlight and fluorescent lighting and also has a seriously detrimental effect on rubber. It accelerates rubber deterioration by producing photochemical reactions that promote the oxidation of the rubber surface resulting in a loss in mechanical strength. This is known as 'UV degradation'. These processes effectively begin as soon as rubber is vulcanized unless antioxidants have been



The first signs — small cracks appear in the surface of the rubber.



Up to 90% of belts sold in Europe fail ISO 1431 ozone testing.

Delamination — the layers of the belt detach themselves.



used to create the rubber compound although the damage may only start to become visible after a few months.

Because of price competition, laboratory testing has revealed that up to 90% of belts sold in Europe, Africa and the

Middle East do not have such protection. The combined effect of ozone and ultraviolet not only dramatically reduces operational lifetime, it also contributes to other problems, including accelerated surface wear and a decline in a belt's

resistance to oil and heat.

STANDING THE TEST OF TIME

Conveyor belts are a considerable investment so to provide genuine value for money, they need to stand the test of time.



Oil absorption over time causes serious distortion.

In fairness, no manufacturer's warranty can ever guarantee a specific length of operational life because there are simply too many variables. However, with the exception of particularly aggressive, demanding applications, most modern-day conveyor belts should run with little or no problem for several years. Nevertheless, in addition to the delayed effects of ozone and ultraviolet damage, there are a number of other problems that can develop over time. Among these is the adhesion between the outer covers and the inner plies and between the plies themselves, which may be only marginally acceptable to begin with and

then decrease in time. This can lead to frequent splice joint failures and delamination of the carcass, where the plies detach themselves and the belt literally begins to fall apart.

Delamination is also symptomatic of heat-resistant belts that have an inadequate level of resistance to heat. Heat accelerates the thermal ageing process of the outer rubber covers, causing them to harden and crack. It also has an extremely destructive effect on the inner carcass of the belt because it gradually destroys the adhesion between the rubber covers on the top and bottom of the carcass and between the inner plies contained within it.

As rubber becomes harder and less elastic, the tensile strength and elongation (stretch) can be reduced by as much as 80%, effectively destroying the operational strength and flexibility of the belt and seriously weakening the splice joints. It is relatively simple to create a rubber compound that will resist even the most extreme temperatures over a short period. However, the difficult and costly part is to create a rubber compound that can resist those temperatures and delay the ageing process for the longest possible period. This is why the length of warranty can be so crucial.

In defence of manufacturers, the operational lifetime of a heat-resistant belt does also very much depend on the conveyor operator. Firstly, that the constant and temporary peak temperatures must not exceed the stated limits of the belt specification and, secondly, that conveyors are not stopped for any length of time while the belt is loaded with hot materials.



Only buy from a source who can be held accountable for the warranty.

Belts that are specified as being resistant to oils and greases are another example of where decline in performance can be gradual. Rubber belts that are not adequately resistant will provide a much shorter working life than they should. As oil imperceptibly penetrates the rubber over time, the rubber gradually softens and its ability to withstand abrasive wear decreases quite dramatically. It also steadily loses its tensile strength while at the same time becoming much more prone to ripping and tearing. While this is happening, the rubber is slowly beginning to swell and distort, leading to steering and handling problems along with a serious reduction in the elongation at break (the amount of stretch before the belt snaps).

As with heat resistance, the cost of producing a belt with short-term resistance to oil is much less than it is to create a belt that can withstand the effects for a much longer and more cost-effective length of time.

ACCOUNTABILITY

As with any warranty for any product, the ability of the purchaser to hold the supplier to account for a problem during the warranty period is paramount. Ease of communication is equally important, including if necessary, legal action. If either of these factors is missing then the warranty is not worth the paper it is printed on.

The biggest single source of rubber belting imported into Europe is from Southeast Asia, the vast bulk of which is from China, who now dominate the market. As with virtually every other market, their strategy is based on mass

volume manufacturing at barely acceptable (and often unacceptable) standards of quality at hugely subsidized prices. Much of the European-based conveyor belt manufacturing capacity has disappeared as a result, creating an unhealthy reliance on low-grade imports.

Indeed, with only one exception (Netherlands-based Fenner Dunlop), virtually all European manufacturers now supplement their production with imported belting while conveyor belt trading companies almost exclusively only sell imported belting. As this market dominance has grown, so has the enormous level of difficulty end-users have trying to lodge warranty claims with Southeast manufacturers. My advice is to always check the provenance of a conveyor belt before committing to buy it.

WARRANTIES ARE IMPORTANT

The conclusion I have drawn from my research is that conveyor belt warranties and quality guarantees should be considered to be very important. In fact, I would say that they are probably more important than ever. The general consensus of opinion seems to be that the general standard of quality has fallen considerably during recent decades. This decline is mirrored by a corresponding decline in the level of expectation by end-users, all of which coincides with the rapidly growing dominance of imported belting from Asia. The relevance and importance of warranties and quality guarantees and the willingness (or reluctance) of the supplier to openly provide such reassurance, clearly needs to be placed much higher on the buying criteria list.

Jeremy Clark



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Rollers alone with spacious gaps, do not give ample support to the critical transfer point. If support is not provided adequately, belt sag can occur — along with detrimental productivity issues such as material spillage and excessive dust. The product loss, equipment damage and downtime issues caused by poor conveyor belt support is inconvenient, unsafe and

expensive.

Kinder Australia's K-Sure® Belt Support System is engineered to provide the heavy-duty support that transfer points require.

It utilizes the existing conveyor idler frames and load, carrying the centre conveyor roller. The wing rollers are then replaced by the K-Sure® Belt Support System's universal adaptor brackets and low friction polymer belt support rails.

The K-Sure® Belt Support System

requires no pre-engineering, adjustments or special tools. It is available in a standard two-metre length assembly kit. Other lengths can be modified upon request.

Effectively, it is designed to provide a consistent and stable support for the troughed belt profile by reducing the number of rotating components. K-Sure® Belt Support System eliminates any belt edge sag and therefore increases the effectiveness of the skirting seal.

K-Sure® Universal Adaptor Innovation

To ensure a precise fit, a specialized universal adaptor stud has been engineered by Kinder Australia. This allows for adjustment to suit three different size roller diameters, offset/inline frames, and manufacturing tolerances in trough frames. Since its introduction, this innovative technology has transformed the industry benchmark, in delivering greater flexibility in conveyor transfer point configuration.



Transforming bulk conveyor systems: innovations and sustainability in the industry

In an ever-evolving industry, the role of bulk conveyors is pivotal in handling dry bulk products across various sectors, especially in ports, stockyards, and mining operations. As we delve into the future of conveyor systems, it is good to spotlight the advancements made by CI Global Traders, GBS Colombia, and Global Belting Solutions LLC. This article explores the significant changes, technological innovations, and sustainability efforts driving the companies' success and positioning them at the forefront of the conveyor industry.

RECENT CHANGES AND STRATEGIC DEVELOPMENTS

CI Global Traders, a major player in the conveyor systems market, has recently undergone transformative changes to better address the international demand for conveyor solutions. The establishment of Global Belting Solutions LLC in the United States marks a strategic move to cater to the growing global market, extending the group's reach to regions including Ecuador, Venezuela, Costa Rica, and beyond. This division focuses on international projects and supply, while CI Global Traders has created a dedicated conveyor systems division to concentrate on local supply and customer service.

These changes are part of a broader strategy to specialize and enhance the group's offerings. CI Global Traders is now channeling its efforts into cutting-edge technologies, including AI, IoT, and 3D printing, aimed at advancing conveyor systems and automation. This specialization makes it possible to push the boundaries of traditional conveyor technology and focus on developing innovative solutions that meet the evolving needs of the industry.

TECHNOLOGICAL INNOVATIONS AND THEIR IMPACT

CI Global Traders' commitment to integrating advanced technologies into conveyor systems is evidenced by its application of AI in predictive and preventative maintenance. By incorporating AI and IoT sensors, it collects and analyses data to forecast equipment performance and load projections. This approach significantly improves operational efficiency, with documented increases in productivity by up to 30% per equipment unit and potential enhancements of up to 50% in equipment availability.



The use of AI-driven maintenance programmes not only extends equipment life but also reduces maintenance costs and failure rates. These innovations mark a substantial leap forward, transforming conveyor systems from mere mechanical components into intelligent, data-driven assets.

SUSTAINABILITY INITIATIVES

Sustainability is at the heart of CI Global Traders' operations, reflecting its commitment to reducing environmental impact. It is actively working on the end-of-life management of conveyor belts, which are traditionally made from rubber — a material that takes up to 1,000 years to decompose. Its initiatives include exploring recycling, repurposing, and proper disposal methods to minimize the environmental footprint of these belts.

Additionally, CI Global Traders is investing in renewable energy solutions, such as solar and wind power, to provide energy for conveyor systems, especially in remote mining operations and coastal areas where energy access is challenging. It is also investigating the potential of wave energy in ports to generate electricity, further aligning its operations with sustainable practices.

DIFFERENTIATION AND MARKET POSITIONING

What sets CI Global Traders apart in the competitive conveyor industry is its holistic approach that combines traditional mechanical engineering with cutting-edge technology and sustainability. While many competitors focus solely on mechanical manufacturing, it is dedicated to enhancing

its conveyor systems with new technologies and reducing the carbon footprint of its operations.

This unique integration of advanced technologies and environmental considerations positions it at the forefront of the conveyor industry, offering solutions that not only meet but exceed current market expectations.

CHALLENGES AND SOLUTIONS

One of the group's significant challenges is the high cost associated with implementing advanced systems. It is actively working to make these technologies more accessible and affordable, ensuring a swift return on investment for clients. By addressing cost barriers, CI Global Traders aims to facilitate the widespread adoption of innovative conveyor systems across various industries.

FUTURE OUTLOOK

Looking ahead, the conveyor industry is poised for a technological revolution, driven by the need for greater efficiency and environmental responsibility. CI Global Traders is preparing for this future by focusing on technology integration and sustainability. Its strategic divisions are designed to cater to these evolving demands, ensuring that it remains at the forefront of industrial movement solutions.

In conclusion, the advancements and strategic developments within CI Global Traders, GBS Colombia, and Global Belting Solutions LLC reflect a commitment to innovation and sustainability. By embracing new technologies and addressing environmental concerns, the group is shaping the future of bulk conveyors and reinforcing its position in the industry.

Warrior Met Coal selects BEUMER Group to build a long-distance overland conveyor for its mine expansion in Alabama

B EUMER Group has been selected by Warrior Met Coal (Warrior) to support the expansion of Blue Creek Mine, a new state of the art underground longwall mine of high quality steelmaking coal. The extracted steelmaking coal will be processed at the surface in a coal preparation plant before being moved over nine miles (14km) to a train loadout station.

The BEUMER Group recently secured the order from Warrior to design and supply a single-flight curved overland conveyor for this 1,500stph (short tons per hour) transport system. Daniel Schmillenkamp, CEO of BEUMER Group Canada, comments: "In co-operation with Warrior, we addressed the project-specific challenges. The design and implementation are a testament to our commitment to innovation and customer-centric solutions."

The project presented some challenges due to the difficult and hilly terrain of the proposed transport corridor. To find the most efficient solution, Warrior explored various transportation methods, including rail, troughed, and pipe conveyor systems. Over the past 12 months, BEUMER Group has worked closely with Warrior to identify the most economical and technically feasible transport method and optimal route, resulting in a single conventionally troughed conveyor with 18 horizontal curves.

Philip Saunders, Senior VP-Engineering at Warrior, commented that, "BEUMER's holistic approach and our very close working relationship allowed us to expedite the design and procurement phase to move toward the completion of this time-sensitive project at a pace rarely seen in the coal or mining industries."

BEUMER Group is responsible for engineering and procurement of all structural, and mechanical components and multiple E-Houses with VFDs, MCCs, and PLC control systems. The conveyor system will utilize nine load-sharing drives to limit the overall belt tension.

BEUMER's Director of Sales, Peter Sehl, explained that this project utilizes innovative and proprietary conveyor engineering and design tools to support the fast construction schedule. "With over 5,000 tonnes of steel for ground modules and elevated sections, 47% of the conveyor flight will be elevated to avoid natural features and minimize earthworks."

The overland conveyor is expected to be operational by the end of 2025.

ABOUT BEUMER GROUP

BEUMER Group is a global manufacturer of material handling solutions. As a third-generation family-owned business, the company offers high-quality system

solutions and comprehensive customer support worldwide and is a 'Partner of Choice' for the mining, cement, building materials, petrochemical, consumer goods, postal, e-commerce, fashion, and baggage handling industries. With 5,600 employees worldwide, BEUMER Group generates an annual order intake of around €1.25 billion. In line with the company motto 'made different', BEUMER commits to the highest standards of quality, innovation and sustainability.

ABOUT WARRIOR MET COAL

Warrior is a US-based, environmentally, and socially minded supplier to the global steel industry. It is dedicated entirely to mining non-thermal metallurgical (met) steelmaking coal used as a critical component of steel production by metal manufacturers in Europe, South America, and Asia. Warrior is a large-scale, low-cost producer and exporter of premium quality met coal, also known as hard-coking coal (HCC), operating highly efficient longwall operations in its underground mines based in Alabama. The HCC that Warrior produces from the Blue Creek coal seam contains very low sulphur and has strong coking properties. The premium nature of Warrior's HCC makes it ideally suited as a base feed coal for steel makers.

*Photo: BEUMER Group
GmbH & Co. KG.*



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YEARS OF
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KEEP IT CLEAN.

Impact Cradles



ApronSeal Skirting



Belt Trackers



Belt Cleaners



Martin® conveyor components keep your bulk material on the belt and under control.

Martin Engineering designs and produces the most innovative and reliable belt conveyor components in the industry. Dust curtains and patented, double-seal skirting effectively contain fugitive material. Support and impact cradles eliminate belt sagging and pinch points. Trackers align belts and keep cargo centered. Transfer Point kits feature dust mitigation and air flow management.

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Superior's enhanced conveyor impact cradle also includes more models

Superior Industries, Inc., a US-based manufacturer and global supplier of bulk material processing and handling systems, has unveiled a revised design of its popular Conveyor Impact Cradle. The new and improved arrangement includes larger pad cartridges to enhance durability and a reinforced point of connection between the pads and cradle frame.

According to Superior's engineers, the Conveyor Impact Cradle is a modern redesign of the traditional impact bed. While both products absorb the force of falling material to prevent damage to conveyor belts, the Impact Cradle is specifically engineered to address common shortcomings associated with the design of traditional impact beds:

- ❖ Curved bed fully supports belting, leaving no gaps to trap fugitive material.
- ❖ Pads are easy to slide on or off cradle frame in tight, hard to access transition zones.
- ❖ No special tools required, which speeds installation and maintenance.
- ❖ One-piece pads made from a special urethane to reduce friction and enhance cushioning.



In addition to these redesigned features, Superior's Impact Cradle is newly available in two more pre-engineered models: medium and heavy duty are now available in addition to the standard model, which was first introduced to conveyor owners in 2017.

ABOUT SUPERIOR INDUSTRIES, INC.

Superior Industries is a deeply-rooted, privately-owned American manufacturing company whose products play a pivotal role in production and transportation of ingredients used to build the world's

infrastructure. Specialties include crushing, screening, washing, and conveying systems, alongside comprehensive parts and services that support robust construction aggregates production from Rock Face to Load Out®. Equipped with one million square feet of manufacturing space and more than 100 engineers, Superior is headquartered in Morris, Minnesota, with four additional production facilities in the United States, plus international manufacturing locations in Canada, Brazil, and Asia.

Loibl Förderanlagen installs pressed beet transport system in Ukraine

The company Agro-Express-Service is active in the Ukraine corn-, and grain-farming industry on an agricultural land of approximately 32,000ha. Among other activities, Agro-Express-Service operates a sugar plant located in the town Maryanovka, Ukraine, with a daily beet processing capacity more than 7,000 tonnes. In 2020, the company decided to

reconstruct and modernize the beet-pulp drying station and to reconstruct the pulp-pellets warehouses.

Extensive planning work was required for this intervention in the existing plant, which was carried out by a local engineering company. In the planning phase, the company was consulted and supported by Loibl Förderanlagen GmbH,

which became a reliable partner to choose modern and durable conveying systems. Loibl's extensive experience for pressed beet pulp, dried beet pulp and pelletized beet pulp, based on the supply of conveying systems for various purposes and bulk materials could be used.

Part of the project is a new single-pass drum dryer with the capacity of 400t/day



Screw conveyor.



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AND EVERYTHING IN BETWEEN...”

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BC-2 CONVEYOR BELT CLEANER



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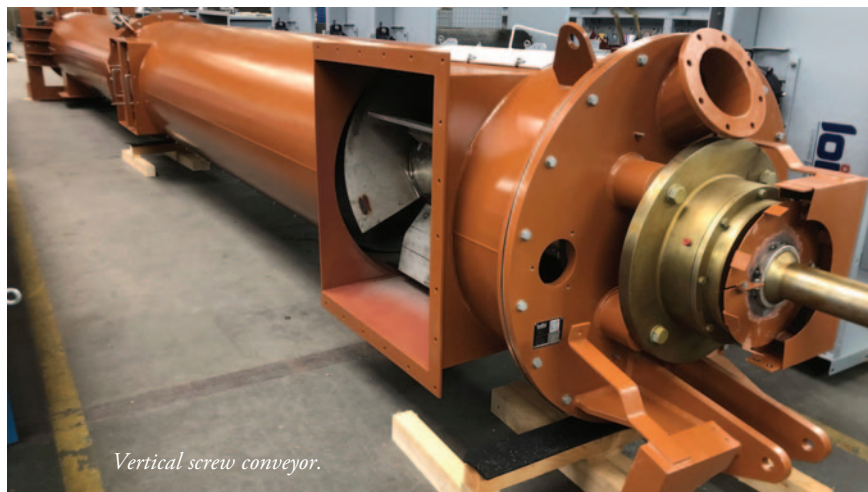
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dried beet pulp, as well as three pieces of the pellet mills with a capacity of eight to nine tonnes a day each, both from well-known German manufacturers. Therefore, Agro-Express-Service needed to reconstruct two warehouses, each with a storage capacity of up to 10,000 tonnes, and a pelletizing department, and a packaging station with the capacity 350t/day to fill pellets into bags.

For the enclosed vertical transport of wet pressed beet-pulp, between the two existing pulp presses and the new feeding hopper, Loibl Förderanlagen GmbH delivered a suitable vertical screw conveyor



Vertical screw conveyor.



Live screw bottom.

with a diameter of 1,000mm, a length of approximately 12,000mm, with a frequency-controlled motor and a horizontal feeding screw with a diameter of 800mm.

Due to Loibl's design and arrangement it was possible to install a conveying system in a limited area and as an alternative to a planned inclined rake conveyor. Both screw conveyors were designed in stainless steel to minimize corrosion.

The speed of the vertical screw shaft and the filling level of the vertical screw housing were calculated according to the requirements and based on Loibl's experience and references. The inner design of the tubular housing favoured a vertical transport. Inner shaft bearings have not been used, to ensure a good material flow to the top.

Behind the vertical screw conveyor and before the drying station Loibl Förderanlagen GmbH delivers a live-screw-bottom for the customer's hopper, which will make it possible to stabilize the material flow for the continuous and proper feeding of the new beet pulp drier, even if the feeding from the pulp presses station will be uneven due to technical matters. Each screw shaft with conical and progressive blades has a frequency-controlled motor to adapt the total

discharge capacity of the hopper to the drying process. Also, a corrosion-resistant stainless-steel version was used here.

After the drying station for beet pulp Loibl Förderanlagen GmbH delivers a chain bucket elevator made from carbon steel with a positive discharge and a double strand chain, which will be suitable for the reliable discharge of the bulk material with a low bulk density of 250kg/m³ and convey the bulk material, which may change the bulk density and dry matter content from time to time. The Loibl chain bucket elevator with a bucket width of 630mm and an axle distance of approximately 15,000mm was adapted to the

requirements and structural conditions.

For the optimal and maximum feeding of the two warehouses, each with 10,000 tonnes beet- pulp pellets, as an energy-rich food for ruminants, Loibl Förderanlagen GmbH delivered one stationary and one movable reversible belt conveyor for each warehouse with belt widths of 650mm. These belt conveyors operate in automatic mode, and are provided with all safety equipment.

The customer also ordered from Loibl Förderanlagen GmbH the necessary slide gate valves (made in stainless steel), in different sizes, manual and pneumatically driven, to control the material flows of the process for all mentioned types of bulk material.

After the assembly by the customer, Loibl made an installation check and accompanied the commissioning for a successful sugar beet campaign.

Loibl Förderanlagen GmbH is a DIN EN ISO 9001:2000-certified manufacturer and supplier of bulk conveying systems for a wide variety of processing operations in a sugar factory. Its products are tailored to the respective requirements and with a network of representatives Loibl Förderanlagen GmbH ensures customer proximity and fast contact.



Bucket elevator.

RBL REI secures key contract for an overland conveyor project in Estonia

In December 2023, RBL REI, a respected global manufacturer in bulk material handling solutions, won a critical contract from an Estonian mining company. This agreement focuses on designing, engineering, fabricating, and installing a state-of-the-art 6.175km overland conveyor (OLC) system. The system is intended to transport raw materials from a newly developed underground mine in eastern Estonia to the company's existing pre-treatment facilities. This project is a vital part of the client's efforts to increase production capacity while ensuring efficient material flow in challenging conditions.

RBL REI'S EXPERTISE LEADS TO SELECTION

RBL REI's long-standing reputation for delivering cutting-edge bulk handling systems capable of operating in harsh environments made it the clear choice for this project. Known for its ability to handle complex engineering challenges, the company was entrusted with the key tasks of delivering:

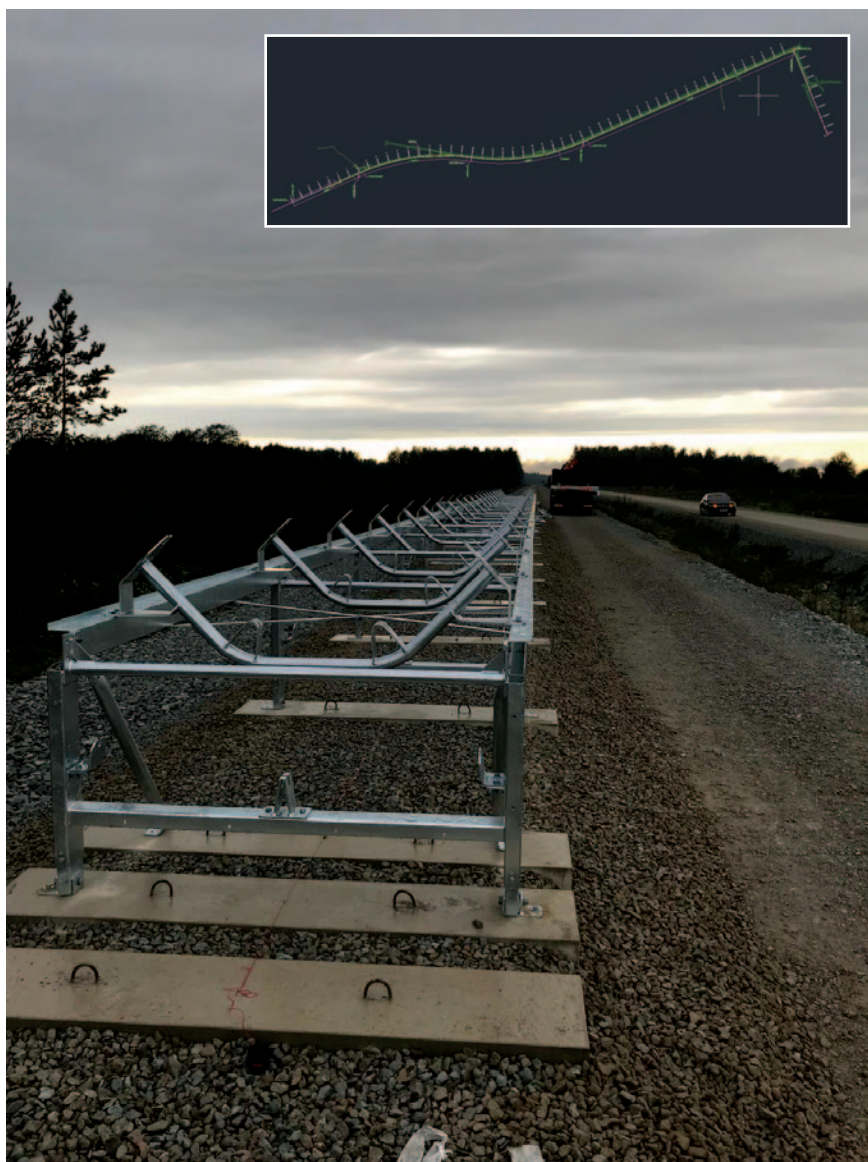
- ❖ a 5,300m curved conveyor to transport materials from the underground mine;
- ❖ a strategically located transfer tower for smooth material handling between systems; and
- ❖ an 875m straight conveyor connecting to the client's pre-existing facility, ensuring seamless integration with current infrastructure.

This comprehensive scope highlights RBL REI's unique ability to manage every aspect of a bulk material handling project, from design to implementation.

ADVANCED SYSTEM CAPABILITIES AND DESIGN

The new OLC system is designed to meet the rigorous demands of the mining operation while maintaining high efficiency and reliability, even in Estonia's severe weather conditions. The system's key technical specifications demonstrate its ability to manage large material volumes under challenging conditions:

- ❖ **Throughput:** capable of a nominal capacity of 2,000tph (tonnes per hour), with the ability to reach a peak of 2,400tph during peak operational phases.
- ❖ **Belt type:** ST 2500 steel-reinforced belt, chosen for its durability and strength under high loads.
- ❖ **Conveyor speed:** running at 4m/s, this



system is optimized to quickly move material while maintaining operational efficiency.

- ❖ **Curved conveyor design:** incorporates two curves, allowing the conveyor to navigate the landscape without costly alterations to the terrain.
- ❖ **Crossing galleries:** three metallic crossings, spanning 53m and two sections of 35m each, ensuring structural stability as the conveyor traverses over uneven ground and obstacles.
- ❖ **Roller and drum specifications:** 159mm diameter rollers and 1,200mm motorized drums are employed to ensure smooth, reliable conveyor operation, reducing wear on the system.
- ❖ **Winch tensioning system:** integrated to maintain optimal belt tension throughout operations, crucial for preventing system sagging and ensuring longevity.

- ❖ **Harsh environment compatibility:** the system is designed to function in extremely cold temperatures, withstanding conditions as severe as -35°C , alongside heavy snowfall, ensuring year-round operation.

TAILORED APPROACH TO MEET CLIENT NEEDS

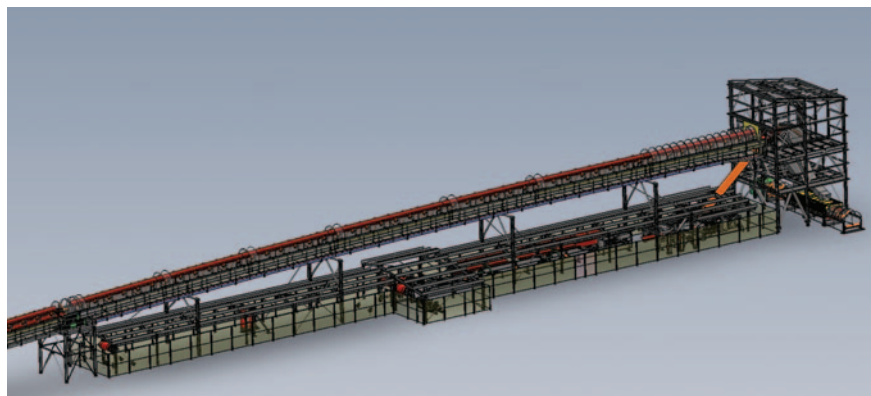
Understanding the client's technical and financial priorities, RBL REI tailored the project's approach to allow the client to oversee certain elements directly. Notably, the procurement and installation of the belt itself remain within the client's scope of responsibility, offering them greater flexibility in managing their resources. Meanwhile, RBL REI focuses on the core aspects of design, structure, and installation, ensuring the system is delivered on time and to the highest quality standards.

A key part of the project's success is RBL REI's collaboration with its sister company, FIPE, which specializes in steel

structures. FIPE, which specializes in steel structures (thanks to its certification EN1090). FIPE has already manufactured the necessary structural components, ensuring the project remains on schedule. These components have begun arriving at the Estonian site in containers, with installation commencing in early September 2023. By maintaining strict coordination between RBL REI and FIPE, the company ensures that all aspects of the project are handled efficiently, adhering to both time and budgetary constraints. The full system is expected to be operational by June/July 2025.

A TRADITION OF EXCELLENCE IN BULK MATERIAL HANDLING

RBL REI's reputation for excellence has been built over more than 45 years of delivering high-quality bulk handling systems across a wide range of industries.



The company's ability to meet the challenges of complex and demanding projects across five continents sets it apart in the field. From mining to energy, cement, and even food processing industries, RBL REI's innovative solutions have become a benchmark for bulk material handling efficiency.

This latest project in Estonia further

cements RBL REI's role as a trusted partner in the mining industry, offering reliable, long-term solutions to clients worldwide. Its comprehensive approach, which combines advanced engineering with a deep understanding of client needs, ensures that each project delivers not only on performance but also on cost-effectiveness and sustainability.

Tru-Trac launches Rip Prevent+ at Electra Mining Africa

Maintaining its prominent position in the conveyor solutions market, Tru-Trac unveiled an innovative system at Electra Mining Africa which will have a major impact on all operations that use conveyor belts.

Early detection of potential issues on conveyor systems is crucial in mining and other materials handling applications and to address this need, Tru-Trac introduced the Rip Prevent+ system. This cutting-edge

monitoring technology, which is set to disrupt the sector, identifies and mitigates conveyor belt anomalies and damages, thereby minimizing downtime and enhancing efficiency and productivity.

The Tru-Trac Rip Prevent+ system, now available in Africa, allows mines to optimize their conveyor lines' performance by preventing costly interruptions due to rip events. The system has already proven effective in global mining operations and

was debuted locally at Electra Mining Africa.

Using a data-driven model and artificial intelligence (AI), the Tru-Trac Rip Prevent+ system can detect anomalies or rip events on any conveyor belt type, including metal cord, pipe and fabric belts.

The innovative system was designed to avoid the need for sensor elements inside the belt, making it versatile for all conveyor systems. The Rip Prevent+ system analyses data from the conveyor belt using an

Using a data-driven model and artificial intelligence (AI), the Tru-Trac Rip Prevent+ system can detect anomalies or rip events on any conveyor belt type.





Tru-Trac unveiled the Rip Prevent+ system at Electra Mining Africa

AI-based model. This AI, combined with an innovative algorithm, detects anomalies and rips, generating data and signals that allow customers to stop the conveyor line before significant damage occurs. The system's model computes data 50 times per second and can generate a signal to the Programmable Logic Controller (PLC) within 0.2 seconds, reducing the impact of rip events.

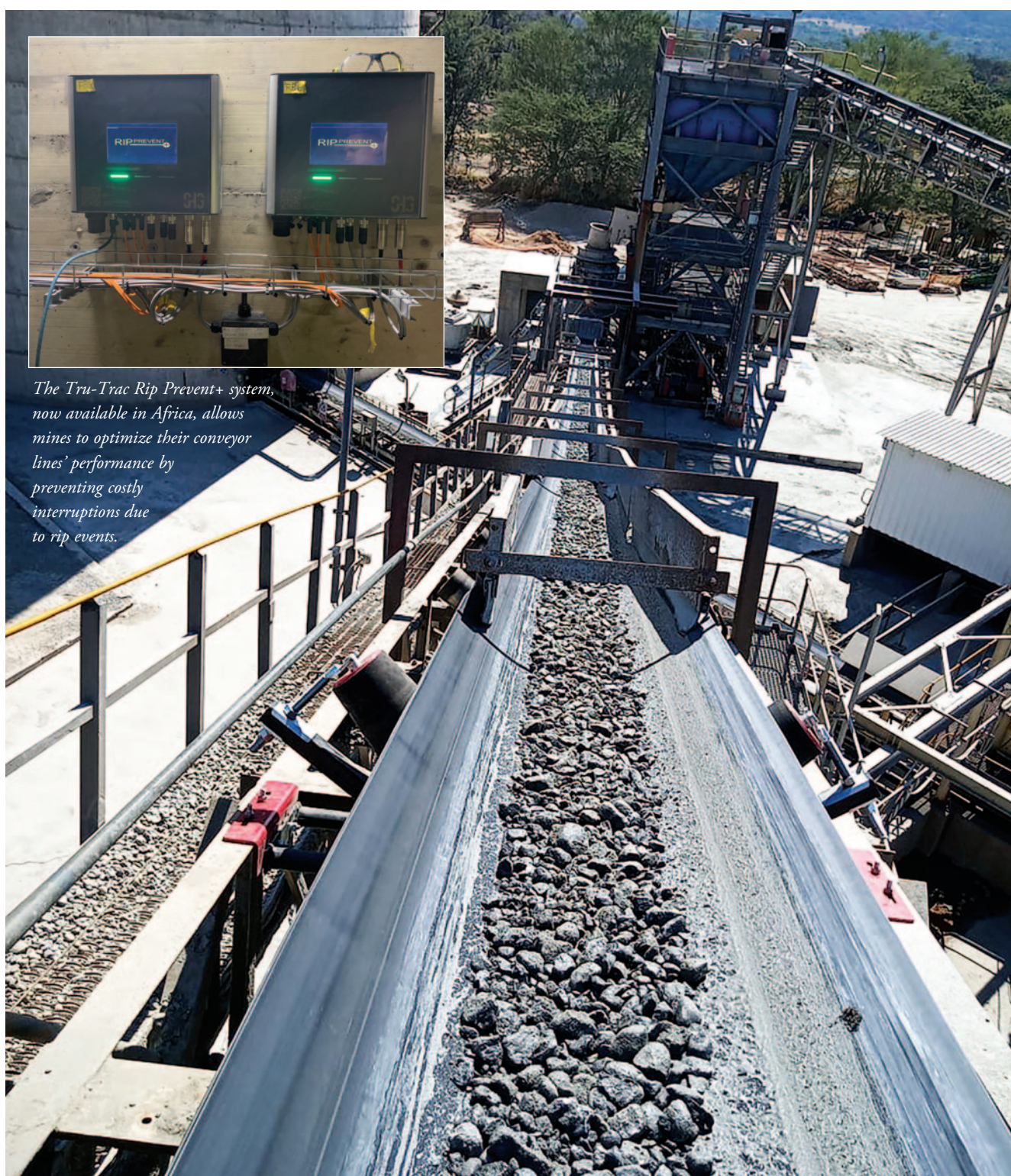
By stopping the conveyor belt when a possible rip event is detected, the system minimizes associated damage, potentially saving millions in downtime, belt replacement, and cleanup costs. The system's data-driven model offers significant advantages over inductive, magnetic and laser-based systems including

reduced wear risk, suitability for all conveyor types and lower investment costs.

The Rip Prevent+ system is web-based and accessible via an Ethernet network connection, featuring a user-friendly interface with a dashboard displaying key information. Additionally, the system incorporates several functions beyond rip detection, including mass flow calculation, condition monitoring, drive or motor monitoring, energy efficiency and electrical network analysis, aligning with predictive maintenance strategies.

The Rip Prevent+ system is also easy to install, requiring only 30 minutes to an hour, with minimal downtime for electrical connections. Commissioning the system

can be completed within two to five hours, depending on preparatory work and available system parameters. Notably, Rip Prevent+ is the first rip-detection system offering a more affordable alternative through a subscription model that minimizes initial capital investment.



The Tru-Trac Rip Prevent+ system, now available in Africa, allows mines to optimize their conveyor lines' performance by preventing costly interruptions due to rip events.

Conveyor cleaning systems from IBL Solutions enhance bulk operations

VACUUM SCRAPER DUST COLLECTION SYSTEM/FINGER SCRAPER BELT CLEANER/PULLEY CLEANER

IBL Solutions offers the following systems to ensure superior cleaning performance for conveyor belts and systems in the grain handling industry: Vacuum Scraper Dust Collection System, Finger Scraper Belt Cleaner and IBL Pulley Cleaner.

The Vacuum Scraper System was designed by working closely with a large grain terminal in the Port of Vancouver — Canada. IBL Solutions has provided this customer with numerous vacuum scraper systems that have enhanced the retention of product on the conveyor systems, lessened the cost of cleanup crews to remove particulate build-up on conveyor systems and walkways and saved monies on taking waste material for disposal.

Of even greater importance is the safety factor that the vacuum scraper offers; the mitigation of airborne particulate potentially being inhaled by staff at the Cascadia facility is minimized by the effectiveness of the system. Also, the anti-static properties of the finger paddles used to remove carryback from the conveyor system greatly reduces the opportunity for

potentially explosive sparking to occur.

Continuous improvements continue to be made to enhance the vacuum scraper's effectiveness and IBL Solutions works closely with its client partners to ensure that their specific needs are met, such is the flexibility of the system.

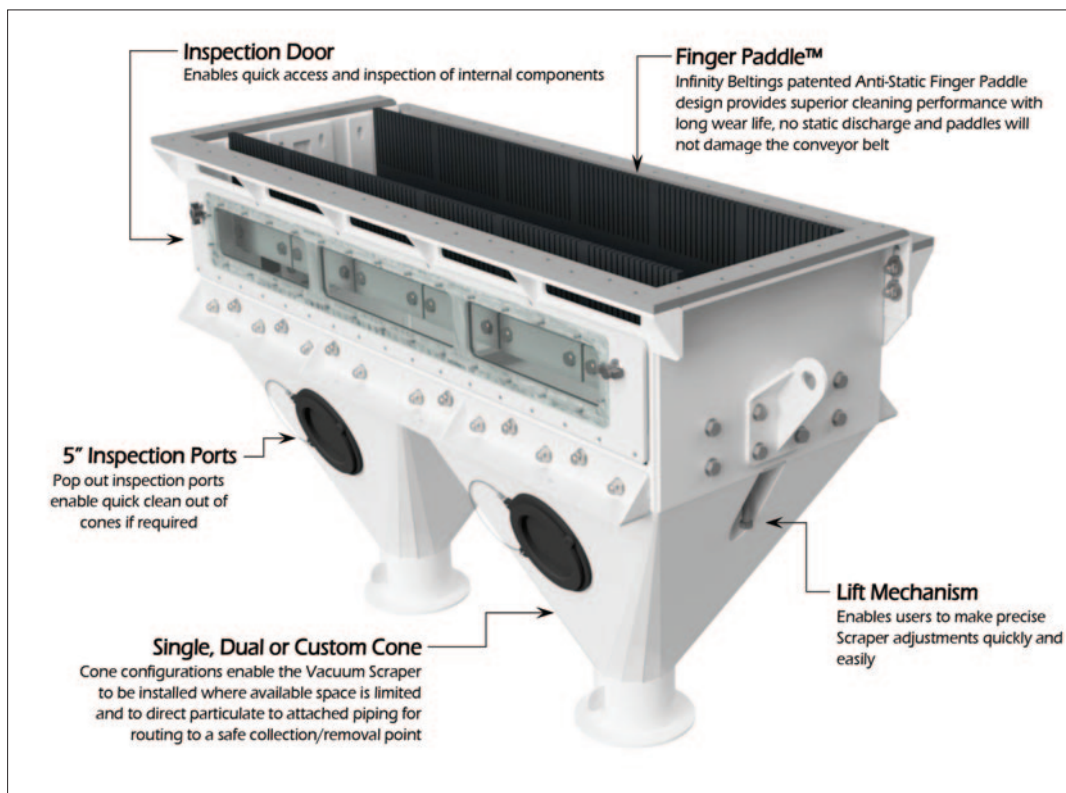
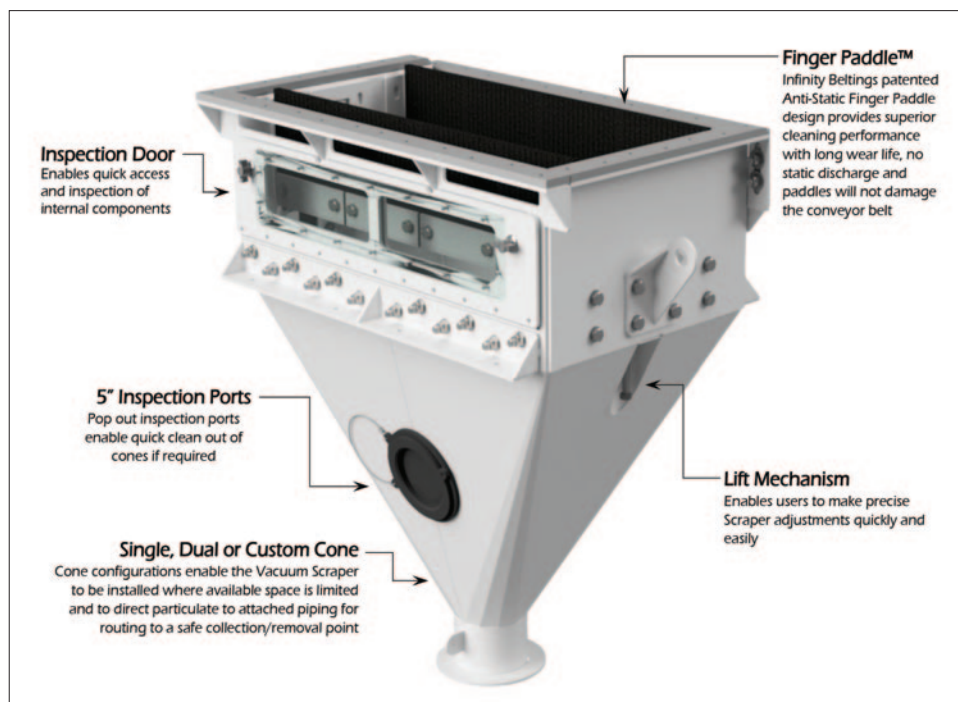
The Finger Scraper has been designed where cleated conveyor belts are in service, such as in grain, sand & gravel, cement, recycling, biomass and many, many more applications, but is equally efficient in

cleaning flat belts as well. Initially designed as a dual row cleated belt cleaner, IBL Solutions also manufactures a single row finger scraper and its latest design, the PSA single row finger scraper. IBL Solutions is also able to provide custom fabrication, made to order designs to fit even the most difficult applications.

The finger scraper system is available with a variety of .50" thick cleaning paddles: green — highly abrasion resistant, black — anti-static, orange — high heat.

For more difficult applications, IBL Solutions provides finger scraper paddles in 5/8" red and 3/4" green for larger cleated conveyor belts (up to 1-1/2 tall cleats).

The Pulley Cleaner was designed to remove materials that become embedded in the pulley lagging and is installed directly on the drive pulley. When used in conjunction with IBL Solutions' V-Flow to effectively remove the cleaned material from the system, the normal wear and tear on the pulley lagging, the conveyor belting and the entire conveyor system is effectively reduced.



ASPEC Engineering leads the way in value engineering for Australian ports and mines: innovative conveyor systems play a major role



Roy Hill Stanley Point berth facility.

Recently, Australian firm ASPEC Engineering marked its 20th anniversary, a milestone that celebrates two decades of innovation, excellence, and leadership in the dry bulk handling industry. ASPEC Engineering Pty Ltd (ASPEC), an independent Australian engineering firm, has been at the forefront of port, mining, and infrastructure projects for over 20 years. With a strong local presence and a partnership with Rendel Ingerop Pty Ltd, a subsidiary of the UK-based Rendel group, ASPEC has continually

delivered innovative, cost-effective solutions across the industry.

COMPANY PROFILE AND SERVICES

ASPEC Engineering prides itself on being an independent Australian firm with a two-decade legacy of delivering successful projects in the port and mining sectors. The firm is associated with Rendel Ingerop Pty Ltd, which brings over 100 years of experience in the ports and maritime sector. This partnership has enabled ASPEC

to leverage global expertise while maintaining a strong local focus in Australia.

The range of services provided by ASPEC is extensive, covering civil, marine, hydraulic, mechanical and structural engineering. This multidisciplinary approach allows the firm to offer comprehensive solutions tailored to the specific needs of its clients. By focusing on Value Engineering (VE) and project optimization, ASPEC ensures significant cost savings and improved project



Queensland Alumina Limited.



Gladstone Ports Corporation.

outcomes at every stage through the project lifecycle.

This commitment to innovative, cost-effective solutions has been a cornerstone of the company's strategy, allowing it to remain competitive and deliver exceptional results for its clients.

MAJOR CLIENTS

ASPEC's impressive client portfolio includes some of the biggest names in the mining and port industry. Major clients such as BHP, Rio Tinto, Gladstone Ports Corporation (GPC), Dalrymple Bay Coal Terminal (DBCT), HanRoy (Roy Hill), and Queensland Alumina Limited (QAL) have consistently turned to ASPEC for their engineering needs. These long-term relationships are a testament to ASPEC's reliability and the high quality of its engineering solutions.

These clients benefit from ASPEC's extensive experience and innovative approaches, which ensure that projects are not only completed on time and within budget but also exceed expectations in terms of quality and efficiency. The firm's ability to forge strong, enduring relationships with such high-profile clients speaks volumes about its commitment to excellence and customer satisfaction.

NOTABLE PROJECTS

ASPEC is currently involved with the Roy Hill/HanRoy Stanley Point Berth 3 Project.

During the value engineering phase, ASPEC was able to identify significant savings in cost and schedule with innovative conveyor and wharf design.

Another notable project is the Gladstone Port Stockpile 22, where ASPEC achieved a \$40 million saving in soil improvement. This project showcased the firm's expertise and innovative approach to cost-saving measures. Similarly, in the Wiggins Island Coal Export Terminal (WICET) Stage 2 project, ASPEC applied value engineering principles to identify a 30% cost reduction, illustrating its ability to deliver cost-effective solutions without compromising on quality.

At the Hay Point SR1 and SR2 replacement project, ASPEC saved \$70 million by reusing existing rail beams for new stacker reclaimers. This project highlighted the firm's innovative approach to resource optimization and its commitment to delivering value-engineered solutions. Additionally, at the RG Tanna Coal Terminal in Gladstone, ASPEC implemented 'piggy-back' conveyors and reused existing structures, achieving a \$25 million saving. This project earned ASPEC and its partner MHO an Australian Bulk Handling Award for their innovative approach.

COMPETITIVE STRATEGY

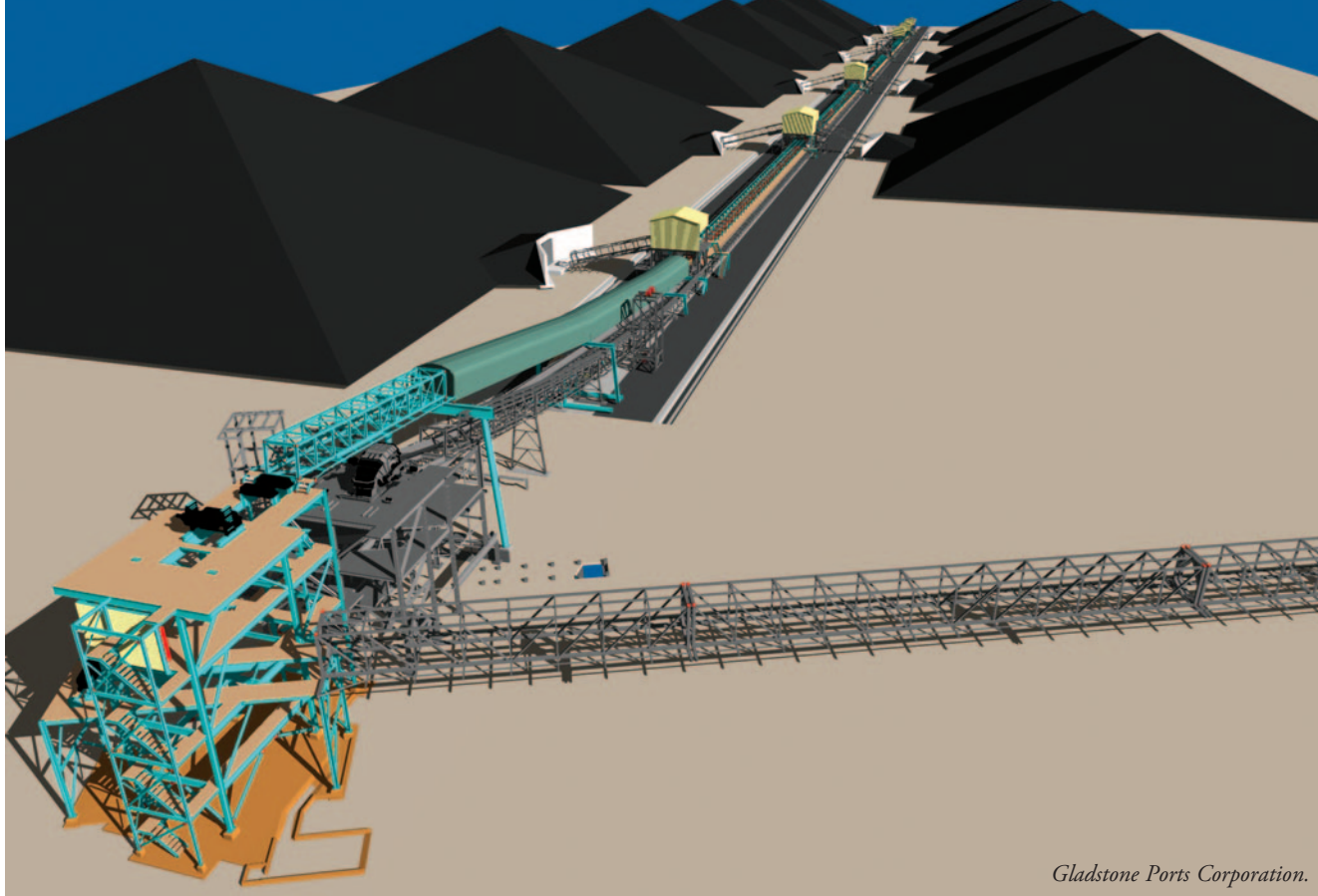
ASPEC's competitive edge lies in its focus on value engineering and cost optimization.

Unlike simple cost-cutting, VE is a creative and organized effort involving a comprehensive analysis of project requirements. This process leverages the expertise of multi-disciplinary teams to explore alternative design concepts, materials, and methods, ensuring that functional and value objectives are met without compromise. Richard Morgan, Director at ASPEC, emphasizes, "Our focus on value engineering sets us apart in a competitive market. By continuously exploring new ways to optimize project costs and improve efficiency, we deliver exceptional value to our clients without compromising on quality."

One of the critical strengths of ASPEC's VE approach is its ability to challenge assumptions and eliminate unnecessary elements, leading to significant cost reductions. By questioning the necessity of each design component, ASPEC can achieve more substantial savings. ASPEC's VE process considers project schedule optimization, focusing on timelines, early contractor involvement, and efficient construction methodologies, thus minimizing operational disruptions and enhancing overall project value.

COLLABORATIONS AND PARTNERSHIPS

ASPEC's long-standing partnership with Rendel has been instrumental in its success. This collaboration has allowed ASPEC to bring global expertise to its local projects,



Gladstone Ports Corporation.

ensuring high standards of quality and efficiency. Together, ASPEC and Rendel have worked on several significant projects, including the HanRoy Stanley Point Berth 3 and the Shiploader and Berth Replacement (SABR) project at Hay Point.

Morgan notes, “Our partnership with Rendel has been instrumental in bringing global expertise to our local projects. This collaboration allows us to leverage international best practices while maintaining a strong local focus, ensuring the highest standards of quality and efficiency for our clients.”

CONCLUSION

As ASPEC Engineering celebrates its 20th anniversary, the firm reflects on two decades of innovation, excellence, and leadership in the port and mining sectors. This milestone marks not just the passage of time but is a testament to ASPEC’s enduring commitment to delivering high-quality, cost-effective engineering solutions. Morgan envisions a dynamic future, stating, “Innovation and sustainability are at the heart of our strategy as we move forward. We are dedicated to staying ahead of industry trends, adopting cutting-edge

technologies, and continuously refining our processes to provide exceptional results for our clients.”

Looking ahead, ASPEC is poised to build on its legacy by embracing new challenges and opportunities. The firm’s ability to adapt and innovate ensures it remains a trusted partner for major clients in the port and mining industries. As ASPEC leverages its extensive experience and continues to pioneer new approaches, it is well-positioned to lead the industry into a future defined by sustainability and excellence.



SABR Project, Hay Point.

Conveying technologies: major part of SAMMI product offering



*Curved conveyor
at a primary
crushing plant in
Amelia, Italy.*

SAMMI s.r.l. specializes in the design and manufacturing of machines for bulk materials handling, providing complete systems and solutions in different fields. Over its almost 50 years of history, SAMMI has expanded its action and production sectors, by increasing and improving its human, managerial and technical skills.

SAMMI believes that “No barriers exist, only new challenges”. This philosophy leads the way the company does business. Over the years, SAMMI has always tried to extend its target market, offering new specific services and facing new markets. In the globalized world, high product quality alone is no longer sufficient. Being dynamic, open and ready for every new challenges and opportunities is fundamental to remaining competitive in the market.

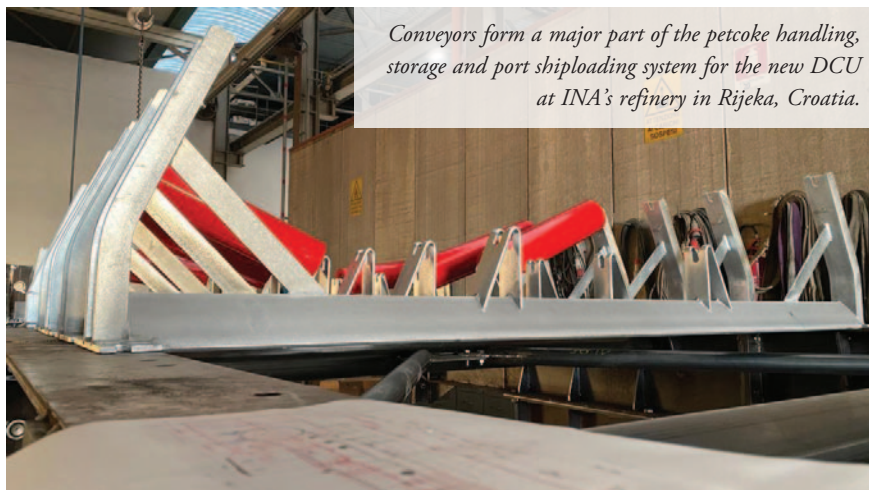
SAMMI offers technologically advanced equipment, several application fields, flexibility to adapt itself to most demanding customers. These are the main elements of SAMMI's strategy for being competitive in the complex, selective and extremely demanding sector of bulk handling industry. The company's aims are to: design, build and innovate. SAMMI invests constantly to offer solutions that anticipate the needs of its customers.

SAMMI has strong expertise in conveying systems and ancillary equipment, and has shared some of its projects, which have included conveying technologies, from the last decade with *Dry Cargo International*.

2023

Location: Artena, Italy

Conveyors form a major part of the petcoke handling, storage and port shiploading system for the new DCU at INA's refinery in Rijeka, Croatia.



Description: material handling system (belt conveyors and spillage chains) for a new lime kiln plant.

Customer: Cimprogetti Lime Technologies

Year beginning/end: 2023/2023

2022

Location: Aalborg, Denmark

Description: material handling system for white limestone co-grinding plant upgrade.

Year beginning/end: 2023/2023

2021

Location: Gabon

Description: offshore material (manganese-bauxite-iron ore-coal) handling and shiploading system for transhipper *FTS Jeroboam* (1,500tph [tonnes per hour] up to 2,500tph conveyor system capacity).

Customer: Norden

Year beginning/end: 2021/2022

Location: Terni, Italy

Description: complete revamping of the batch house handling system at glass factory in San Gemini.

Customer: Owens-Illinois

Year beginning/end: 2021/2022

Location: Terni, Italy

Description: belt conveyor system for the new stainless steel slag.

Customer: Tapojärvi

Year beginning/end: 2021/2021

SAMMI wins Best Value Award 2023 Umbria



In 2023, SAMMI received the Best Value Award Umbria for the second time — a significant achievement, especially as it was only the fourth time the honour was awarded. This is further recognition of the company's commitment and entrepreneurial vision, which emphasizes the main goal that guides every action the company takes: to create long-term value for customers, employees, business partners, and the communities in which it operates.

The Best Value Award Umbria, given by Imprenditore Smart®, is the result of an in-depth study of over 4,700 Umbrian entrepreneurial companies, representing all regional production sectors. The finalist companies were selected based on financial criteria, evaluating the equity value and its rate of change compared to the previous year.

SAMMI stood out among the best, emerging as one of the leading companies demonstrating the best performance, in terms of growth, in the special category of companies with a constant and positive increase in value over the last five years. This is an important result that underlines, once again, the effectiveness of the company's strategy and its ability to manage the financial resources available.

"For us, this recognition has enormous, incredible value... because if it is difficult to establish yourself, it is even more difficult to confirm yourself!" comments SAMMI CEO Floriano Bussetti. He adds, "Being recognized in the 'wolf' category, in the five-year sharing of results, further enhances the planning and the path that underlies our strategy."

This victory is a source of great pride for the entire SAMMI Group, the result of the hard work and dedication of all the valuable women and men in the team, who demonstrate a constant commitment to offering added value to stakeholders and to the company's financial management.

2020

Location: Rijeka, Croatia

Description: petcoke handling, storage and port shiploading for the new DCU at INA's refinery in Rijeka.

Customer: Tecnimont KT

Year beginning/end: 2020/ongoing (commissioning stage)

Location: Phong Dien District, Vietnam

Description: belt conveyor system for

high-quality sand and quartz powder for HPS processing plant.

Customer: Minerale Industriali

End user: Hue Premium Silica (HPS)

Year beginning/end: 2020/2020

Location: Terni, Italy

Description: rollway extension of cco-3 continuous casting machine for Parsytec installation.

Customer: Acciai Speciali Terni

Year beginning/end: 2020/2020

2019

Location: Couvrot, France

Description: material handling system for raw meal quality improvement package.

Customer: Heidelberg Cement

Year beginning/end: 2019/2020

2018

Location: Piegara, Italy



Offshore material handling and shiploading system for transshipper FTS Jeroboam.

Description: revamping of the existing material handling system for glass cullet selection.

Customer: VCP

Year beginning/end: 2018/2019

Location: Shuaiba, Kuwait

Description: material handling system for the new lime calcining plant serving the existing steel plant.

Customer: Cimprogetti Lime Technologies

Year beginning/end: 2018/2019

Location: Le Palais-sur-Vienne, France

Description: big-bag unloading system and material transfer to turbine dissolvers for table ware raw material (micronized alumina).

Customer: Imerys Ceramics

Year beginning/end: 2018/2018

Location: Brennero, Italy

Description: concrete loading belt conveyors for the new Brenner.

Customer: Simem

Year beginning/end: 2018/2018

Location: Civita Castellana, Italy

Description: big-bag unloading system and material transfer to turbine dissolvers for sanitary ware raw material (kaolin, feldspar).

Customer: Imerys Ceramics

Year beginning/end: 2018/2018

2017

Location: Sangan, Iran

Description: new drive trains 2x200kW for iron pellet long conveyor.

Customer: RAMPCO Group

End user: Nimidco

Year beginning/end: 2017/2018

Location: Pont-A-Mousson, France

Description: railcar unloading system and transfer to storage silo of aggregate, carbon coke and iron pellet for blast furnace feeding.

Customer: N/A

End user: PAM Saint-Gobain

Year beginning/end: 2017/2018

Location: South Dakota, USA

Description: material handling system for a full-automated concrete batching plant.

Customer: Marcantonini Concrete Technology (MCT) Italy

Year beginning/end: 2017/2018

Location: Genoa, Italy

Description: front-end engineering design (FEED) of muck removal, analysing and storage system for potentially asbestos containing material.

Customer: Amec Foster Wheeler

Year beginning/end: 2017/2018

Location: Viterbo, Italy

Description: revamping of raw material handling system for the existing mixing room.

Customer: Catalana

Year beginning/end: 2017/2017

Location: Torreón, Mexico

Description: feasibility study, basic and detail engineering of the new underground crushing and stockyard facilities.

Customer: EUROPROGETTI S.r.l.

Year beginning/end: 2017/2017

Location: Larbatache, Algeria

Description: sugar handling system for the new 2,000tpd sugar refinery.

End user: N'Gaous

Year beginning/end: 2017/2017

Location: Pisa, Italy

Description: feasibility, risk analysis and upgrade of safety system on existing scrap and raw material production conveyor lines.

Customer: Saint-Gobain

Year beginning/end: 2017/2017

2016

Location: Porvoo, Finland

Description: asphaltene & coal handling system for Kilpilahti Power Plant.

End user: Kilpilahti Power Plant Ltd

Year beginning/end: 2016/2017

Location: Saadat Abad, Tehran, Iran

Description: three Bandeboard conveyors for 500tph lime and quicklime handling system.

Customer: Cimprogetti Lime Technologies

Year beginning/end: 2016/2016

2015

Location: Gdansk, Poland

Description: petcoke handing, storage, reclaiming and truck loading.

Customer: Tecnimont KT

Year beginning/end: 2015/2017

Location: Rezzato (BS), Italy

Description: burning line & raw grinding material handling system.

End user: Italcementi Group

Year beginning/end: 2015/2015

2014

Location: Lomas de Chapultepec, Mexico

Description: belt conveyors equipped with spillage chains, belt extractors for clinker handling.

Customer: Team Net Work

Year beginning/end: 2014/2015



Belt conveyor workshop assembly.

Location: Tuen Mun, Hong Kong

Description: radial stacker for muck/spoil removal storage on open area and barge loading system.

Customer: Marti Technics

Year beginning/end: 2014/2014

Location: Lecco, Italy

Description: biomass plant.

Customer: Unicalce

Year beginning/end: 2014/2015

Location: Terni, Italy

Description: revamping conveyor belts for biomass transport.

Customer: Comart, Tozzi Industries

Year beginning/end: 2014/2014

Location: Florange, France

Description: belt conveyors system for carbon coke at high temperature.

Customer: SOMMET

Year beginning/end: 2014/2014

SAMMI GROUP EVOLVES TO FACE FUTURE CHALLENGES

SAMMI Group has capitalized on its many synergies between SAMMI S.r.l. and CCM Engineering S.r.l., and has announced a new

organizational entity — Integra Holding srl. This represents a new chapter in the company's history, one that is rich in ambitions and goals to achieve, marked by unity and collaboration.

The choice of name encapsulates the essence of the philosophy behind the project:

- ❖ **Integration:** uniting diverse skills and talents to create a solid and synergistic system, where each element contributes to the common success;
- ❖ **Integrity:** operating with transparency, ethics, and responsibility, focusing on sustainability and the creation of long-term value for all stakeholders;
- ❖ **Innovation:** looking to the future with a forward-thinking vision, embracing new challenges and opportunities to continually grow and improve.

A sustainable and replicable business model, Integra Holding aims to create and maintain a sustainable and replicable business model over time, applicable to all the companies within the group.

The synergy between the various skill will be key to generating added value and successfully facing the challenges of

different markets.

CREATING VALUE FOR EVERYONE

The vision is to develop long-term value for all stakeholders, from employees to customers, from suppliers to the communities in which Integra operates. It believes in a business model that can generate profits in a responsible and sustainable way, contributing to social well-being and the sustainable development of the region.

"The creation of Integra Holding marks a new beginning for us, an opportunity to look to the future with renewed enthusiasm and confidence. We are certain that, through the union of our talents and the sharing of our values, we will achieve great milestones and build a bright future for our holding and for all those who are part of it," says Floriano Bussetti, CEO — SAMMI S.r.l. e CCM Engineering S.r.l.

He adds, "With these words, I would like to summarize and encapsulate the essence of Integra Holding: an entrepreneurial entity that draws strength from the know-how and skills of the best resources in the Umbria region, constantly investing in valuable men and women and in innovation."

Keeping chutes working when speeding up conveyors



A large coal handling transfer chute designed by Weba Chute Systems to manage varying load conditions.

In the mining environment, chutes are generally designed to manage some variance in the loads being transported by conveyor systems — but drastic changes in conveyor belt speeds can introduce complications. According to Dewald Tintinger, Technical Manager at Weba Chute Systems, chutes are designed with the

width of the conveyor belt in mind — accommodating the various levels of loading on these belts. Changing the speed of the belt significantly, however, can affect not only the volume of material entering the chute, but the first point of contact in the chute as the material leaves the belt.

“The speed of the conveyor belt has a

direct impact on the trajectory of material when it reaches the chute,” says Tintinger. “When changing the belt speed from 2.5m/s to 3m/s, for example, the chute would easily accommodate this. However, if the speed was doubled, this would change the trajectory so that the material impacts a different point in the conveyor, and at a

The trajectory of material inside a transfer chute is crucial to maintaining efficient flow and reducing wear.





Material being fed onto an outgoing belt in a coal application, demonstrating the importance of correct chute design.

different angle.”

He explains that Weba Chute Systems adopts a customized approach to each chute’s specific application, modelling the flow of material to guide the final design. Among the calculations is the initial velocity of the material leaving the conveyor belt, and the precise impact point on the inside wall of the chute.

Using the dead box principle to optimize material-on-material flow, the position of the first dead box in the chute

will match this impact point. A higher speed of material will start to straighten the trajectory and change the impact angle.

“As the impact angle approaches 90°, there is a risk that material flow could stall,” he says. “Rather than slowing down on impact and then accelerating downward towards the discharge point, the material could start backing up and clog the chute.”

While some chute manufacturers introduce platework to bend the trajectory of material, this adds to the wear on the

chute. Weba Chute Systems generally applies its full cascade designs, using dead box sections to reduce the impact and speed.

“The change of angle of material onto the first dead-box will not necessarily change the flow pattern, but it is likely to affect the speed of material through the chute,” says Tintinger. “It is therefore important to check the chute’s capacity to still allow enough material to pass through smoothly.”

DC*i*



A technical advisor from Weba Chute Systems measures belt speed to ensure optimal material flow and minimal impact on the transfer chute.

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Ill-favoured fragments

Dust emissions control

The intricate design of Weba Chute Systems is crucial for optimizing material flow and minimizing dust generation.

Jay Venter

Weba Chutes continue to set benchmark in dust control and efficiency

In recent years, transfer chutes have evolved from basic channelling devices into sophisticated engineering solutions, essential for managing dust and material flow in mining and processing plants. The traditional chute, once a simple box, is now a high-tech component designed to address complex challenges related to coal dust, material degradation and segregation. With advancements in design and technology, these modern chutes not only enhance operational efficiency but also contribute significantly to environmental and safety standards, reflecting a shift towards more responsible and effective industrial practices.

Major provider of engineered transfer

chutes, Weba Chute Systems has more than four decades of success in supplying bespoke chute systems across a range of materials handling applications. CEO Mark Baller explains that historically transfer chutes were seen as basic functional elements within the mining and industrial sectors.

“Their primary purpose was to channel ore or other bulk materials from one piece of equipment to another with minimal consideration for the broader implications of their design. These early chutes, often constructed as rudimentary boxes, were designed with little regard for dust control, material degradation or the complex dynamics of material flow,” Baller says.

“However, as industries evolved and the demands for efficiency, safety and environmental responsibility increased, so too did the expectations placed upon these critical components.”

Today’s chutes are engineered with advanced technology and innovative design principles to address a range of operational challenges. Modern chutes are not merely passive conduits but are actively designed to optimize material flow, minimize dust generation and reduce wear on equipment. Weba Chute Systems leverages sophisticated software and simulation tools in the design process, allowing its engineers to predict and verify material flow dynamics before the chute is even manufactured. This pre-emptive approach ensures that the chute will perform optimally under the specific conditions it will encounter in the field, he says.

There is a focus driven by a combination of regulatory requirements and heightened environmental, social and governance (ESG) concerns to ensure that chute systems mitigate the risks associated with dust exposure, which can have severe implications for both human health and the environment.

Also, dust that escapes from transfer points can be carried by the wind affecting nearby farms, communities and ecosystems. This growing awareness has prompted industries to seek out solutions



Weba Chute Systems provides comprehensive installation and maintenance services to ensure optimal performance.



Weba Chute Systems are engineered to handle a wide range of materials and applications, ensuring efficient and reliable transfer.

that not only comply with regulations but also address broader societal concerns.

Baller explains that the Weba Chute System has long been engineered to enhance dust control and improve operational efficiency. "Transfer points were historically notorious for their dust creation, and from the early days our approach was always to achieve an engineered solutions that would manage material flow more effectively," he says.

"One notable engineering principle applied to Weba chutes is the 'supertube' effect which helps to regulate material flow and velocity, and in doing so reduces the turbulence that contributes to dust generation. By consolidating material into a more homogeneous stream, Weba chutes help to minimize the impact of material flow and reduce dust dispersion," he continues.

This principle, Baller says, is crucial for reducing wear on conveyor belts, a common issue in material handling operations. The Weba 'supertube' design ensures that material is transferred smoothly and evenly, preventing excessive friction and damage to the conveyor system. This not only extends the lifespan of the equipment but also contributes to overall operational efficiency.

"The benefits of our advanced chute designs are evident in the significant improvements observed at sites where dust control was previously a major issue. In some cases, dust levels have been reduced by up to 77% following the

installation of specially engineered Weba chutes," Baller says. "This reduction in dust has allowed personnel to access transfer points safely, which in turn enhances operational efficiency by enabling regular inspections and maintenance without the need for stoppages."

Effective dust control also plays a crucial role in managing material degradation, which can have serious financial implications, particularly for producers who must meet strict size and fines content specifications. For example, in industries such as iron ore and manganese mining, penalties are levied if the fines content exceeds certain limits.

Further, segregation of fines from larger material during conveyor transport exacerbates dust creation, as fines are more likely to aerate and form dust clouds. To address this issue, Weba chutes are designed to minimize segregation and ensure a more consistent material stream.

Baller says that dust suppression systems are often employed to manage dust, but they can introduce their own set of challenges. Chemicals used in these systems can sometimes cause fines to become sticky, leading to blockages and operational disruptions. Effective chute design mitigates these issues by ensuring proper flow dynamics and reducing the potential for dust accumulation and clogging.

In addition to addressing dust and degradation, Weba's advanced chute designs also tackle issues related to



Rigorous dust testing is essential to ensure that Weba Chute Systems meet the highest standards for environmental and safety compliance.

material distribution in storage silos. When a conveyor belt feeds material into a silo, segregation can occur leading to inconsistent material performance at various points along the base of the silo. A rotary chute, for instance, can help to mix fines and coarse material to achieve a more homogeneous blend, ensuring the material is evenly distributed and performs consistently.

"The impact of effective chute design extends beyond dust control to influence overall operational efficiency and cost reduction, he explains. "Excessive dust can impede safe access for maintenance, leading to potential stoppages and costly breakdowns and dust can damage mechanical and electrical equipment, affecting its performance and longevity. By reducing dust creation and improving material flow, our Weba chute designs contribute to more reliable and cost effective operations."

"Weba chutes are designed to address complex challenges related to dust control, material degradation and segregation, and reflect our commitment to assisting our customers to achieve operational efficiency while ensuring environmental responsibility. As industries continue to face growing demands for safety, efficiency and sustainability, we believe that the role of advanced chute technology will remain crucial in meeting these challenges and achieving more effective and responsible industrial practices," Baller concludes.



Weba Chute Systems are designed to significantly reduce dust emissions, improving the working environment for operators and reducing environmental impact.

The evolution of transfer chutes from basic channels to sophisticated engineering solutions demonstrates the industry's commitment to efficiency and sustainability.



Key elements in the design of efficient soft-transfer materials handling systems for reduced dust generation

Dust control has become an increasingly important health, safety, and environmental concern. This is particularly important at ports and terminals handling dry bulk materials because of their proximity to the water and, often, neighbouring urban communities.

ACTIVE DUST CONTROL VERSUS PASSIVE DUST MANAGEMENT METHODS

Active dust control methods are used to suppress or collect fugitive dust generated by material handling processes and conveyance. These methods include equipment such as dust sprays, fogging and chemical systems, wind fences, baghouses, cyclones, and wet scrubbers. These active methods can be highly effective in reducing fugitive dust emissions that have already occurred.

However, preventing or minimizing the occurrence of fugitive dust from the outset, by employing effective passive dust-management methods in the early design phases of bulk materials handling systems, can diminish the need for active dust control.

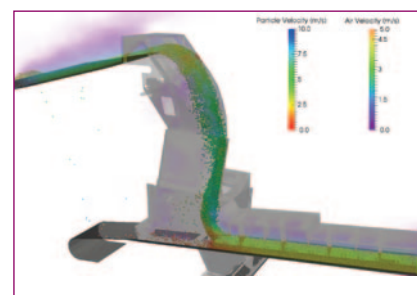
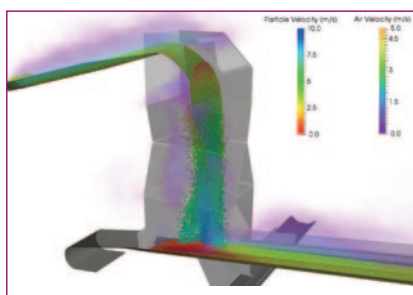
INITIAL CONSIDERATIONS: MATERIALS ANALYSIS AND DESIGN TECHNIQUES

Discrete Element Method (DEM) modelling is a technique used to simulate the movement and effect of numerous, small, solid particles such as those found in bulk materials handling industries. These particles can be anything from coal and potash to rocks or wood fibre, in essence, any solid material made up of particles.

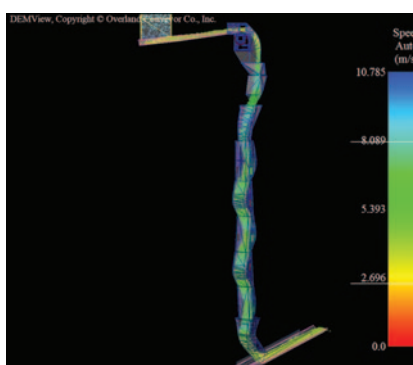
Computational Fluid Dynamics (CFD) modelling uses numeric analysis and data structures to solve problems involving fluid and air flows, simulating their movement around objects.

A reduction of dust emissions can be achieved in the early design stages through careful analysis of the materials' properties and the use of design techniques such as DEM or coupled CFD-DEM model analysis to produce soft transfers of dry bulk materials. This proactive design approach reduces the need for costly active dust control methods and results in a more efficient throughput, while minimizing product degradation, clean-up requirements, and waste.

Modern design tools, when combined with expertise and proven validation techniques, can be used to develop conveyor chute designs which control the



The images above depict how coupled CFD-DEM simulations are used to validate and optimize the transfer design to reduce dust generation. The image on the left depicts an existing transfer which had issues with fugitive dust that was modelled to validate the simulation. The image on the right depicts the re-designed transfer which has been optimized to reduce dust generation.

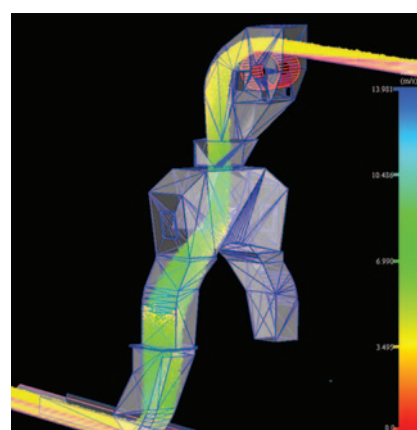


A relatively tall transfer designed to keep material in near constant contact with three sides of the chute and within a tight velocity range.

material velocity in a manner that minimizes dust generation. This is ideally achieved by keeping dusty materials in constant contact with three-sides of the chute and varying the angle and cross-section of the chute to maintain a constant material cross-sectional area.

For new conveyor designs, it is critical to consider the optimization of material transfers at the beginning of the design process to ensure the conveyors are laid out in a manner that allows for the most efficient configuration. This helps avoid the need to modify the conveyor geometry at later stages of the design process when it would be relatively more expensive and time consuming.

However, all too often on projects the transfers are not given satisfactory attention during the design phase. This can be much more costly in the long run due to the expense of additional operations and maintenance measures required to address fugitive dust emissions, product degradation, clean-up, and waste that results from an inefficient design. Additionally, retrofit modifications will be relatively more expensive compared to what it would have cost to optimize the design in the first place.



A 1 to 2 transfer designed to turn the material in the direction of the receiving conveyor with minimal deceleration at the impact points to reduce product degradation & dust generation.

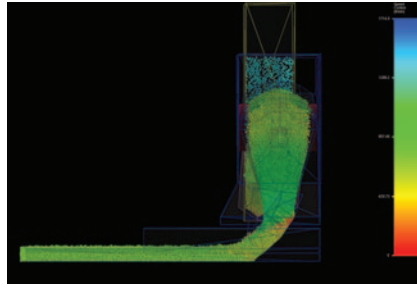
KEY DESIGN ELEMENTS

The key design elements to be considered during the early design stages of a dry bulk material handling system include:

- ❖ **Evaluation of material properties:** the design of bulk material handling systems begins with understanding the material. Determine the key properties of the material to be handled (such as material density, wall friction angles, and particle size) by sending materials to a test laboratory for analysis.
- ❖ **Conveyor speed selection:** choosing the appropriate conveyor belt speed will reduce the likelihood of product spillage and dust generation.
- ❖ **Determination of vertical incline:** ensure that the conveyors' vertical inclines are appropriately sized for the material in order to avoid roll back.
- ❖ **DEM modelling to validate chutework design — Simulation input:** observe and model an existing transfer to acquire real-world input for DEM or coupled DEM-CFD simulations to help ensure that the

model accurately simulates the real-world flow of materials.

- ❖ **Soft transfer systems:** Soft transfer systems can be achieved through DEM or coupled DEM-CFD modelling analysis, used to optimize material flow and trajectories in chutes including the influence of moving surfaces to reduce turbulence in the material flow, minimizing dust emissions, product degradation, and waste. Key components of the analysis include:
 - o Optimized drop height.
 - o Optimized position of the discharge pulley relative to the receiving conveyor.
 - o Minimizing the size of open areas to reduce induced air.
 - o Design of the loading zone so that dust-laden air is slowed down to give the dust an opportunity to fall back onto the belt.
 - o Reduced impact angles.
 - o Design of the material flowing through the chute in a tight cohesive stream to prevent dust from escaping.
 - o Ensuring that material is centrally loaded onto the receiving conveyor.

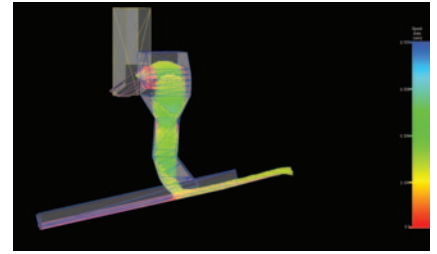


A relatively short transfer designed to keep the material in a tight stream and in contact with 3 sides of the chute to reduce dust generation.

Attention to these key design elements during the early design phases of material handling systems will optimize the material flow and reduce dust generation, resulting in a safer work environment, the reduction of emissions, and an improved throughput. Additionally, remedial system modifications and the need for active dust control methods can be reduced, resulting in significant cost savings.

ABOUT NORDA STELO

Norda Stelo, a Canadian engineering consulting firm serving global industry-leading clients since 1963, offers a comprehensive range of services for every phase of a project's lifecycle, from concept



An existing intermediate transfer with less-than-optimal discharge and receiving conveyor geometry which was re-designed to optimize performance.

development to commissioning and operational support. Norda Stelo leverages its extensive expertise in heavy industries with innovative planning from the earliest stages of a project to minimize construction and life-cycle costs, while delivering a higher-quality finished product.

Combining decades of expertise in the design of complete material handling systems at a variety of heavy industrial facilities with operations experience and engineering knowledge, Norda Stelo provides practical and cost-effective dust management solutions to help clients meet stringent regulatory requirements through the development of best-in-class dust management systems.

Dust suppression technology from HAVER & BOECKER

Every experienced baker knows to keep the mixer speed low when adding flour to a recipe, writes *Henrik Knoche, Managing Director HAVER & BOECKER Deutschland*. If added too fast, the flour will puff up into the air, settling on the mixer, countertops and even the baker. Powdered cement and building materials behave similarly, especially when not poured properly. Instead of flowing neatly into a confined area, free-flowing powder materials will settle on the floor, equipment and operators, leading to unclean working conditions, product loss and higher maintenance needs for equipment. Unlike baking, a packing plant cannot just lower the speed of each filling unit without sacrificing significant productivity. When the goal is to fill as many bags as possible, they must rely on dosing technology and the proper bag to reduce dust and spillage.

DOSING TECHNOLOGY

All automated packing machines feature dosing equipment, whether that's a slide gate or a specialized shaft-sealed unit. The type of dosing technology in the packing machine has a huge impact on the dust and spillage occurring during the dosing

process. When paired with the proper product feeding technology in the silo, the system becomes even more impactful. Some common options of product feeding technology are screw feeding, vibratory feeding and rotary feeding.

Slide gates often don't close completely and leave a gap of several millimeters between the gates where dust and spillage can escape throughout the packing process. Each bag filled can incur up to 200 grams of product loss due to spillage and dust.

Maintenance is also a consideration. Changing slide gates takes up to 60 minutes whereas the maintenance of a shaft-sealed dosing unit can be completed in 30 minutes.

Another component that offers less spillage and dust is a specialized shaft-sealed dosing unit paired with an airless rotary feeder. Less dust is created in the feeding process, which translates to the dosing process. From there, the fully enclosed, metal shaft-sealed system features a rubber interface between the gates to protect against dust and spillage. With less dust, the system lasts longer and needs to be changed out less often. The only dust and spillage to escape this system

comes from the way the filling tube and the bag valve interact, significantly reducing the amount compared to a slide gate or other dosing system. A shaft-sealed dosing unit is a minimum of 70% cleaner than a slide gate dosing system and allows up to 8% faster filling.

THE RIGHT BAG

Packing does not rely on one simple system in the plant — it relies on all the systems working together optimally. While the dosing system helps reduce the amount of dust and spillage, the packing machine isn't the only place where spillage occurs. An improperly sealed bag also results in material loss at a rapid rate while in storage and throughout transport. This could lead to a total product loss of up to 5%.

Unsealed valve bags rely on the inner pressure of the bag to close, which results in the bag being only 70% closed, leaving a 30% opening for spillage. Look for a manufacturer who offers specialized, ultrasonic sealing technology. Ultrasonic sealing effectively welds plastic bags shut, resulting in the bag being 100% closed. Instead of adhesive closed bags, this type of seal means bags won't unstick over time



A specialized shaft-sealed dosing unit is a fully enclosed, metal system featuring a rubber interface between the gates to protect against dust and spillage.

and cause spillage if left in storage. This bag leaves absolutely no room for product to be lost in transport either.

Manufacturers with a wealth of experience in the machine, packaging material and product to be filled offer bag testing to optimize production. They analyse the bags currently being used by a facility, conducting tests to assess the aeration, deaeration and valve sizing. Based on these results, they provide a comprehensive report with recommendations to ensure synchronicity between the product, machine and bag.

COMPREHENSIVE DUST SUPPRESSION

Just as baking requires the perfect blend of mixer, oven, pan and recipe to create an optimal final product, a packing line requires optimization and integration at every stage to ensure dust suppression and minimal spillage. Focusing solely on the dosing system won't solve the issue on its own. Partner with a manufacturer who takes a holistic view of the packing line to maximize equipment performance, dosing systems and bags. It's important to make sure you have the right ingredients — or in this case, equipment — every step of the way.

ABOUT HAVER & BOECKER

HAVER & BOECKER is a family-managed, midsize company with headquarters in Oelde, Westphalia, Germany. HAVER & BOECKER OHG is comprised of the Wire Weaving and Machinery Divisions. Together with more than 50 subsidiaries and 150 representatives on five continents, HAVER & BOECKER operates worldwide with about 3,000 employees.

The Wire Weaving Division manufactures woven wire cloth and processes it into engineered woven wire products. They are used for screening and filtration in the chemical, plastics and automobile industries, in aviation and aerospace, electronics, industrial and analysis screening, in the food industry as well as for architectural applications.

The Machinery Division and its technology brands HAVER & BOECKER, HAVER & BOECKER NIAGARA, IBAU HAMBURG, SOMMER, FEIGE FILLING, BEHN + BATES, AVENTUS, NEWTEC BAG PALLETIZING,

HAVER Engineering, NEXOPART, AML and The Portland Company specialize in processing, transport, storage, mixing, filling, packing, palletizing and loading of bulk materials. The product range includes individual machines and complete systems for handling bulk goods, liquid and pasty products, food and pet food, as well as shiploaders and unloaders. QUAT²RO networks the individual process steps for a transparent and efficient process.



Dust Suppression

HATCH — SHIP LOADER — HOPPER — SHED



ZERO DUST

Web: www.bluewatermisting.com
E-mail: sales@bluewatermisting.com



Saving 20 million dollars per year by implementing TRC's ADS™ dry fog in your gold mine

Dust emissions are defined as the release of fine particulate matter into the air, writes Gonzalo Campos Canessa, CEO, The Raring Corp. While there are many sources of dust emissions, this article will focus on those related to industrial activities. When fine particles of different sizes become airborne, they can affect neighbouring communities, human health, the environment, and the profitability of a business. Dust emissions are typically regulated to minimize their impact on public health and the environment. However, it is crucial for the industry, particularly the mining industry, to recognize that by implementing effective dust control measures within their properties, they can not only safeguard their workers and the environment but also mitigate fire risks and reduce ore losses, ultimately leading to cost savings.



ADS™ (AGGLOMERATIVE DUST CONTROL) DRY FOG:

1. Is based on a highly effective natural method of controlling airborne dust. ADS functions similarly to clouds, capturing and returning volcanic ash to the earth in rain and then binding and settling the dust, preventing it from becoming airborne again.
2. The system functions similarly to a chemical process, whereby the water used has a significantly increased ability to wet the fine material it contacts. This is achieved through atomization rather than surface tension reduction. ADS dry fog is equally effective in controlling coal and hard rock ore dust as it is in controlling other types of dust.
3. This system is comparable to bag houses in that it is a dust collection

system (without using dust extraction). It is an in-situ, multi-chambered, fine particulate, semi-wet scrubber that uses water fog rather than water spray. The use of fog eliminates the need for pressure drop and large scrubbing ratios to achieve agglomeration and high efficiency.

4. This system is more efficient than bag houses because there is no by-product to handle. The collected dust is returned directly to the conveyor, where it adheres to larger rock particles.
5. This innovative solution combines the best of wet technology with an efficient dust collection technology. This system satisfies all opacity regulations associated with crushing, screening, and transferring materials.
6. Has been in use worldwide for more than 40 years and seen reductions in

dust generation of 96.5% on crushers, 92% on screens and 99.29% in transfer points.

These factors contribute to the reduction of dust emissions, the protection of the environment, the protection of our workforce, and the protection of neighbouring communities.

A notable instance of the effectiveness of TRC's ADS™ dry fog in controlling dust occurred when we transitioned the Powder River Basin coal region from a 100% reliance on dust extraction with baghouses to ADS™ dry fog systems. MSHA (Mine Safety and Health Administration) was pleased to see a significant reduction in the occurrence of injuries due to fire and explosion, as well as a notable improvement in the cleanliness of coal processing buildings. The operating companies were also satisfied with the results, as the new system reduced



Track Hopper PPT.

operating costs and maintenance requirements while eliminating the need for stack emissions associated with dust extraction. This allowed them to expand their operations without affecting their emissions permits.

Another excellent example of a successful implementation is the ADS™ dust suppression system at Paradip Port in India. This was implemented by F. Harley (our licensee in India) but the concept was designed between TRC and F. Harley. his facility handles 29mt (million metric tonnes) on an annual basis. The dust generated by the unloading of a single wagon, without any dust control system in place, posed a significant daily health hazard for the personnel working at the facility over the past 18 years. The objective was to implement a solution that would allow for the unloading of eight wagons simultaneously, using two parallel track hoppers. The solution implemented was a unique one in India, which now controls the dust through highly customized containment and suppression techniques. Furthermore, the ADS™ dry fog system introduces a new work practice that not only mitigates visible dust and improves work conditions for employees but also creates a more productive operation, resulting in economic benefits for our client. On 28 October 2021, the Union Coal and Mines Minister, Shri Pralhad Joshi, conducted a site visit and commented: "The new system of unloading is efficient, helps save time and demurrage charges, and reduces the spread of coal dust," according to an official press release from



the Indian Ministry of Coal.

Finally, and in order to estimate the costs associated with dust emissions generated at a mining facility, we will analyse the following case. For the purposes of this analysis, we will consider a gold mine that processes 600,000 tonnes of gold ore per year. The grade of this gold ore is three times the feed grade of 15gpt gold. It is assumed that 1% of the weight of the 200-mesh material in the mill feed is lost to the wind (I am being conservative). The current market price of gold is \$2,482.65 per ounce, or \$79.82 per gram. Based on the aforementioned information, the projected annual savings for a randomly selected gold mine are expected to exceed \$21,551,400. The implementation of an efficient ADS™ dry fog system

along the entire gold mine crushing plant is estimated to cost between one and one and a half million dollars. The price will fluctuate based on three factors: automation, NEMA rating, and heat needs. The annual cost of ensuring the dust control system operates as designed and receives proper maintenance will not exceed \$250,000. This equates to a two-month payback period and annual savings in excess of twenty million dollars.

An ADS™ dry fog system can assist you in achieving your environmental objectives, protecting your employees and the surrounding community from exposure to polluted environments, reducing the risks of fires and explosions, and also generating significant cost savings, thereby enhancing your business profitability.

Loibl case study – feed hopper for smelting plant in Norway

QUICK FACTS

LOCATION & PLANNING PERIOD

Port of Norway

August 2022 – October 2023

CONVEYED MATERIAL

Sulphates, oxides (clinker), aluminium hydrates, calcium fluorides

SPECIAL FEATURES

Grain sizes in μ range, high bulk density. To protect the environment, special emphasis is placed on reducing dust formation.

RETROFIT PROJECT IN NORWAY

Enclosed between mountains and fjords lies the zinc smelting plant for which Loibl Förderanlagen GmbH supplied a customized feed hopper system. The factory is being fundamentally modernized and extensively expanded.

In the process, the decades-old ship unloading system was replaced by a new one. The Loibl hopper car is an important part of the ship-unloading process. It is the link between the handling dredger and the conveyor system. The feed hopper leads right up to the factory and is equipped with modern and innovative solutions, including a dust retention system to enable dust-free ship-unloading.

SHORT OVERVIEW

The hopper car runs on rails in the harbour and can be moved together with a transshipment dredger as needed. The dredger feeds the hopper with bulk materials that are needed for the zinc smelting plant and are delivered by ship.

The integrated extraction with filter system in the bin prevents dust from developing in the surrounding area. Underneath the bin is a bin discharge conveyor, transporting material onto a stationary conveyor.

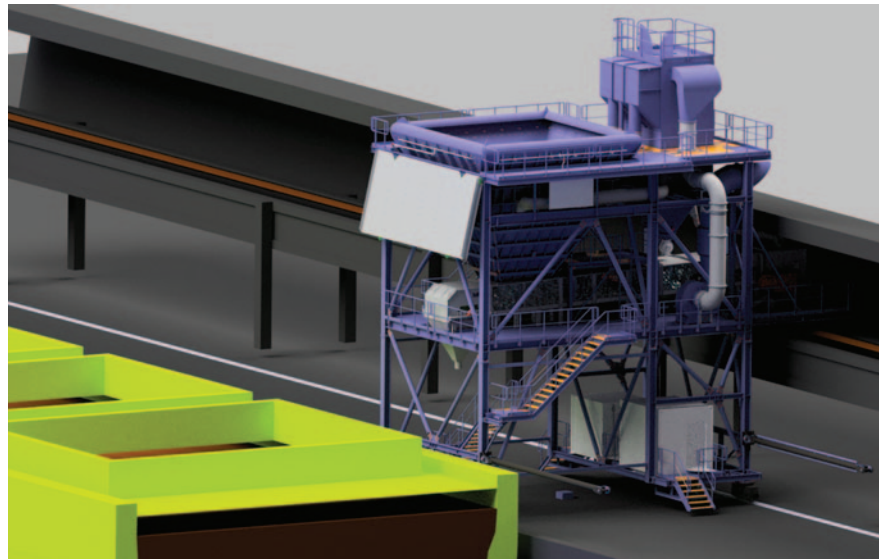
WEAR RESISTANT CONSTRUCTION

A special plastic lining was selected for all surfaces in contact with material in order to improve wear resistance and gliding properties.

The dust retention system is likewise used in a reinforced version adapted to the customer's needs. An integrated sprinkler system takes care of cleaning the bin.

DUST REDUCTION & WATER PROTECTION

The sophisticated extraction system of the feed hopper continuously extracts dust-laden air. A rotary valve discharges the filtered dust onto a discharge belt and



conveys it into the main material flow.

An additional special construction, the spillage board from Loibl, is used to collect spilled material during the transfer from ship to bin in order to guide it back into the ship. This protects the surrounding sea, so nature remains unaffected.

SCOPE OF SUPPLY AND SERVICES

- ❖ basic and detail engineering;
- ❖ static design of the steel structure;
- ❖ manufacturing in Straubing, Bavaria;
- ❖ steel construction EXC3;
- ❖ feed hopper and bin;
- ❖ weighing system;
- ❖ spillage board;

- ❖ dust suppression system;
- ❖ extraction with filter system;
- ❖ LASHBELTCON® — belt conveyor;
- ❖ electrical and control system;
- ❖ assembly; and
- ❖ commissioning.

ENVIRONMENTAL RESPONSIBILITY AND SUSTAINABLE BUSINESS

Zinc is an essential raw material for numerous industries, which is usually delivered by ship. Investments in innovative conveyor and filter systems are crucial to protect people and nature and to maintain the economic viability of plants in the long term.



Efficient dust prevention with atomized water fog

Silica Carbide factory in Norway.



Controls all types of dust.

Imagine a really dusty indoor environment. You installed dust extraction equipment but the PM2s and silica levels are way too high and dust is a constant halo around the lights. The problem with extraction is it is localized, it costs a fortune to install, run and maintain, writes Mike Carter, Director, Mist-Air Dust Suppression Limited.

If you can get a well sealed hood around a machine, the extraction can work efficiently, however ill-fitting guards, conveyor transfer points, the underside of conveyors, transporting material to hoppers all lead to leakages of materials.

If you have suction vents around the building to collect the airborne dust, all you are doing is ensuring the dust is constantly dragged through the building to the vents for everyone to breathe.

Later in the day when the manual clean up begins, the settled dust again rises into the air simply by being moved, brushed, or driven over by vehicles.

Heavy particles, PM10s and larger are not so much of a problem as they are not so easily ingested and will sink quite rapidly by their own weight.

However many of the smaller particles, PM2s and PM1s, can easily be ingested into the lungs and tend to stay in the air permanently. These may also contain heavy metals, VOCs, and organic compounds.

So what is the answer – fog cannons, rotary atomizers, lines of spray jets in the roof, bowsers driven around the site, vacuum lorries?

These will suppress some of the problems, but they also soak the floors, machinery, stock and personnel, increasing the weight of the stock and creating slip hazards.

THE ANSWER IS SIMPLE:

mist-air® atomizes water into fog so finely that it stays afloat in the air and does not drop to the floor, which keeps everything completely dry. It can be installed to many areas for independent control.

Small or large areas are easily covered, for either new builds or retro fits.

It actually prevents dust from forming and stops it moving to other areas. As fresh dust forms it is constantly bombarded with microscopic drops of fog which it adheres to and increases in weight, so is unable to stay airborne.

End of problem — you have clean air without having to use huge electric motors to suck it up and there are no filters to clean, no big electricity bills, and low water usage.

It is just so simple, people just cannot accept that they do not have to spend

millions of pounds on complicated dust extraction systems to get a more efficient solution.

mist-air® started manufacturing this system over 40 years ago and not only does the company design the system to suit the customer's building or application, but it also manufactures, installs and maintains it for the customer.

Installed in over 6,000 sites worldwide covering recycling sites, EFV, biomass power stations, ash handling, brick factories, quarries, tunnelling, foundries, papermills, particle board factories, glass recycling, gypsum recycling, plastic recycling, the list is endless. It is suitable for use with any material and on any site.

mist-air® is so confident in its products, that it offers a full money back refund if the customer is not pleased with the system once installed.



Stockpile and storage buildings.

'Dust - The great escape', a White Paper by Kinder Australia Pty Ltd.



Dust is inevitable. Whether from grinding up ores to extract the sweet, sweet minerals inside, or from crushing, what are essentially boulders, into tiny, little rocks that are a much more manageable size for handling and transport, or even just when handling the super fine aggregates so often used in construction, the emission of at least some amount of dust is nigh unavoidable. And dust just gets everywhere. The formation of this dust is not entirely unwelcome, however, and in some cases, the dust is the intended product; so, efforts to negate it are rarely required, nor are they entirely plausible.

Therefore, the more auspicious approach is to control the spread of this byproduct by removing any possible avenues of emission into the environment. It doesn't matter how much dust you produce if it never gets a chance to see the light of day.

The great escape of dust tends to be most prevalent in some rather specific locations: transfer points, where the product is in its most turbulent state. At the end of the belt where the material is discharged, especially when into open air, such as onto stockpiles, rather than into sealed chutes or hoppers. In areas where product is exposed to environmental factors, primarily wind, which can whip the top layers up into a violent frenzy. In any areas where vibration is common, where this jolting movement can bounce the material around, causing unsettled particles

to wander off the conveyor looking to wreak havoc. In places where carry-back or spillage are present, since these are unintentional there are usually few safeguards present to prevent these issues causing excessive dust to spread. And if the particulates are fine enough, the movement of the belt starting, stopping or even just when travelling at high speeds can be all that's needed to disturb the top layers of material and throw dust. The fineness of dust is categorized as particulate matter (PM), then subcategorized based on size. Fine particles (PM_{2.5}) are smaller than 2.5µm (1µm = 0.001mm), coarse particles (PM₁₀) are sized between 2.5µm and 10µm and 'larger than PM₁₀' is for all particles with a diameter of 10µm or greater. Coarse and larger than PM₁₀ particles make up the largest proportion of what is typically produced in quarrying and mining activities³.

With all these different factors why even bother putting in the effort to stop the spread in the first place? Well, just listing the rampant health issues associated with fine airborne particulates from mining and industrial sites, we have the numerous respiratory diseases, such as silicosis, coal workers pneumoconiosis, chronic obstructive pulmonary disease, and the savagely increased risk of lung cancer, which are just the result of working around coal and silicas dusts- with the occupational exposure limits of respirable

dust and respirable crystalline silica being 1.5mg/m³ and 0.05mg/m³ respectively² — without even mentioning the plethora of health risks from working with the metalliferous dusts inherent to ore mining⁶, or the outright toxic particulates from industries such as fertilizer manufacturing, as well as the numerous cardiovascular issues, kidney disease and autoimmune diseases such as scleroderma¹. On top of the copious amounts of health issues we also have numerous other hazards: including the very real risk of dust explosions, impaired visibility, damage, and accelerated wear of exposed electrical and mechanical devices, including motors — which are large fire hazards — plus a significant loss of product. There are a considerable number of plaguing issues that stem from dust exposure, so it's best to implement a few measures to keep the dust down.

Thankfully when it comes to subduing the beast that is dust, modern conveyor solutions provide quite the arsenal. Take the transfer for example, likely the dustiest place on any conveyor. Skirting is one of the most effective methods of keeping material from just spilling out of your transfer the moment it touches the belt. Ideally you would want skirts that provide some sort of contact seal, but when the diameter of dust is measured in microns, even a 1mm gap is enough for millions of particles to escape. So, a proper seal needs this belt contact to be effective, and

PPE is imperative for dust protection.



contact means wear, so a skirt needs a way to combat wear or it risks quickly becoming worthless. A self-adjusting skirt, that maintains full effectiveness for its entire lifecycle without the need for direct maintenance, is incredibly cost effective. These self-adjusting skirts are typically quite soft to allow for them to conform to the belt unhindered. This softness leaves them vulnerable to the harshness of the material stream, which can cause some serious damage as it flows by, so typically a hard internal skirt, that stops just short of the belt, is used to keep the material at bay, while the soft skirt picks up the slack and completes the contact seal in relative safety. But if the wear and tear of contact systems rubs you the wrong way, then the innovative, contactless external skirts may be your best bet. While they do tend to hit a higher price point in the short term, these marvellous devices tend to make up for it with their almost non-existent maintenance costs. Using their unique geometry to manipulate the power of airflow; a continuous suction effect is created to keep dust in. These contactless skirts still require the support of an internal hard skirt to make sure they don't clog up with the larger product, but their overall effectiveness is impressive. Whatever your preference, having at least some basic skirting is always better than having none.

Of course, with all this skirting it's imperative that your belt profile is well supported to maintain consistency and prevent gaps, even more so with contactless skirting which requires a very particular spacing for the proper suction flow to be possible. Any sag in the belt and you can suddenly find yourself wondering

where you left your shovel. How you go about supporting your belt is usually determined by the conditions of your transfer point. Systems that experience low impact from a small fall height or light products can get away with static belt support systems, which provide little in the way of impact support, but help maintain that perfect, flat surface across the transfer. Environments that require at least some impact support should invest in an impact bed, a large structure with flexible rubber rails that alleviate some of the impact force from the belt. For situations where severe impacts are common, a dynamic bed may be required. These utilize a trough panel suspended by spring elements to support the belt, while the static outer rails maintain the edge profile. These systems all tend to utilize low frictions rails (typically < 0.3 static coefficient of friction) on the wings to create a consistent surface for the belt to move across, however, this is still an increase in friction over most rollers. While these rails typically quite resistant to abrasion, they will eventually



Conveyor belt support & conveyor skirting.

require replacement as well.

The problem of dust cannot be solved solely at the transfer, however, as even if the dust is controlled there and the product is settled, the dust can still present new problems across the rest of the conveyor. Compared to the transfer point, the run of the belt typically has far less structure to encase the product and protect it from the open elements, sometimes as little as just a set of stringers are present. Therefore, special equipment adapted to these constraints must be used; belt covers are physical barriers that attach to the stringers and almost completely enclose the belt, preventing the influence of wind, and trapping dust that is disturbed by vibration and belt movement. Belt covers typically are made from rigid materials such as steel or reinforced plastics, which are effective barriers, simple to install, and can be modified with features like inspection and maintenance windows, alternatively more flexible materials like mesh cloth can be used, which maintain airflow and a degree of visibility while preventing dust migration. Water sprays can also be used and are very effective for dust suppression, however, the resultant water saturation is undesirable for a lot of products and the wastewater must be dealt with limiting their desirability for numerous applications.

Similarly, extraction fans can be very effective when run across the belt length, but maintenance for these is high as filters must be replaced to maintain effectiveness. Unlike the belt run, discharge points can usually be encased in structure with dust curtains to prevent any wayward dust spreading, but when material is being discharged into open space say for stockpiles, an extendable loading chute is more appropriate as it can be used to guide the material down to the stockpile without excessive dust being thrown during the fall. Belt cleaners are also

essential in preventing carry back, which causes a slow loss of material on the underside of the belt which creates opportunities for dust in unprotected areas. Effective belt cleaning in an enclosed area can alleviate this risk of carry back and thus prevent the dust that results from it.

Dust is an innate byproduct of the conveying process. Preventing it outright is essentially unfeasible due to costs and difficulty, however, controlling and containing dust is both simple and affordable with an abundance of modern products for the many aspects of dust control. Maintaining a low level of dust is important for a plethora of reasons, including the health risks associated with airborne dust, even in small quantities, wear of mechanical and electrical systems, poor visibility, and the overall loss of product. Operators should evaluate their conveyor and determine if there are any locations that are a source of dust, so that a solution can be applied. Operators who would prefer evaluations confirmed or would prefer professional input on the severity of issues can seek conveyor inspections from the numerous available conveyor solutions providers.

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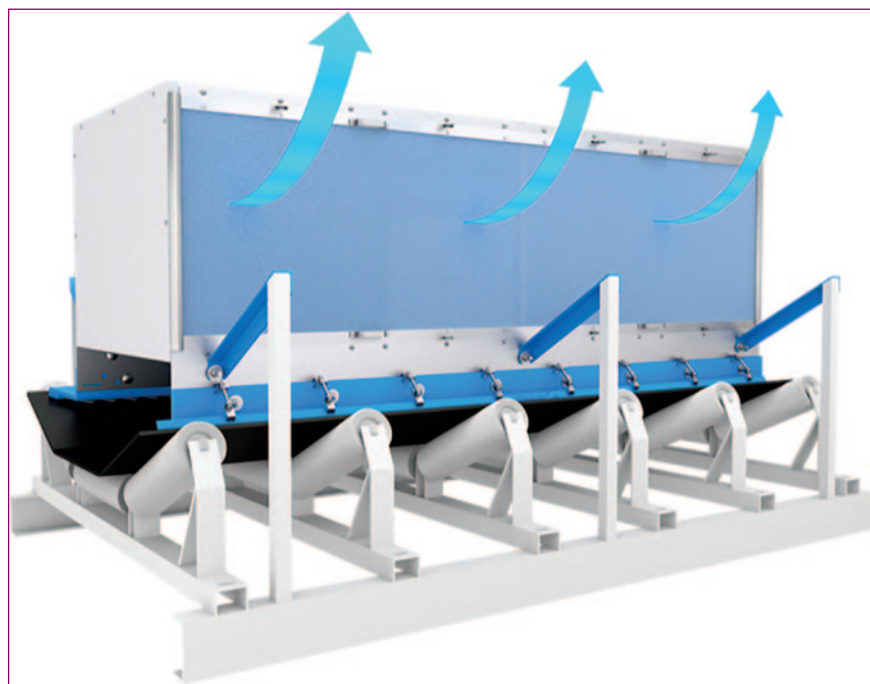
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Effective dust control = greater safety, higher productivity & cost savings

BLT WORLD Inc, in conjunction with the global ScrapeTec team, plays an important role in the USA, by assisting companies during conveyor handling, to effectively manage dust emission and material spillage.

“ScrapeTec’s advanced dust control systems are proving to be highly effective in many industries — not only for preventing dust formation and reducing material spill, but also to minimize the risk of explosion at critical sections along the conveyor route and transfer points,” explains Ken Mouritzen, BLT WORLD Inc, distributors of ScrapeTec products, which are engineered in Germany to pristine quality and environmental standards. “Apart from the benefit of cost savings and minimal energy consumption, DustScrape and AirScrape dust suppression systems are highly effective in minimizing exposure of workers to environmental pollution, which is a major problem caused by fugitive dust in dry bulk handling.

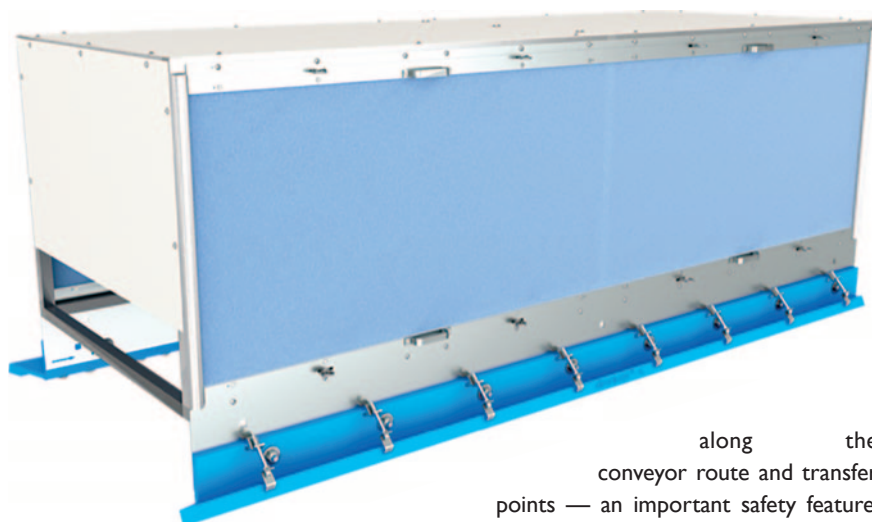
“In fact, ScrapeTec systems will go a long way to assist operators in the mining industry who need to prepare for the US



Department of Labor Mine Safety and Health Administration’s (MSHA) new silica dust regulations. The new silica rules will require aggregates, sand and gravel mine

operators to conduct exposure monitoring for crystalline silica, dust sampling and medical surveillance.

“Although the compliance date for the



rule is only in April 2026, we believe it is critical that operators begin preparations now, so they are fully compliant when the new regulations become effective. Our highly experienced specialists offer dependable solutions for specific problems at the transfer points of conveyor systems in many industries, where dust and material spillage are concerns.

"Dust is a major problem associated with conveyor systems in all sectors, particularly where workers have prolonged exposure to the hazards of dust particles. Apart from the negative effects of dust on one's health — like irritation to the eyes, skin and respiratory tracts, as well as serious lung diseases — some types of dust can also form an explosive mixture with air, which is extremely dangerous.

"It is therefore crucial that the correct conveyor skirting is used to offer maximum safety to workers and to minimize deterioration of materials being handled in order to maintain the desired level of quality."

The BLT WORLD Inc team has installed ScrapeTec's highly-effective dust suppression systems on many conveyor systems at various plants in the USA and feedback from customers is positive.

Common difficulties of traditional bulk conveyor systems include dust, material spills and contamination at the transfer points of conveyor systems. Misalignment, abrasion and subsequent belt damage are other problems.

According to plant managers, since the installation of the ScrapeTec systems, dust levels around transfer points have significantly reduced, ensuring a safer and healthier working environment. In addition, running costs are lower because there are no longer the costly energy requirements of extraction fans. The highly effective ScrapeTec system also minimizes the risk of explosions at critical sections

along the conveyor route and transfer points — an important safety feature. Plant managers also note there is no longer the need for extensive cleaning operations and maintenance work on the conveyor belt is minimal.

Prior to these installations, maintenance teams needed to spend hours each day cleaning the belt periphery and all transfer points, removing unplanned material spills and the remnants of product. Various methods to cope with excessive dust and costly material spills in moist and sticky environments had been tried previously, without success. This ScrapeTec conveyor system enables teams to now spend more time on productive work at each plant.

Studies indicate, that even after five years after installation and with continuous use in harsh conditions, BLT WORLD's ScrapeTec systems show minimal wear. Operational costs are also reduced because there is no need for high energy consumption, spillage collection, regular maintenance, or replacement parts.

The contact-free AirScrape conveyor belt skirting system is a highly-effective side seal that lies over the conveyor belt, without contact, and creates negative pressure on the belt, due to its specially designed blade structure.

Because this system hovers freely above the conveyor belt, skirt friction and belt damage are eliminated and service life of every component of the conveyor is extended.

Conventional skirting is pressed against a conveyor belt to keep dust and material in the middle of the belt, but after a period, wear of the skirting and belt can be so severe, that material and dust are able to escape. The danger is fine wear particles can be ingested by workers and consumers. Material spillage at transfer points needs to be removed at great effort and cost and regular maintenance of belt skirting and transfer points is necessary.

The durable ScrapeTec system consists of non-flammable and anti-static

polyurethane materials and blades made from Stainless Steel. FDA-approved materials are also available for specific conveyor handling applications.

The highly efficient DustScape — which replaces a conventional dust collector — consists of a durable filtering cloth that is installed above the conveyor belt, to retain dust particles created by conveyed materials, while remaining permeable to circulating air. This long-lasting filter cloth, with cleaning and dust-releasing properties, is available with different qualities, including anti-static features, for specific applications — for example, in surface or underground mining. The dust retaining filter cloth, which is manufactured in rolls, can be extended to any required length and is suitable for any conveyor belt width.

It is notable that DustScape and AirScrape operate without energy consumption, which means operational costs are significantly reduced.

The TailScrape system enhances performance of the AirScrape, by sealing the transfer tail in the rear area and also works according to the Venturi concept, to prevent dust generation and material spills. The intelligent blade structure on the underside of the system, creates negative pressure in the conveying area, preventing the escape of materials. Dust is kept in the material flow by air intake.

The SureSupport system works in conjunction with DustScape and AirScrape to deliver support and stability to the belt at transfer points. Other advantages of this system include quick and simple installation, as well as reduced maintenance time and costs.

Also in the range of ScrapeTec conveyor components, is the PrimeTracker belt tracker, which eliminates other problems associated with conveyor belt systems, including misalignment, abrasion and belt damage.

Correct installation of suitable equipment ensures cost efficiency, optimum performance and safety, reduced risk of breakdown and extended service life of the conveyor system.

These advanced solutions for conveyor systems are designed for use in diverse sectors, including the handling of difficult bulk materials, like corn and feeds, cement, fertilizer, coal and minerals.

BLT WORLD and ScrapeTec experts provide an assessment and solutions service to customers, for planning and implementing projects. A technical advisory and support service enhances performance of every ScrapeTec system.

Port dust emissions: conveyor sources and remedies



Port terminals of coal or petcoke with exposed stacker conveyors can be especially vulnerable to dust emissions. © Martin Engineering 2024

Particulate emissions at ports and terminals around the world are coming into acute focus, affecting the health and morale of workers, inspiring operators to seek solutions, writes *Daniel Marshall, Process Engineer, Martin Engineering*.

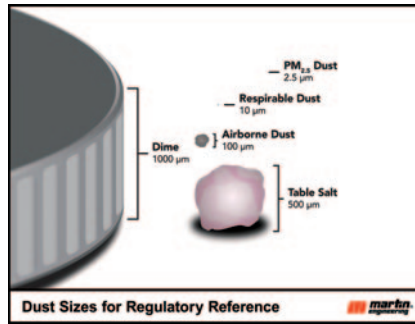
Many of the regulated particulates, such as respirable crystalline silica (RCS), are invisible to the naked eye, so staff working around a conveyor system and neighbours downwind are often unaware of the danger or the level of exposure.

Operators can protect staff and the community by understanding how particulates become airborne at each stage of the conveying process so that they can better assess the sources of dust within the system and ways to mitigate those emissions. Some dust solutions are more complicated to solve than others. Modern conveyor equipment designs have taken dust into account and offered solutions that are easier to maintain and support workplace safety compliance.

SPECS ON DUST SPECKS

In the United States, inspectors from the Occupational Safety and Health Administration (OSHA) and the Mining Safety and Health Administration (MSHA) equip trained workers with personal dust monitors that they wear throughout their shift. The small machines collect particulates from the air to measure RCS, heavy metals and other regulated substances. The filters capture particulate matter (PM) smaller than 10 microns (μm) in size. In the case of RCS, the regulated measurement must be less than 50 micrograms (μg) in weight over an eight-hour time-weighted average (TWA), i.e., a single shift.

For perspective, PM smaller than $200\mu\text{m}$, roughly the size of sand dust, is light enough to remain airborne on ambient air currents. When PM reaches



Respirable dust is invisible to the naked eye, travels long distances, and is the most detrimental to worker health.

© Martin Engineering 2024

$100\mu\text{m}$ — approximately the size of a cross section of a human hair — it becomes invisible to the naked eye. At $10\mu\text{m}$ or smaller, the particulate is considered 'respirable', meaning it can surpass the body's natural defenses and enter deep into the lung causing serious damage and health issues.

Once measured, inspectors usually order violators to address air quality. Personal protective equipment (PPE) such as respirators can be the answer in the short term, but for the long term, regulators recommend that operators address the problem using 'engineering controls'. These are equipment solutions that prevent emissions, reducing or eliminating the need for PPE. The reason for this is PPE can be hard to monitor throughout a shift, is often inadequately maintained, and the internal safety policy commonly lapses as time goes on since respirators can be challenging to wear day in and day out throughout entire shifts.

RELEVANT INTERNATIONAL STANDARDS INCLUDE:

- ❖ **Australia:** AS2895-2004 Workplace Atmospheres — Method for Sampling and Gravimetric Determination of Respirable Dust and AS3640 — 1989 Workplace atmospheres — Method for sampling and gravimetric determination of inhalable dust.
- ❖ **Canada:** Alberta's Occupational Health and Safety Code (2009) Part 36 (Mining) Section 601 (1)(2), 742 (1-5); Section 743 (1.1). Health, Safety and Reclamation Code for Mines in British Columbia (6.24.2); Province of Quebec's Regulation respecting occupational health and safety in mines (98).
- ❖ **European Union:** DIN EN 620 Continuous handling equipment and systems — Safety and EMC requirements for fixed belt conveyors

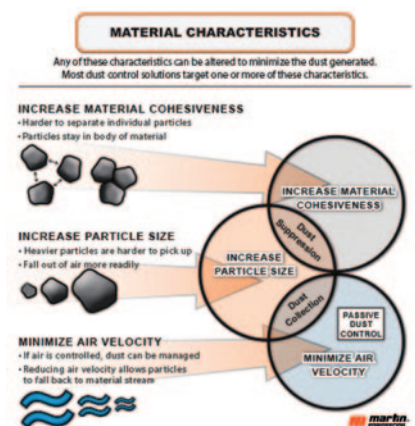
for bulk materials (5.5); EN 1127-1:1997; DIN EN 620 Annex A

- ❖ **South Africa:** SANS 1929 (2011) Ambient air quality — Limits for common pollutant; National Environmental Management: Air Quality Act, 2004 National Dust Control Regulations (4.2)(6.2 a-f)
- ❖ **United States:** OSHA 29 CFR 1910.22; CFR 29 1910.307 Hazardous (classified) locations; CFR 29 1910.1200 Hazard communication; CFR 29 1910.269 Electric power generation, transmission and Distribution; CFR 29 1910.272 Grain handling facilities. MSHA 30 CFR Section 56.5001 and 57.5001

CONVEYOR DUST EMISSIONS IN PORTS

The volume of conveyor dust emissions is dependent on the conditions and the application. Operators and designers should first know the material characteristics and how they change as they pass through the processing and conveying system. This can be a challenge for smaller general purpose ports, since it is commonplace to handle many different types of materials, whereas terminals, for the most part, are designated for a specific type of material transfer and have the mechanisms in place to remain compliant.

Year-round weather conditions can cause dust, especially during dry seasons, which pull humidity out of the air, increasing emissions. Prevailing winds or changes in wind patterns can suddenly shift a dust-free operation into one with several violations.



Dust suppression can be engineered controls like enclosed transfer points. Dust collection include dust bags or mechanical air cleaners. © Martin Engineering 2024

Conveyor dust emissions are also derived from many sources including transition points, material impact and cargo

disruption:

- ❖ Dust at the transition happens when material falls to the belt, hitting the sides of the chute or rock boxes on the way down. As it falls, material not contained by a drop chute (such as onto a stockpile) separates, exposing the entire stream to ambient air currents allowing emissions.
- ❖ Dust on impact happens when material lands on the belt with no controls such as a rock box or curved drop chute. Depending on the height, weight, and density of the material, the impact on the belt causes air turbulence and shifting leading to airborne emissions.
- ❖ Dust from disruption happens along the conveyor path, often between idlers where the belt slumps. This causes the cargo to shift and bounce slightly along the belt path, disrupting material, and causing dust emissions.

LOADING THE BELT

Loading zone design has shifted over the past decade in response to the need for dust reduction and greater efficiency and is an excellent example of an engineering control. Rather than transitions from conveyor to conveyor or storage container to conveyor that are straight drops from heights, chutes direct and control material flow using spoon designs. These designs ensure that material is loaded in the center of the belt with little impact. This reduces dust, spillage, mistracking and belt damage commonly associated with conveyor transitions.

The impact of material on the belt can cause a splashing effect and produce air turbulence that seeks exit points from the chute through gaps between the skirt and the belt created by the slump between impact idlers. These rollers also tend to break under long-term pressure, causing them to seize. So, another innovation replaces impact idlers with bed of steel

angles lined by energy-absorbing impact bars with a top layer of low friction, ultra-high molecular weight (UHMW) polymer or polyurethane. The bar design helps the skirtboard sealing systems consisting of a wear liner and skirting to retain a consistent seal at the loading point to reduce the amount of spillage and dust emissions.

Eliminating moving parts and the requisite lubrication of rolling components drastically reduces the amount of maintenance and improves safety by promoting a tight seal between the skirting and the bar. Some manufacturers have even developed innovative designs that mount the cradles on rails, allowing slide-out removal to reduce maintenance time and improve safety.

DUST DURING TRANSPORT

After cargo has been loaded, the stilling and settling zones of the transfer enclosure should be properly designed to have a sealed environment that controls airflow with negligible dust emissions. This design should include closely set idlers or idlers that transition between cradles. Another important element is continuous external skirting in single strips that run the length of the enclosure on either side. Inside the enclosure, strategically placed dust curtains slow airflow enough for particulates to settle back into the cargo stream. Dust bags and compact mechanical air cleaners, when installed on the enclosure, will also capture dust and ensure a dust-free exit from the enclosure.

Once the material has left the enclosure, wind can be an issue so many operators cover exposed conveyors. However, this does not control dust from material shifting, disruption over idlers, or mistracking. These actions can cause spillage and dust to fall along the length of the conveyor. Installing tracking devices along the belt path helps reduce spillage from mistracking even if cargo shifts.

DUST AT THE DISCHARGE ZONE

More often than not, the conveyor discharges down an open shaft with a dead drop into the transfer chute leading to another conveyor, into a hopper or silo, or onto a storage pile. When the material leaves the belt, it separates, exposing the entire stream which allows smaller particulates to become airborne. Stacker conveyors and tripper conveyors are especially prone to this and often utilize a misting ring or specially designed sock to control the stream.

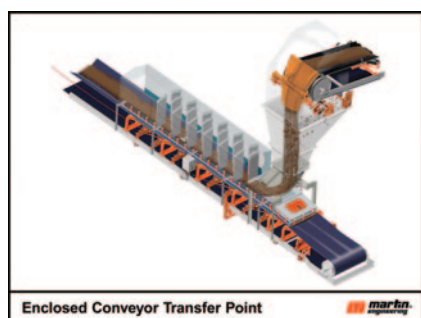
However, material often hits the back of the transfer chute or impacts on rock boxes which can result in dust blowing back up the chute. Enclosing the discharge zone and controlling the impact of material using a spoon design will mitigate blowback. Also, adding air cannons helps direct cargo and airflow, as well as prevent unscheduled downtime from buildup and blockages within the chute.

DUST ON THE RETURN

Conveyor belts across all bulk handling sectors take a tremendous amount of punishment and the single most expensive piece of equipment on the conveyor system is the belting. No matter how careful the upkeep, the belt will eventually start to show divots and cracks. The weight of the cargo can cause dry material to stick to the surface and dust and fines collect in the flaws. If not properly cleaned, the adhered material will not be discharged with the cargo flow and remain on the belt as carryback, spilling fines and emitting dust along the return path of the system.

Primary cleaners remove the most abrasive and hardest material left on the belt after discharge. Mounted at the head pulley on a tensioned assembly and the engineered polyurethane construction, many blades are in a curved configuration that allows the blade tip to fit snugly against the belt and wear evenly throughout the blade's life with only minor adjustments to the tensioner. One innovative primary cleaner design requires no tensioning at all after initial installation. It features a matrix of tungsten carbide scrapers installed diagonally to form a 3-dimensional curve around the head pulley and typically delivers up to 4 times the service life of urethane cleaners without ever needing re-tensioning.

Secondary and tertiary cleaners are located immediately after the belt leaves the head pulley to address dust and fines that escape the primary cleaner. Generally equipped with spring or air tensioners that easily adjust to fluctuations in the belt,



A controlled material flow with dust curtains help dramatically minimize dust emissions in the loading zone.

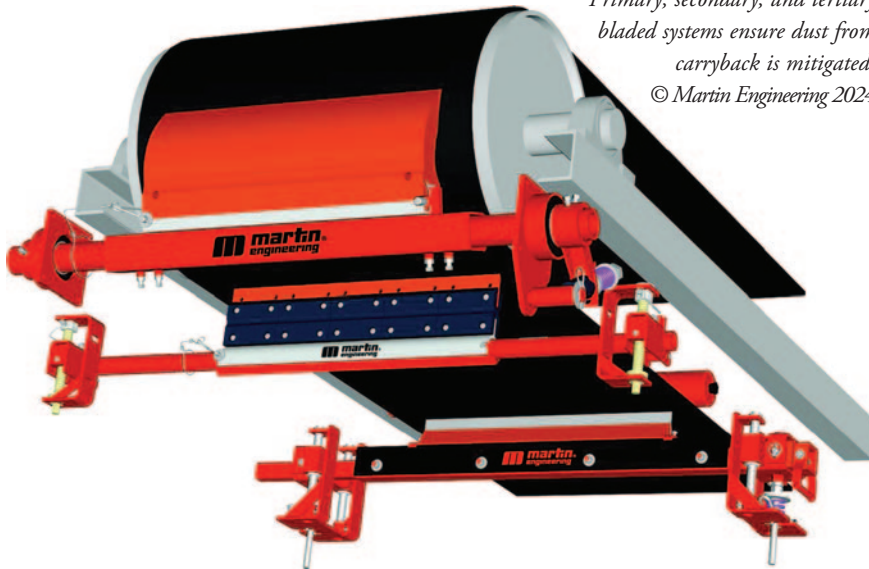
© Martin Engineering 2024



Belt tracking keeps loads centred and minimizes dust from spillage and disruption.

© Martin Engineering 2024

Primary, secondary, and tertiary bladed systems ensure dust from carryback is mitigated.
© Martin Engineering 2024



secondary and tertiary cleaners dislodge dusty carryback, adding it back into the cargo flow.

CONVEYOR DUST: NOT JUST A FORGONE CONCLUSION

The prevailing impression that bulk

handling is inherently dusty is an old idea that regulators are trying to reverse. By identifying causes of dust and retrofitting modern equipment, operators find that they can control emissions at the source and increase efficiency. Designers and engineers of high-quality conveyor

accessories are constantly striving to innovate, adding ways for operators to reduce employee interactions with equipment, significantly lower dust emissions, improve workplace safety and remain compliant.

About the Author

Daniel Marshall received his Bachelor of Science degree in Mechanical Engineering from Northern Arizona University. With nearly 20 years at Martin Engineering, Dan has been instrumental in the development and promotion of multiple belt conveyor products. He is widely known for his work in dust suppression and considered a leading expert in this area. A prolific writer, Marshall has published over two dozen articles covering various topics for the belt conveyor industry; he has presented at more than fifteen conferences and is sought after for his expertise and advice. He was also one of the principal authors of Martin's 'FOUNDATIONS™ The Practical Resource for Cleaner, Safer, and More Productive Dust & Material Control, Fourth Edition', widely used as one of the main learning textbooks for conveyor operation and maintenance.

Martin Engineering case study – Transnet Port Terminal, Richards Bay, South Africa

Transnet Port Terminal at Richards Bay, one of South Africa's largest ports, was experiencing excessive spillage at eight of its conveyor discharge zones. Transporting raw materials such as magnetite, chrome, coal, chloride and zircon on 1,350mm and 1,500mm (54in. to 60in.) belts, fines were adhering to the belt and carryback spilled along the belt path, causing excessive dust emissions and material to pile underneath the system and spill out into walkways. In addition to product loss, workers would have to be pulled from other duties to clean up under and around the system. Several different brands of primary and secondary cleaners were installed in an attempt to mitigate the problem, but they were unsuccessful. To reduce the cost of operation, stay compliant to workplace air quality standards and improve safety, managers sought a solution.

Invited to inspect the system and resolve the dust and spillage issue, technicians from Martin Engineering South Africa performed a detailed



Spillage was pervasive, requiring regular cleanup which raised the cost of operation. © Martin Engineering 2024



The low-profile Cleanscape primary cleaner takes up less space than standard cleaners.
© Martin Engineering 2024

Walk the Belt™ inspection to determine the best course of action. Due to the varying nature of the material, technicians replaced the existing cleaner with a CleanScape primary cleaner. Installed diagonally across the discharge pulley to form a three-dimensional curve, the design uses a matrix of tungsten carbide scrapers to dislodge material. The cleaner is tensioned once upon installation, requiring no further adjustment. With four times the equipment life of other cleaners, the CleanScape reduces carryback and delivers superior performance, reducing the cost of operation.

Operators report that spillage along the length of the belt has been drastically reduced and no longer piles up around the conveyor structure, resulting in considerably less dust. The material discharge efficiency has improved production and reduced maintenance requirements, giving operators more control over labour costs, while reducing the need to perform potentially hazardous cleaning near the moving conveyor. "There has been a huge improvement in the amount of spillage since the scrapers were installed," said a manager close to the project. "As a result, we will be installing more CleanScape units to improve efficiency for the entire plant."

The Arden Jet, an innovation of Arden Equipment in demolition, recycling, earthmoving and material handling

AWARDED SEVERAL TIMES WORLDWIDE

The Arden Jet is the first factory integrated water spray system in a demolition equipment that reduces dust and odour emissions. The technology, awarded six times by the demolition industry in France and internationally, is ideal to reduce dust on demolition sites or in quarries. The Arden Jet is available on demolition shear, sorting grab, concrete crusher, hydraulic breaker and clamshell.

HOSES SYSTEM FULLY INTEGRATED INSIDE THE TOOL

The hoses are fully connected inside the body which renders them totally invisible and protected from external destructive elements. All of this is possible using a specific turning joint which allows hydraulic oil and water management at the same time enabling the full use of the rotation head to operate the equipment without worrying about hoses position. The operator can be fully focused on the task at hand. Spraying nozzles can be fitted in different angles or changed by the customer allowing various nozzles diameters and shapes of the spraying pattern to best match working site requirements. High pressurized water turns into a mist that is propelled several metres away creating a large area of fog to better capture airborne particles.

SPRAYING AS CLOSE AS POSSIBLE TO THE AREA TO BE DEMOLISHED

The sprayed area is outstandingly accurate because of the four nozzles that are directly fitted on the body of the equipment. As water is atomized with high pressure, creating a very fine mist, visibility on demolition area remains very clear.

Highly pressurized water turns into a very thin mist that is propelled several metres away creating a large area of fog to better capture airborne particles. The finer the water particles, the better they can capture dust. The use of high pressure water means that less water is needed for the whole process to be more effective. This means that cost saving on water usage is significant and this is not taking into account cost saving on fuel. The suppression of dust means also, that other machines around will not be clogged by dust and will therefore run longer and need less maintenance.

ENVIRONMENTAL PROTECTION

It is proved dust particles generated on demolition job sites are detrimental to workers' and local residents' health. The Arden Jet reduces dust particles to bring more safety to workers. The Arden Jet dramatically reduces the mud as water is atomized through the nozzles with high pressure, making it very fine mist, which is very effective against airborne dust and even micro particles.



ELIMINATING DUST

BEFORE



AT THE SOURCE OF EMISSION

AFTER



dust
BOSS DB-R MISTING RING

The DustBoss® DB-Ring provides effective dust suppression for conveyor or chute discharge points, preventing exposure within and across site lines.



GET THE SPECS!



Feed the world

high-tech grain
handling equipment
is as vital as ever

Mechanical clamshell two-roped and four-roped grabs from Guven Grab.

Louise Dodds-Ely

Guven Grab handles grain efficiently and cleanly

Grab manufacturer Guven Grab & Machine has been in business since 1984 and is based in Istanbul, Turkey. The company now boasts a high-tech 4,000m² factory. Guven Grab & Machine designs, develops and manufactures grabs for the loading and unloading of cargoes. Ninety-five per cent of its products are exported to foreign countries, with a great many destined for use on oceangoing bulk carrier vessels. To date, Guven has exported its products to more than 90 countries.

Guven Grab is proud of having a customer portfolio that spans the globe. Guven Grab & Machine Inc.'s main activity is to supply the grabs for bulk carrier vessels of first class shipowners (Ultramax, Supramax, Handymax, Handysize vessels). Along with shipowners, its other customers are stevedores, ports, steel factories and more. Most of the products delivered to Chinese and Japanese shipyards are for bulkier newbuilds. The company's grabs fully cover customer requirements such as: competitive prices, European quality, less maintenance, less

spare parts and reliability.

Guven Grab & Machine has integrated the latest design and product technologies into grab performance and guarantees a 24-hour after-sales service, product maintenance and the supply of spare parts worldwide. Therefore, professional attention is paid during the early design and development stage of the grab in order to secure client's utmost satisfaction. The company's main objective is to ensure that all products supplied add value for its clients. Product development is guaranteed; solving specific problems for its clients is the cornerstone of the company's business philosophy.

Guven's production plant is in Cayirova Kocaeli, Turkey and has been set up over an area of 10,000m². There are four CNC cutting units, 11 CNC lathe units and 28 units of cranes for various purposes and with differing capacities at its machining centres available in its plant. Guven's team consists of 85 people in production offices, manufacturing and exports. Guven's grabs are designed by 3D software — all virtual,

load and working tests are done by computer prior to production.

Grain is just one of the many cargoes handled by Guven's grabs. Other include: coal, gravel, sand, fertilizers, wood chips, forest products, biomass, nickel ore, iron ore, pellets, scrap, HBI (hot briquetted iron), HMS (heavy melting steel), pig iron, recycling materials, etc. Guven even offers a Big Bag spreader, to handle already bagged cargoes.

Among the products made by Guven Grabs are:

- ❖ radio remote control grabs;
- ❖ electro hydraulic clamshell motor grabs;
- ❖ electro hydraulic orange-peel motor grabs;
- ❖ mechanical clamshell two-roped and four-roped grabs;
- ❖ mechanical orange-peel two-roped and four-roped grabs;
- ❖ hydraulic clamshell excavator grabs;
- ❖ hydraulic excavator orange-peel grabs;
- ❖ radio remote control orange-peel grabs;



Technology to **move** **the world**

Recognized worldwide for our quality, we are committed to advancing the goals of ESG by providing durable, low-maintenance equipment that ensures unparalleled reliability, along with tangible environmental benefits such as reduced airborne dust, lower noise, and superior operating efficiency. Our mission extends beyond manufacturing - we actively strive to reduce waste, contain contaminants, and continually improve our manufacturing processes for greater efficiency and environmental responsibility.

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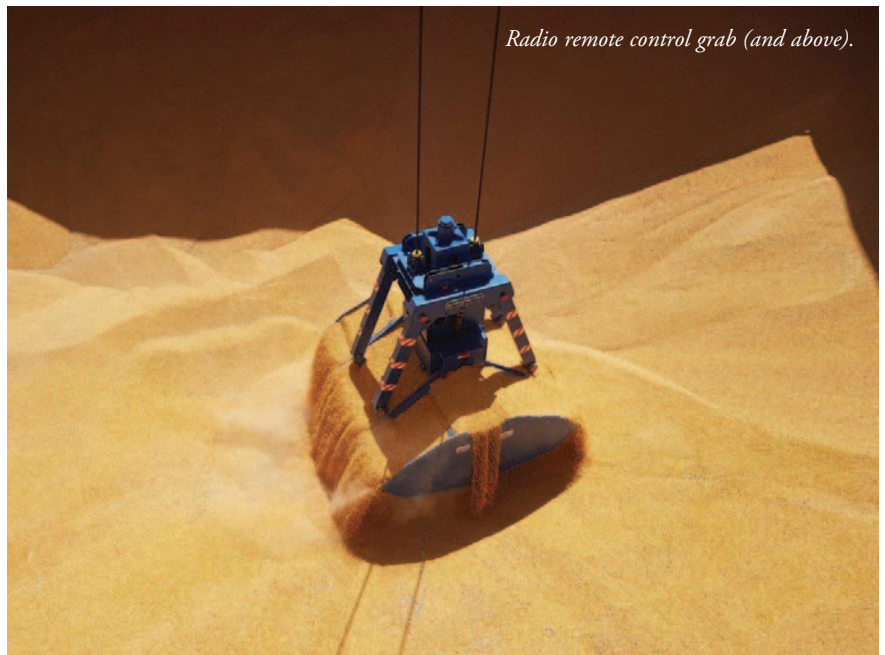


- ❖ mechanical clamshell touch down grabs;
- ❖ mechanical orange-peel touch down grabs;
- ❖ timber & log grabs;
- ❖ dredging facility grabs;
- ❖ big bag spreader; and
- ❖ hoppers.

SPECIALIZING IN GRAIN

Grabs that are particularly popular in the grain handling market include: radio remote control grabs; mechanical clamshell two-roped and four-roped grabs; electro hydraulic clamshell motor grabs; and hydraulic clamshell excavator grabs.

- ❖ **Radio remote control grab:** this is a very popular grab, and is designed for single wired cranes. These grabs can load and unload all pouring loads and are closed by means of wire and pulley equipment, and opened in the air by radio remote control at the distance of 100 metres. The grab can be stopped during operation. There is no need for any additional accessories to use the grab on a vessel. The grab connects to a hook and works with any crane. This is the company's most popular model, and it exports 150 units a year.
- ❖ **Mechanical clamshell two-roped and four-roped grabs:** these enable the most efficient handling of bulk materials together with dual drum cranes which are two- or four-roped cranes. These grabs operate with wire



Radio remote control grab (and above).



Mechanical clamshell two-roped and four-roped grabs.



Handle bulk with
efficiency and reliability

Pneumatic and mechanical ship (un)loaders

Up to 2500 tph for loaders and up to 1200 tph for unloaders.

Low noise & no dust emission

Turnkey solutions for cereals, soy flour, fertilizer, pellets and more...





Electro hydraulic clamshell motor grabs.

rope, NO motor and hydraulic system. They have a simple and efficient structure, low failure rate due to the four-rope system. The grabs open on the air by lowering closing ropes, closes on the air by lifting closing ropes. They operate at up to 45° angle of cargo.

- ❖ **Electro hydraulic clamshell motor grabs:** these are for all kinds of pouring loads. Guven Grab & Machine can, on request, also supply cable drum systems, cables, electric panels and other accessories, which it can install on bulk vessels. These grabs can be operated with power cables on cranes, enable the most efficient handling of

bulk materials together with ship cranes, mobile harbour cranes, portal cranes, etc. The grabs operate with electrical supply, and environmentally friendly. The grabs opens on the air and closes on the air. They operate at up to 45° angle of cargo. Hydraulic cylinders with brake at the end of open function of grab.

- ❖ **Hydraulic clamshell excavator grabs:** these enable the most efficient handling of bulk materials together with a material handling machine. They operate with oil pressure, NO motor and pump. Operating functions come from the excavator crane. They have a simple and efficient structure, and

open on the air and closes on the air by oil pressure. They operate at up to 45° angle of cargo. There are hydraulic cylinders with brake at the end of open function of grab, and stoppers at open position of grab. All materials are heavy duty for high performance.

Guven Grab also manufactures attachments that are customized for customer-specific needs.

Guven Grab & Machine provides 24-hour service facilities to its customers. In order to save the transport cost to its customers, it provides door to door service delivery and assembly on site.



Hydraulic clamshell excavator grabs.

F 120 MH

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F 120 MH - Technical Data
Engine Power: 350 kW (150 kW hybrid) - Operating Weight w/o Attachments: 120 - 150 t - Reach: max. 27 m

HHLA TK Estonia expands grain handling facilities

HHLA TK Estonia, a subsidiary of Hamburger Hafen und Logistik AG, is ushering in the grain season with innovative and sustainable solutions for bulk handling and warehousing in the Estonian port of Muuga. The company has recently expanded its facilities with the addition of three newly built warehouse sections and significant advancements in its automatic entry and scale systems.

As the largest warehouse operator in the region, HHLA TK Estonia now offers diverse storage options for pellets and grain. The terminal boasts 86,500m² of specialized covered storage halls, complemented by extensive open areas. This expansion allows the facility to handle up to 500,000 tonnes of bulk cargo annually, reinforcing its position as a key player in the Baltic logistics sector.

The new bulk cargo terminal concept integrates state-of-the-art storage solutions, digital innovations, and advanced loading equipment featuring dual power

technology. The highlight of this development is the mobile hydrocrane Mantsinen 120 DER, which can handle up to 620 tonnes of bulk cargo per hour. This crane is the first of its kind in the Baltics, equipped with both electric motors and a diesel engine, promoting operational flexibility and efficiency.

In line with HHLA TK Estonia's commitment to sustainability, the new facilities include three solar parks installed on warehouse roofs, with a combined capacity of 310kW peak. This renewable energy integration ensures that a significant portion of the loading operations is conducted with minimal greenhouse gas emissions.

Andres Uusoja, Chief Commercial Officer of HHLA TK Estonia: "We are proud to offer environmentally friendly solutions for handling Estonia's primary bulk export commodities, including grain, pellets, and organic grain. Our customers increasingly value sustainable practices, and



our new facilities are designed to meet these expectations."

With these enhancements, HHLA TK Estonia is well-equipped to support the region's agricultural sector and contribute to a greener, more efficient supply chain.

HHLA TK Estonia is a part of the leading European logistics group Hamburger Hafen und Logistik AG (HHLA) that operates container terminals in Hamburg, Odessa, Trieste and Muuga, as well as runs logistics interconnections and intermodal centres in many regions of Central and Eastern Europe.

Photos: HHLA TK Estonia.



Dos Santos Sandwich Conveyors: gently lifting grain since 1983

Sandwich Belts were made for grain. We knew it from the start so we couldn't wait to demonstrate it, writes *Joseph A. Dos Santos*.

The very nature of the Sandwich Belt principle; hugging bulk material between two smooth surfaced rubber belts conveys a sense of gentleness when implemented with care.

The modern Sandwich Belt high angle conveyor technology theory was developed by the writer between 1979 and 1981. Figure 1 shows the nature of the hugging forces that develop the internal friction thus precluding any material slide-back. Other Dos Santos writings present the equations associated with this frictional development.

The opportunity to prove the technology happened in 1982. In mid-1982 we began engineering of a large-scale Sandwich Belt high angle conveyor prototype, test and demonstration unit. By mid-1983 we had manufactured and installed this unit and began a year-long

testing programme. With 1,524mm (60 inches) wide belts and 35 metres (115 feet) length, the unit was large enough to be impressive. It featured much versatility including a conveying angle range from 30–60°, DC variable speed drives, a power monitoring system and much more. At start-up the unit immediately successfully conveyed coal at 30° then at 45° then at 60°.

1983

The system clearly handled all materials gently and we especially wanted to demonstrate its gentleness handling various grains. So, we made a special testing programme just for grain.

Firstly, we wanted to convey in bulk the most difficult grain. We judged this to be soybeans because of their spherical shape and low angle of repose. We conveyed these successfully at all angles to 60°. We assigned to soybeans a material (filling) factor of 0.85 — the lowest of all materials tested. For reference, iron ore pellets were

a close second with material factor of 0.86 and woodchips had the highest material factor at 1.15.

Secondly, we wanted to demonstrate the gentleness. For this, damage testing was performed on three USDA Grade 1 grains to demonstrate the gentle distribution of the hugging pressure on the sandwiched material. Five one-bushel samples were loaded into oversized burlap sacks from each of a common batch of soybeans, wheat and seed corn. The first bushel of each grain was set aside to serve as the control sample, while the next four bushels were conveyed at 60°, the full length of the 1,524mm (60") belt width demonstration unit, two, four, six and eight times for corresponding conveying distances of 45.7 metres, 91.4 metres, 137.2 metres and 182.9 metres, respectively. Samples (2,555 grams) from each bushel sack were then analysed at a State of Alabama Department of Agriculture laboratory for the various forms of damage and contamination, and at the Alabama State Seed Laboratory

FIGURE 1 Sandwich Belt model.

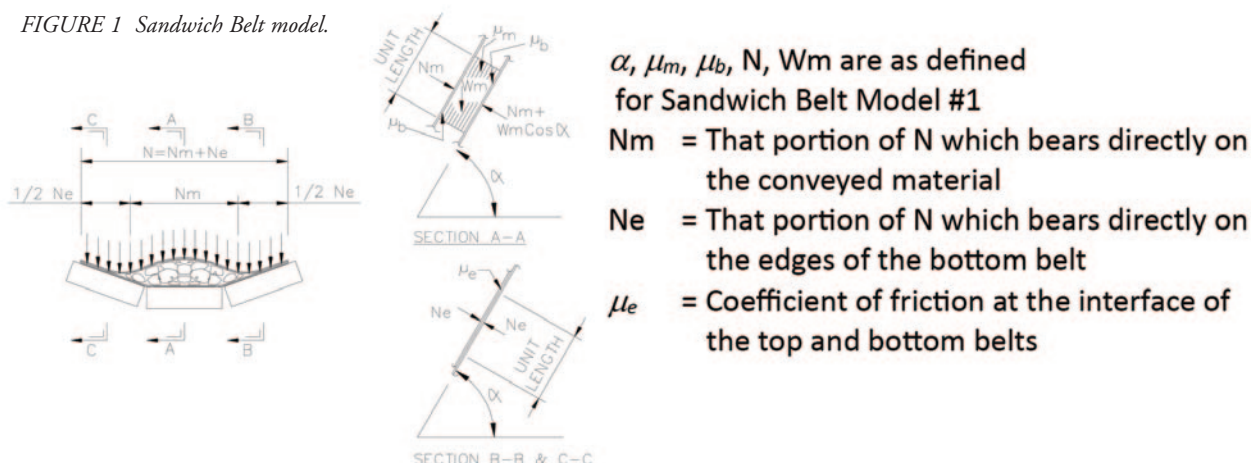


FIGURE 2 The Cavallino self-unloading ship system.

Sandwich Conveyor for Self-Unloading Ship, Mexico

Material	- Various Grains
- Density	- 0.721 t/cu-m (45 PCF)
Conveying Rate	- 584 t/h (644 STPH)
Conveying Angle	- 90 degrees
Belt Width	- 1524 mm (60")
Belt Speed	- 4.06 m/s (800 FPM)
Lift	- 18,900 mm (62')
Length	- 27,400 mm (90')
Drives	
- Inner Belt	- 56 kW (75 HP)
- Outer Belt	- 56 kW (75 HP)

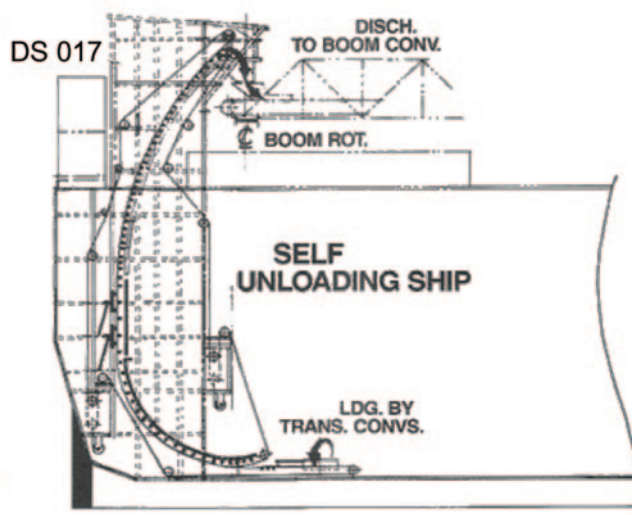
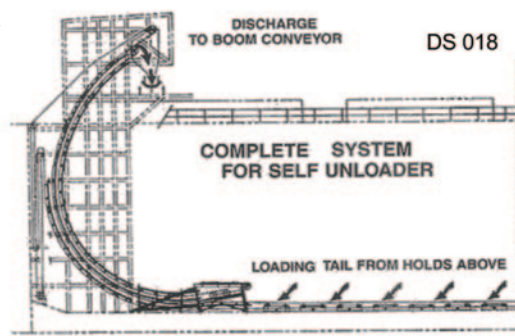


FIGURE 3 The Hermitage self-unloading ship system.



Sandwich Conveyor for Self-Unloading Ship, Mexico

Material	- Various Grains
- Density	- 0.721 t/cu-m (45 PCF)
Conveying Rate	- 1361 t/h (1500 STPH)
Conveying Angle	- 90 degrees
Belt Width	- 1829 mm (72")
Belt Speed	- 4.06 m/s (800 FPM)
Lift	- 17,800 mm (58.5')
Length	- 123,000 mm (404')
Drives	
- Inner Belt	- 112 kW (150 HP)
- Outer Belt	- 112 kW (150 HP)

Department of Agriculture and Industries for germination potential. The results showed no damage to any of the three grains tested, as a result of conveying in the Sandwich Belt high angle conveying unit.

These damage tests were later repeated with wood chips under the scrutiny of a customer that was considering the first installation to elevate high quality screened chips. The results were the same — no damage. That customer thus purchased and benefited from the great savings.

The many subsequent installations have consistently demonstrated the gentleness. Like any conventional conveyor, the areas of wear and tear are always at the transfers, not along the conveyor carrying path.

1991

Despite the emphasis on suitability for grain the first sale did not come until 1991 in the 17th installation. This was an upgrade of the customer's design.

In this case a grain shipper first engineered and converted his ship — the *Cavallino* — into a self-unloading ship. He also engineered and built his own 1,524mm (60") belt width C-Loop Belt as part of the self-unloading system. Unfortunately, he did not understand all of the rules and the C-Loop Belt had many problems. He turned to the writer and we were able to

correct all issues including modifying the belt line profile, replacing wrong belts with curvature compliant low modulus belts and more. The result was a trouble-free operation that expedited the unloading and minimized the time at port. The success led to two more Dos Santos Sandwich Belt installations for the same client.

1993

Success of DS 017 led to DS 018. In this case the same customer turned over to us the engineering of the entire self-unloading system and supply of all conveyors. This client loved conveyors and he used multiple conveyor lines under the ship's holds in order to maximize the cargo carrying capacity. Whereas the *Cavallino* had four parallel collector conveyor lines under the holds leading to the C-Loop elevating conveyor, this, the *Hermitage*, had seven collector conveyor lines with the main line being the 1,829mm (72") belt width full length tail of the elevating C-profile conveyor. Otherwise, there are four 1,219mm (48") belt width lines, two to either side and two 914mm (36") belt width lines, one at each outer width of the ship. The unloading sequence first utilized the tail of the C-Sandwich to draw down the main cargo then the 1,219mm (48") wide belts and finally the 914mm (36") belt

width clean-up conveyors.

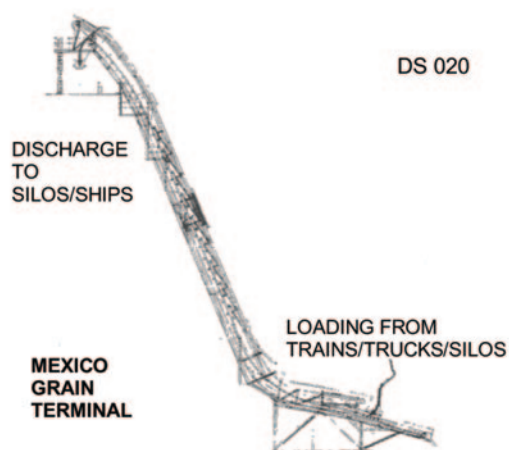
For this same client, success at the self-unloading ship systems finally led to DS 020, implementation on land at his grain distribution terminal in western Mexico.

1997

By 1997, at Bristol Port in the UK, bigger and bigger grain ships were arriving to be loaded by their high-capacity shiploader which travelled on a relatively short dock. The conventional tripper that elevated the dock conveyor to the shiploader stretched over far too much dock length limiting the shiploader's travel range. It could not travel to all of the holds of the largest ships requiring their repositioning in order to be fully loaded. The port management found their solution in a Sandwich Belt high angle conveyor that could elevate the grain to the ship loader at a high angle. Combined with a short dock conveyor tripper onto the high angle conveyor the trailer length was dramatically shortened and the shiploader's travel range increased by the same amount. This solution facilitated loading all ships without their repositioning and greatly reduced the loading time.

2021

The *Louisiana Midstream One* — LMO — has operated on the Mississippi River and



Sandwich Conveyor for Grain Distribution Terminal, Mexico

Material	- Various Grains
- Density	- 0.721 t/cu-m (45 PCF)
- Size	- 50 mm (2") minus
Conveying Rate	- 907 t/h (1000 STPH)
Conveying Angle	- 65 degrees
Belt Width	- 1372 mm (54")
Belt Speed	- 3.73 m/s (735 FPM)
Lift	- 30,700 mm (100.6')
Length	- 44,200 mm (145.2')
Drives	
- Top Belt	- 75 kW (100 HP)
- Bottom Belt	- 75 kW (100 HP)

FIGURE 4 Sandwich Conveyor at Topolobampo Terminal.



VERSTEGEN
GRAB INTELLIGENCE



Professional companies in more than 110 countries worldwide work with Verstegen grabs, because our grabs offer them the highest reliability and best productivity. Combining our extensive knowledge and experience with the feedback from our loyal customers results in optimized grabs for all bulk materials and unloading situations. We call this 'Grab Intelligence'.

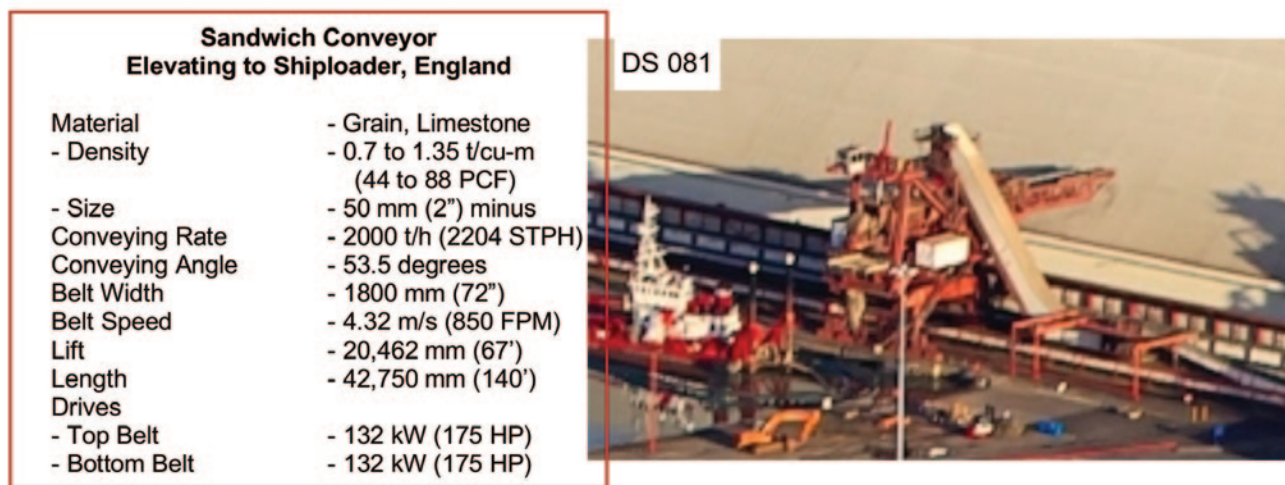
Looking for increased reliability and productivity, lower maintenance costs and an extended lifespan? Let us know, because together we can move mountains.

LET'S MOVE MOUNTAINS

WWW.VERSTEGEN.NET



FIGURE 5 Sandwich Conveyor elevating to shiploader.



Gulf of Mexico as a midstream transfer terminal since 2012. Until 2021 it operated transferring only carbon based products (coal and petroleum coke), transferring the carbon products from river barges to ocean going vessels. From the clamshell barge unloaders to the shiploader this required only two conveyor flights in switch-back arrangement.

In 2020, Cooper Consolidated, the owner, decided to refit the LMO for grain transfer. With grain transfer came strict weighing and sampling requirements and the scrutiny of the USDA/FGIS.

In the limited barge space, the grain had to be diverted to a newly added weigh bin for official weight determination. Then from the bottom of the weigh bin it had to be elevated to the sampling system and onto

the conveyor line for its transfer to the ship loader. The first diversion was easily accomplished with a conventional conveyor but the second, from the bottom of the weigh bin to the sampling system and

conveyor line — elevation of 65' over 100' of distance — required a high angle conveyor. At the high volumetric rate of nearly 3,000m³/hour the DSI GPS Sandwich Belt proved to be the best solution. Early investigations considered the use of multiple centrifugal discharge type bucket elevators but this would mean high speed operation and consequential damage to the grain. The demonstrated gentleness of the Sandwich Belt concept was well exploited in this important application.

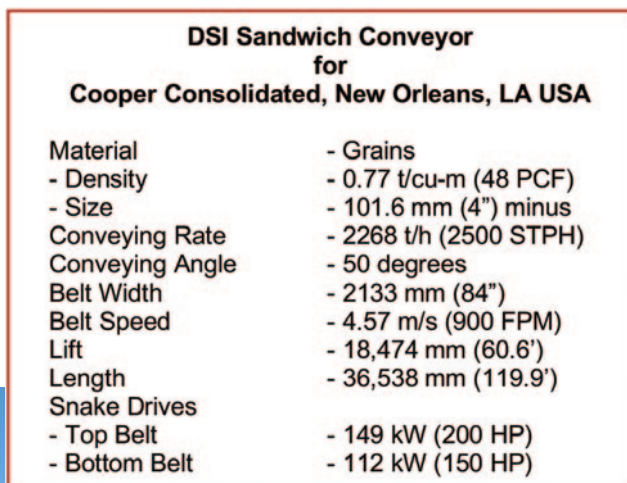


FIGURE 6 Sandwich Conveyor at Mid-Stream Transfer Terminal.

THE FUTURE

Though demonstrated to be very gentle with grain and well proven at very high volumetric rates the number of grain handling installations can be counted on one hand. The operating units do have a very good customer satisfaction, and plans are already under way for midstream transfer barges with a more simplified arrangement thanks to the high angle, high-capacity capability of Dos Santos Sandwich Belt high angle conveyors.

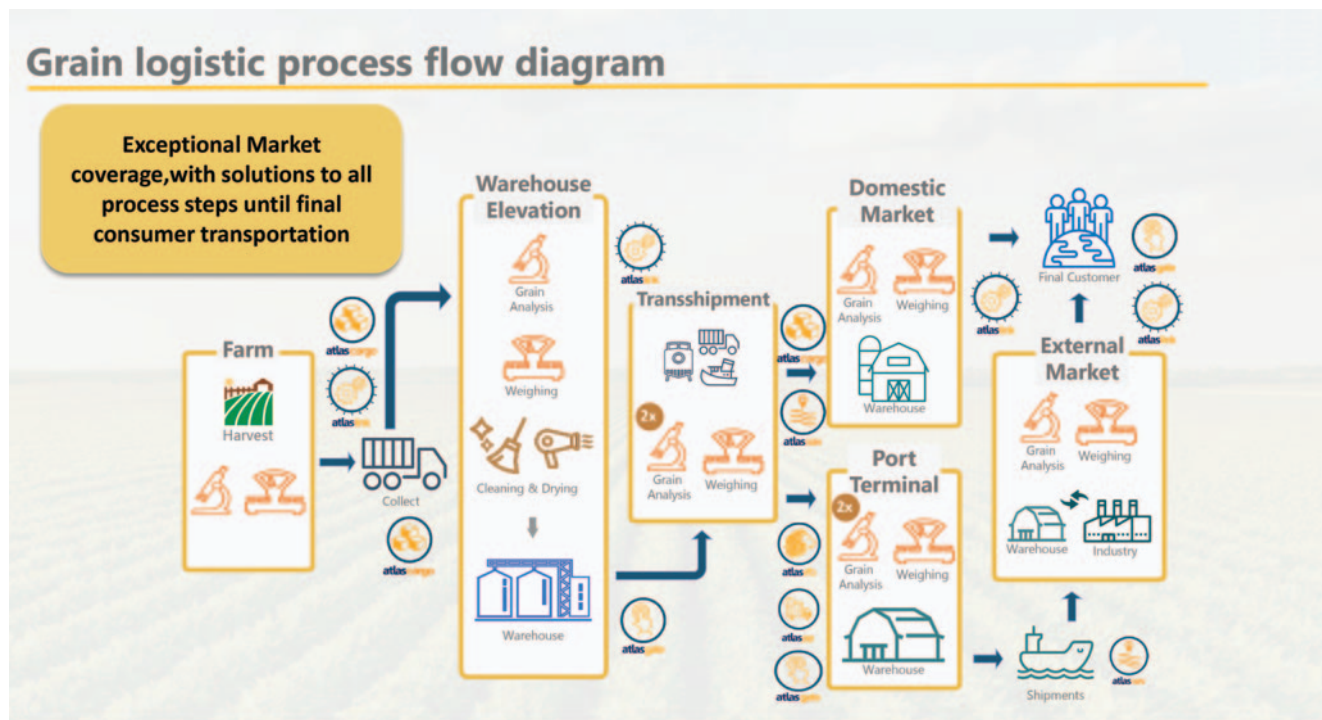


Negrini company, established in 1967, specializes in engineering and manufacturing a comprehensive range of grabs and buckets for rope machines and crawler mounted cranes; they are employed to do many jobs. Negrini buckets and grabs are very well-known for quality as well as for the very accurate and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

VIA TORRICELLI 4 - CASTELFRANCO E. (MO) - ITALY



Império Systems: revolutionizing agribusiness with innovation and technology



Brazilian company Império, with its advanced Atlas Cargo Pro system, is transforming the agribusiness market. Operating in key segments such as fertilizers, biodiesel, and with a strong presence in the grain sector, Império is an ideal choice for those seeking efficiency and cutting-edge technology. With a presence in all regions of Brazil, it operates in over 60 plants nationwide, and its expertise extends to clients across South America.

With a vision for the future, Império has already established a branch in Sorriso (Mato Grosso) and has ambitious plans to expand further, with three new branches planned for Mato Grosso do Sul, Paraná, and Rio Grande do Sul in the next two years. This continuous growth is the result of a 20-year success story, started by Angela and Sergio, who recognized a unique opportunity and turned it into a solid, respected company in the grain management systems market.

Império's Atlas Cargo Pro system is more than just software; it is a complete solution for managing the entire movement of grain trucks, from scheduling their arrival at the plants to ensuring security against fraud, with automation that brings precision and confidence at every stage of the process. Império integrates its systems with the leading ERPs in the market, offering clients strict and efficient fiscal control.

Evolution is Império's motto. That's why it invested one million dollars to

completely transform its product. Today, Império offers a system with a modern design, fully web-based, and ready to operate in the cloud in a SaaS model, providing flexibility and access from anywhere, at any time. In recent years, Império has restructured to grow even stronger: it created a development factory focused on innovations, expanded its support to 24x7, and assembled a team of specialists ready to deliver projects with excellence.

Império's commercial strategy is powerful and segmented to serve both major players and small warehouses, bringing the modernity and efficiency that everyone needs to thrive. The strategic partnerships it has established with automation, construction, and infrastructure companies allow it to offer the complete solution that clients need, with the convenience of a single supplier.

Império is always ahead, and that's why it

is developing a new line of maintenance and prevention services for automation equipment, addressing a growing market demand.

Império firmly believes that its system will be the pillar that will elevate the Brazilian agribusiness sector to a new level, integrating it into the technological boom that is already revolutionizing agriculture.

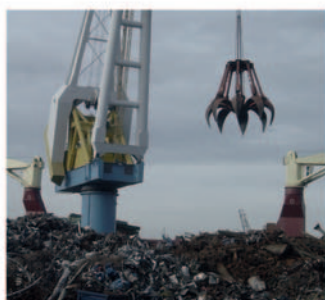
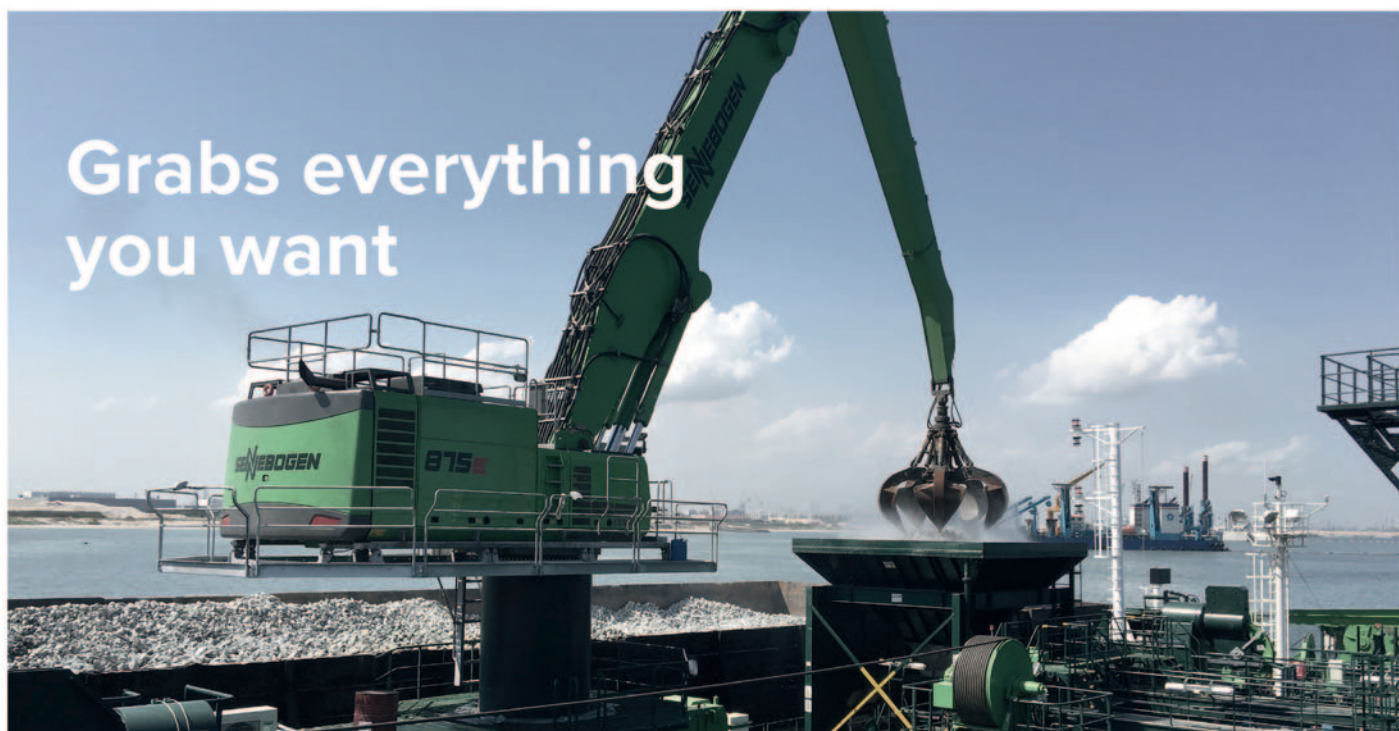
ABOUT IMPÉRIO

Império's business is intelligence and its history is intertwined with the advance of technology and information technology in Brazil. For over 20 years, Império has been researching, developing and implementing technologies and solutions for the process automation market. It offers a wide range of products for agribusiness, especially with regard to the logistics management of the grain flow chain.

Império is a 100% Brazilian company, recognized widely for its solutions.

Numbers overview





Our products

For all kinds of bulk handling

- Cactus Rope Grabs
- Clamshell Rope Grabs
- Hydraulic Cactus Grabs
- Hydraulic Clamshell Grabs
- Hydraulic Log Grabs
- Hydraulic Demolition & Sorting Grabs
- Quick Change System
- Multipurpose Spreader

All our grabs are custom made, designed and produced to our customers requirements.

J&B Grabs are highly efficient for large volume and low deadweight handling.

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HEMC GmbH: setting new standards in grain storage and port terminal solutions



INTRODUCTION

With almost 100 years of experience, HEMC GmbH, headquartered in Vienna, Austria, has become a cornerstone in the grain storage, handling, and processing industry. Its legacy is built on a profound understanding of the industry's needs and a commitment to delivering tailored

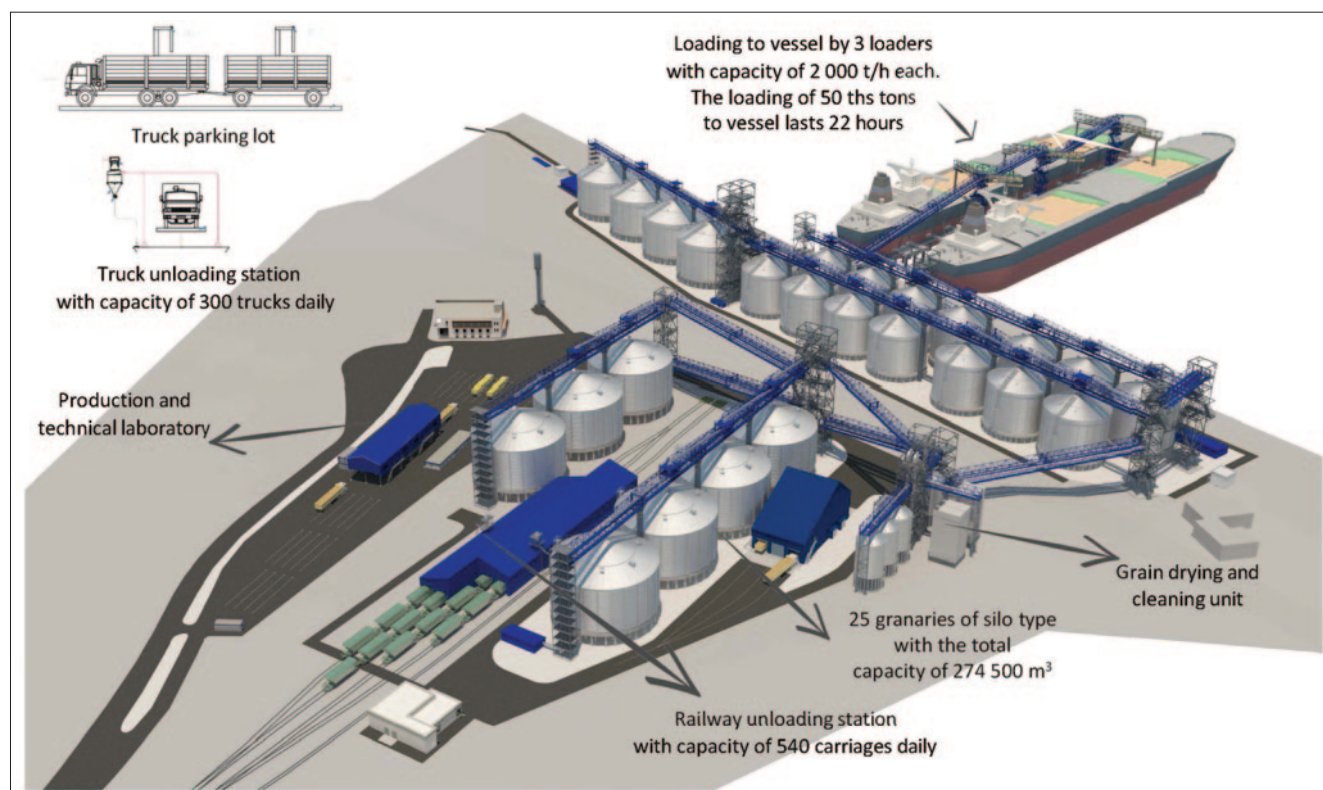
solutions that enhance operational efficiency and safety across global markets.

EXPERTISE IN PORT TERMINAL SOLUTIONS

HEMC GmbH is renowned for its comprehensive approach to the design and implementation of grain port terminals. Its methodology is anchored in a detailed

analysis of every aspect of port logistics, ensuring that each terminal it designs is optimized for performance:

- ❖ **Transport integration:** HEMC assesses rail and road logistics to ensure seamless connectivity and efficient throughput.
- ❖ **Marine traffic analysis:** HEMC's team



considers vessel dimensions, waterway characteristics, and channel access to optimize terminal layout.

- ❖ **Construction feasibility:** by navigating local regulations and spatial constraints, HEMC ensures compliance and practicality in its designs.
- ❖ **Berth and crane systems:** HEMC's thorough evaluations ensure that grain trading operations, including seasonal variations, are supported by robust infrastructure.

HEMC leverages its extensive technical expertise and deep industry knowledge to provide precise recommendations on storage systems, conveying equipment, and shiploading solutions. Its involvement spans from the selection of appropriate equipment to guiding investors through tender processes, ensuring informed decisions at every stage.

GLOBAL REACH AND PROVEN SUCCESS

HEMC has successfully executed a wide array of projects, ranging from smaller river ports to large deep-water sea terminals with capacities exceeding 10 million tonnes annually. Its projects span across the Mediterranean, Black Sea, Baltic Sea, and other critical regions, each reflecting its commitment to delivering region-specific solutions that address local challenges.

COLLABORATION WITH INDUSTRY LEADERS

In addition to its proprietary technologies, such as the **Portsweeper** — a high-capacity silo sweeping system designed for superior cleanout efficiency — HEMC collaborates with leading solution providers to bring the best technologies to its clients. For instance, its partnership with **Vibrafloor**, specialists in unloading systems for challenging materials, exemplifies its commitment to offering advanced solutions that meet diverse client needs. These collaborations, along with others, enable HEMC to provide a comprehensive suite of technologies tailored to the specific requirements of each project.

WHY PARTNER WITH HEMC?

HEMC GmbH's in-depth understanding of the grain handling industry, combined with its expertise in both technology and market dynamics, ensures that it delivers solutions that are not only effective but also economically viable. Each project benefits from HEMC's meticulous approach, ensuring optimal equipment selection and system design.

CONCLUSION

For customers planning a new terminal, upgrading existing facilities, or seeking innovative equipment solutions, HEMC GmbH is ready to support their goals. Its longstanding experience, combined with a global perspective and strategic partnerships, positions it to deliver the high standards of quality and efficiency that the industry demands.



Efficient grain handling with SENNEBOGEN material handlers



*PK Terminal
handling grain in
the Port of Muuga with
a SENNEBOGEN 875.*

Efficiency and reliability in grain handling are crucial to the success of the agricultural sector and logistics companies. In view of the constantly increasing demand for grain products and the associated need to move large quantities quickly and precisely, modern material handlers such as those offered by SENNEBOGEN Maschinenfabrik GmbH are used.

The changing transportation routes in connection with the Ukraine war also require investments in new terminals and handling technology.

SENNEBOGEN material handlers offer a significant advantage in terms of performance, flexibility and safety in grain handling, both in port facilities and at transfer stations.

SENNEBOGEN: THE COMPANY

SENNEBOGEN Maschinenfabrik GmbH, a family-owned company based in Germany, has made a name for itself as a leading supplier of material handling equipment since it was founded in 1952. The company develops and produces machines that are used in a wide range of industries, including construction, recycling and port handling. However, the application of its material handlers in grain handling, an area that

places specific demands on machines, is particularly noteworthy.

REQUIREMENTS IN GRAIN HANDLING

Grain handling presents special challenges that go far beyond the mere movement of bulk goods. Due to the sensitivity of grain to damage and contamination, it is necessary for the machines used for handling to ensure a high level of precision and care. In addition, the handling of large volumes is required in order to make the processes as efficient as possible.

Important factors in grain handling are

- ❖ **Speed:** as large quantities of grain have to be moved within a short time, a high handling speed is essential. Loading has to be stopped as soon as it starts raining.
- ❖ **Gentle handling:** to maintain the quality of the grain, damage caused by mechanical stress must be avoided. SENNEBOGEN has developed a function to avoid grabs being forced into the material.
- ❖ **Dust reduction:** when handling bulk materials such as grain, it is important to minimize dust generation in order to keep the working environment safe and losses low.

- ❖ **Flexibility:** the machines must be able to handle different types of grain and different handling situations.

SENNEBOGEN MATERIAL HANDLERS IN USE

SENNEBOGEN material handlers, especially its harbour cranes and telescopic handlers, are ideally suited for grain handling. They are characterized by a combination of robustness, precision and user-friendliness. SENNEBOGEN has always paid the greatest attention to the availability of its machines, which is reflected in its service friendliness. A particular highlight is the SENNEBOGEN 875 E Hybrid, a powerful material handler that is ideal for use in grain handling and has been developed for use with Handysize ships. With quick-change systems, the grabs can be exchanged in the shortest possible time and adapted to the appropriate variety.

SENNEBOGEN 875 E HYBRID

The SENNEBOGEN 875 E Hybrid is an example of the company's innovative strength. This machine combines state-of-the-art technology with ecological efficiency. The hybrid drive ensures considerable fuel savings in the region of



THE POWER OF GREAT BULK HANDLING

Reduced handling costs, shorter turnaround times, reliability and flexibility: NemaMag grabs give dry bulk terminals throughout the world that competitive edge they need in today's demanding market.

Driven to achieve the best performance, we closely listen to our clients' needs. For a hundred years, NemaMag's innovative grabs make it possible to realize the highest productivity at the lowest costs.

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35% and thus a reduction in operating costs. In grain handling, this machine proves its worth thanks to its enormous reach and ability to easily reach areas that are difficult to access. The use of cab elevations such as the SENNEBOGEN Skylift provides the operator with optimum visibility of the working area.

With a maximum reach of up to 29 metres, the 875 E Hybrid is able to handle large handling volumes quickly and efficiently. The high load capacity and precise control make it possible to ensure maximum efficiency even with sensitive goods such as grain.

The 875 is also available with a purely electric drive and — when using green electricity — makes handling climate-neutral.

The advantages of SENNEBOGEN material handlers are obvious:

- ❖ **Economic efficiency:** thanks to the hybrid drive and the durable design, operating costs are lower compared to conventional machines. The reduction in fuel consumption also

contributes to economic efficiency.

- ❖ **Environmental friendliness:** the lower fuel consumption leads to reduced CO₂ emissions, which is particularly important in the context of stricter environmental regulations in the logistics sector. In addition to that, SENNEBOGEN machines can be operated with Biooil and HVO Diesel.
- ❖ **High flexibility and mobility:** the ability to move the machines quickly and easily to different locations is another plus point. This is particularly important when different handling situations follow each other in quick succession.

FUTURE PROSPECTS AND FURTHER DEVELOPMENTS

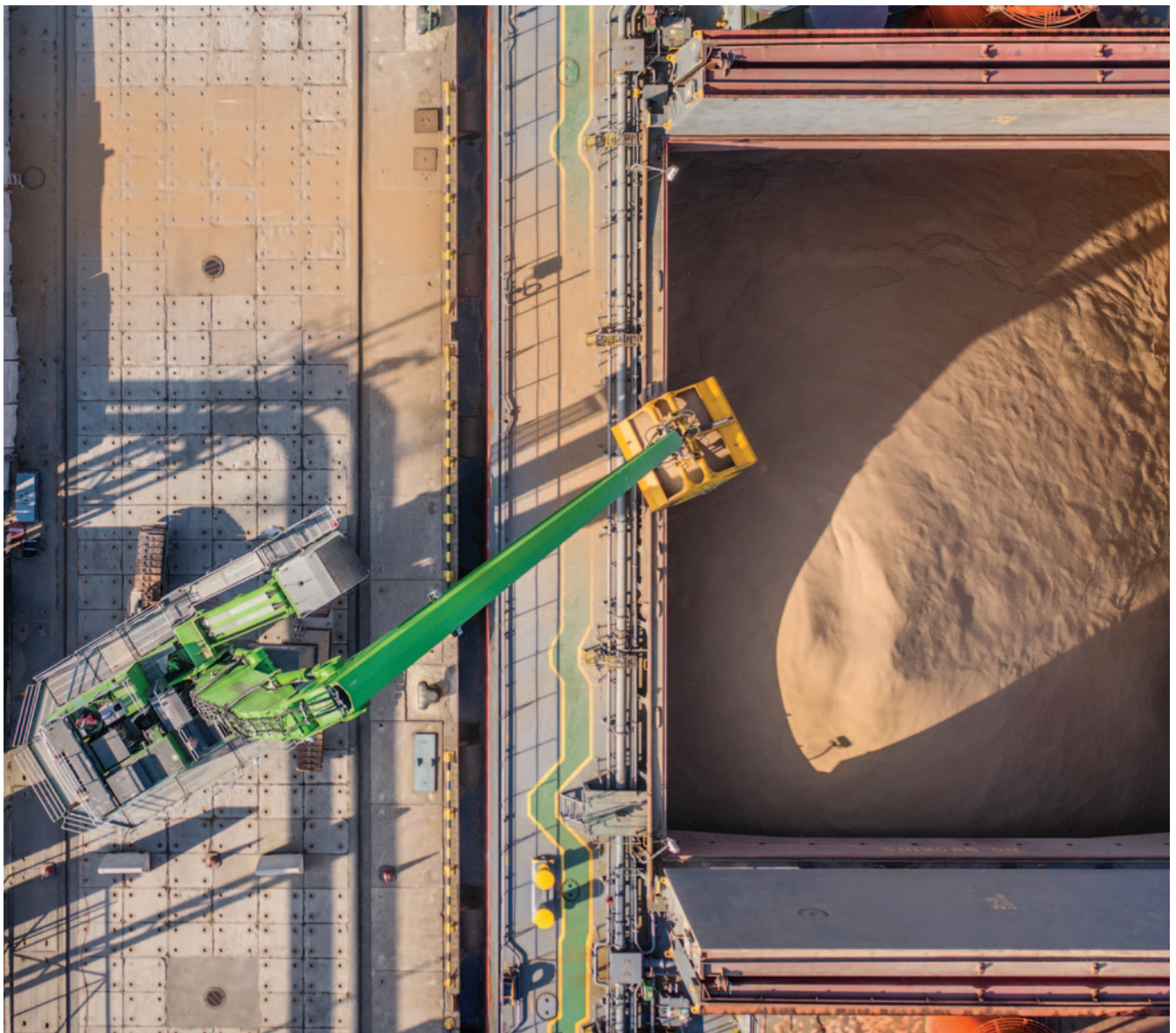
The continuous further development of SENNEBOGEN machines is aimed at offering even more efficient and environmentally friendly solutions for material handling. In view of the increasing global demand for grain, the demand for such specialized material handlers will

continue to grow.

Future technologies could enable even more precise control, digital evaluation of operations and automation of handling processes, further reducing personnel costs and increasing efficiency at the same time. SENNEBOGEN is also constantly investing in the continuous optimization of its drives to become even more environmentally friendly and further reduce its ecological footprint.

The use of SENNEBOGEN material handlers in grain handling is a sensible investment for companies operating in this sector. With innovative machines such as the SENNEBOGEN 875 E Hybrid, the company offers solutions that meet the high demands of this special handling task. The combination of efficiency, flexibility and environmental awareness makes these machines an indispensable part of modern logistics and agricultural operations.

In a world that places increasing emphasis on sustainability and efficiency, these machines are a step in the right direction.



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Customized Bulk Handling Solutions

Take advantage of our expertise and long-term market experience for your next project. We help you reduce your handling costs.

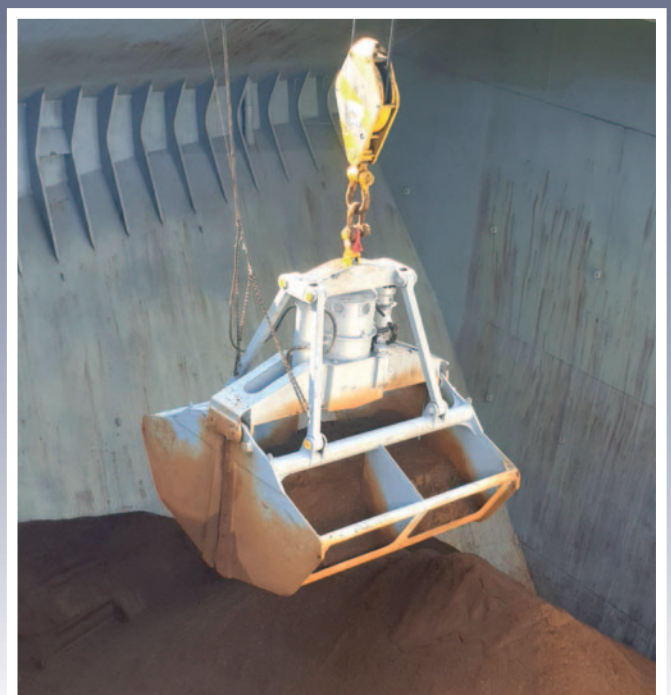
Our services include

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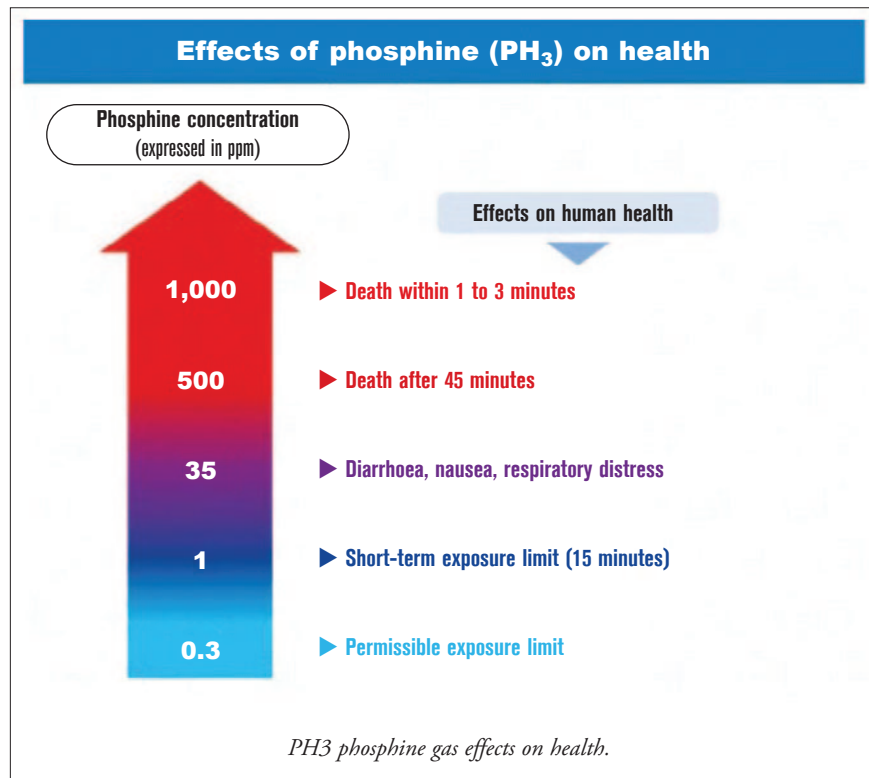
Online monitoring of remaining Phosphine (PH₃) levels in bulk carrier holds

Phosphine PH₃ is the most widely used fumigant in the world, ideal for fumigating mills, industries, factories, silos, warehouses, containers, among many others. In addition, it is the most recommended product for fumigation to control and prevent insect pests in food grains.

However, its use requires care to avoid exposing the health of workers who work directly in such places and hazard environments. For this reason, the Chilean Maritime Authority has imposed strict regulations requiring the permanent monitoring and recording of phosphine levels (PH₃ in ppm) both in grains in the holds of ships and in silos or other storage places at port terminals.

Puerto Panul is the largest unloading terminal for food grains in Chile, located in the central area of that long country, facing the Pacific Ocean. The port unloads 3.5 million tonnes of food grains per year (wheat, corn and soybeans). It has therefore had to carry out a development project for the registration and monitoring in real time of the levels of phosphine of the more than 100 ships that it receives and must unload each year.

The system has been developed in partnership with the company ENCRYPTA CHILE, and consists of the installation of autonomous equipment which adheres magnetically to the top of the bulkhead of each of the holds of bulk carriers to be



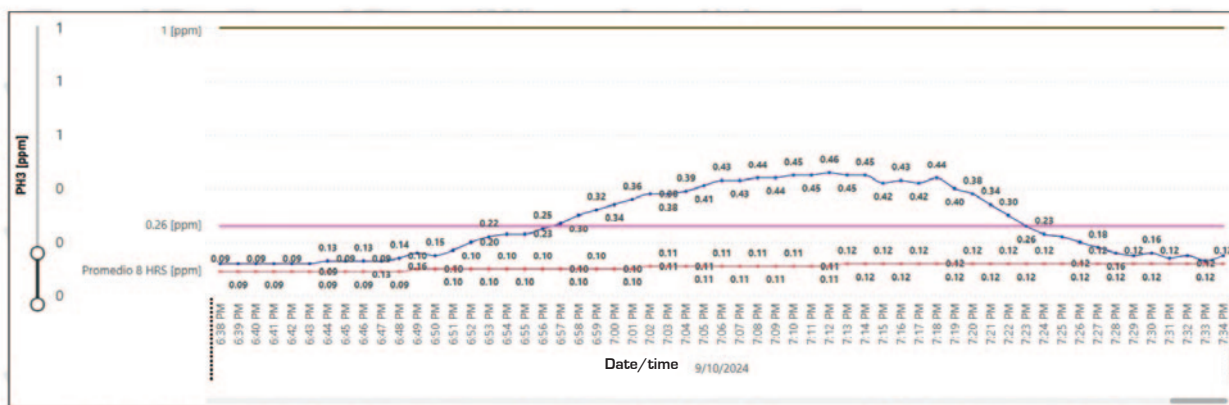
unloaded, or is installed in the silos where it may be stored or besides the conveyor belts where the grain pass thru.

These sealed devices have Phosphine, Temperature and Humidity sensors. Data is collected and sent via GSM (Global System for Mobile Communications) minute-by-minute. The information from each device is recorded separately on a private access web pages, where historical

records can be either reviewed in charts or downloaded spreadsheets. These devices have rechargeable batteries. It efficiently uses allow up to ten days of communication.

“We are very satisfied with the results obtained, because now we have real-time information on the levels of Phosphine that may still remain in residual form in the holds of ships, both those ships that are

Levels of PH₃ in the ‘Ardelt Building’ (latest recording 12 September 2024)



Mediciones en el intervalo de 12 mas

12 Hrs

24 Hrs

36 Hrs

72 Hrs

Turnos

Mañana

Noche

Tarde

Ubicación equipo

● Edificio Ardel

○ Edificio FAM

○ Torre transferencia

Volver atrás

Mediciones

1 de 3

117%

Microsoft Power BI

117%

Cristian Valenzuela.



waiting on the line, as well as those that are being unloaded” says Cristian Valenzuela, CEO of Puerto Panul.

The system allows setting an alarm system, to calculate the average levels of Phosphine during the last 15 minutes (must not exceed 0.26ppm) or during the last eight hours (must not exceed 1.0ppm) according to the international standard also in force in Chile.

If at any time the levels of phosphine exceed the permitted ranges, the system automatically sends alert messages via SMS to the mobile phones of those responsible for the operation, as well as sending emails

to the predetermined email addresses.

“This monitoring and alarm system gives us greater peace of mind in the care and safety of our workers, preventing them from being exposed to any hazard environment where there are levels of

phosphine that may be bothersome or dangerous to their health. With these tools, in addition to meeting the demands of the authority, we can be more focused and take important operational decisions immediately,” concludes Valenzuela.

Last 3 days at Panul

Archivo Editar Ver Insertar Formato Datos Herramientas Extensiones Ayuda

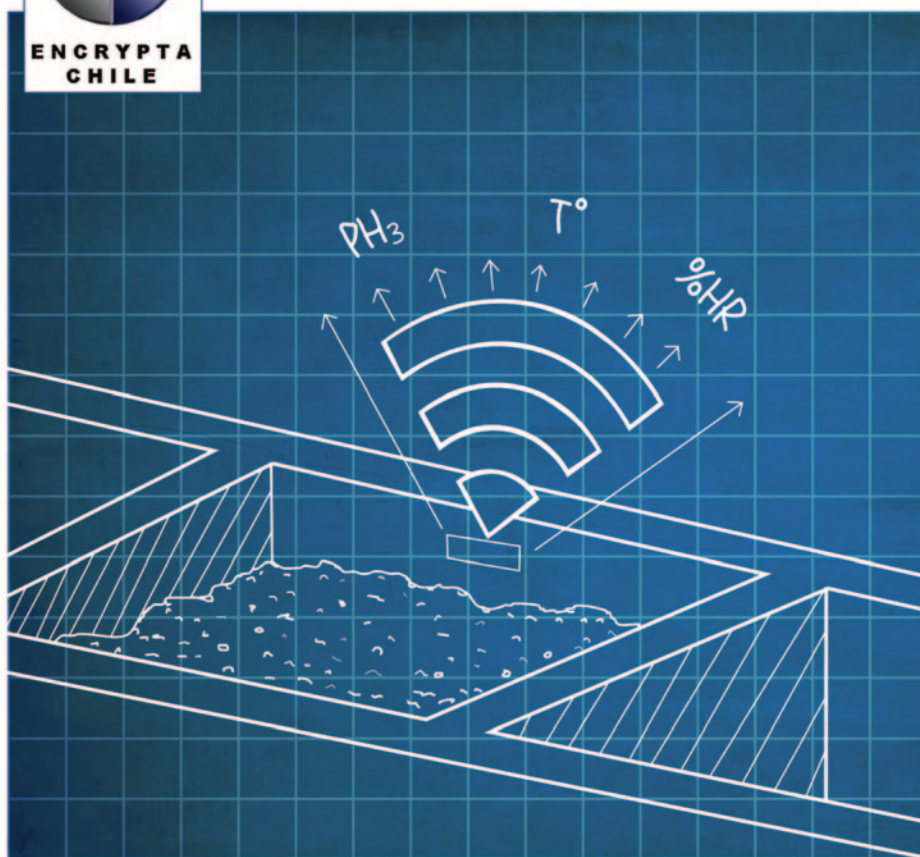
100%

	A	B	C	D	E
	Hora	Equipo	Promedio 15 MIN (ppm)	Promedio 8 HRS (ppm)	Turno
1400	2024-09-11 20:53	#20 - Edificio Ardelt	0,02	0,03	Tarde
1401	2024-09-11 20:54	#20 - Edificio Ardelt	0,02	0,03	Tarde
1402	2024-09-11 20:53	#20 - Edificio Ardelt	0,03	0,03	Tarde
1403	2024-09-11 20:52	#20 - Edificio Ardelt	0,03	0,03	Tarde
1404	2024-09-11 20:51	#20 - Edificio Ardelt	0,03	0,03	Tarde
1405	2024-09-11 20:50	#20 - Edificio Ardelt	0,03	0,03	Tarde
1406	2024-09-11 20:49	#20 - Edificio Ardelt	0,03	0,03	Tarde
1407	2024-09-11 20:48	#20 - Edificio Ardelt	0,03	0,03	Tarde
1408	2024-09-11 20:47	#20 - Edificio Ardelt	0,03	0,03	Tarde
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1411	2024-09-11 20:44	#20 - Edificio Ardelt	0,04	0,03	Tarde
1412	2024-09-11 20:43	#20 - Edificio Ardelt	0,05	0,03	Tarde
1413	2024-09-11 20:42	#20 - Edificio Ardelt	0,05	0,03	Tarde
1414	2024-09-11 20:41	#20 - Edificio Ardelt	0,05	0,03	Tarde
1415	2024-09-11 20:40	#20 - Edificio Ardelt	0,06	0,03	Tarde
1416	2024-09-11 20:39	#20 - Edificio Ardelt	0,06	0,03	Tarde
1417	2024-09-11 20:38	#20 - Edificio Ardelt	0,06	0,03	Tarde
1418	2024-09-11 20:37	#20 - Edificio Ardelt	0,06	0,03	Tarde

+ PH3 Edificio FAM PH3 Torre Transferencia PH3 Edificio Ardelt



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www.encrypta.cl/ph3

Port of Vancouver: Canada's premier gateway for grain exports to the Indo-Pacific and beyond

Canada and its vast prairie region continues to be an important global food source that helps to feed countless communities around the world by providing reliable access to high-quality grains.

Every year more than half of Canada's marine grain exports pass through the Port of Vancouver in British Columbia on their way to world markets — with terminals loading 32mt (million metric tonnes) of bulk and containerized grain onto hundreds of ships in 2023.

The Port of Vancouver is Canada's largest and most diversified port, and its 29 terminals handled a record 150mt of goods in 2023 across four sectors (bulk, breakbulk, container, auto), and welcomed a record 1.24 million passengers at the Canada Place cruise terminal. There are nine bulk terminals and four container terminals at the port able to handle grain exports.

"Grain has long been a core sector connecting the Canadian Prairies and the Port of Vancouver," said Doug Mills, the bulk sector's Senior Account Representative at Vancouver Fraser Port Authority, the federal agency mandated

PORT OF VANCOUVER TERMINALS

BULK GRAIN TERMINALS

- ❖ **Alliance Grain Terminal (AGT), South Shore Burrard Inlet:** handles wheat, canola, grain and other grain products.
- ❖ **Cargill, North Shore Burrard Inlet:** handles wheat, durum, canola, barley and grain by-products.
- ❖ **Cascadia, South Shore Burrard Inlet:** handles wheat, durum, canola, barley, rye, oats and by-products.
- ❖ **Fibreco, North Shore Burrard Inlet:** handles agricultural products such as peas and lentils, as well as wood pellets.
- ❖ **Fraser Grain Terminal, Fraser River Surrey:** handles bulk and containerized grain products including wheat, barley, oil seeds, pulses and other specialty crops.
- ❖ **G3 Terminal Vancouver, North Shore Burrard Inlet:** primarily handles wheat, soybeans, canola, peas and specialty crops.
- ❖ **Pacific Elevators, South Shore Burrard Inlet:** handles canola, flax, peas, wheat and other grain products.
- ❖ **Richardson International, North Shore Burrard Inlet:** handles wheat, canola, barley, rye, flax, grain and feed products.
- ❖ **Vancouver Wharves, North Shore Burrard Inlet:** handles bulk agri-products.

CONTAINER TERMINALS

- ❖ **DP World's Centerm, Burrard Inlet** in Vancouver
- ❖ **GCT's Deltaport, Roberts Bank** in Delta.
- ❖ **DP World's Fraser Surrey Docks, Fraser River** in Surrey.
- ❖ **GCT's Vanterm, Burrard Inlet** in Vancouver.





with enabling Canadian trade through the Port of Vancouver, while protecting the environment and considering local communities.

“The port’s grain handling facilities are among the most productive in any gateway in the world — successfully handling ever increasing volumes of agricultural exports. We saw the terminal’s capability in action last year when they were able to handle a sudden volume increase without impacting port fluidity, after grain exports increased almost 40% year-to-year.”

Canadian grain export volumes increased sharply in 2023 because a bumper crop season was preceded by a drought-affected season, which combined with Russia’s invasion of the Ukraine disrupting international trade flows and increasing demand for Canadian grain. For example, Q1 2023 wheat exports through the port were up 134% led by Algeria which had a 356% jump.

WAVE OF INVESTMENT IN THE GATEWAY

The Vancouver gateway has experienced a major wave of investment over the past decade and a half, with billions of dollars invested to build capacity, reliability and resilience. When it came to handling grain,

this includes:

- ❖ Construction of the new G3 Terminal, a state-of-the-art facility and the first new grain terminal constructed at the Port of Vancouver in decades.
- ❖ Major upgrades to the Richardson International, Viterra Pacific, Fraser Grain, AGT, Cascadia and Fibreco terminals.
- ❖ Road and rail improvements including improving rail access to the North Shore terminals, which handle about half of the grain that moves through the port.
- ❖ Upgrades to the Vanterm and Centerm container terminals, and progress for the Roberts Bank Terminal 2 — supporting growing containerized grain exports.

This investment has supported a decade of growth for grain exports through the port and means Vancouver terminals have the capacity needed to handle expected growth well into the next decade. Grain volumes have steadily grown from around 19mt in 2010 to more than 30mt in 2023.

The port’s grain exports averaged just under 30mt from 2019–2023 — with China and Japan being the two largest

export markets respectively.

SUPPORTING EVOLVING MARKET NEEDS

“Another trend we have seen emerge over the past decade is growth in containerized exports of grain and food products going through the port,” Mills says. “About a quarter of agricultural products such as peas, lentils and soybeans by value now move through the port in containers — or 10% to 15% of our total grain volumes.”

Wheat is the largest grain by volume exported through the port and accounts for about half of annual grain exports—as well as 5–6% of the world’s total wheat exports. Other major grains moved by through the Port of Vancouver include canola (seed and oil), specialty crops such as peas and lentils, and barley.

The peak season for Canadian grain exports is fall and winter, and the Prairies’ latest harvest is now making its way to world markets through the Port of Vancouver. Decades of investment in infrastructure, relationships and supply chains mean the port is ready to support growing grain exports at a time when global instability means the world is increasingly turning to Canada as a reliable source of food.

Grabbing grain efficiently – with help from Tobu Jukogyo Co. Ltd.

Japanese company Tobu Jukogyo Co. Ltd. specializes in the manufacture and supply of grabs, hoppers and coil lifters. The company's grabs and hoppers are ideal for grain handling operations.

POWERFUL AND EFFICIENT GRABS

Tobu Jukogyo Co. Ltd.'s grab buckets for handling grains can be used at ports, factories, offshore facilities and onboard ships.

RADIO-CONTROLLED SINGLE-ROPE BUCKET

To operate this grab, users can simply hang the grab bucket on the hook of the crane and start working speedily.

Operators can work safely by remote wireless operation with a remote control device. The wireless transmitter and receiver are made in Japan exclusively for Tobu Jukogyo Co. Ltd.'s grab bucket; they are highly reliable and can be used continuously for a long time with a short time charge.

Since only one hydraulic cylinder is in the centre of the grab bucket, it can take a long stroke and exert a strong gripping force.

Due to its simple structure, normal maintenance is easy and running costs can be reduced.

Standard capacity of grab for ship's crane is 12m³ with volume adjusting plates.



Radio-controlled single-rope bucket.



Electro hydraulic type grab.

RADIO-CONTROLLED SINGLE-ROPE TYPE FOR GRAINS

There is a grab bucket specialized for grains and light cargoes.

It has fewer sheaves, and less height than the standard model.

It offers a faster cycle time in unloading operations.

ELECTRO HYDRAULIC TYPE

Operated by a hydraulic system that is driven by two electric motors which make it possible to grab cargo with strong power. It is possible to handle a wide variety of cargoes, including grain.

In case of emergency, two motors can be used — if one motor breaks down, the second can be used. The working cycle time would be shorter, due to the shorter height.

STANDARD MODEL FOR GENERAL CARGO

This unit is suitable for grain, coal, cement clinker, fertilizer, iron ore and more.

It has volume adjusting plates on each shell. Specific capacities available are: 15m³,

14m³, 13m³ and 12m³ and 6m³ as minimum.

FOUR-ROPE TYPE FOR POWDERY BULK

The clamshell grab bucket grabs the cargo by closing each cutting edge. Ideal cargo for this grab bucket is powdery and granular cargo such as limestone, fertilizers and ores.

By adding claws to improve the bite ability, a rubber cutting edge to prevent leakage, and stainless steel lining to prevent adhesion, according to the nature of the cargo, it is possible to further improve cargo handling efficiency.

The grab's capacity is adjustable according to the crane.

HOPPERS

All types of bulk cargo, including grains, coal, ores, and biomass fuels, are loaded into dump trucks and containers. The cargo loading status can be visually confirmed from the control room. Automatic operation to discharge a fixed amount is also possible. There are also types equipped with dust collectors for cargo with a lot of dust. The machine can be towed by a trailer or wheel loader.



Four-rope grab for powdery bulk.

Bulk handling hoppers.



Grain storage and transportation systems with Henan SRON Silo Engineering Co., Ltd.

As a bulk commodity, grain goes through many stages from being in the fields to becoming commercial grain, write *Wen Peng and Du Zhiqing*. Some stages may be around the processing plant, and some may require a large amount of transfer process, or even travel across the ocean to the processing plant. No matter what the situation is, it will involve the storage, transportation, cleaning, loading and unloading of bulk grains; Henan SRON Silo Engineering Co., Ltd. is a high-tech and professional company specializing in the storage and transportation of bulk grains.

The storage and transportation of bulk grains mainly includes storage, transportation and other links. At present, the storage of bulk grains is mainly achieved through warehouse storage. Storage is mainly divided into two types, one is a horizontal bin and the other is a silo.

Horizontal bins are mostly made of concrete structures. At present, tall horizontal bins are often used to store bulk grain. Its grain storage line can reach more than six metres, and its size can be designed according to actual needs while meeting various fire protection and construction regulations. Compared with silos, horizontal bins occupy a larger area, but their construction is relatively easy. Bulk grain can be transported in and out of the bin through mobile and fixed conveying equipment.

Another type of storage equipment is the silo. The biggest advantage of the silo is that it occupies a small area and has a high degree of mechanization for loading and unloading grain from silos.

Silos are the flagship product of Henan SRON Silo Engineering Co., Ltd. The main types of silos include concrete silos and steel silos. The main differences are in composition, cost and service life. Concrete silos are mainly composed of reinforced concrete. Their construction period is long and the investment is large, but their service life is also longer. The other is steel silos.

The current steel silos are mainly composed of corrugated bolted steel silos and spiral steel silos. The raw materials are all galvanized steel sheets, but the processing and assembly methods are different. Steel silos are the flagship product of Henan SRON Silo Engineering Co., Ltd. The storage capacity of a single silo ranges from 50 tonnes to 15,000 tonnes. Users can choose the appropriate



steel silo model and category according to their own needs. Henan SRON Silo Engineering Co., Ltd. can design different silo types and plate selections for different regions and usage scenarios. Currently, the galvanizing amount of the steel plates used by the company ranges from 275g/m² to 600g/m².

According to different usage environments, the seismic and wind-resistant strength designs of the silos used are also different. Henan SRON Silo Engineering Co., Ltd. can design steel silos with seismic levels of 3–10 or even higher based on different on-site usage scenarios. Steel silos with wind resistance levels at different wind speeds from 10km/h to 300km/h can also be designed.

For systematic silo storage systems, Henan SRON Silo Engineering Co., Ltd. is equipped with corresponding intelligent management systems according to client needs, such as temperature measurement, ventilation, grain cooling, fumigation, air conditioning, etc., which can realize online,

real-time management and control of the entire storage system, and more directly understand and manage the entire storage system.

During the transportation of bulk grains, Henan SRON Silo Engineering Co., Ltd. will provide corresponding transportation equipment, such as belt conveyors, bucket elevators, scrapers, clearance machines, ship-unloaders, shiploaders, unloading and tilting machines, fully automatic loading systems and other equipment or systems. It can combine the operation of all conveying equipment with fully automatic control and on-site control to truly realize fully automatic operation.

In the storage, transportation, management and automated control of bulk grains, Henan SRON Silo Engineering Co., Ltd. has rich experience in project design, construction and management, which can ensure the safety of grain storage to the greatest extent, and ensure the reliability of system operation and intelligent management.



VIBCO Vibrators systems optimize flow, improve efficiency and cut costs

VIBCO Vibrators offers solutions to improve flow in the grain industry. The company, which has been in business since 1962, provides numerous benefits such as improved grain flow, increased efficiency, cost savings, enhanced safety, quality assurance, and superb versatility.

Vibration technology from VIBCO supports the agriculture market. Its advanced vibration equipment ensures agricultural production processes are streamlined, saving valuable time and increasing profitability at every stage.

OPTIMIZED GRAIN FLOW

From seeding and tending to harvesting, storing, and transporting, VIBCO vibration technology guarantees a consistent and smooth flow of grains through bins, hoppers, and chutes. It prevents clumping, clogging, and bridging, which can disrupt grain movement in processing and storage facilities. VIBCO systems eliminate hang-ups and maximize productivity.

ENHANCED EFFICIENCY

By promoting seamless grain flow and preventing blockages, VIBCO vibrators significantly boost operational efficiency. They reduce downtime caused by manual clearing of blockages or equipment malfunctions due to poor flow. Its vibration technology prevents build-up, removing the need for risky manual interventions and ensuring efficient grain storage.

COST SAVINGS

VIBCO Vibrators contribute to substantial cost savings by minimizing product waste, reducing energy consumption, and lowering maintenance costs. Its systems enhance the efficient use of equipment and resources in grain handling and processing operations, optimizing overall profitability.



MANY BENEFITS OF VIBCO SOLUTIONS

VIBCO has the expertise for all grain handling needs, and has a strong focus on safety. Its vibrators eliminate the need for manual intervention, ensuring grains flow smoothly and consistently. They facilitate a smooth and consistent flow of grains, improving workplace safety by reducing the need for manual intervention in potentially hazardous situations. This lowers the risk of accidents related to equipment blockages and overflows. Maintaining a consistent flow of grains ensures uniformity and quality of the final product. VIBCO vibrators help achieve this by preventing segregation, uneven distribution, or grain damage during handling.

VIBCO offers a range of vibrators in various sizes and types, making them suitable for diverse applications in the grain industry. Tailored solutions meet specific needs; by understanding parameters such as bin material, shape, temperature,

moisture content, and discharge method, VIBCO recommends the perfect vibration solution for each operation.

Customer satisfaction is also a high priority. Dedicated sales engineers are available 24/7 to provide expert technical assistance and guidance.

NO GRAIN LEFT BEHIND

MOVE GRAIN FASTER, SMARTER & SAFER

VIBCO customers can bid farewell to the days of laboriously hammering steel and aluminium bins to coax material into flowing smoothly. No more relying on hammers, mallets, or shovels to clear grain bins and rail cars — the solution lies in the power of vibration. Preserve equipment and eliminate the headaches caused by dents, hammer rash, metal fatigue, bin deflection, and bin cracks, all of which chip away at the bottom line.

Grain sticking is often a result of friction between the material and the bin skin. Break through that friction barrier with the efficiency of vibration. By installing and utilizing a vibrator, users ensure a consistent and reliable flow of material through the discharge, whether in hoppers or rail cars. The effectiveness of conveyors and pipes is enhanced, maintaining continuous grain motion with minimal downtime, thereby maximizing profits.

WIDE RANGE OF SYSTEMS

VIBCO Vibrators offers a wide range of solutions, to meet an equally wide range of needs. These include:

- ❖ **Mounting feed bin vibrators:** these work on typical welded bins, as well as



typical bolted panel bins.

- ❖ **Big Berth units (and more) for trucks and trailers:** setting the standard since its inception in 1990, the Big Bertha line remains an industry favourite. Units in the Bertha line include the Original Big Bertha; the XL Bertha; Hydra Bertha; and the Air Bertha.
- ❖ **Traila™ Stik-It:** this mobile unit is meticulously crafted to lighten loads and simplify operations. Designed with the agricultural market in mind, the Traila™ offers superb efficiency in unloading trucks and tender hoppers. With its innovative suction activated base, the Traila™ effortlessly moves from hopper to hopper, adapting to the needs of the user, without the hassle of bolts or welding. VIBCO's expertise shines through with a specialized air fitting that seamlessly integrates with the truck's compression system. Switching between bins is a breeze with just an air hose — suction is activated with one straightforward switch and vibration with another.
- ❖ **Pneumatic and electric units** create an even flow of material. Among its pneumatic offerings are VIBCO's **pneumatic piston vibrators**, which provide high impact and efficient energy transfer to ensure a smooth flow of material through bins, chutes, weigh batchers and other bulk material applications. They really hit home with a compelling blend of low cost, reliability, power and a wide selection of models, making them a favourite in the grain industry. Electric options include the popular **Model DC-700 electric vibrator**. Designed to meet the versatile needs of the agriculture industry, the DC-700 boasts a single-phase operation with low amperage draw, available in both 12 and 24 volts. VIBCO's Silent Electric Vibrators are engineered to tackle a myriad of challenges, from expediting bulk material flow in agricultural tenders and trucks to facilitating smooth operations through bins, hoppers, and chutes.
- ❖ **VIBCO Rail Boss railroad shakers:** unloading rail cars is a dangerous, dirty and slow job. Using VIBCO vibration products helps the material flow faster and more consistently. Most of all, they clear the hopper cars completely so operators get all the product. A common misconception is that free-flowing material like grain does not

require vibration but VIBCO Railroad Carshakers knock out every grain. Depending on the level of usage, VIBCO railroad car vibrators generally pay for themselves within the first month of operation. They can attach by many methods depending on the rail car style. The most common is the wedge style which fits into the female wedge pocket on many hopper rail cars. Electric, hydraulic and pneumatic railcar shakers are all available.

- ❖ **Air cannons:** a super quiet blast of air from a VIBCO Air Cannon can prevent material from sticking to the bin walls. The unit's revolutionary piston valve will work safely and effectively to blast out clogs using normal plant air — just 80 to 125PSI is required. VIBCO's Air Cannon safeguards workers who previously were required to clear out the bin manually. It can handle many materials like wood chips, pellets, grain, cattle feed and any fine, coarse, granular, spongy or stringy materials. VIBCO's latest Air Cannons have been designed to be serviced where they are mounted. A VIBCO Air Cannon creates no flames or sparks. It can be blasted when needed up to every few seconds. They are inexpensive compared to other dischargers such as high pressure blast systems, air pads & vibrating bin bottoms. Mounting is simple — no structural reinforcement is needed. The air blast does not shake the structure, only the material. The Air Cannon is economical and silent, and can be used in any bin — square round, rectangular, steel, and others.

ABOUT VIBCO VIBRATORS

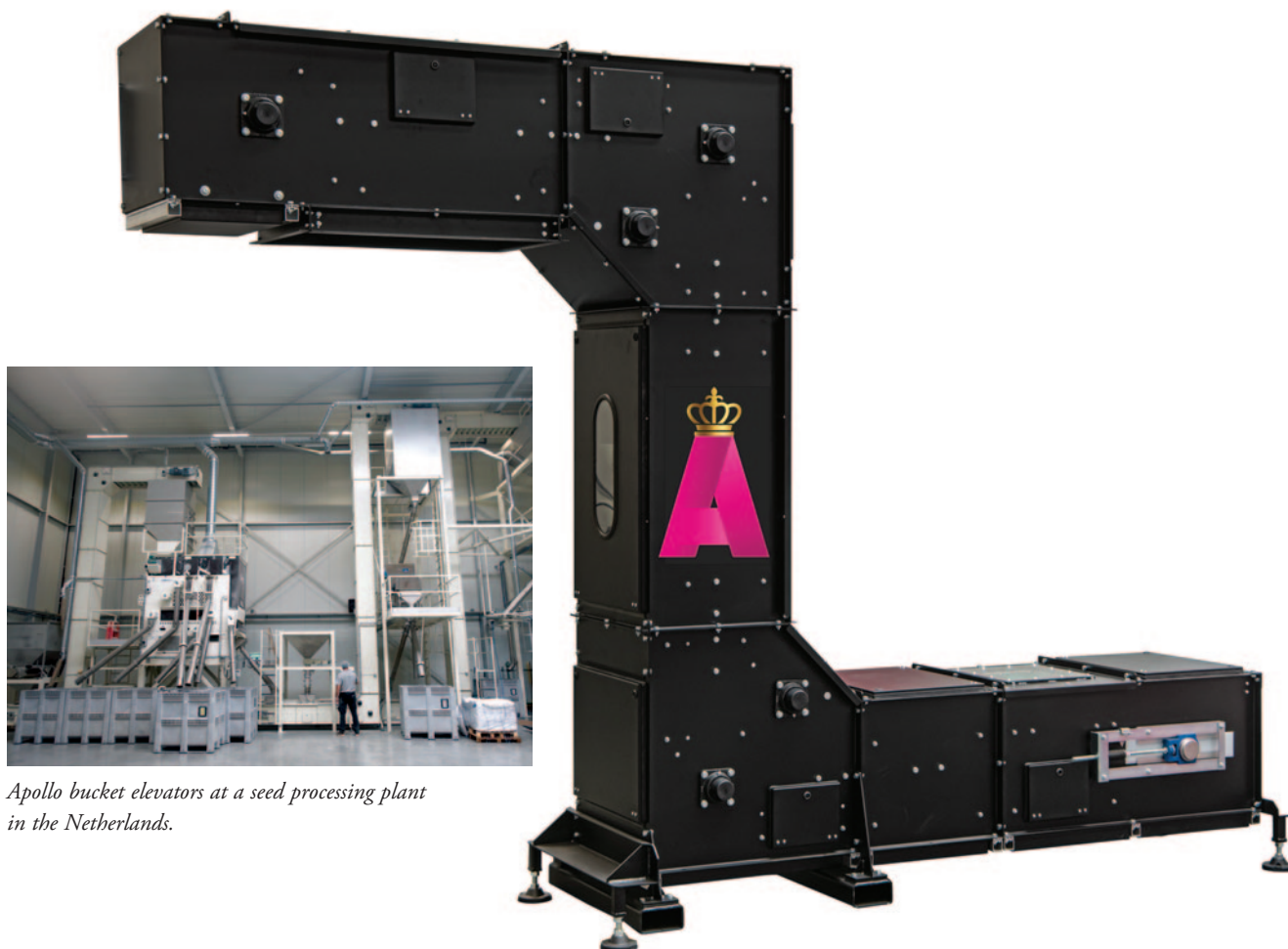
VIBCO Vibrators understands the customers make purchasing decisions

based on value and cost. It creates value by manufacturing high-quality, low maintenance industrial vibrators, construction vibrators and other vibratory equipment; offering world-class vibrator technical support and personalized service; and innovating to ensure that its customers have access to the best possible vibration solutions. VIBCO Vibrators is proud of its awards, which reflect the commitment of the whole team to quality, throughput, innovation and a same day, next day approach. Its awards include:

- ❖ 2019 PBN Manufacturing Award for, Workforce Development & Productivity
- ❖ 2018 Gallup's CEO, Jim Clifton, Names VIBCO "Ground Zero for Organizations learning Strengths."
- ❖ 2017 PBN Manufacturing Award for, Excellence in LEan Manufacturing
- ❖ 2017 AME, Journey to Excellence
- ❖ 2016 URI, CEO Karl Wadensten, Earns Lean Six Sigma Black Belt
- ❖ 2015 Recognized by Gov. Gina Raimondo for hosting Lean Government Initiative
- ❖ 2009 Managing Automation's Progressive Manufacturing 100
- ❖ 2009 PBN Manufacturing Award for, Best Places to Work
- ❖ 2009 Silver Toaster Award, Employee Excellence in Lean
- ❖ 2008 RIMA Award, Commitment to Manufacturing
- ❖ 2008 Governor's Workforce Innovation Award
- ❖ 2008 Diversity Business, Top 100 Privately Held Business in RI
- ❖ 2007 PBN Manufacturing Award for, Business Excellence Award
- ❖ 1996 Service Award, Cooperative Education and School-to-Work Opportunities.



Royal Apollo's bucket elevator combines horizontal and vertical lifting



Apollo bucket elevators at a seed processing plant in the Netherlands.

The Apollo VTS division of Royal Apollo Group is a highly respected supplier of vertical conveying systems. Part of its vertical conveying systems are its renowned bucket elevators. Every bucket elevator is designed according to the company's proven reliable technology, while offering many features, benefits and flexibility. This conveyor has the benefit of combining both horizontal and vertical bulk transport in one machine. Users can replace the cumbersome combination of separate belt conveyors and basic bucket elevators with just one Apollo bucket elevator solution, saving on initial investment as well on integration and maintenance costs. Additionally, having no discharge from the bucket elevator onto the conveyor belt lowers dust levels and related pollution, which leads to a cleaner working environment.

The bucket elevator specializes in handling irregular shaped items, as well as particulate or granular products such as grain or seed. They can be installed as a stand-alone unit, or as a part of a total solution, linking other bulk material handling machines. ApolloVTS guarantees a high degree of durability, low noise and low

power consumption in its conveying operations.

A unique feature is that incoming product can be fed continuously into the pendulum bucket elevator, which saves the need for an additional dosing system to feed the elevator. The edges of the buckets overlap in the inlet section which avoids that product falls through, which helps to prevent spillage. The buckets also have a pivotal mounting in the chain which maintains their horizontal position throughout the conveyor route before they are finally tilted when the buckets reach the outlet(s).

ACTIVITIES IN THE GRAIN INDUSTRY

The bucket elevators are very well suited for a broad range of bulk products in the food, agriculture, pharmaceutical, cosmetic, chemical, ceramic, glass, recycling, building and metallurgy industries and other materials requiring gentle handling. They can handle a wide range of commodities — most interesting for the bulk industry are powders, seeds/nuts and grains.

In addition, seeds with a high content of oil such as rapeseed, poppy seed, soybeans, and sunflower seeds might cause a thin

layer of fatty pollution on equipment and eventually affect the seed quality. Apollo pendulum bucket elevators can be equipped with in-line washing and drying modules to ensure optimal product quality.

COMPLIANT WITH FOOD REGULATIONS

Bodies like the US Food and Drug Administration (FDA) and European Food Safety Authority (EFSA) continuously sharpen food safety regulations across various sectors. FDA regulations and the European CE1935/2007 do stipulate that any migration of material which is in direct contact with food should be reduced to a minimum. This kind of legislation is gradually seen across the agricultural sector and often equipment has to comply with these standards. Apollo's bucket elevators comply with all of these stated regulations.

ALWAYS MOVING FORWARD

Apollo's keep adapting to new market trends and expanding into new markets. It recently became active in new fast-growing markets such as oilseeds, coffee, and wood pellets. Besides listening to the market, Apollo also thinks ahead and takes action,



The APOLLO Bucket Elevator combines horizontal and vertical transport of bulk materials in one installation.



Modular
Design



Easy to
Install



Completely
Enclosed



Gentle
Handling



Low
Maintenance



Built-in
Protection



Multiple Inlets



Multiple
Outlets

listening to its customers and responding to them.

ABOUT ROYAL APOLLO

The company's humble story begins in 1847. The first generations of Van den Pol always considered entrepreneurship to be of paramount importance. Nowadays, standing on the shoulders of her ancestors, Claudia is the sixth generation of the Van den Pol family. Royal Apollo has been awarded 'the crown on its work', the status of a Royal title, granted by the King of the

Netherlands himself. The predicate announces an acknowledgement for having a good reputation and symbolizes the respect, valuation, and trust of the King. An impeccable reputation and financial stability are mandatory to receive this honour.

GLOBAL PARTNER

Royal Apollo's people show the joy, passion and expertise to develop the best machines and deliver superb service globally. Everybody knows the direction of the company and the goals that it has set.

Everybody in his or her own way is actively contributing towards reaching company goals.

RESULT- AND QUALITY DRIVEN

Apollo is a company that fully meets the logistic challenges of its customers. It brings nearly 180 years of experience. This is carried by its people, its vibe, its outstanding service and its innovative atmosphere. It is very clear that Royal Apollo produces only machines with the highest quality standards.



Ahrens were engaged to design and construct a new export grain terminal at Lucky Bay in SA to provide local grain farmers with a much-needed alternate grain storage and export option for the region.

Wrapped up

Enclosed storage and handling

Jay Venter

Ahrens' capabilities as an enclosed storage & handling designer & constructor

Ahrens is a national full-service construction, engineering, rural infrastructure and mining services company, delivering a complete range of project services and cost-effective solutions across Australia.

With a strong history of delivering high-quality infrastructure for agricultural and industrial sectors, Ahrens offers complete end-to-end services, from design and engineering to construction and commissioning.

Ahrens' ability to deliver enclosed storage and handling projects on time and

within budget has solidified its reputation as a trusted partner in the industry.

The company's comprehensive approach, from design to construction, ensures that its clients receive customized solutions that enhance productivity, safety, and environmental sustainability across their operations.

With varied experience from extensive port design and construction to on farm grain storage solutions, Ahrens' breadth of capability in the agricultural sector exemplifies the company's agility, marking its competitive edge in the market.

Ahrens' complete range of in-house capabilities, its numerous strategic locations and its collaborative, personable approach to business proves it truly is a one-stop shop, able to deliver a complete project, from concept to completion.

Its approach to business stems from its deep-set culture of getting the job done. Focusing on honesty, sincerity and reliability, the company fosters strong working relationships and are committed to doing business that creates mutual benefit for all involved.

Ahrens has delivered over 1,000 successful projects, demonstrating its experience well beyond its 120 years.

NOTABLE ENCLOSED STORAGE AND HANDLING PROJECTS:

VITERRA

Ahrens Design & Construct and Grain Handling teams were engaged by Viterra Operations Pty Ltd to build a 11,500m² facility providing Viterra Operations Pty Ltd in excess of 67,000m³ in storage space along with the capability to outload product at a rate of 250tph (tonnes per hour).

This work showcases Ahrens' complete project management and steel



A 11,500m² facility providing Viterro Operations in excess of 67,000m³ in storage space.



manufacturing capabilities in the Victorian market. Ahrens steel provided all the structural requirements for the project and our grain storage and handling division provided the associated out load equipment.

T-PORTS

Ahrens were engaged to design and construct a new export grain terminal at Lucky Bay in SA to provide local grain farmers with a much-needed alternate grain storage and export option for the region.

The Lucky Bay Port on South Australia's Eyre Peninsula incorporates the Ahrens-built handling facility utilized by T-Ports' owned and operated transshipment vessel (TSV) to transfer grain from the harbour out to deep water where ocean-going vessels can be loaded. Ahrens' scope of works included electrical and control systems design and installation, material handling systems and the supply and erection of three 8,300-tonne flat bottom silos.

The silos included fumigation systems, Ahrens GasLock sealing system exceeding the Australian Silo Sealing standard, and 300tph sweeps, feeding the 1,500 tonne per hour reclaim conveyor.



The Lucky Bay Port incorporates the Ahrens-built handling facility utilized by T-Ports' owned and operated Transshipment Vessel (TSV) to transfer grain from the harbour out to deep water where ocean-going vessels can be loaded.

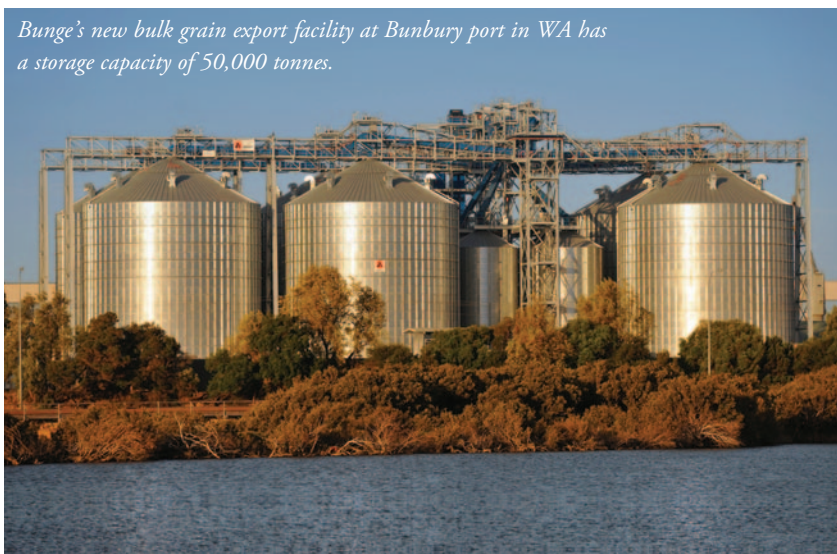
BUNGE

Ahrens designed and constructed a bulk grain export facility for major agribusiness, Bunge. Located at the Bunbury port in WA, the facility has a storage capacity of 50,000 tonnes. The scope of work included six 7,300-tonne flat bottom silos and four 700-tonne hopper bottoms silos, office and road intake buildings and materials handling infrastructure. Using its in-house steel fabrication facilities, Ahrens

also produced the structural steel and bases for the hopper bottom silos.

The structural, mechanical and electrical works, include dual truck receipt hoppers, transferring grain at 1,000tph via belt conveyors and bucket elevators to the bulk storage silos. The advantage of the custom designed and engineered conveying system is that grain can be delivered to any of the ten silos before being conveyed to the existing shiploader.

Bunge's new bulk grain export facility at Bunbury port in WA has a storage capacity of 50,000 tonnes.



Fresh remedies for a rotten discovery

The importance of maintaining bulk storage vessels to avoid loss of capacity, maintain operational flexibility and mitigate potential safety risks cannot be overstated, writes Kearsten Huffman, Southeast Regional Project Manager, Mole•Master Services Corporation.

INTRODUCTION

A major southern Georgia grain facility, well versed in timed emptying, rotation and cleaning of its storage vessels, experienced some of the adverse effects that long-term grain storage can cause. Ideally, grain processing facilities will consistently utilize material with a regularity sufficient to eliminate prolonged exposure to moisture, heat, and other outside variables.

This facility had a vessel that had been out of production for several years. Due to an increasing demand for additional storage capacity, and a safety-oriented drive to clean the silo in question, urgent scheduling discussions were initiated with Mole•Master Services Corporation, the facility's preferred cleaning contractor.

PROJECT

Due to the number of years it was out of use, the completely full grain silo was thought to have potential hot spots with both hardened and wet material throughout. Mole•Master utilized the proprietary Big•Mole system in conjunction with the Arch•Master portable auger system to complete the cleanout project. The Big•Mole silo cleaning system dramatically reduces project downtime in top-to-bottom cleaning of grain silos. Material is quickly and thoroughly freed and readied for further processing or loadout and lost storage is recovered to 100% of planned capacity. The system utilizes non-sparking equipment that is mandatory for potentially combustible environments. The Arch•Master portable auger system is a tough, miniaturized rock drill is ideal for material that tends to 'arch' or 'bridge' across an entire vessel. The Arch•Master was designed to create flow channels up to 150 feet deep in this type of material. A high-torque, variable-speed, hydraulic-powered head powers through the compacted material safely and quickly.

These two proprietary systems were used to create a steady flow of material from the lower portion of the silo. This was done for a few reasons. First, it allows for a visual assessment of the freed material to determine exactly how severely the grain was compromised. Second, this method



allows cleaning operations to be performed safely and efficiently without confined space entry, eliminating the need to place a crew member inside the vessel.

This approach also drastically speeds up the removal of built-up material.

Three days into the project a discovery was made that neither Mole•Master technicians nor facility management had foreseen. Years prior, the silo been tied into an interior, neighbouring vessel by means of a shared cone and discharge equipment.



This unexpected development prompted in-depth conversations with Mole•Master field technicians, facility engineers and a return to the drawing board to determine a new scope and best course of action.

There was no access to the secondary attached vessel, necessitating a creative solution. Mole•Master technicians, accustomed to necessary strategy changes based on unexpected findings in the field, took action. Subsequently, access points in the roof of the silo were created to allow interior access and aid in cleaning.

Mole•Master technicians supplemented the utilization of the Big•Mole system and Arch•Master with a high-capacity vacuum truck to continuously remove and transport freed material from the point of discharge. This approach allowed the technicians to maximize their efficiency while minimizing the likelihood of downtime. Mole•Master technicians' ability to use a variety of specialty equipment in proper sequence, along with constant on-site communication and intensive safety

training allowed them to solve the unexpected challenges safely and effectively. Although the scope of work had doubled, the project was completed in only two additional days than had been originally estimated.

ABOUT MOLE•MASTER

Mole•Master Services Corporation is uniquely positioned to handle projects of all sizes and levels of complexity due to its wide range of techniques and proprietary

equipment. More than 40 years of experience in the industry and an intimate understanding of cost-effective services translates into reliable results for its clients. Mole•Master technicians travel with a full complement of proven silo cleaning and inspection equipment to solve flow issues and provide effective cleanout solutions.

The results are safer work environments, reduced downtime, greater storage capacity and the prevention of future storage vessel issues.

The benefits of storing grain in steel silos in high-volume port operations

In the global trade of agricultural commodities, ports play a crucial role in facilitating the rapid movement of agricultural produce. With the demand for efficient, high-volume grain handling increasing, proper storage systems play a key role in enhancing exchanges and maintaining quality. Steel silos have emerged as an ideal solution for port operations, especially for protecting grain from environmental threats such as moisture. Companies like PRADO SILOS, with over 70 years of experience in the design and manufacture of steel silos, have

become key players in this segment, providing reliable storage solutions to meet the challenges of modern grain logistics and applying new innovations for the safe and reliable storage of produce.

EFFICIENCY AND SPEED IN PORT OPERATIONS

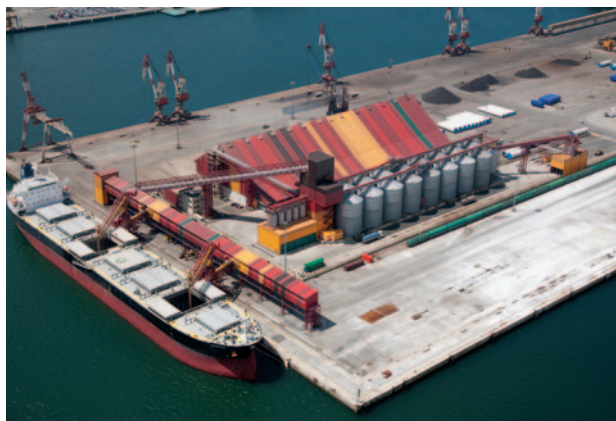
Grain terminals handle massive volumes of produce, and storage systems must be capable of both housing large quantities of grain and ensuring that it remains in optimal condition. Steel silos are designed for exactly this purpose, offering capacities

that can reach tens of thousands of cubic metres. This is particularly important for ports where grain shipments must be stored for short periods before being loaded onto vessels for export.

Steel silos enable fast loading and unloading operations, a key factor in port efficiency. Their design allows for the rapid discharge of grain into trucks, railcars, or conveyors, ensuring that grain can be transferred smoothly from the silo to the next stage in its journey.

To ensure seamless operations and flexibility of distribution, companies like





PRADO SILOS have developed different systems to make sure that the grain stored in silos can be transferred safely and efficiently to their next phase of transformation:

- ❖ side discharges to trucks/trains — the special design of the silo allows for this eccentric load to direct the grain sideways and fill one truckload in a very fast fashion using only gravity;
- ❖ the same system can be applied to discharge to the bottom side and feed a conveyor to move the contents elsewhere;
- ❖ operators can also use high-rotation smaller hopper silo units on structures to fill trucks, trains, containers... with their bulks in batches, all the while keeping full control of the delivery, in terms of quality and quantity; and
- ❖ clearing of the residual content with high-capacity augers that sweep the inside of the silo after full gravity discharge from their central hopper

MOISTURE PROTECTION: A KEY CONCERN IN GRAIN STORAGE

One of the greatest threats to grain storage is moisture. Excessive humidity can lead to spoilage, mould growth, and pest infestations, all of which compromise the quality of the grain and can lead to significant financial losses. In high-humidity environments like ports the challenge of protecting grain from moisture is even more pronounced.

A steel silo is one key tool to provide protection against moisture. PRADO SILOS, for example, incorporates advanced sealing technologies and ventilation systems into its silos to ensure that the grain remains dry. Backed by science-based analysis of grain needs and ventilation requirements, PRADO SILOS' aeration systems are a major ally in controlling the internal climate of the silo, reducing the risk of moisture accumulation. In addition, PRADO SILOS are equipped with temperature monitoring systems, that allowing to automatically manage all operations for aeration in the event of temperature or moisture changes.

DURABILITY AND SAFETY — DRIVERS OF GROWTH

The robust construction of steel silos also helps to protect against water infiltration — compare this to the highly porous concrete solutions, that with time and exposure present risks of moisture transfer. Made with ZM310 steel, PRADO SILOS resist corrosion five times more than standard-galvanized steel silos, ensuring a longer service life in the harsh, highly-corrosive port environments where exposure to saltwater and humidity is constant.

Once silo operations are up and running, port operators expect a seamless, constant use of the silo that does not delay or hamper day-to-day activities. Steel silos offer several

WE CLEAN SILOS



Safety

No hazardous human entry of raw material or finished cement silos.

Total Material Recovery

Return your silo to 100% of planned storage capacity.

Restored Production

Eliminate obstructed silo discharge points to facilitate proper material flow.

Minimized Downtime

Innovative cleaning methods get silos back into production quickly.



www.molemaster.com

740.374.6726 800.322.6653 (USA)

advantages in this regard. They are designed to withstand the stresses of repeated loading and unloading, as well as the physical demands of outdoor storage. In contrast to traditional wooden or concrete storage options, steel silos require minimal maintenance, reducing operational costs and downtime.

Regulations will also continue to evolve, and adaptation to new requirements is key. PRADO SILOS has spearheaded the design of the of solutions for safety and security, with specific designs to make their silos pass the most demanding fire-hazard and explosion controls.

PRADO SILOS: INDUSTRY BEHEMOTH

PRADO SILOS takes big pride in having their silos featured in some of the world's most important transport and port facilities and is recognized as being at the forefront of the industry, supplying silos to customers in more than 70 countries.



One of PRADO's standout projects involved the installation of silos for TASA in Santander (Spain), where the company

delivered 18 silos with a total capacity of 42,600 metric tonnes of storage and fast-delivery hopper silos with its structures.

HES International celebrates official opening of its advanced agri-shed at Port of Amsterdam



European bulk terminal operator, HES International, on 17 September 2024, announced the opening of a new agricultural shed at its terminal in the Port of Amsterdam (Westhaven). This new flat storage facility is designed specifically for agricultural products and incorporates advanced automation for optimized storage and handling processes.

The new shed, with a total capacity of 145,000m³ (approximately 80,000 metric tonnes), features over 16 dedicated compartments, ranging from 3,000 to 8,000 metric tonnes each. This versatile design allows HES International to accommodate a wide range of product categories, meeting diverse customer requirements. This new facility largely replaces the existing storage at the Vlothaven terminal, ensuring a seamless transition for clients. The total agri storage capacity at the HBTA terminal (Westhaven) now amounts to 150,000 metric tonnes.

The construction of this facility was

made possible through a collaborative partnership with Cefetra and ADM, Europe's leading suppliers of agricultural ingredients for animal nutrition, which have been long-time valued customers of HES International across multiple terminals.

The opening ceremony, which took place on 12 September, was attended by various HES clients and partners. Distinguished guests included the CEO of the Port of Amsterdam, Koen Overtoom, and Hester van Buren, Alderman at the Amsterdam Municipality.

"We are extremely proud to announce the opening of this new shed, which strengthens our leadership position in the industry. I would also like to extend my deepest gratitude to the entire HBTA team and staff, whose dedication and hard work made this achievement possible," said Jeroen van der Neut, COO of HES International.

"We are very pleased with the progress made by HES International in further

establishing Amsterdam as a leading hub for agricultural products in Europe" added Koen Overtoom.

"We are proud to support HES' journey towards decarbonization as they invest in infrastructure to handle more sustainable commodities. This effort aligns perfectly with the anticipated coal phase out in the Port of Amsterdam and the decarbonization objectives of the Municipality of Amsterdam," said Hester van Buren.

In addition to the Amsterdam facility, HES International is constructing an additional agri-shed at its terminal in Gdynia (Poland), which is scheduled to open at the start of 2025.

ABOUT HES INTERNATIONAL

HES International is one of Europe's largest independent bulk handling companies for liquid, dry, and breakbulk products. Its companies hold a unique independent position in the supply chain of bulk goods for a wide range of products providing first class access to Europe's deep draught terminals and excellent hinterland connectivity by barge, rail and truck. With 15 terminals in five countries at strategically located ports in Europe HES International is an important switch in the continuous delivery of essential building blocks for our everyday life needed to develop, sustain and improve the world around us.

Safeguarding product and environment with enclosed conveying

"While almost any disturbance of bulk material is likely to generate dust, conveyors are particularly challenging as they move large amounts of material at high speeds and more often than not require a number of transfer points. While there are various dust management approaches, containment is at the heart of most good dust prevention processes," says DemcoTECH general manager, Paul van de Vyver.

DemcoTECH offers a choice of enclosed conveying systems, depending on the application. "These include pipe conveyors and the DemcoTECH AeroConveyor™, both of which enclose the material, preventing spillage of product and preventing airborne dust from being released into the environment, while also protecting the product from the elements and/or theft of valuable products during transportation."

PIPE CONVEYORS

Pipe conveyors resemble conventional troughed conveyors at their tail end where the material is loaded. The open belt then passes through a series of transition idlers



Pipe conveyor transporting gold and silver ore in Papua New Guinea.



to form a tube shape, which is maintained along the conveyor length. Prior to the discharge pulley, the belt opens up to allow the material to be discharged over a conventional troughed conveyor head pulley.

"This means that the tubular form of the belt fully encloses the material being conveyed," says van de Vyver, "while transfer points can be minimized or even



TAKRAF multi-commodity portal scraper reclaimer with a capacity of 1,100 t/h in Japan.

TAKRAF enclosed storage and handling solutions

- High performance TAKRAF Reclaimers with a wide range of sizes and capacities.
- Versatile storage options: pure buffer storages or homogenizing and blending storages.
- Exceptional reliability, even with challenging bulk materials.
- Cost-effective solutions with outstanding longevity.



Pipe conveyor at Koidu Mine in Sierra Leone.*AeroConveyor being installed at Moma mineral sands plant in Mozambique.*

eliminated by curving the conveyor, as the pipe conveyor can then negotiate both horizontal and vertical curves. This also makes it ideal for navigating difficult routes.”

Steep inclines are possible, generally up to a 26° slope, which means that the overall length of the conveyor system and the plant footprint can be optimized.

The pipe conveyors are erected on ground level or elevated in gantries, with DemcoTECH offering various gantries, including a triangular gantry with travelling maintenance trolley.

“Our numerous pipe conveyor references cover a wide range of commodities such as coal, cement, sulphur and diamond concentrate. A major contract included supply of a 2.2km long pipe conveyor as part of a sulphur handling system DemcoTECH delivered for the refinery and petrochemical integrated development (RAPID) project in Malaysia,” says van de Vyver.

The contract was awarded by the SYS & McConnel Dowell joint venture (SMJV), and covered design and engineering through to construction and commissioning of the granular sulphur handling system, with stringent environmental regulations to be adhered to.

DemcoTECH also designed a 4.5km-long pipe conveyor for an open-pit gold and silver operation in Papua New Guinea. The pipe conveyor provides environmentally friendly conveying of crushed ore from the pit to the processing plant through pristine jungle. In addition, it handles the vertical and horizontal changes in direction, without having additional power points along the route.

“Not only was the pipe conveyor required to have multiple curves given the jungle environment, it also has elevated gantries to allow animals to pass underneath,” notes van de Vyver. “We physically walked through the jungle to develop the most suitable route for the pipe conveyor.”

In a further contract, a pipe conveyor was supplied for a diamond processing plant at Koidu Mine in Sierra Leone. This shorter conveyor with a 200mm diameter pipe conveys 2tph (tonnes per hour) of concentrate from the process plant at 0.5m/s to a secure area. In addition to its environmental benefits, the pipe conveyor technology was selected as it provides secure handling of the concentrate along the complete length of the conveyor.

DemcoTECH was appointed as the EPCM contractor for the materials handling portion (excluding the civils and earthworks) of the expansion to Grindrod’s multi product terminal at Richards Bay in South Africa. A pipe conveyor, 340mm in diameter and 516m long, formed part of the system, which conveys various materials from the three Richards Bay terminal sites.

DEMCOTECH AEROCONVEYOR™

The AeroConveyor™ has been in use for a number of decades, with many innovations having been made to accommodate various applications and climatic, environmental and topographical conditions. The AeroConveyor™ is an enclosed troughed conveyor that eliminates idlers by supporting the conveyor belt on a cushion of low pressure air. Like the pipe conveyor, the DemcoTECH AeroConveyor™ provides fully enclosed conveying and can incorporate convex and concave curves and convey product up steep inclines successfully.

Traditionally used over short distances and high inclination angles, the modern AeroConveyor™ offers high capacity conveying at greater belt speeds, over long conveying distances. It is particularly suitable for products that are dusty, of low bulk density and often difficult to convey.

“A unique feature of the DemcoTECH AeroConveyor™ is the design of the conveyor, with the standard steel pipe also acting as structural support,” notes van de Vyver. “As opposed to other forms of enclosed conveying, the DemcoTECH

AeroConveyor™ can be used to convey at higher incline angles as it does not experience the rolling wave motion of troughing idler conveyors. This makes it very suitable for conveying precious minerals and metals up steep inclines.”

DemcoTECH has an extensive track record of AeroConveyor™ installations in the mining, power, industrial and sugar industries. In a recent project, DemcoTECH supplied Kenmare Moma Minerals Processing Limited with its AeroConveyor™ technology.

“We executed the project in two phases,” says van de Vyver. “In the first phase, an AeroConveyor™ and tail-end combination hopper were supplied to the MOMA plant in Mozambique, while the existing AeroConveyor™ was repurposed. This installation, which provides conveying up an inclination of 20°, proved to be a perfect application for the AeroConveyor™.”

Based on the success of this first installation, the client placed an order to retrofit four AeroConveyors™ in other parts of the plant. The second installation comprised three conveyors. These AeroConveyors™ have conveying rates of up to 9tph, with instantaneous surges not exceeding 10tph.

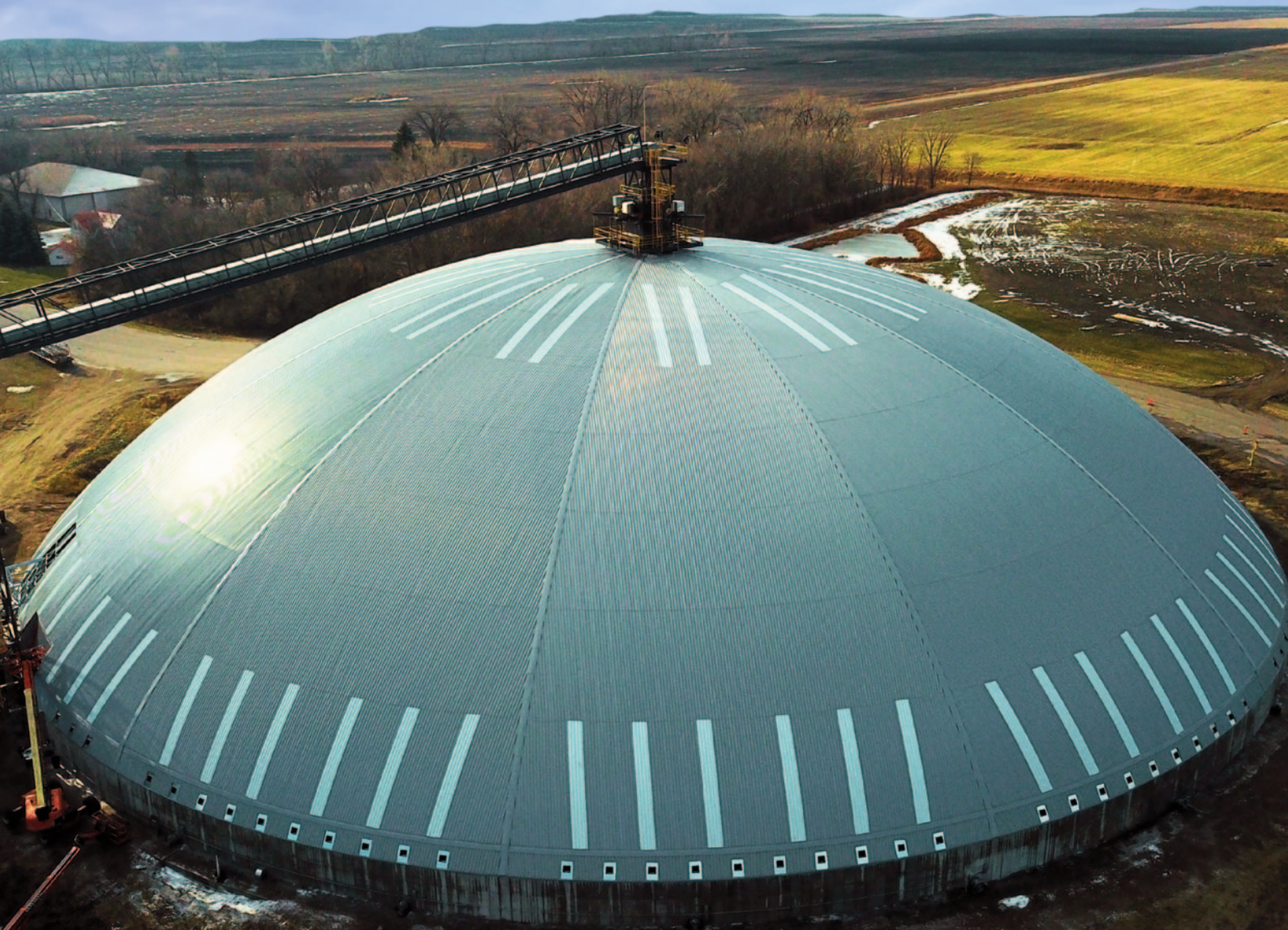
ABOUT DEMCOTECH

With extensive experience both in Africa and internationally, DemcoTECH offers 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.

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.

DOMES

PROTECT YOUR HARVEST



ESI Eurosilo: innovative storage concepts in various industries

ESI Eurosilo specializes in the design and implementation of advanced large-scale bulk storage silos. The company's unique system, featuring screw conveyors on top of the stored material, ensures trouble-free operation, even with challenging materials like coal, FGD gypsum, fertilizers, fly ash, and starch.

With over 50 years of experience and more than 190 silo units installed globally, ESI Eurosilo's fully automated systems minimize the required footprint, optimize operational costs, and eliminate dust emissions. These innovations greatly enhance logistics in industries such as power generation, bulk terminals, and manufacturing.



In January this year, the new Eurosilo designed for FGD Gypsum at the Nikola Tesla power plant in Beograd, Serbia went into operation. After finalization of the complete desulphurization unit the freshly produced gypsum could be stored and the hot commissioning was completed.



(Left) After careful consideration Lyckeby, one of Swedens leading potato starch producers, decided to work with the Eurosilo system for its new potato starch silo. The project consists of a new 50,000-tonne storage silo. This will be Lyckeby's largest potato starch silo. It will stand out as a landmark, next to three existing silos at the production site in Nöbbelev. The design and delivery of all components will take place during 2024, while the commissioning is scheduled for May 2025.

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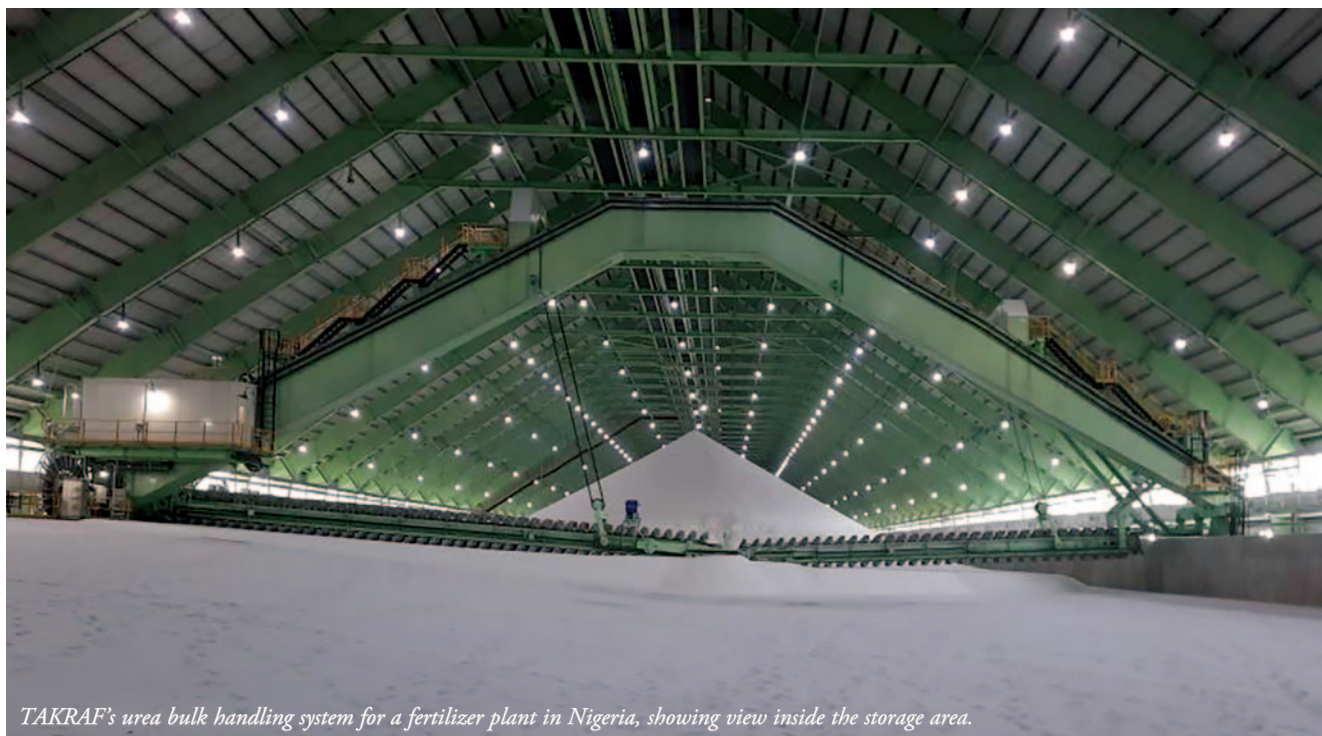
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TAKRAF's technologies optimize enclosed storage and handling solutions for bulk materials



TAKRAF's urea bulk handling system for a fertilizer plant in Nigeria, showing view inside the storage area.

With the increased stringency of environmental regulations, there is growing demand for enclosed storage solutions in which bulk storage and materials handling systems are seamlessly connected.

The mining industry's increasing focus on environmental sustainability has highlighted the benefits of enclosed storage and materials handling solutions, which, besides protecting the environment from dust generation and product spillage, also shield the material from contamination and degradation from exposure to climatic conditions. Although applied over a range of commodities, enclosed storage and material handling solutions are particularly important for challenging, sticky and/or abrasive commodities, such as fertilizer, sulphur and cement/limestone.

As a result, TAKRAF Group is seeing increasing demand for its technologies suited to enclosed storage solutions, including TAKRAF scraper reclaimers, TAKRAF stackers and in-plant conveying systems.

In addition, TAKRAF tube conveyors provide an efficient solution for enclosed bulk material transportation to minimize interactions between the environment and conveyed material. Furthermore, compared to typical belt conveyors, tube conveyors boast very small curve radii, which allows the conveyor to curve horizontally as well as vertically. This very

flexible conveyor routing often means that a single tube conveyor can replace several conventional belt conveyors, reducing the requirement for multiple transfer points and thus product degradation and dust generation at transfer points — all important plus factors for environmental sustainability.

SCRAPER RECLAIMERS FOR ENCLOSED BULK STORAGE

TAKRAF's scraper reclaimers are being increasingly employed globally across open enclosed or covered bulk storages for their high operational versatility, robustness, high efficiency, low operating costs and gentle treatment of material. With spans up to 70m and capacities up to 6,000tph (tonnes per hour), scraper reclaimers also provide problem-free reclaiming of challenging bulk materials, complete emptying of the storage area, transfer of constant and uniform bulk flow to the outgoing conveyor, and fully automatic operation.

Depending on whether pure buffer storage is required or whether the storage is required for homogenizing and blending, either side, portal or bridge-type reclaimers are employed.

A recent order comprised the supply of four TAKRAF portal scraper reclaimers for a multi-commodity power plant in Japan. They are located within the multi-commodity warehouse, which is divided into two sites and form an integral part of

the complete material handling and feeding system.

The advanced plant is fired by a combination of thermal coal and woodchips or biomass, requiring the reclaiming system to convey material from one site to the other to provide the flexibility to restore or (if required) mix material. Due to the necessitated redundancy in which two reclaimers are required to work on the same rail in the same site, a dedicated safety and anti-collision system was implemented and extensively tested. Each reclaimer is designed to scrape up to 1,100tph. With a rail gauge of 52m and a double-boom system, with the main and auxiliary boom in line, they are some of the largest built. Each reclaimer also boasts a dedicated platform to carry a small bulldozer, which it can drop off at any location along the stockpile for cleaning purposes.

In an important acknowledgement of TAKRAF's superior technology and outstanding technical support, a major Chinese global steel producer awarded an 'outstanding service' certificate to the company. The certificate, a repeat award, was made in recognition of the fact that scraper reclaimer machines supplied by TAKRAF have performed consistently on their design promise since installation. TAKRAF supplied eight semi-portal scraper reclaimers and one portal scraper reclaimer over a period of five years. These machines also operate within



TAKRAF Portal Scraper Reclaimer for a multi-commodity power plant in Japan.

covered material storages to meet the highest environmental standards.

UNIQUE HANDLING CHALLENGES

A 400tph portal scraper reclaimer, with a main and auxiliary boom, formed part of a urea bulk handling system for an enclosed storage application for Train-2 of a mega fertilizer plant in Nigeria. This project built upon the success of a previous handling system also supplied by TAKRAF for Train-I of the project. The contract for the design, supply, supervision of erection and

commissioning and performance testing of the handling system covered the handling of urea from receipt of material from the granulation plant through to a storage yard, from where it is reclaimed for feeding to a truck loading station.

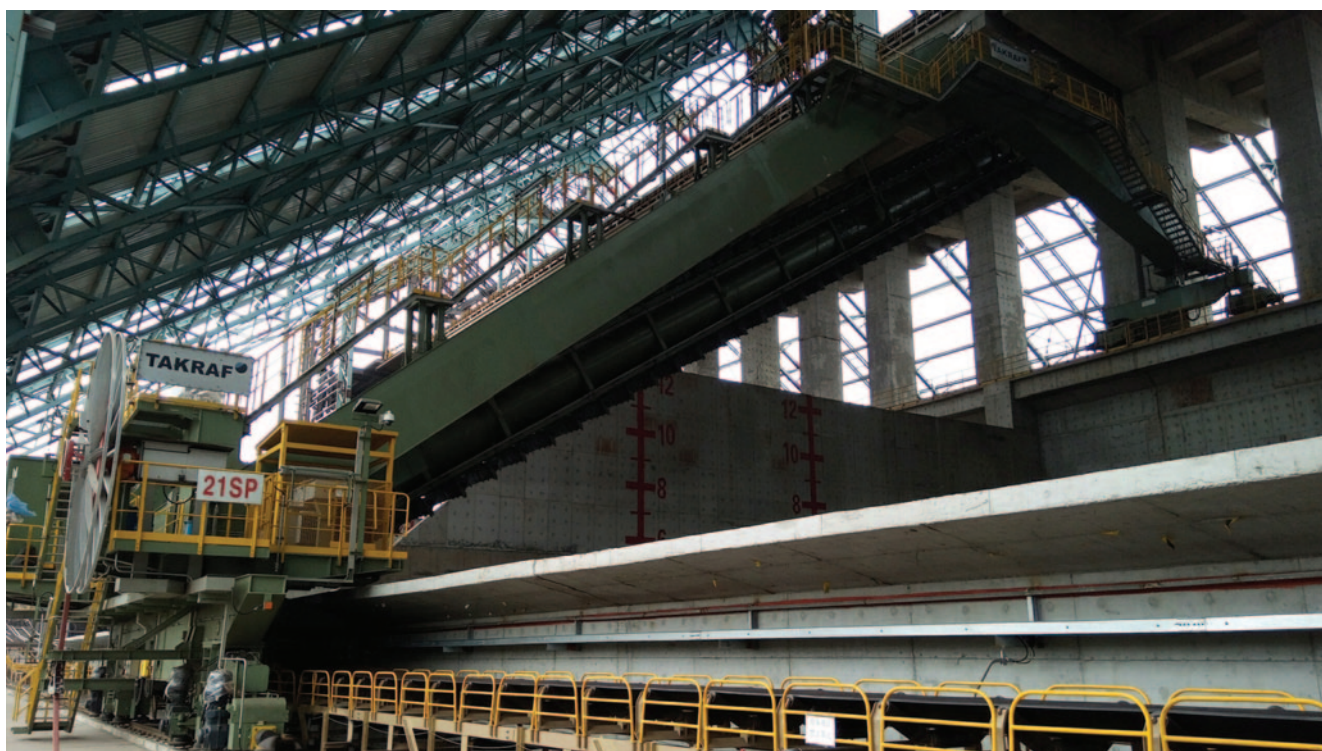
Handling urea in bulk storage poses unique challenges and, as a result, the client, in addition to utilizing covered storage, required special design considerations from TAKRAF. These included completely sealing all conveyor galleries and transfer towers to avoid any

moisture entry or exposure of the product to the outside environment. In addition, the portal scraper reclaimer was provided with a 'de-lumper' to break the lumps formed during storage. To avoid material degradation and dust generation, the truck loading station, which can handle up to four trucks at once, was equipped with special cascading chutes, a pit-less weighing bridge and de-dusting bag-filters. Importantly, to protect worker health and safety, fresh air supply was provided to the operator cabin and E-house via a separate hose reel.

Boasting a 60,000t storage capacity, the system includes 200tph conveyors, including the overhead tripper and those feeding the storage yard, and 400tph reclaiming circuit conveyors, in addition to the portal scraper reclaimer. Despite the challenging nature of the project, it was required to be completed within a tight schedule. TAKRAF also supervised site erection and commissioning, ensuring that the rigorous acceptance criteria required, due to the demanding nature of urea handling, were fully met.

A primary advantage of covered storage is protection from the elements; and while this does come at a cost, the environmental benefits both for the surrounding area and for the material being handled cannot be overstated. With an increased awareness of a social licence to operate and increased industry-wide focus on ESG issues, TAKRAF believes that its covered storage solutions and significant references in this area position it well to support clients into the future.

DCi



TAKRAF Semi-Portal Scraper Reclaimer for major steel producer in China.

Mobile magic



flexible bulk equipment
keeps cargo moving

RAM Spreaders' role in keeping bulk cargo moving

Portable bulk handling systems are becoming increasingly essential across various industries. RAM, which provides its revolver containerized bulk handling

system (CBH), believes this is due to its flexibility, efficiency, and adaptability in handling large quantities of material and zero material loss during the handling

process.

A well-designed material handling system, such as CBH on a reach stacker, helps improve customer service, lower



costs, and reduce the risk of accidents and commodity loss.

While some bulk terminals can cost more than \$100 million to set up, the RAM Revolver CBH is a fraction of the cost, with less set-up time and a fast-to-market approach, making it an ideal solution for many bulk handling projects. From its tally

of CBH projects for MHC, STS, Ship and Bridge Crane applications, RAM has a total of eight portable CBH projects on reach stackers in Europe, North, Central, South America and also China, handling various commodities from iron ore and copper concentrate to pyrite concentrate and UREA for fertilizer production.

THE VERSATILITY OF CBH

By optimizing the movement and storage of bulk, CBH avoids the need for expensive infrastructure, storage sheds or stockpiles. It enables the rapid and efficient transfer of bulk materials, such as grains, minerals, and biomass.

It minimizes handling times, reduces





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labour costs, and streamlines the process by automating the movement of materials.

RAM commented that this efficiency improves productivity and faster project completion for their customers.

CBH IS ALSO SCALABLE

For ports, terminals, and mining and handling facilities experiencing growth, CBH offers scalability without the need for expensive capital investment in permanent infrastructure. It is especially useful for emerging markets or those with fluctuating demand.

ENVIRONMENTAL BENEFITS

Many industries face space restraints or operate bulk handling operations in remote areas, so fixed installations are not feasible. CBH can operate efficiently in confined or difficult-to-access locations, making it ideal for urban and remote sites. Moreover, CBH is designed to be environmentally friendly by reducing dust generation and minimizing commodity loss by containerizing the bulk in sealed open-top containers. The commodity only sees the light of day when decanted at its final destination, with an added dust suppression

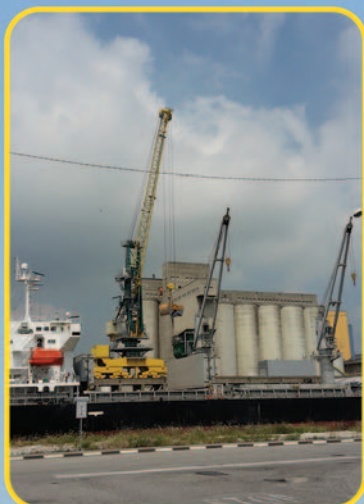
system reducing the amount of dust plumes.

RAM believes the growing demand for portable bulk handling systems is driven by its ability to enhance operational flexibility, efficiency, and safety while reducing costs. The handling and transportation of large volumes of material are crucial to success; with the industry's ability to prioritize adaptability and cost-effectiveness, the role of portable bulk handling will only increase, providing solutions that can easily be tailored to the specific needs of any operation.



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Reducing fuel consumption with electric drive



Timber handling with electric drive and trailer in state-of-the-art sawmill.

In the picturesque Swiss canton of Lucerne, the Tschopp family has been operating a sawmill since 1959, which today is one of the most important and modern wood processing companies in the country. The family business, now in its third generation led by Ronald and Daniel Tschopp, employs 130 people and processes 130,000 solid metres of roundwood annually on an 80,000m² site.

Since November 2023, Tschopp AG has been relying on an innovative solution from SENNEBOGEN: the 735 E with electric drive and trailer. The new acquisition was officially confirmed at bauma 2022 together with SENNEBOGEN's sales and service partner Kuhn Schweiz AG. Erich Helfenstein, Head of Roundwood Procurement, emphasizes: "We chose the electric drive for a very simple reason: fuel prices are high, and by using the 735 E Electric Drive, we can massively reduce our consumption." The new material handler impresses with its outstanding performance and operates much more quietly and smoothly than conventional diesel machines — a great advantage in the noise-sensitive environment of a sawmill.

TSCHOPP FOCUSES ON REGIONALITY AND SUSTAINABILITY

Tschopp AG sources its wood regionally within a 100km radius. The transport is organized by the company itself and is mostly carried out with in-house trucks to ensure seamless further processing at the

plant. Sustainability is also a priority in production: an in-house wood plant supplies the site with green energy through 100% utilization of the wood raw material. For internal roundwood transport, the company was also looking for a sustainable solution and chose the 735 E with an electric drive. "We identify with SENNEBOGEN's values and also rely on forward-looking technologies that make a positive contribution to our environment," says Helfenstein.

EFFICIENT USE WITH TRAILER

The main tasks of the SENNEBOGEN 735 E include unloading trucks, removing wood from sorting boxes, and feeding the saw line. In addition to the special trailer attachment, the material handler stands out

for its unique features that enable smooth and efficient operation. The rear-pivoted boom ensures optimal weight distribution, while the robust undercarriage is capable of towing trailers weighing up to 30 tonnes. With a stacking height of around 10 metres and a reach of 11.3 metres, even challenging loading and unloading tasks can be handled effortlessly. Additionally, the machine has been equipped with an extra grid and cameras to ensure work safety for employees. By choosing the SENNEBOGEN 735 E Electric Drive, Tschopp AG underscores its innovative strength and commitment to sustainability and efficiency. The SENNEBOGEN 735 E contributes significantly to ensuring that Tschopp AG continues to be a pioneer in the Swiss wood industry.



Official machine handover at bauma 2022: representatives from SENNEBOGEN, Kuhn Switzerland and Tschopp are delighted with the successful sale.



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MultiDock material handler – sustainable and flexible

MultiDock is a renowned manufacturer of highly versatile and customizable material handlers, based in Terneuzen, the Netherlands. From its headquarters, it ships its material handlers to ports and industries all over the world.

With over 40 years of experience in the material handling industry, MultiDock was born out of dock operators. The company's roots as dockworkers gave unique insights into what was needed to create the most efficient material handlers,

to make jobs easier and faster. This expertise led to the creation of the company's first cargo handler in 1981.

MultiDock's machines are built on the robust foundation of a Caterpillar excavator, which it completely redesigned





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into a material handler. Each machine is equipped with a moveable cabin, which results in maximum overview for the operator. A new boom and stick is used to handle big amounts of cargo, and an undercarriage suited to specific work environment. MultiDocker has different undercarriages for its machines, for example; its gantry undercarriage or the mobile undercarriage. Both can be used for totally different jobs. The mobile machines are equipped with wheels and can easily

drive anywhere. Meanwhile, MultiDocker's gantry undercarriage is made so that trucks can easily drive underneath, resulting in a fast unload time as the machine only has to turn 90° to discharge the load.

Originally a Swedish company, MultiDocker has maintained strong connections with Scandinavian ports, where many of its clients are based. While Scandinavia remains a key market, MultiDocker is constantly growing, and we now serves ports and industries

worldwide, continually adding new countries to its portfolio.

MultiDocker's material handlers are designed to efficiently manage a wide variety of cargo types, including dry bulk, round timber, sawn wood, bags, scrap, rocks, pulpwood, gravel, and other bulk and general cargo. It believes that loading and unloading ships should be as efficient as possible, which is why its machines are engineered to transfer goods swiftly from ship to shore and shore to ship in no time.





In a market dominated by larger competitors like Sennebogen and Liebherr, MultiDock recognizes the challenges of competing as a smaller company. However, its focus remains on establishing itself as a trusted name by delivering machines precisely aligned with its clients' needs. Every machine is built in close consultation with the client, allowing them to choose the specifications that best suit their operations. This personalized approach is a key factor in MultiDock's competitiveness, along with the excellent service it provides.

Because its machines are based on Caterpillar excavators, MultiDock benefits from the extensive CAT service network, with mechanics available worldwide. If a problem arises that can't be resolved by CAT mechanics, MultiDock's own specialists step in to minimize downtime.

In addition to manufacturing material handlers, MultiDock is also an expert in converting diesel-powered earth-moving machines to electric. This process involves replacing the diesel engine with a green, sustainable electric motor, ensuring the machine delivers the same performance while reducing downtime and eliminating emissions. MultiDock is working towards a more sustainable future.

Mobile cranes in bulk handling: ASPEC shows the way

INTRODUCTION

Mobile cranes are widely used in the engineering industry for the construction and assembly of heavy machinery, infrastructure and other large payloads — and are heavily used in the bulk handling industry, writes Will Gillespie. During both the design and manufacturing phases of a project, it is important to consider the method used to position large components. Should this positioning involve the use of mobile cranes, the ability to rapidly evaluate the suitability of a variety of cranes can inform design decisions and simplify initial lift studies. Additionally, the loads imparted by cranes used for maintenance and construction can have a significant impact on the design of the structures that support them.

COMPANY PROFILE

ASPEC is a multi-disciplinary engineering consultancy specializing in bulk materials handling in the mining and port industry. The firm has a two-decade history of delivering engineering services in greenfield and brownfield projects, with involvement spanning from initial study and value engineering phases to project execution and closeout. Through this involvement, ASPEC's engineers have seen first hand the impact of early consideration of construction and maintenance methodologies on a project's success.

MAJOR CLIENTS

ASPEC's client portfolio includes some of the largest companies in the Australian mining and port industry. Major clients

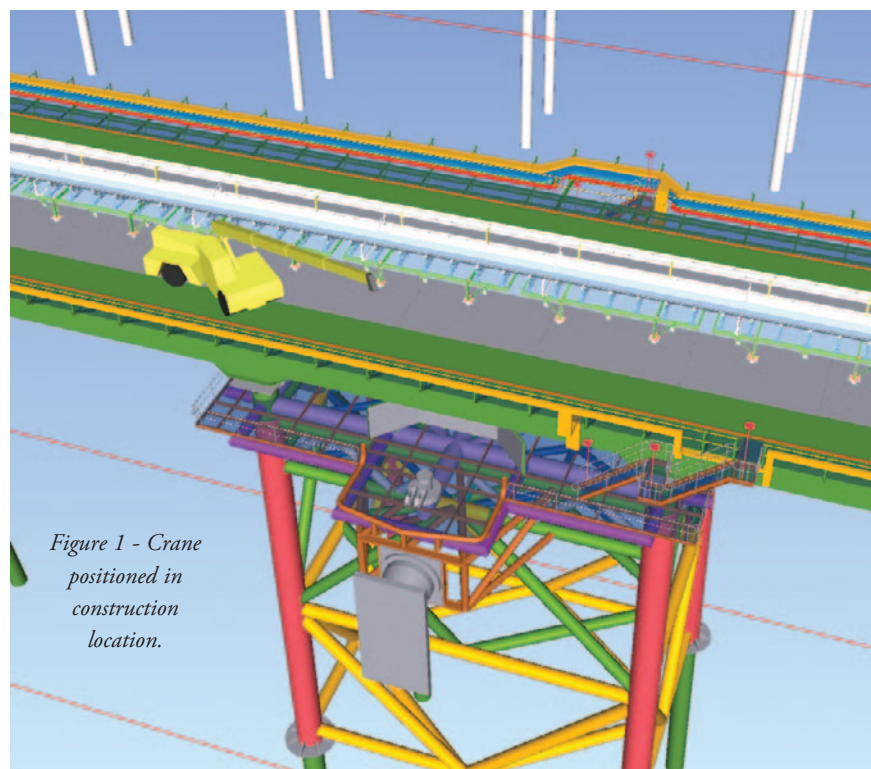


Figure 1 - Crane positioned in construction location.

such as BHP, Rio Tinto, Gladstone Ports Corporation (GPC), Dalrymple Bay Coal Terminal (DBCT), HanRoy (Roy Hill), and Queensland Alumina Limited (QAL) have consistently turned to ASPEC for their engineering needs.

CRANE TYPES

During project execution, mobile cranes are typically used to lift large mechanical and structural items. These mobile cranes include crawler cranes, all-terrain cranes and pick-and-carry (Franna) cranes.

ASPEC has focused on two main crane

types: all-terrain cranes and crawler cranes. All-terrain cranes (demonstrated in Figure 3) can be driven on roads and are supported by outriggers when lifting. Conversely, crawler cranes require transport to lift sites and are supported by a set of tracks.

LIFT MODELLING

In order to determine the placement of cranes, ASPEC has developed 3D models of a variety of cranes, based on key dimensions:

- ❖ body length and width;
- ❖ outrigger width (for all-terrain cranes);
- ❖ track width, length and spacing (for crawler cranes);
- ❖ counterweight swing radius; and
- ❖ slew point.

Key geometry such as the lifting axis, ground and boom pivot point are represented by included work features. These allow for the positioning of the crane and simple measurement of the lift radius. The lift radius and boom length can then be used to determine the crane's lifting capacity for the given scenario. Figure 3 demonstrates a crane positioned in a 3D model used for a design review.

In addition to determining the lift radius, the availability of a parametric 3D model allows engineers to assess the suitability of pick points and component placement. Furthermore, the lift sequence can be



Figure 2: cabin lift.

animated using CAD software to accurately track the lift path.

ASPEC has catalogued a wide range of crane capacity tables and use in-house calculation templates to quickly determine crane capacity using the given inputs.

CRANE SUITABILITY IN THE DESIGN STAGE

During the early stages of a design project, there are clear benefits to considering the use of cranes during project execution. Given a specified crane, it is possible to determine potential crane locations, and use the calculated lifting capacity to determine the breakdown of components. If a crane is not yet specified, the selection of a crane can improve the accuracy of cost estimations or allow the visualization of construction. This can aid in reviewing construction sequencing or identifying potential clashes.

A key area of materials handling is ship loading and unloading. Many of these machines are positioned on wharves, which can often have limiting structural loads. A preliminary lift study will allow for the calculation of crane outrigger loads and the location of the load.

CASE STUDY – SHIPLOADER CABIN REPLACEMENT

As part of providing detailed engineering services for a major upgrade of Shiploader SLI at the Hay Point Coal Terminal, ASPEC was involved with the installation of a new operator's cabin. ASPEC's role included providing input for crane selection and performing wharf structural checks and designing strengthening as required.

With the cabin mass and approximate crane positioning known, the crane could be selected based on lift capacity at the given lift radius. The main objective in selection was to minimize the wharf load and optimize the positioning of outriggers above wharf structural supports. While a larger crane imparts a larger point load, differing outrigger dimensions present an opportunity to negate this impact through positioning.

After preliminary crane selection, ASPEC was able to perform structural checks of the wharf area and identify the need for minor local strengthening. The strengthening required was only minor and did not present an unreasonable increase in project duration or cost.

CASE STUDY – PORT EXPANSION DESIGN

ASPEC, in association with Rendel Ingerop Pty Ltd, is currently involved in the design of the Roy Hill Stanley Point Berth 3 Project. A key design requirement of the project was facilitating simple and safe conduction of typical maintenance activities. Roy Hill specified the cranes available on site to perform activities including conveyor drive replacements and wharf dolphin replacements. The main objective was to perform these replacements with the components fully assembled to reduce the amount of work required during shutdown windows.

Given the known mass of the conveyor drives, ASPEC was able to identify crane positioning that allowed the drives to be lifted with the required capacity and without any clashes. This positioning and the associated point loads allowed Rendel to ensure the wharf had sufficient structural capacity at these points.

When considering replacement of the dolphins, ASPEC identified positioning of a crane that would have sufficient capacity for the lift. However, the inclusion of the crane in the 3D model allowed for the identification of a potential clash between the

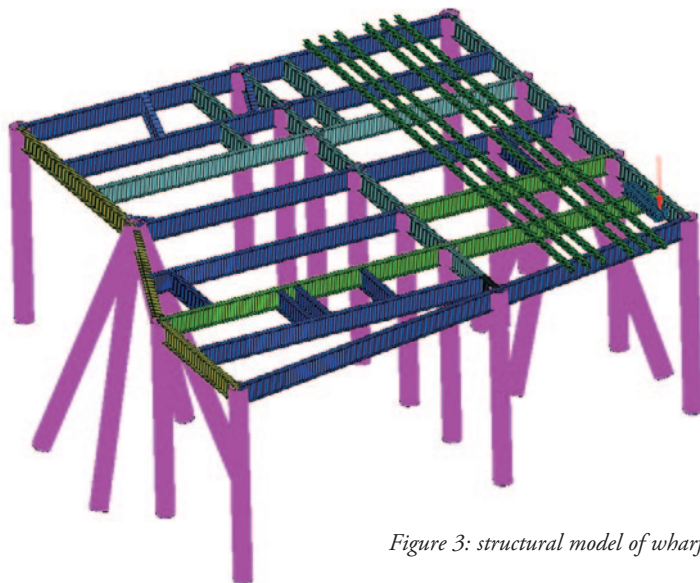


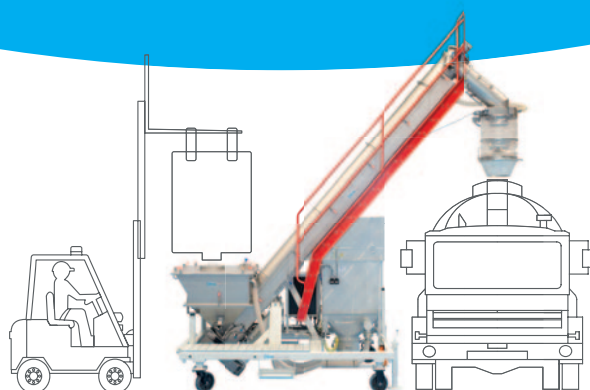
Figure 3: structural model of wharf.

crane counterweight and some wharf conveyor furnishings. ASPEC reviewed alternate solutions, including using a larger crane in a different position, or requiring minor disassembly of the conveyor furnishings to allow the lift. Both options are available during the dolphin replacement.

CONCLUSION

Using cranes to lift large components can be a significant part of a project's logistics and expense. Considering this early in the design phase allows for identification of potential issues which can often be rectified easily. Conversely, identifying issues after design or during construction can result in far more expensive or complicated solutions.

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Kilic Engineering grain reclaimer and stacker set for international market



KE's NEW INNOVATIVE GRAIN RECLAIMER AND SUPERFAST GRAIN BUNKERSTACKER MACHINE TO HIT THE GLOBAL MARKET IN LATE 2024

Kilic Engineering's international brand, KE Agri International (KE), is expanding its overseas presence and entering the USA market later this year with its BunkerSweeper600 grain pile reclaimer being introduced to storage and handling operations across the mid-west.

KE has been supplying bulk handling equipment for grain handlers in Australia,

Asia and the Middle East for almost 50 years, servicing the agricultural industry with fixed and portable machinery over that period. With open stockpile storage facilities (grain pile or bunker storage) becoming more prevalent in many grain producing countries, KE has been concentrating more recently on supplying its customers with its specialized bunker in loading and reclaimer machines.

Its new BunkerSweeper600 reclaimer will undergo US field trials in November 2024 in Iowa, Nebraska and South Dakota.

These trials will involve major bulk handlers such as CHS and Viterro USA as well as several other companies including KAAPA ethanol who are keen to see the machine in action after its promotion at the GEAPS conference and expo in Kansas City earlier this year.

The BunkerSweeper600 is designed to make reclaiming grain from temporary storage, grain piles or sheds, directly into road trucks quick and easy, reducing operating costs for grain distributors and handlers, with its superior safety features



The reclaimer drives itself on and off a flat-bed truck trailer for easy transport between sites.

The Super Roo version 3750 can discharge trucks at 750tph (wheat).



making it one of the safest methods to move agricultural produce from a grain pile to a truck.

The new model reclaimer is self-propelled (using hydraulic drives) which meets the needs of operators seeking an alternative to using front-end loaders or other less efficient mobile plant to recover products from open stacks and piles or from shed storages. Its manoeuvrability, one-person operation and suitability to handle all grains, including corn, oilseeds and pulses makes it a valuable addition to agricultural bulk handling operators across the globe, with remote control and automation ready technology a key feature of the new machine.

The self-propelled unit has a capacity of over 600tph (metric tonnes per hour) (wheat at 800kgm³) or 22,000 bushels equivalent and can be used to direct feed into road trucks or into other portable conveyors to outload product from the storage pile, providing additional flexibility for the operator.

Its swing conveyor offers multi-directional feed, whilst hydraulic steering, the ability to have its height adjusted to allow for various ground levels and pneumatic tyres providing stability and traction, are other features of the new reclaimer.

Furthermore, the BunkerSweeper600 is compact, which enables it to be easily driven onto and off a flattop trailer and transported from site to site as a standard semi-trailer load in most jurisdictions.

On the grain unloading side of grain handling operations, KE's BunkerStacker

range of handling equipment has continued to be a leader with the larger bulk handlers in Australia, with the extremely popular self-propelled machines allowing road trucks to deliver grain to a shallow above ground road hopper which feeds an underbelly belt conveyor onto a stacking conveyor to move product into open storage grain piles or 'bunkers', as well as into horizontal shed or warehouse storages.

Farmers, truck drivers and machine operators have said they appreciate the easy loading system — deliveries can be made by driving over the 6m dumping zone and leaving up to 12 tonnes to be moved. The machine is self-propelled and is a self-contained work centre, reducing the workload for other equipment around grain handling sites.

KE currently services the majority of bulk handling operators in Australia with its bunker loading equipment, with major customers including Viterro, CBH, Cargill, ADM, CHS Broadbent, LDC, T-Ports, Bunge, Manildra, Fletchers International, Australian Grain Exporters (AGE), Altor Ag and Robinson Grain.

KE's BunkerStacker range includes the base level Joey version, which utilizes a smaller dump pit and conveyor to stack the product at a maximum rate of 600tph (wheat tonnes), to the Super Roo version which receives and stacks product at 750tph (wheat tonnes).

The fastest discharge machine that KE currently produces is its Super Roo version or BunkerStacker3750 machine which has the added benefit of requiring only a 14

metre (46 feet) footprint between bunker or grain stockpiles for truck access.

The most popular of the current range of portable stackers is KE's Big Roo BunkerStacker3000 which has a handling capacity of 600tph (wheat tonnes) and is capable of handling truck lengths of over 30 metres with its easy access nine-metre-long approach and exit ramps supporting delivery to a six-metre (19ft) drive-over hopper pit for rapid discharging of the truck's cargo.

These machines are a one-person operation with self-propulsion features and hydraulic lifting jacks for the hopper, stacker and ramps enabling the equipment to move along the grain or product stack with ease. Powered by its own generator set mounted to the unit, the Dump and Go hopper design featured on the Roo and Super Roo is a point of difference to other machines on the market and allows for softer handling of agriproducts, particularly pulses and oilseeds, in addition to the major cereal grains in wheat, barley and oats.

During 2024, KE worked with its customer base to develop additional models to its BunkerStacker fleet which can now incorporate auger discharge conveyors in lieu of its standard underbelly belt conveyors which feed grain and other products from the receive hopper to the conveyor stacker.

Some customers consider the new under belly auger (UBA) design hopper discharge is more suited to oilseed products and, although many still prefer the under belly belt (UBB) conveyor option which handles all grains, pulses and

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oilseeds, KE has been more than happy to modify its designs and manufacture alternative machines to meet specific customer requirements.

In addition to the new UBA design hopper conveyors detailed above, KE is working with customers to trial an even faster BunkerStacker machine that can unload grain deliveries from farmers at 1,000 wheat tonnes per hour. The demand for this superfast machine, to be labelled the BunkerStacker SuperRoo 4000 is not just driven by Australian interest at grain handling receival sites but also KE customers overseas who are looking to utilize the newly developed model in their transshipment operations.

The New SuperRoo 4000 will be the fastest unloading bunker loading machine in the market and will feature the traditional large hopper, serviced by with UBA conveyors feeding a twelve hundred mm wide chevron belt with all the other standard features of the SuperRoo 3750



KE's new UBA (under belly auger) hopper conveyor unloading Canola (rapeseed) on a BunkerStacker3000 Roo machine (and above).

detailed above.

The initial machine will be operational in early December and trialled at LDC sites in Australia during this coming harvest.

KE is a diverse mechanical engineering company based in Adelaide, South Australia, owned and operated by the Kilic family

since 1973. The company has a long and proud history of excellence in designing, manufacturing and installing a wide range of material handling systems, including its exclusive and most popular BunkerStacker and BunkerSweeper range of portable agri product handling equipment.



KE's standard UBB (under belly belt) hopper conveyor unloading wheat .

Working with the GENMA mobile harbour crane is easy and fast

The 105-tonne GENMA mobile harbour crane (MHC), designed and built by Rainbow Heavy Machineries (RHM) for an overseas client, has now been in smooth operation for a year since its deployment in August 2022. Its outstanding performance and comfortable driving experience have earned high praise from the client.

Mr. Tunnu, the operator of the GENMA MHC at the client company, said, "This GENMA crane which I'm working with performs functions very smoothly, and the operation process is very stable."

To meet the client's needs for loading and unloading bulk cargo, containers, and general cargo, the GENMA MHC is equipped with various work attachments such as hooks, grabs, and container spreaders, along with advanced intelligent management and control systems to



enhance its functionality and performance.

INTELLIGENT MANAGEMENT SYSTEMS ENSURE STABLE OPERATION OF THE EQUIPMENT

- ❖ **Intelligent power adjustment system:** the lifting, luffing, and slewing mechanisms of the GENMA MHC can intelligently adjust acceleration and deceleration based on the lifting weight and boom reach, ensuring smooth and safe operation.
- ❖ **Intelligent diesel management system:** can make real-time adjustments based on fuel consumption, ensuring continuous and stable engine power of the equipment while optimizing fuel efficiency.
- ❖ **Multi-mechanism linkage intelligent management system:** through intelligent linkage, the stable operation of each mechanism and sufficient power during the lifting process are guaranteed, improving operation efficiency.

INTELLIGENT CONTROL SYSTEMS ENSURE SAFE OPERATION OF THE EQUIPMENT

- ❖ **Intelligent torque limiting system:** can meet the crane's operational needs under various working conditions and with different lifting



attachments, ensuring efficient and safe operation.

- ❖ **Intelligent anti-collision system:** during the slewing and luffing process, the GENMA MHC uses integrated design and algorithms to achieve deceleration and stopping within a limited working area, intelligently avoiding collisions with other buildings or equipment, thus enhancing operational safety.
- ❖ **Crane information intelligent management system:** the operator can read real-time data on the working hours, pressure, current, alarm information, and historical records of each mechanism of the GENMA MHC, providing strong data support for managing the equipment's operational status.

Additionally, the user-friendly driver's cabin of the GENMA MHC is highly appreciated by the client. "The operator seat of the GENMA MHC is very comfortable, and the excellent visibility from the driver's cabin is highly functional. Working with the crane is easy and fast."

As the first MHC brand in Asia, GENMA boasts extensive experience in MHC product design and manufacturing. It has independently developed some intelligent technologies, such as the intelligent path planning system, intelligent anti-sway system, and intelligent energy storage management, effectively enhancing the stability, environmental protection performance, and safety of the equipment, and providing clients with professional solutions for lifting operation and bulk cargo handling.

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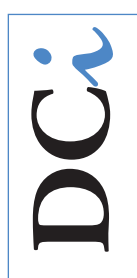
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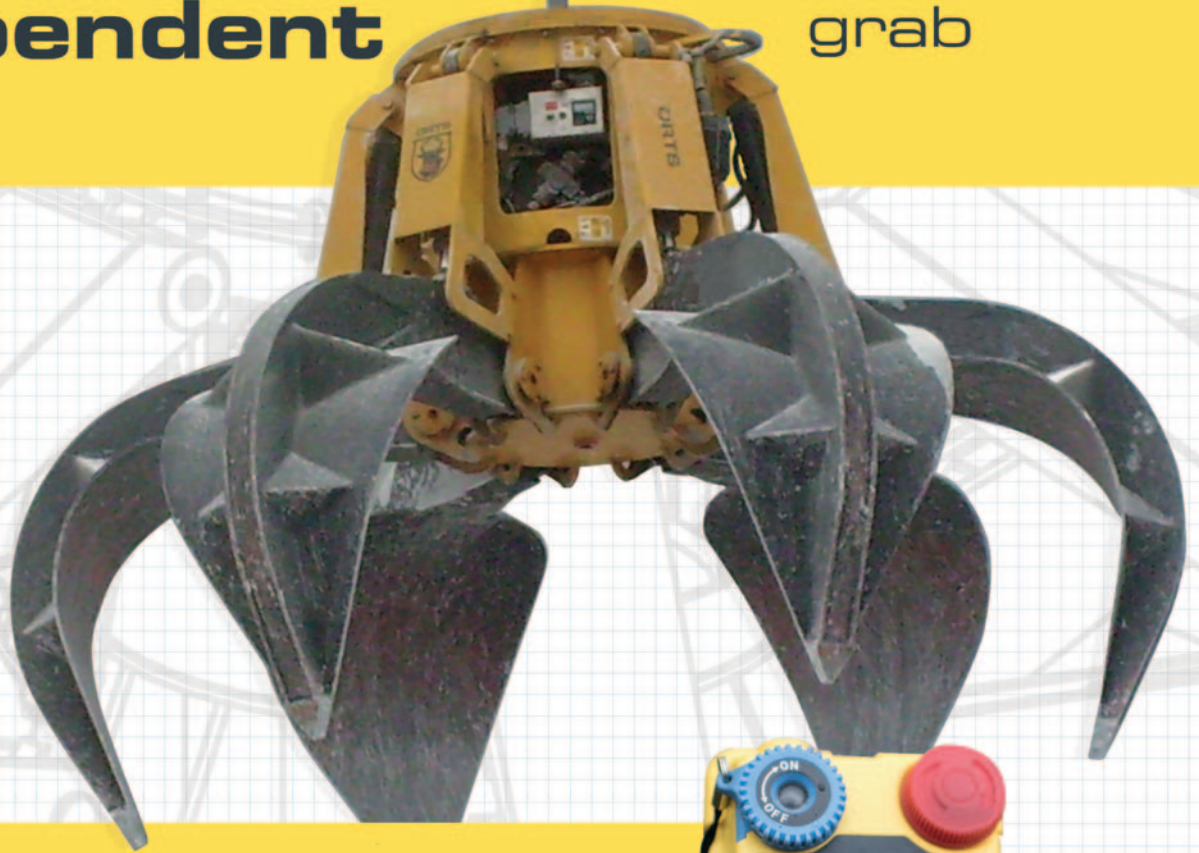
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