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ISSUE NO. 280 JUNE 2024



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ISSN 1466-3643

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Hazy iron ore trade prospects

A varied outlook for commodity import demand around the world is evolving. Global seaborne dry bulk trade evidently has been holding up firmly after last year's upturn but potential for further growth in 2024 seems uncertain and perhaps limited.

Several influences are contributing to a supportive global economy, although a strong improvement this year seems unlikely. The latest update by the OECD organization published at the beginning of May suggested that continued gross domestic product growth "at a modest pace" is achievable, and risks to the world outlook "are becoming more balanced". Declining interest rates amid receding inflation are expected to provide benefits for economic activity and dry bulk trade.

IRON ORE

Following last year's recovery, a flat or marginally higher volume of world seaborne iron ore trade could be seen in 2024. Several importers may see larger purchases, but the performance of China will probably have the largest influence on shaping the outcome due to its dominant position, as shown by the breakdown in table 1.

During the first four months of this year China's iron ore imports totalled 412mt (million tonnes), rising by 7% from the same period a year earlier. However, port inventories have enlarged and crude steel production was 3% lower in the January–April period. Amid a weaker

property market that comprises a large part of the country's domestic steel consumption, there are doubts about support for iron ore trade in the months ahead despite stronger exports of steel products.

COAL

Restricted import growth or possible downturns, in coal imports by the two largest buyers — India and China — together comprising almost half of the world total, are envisaged during 2024. Elsewhere, including many European countries and some Asian importers, growth prospects are heavily constrained by continuing advances in the shift towards cleaner energy supplies.

According to a new report published last month by energy think tank Ember, in 2023 record renewable electricity generation (the sector in which coal use is concentrated) propelled the world "towards a new era of falling fossil generation". Expansion of solar and wind power in particular is steadily diminishing coal's market. Renewable sources provided 30% of world electricity requirements during 2023.

GRAIN & SOYA

More attention is now being focused on prospects for grain and soya trade in the new 2024/25 year approaching. For wheat, about a third of the total, the marketing year begins on 1 July. For the remainder, corn and other coarse grains plus soyabeans/ meal, the year starts on

1 October. Trade is expected to be fairly flat.

The US Department of Agriculture, in its first forecast for 2024/25 revealed a few weeks ago, suggested that world grain and soya trade may be marginally higher by under 1%. In the current 2023/24 year a 24mt or 4% increase to 693mt is estimated. But the calculation for the year ahead is tentative, mainly because weather conditions affecting harvests in both importing and exporting countries are unpredictable.

MINOR BULK

Higher volumes of industrial raw materials and products movements could provide additional impetus for the minor bulk segment this year. Positive signs have emerged in some of the biggest components, the steel products, forest products and bauxite/alumina trades, as well as in other ores and minerals.

BULK CARRIER FLEET

Among bulk carrier size groups, the handymax (including Supramax and Ultramax) category of ships with a 40–69,999 deadweight capacity comprises over 20% of the entire world bulk carrier fleet, as detailed in table 2. During 2023 Handymax capacity grew by over 3%, sustaining a trend of fairly steady annual expansion rates in recent years. Amid increased newbuilding deliveries and low scrapping this year, similar growth is likely to continue.

TABLE 1: KEY IRON ORE IMPORTERS (MILLION TONNES)

	2018	2019	2020	2021	2022	2023
China (incl land)	1,064.5	1,068.7	1,170.1	1,125.6	1,107.7	1,178.0
Japan	123.9	119.6	99.4	113.1	104.2	102.2
EU+UK	106.1	96.7	82.8	97.0	89.0	82.5
South Korea	73.3	74.7	70.4	74.1	66.4	68.3
Taiwan	24.2	24.0	21.2	25.0	22.6	19.4
Total of above	1,392.0	1,383.7	1,443.9	1,434.8	1,389.9	1,450.4

source: China Customs, AGDISR, Bulk Shipping Analysis

TABLE 2: HANDYMAX (40–64,999 DWT) BULK CARRIER FLEET (MILLION DEADWEIGHT TONNES)

	2018	2019	2020	2021	2022	2023
Newbuilding deliveries	5.6	8.2	9.2	7.0	7.3	9.4
Scrapping (sales)	0.7	0.8	1.7	0.6	0.4	1.6
Losses	0.0	0.1	0.0	0.1	0.0	0.0
Plus/minus adjustments	0.1	0.1	0.0	0.0	-0.1	-0.1
Fleet at end of year	199.7	207.1	214.6	220.9	227.7	235.4
% change from previous year-end	+2.5	+3.7	+3.6	+2.9	+3.1	+3.4

source: Clarksons Research (historical data) & BSA

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Coal exporters confront a puzzling outlook



Richard Scott, Bulk Shipping Analysis

After three consecutive years of global seaborne coal trade expansion, assessing the possibility of the trend continuing is a puzzle for exporters and other market players. Despite recent signs of well supported import demand in some countries, other indications for potential activity in the remainder of 2024 and into next year are less positive. Prospects for individual exporters are likely to vary.

Many uncertain elements are familiar coal market features. The products of industries using coal are affected by progress in economic activity around the world, which is still showing limited ability to strengthen. A complicating factor is geopolitical events, especially ongoing disruption of world energy supplies caused by the war in Ukraine. Also, support from influences that benefited coal purchases by major importers last year may not be

prolonged in the period ahead.

The existential shift away from fossil fuels, coal in particular, is another aspect, and is expected eventually to have a large adverse impact on trade movements. Further pressure is being exerted by policies in numerous countries to increase the use of cleaner energy, especially the renewable sources of wind and solar power. In these circumstances coal demand and trade flows are likely to be greatly restrained and ultimately reduced, with negative implications for many exporters. But in the short term at least, tight energy supplies and more emphasis on energy security is an offsetting influence.

Recent forecasts of world coal trade in 2024 vary. Some point to a flat or slightly higher volume than seen last year, while others are more pessimistic, envisaging a

decrease. Available global export supplies enabling this range of outcomes seem adequate. As usual, however, there are uncertainties surrounding how activity by the main buyers and sellers will evolve.

ENERGY BACKGROUND

Events unfolding around the world over the past few years dramatically emphasized how changes in the pace and pattern of economic activity affect energy consumption in general and coal usage in particular. During and after the coronavirus pandemic an economic recession and recovery were reflected in coal trade changes. Subsequently in 2022 a global energy crisis with tighter supplies and increased prices followed Russia's invasion of Ukraine, contributing to surging inflation and rising interest rates in many countries, restraining economic activity

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WORLD COAL TRADE — PRINCIPAL EXPORTERS (MILLION TONNES)

	2019	2020	2021	2022	2023	2023 % change**
Australia	397	371	366	339	351	+4
Canada (coking)	34	31	31	35	38	+9
Colombia	74	60	55	54	49	-9
Indonesia	459	407	436	470	523	+11
Russia	150	154	167	158	164	+4
South Africa	77	73	65	71	73	+3
USA (exc to Canada)	80	58	73	73	86	+18

** compared with previous year

source: Australian Government Dept of Industry, Science & Resources and BSA calculations

into 2023.

Prospects for economic activity in 2024 suggest limited potential for improvement compared with last year. For the world as a whole, growth in gross domestic product this year is expected by the OECD organization to be the same as seen in the past twelve months. But the declining inflation trend becoming more firmly established in recent months implies a reversal of the upwards trend in interest rates, providing an expected boost for economic activity as consumer and business spending strengthens.

These changes are highlighted by the latest OECD update published in early May. The global economy is expected to continue growing “at a modest pace” in 2024 and beyond, and it is observed that “the impact of tight monetary policy conditions continue to be felt”. The organization cautions that “inflation may stay higher for longer, resulting in slower-than-expected reductions in policy interest rates”.

GDP growth in the world economy was 3.1% in 2023 and is forecast to remain at the same rate in 2024 followed by a marginal strengthening next year. Looking at specific forecasts for countries which are major coal importers, India’s GDP growth in 2024 could remain high at 6.6% while China’s growth is expected to decelerate to 4.9%. In Japan’s progress may be minimal this year at +0.5% and in the euro area growth also may be minimal at +0.7%.

These expectations suggest that positive effects on energy consumption from economic activity trends are likely to prove limited. Consequences are not always obvious, because other influences will modify the impact of any change in the broad pattern of economic activity.

Coal import demand specifically, in some countries, reflects other developments. Varying trends in domestic production of coal (where this aspect is relevant) can be influential, especially in

China and India, where changes in these supplies are often a prominent element determining foreign coal purchases. Another aspect already mentioned is the longer term focus on alternative energy sources. Environmental regulations designed to limit or reduce coal burning are a notable feature. A heightened emphasis on energy security in many countries is also evident.

OVERVIEW OF EXPORT MARKETS

The outlook for coal exporters in the current year seems mixed, as it often seems, with some raising volumes while others experience reductions, although the outcome clearly depends greatly on how overall import demand and its pattern evolves. Changing trade patterns could provide advantages for a number of suppliers, especially if in other countries exports fall.

In the past few years seaborne trade developments re-emphasized how political decisions in importing countries — often reflecting environmental pressures designed to cut carbon emissions and reduce air pollution — are shaping coal trade. Decisions of this type are foreseeable in principle, but the precise timing and extent is not always predicted correctly, adding impetus to speculation surrounding trade volumes and patterns. Currently the ongoing war involving one of the biggest coal exporters, and sanctions imposed in reaction, are compounding uncertainty about political influences on the coal market.

Recently an example of a cautious outlook for 2024 was published. Calculations by the Australian Government Department of Industry, Science and Resources suggest that world coal trade - mostly seaborne but including land movements — could decline by 39mt (million tonnes) or 3%, from 1,469mt last year to 1,430mt this year.

Differing performances in the two parts

are envisaged. Steam or thermal coal trade, the largest part comprising just over three-quarters of the total, is forecast to decline by 24mt (2%) to 1096mt this year. In the metallurgical or coking coal sub-sector comprising the remainder, the current year’s volume is estimated at 334mt, a decline of 15mt or more than 4%.

Reflecting the uncertainties evident, forecasters’ opinions do not always align. In the weeks since these calculations were published, other coal trade analysts have suggested that a small increase in the world seaborne 2024 total, compared with the previous twelve months, may be achieved. China and India, together comprising almost half of world imports, are countries where there is much uncertainty about foreign purchases.

This outlook suggests a possibility that some supplying countries could raise exports during 2024. But, assuming a smaller global increase than actually materialized last year or alternatively a decrease, coal exporters probably will experience greater competition. Direct commercial competition reflecting availability, quality and price will influence varying success in achieving results. The trade policy of governments, especially affecting imports from Russia that are under sanctions prohibiting purchases, also are likely to be instrumental in shaping trade movements.

Exporting countries’ coal production, availability and quality of export supplies reflect domestic influences. These include the scale, efficiency and profitability of mining activity and output, the type of coal produced, and the proportion absorbed by domestic demand. Production costs and internal transport capacity for moving coal from mines to loading ports and the costs involved have an impact on competitiveness and pricing in the international market.

INDIVIDUAL EXPORTERS’ OUTLOOK

Major suppliers to the world coal market

are included in the table, showing export totals for 2023 and trends in preceding years. These seven large exporters' volumes represent over 95% of all world sea trade in coal. It is evident that large and often contrasting annual changes among individual countries are a feature. Another notable characteristic is how the market is dominated by three countries. Indonesia and Australia, together with Russia, comprise almost four-fifths of world export supplies.

In 2023 coal exports by number one supplier Indonesia (predominantly steam coal) increased by 53mt (11%) from the previous year, to reach 523mt, according to these calculations. The total included large quantities of low-grade lignite mainly carried to China for power station use. During 2024 signs suggest that further growth may be hard to achieve, resulting in a fairly flat volume. Government policy aims to ensure that expanding domestic coal use is always well supplied, a priority implying some uncertainty about how export sales evolve.

Exports from Australia are fairly equally divided between steam coal and coking coal. In 2023 the 351mt total was 12mt (4%) higher, comprised of 207mt steam coal (59% of overall volume) and 144mt coking

coal (41% of the total). In 2024 an overall increase of over 20mt or 6% to 375mt is forecast by AGDISR, mainly due to an envisaged rise in coking coal quantities, but other forecasts suggest a smaller rise may occur. Coal supply constraints are expected to ease this year, implying improved potential for extra sales.

Russia is the third largest supplier to the world market for seaborne coal, mainly selling steam coal grades which comprised over four-fifths of exports in the past twelve months. Last year's export total was 164mt, a 6mt or 4% increase. During 2024 some weakening may be seen but forecasts are largely speculative. Uncertainty in particular surrounds the impact of international sanctions that have reduced buying by several importers, while other importers not imposing sanctions have raised purchases. The ability of Russian exporters to continue directing extra sales towards these non-sanctioned markets seems unclear, despite the competitive advantages of having low-cost, high-quality coal available.

Coal exports from the USA (excluding shipments to Canada) were much higher last year when the total increased by 18%, to reach 86mt. Within this quantity both steam coal and coking coal comprised

equal proportions at 43mt. Indications suggest that in 2024 the total may be similar although AGDISR calculations point to a somewhat lower volume. The USA is generally viewed as a price-sensitive swing supplier in world markets, because most production is high-cost and therefore more vulnerable to competition.

South Africa's seaborne coal sales, mainly consisting of steam coal, rose last year. The total was about 3% above the previous year's level at 73mt and for 2024 estimates vary between a small increase and a reduction. One feature, restraining throughput at the Richards Bay terminal, handling most of the country's shipment, has been various logistical problems encountered in transporting coal from mines to the port.

Similarly exports from Colombia mainly comprise steam coal grades. The total decreased in 2023 by 5mt (9%) to 49mt but some forecasters envisage that this year's volume will see a pickup. However several influences could restrict production over the years ahead, implying difficulty in maintaining current export levels.

Another significant supplier is Canada, mainly exporting coking coal. Seaborne exports (excluding shipments within North America to USA) increased last year by



3mt (9%) to 38mt. In 2024 the total may diminish, according to some estimates. A relatively minor supplier is Mozambique, which exported 5mt of coking coal last year, similar to volumes seen in previous years. Signs suggest that potential for increases in the years ahead is limited.

AN UNCLEAR TRAJECTORY

Most of the world's coal exporting countries are facing an uncertain future amid clear indications that, in the longer term, a shrinking market for coal is likely to unfold. But such a trend overshadowed by adverse influences may not become established in 2024 or, if it does begin, the negative change may be quite small. Nevertheless, potential for a larger weakening in the current year is apparent, especially if there is a sharp downwards adjustment of purchases by one of the biggest importers.

Over a longer period, a diminishing global coal import demand trend is widely expected to occur, probably affecting most exporters albeit unevenly. Environmental pressures have profoundly unfavourable implications for coal usage and trade. In many countries decarbonization strategies are being applied with intensified vigour. Competition from alternative energy sources is growing, especially renewables, with some benefiting from falling costs. Government measures in numerous countries are designed to deter or prevent coal usage in the years ahead.

Two assumptions are applicable to an assessment of prospects for global coal import demand and the participation of exporters during 2024 and into next year. First, economic activity around the world remains fairly firmly supported, albeit probably not strengthening much, with implications for energy- and coal-consuming industries. Second, geographical trading patterns remain disrupted by the war in Ukraine and its wider consequences for both importers and exporters in the world energy market.

Coupled with recognition of the pervading effects of environmental policies, prospects for further growth in global seaborne coal trade this year are hazy. A small increase in this trade is a plausible possibility, although it is perhaps an optimistic view that may not prove attainable.

Downside risks to the coal trade forecast are especially visible in China and Europe. The nature of the risks is markedly different in these two major importers. In Europe the rapid phase of reducing or eliminating coal use, especially in power stations is ongoing and commencement of the phasing out of coal use in the steel industry is approaching. How much this will impact imports in a single year, 2024, is not so clear but the trajectory over a number of years is visible.

China's position as the number one importing country with well over a quarter of the world coal imports total is different.

Imports although massive form a small part, about 7%, of the Chinese coal market mainly supplied by domestic mines. Limited changes upwards or downwards in domestic coal production, consumption and stocks sometimes have a disproportionate impact on imports which also partly reflect government policy changes. Last year's huge imports increase as a result of output, usage and stocks changes may prove to have been exceptional and could be at least partly reversed either in 2024 or next year.

Adverse pressures are also evident in some other Asian countries, where changes weakening coal use are already clear or are foreseeable, reflecting government energy policy priorities. But the pattern is not uniformly negative for coal trade, because in several smaller Asian importing countries consumption growth is still evolving.

As a general feature, coal trade prospects in the longer term future have become harder to predict. Commercial influences are now accompanied by powerful political influences reflecting environmental pressures. Although the longer term trend's broad direction appears to be identifiable, year-to-year forecast changes in global trade volumes tend to be heavily based on speculation and guesses, both for the total and for individual countries involved. Assumptions about changes require frequent modification. Views about coal sales by exporters reflect these complicated patterns.

DCi



INTERCARGO Bulk Carrier Casualty Report highlights positive improvement in safety of dry bulk shipping

- ❖ There is now a clear ten-year trend showing significant improvements in safety across the dry bulk shipping sector.
- ❖ In 2023 there was one loss of a dry bulk vessel and no loss of lives.
- ❖ Safety improvements have been achieved despite the dry bulk fleet growing by 20% more in tonnage over the past decade.

Annual casualty figures from INTERCARGO, the International Association of Dry Cargo Shipowners, highlight continuing improvement in the safety performance of the sector. The Association's Bulk Carrier Casualty Report records the yearly loss of vessels* and lives across the dry bulk sector, with the intention of monitoring the impact of safety measures in the sector across the globe.

The bulk carrier fleet has grown significantly in recent years to cater for the world's growing economy. Between 2014 and 2023 the number of vessels increased by 20% (to 12,200 according to the statistics used for the purposes of the report), with today's bulk fleet representing more than 40% of world tonnage and carrying an estimated 55% of the global transport work. Despite the fleet growth, encouraging statistics show that the loss of vessels continues to fall.

Naturally, areas of concern remain including cargo liquefaction or other moisture related cargo failure mechanisms, which pose the greatest risk to life, contributing to the loss of 55 lives or 61.8% of the total loss of life over the past 10 years. Groundings remain the biggest cause of ship losses. Enhancement of safety awareness by all parties, and especially the need for stakeholders to provide ships' crews with the correct cargo characteristics details, remains a priority to reduce casualties even further.

The reduction of incidents, as revealed in the Report, can be attributed to continual safety improvements implemented by ship operators in tandem with enhanced legislation within the sector. A significant contributing factor to the safety performance of bulk carriers is the development and implementation of an improved international regulatory framework. As a Non-Governmental Organization (NGO) within the



"Safety performance in the dry bulk sector has steadily improved."

Dimitris Fafalios, Chairman of
INTERCARGO

International Maritime Organization (IMO), INTERCARGO is proud to have played an important part in the development of this legislation. The adoption of new technology to improve ship design is also a major causal factor.

Announcing the publishing of the latest Bulk Carrier Casualty Report 2014–2023, Dimitris Fafalios, INTERCARGO Chairman, commented:

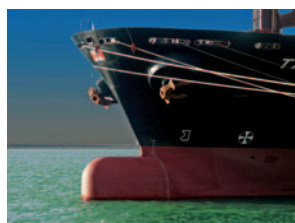
"Bulk carrier safety must never be overlooked. We have come a long way since the 'dark days' of the 1980s, when we experienced many tragic losses of lives and vessels. Since then, safety performance of the sector has steadily improved, thanks in large part to concerted efforts by INTERCARGO with other industry stakeholders. These latest statistics reveal an impressive achievement, especially when considering the significant rise in the number of bulk carriers during this period."

"There is, however, definitely no room for complacency. Any loss of life is tragic, and the shipping industry must pay close attention to the contributing causes analysed in this report. INTERCARGO believes the dry bulk sector should be proud of its achievement and recognize that improved safety is largely thanks to continuous crew and shore-staff training, improved ship design, new technology and stronger regulatory compliance," Fafalios said.

INTERCARGO has vowed to continue to work tirelessly with all stakeholders in order to improve bulk carrier safety and ultimately to strive for the day where there are zero losses of dry bulk ships and

seafarers every year. We also point out that the pandemic and recent geopolitical events have generated new challenges for ship and crew safety which INTERCARGO is closely monitoring and voicing its members' concerns in all available fora.

The full report can be found on the INTERCARGO website.



ABOUT INTERCARGO

International shipping is vital for the global economy and prosperity as it transports approximately 90% of world trade. The dry bulk sector is the largest shipping sector in terms of number of ships and deadweight. Dry bulk carriers account for 43% of the world fleet (in tonnage) and carry an estimated 55% of the global transport work.

The International Association of Dry Cargo Shipowners (INTERCARGO) unites and promotes quality dry bulk shipping, bringing together 250 forward thinking companies from 30 countries. INTERCARGO convened for the first time in 1980 in London and has been participating with consultative status at the IMO since 1993. INTERCARGO provides the forum where dry bulk shipowners, managers and operators are informed about, discuss, and share concerns on key topics and regulatory challenges, especially in relation to safety, security, the environment, and operational excellence. The Association promotes its members' positions to IMO, as well as to other shipping and international industry fora, having free and fair competition as a principle.

*Vessels over 10,000dwt.

Survitec calls for greater industry oversight for fire safety inspections to combat increase in ship detentions and ship losses due to fire

Global Survival Technology solutions provider Survitec has highlighted the dangers of inadequate maintenance, testing, and inspection of ship fire safety systems in a new white paper, which points to an alarming increase in fire-safety-related deficiencies found during Port State Control Inspections and subsequent ship detentions.

In a white paper released at the Posidonia tradeshow in early June, Survitec highlights that fire continues to be a leading cause of major shipping incidents, accounting for over 20% of total losses, and the most expensive cause of marine insurance claims. While the highest level of fire safety deficiencies in a decade was recorded by the Paris MoU in 2022, and the Tokyo MoU also reported an increase in detentions, with a staggering 15,562 deficiencies reported in 2023.

"Analysts report a 17% year-on-year rise in shipboard fires, which correlates with an increasing number of reports and testimonies from our network of certified service technicians and engineers that document serious faults requiring immediate corrective measures," says Metkel Yohannes, Director of Service & Rental Solutions, Survitec.

Survitec has found that the economic downturn and the emphasis on cost reduction post-Covid have negatively impacted fire safety, with some shipowners and operators maintaining and inspecting safety equipment themselves in an attempt to save costs.

As Yohannes explains, "We're finding basic errors and oversights that do not become apparent until either the ship fails an inspection and is detained — or there is a fire."

He quotes an example. Survitec was called out to a vessel after an engine room fire. The crew had managed to extinguish the fire but suspected there was a fault with the high expansion foam firefighting system. The cause of the fault was a blockage in the system. The crew had installed a new foam pump and forgotten to remove one of the protective caps from the inlet.

Survitec also finds wrong parts being used or poorly fitted, or low-quality parts that deteriorate rapidly and fail. For example, in CO₂ firefighting systems, hydraulic hoses are often mistaken for high-pressure hoses but they are not designed for CO₂ applications and may



As an industry, current practice should be reviewed to determine if more oversight and governance, and more quality control procedures are required to protect crew and vessel safety.

burst under pressure.

"We see evidence of a slip in standards regarding basic safety practices but also a wide disparity in service quality between service providers. Approval stamps are being applied to fire systems and appliances that would or should not pass inspection. Some issues are self-evident; for example, rust on a valve or fire extinguisher is clear to see, but other issues are less obvious and can have catastrophic consequences," says Yohannes.

The white paper highlights an incident involving a bulk carrier. The vessel had completed a fire safety inspection and received full certification from a local service provider. Shortly after leaving port, a fire broke out in the engine room. Over half of the cylinders failed to activate despite the CO₂ system having been inspected and approved. While the fire was eventually extinguished, it caused significant damage to the vessel, resulting in off-hire and repair costs estimated between US\$2–3 million.

Yohannes states, "The development and introduction of alternative fuels, including the use and transportation of lithium-ion batteries, brings new fire risks and safety challenges that can't be ignored. Fire systems and equipment must be maintained and tested as mandated by SOLAS, the IMO and the FSS code.

"Shipowners and operators need accredited service partners they can trust. They must have confidence in the system of

approvals. It is clear there are substandard inspections taking place, which is worrying. Although service providers may boost many approvals, they may not be suitably equipped or resourced to perform all the required tests."

Yohannes concluded, "As an industry, current practice should be reviewed to determine if more oversight and governance, and more quality control procedures are required to protect crew and vessel safety."

ABOUT SURVITEC

Survitec is a global Survival Technology leader to the maritime, defence & government, aerospace and energy sectors. Survitec has over 3,000 employees worldwide, covering 11 manufacturing facilities and over 400 service centres. They operate in over 2,000 ports, spanning 96 countries. Survitec are the world's largest manufacturer and supplier of liferaft, Marine Evacuation Systems (MES) and offshore rental PPE. They are a leading supplier of fire solutions to the maritime industry and hold a market leading position for Pilot Flight Equipment in the aerospace & defence market. The Survitec team live by their purpose 'We Exist to Protect Lives'. Throughout its 168-year history, Survitec has remained at the forefront of innovation, design and application engineering and is the trusted name when it comes to critical safety and survival solutions.

Intermarine adds additional bulk carriers

The Intermarine shipping line, which forms part of the SAL-Intermarine Group, is to extend its service provision as part of its

Intermarine Bulk Carriers branding. With this in mind, it had already acquired a further two vessels, bringing the overall fleet size to 30 units.

In addition, IBC is to commercially operate the Harren Group's bulk carriers. This constitutes six vessels, with a combined 350,000dwt, with services being offered through its multi-purpose and

Handysize vessels.

Furthermore, Intermarine's bulk specialists are also to assume the role as commercial managers for all bulk carriers in the 76,000–95,000dwt range. In addition to these being the largest in the group, they are also used for the transport of wind turbine blades.

Richard Seeg, Intermarine's president, noted that there are certain synergies to be realized across the multipurpose and dry bulk segments. Above all, customers will

benefit from greater options and more efficient solutions. In addition, it is hoped that the merger of these two sectors will open up new markets.

As for the two new MPP F300 vessels that will be added to the fleet as of the summer, these are pre-owned. Both the *Industrial Ursula* and the *Industrial Katharina* are equipped with two very reliable 150-tonne NMF cranes and driven by a highly robust MAK engine.

Barry Cross

Class approval granted to remove onboard chief engineer

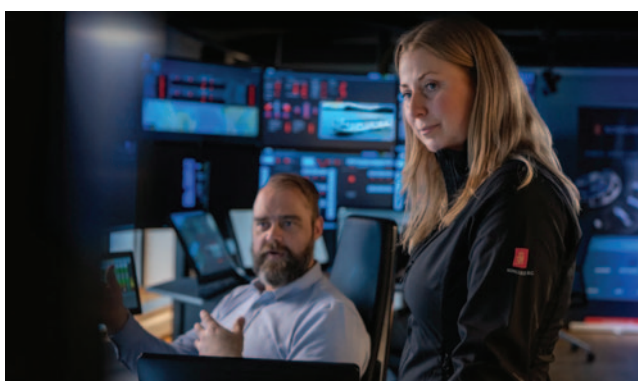
Kongsberg Maritime reports that it has received Approval in Principle from classification society DNV to enable the role of the Chief Engineer to be transferred from a ship to a shore-based control centre, to support the introduction of uncrewed vessel operations.

The proposed set-up would allow the Chief Engineer to be located at a Remote Operations Centre (ROC) where their duties can be carried out from a desk-based workstation, instead of onboard the vessel.

Such a system is set to be tested in the operation of three vessels: the world's first fully electric container vessel *Yara Birkeland*, and a pair of electric barges operated by Norwegian grocery retailer ASKO, named *Marit* and *Therese*. From the ROC workstation, the Chief Engineer will be able to monitor and control systems including the power management system, ballast water system and deck machinery on each of the ships.

The partners said that they expect full approval for what's known as 'Chief-to-Shore' functionality to be granted later this year once a period of testing has taken place, overseen by DNV and the Norwegian Maritime Authority.

"The journey towards autonomous,



and uncrewed operation of vessels is defined by a set of increments. To get there, we must take each step in-turn and prove the functionality and value before moving to the next," said Pål André Eriksen, Kongsberg Maritime, SVP Remote & Autonomous Solutions.

"The role of Chief Engineer is one which already involves a lot of monitoring of automation and control systems on board. For this trial, moving this functionality to the shore-based ROC will see one person now managing a range of systems across three vessels, rather than one."

"This is a significant and exciting realization, and we're pleased to have received Approval in Principle from DNV. There has been great collaboration from Yara, ASKO, DNV and the Norwegian Maritime Authority, to enable this functionality to be switched from ship to shore, and we look forward to testing

this latest innovative approach to transforming vessel operations."

Testing will be conducted this summer and will involve the shore-based technician managing a number of tasks remotely from shore. From the ROC, an 'aggregated view' of the three vessels will be visible at all times, and if an issue arises or an intervention is required on

one of the vessels, the system will manually switch to 'high attention mode' to focus operator attention where support is needed.

Alongside the Chief Engineer, other crew members, such as the Master and Navigator, will remain on the vessels throughout the tests, and in constant contact through radio and CCTV until full approval of the Chief-to-Shore functionality has been granted.

During the qualification process Kongsberg Maritime will be following DNV's class guidelines for Autonomous and Remotely Operated Ships (DNV-CG-0294) and Remote Engineering Monitoring and Control Systems (REMC), prior to full approval being granted.

The ROC in Horten, Norway, is a facility managed by Massterly, a joint venture between Kongsberg Maritime and Wilhelmsen.

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Clean Shipping Commitment

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HULL PERFORMANCE

Paint the strain away

Marine paints & coatings

Jay Venter

Certainty in uncertain times

Good ship management, like good seamanship, is about making decisions that meet the moment. It's about adjusting to the reality of present conditions, while keeping an eye on the horizon.

For veterans in the dry cargo sector, the International Maritime Organization's (IMO) ambitious revision of its Greenhouse Gas (GHG) emissions reduction strategy is just another variable to consider — they're used to recalibrating to a 'new normal' with every business quarter.

Stubborn inflationary pressures, a low vessel orderbook and an ageing fleet — these daunting factors were already causing uncertainty and bearish freight rates as we entered 2024. Unfortunately, the operating environment of today, exacerbated by rapidly evolving geopolitical risks impacting key trade routes, does not offer a view of calmer seas ahead.

So, for many, the IMO's change of its 2050 target — from 50% of 2008 emissions by 2050 in its earlier iteration to Net Zero by or around 2050 — simply represents another challenging variable to plug into their business plan; albeit a sizeable one.

Of course, the revised IMO GHG strategy is both a medium and a long-term

challenge for vessel owners and operators. There are 'indicative checkpoints' to meet: a 20% reduction in total GHG emissions by 2030 and 70% by 2040 (all relative to 2008 measurements).

The development, availability and affordability of zero and near-zero fuelling options for bulk vessels will be critical in the coming decades. However, in the near term, dry bulk vessel owners/operators must look at available technologies and solutions to maintain a good Carbon Intensity Indicator (CII) rating as well as increase the reference speed for Attained Energy Efficiency Existing Ship Index (EEXI) measurements.

Hull coatings are such a well-established industry tool that they are often characterized, incorrectly, as having little relevance beyond antifouling.

But in a world focused on decarbonization and energy optimization, hull coatings have much more to offer. A high-performance silicone-based fouling defence system in particular is an energy-efficient way to improve the hydrodynamics of a dry-cargo vessel, and by extension, reduce fuel consumption.

The secret to the effectiveness of a silicone-based fouling defence system (in comparison to a conventional self-polishing anti-fouling) is its exceptionally low hull roughness and a very long-lasting

antifouling effect. It doesn't matter if a vessel armed with a high-performance silicone-based fouling defence system undergoes extensive idle periods, changes trading patterns, or steams slowly.

"A high-performance antifouling solution is a fast and simple way to make a significant change, today," confirmed Nic Lawrence, Global Business Development Manager, Marine Dry Bulk at Hempel. "In the most basic terms, operators can reduce emissions by reducing fuel consumption without having to radically alter what they are already doing — no retrofitting engines, no training crew to handle alternative fuels — just a more advanced fouling defence system applied at drydock and off you go."

"In essence, it's a simple solution for vessel owners and operators, but the science and data underpinning the proven relationship between fouling control solutions and fuel emissions is complex," Lawrence added. "At Hempel we take a data-driven approach to identifying the most appropriate hull management solution for our customers and work with them to develop solutions that can help them reach their emissions reductions and operational objectives and do so in a way that is specific to each vessel," they said.

"For many, a silicone-based fouling defence system is most beneficial because

it offers a range of operational benefits – from emissions reduction to operational flexibility, as it is suitable for all waters, doesn’t require in-service dry-docking or cleanings for maintenance and tangibly reduces fuel requirements,” says Lawrence.

Some in the dry bulk sector may remain sceptical about the long-term environmental and financial impacts of coatings, and Lawrence was keen to make the case for a change in mentality: “It is possible to see the impact of a high-end hull coating on energy efficiency and resulting emissions and — crucially — to calculate the costs and potential savings, which are primary concerns for all vessel interests,” they said.

Hempel set out to demonstrate this principle by publishing its own independent simulation of the effect of Hempaguard X7 on three bulker types. The company modelled likely trading patterns, speed, activity, and water temperature to calculate hull-biofouling risks.

This analysis took into account how vessel performance impacted EEXI and CII ratings. But critically, it also extrapolated the total cost of ownership (TCO) and return on investment (ROI).

The findings make for fascinating — and even surprising — reading.

ULTRAMAX: SIGNIFICANT SAVINGS TO BE MADE

Ultramaxes sit in the 60,000–65,000dwt range, and typically operate in medium-warm waters where biofouling risk is more severe than in colder waters

The model data (based on a 2020-built Ultramax) presumed a full coating blast followed by full system application during drydock with Hempel’s Globic 9500 on the boot top and the company’s high-performance silicone-based fouling defence coating Hempaguard X7 on the flat and the vertical bottom of the vessel.

This was the basis for a comparison



Impact of hull coating upgrade | TCO & ROI

	Elements of Cost	Hempaguard X7 / Globic 9500	Globic 8000	Hempaguard X7 / Globic 9500 VS Globic 8000
Paint	Paint purchasing cost	\$300,000	\$150,000	\$150,000
	Surface preparation cost	\$45,000	\$19,000	\$26,000
Repair Yard	Washing cost	\$5,000	\$5,000	\$0
	Paint application	\$65,000	\$10,000	\$55,000
	Repair Yard Rent	\$40,000	\$30,000	\$10,000
	Off hire cost	\$95,000	\$72,000	\$23,000
Cleanings	Diver cost	\$0	\$11,000	-\$11,000
	Extra cost for next DD	\$0	\$12,000	-\$12,000
	Additional fuel consumption (HSFO)	\$0	\$150,000	-\$150,000
	Off Hire cost	\$0	\$36,000	-\$36,000
Fuel	Fuel Cost (HSFO) 5 Years	\$17,000,000	\$19,700,000	-\$2,700,000
	CO2 emission Tons (HSFO) 5 Years	136,300	153,000	-16,700
TCO	Total Cost of Ownership (HSFO) 5 Years	\$17,550,000	\$20,195,000	-\$2,645,000
Savings over 5 years (HSFO)				\$2,645,000
Payback Period (Months)				11
Increase in earnings per day (TCE)				\$2,000

Ultramax Vessel Data: Hempel.

with a full blast on the entire hull area with only Hempel’s Globic 8000 antifouling solution.

Over a five-year drydocking period, an Ultramax vessel coated in only Globic 8000 would release 153,000 tonnes of CO₂ emissions. The figure decreased considerably with the Globic 9500/ Hempaguard X7 combination: 136,300 tonnes of CO₂ emissions would be

released.

So the more advanced Hempaguard X7 coating reduced emissions by 16,700 tonnes over the five-year period, representing a reduction of almost 1%.

In fact, the total savings over a five-year docking period amounted to more than US\$2.6 million, and the investment was projected to be paid back in less than one year.





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► There are persuasive reasons - WHY - several major international shipowners continue to use the STEELPAINT-ZINC system for highly stressed ship floors and holds, preferring it to conventional epoxy systems.

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*Alfred Oldendorff · Cargo holds ·
ship tank tops application works*

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Impact of hull coating upgrade | TCO & ROI

	Elements of Cost	Hempaguard X7 / Globic 9500	Globic 8000	Hempaguard X7 / Globic 9500 VS Globic 8000
Paint	Paint purchasing cost	\$450,000	\$200,000	\$250,000
	Surface preparation cost	\$60,000	\$25,000	\$35,000
Repair Yard	Washing cost	\$6,500	\$6,500	\$0
	Paint application	\$85,000	\$15,000	\$70,000
	Repair Yard Rent	\$40,000	\$30,000	\$10,000
	Off hire cost	\$96,000	\$72,000	\$24,000
Cleanings	Diver cost	\$0	\$16,000	-\$16,000
	Extra cost for next DD	\$0	\$17,000	-\$17,000
	Additional fuel consumption (HSFO)	\$0	\$166,000	-\$166,000
	Off Hire cost	\$0	\$36,000	-\$36,000
Fuel	Fuel Cost (HSFO) 5 Years	\$19,000,000	\$22,100,000	-\$3,100,000
	CO2 emission Tons (HSFO) 5 Years	151,000	171,000	-20,000
TCO	Total Cost of Ownership (HSFO) 5 Years	\$19,737,500	\$22,683,500	-\$2,946,000
Savings over 5 years (HSFO)				\$2,946,000
Payback Period (Months)				11
Increase in earnings per day (TCE)				\$2,400

Panamax case study. Data: Hempel.

PANAMAX: INVESTMENTS THAT PAY OFF

Panamax vessels sit within the 60,000–80,000dwt range, necessitating a larger initial outlay for application of hull fouling defence solution. Nevertheless, when considering high-impact fouling defence systems, the overall benefits are comparable to an Ultramax.

Over a five-year drydocking period, a 2013-built Panamax vessel coated in Hempel's Globic 8000 antifouling solution was projected to release 171,000 tonnes of CO₂ emissions. With Globic 9500 and the advanced Hempaguard X7, the projection showed 151,000 tonnes of CO₂ emissions would be released.

The difference in emissions released between the two hull coating scenarios represented a reduction of approximately 11.6% over the five-year period: 20,000 tonnes.

Hempel's analysis noted that the resultant savings would actually outperform the higher initial cost of the premium coating. The total savings modelled over a five-year docking period were significant, amounting to almost US\$3 million. The investment would be paid back in less than a year.

CAPESIZE: EMISSIONS FOOTPRINT SHRUNK

These 110,000–200,000dwt behemoths have a correspondingly sizable emissions 'footprint' and demonstrate significant emissions and cost impacts dependent on the hull fouling solution applied.

Hempel's data showed that over a five-year period, a 2013-built Capesize coated in its Globic 8000 antifouling solution

would release 223,000 tonnes of CO₂ emissions. Subject to the Globic 9500/Hempaguard X7 combination, the same vessel would release 196,600 tonnes of CO₂ emissions. The difference amounted to close to a 12% difference over the five-year period: 26,400 tonnes.

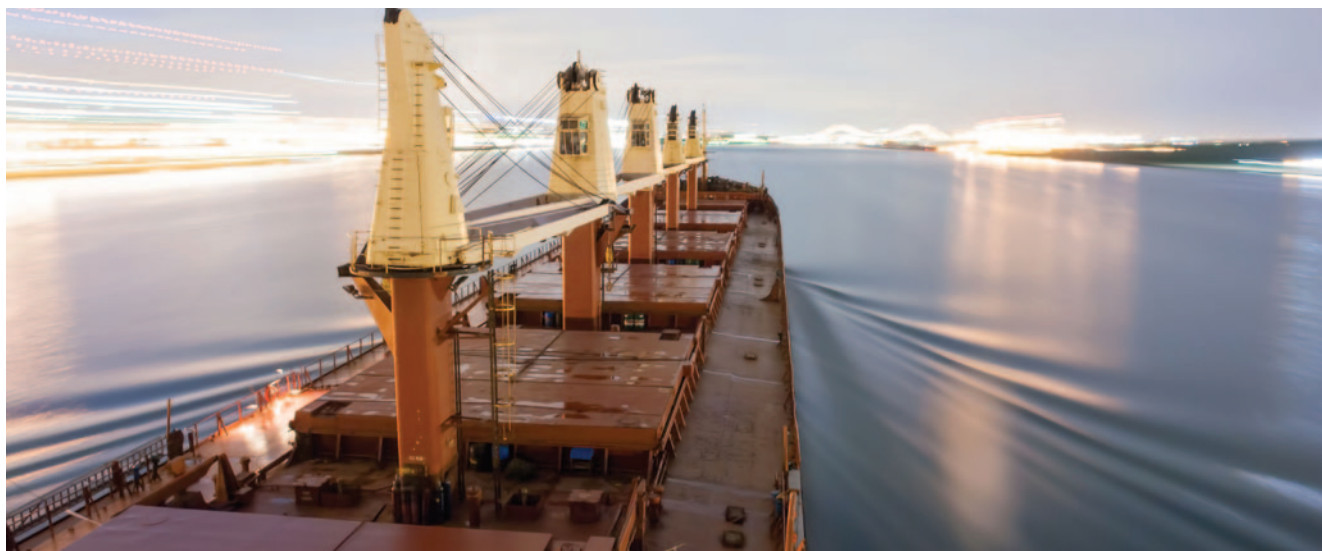
What's more, the total savings over the modelled five-year docking period were calculated to be more than US\$2.8 million. Understandably, the investment takes a little longer to pay back; even so, the ROI was seen in a little more than a year.

"Our advice to customers is to take the time to do all of the calculations, carefully consider their options when assessing what tools, technologies and solutions they will apply for reducing their GHG emissions. It won't get them to net zero, but the right fouling defence system can go a long way to reducing emissions and saving costs. Our extensive analysis demonstrates that, whatever the near future holds for the dry cargo sector, there's at least one emission-reduction pathway that can bring both cost-efficiencies, and even savings, now and in years to come," Lawrence concludes.

Impact of hull coating upgrade | TCO & ROI

	Elements of Cost	Hempaguard X7 / Globic 9500	Globic 8000	Hempaguard X7 / Globic 9500 VS Globic 8000
Paint	Paint purchasing cost	\$750,000	\$400,000	\$350,000
	Surface preparation cost	\$100,000	\$40,500	\$59,500
Repair Yard	Washing cost	\$10,000	\$10,000	\$0
	Paint application	\$130,000	\$25,000	\$105,000
	Repair Yard Rent	\$40,000	\$30,000	\$10,000
	Off hire cost	\$140,000	\$105,000	\$35,000
Cleanings	Diver cost	\$0	\$28,000	-\$28,000
	Extra cost for next DD	\$0	\$29,000	-\$29,000
	Additional fuel consumption (HSFO)	\$0	\$215,000	-\$215,000
	Off Hire cost	\$0	\$52,500	-\$52,500
Fuel	Fuel Cost (HSFO) 5 Years	\$24,500,000	\$28,700,000	-\$4,200,000
	CO2 emission Tons (HSFO) 5 Years	196,600	223,000	-26,400
TCO	Total Cost of Ownership (HSFO) 5 Years	\$25,670,000	\$29,635,000	-\$3,965,000
Savings over 5 years (HSFO)				\$3,965,000
Payback Period (Months)				13
Increase in earnings per day (TCE)				\$3,000

Capesize vessels Data: Hempel.



Chugoku Marine Paints' Hull data analysis service 'CMP-MAP' awarded Innovation Endorsement Certification by ClassNK

As a new phase of the CMP-MAP hull data analysis service that Chugoku Marine Paints has been providing since 2019, it announced in April of this year, that two elemental technologies of 'CMP-MAP' have been awarded Products & Solutions (P&S) certification under Innovation Endorsement by ClassNK^{*1}.

OVERVIEW

The hull data analysis service 'CMP-MAP' aims to improve the fuel consumption during the life cycle of a ship by combining a PDCA cycle, including performance prediction and evaluation, with high-performance antifoulings.

The elemental technologies that have now been awarded P&S certification are as follows:

(1) PIR SIMULATION (PIR: POWER INCREASE RATIO)^{*2}

PIR simulation is performed by combining "Frictional resistance estimation using 3D hull roughness analyzer and FIR theory ver 3.0" and "Changes in the performance of antifoulings over time, such as hull fouling". The benefits of using high-performance antifoulings can be estimated in terms of

reduced fuel consumption and CO₂ emissions, as well as improved CII ratings.

(2) PERFORMANCE AND OPERATIONAL PROFILE ANALYSIS SOLUTIONS

Performance analysis is carried out in accordance with ISO 19030, using actual data provided directly or via a sharing platform such as IoS-OP^{*3}. The analysis results are visualized as parameters such as average speed loss and power increase ratio, as well as the benefit applying Class NK's products on fuel consumption and CO₂ emissions.

Operational profile analysis visualizes the operational and berthing status of a vessel based on the actual data obtained from the AIS database. The results are used to propose and develop antifoulings optimized for the operational profile of each vessel. The synergy between these analysis results and the PIR simulation in (1) allows even more optimal coating specifications to be proposed.

As part of Chugoku Marine Paints' Digital Transformation (DX), it is promoting the visualization of the performance of antifoulings using CMP-MAP.



The company will continuously contribute to the reduction of GHG emissions from ships by reducing fouling and resistances.

**1 Innovation Endorsement: A service by ClassNK to support innovative initiatives through third-party certification. The aim is to encourage the spread and development of a number of innovative technologies, including the sharing and utilization of data from ships, to further improve environmental protection and safety at sea, and to support sustainable development as set out in the SDGs.*

**2 A free CMP-MAP web application, including a simplified version of the PIR simulation, is available.*

**3 Internet of Ships Open Platform*

Steelpaint coatings: long-lasting corrosion-protection

Steelpaint produces high-performance single-component polyurethane coatings offering significant advantages over 2-component coatings.

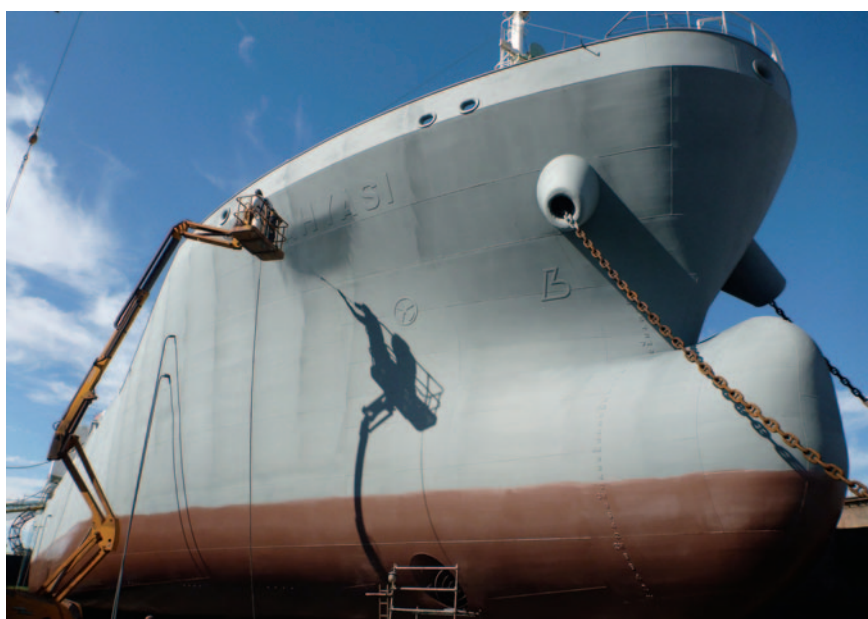
The company's MCPUs are suitable for application from -5°C to +50°C and at relative humidity levels up to 98% and can be applied using brush, roller or spray. Surface preparation can be done by water jetting, blasting and with power tools.

SP coatings withstand high levels of mechanical strain and offer cost-saving, long-lasting corrosion-protection for tank tops, cargo holds, hatch covers, lashing bridges, hull & deck areas and are suitable for crew maintenance during voyages.

Among its clients are Oldendorff, Bergebulk, Hapag Lloyd, CP Offen, BW Epic Kosan, MSC and many more.

To ensure the best material quality SP exclusively produces in Germany using the most modern equipment and carefully selected raw materials.

The company's references from satisfied customers all over the world speak for themselves.



Nippon Paint Marine - Driving positive change

For more than 140 years, Nippon Paint Marine has been driving innovation and development within marine coatings, by consistently delivering cutting-edge solutions. The company's customer-centric focus remains central to everything it does at Nippon Paint Marine, nurturing a detailed understanding of the challenges its customers face in a complex operating environment.

As the industry adapts to ever more stringent global and regional regulations, designed to achieve IMO decarbonization targets, so must the solutions that are developed to support them. Research, development and innovation are fundamental to ensuring technology can keep up with this change, which is the reason why innovation has always been a core pillar of Nippon Paint Marine's business.

This unwavering commitment to evolve with the industry has led to the development of ground-breaking technologies that have greatly enhanced the performance of our coatings. For instance, Nippon Paint Marine's patented hydrogel water trapping technology incorporates a water affinitive polymer with three-dimensional structure that doesn't dissolve in water and performs a continuous effect. By incorporating this

technology into antifouling coatings, such as FASTAR, the company can significantly reduce hull to water friction. The hydrogel in FASTAR works by trapping a microscopic layer of water on to the hull's surface as the ship travels through the seawater, effectively smoothing the water flow around the hull. This technology has delivered proven reductions in fuel cost and emissions by up to 8%, compared to other silyl-acrylate SPC systems manufactured without hydrogel.

Although efforts to reduce carbon emissions through vessel efficiencies is a key priority for Nippon Paint Marine's customers, so too is the continued protection of the marine environment. The release of AQUATERRAS marked a significant step forward in coating technology as the world's first 100% biocide free hull coating. Following years of dedicated work by our R&D team, AQUATERRAS' biocide free self-polishing coating adopts technology developed in the pharmaceutical sector, utilizing medical anti-thrombogenic polymer technology. With its micro-domain structure, AQUATERRAS naturally repels any biological adhesion onto its surface. The constant exposure of its active micro-domain structure to seawater results in continuous self-polishing, which smooths

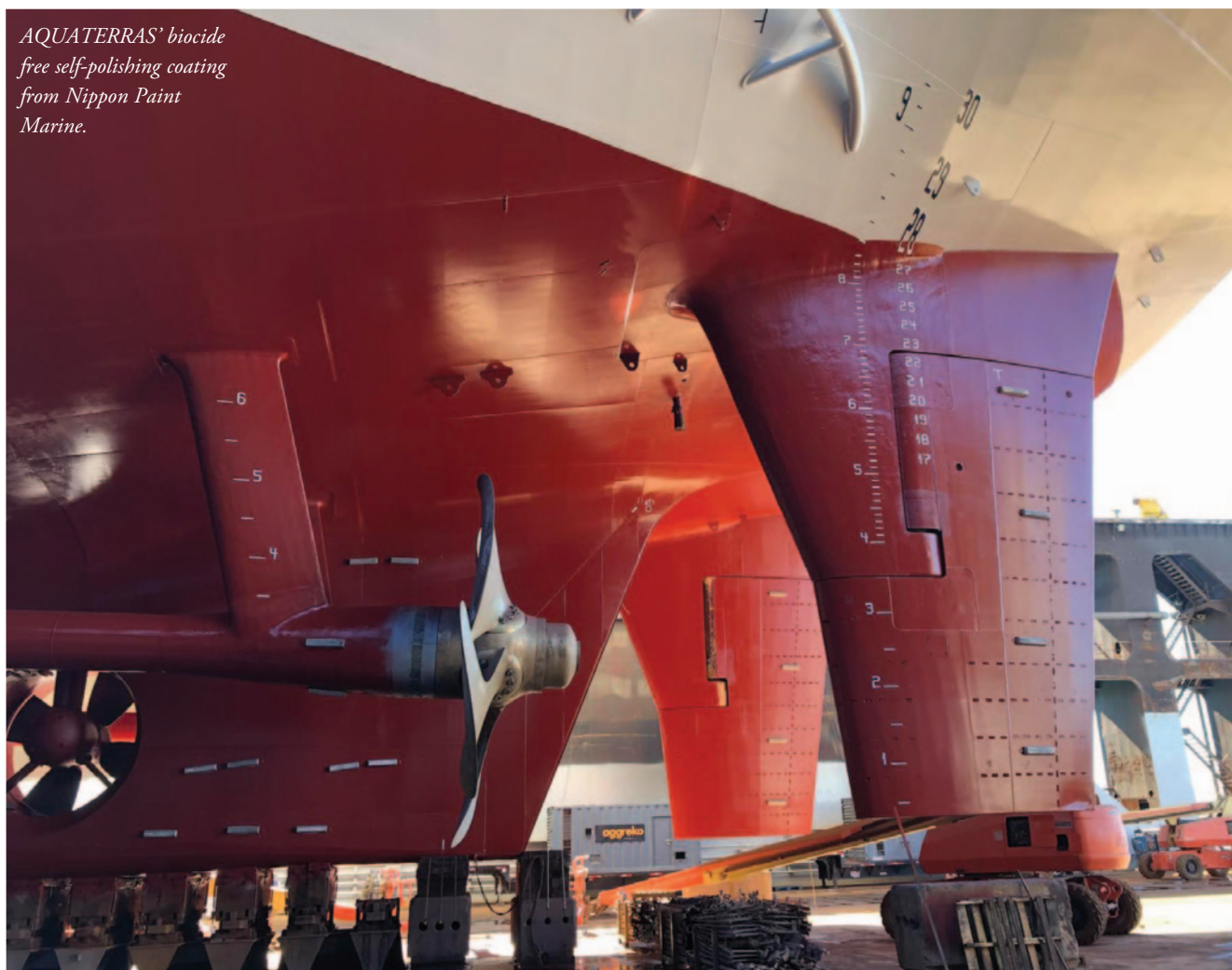
the hull's surface as it travels through the water, helping to maintain performance. Not only has AQUATERRAS been proven to have minimal impact on the marine environment, its reduced hull-to-water friction has been found to lower vessel emissions by up to 10%.

Alongside the continued development of our current product line, our dedicated R&D team are working hard on the next generation in hydrogel-based solutions. Furthermore, looking to the future, we will continue to maintain a leading role in coatings industry by expanding our range of low VOC products, introducing ultra-high-solid epoxy coatings and unveiling methanol-resistant solutions.

The maritime industry is going through a significant period of transition. Ship owners and operators are having to adapt their operations to engage with more sustainable practices as they seek to dramatically curtail carbon emissions from their vessels. At the same time, they need to ensure operational efficiency is not impacted. This is a significant challenge, and it is Nippon Paint Marine's role, as a global coating solutions provider, to supply new and increasingly more innovative technologies that will drive positive change for the maritime industry and for the marine environment.

DCi

AQUATERRAS' biocide free self-polishing coating from Nippon Paint Marine.



JAXPORT & Puerto Rico Ports Authority Ports and Partners Summit in San Juan

Leadership from the Jacksonville Port Authority (JAXPORT) recently travelled to San Juan to join the Puerto Rico Ports Authority (PRPA) in hosting the inaugural Puerto Rico – Jacksonville Ports and Partners Summit on the island. Jacksonville is the number one port in the United States for trade with Puerto Rico, handling nearly 90% of all sea trade between the island and the US mainland.

In addition to the port authorities, other participants in the two-day event included the three Jacksonville-based ocean carriers serving the island from JAXPORT – Crowley, TOTE Maritime Puerto Rico, and Trailer Bridge – as well as the Puerto Rico Manufacturers Association and the Puerto Rico

Shipping Association.

“We always mention that Puerto Rico and the state of Florida share similarities in their ports; both are strategic, solid locations for regional and international commerce. They facilitate diverse industries and support the economy,” said PRPA Executive Director Joel A. Pizá Batiz. “The synergy and symbiotic relationship between Puerto Rico and Jacksonville are strong and critical. This summit is a testament to that sense of fellowship, friendship, and partnership.”

The summit featured discussions about best practices in a range of areas, including business continuity during hurricane season, infrastructure upgrades, grant pursuits, and

sustainability. The group also toured PRPA facilities, including cargo operations at Crowley, TOTE and Trailer Bridge.

“Puerto Rico is our longest-running trade partnership, and we are proud of the relationships we have built with our partners serving the trade,” JAXPORT CEO Eric Green said. “Many of the goods our neighbours on the island use every day come from Jacksonville, and it is an honor and a privilege to serve their community in this role.”

The goal of the Summit is to continue to advance the strategies outlined in the MOU JAXPORT signed with the PRPA in 2021. Through the MOU, the ports are collaborating in key areas.

Bilbao expands outer harbour



Bilbao Port Authority has put out to tender works associated with its second phase development of the Central Espigón, in the Outer Harbour. The budget assigned for the project is €55.44 million, and comes entirely from the port's own resources. Work will be implemented over a 26-month period, with June 20 set as the bidding deadline. Work is expected to begin in the autumn.

Once completed, a further 31.2ha of land will be added to the Outer Harbour, along with the new A3 and A4 berths. Development of this new area of the port first began in the 1990s. It offers deep draught suitable for the handling of dry bulk carriers.



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Paradip overtakes Kandla as India's biggest port



In India, the Port of Paradip has now established itself as the country's largest, following the publication of recent figures. In the 2023–2024 financial year, it handled 145.38mt (million tonnes), which meant it leapfrogged Gujarat's Port of Kandla for the very first time. There the Deendayal Port Authority had previously led the volume-handled table of all 12 major ports for the previous 16 years.

In terms of traffic, it posted record volumes of coastal shipping and thermal coal shipping. The latter amounted to

43.97mt, equivalent to growth of 4.02% compared to the previous financial year.

According to the port, its upward trend in volumes handled can be mainly attributed to improved operations at its mechanized coal plant, where dead time between the unloading of coal trains has been reduced, resulting in traffic of 27.12mt being handled there. A total of 21,665 train rakes were accommodated during the year, an increase of 7.65%

Overall berth productivity has also gone up by 6.33%, now making it the most

efficient port in India.

The number of vessel calls also notably increased, by 13.82%.

Within the next three years, with the opening of the new Western Dock, traffic is expected to go north of 300mt annually. This healthy situation is, in part, due to the decision to freeze port tariffs for the next three years, making it the cheapest port in the country in which to operate. At the same time, Paradip already benefits from having a hinterland rich in mineral resources.

Barry Cross

Porto Sudeste breaks volume records

In Brazil, Porto Sudeste has set a new record for the amount of coal unloaded in a single day. This amounted to 7,502 tonnes and not only helped improve the turnaround time of the docked vessel, but also boosted productivity and lowered carbon emissions.

The terminal at Itaguaí, in the state of Rio de Janeiro, handled 130,000 tonnes in total during the first quarter of 2024. It has two coal stockpile areas and two vessel berths.

The port has also handled a Wozmax vessel with a cargo of 246,000 tonnes of iron ore, the largest cargo ever to be received at the port. The Houheng 6 is the second of its kind to dock at the specialist facility on Madeira Island. The first called in February this year, departing with a shipment of 225,000 tonnes of iron ore.

Barry Cross





Jay Venter

Dutch Carriage

Regional Report: The Netherlands

[Nemag case study] From Challenge to Conquest: SMT Shipping's journey to a 25% productivity boost

Would you buy a new grab if you already had three grabs available?

That's a challenge that Nemag's client faced. SMT Shipping is a leader in the global maritime industry and has many years of experience with transshipment in the shallow shores of the West African region. Market transitions led them to this grab selection challenge. The solution had a significant impact: a 25% productivity boost, and it paid back over four times its cost in the first year.

THE CHALLENGE: THE SEARCH FOR THE OPTIMAL CRANE AND GRAB COMBINATION

To stay profitable, SMT Shipping needed to optimize its transshipment operations. The company owns and operates vessels with high-loading capacities and shallow draughts, allowing them to transport significant amounts of cargo from terminals, often located in rivers, to the open sea. Once there, they use large cranes to transfer the cargo to Capesize vessels. For these rapid transfers, an efficient grab is essential. Marc Smeets, Technical Project Manager at SMT Shipping, explains, "We need to optimize the continuous cargo transfer process to maximize our profit."

TRANSITIONING FROM BAUXITE TO IRON ORE

Originally, SMT's vessels in West Africa transferred bauxite with a Nemag scissors grab that already improved the company's productivity. However, when the bauxite market collapsed, they shifted to transfer iron ore for a client in Sierra Leone. This posed a new challenge as the specific gravities of bauxite and iron ore differ significantly. Bauxite is 1.6 tonnes per cubic metre, while iron ore is heavier at 2.5 tonnes per cubic metre. SMT Shipping found that its three existing grabs were not optimal for the heavier iron ore, leading to slower grab cycles and crane overloading.

THE SOLUTION: ENABLING A HIGHER EFFICIENCY RATE WITH THE NEMA^X GRAB

Faced with suboptimal equipment, SMT Shipping needed a new grab specifically designed for iron ore. Nemag introduced the Nema^X grab, which promised enhanced efficiency. Unlike traditional clamshell grabs, the Nema^X requires significantly less wire to operate, saving valuable time on each cycle. Smeets recalls, "Saving seconds on each cycle doesn't seem much until you calculate the impact on an annual basis."

Nemag's initial presentation highlighted that the Nema^X grab showed a productivity improvement of 14% to 19% compared to other grabs. These numbers convinced SMT Shipping to invest in the Nema^X grab, seeing its potential to improve their overall efficiency.

THE RESULTS: 25% PRODUCTIVITY BOOST, THREE MONTHS ROI AND EASIER MAINTENANCE

The Nema^X grab's integration into SMT Shipping's operations led to impressive results. Initially, the crew needed time to adapt to the new equipment, but within the first month, the handling rate increased from 1,000 to 1,250 tonnes per hour. This represented a 25% productivity boost compared to the previous Nemag scissors grab, which wasn't optimally suited for iron ore.

The Nema^X grab not only improved productivity but also enhanced safety and maintenance efficiency. With fewer moving parts than traditional grabs, it significantly reduced the risk of breakdowns and made maintenance easier and faster.

Smeets noted, "Our owner always thought Nemag was a bit like the Mercedes or Ferrari of grab builders —



the highest quality but overpriced when you only need to get from A to B. He later discovered that the price difference between NemaX and its major competitors wasn't significant. This ended his long-standing perception when he learned that NemaX's prices are reasonably in line with the market."

The introduction of the NemaX grab resulted in a 25% productivity increase, a three-month return on investment period, and easier maintenance. This makes it a pivotal asset for SMT Shipping.

FUTURE PLANS AND THE NEXT STEPS

After seeing the success of the NemaX grab, Smeets was interested in buying another grab to increase their productivity even further. The new grab includes custom SMT adjustments and a unique feature allowing weight adjustments, making it versatile for both wet and dry ore handling. Another tailored innovation to improve their flexibility and overall performance with a hybrid grab.

Any car can get you from A to B. However, only some cars offer both reliability and performance. The same goes for grabs. But more importantly, don't bring a road car to a Dakar rally. Use the right grab for the right job, as SMT did.



Read the complete case study to uncover more insights into SMT Shipping's journey and explore how NemaX's "Passion for performance" can boost your productivity. The case study also includes a video to experience their grab cycle speed and transshipment operation. Get your copy here.



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.

Explore our comprehensive range of high-quality grabs and discover the power of great bulk handling.
From coal and iron ore to wheat, scrap metals, minerals and clinker: NemaMag has the optimal solution for every dry bulk flow!

Contact us find out how we can take your bulk handling to the next level.

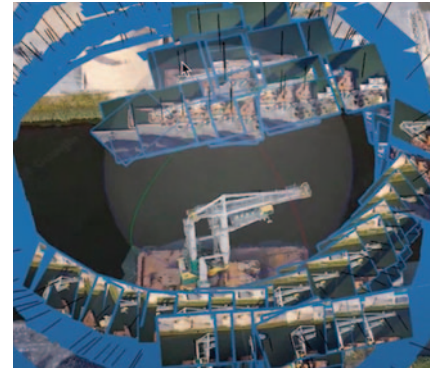
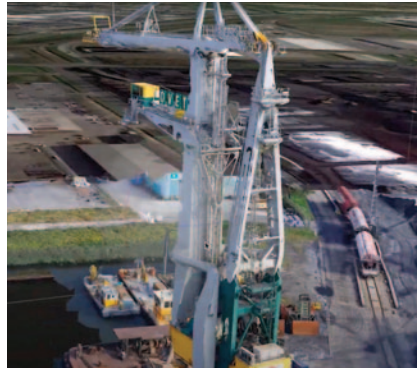
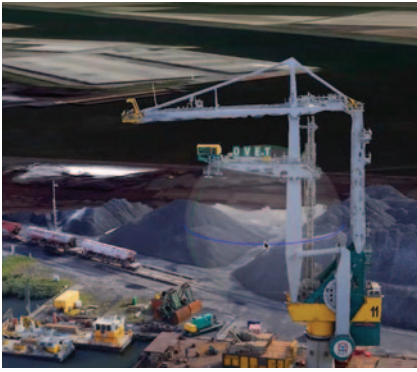
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Passion
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The World Treasury Center: from Noorman Taxaties to global innovation and reliable collaboration



A detailed examination of an Ovet crane, conducted using the latest digital measuring equipment from Collin Aerospace UK Ltd and World Treasury Center, aimed at improving maintenance and online management.

The World Treasury Center (WTC), founded in 1996, is a brilliant example of how specialized knowledge can evolve into an influential global assessment platform. Originally stemming from Noorman Taxaties, a valuation firm that focused on assessing cranes, hoists, and excavators, the WTC has developed into a leading platform and authority for supporting financial business stability and sustainable operations.

This article discusses the evolution of Noorman Taxaties into the WTC and its impact on modern business practices worldwide, as well as its reliable partnerships with banks, companies, and other stakeholders.

FROM SPECIALIZATION TO INNOVATION

Noorman Taxaties began in the 1980s with developing a deep expertise in valuing heavy equipment worldwide. Its focus was on determining the global market value of bulk handling equipment and terminal operations in major European ports such as Rotterdam, Amsterdam, Antwerp, and Hamburg, as well as in Scandinavia, South America, the Far East and the Eastblok. This specialized knowledge provided Noorman Taxaties with unique insights into the value chain of international trade and industry, making it a valued partner for companies and financiers involved in heavy industrial activities.

TRANSFORMATION INTO THE WORLD TREASURY CENTER

The experience and knowledge accumulated by Noorman Taxaties formed the perfect foundation for a much broader and deeper platform that would not only assess the financial aspects of industrial machinery but also the technical aspects of business assets. In 1996, this specialized valuation firm transformed into the World

Treasury Center, an institution that now stands at the forefront of promoting global and local collaboration and innovation at all levels.

The WTC now serves as a central point for the exchange of valuable knowledge between diverse stakeholders in the financial world. The platform offers a wide range of services and tools that help companies navigate the complex world of international regulations, finance, and operations. By leveraging advanced digital technologies and a multidisciplinary approach, the WTC helps companies not only remain economically viable but also map their social and ecological footprint in the short and long term and minimize it as much as possible.

ADVANCED VALUATION METHODOLOGIES

With the transition to the WTC, a revolutionary digital valuation methodology was introduced. This methodology integrates not only economic factors but also technical, ecological, and social aspects, enabling companies to gain deeper instant insights into 'real time' value of the total impact of their activities today and in the future. This broad approach allows companies to assess their financial health while simultaneously understanding the broader social and ecological consequences of their products and services.

INTERDISCIPLINARY COLLABORATION

The WTC facilitates a unique platform where professionals from various fields come together — from financial experts and data analysts to environmental scientists and social researchers.

TECHNOLOGICAL ADVANCEMENT AND DATA ANALYSIS

Technology and data analysis form the

backbone of the WTC platform's activities. Investments in advanced technological systems and developments since the 1990s enable the centre to process large volumes of data and perform complex analyses that are translated into clear management information.

These capabilities are essential for monitoring business operations and managing and exploiting assets.

RELIABILITY THROUGH COLLABORATION

One of the greatest strengths of the WTC is the reliability that comes from its long-term collaborations with banks, companies, and other stakeholders. These partnerships are based on shared facts, values and goals, with transparency and mutual trust at the core.

Through these collaborations, the WTC has built a solid reputation as a reliable partner that always strives for the best transparent results for all involved.

SUSTAINABILITY AND FUTURE-ORIENTED INITIATIVES

The WTC operates globally and continues to expand its influence through initiatives focused on sustainability and financial inclusion. The focus is on promoting business efficiency, green finance, and supporting companies in integrating sustainability principles into their business models. The WTC also supports responsible financing and business practices, which help build a robust and resilient economy.

Through the structure chosen within the WTC, sustainable financial practices are promoted that contribute to a better world. The centre plays a key role in the transition to a green economy and helps companies achieve long-term economic benefits by integrating sustainable practices into their daily operations.



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

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Wood chips will increasingly serve as a raw material for the bio-based industry in the port of Rotterdam



BIOMASS AT THE PORT OF ROTTERDAM

The port of Rotterdam in the Netherlands is an important port for the import of biomass into Europe. Wood pellets, the most important biomass product group, are primarily used in the European heating and energy market.

Excellent connections for the supply, throughput and handling of biomass in the port, existing cargo flows and specialized transshipment and storage facilities make Rotterdam an attractive hub for biomass distribution.

ACCESSIBILITY FOR THE SUPPLY OF BIOMASS

The port of Rotterdam's central location in Europe makes Rotterdam exceptionally attractive as a biomass port. The port's maximum draught is 23 metres and it is without any obstacles such as locks or bridges, which means that it can

accommodate also the largest ships 24/7. Via the excellent intermodal connections, the wood pellets can be transported to their final destination, such as key markets in Germany, Italy, Belgium, Austria and the United Kingdom.

POWER PLANTS AND THE BIOMASS INDUSTRY

The Maasvlakte in Rotterdam has two coal power plants capable of co-firing wood chips and other biomass. These power plants and the plants in the Rotterdam region, Belgium and the United Kingdom provide for a constant supply of biomass to Northwest Europe. The knowledge, experience and the required facilities for this are already available in Rotterdam. Over the long term, wood chips will increasingly serve as a raw material for the bio-based industry in the port of Rotterdam.

DISTRIBUTION HUB OF WOOD PELLETS IN EUROPE

The storage capacity in the port of Rotterdam area makes it possible to use Rotterdam as the distribution or storage location for the Northwest European market. Energy companies, pellet suppliers and traders in biomass will find all the necessary facilities here and furthermore benefit from attractive economies of scale and optimal cost efficiency. By clustering the supply of biomass into larger ships (for example, Panamax) and subsequently transporting it in smaller volumes to its final destination, transportation costs are reduced.

BIOMASS TRANSSHIPMENT AND STORAGE FACILITIES

The generous supply of expert service providers and modern storage and transshipment facilities make Rotterdam attractive as a biomass import and

transshipment port. The following companies are in Rotterdam with the storage and handling of biomass:

- ❖ EMO
- ❖ BSR Van Uden Stevedoring
- ❖ EBS (European Bulk Services)
- ❖ Marcor Stevedoring
- ❖ ZHD (Zeehavenbedrijf Dordrecht)

BULK THROUGHPUT FALLS AT THE PORT OF ROTTERDAM, WHILE CONTAINER CARGOES INCREASE

Total throughput at the port of Rotterdam fell by 1.4% in the first quarter of 2024 compared to the same period last year. In the first three months of this year, throughput was 110.1mt (million tonnes) compared to 111.7mt in the first quarter of 2023. The decline is mainly due to less throughput of coal, crude oil and oil products. Throughput of iron ore & scrap and LNG increased. Container throughput was also on the rise, with a 3.3% uptick.

In the first quarter of 2024, container throughput for by 3.3, despite the situation in the Red Sea, which has resulted in

significantly fewer ships (-24.5%) and less volume from Asia (-13.7%) in January and February due to delays and missed sailings. Fitting in the changed sailing schedules initially led to the necessary adjustments in the logistics chain.

Dry bulk throughput declined by 4.5% compared to the first three months of 2023. The main reason for the decline is the sharp contraction in coal throughput. Two million tonnes less coal was handled than last year due to lower demand for thermal coal for power generation in coal-fired power plants. As German steel production picked up, iron ore imports also increased.

The strong 93.7% increase in the other dry bulk segment is distorted by the fact that there was a correction in throughput in the first quarter of 2023.

The same goes for the 23.9% decline in the agribulk segment. Without the correction, throughput in the agribulk segment shows a decline of 10.9%. Other dry bulk shows a decline of 16.8%. The other dry bulk segment includes raw

materials used in energy-intensive sectors. Production in these sectors is still low, as energy costs account for a large part of production costs.

Total throughput of the breakbulk market segment (Roll-on/Roll-off and other breakbulk) decreased by 1.9% to 7.8mt. RoRo throughput fell by 3.8% to 6.3mt compared to the first quarter last year, as volumes to the UK still show no recovery. Other breakbulk rose 7.4% to 1.5mt.

Boudewijn Siemons, CEO & Interim COO of the Port of Rotterdam Authority: "The throughput figures show limited imports of raw materials and exports of finished products. This tells us that European industrial production is still suffering from high energy prices and low demand from the biggest declining sectors such as construction and the processing and automotive industries. From the growth in container throughput, we see the first signs that world trade is picking up. However, these tentative signs remain highly uncertain due to rising global tensions."



Silos storing a variety of grains



The Nacala Bulk Grain Terminal, currently under construction in Mozambique, is set to revolutionize grain handling in the region. With its state-of-the-art facilities and strategic planning, this development, marketed, operated, and managed by C. Steinweg Bridge, promises to meet the growing demands for efficient grain management. Central to this transformation are the terminal's innovative silos, designed to maximize capacity, flexibility, and future expansion.

PHASE ONE: ESTABLISHING A STRONG FOUNDATION

The initial phase of the terminal will feature eight silos, each with a capacity of 5,000 metric tonnes, totalling an impressive 40,000 tonnes. This set-up is specifically designed to accommodate a variety of grains, including rice, wheat, maize, and soybean. By having multiple silos, the terminal can simultaneously store different types of grains, ensuring that the integrity and quality of each type are maintained.

This diversity in storage capability is particularly crucial in a region where the agricultural landscape is rich and varied. Farmers and suppliers can confidently store their produce knowing that it will be handled with care and precision.

FUTURE-PROOFING WITH MINIMAL CIVIL WORKS

One of the standout features of the Nacala Bulk Grain Terminal is its forward-thinking design. The civil works required for this project have been minimized to ensure that future expansions can be carried out



seamlessly. This approach facilitates quick and efficient scaling up of operations as demand grows.

In total, the terminal will eventually boast 15 silos, increasing the storage capacity to a staggering 75,000 tonnes. This expansion will be implemented in two phases, ensuring that the infrastructure can grow in tandem with the region's needs.

HIGH-EFFICIENCY UNLOADING & UPLOADING

Efficiency is at the heart of the Nacala Bulk Grain Terminal's operations. The facility will feature an initial unloading and uploading capacity of 300 tonnes per hour. This high throughput rate ensures that grain can be moved quickly and efficiently, reducing bottlenecks and ensuring that supply chains remain smooth and responsive.

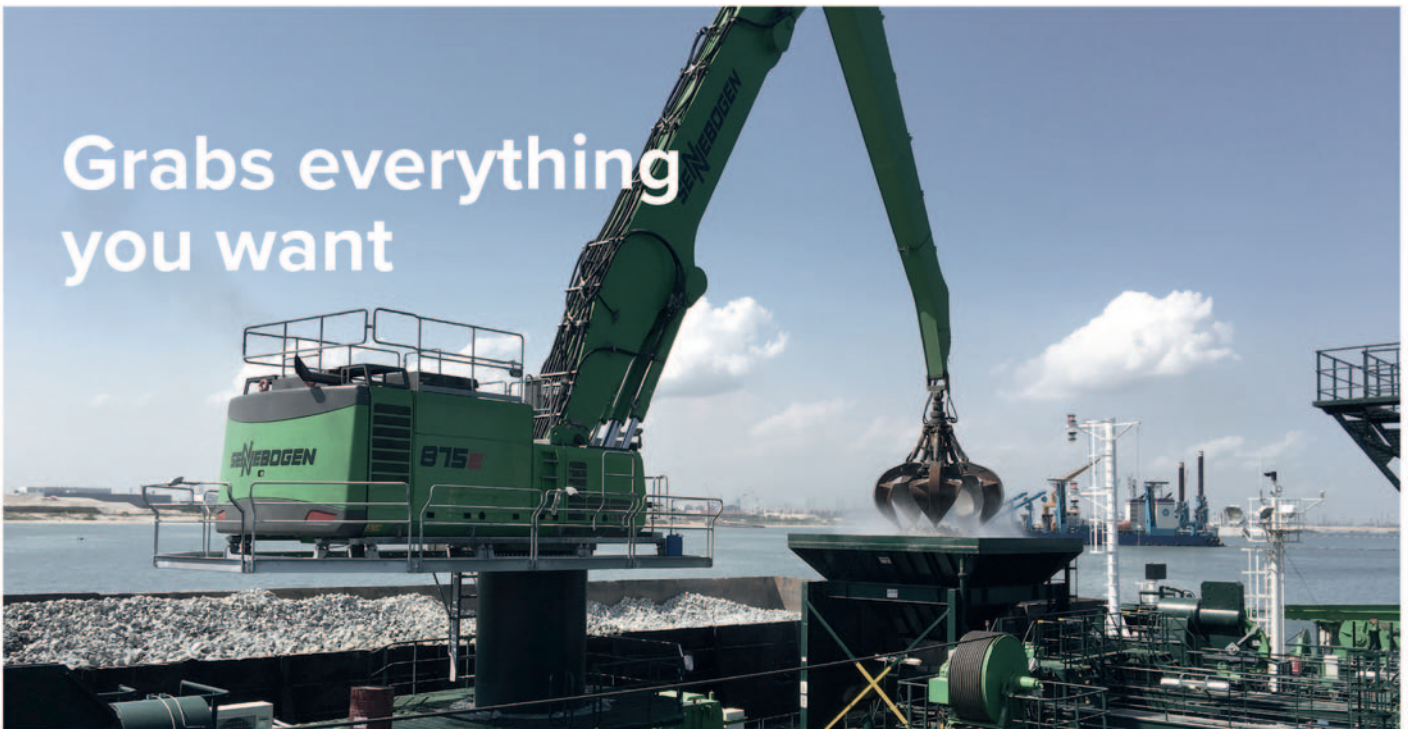
This capability is particularly important in minimizing the time that grains spend in transit, thereby reducing the risk of spoilage and ensuring that they reach markets in optimal condition.

THE BROADER VISION: A WORLD-CLASS BULK TERMINAL

The Nacala Bulk Grain Terminal is part of a larger vision being developed by the Mitrelli-Udoyen consortium. This world-class bulk terminal not only includes the Grain Terminal but also an adjacent Non-Food Terminal designed to handle products such as fertilizers and clinkers. This dual focus ensures that the terminal can serve a wide range of agricultural and industrial needs, making it a pivotal hub in the region's logistics and supply chain network.

The construction of the Nacala Bulk Grain Terminal marks a significant step forward for grain handling in the region. With its innovative design, efficient operational capabilities, and strategic planning for future expansions, the terminal is poised to become a key player in the global grain market. As it develops, it will undoubtedly provide immense benefits to local farmers, suppliers, and the broader economy, solidifying Nacala's position as a crucial logistics hub.

Grabs everything you want



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.

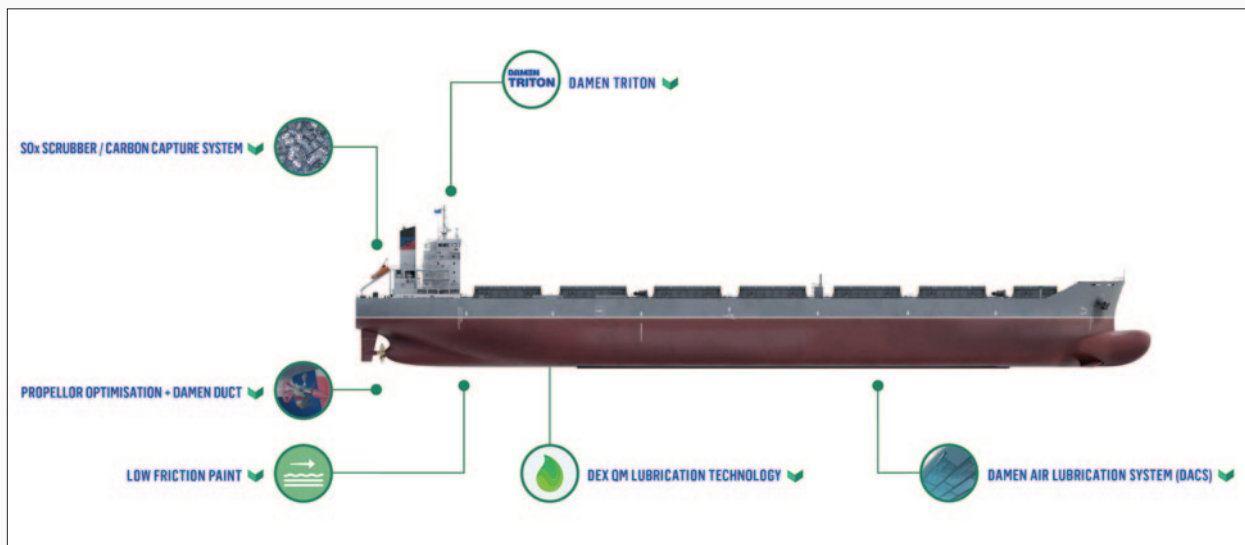
We grab everything you want!

J&B Grabs The Netherlands



Take a look at our website jb-grijpers.nl

Damen and Atal Solutions announce partnership to slash shipping emissions



Early in June 2024, Damen Shipyards Group announced its role in a partnership with Atal Solutions and other parties that will deliver a significant boost for the maritime green transition. For BAM Shipping, the project partners will undertake the retrofit of four bulk carriers by integrating 8 different proven technologies. Damen's role is to provide the vessels with fuel-saving and emission reduction technologies. Following this, the bulk carriers are anticipated to consume at least 20% less fuel and reduce up to 99% greenhouse gases (GHG).

The increased efficiency paves the way for these and other existing vessels to sail in compliance with recent regulations such as the Energy Efficiency Existing Ship Index (EEXI) and Carbon Intensity Indicator (CII). Additionally, the reduced OPEX of the vessels is expected to yield a rapid return on investment. As a further benefit, the overhaul is anticipated to increase the vessel's lifecycle by a further ten years.

COMMITTED TO THE GREEN TRANSITION

Damen is committed to the shipping transition and has set itself the goal of becoming the most sustainable maritime solutions provider in the world. This commitment is shared by Atal Solutions, as underscored by the company's arrangement of the US\$123.7 million funding for this unprecedented project. Atal will provide a supplier's credit amounting to US\$105.2 million, requiring vessel owners to provide just 15% equity, and having a ten-year repayment period with competitive interest rates.

The approach enables considerable emissions reduction with conventional fuels. With no requirement to await the maturation of emerging technologies and/or relevant fuel infrastructure, a positive environmental impact can be made in the shortest possible timeframe.

NEW STANDARDS FOR EMISSION REDUCTION

Atal Solutions' Founder and Managing Director Edwin Sieswerda said, "We look at real impactful solutions — easy and fast to implement, based on proven technologies — and avoid idealistic solutions. If we truly believe in a project, we make it happen and don't stop until we do. Currently, we are working on four vessels, but we anticipate many similar projects will follow upon the successful implementation of this initiative. Additionally, we expect increased support from the financial sector as the positive impact of our integrated solution becomes evident. Atal's ongoing collaboration with Damen and other industry players helps them set a new standard for fuel-saving and emission-reduction solutions."

SUSTAINABILITY AT THE FOREFRONT

Rutger van Dam, Business Development Manager at Damen said, "We are proud to team up with Atal Solutions to offer a robust solution for financing large projects such as this one on behalf of BAM Shipping, while mitigating risk and keeping sustainability at the forefront. Embracing Atal Solutions' innovative vision and capabilities, we are confident that this collaboration provides the ideal solutions to meet the current demand for cleaner shipping and fuel saving technologies. Our mutual goal is to accelerate the transition to more sustainable shipping while ensuring that the business case and revenue generation remain competitive. The financing structure of this project is a breakthrough, enabling significant advancements in sustainable shipping with a commercially viable model."

The project is currently being implemented and is expected to be realized by Q1 2025.

New FGD Gypsum silo Nikola Tesla in operation

In January this year, the new ESI Eurosilo designed FGD Gypsum silo at the Nikola Tesla power plant in Beograd, Serbia went into operation. After finishing the building process and the installation of the material handling systems last year, the cold commissioning took place in autumn. With the first production of the new desulphurization plant ESI Eurosilo was able to successfully execute the hot commissioning this year.

ENVIRONMENTALLY SAFE SOLUTION

The FGD Gypsum silo at the Nikola Tesla power plant is one of several flue gas desulphurization plants built by Mitsubishi Heavy Industries in a number of Balkan countries. In order to reduce the negative effects of sulphur dioxide (acid rain), older power plants need to be equipped with flue gas desulphurization plants to remove sulphur dioxides from the exhaust of thermal power plants. This is achieved by driving the exhaust through a milk of limestone, which causes the sulphur dioxide to stick to the limestone. This limestone then transforms into Flue Gas Desulphurization (FGD) Gypsum. This wet FGD gypsum slurry is input for the Eurosilo which is dewatered and stored before shipment to producers of gypsum products, working towards a better environment.

ENSURING RELIABLE OPERATION

With a fully automated material handling system for a sticky bulk material such as FGD Gypsum, all components and the complete integration are thoroughly checked during commissioning. Jan-Willem Hanskamp, manager Project Department ESI: "Using scripts and checklists, we run tests on the software as well as electro technical and mechanical components. It all has to operate as one dependable system, which accurately switches from one step to another in each process flow. For the infeed as well as the output of the gypsum, there are different programmes to ensure an infeed capacity of 40 to 50tph (tonnes per hour) and an outfeed of 150tph. On request ESI Eurosilo also provided an air extraction system for dust free truck loading, including a filter to prevent dust emission in the surrounding."

ALL-IN-ONE STORAGE SYSTEM

The FGD Gypsum silo at the Nikola Tesla power plant combines dewatering, 10,000m³ storage capacity and reliable discharge. By combining these three basic



functions in a fully automated logistic flow, we can achieve the smallest possible footprint with just one facility. This is one of the main benefits at existing plant sites that

offer limited space for new installations. As a result, this new FGD Gypsum silo is one of no fewer than 72 units that ESI has built around the world.



The new SENNEBOGEN maXcab – the most modern and comfortable cab in its class

Operator comfort is a priority at SENNEBOGEN, as the operator spends many hours in the cab every day. The maXcab is designed to make working in the machine as pleasant and easy as possible for the operator. The extensive cab update ideally rounds off the new features of the G-series and once again sets new standards.

COMFORT SEAT AND CLIMATE SEAT

In addition to the back-friendly comfort seat with air suspension adapted to the driver, individual ergonomic adjustment options such as adjustable armrests and optimally positioned controls ensure maximum comfort while driving. The

*The SENNEBOGEN
Comfort Audio System focuses
on the driver.*



The latest maXcab — unobstructed view from the standard armoured glass windscreen.

optional air-conditioned comfort seat also contributes to this.

COMFORT AUDIO SYSTEM

Noise is an omnipresent problem that machine operators are exposed to on a daily basis. The new SENNEBOGEN Comfort Audio System offers the solution: its advanced Active Noise Canceling technology can reduce harmful noise by up to 50% while providing a high-quality communication system.

The optional SENNEBOGEN radio helmet enables easy communication with workers outside the machine via radio. The advantage here: no annoying cables, as the radio can be charged via USB cable. In addition, ambient noise is muffled by the microphone.

AIR CONDITIONING AND AIR FLOW

In addition to the innovations already mentioned, the SENNEBOGEN maXcab is particularly impressive due to its large number of air nozzles. A total of ten built-in air glands ensure even air circulation and a well-tempered workplace — whether in summer or winter.

DRIVER SUPPORT THROUGH SAFETY CAMERAS

Important operating parameters and clear text displays of error messages for quick troubleshooting are clearly visible on the camera display. The driver is supported in his work by safety cameras — he can conveniently monitor the danger zone via the monitor system in the cab. In addition, the retrofittable Backeye360 camera

The ten air nozzles installed in the cabin ensure a pleasant indoor climate.



system with its four cameras detects people and eliminates blind spots. A wide range of safety guards for every application provide additional safety for the driver, while bright LED headlights ensure safe working even in difficult lighting conditions.

AMENITIES FOR THE DRIVER: SUN VISOR, USB & COOL BOX

The cab is often not only the driver's workplace, but also their own personal space. This is why SENNEBOGEN attaches great importance to the driver's well-being and integrates additional features into the maXcab, such as the sun visor, which provides improved visibility and protection from dazzling sunlight.

The 12V, 24V and USB charging sockets make it easy to charge electronic devices directly in the cab, while an integrated cool box keeps drinks and snacks cool even in hot outside temperatures.

Entertainment and safety for the driver is provided by the built-in radio, which has Bluetooth and USB functions in addition to an integrated hands-free system. Some customers had the opportunity to see the advantages of the new maXcab for themselves at the SENNEBOGEN Operators' Xperience driver's day in February.

The outcome was overwhelmingly enthusiastic about the outstanding comfort of the cab.

Maximum comfort thanks to air-sprung comfort driver's seat with active seat climate control.



Haver & Boecker Niagara: high-level vibrating screen expertise



Haver & Boecker Niagara's diagnostic portfolio includes Pulse Vibration Analysis, Pulse Condition Monitoring and the Pulse Impact Test to improve operational efficiency and negate unplanned downtime.

Haver & Boecker Niagara is a leading provider of screening, pelletizing and mineral processing plants and systems, writes Julie Andras, Marketing Director, Haver & Boecker Niagara. It offers a selection of vibrating screens engineered to take on challenging mineral processing applications that require constant performance, load dependence and limited vibration transmission to the structure, all designed durably with minimal maintenance requirements.

It also manufactures all types of screen media, including polyurethane, metallic, hybrid, self-cleaning and rubber screens. It helps operations analyse the three phases of vibrating screening — layered, basic and sharp — to find the optimal combination of opening and open area by blending the right types of screen media to achieve proper product specification, minimize wear and maximize output.

The company's Pulse diagnostics suite monitors the health of vibrating screens and identifies issues before they become critical, improving operations' productivity and proficiency. The suite includes Pulse Vibration Analysis, Pulse Condition Monitoring and the Pulse Impact Test.

Haver & Boecker Niagara's Scarabaeus Pelletizing Disc Technology efficiently produces 'green' pellets for a wide range of applications such as iron ore agglomeration, zinc recycling, fertilizer processing and more. The process forms fine material into pellets using water as a liquid binding agent. The company's

technology minimizes circulation, increases product output and reduces CO₂ emissions.

CLIENT BASE

Haver & Boecker Niagara works with major mineral processing operations around the world. Its full-service capabilities allow it to partner with customers to provide complete solutions, from screening to diagnostics, throughout the lifecycle of the plant.

STAYING COMPETITIVE

Ensuring equipment stays up and running at maximum performance through the Pulse diagnostics portfolio is a major competitive edge for Haver & Boecker Niagara. For the company, the commitment extends well beyond the sale. Pulse Condition Monitoring tracks the health of vibrating screens, using modern algorithms to provide accurate measurements and forecasts complemented by easy-to-understand information.

Pulse Vibration Analysis is designed to examine the health of any vibrating screen by detecting irregularities that could translate into diminished performance, decreased efficiency, increased operating costs and imminent breakdowns.

Pulse Impact Testing ensures each machine is properly calibrated to avoid operating in resonance for efficient operation. Operating in resonance can diminish productivity, incur damage to vibrating screens and pose safety risks.

Additionally, Haver & Boecker Niagara provides rugged primary crushing plants in a wide range of configurations for pre-crushing, secondary and tertiary crushing in the mining and aggregates industries. The company works with any crusher and peripheral component manufacturer to provide turnkey systems engineered to individual specifications.

LATEST PROJECTS

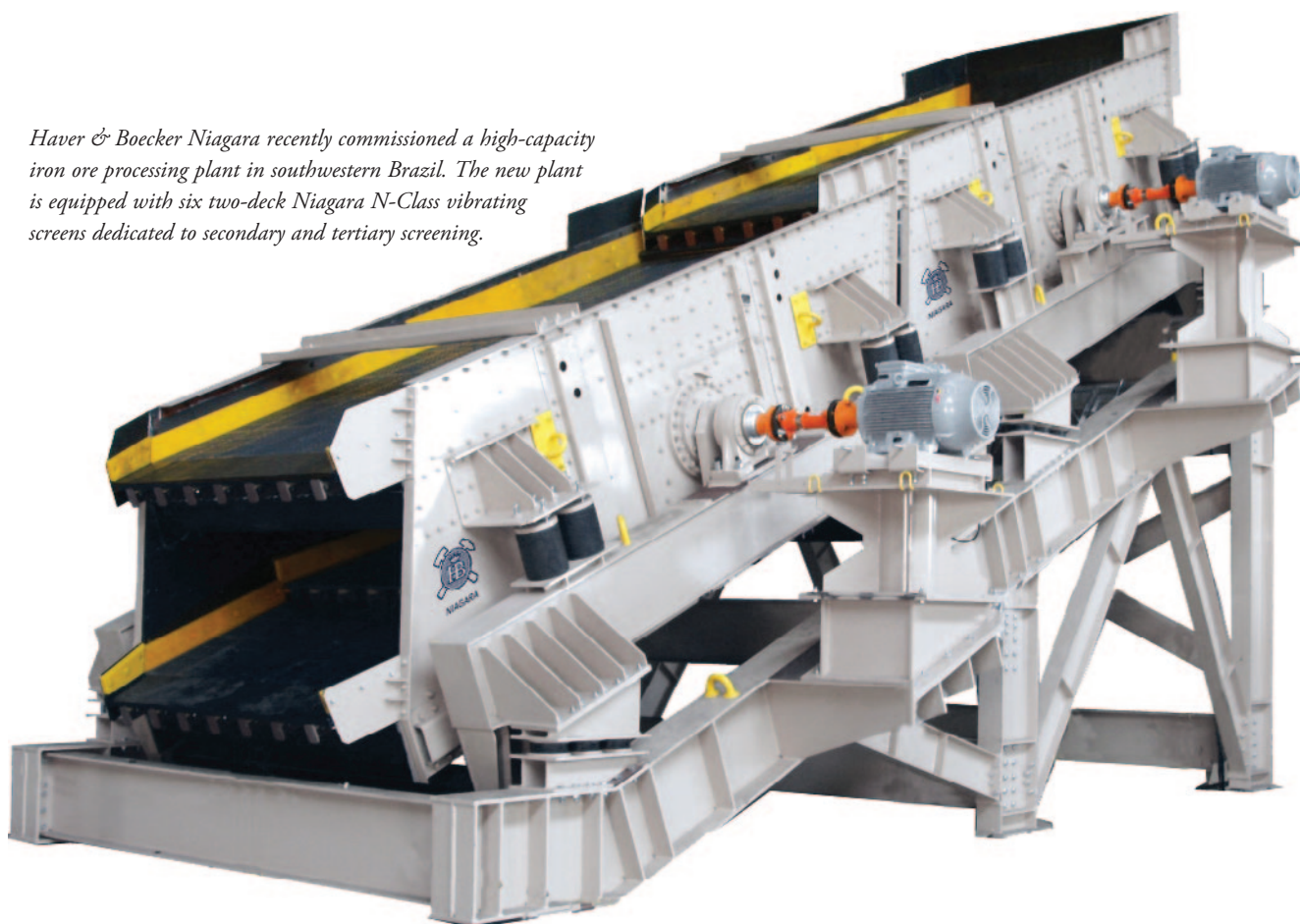
Haver & Boecker Niagara recently had the exciting opportunity to commission a high-capacity iron ore processing plant in southwestern Brazil. It designed the plant as a turnkey solution that included a Niagara XL-Class Grizzly vibrating screen, primary and secondary crushers, belt conveyors, magnetic separators, metallic structure building and all-electric automation devices to monitor and control the production and equipment.

The new plant is equipped with six two-deck Niagara N-Class vibrating screens dedicated to secondary and tertiary screening. The plant can process 1,200 tonnes of iron ore per hour with an annual production capacity of about six million tonnes. The Pulse Condition Monitoring System monitors the vibrating screens' conditions 24/7 to ensure uptime and efficiency, reducing the per-tonne cost of production.

TECHNOLOGICAL DEVELOPMENTS

Haver & Boecker Niagara has been a pioneer in developing diagnostics to help

Haver & Boecker Niagara recently commissioned a high-capacity iron ore processing plant in southwestern Brazil. The new plant is equipped with six two-deck Niagara N-Class vibrating screens dedicated to secondary and tertiary screening.



customers streamline their operations, increase efficiency and get ahead of scheduled maintenance and downtime. Its NIAflow simulation software helps producers optimize quarry and mine operations by diagramming plant flow, machine placement, product pre-calculations and more. NIAflow instantly analyses existing or proposed processes, records plant statuses and recognizes potential for plant optimization. It allows users to analyse more than 90 different processes and pieces of equipment, from crushers and vibrating screens to material

washers and conveyors. Furthermore, NIAflow uses scientific-based methods to monitor an operation's input, output and waste piles.

ABOUT HAVER & BOECKER NIAGARA

Haver & Boecker Niagara's legacy dates back more than a century. Its vibrating screen technology began with W.S. Tyler, who saw an opportunity in the industry and produced the first fully mechanical vibrating screen in 1917. Eighteen years later, W.S. Tyler purchased the Niagara screen patent and developed its first four-bearing

screen, the Ty-Rock. This marked the first collaboration between W.S. Tyler and Haver & Boecker.

Haver & Boecker and W.S. Tyler continued their joint ventures, establishing W.S. Tyler International in 1958. Haver & Boecker bought the company in 1998 and, in 2019, W.S. Tyler rebranded to Haver & Boecker Niagara as a new global brand for mineral processing and technology. The name embodies the rich history of both companies and continues to carry on W.S. Tyler's founding principles of integrity, value and stellar customer service.



Haver & Boecker Niagara's Scarabaeus Pelletizing Disc Technology efficiently produces 'green' pellets for a wide range of applications such as iron ore agglomeration, zinc recycling, fertilizer processing and more.

Florida's SeaPort Manatee orders two Konecranes Gottwald Generation 6 mobile harbour cranes to expand capacity

SeaPort Manatee will bring extra capacity to general cargo and container handling at its operations in Tampa Bay, Florida with two Konecranes Gottwald ESP.7 mobile harbour cranes. After it ordered the first crane in Q1 2024, the port quickly decided to take a second optional crane at the beginning of Q2 to keep up with fast-growing demand. Both cranes will be delivered by the end of the year.

SeaPort Manatee, the closest US deepwater seaport to the expanded Panama Canal, is investing in new equipment to manage anticipated strong growth in container and general cargo traffic. With four Konecranes mobile harbour cranes already on site, the port ordered two more that will offer the ability to run both with electricity from the harbour main, meaning a significant reduction in emissions and a higher efficiency.

"These two new Konecranes Gottwald mobile harbour cranes will not only help SeaPort Manatee accommodate its growing container business, but their electric drive design will also contribute to the port's strong commitment to reducing emissions. Both the Florida Department of Transportation and the port's loyal customers appreciate this dedication to sustainability and the entire community will benefit," said Carlos Buqueras, SeaPort Manatee's executive director.

"We've been proud to work with

SeaPort Manatee over the last two decades as they've cemented a key role in the economy of Florida. This order is a good example of the interest our Generation 6 cranes are developing across the market with their high performance, outstanding reliability and impressive eco-efficiency," says Alan Garcia, Sales Director, Port Solutions, Konecranes.

The order is for two Konecranes Gottwald ESP.7 mobile harbour cranes, with a working radius of up to 51m and a maximum capacity of 125t to serve container ships up to post-Panamax class. Strong lifting capacity curves, improved handling rates and a high classification ensure a long service life. When connected to the harbor mains by cable reel, it eliminates local exhaust emissions and collects lowering and braking energy in ultracapacitors. For unplugged operation, the crane is powered by a smart hybrid drive combining a fuel-optimized diesel generator with the ultracapacitors that provide additional power for heavy lifts.

For deeper insights, SeaPort Manatee will use TRUCONNECT® remote monitoring to collect usage data, which is sent via secure mobile connection to the yourKONECRANES customer portal. There it gets a full overview of its Konecranes equipment, with detailed information about fuel consumption, carbon emissions and handling performance.

POWERED BY ECOLIFTING

This contract is part of Ecolifting™, Konecranes' vision to increase its handprint — meaning the beneficial environmental impact that can be achieved with its product and service portfolio — while reducing customers' carbon footprints. From eco-optimizing diesel drives, to hybridization and fully-electrified fleets, Konecranes will continue to do more with less.

A strong focus on customers and commitment to business growth and continuous improvement put Konecranes at the forefront of the material handling industry. This is underpinned by investments in digitalization and technology, plus the company's work to make material flows more efficient with solutions that decarbonize the economy and advance circularity and safety.

ABOUT KONECRANES

Konecranes is a global expert in material handling solutions, serving a broad range of customers across multiple industries. The company consistently sets the industry benchmark, from everyday improvements to the breakthroughs at moments that matter most, because it knows it can always find a safer, more productive and sustainable way. That's why, with around 16,600 professionals in over 50 countries, Konecranes is trusted every day to lift, handle and move what the world needs. In 2023, Group sales totalled €4.0 billion.



At the coalface

handling systems and technologies



Louise Dodds-Ely

Comprehensive strategies for controlling coal dust at transfer points

Controlling coal dust at conveyor transfer points is essential for health, safety, operational efficiency, and infrastructure cost management. Given that coal represents a major proportion of all dry bulk, optimizing dust control is crucial for the entire supply chain, including equipment, storage facilities, and handling services such as inspection and sampling.

IMPORTANCE OF TRANSFER POINTS

Transfer points in conveyor systems are key sources of coal dust. Many plant owners do not fully utilize opportunities to optimize the position and design of transfer chutes, according to Alwin Nienaber, Technical Director at Weba Chute Systems.

“Coal mines, preparation plants, power stations, and other coal-burning facilities

heavily rely on dust suppression and extraction systems,” says Nienaber. “However, they often expect these systems to handle more than they realistically can.”

Nienaber suggests that a more effective strategy begins with engineering the chutes to alleviate 50 to 80% of dust issues. Dust suppression and extraction systems then become more efficient components of a holistic solution.

HEALTH, SAFETY & OPERATIONAL EFFICIENCY

Global health and safety regulations are becoming increasingly stringent, pressuring facilities to address dust issues more conclusively. Coal dust poses specific risks due to its potential for spontaneous combustion, which can endanger employees, contractors, and nearby

communities. Nienaber emphasizes the broad impact of dust control.

“Excessive dust affects operational efficiency and continuity,” says Nienaber. “In many facilities, certain areas become off-limits during conveyor operation due to high dust volumes.”

Dust accumulation hinders access to critical equipment for maintenance, reducing operational efficiency. Continuous operations benefit from reduced dust levels, leading to fewer disruptions and lower cleaning costs. Dust ingress into machinery also shortens equipment lifespans, increasing both capital and operating expenditures.

CONTROLLING MATERIAL FLOW

Effective dust control starts with



understanding material flow and the effects of uncontrolled velocity and impact. “Dust is a consequence of uncontrolled material flow, which also leads to material degradation,” explains Nienaber. By consolidating material into a homogenous stream, aeration and dust dispersion are minimized. However, natural segregation of coal on conveyors complicates this task, as fine material sinks and granular material rises, leading to dust generation when the

material falls freely.

Standard chutes often lack control, allowing material to spread and generate excessive dust. Nienaber notes that controlled chute flow reduces material degradation, which is critical for processes such as feeding steel plant furnaces.

OPTIMIZING EQUIPMENT CONFIGURATION

Nienaber highlights the importance of plant design in dust control. Proper alignment of

chutes and conveyors to the material flow is crucial. “The configuration of equipment within a plant determines the level of control over material flow,” he says. Expert advice during the design stage can optimize equipment positioning, enhancing material flow and reducing dust.

Effective control of coal dust starts at the early stages of plant design. Ensuring that chutes and conveyors are correctly aligned with the material flow creates a

conductive geometry for coal travel. "The general arrangement of equipment, such as crushers, grizzlies, screens, feeders, and conveyors, is vital," Nienaber adds. Proper positioning of these elements allows for better control over material flow and dust generation.

ENGINEERED CHUTES

Custom-engineered chutes designed for controlled flow, based on material properties, speed, and volume, can significantly minimize dust.

Nienaber explains, "Sound engineering principles can design chutes to minimize physical impacts that create dust. Our 'supertube' designs, for instance, allow controlled material transfer onto conveyors, reducing wear and tear."

Advanced modelling tools, such as three-dimensional software and discrete element method (DEM) simulations, help verify chute designs before manufacture. Cascade lining systems further reduce wear by allowing most material to run on itself rather than on the chute surface. This reduces the generation of dust and prolongs the life of the chute.



ACHIEVING RESULTS

Weba Chute Systems' controlled flow chutes have successfully reduced coal dust in various projects. At a coal-fired power station in Wyoming, replacing standard chutes with ten controlled flow chutes resulted in a 46% to 77% reduction in dust levels and increased conveyor capacity by 150 tonnes per hour. The controlled flow chutes also minimized blockages, reducing coal spillage.

In another example, a Missouri power plant sought to reduce the cleaning required to comply with occupational health and safety regulations for respirable

coal dust. The installation of controlled flow chutes led to a dust reduction of 73% to 91% and improved conveyor component longevity. Enhanced belt wipers also reduced material carryback, further mitigating dust issues.

By focusing on chute engineering and optimizing material flow, facilities can achieve significant improvements in dust control, operational efficiency, and equipment longevity. This approach not only enhances the working environment but also contributes to the overall profitability and sustainability of coal handling operations.



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The critical role of maintenance in times of financial constraints



In the face of declining commodity prices, the mining industry has increasingly prioritized cost saving measures, often leading to the suspension of capital expenditure (CAPEX). While such strategies may yield short-term financial relief, the importance of implementing comprehensive maintenance programmes has never been more critical.

These programmes are essential for ensuring the reliability and performance of

existing equipment, timely servicing, repairs and refurbishments, preventing failures that could severely impact operations downstream.

One of the more complex aspects of mining operations maintenance is measuring the wear life of transfer chutes, which involves tracking numerous components. The advantages of accurately gauging wear life are direct and substantial, contributing to enhanced operational

uptime and, consequently, to the bottom line.

Mark Baller, CEO of Weba Chute Systems, sheds light on how the company's customized reliability model plays a pivotal role in capturing key wear indicators for each chute. This model, when supplied with the correct data — including regular wear measurements — provides plant operators with invaluable insights into wear patterns.

“Such insights are not just academic;





they are practical, enabling predictions about which components will need replacement and the optimal timing for such replacements,” Baller explains. “This predictive capability facilitates meticulous planning, such as timely ordering of necessary parts to ensure they are on-site for upcoming maintenance windows. By adopting a proactive approach to maintenance, unforeseen stoppages are minimized, along with the accompanying disruptions and lost production time.”

He emphasizes the significant efficiency gains achieved through accurate predictions of component lifespan within their chutes. This efficiency is not confined to Weba Chute Systems’ maintenance contracts. The company extends the benefits of its reliability tool to all customers, offering the ability to request the service independently.

The application of reliability modelling allows for the generation of monthly reports, detailing the maintenance schedules required for each wear part within every chute. The model’s complexity accounts for differential wear levels across various parts of the chute, influenced by varying impact levels. This granularity enables chute owners to prioritize maintenance efforts on areas experiencing the highest wear, thereby optimizing maintenance operations and ensuring continuous and reliable production.



SENNEBOGEN material handlers ideal for moving coal cargoes



SENNEBOGEN material handlers are specially designed to deal with demanding material handling — and are ideal for use in the coal transport industry. They stand out for their high performance, reliability and high levels of safety.

The material handlers can be adapted to meet customer-specific requirements with modular undercarriage solutions (mobile, crawler, stationary, rail undercarriages and pylon options) for a wide variety of applications. Hydraulically elevating operator cabs provide the best view and high levels of comfort. With equipment lengths of up to 40m, numerous attachments and quick change systems, the machines are very versatile (orange peel grab, clamshell grab, magnet system, scrap shears, vacuum crossbeam). In addition to modern stage V engines, SENNEBOGEN offers a range of solutions, such as its energy recovery system, SENNEBOGEN Green Hybrid, or the efficiency package, SENNEBOGEN Green Efficiency, which reduce operating costs and exhaust emissions.

ADVANTAGES OF SENNEBOGEN MATERIAL HANDLERS

- ❖ **Improved performance:** top performance, even under tough operating conditions: well thought-out design, high-performance engines, optimized hydraulics and robust components. More efficiency through customized and customer-specific solutions: modular design for individual configuration of material handlers.
- ❖ **Reduced operating costs:** low service costs due to avoidance of over-engineering. Robust technology increases the uptime of the handling excavators. A reversible fan ensures reliable operation in dusty environments.
- ❖ **Protect the environment:** electric drive — all SENNEBOGEN's material handlers are also available with electric drive. State-of-the-art engines offer the latest exhaust emission standards. There are numerous energy saving and recovery systems.
- ❖ **Increased safety:** there is an ideal view of the work area thanks to cab elevation, as well as best possible accessibility to all stairs and ascents. Optimum illumination is provided by powerful LED spotlights, and camera monitoring keeps an eye on all safety-relevant areas.
- ❖ **Maximum operator comfort:** spacious cabs are perfectly adapted to the operator's application, complemented by ergonomic seats and joysticks. Panoramic windows give maximum visibility of the work area. For more details on SENNEBOGEN's maXcab, please see 'The new SENNEBOGEN maXcab — the most modern and comfortable cab in its class' on p32 of this issue.
- ❖ **Simplified maintenance & service:** service points are clearly and ideally accessible from the ground. SENNEBOGEN prefers to keep it simple, and relies on hydraulics and electrics where electronics add no value. Easy orientation ensures clear identification of components, and supporting diagnostics are provided through the SENCON control system.





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



Heyl & Patterson systems prioritize customer safety and success



The Heyl & Patterson railcar dumper is widely recognized for its outstanding efficiency and capability.

From Heyl & Patterson's early days, back when coal and steel dominated the market, the company has been achieving milestones through high-quality, time-tested, custom-engineered solutions for over 135 years. Founded in 1887, Heyl & Patterson has been at the forefront of the industry in the design and construction of world-class bulk material handling equipment for a wide range of industries including coal. As an avid contender in the coal segment, Heyl & Patterson has continued to combine cutting-edge technological innovation with a wealth of experience that its customers have come to rely on.

Effective coal handling is critical for power plants and other industrial facilities that rely on coal. Having a well-designed coal handling system is imperative when it comes to reduced transportation costs, enhanced safety, and cleanliness within each facility. Heyl & Patterson provides solutions for sites that transport coal using machinery like railcar dumpers and continuous barge unloaders, whether it's via ship or rail. It also offers solutions such as stackers and reclaimers that arrange coal in stockpiles and retrieve it when needed.

When it comes to transporting coal by

rail, prioritizing efficiency is crucial to the unloading process of bulk materials and Heyl & Patterson offers an ideal solution. The Heyl & Patterson railcar dumper is widely recognized for its outstanding efficiency and capability. This cutting-edge system plays a vital role in numerous industries. With its advanced features, the railcar dumper can handle various materials, including coal, regardless of whether it is clumped or frozen. These machines are used to unload railcars quickly and efficiently in various environments. The Heyl & Patterson railcar dumper is made to keep businesses flowing.

To make rail transportation the most productive for coal handling as well as other material handling, Heyl & Patterson also offers railcar movers and positioners. These devices are used in facilities where they are moving railcars from one location to another, prioritizing efficiency. These devices are available in various sizes and configurations depending on size specifications. Heyl & Patterson's railcar positioners and movers can quickly and easily spot cars for loading and unloading, saving time and money.

Beyond rail, shipping coal by barge also

plays a key role in moving coal efficiently. Barges are commonly used to ship coal as they move about 60% of crops to be exported. The economic impact of barge transportation is imperative as it reduces congestion, it is cost effective, and environmentally friendly. Therefore, having an efficient way to unload barges is crucial to the business's success. Heyl & Patterson is a leader in the engineering and fabrication of continuous barge unloading systems. It has developed a range of high-capacity machines to address the diverse challenges faced by numerous customers. The H&P barge unloader was designed to swiftly and safely empty barges while maintaining environmental integrity. This versatile system is ideal for coal unloading and other applications.

While efficiency is key, the safety of facilities is of utmost importance in the coal industry, which is why it is crucial for customers to have machinery that supports them at every stage. For over 60 years, Heyl & Patterson has been a prominent provider in the stacker reclaimer industry. It specializes in customizing stacker reclaimers to meet the unique requirements of each customer,

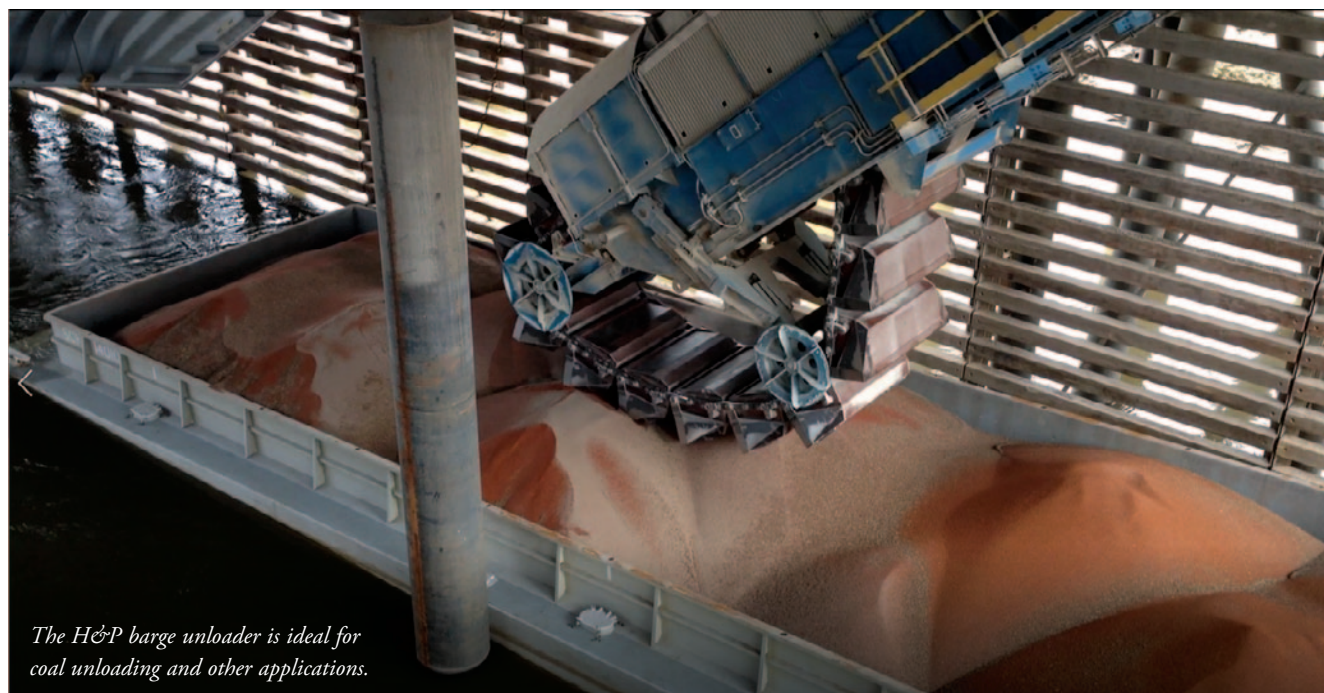


Heyl & Patterson specializes in customizing stacker reclaimers to meet the unique requirements of each customer, considering factors such as site capacity, yard limitations, and environmental conditions.

considering factors such as site capacity, yard limitations, and environmental conditions. Heyl & Patterson's heavy-duty stacker reclaimers are designed to handle various materials, including coal. These machines are equipped with a boom that can reach over the top of the material stack for reclamation, as well as a bucket or claw to efficiently grab and stack the material.

By utilizing these machines, the safety of each site is improved dramatically. Stacker reclaimers automate the process of storing and reclaiming bulk materials, eliminating the need for manual labour directly. With an appropriately designed stacker reclaimer that is properly maintained, facilities can ensure optimal performance while guaranteeing a safer work environment.

Heyl & Patterson has adapted to the latest technological advancements in order to better serve the industries in which it is involved. It is a reliable partner to numerous facilities, and the company remains committed to maintaining and nurturing these relationships. Customers depend on Heyl & Patterson to propel their businesses towards success.



The H&P barge unloader is ideal for coal unloading and other applications.

Coal and coke handling with help from Italian expert SAMMI

Italian bulk handling equipment specialist SAMMI Srl has extensive experience in the coal industry, with numerous references around the world.

Two of the company's flagship projects are detailed below.

LOTOS COKING UNIT, HANDLING SYSTEM AND SCRAPER RECLAIMER

SOLUTION FOR BULK MATERIALS, STOCKYARD, STACKER, BELT CONVEYORS

Design, full supply (MEC-ELE-AUT) and commissioning of petcoke handling storage, reclaiming and truck loading system for end-user LOTOS Asphalt Sp. z o.o. The work was carried out in 2016–2017, for customer KT Kinetics Technology S.p.a. (part of Maire Tecnimont Group). The specified conveyor capacity was 200tph (tonnes per hour), with the plant scheduled to be commissioned in 2018.

DETAILS

In the oil and gas market, an important project was carried out by SAMMI in Poland. After having acquired the commission by KT Kinetics Technology for Lotos EFRA project, in 2015, SAMMI's specialized team started to design for the equipment required. The company was able to draw on all of the expertise and experience that it has gained over the years to meet the needs of the customer.

The project concerned the manufacturing of the coke storage and loading facilities system, whose function is to handle the coke product from the closed coke slurry system (CCSS) to the storage stockpile and then from this one to the truck loading station. The coke from the CCSS unit is delivered to the storage bulk hall, where a shuttle conveyor allows for the distribution of material through building length. To prevent against dispersions of explosive coke dust, a loading bellows is provided under the shuttle.

From the stockpile, the coke is delivered to the truck loading system by means of a semi portal scraper that continuously provides material to a conveyor chain up to truck loading station. In case of reclaimer shutdown, petcoke can be routed directly to the truck loading station with a bypass route.

Moreover, it is important to underline that all the systems are Atex certified to guarantee safety, and that they are all certified for working temperatures from -25°C . The first level control system is performed by a fully redundant PLC.



LOTOS Asphalt project.



LOTOS Asphalt project.



LOTOS Asphalt project.



SAMMI has participated in each stage of the project, from the early stages with the initial design, through production, monitoring and final assembly. The plant has been successfully completed and obtained CE marking. In accordance with the company philosophy, "There are no barriers, only new challenges"; this contract is only a starting point for the further international growth of SAMMI.

DELAYED COKER UNIT FOR RESIDUE CONVERSION

INA - INDUSTRIJA NAFTE D.D. ZAGREB, RIJEKA
REFINERY: COKE HANDLING SYSTEM AND SHIPLOADING SOL. "2C"

SAMMI has taken on the role of EPC contractor for the above project, providing all the necessary components for the plant. The project is currently in the commissioning phase, with CE marking expected in the near future.

A crushing and stacking capacity of 450tph is specified.

The completed project will have an ESI Eurosilo storage silo capacity of 27,750m³, and the reclaiming and shiploading capacity will be 550tph.

Description of the handling system

Petroleum (green) coke is cut from the coke drum by high-pressure cutting water. Coke and water fall into the pit and coke is moved to the pad for dewatering by using a bridge crane. Coke is transferred from the coke pad to the feed hopper by the bridge





INA project.

crane, which is able to move around the length and width of the coke pad area. The coke is generally moved in two steps: wet coke from the pit to a coke pile on the pad and from a coke pile, dewatered for approximately 24 hours, to the feed hopper.

From the feed hopper, the coke goes through the roll crusher reducing the coke particle size from inlet size 300mm to either 100 or 50mm (adjustable output size) and transferring the coke to the coke transportation system, which starts with the belt feeder, furnished with magnetic separator. A belt feeder is located within crusher tower near DCU and discharges the coke on the pipe conveyor, which delivers the material to the coke storage facility.

Crushed petroleum coke will be stockpiled in an ESI Eurosilo vertical silo (27,750m³) provided by the client. Near the discharge end of the pipe conveyor the belt scale is located, thus monitoring the incoming material flow.

The nominal crushing and stacking capacity is 450tph.

Coke is reclaimed from the silo by a collecting conveyor and then conveyed on a transfer conveyor, which delivers the product to shiploading facility on jetty (about 110m from silo).

Transfer conveyor is equipped with a belt scale and magnetic separator, and discharges the material on the jetty conveyor located in the gallery along the jetty. The jetty conveyor is equipped with a non-driven tripper car, towed by shiploader, for transferring coke on belt conveyor of the ship loader.

The nominal reclaiming and shiploading capacity is 550tph.

Supply description

- ❖ **Belt feeder:** the belt feeder will collect the crushed coke from upstream crusher/discharge hopper. The conveyor includes drive and tail head, drive unit by geared motor hollow-shaft mounted by torque arm, intermediate support frame by means of bolted steel profiles, roll idlers, rubber belt and accessories for proper and safe operation. As a general rule, conveyor is capable to being started under full load.
- ❖ **Pipe conveyor:** the pipe conveyor will collect the coke from upstream conveyor and transport the flow up to the storage facility.
- ❖ **Collecting conveyor (BC-03):** the belt conveyor will collect the coke from storage silo facility, and transfer it to the next equipment. The conveyor

includes drive and tail head, drive unit by geared motor, intermediate support frame by means of bolted steel profiles, roll idlers, rubber belt and accessories for proper and safe operation. As a general rule, the conveyor is capable of being started under full load.

- ❖ **Inclined conveyor (BC-04):** the belt conveyor will collect the coke from BC-03 and transfer it to the next equipment. The conveyor includes drive and tail head, drive unit by geared motor, intermediate support frame by means of bolted steel profiles, roll idlers, rubber belt and accessories for the proper and safe operation. As a general rule, the conveyor is capable of being started under full load.
- ❖ **Jetty conveyor (BC-05):** the belt conveyor will collect the crushed coke from the upstream belt conveyor BC-04 and transfer it to the shiploader by means of a tripper car moving on rails mounted on foundations. The tripper car is idle and towed by the movement of the shiploader along the berth. The belt conveyor includes drive and tail head, drive unit by geared motor, intermediate support frame by means of bolted steel profiles, roll idlers, rubber belt and accessories for

the proper and safe operation. The tripper car is considered as a part of the shiploader. As a general rule, the conveyor is capable of being started under full load.

❖ Shiploader.

COAL HANDLING PROJECTS CARRIED OUT BY SAMMI

- ❖ offshore material (manganese-bauxite-iron ore-coal) handling and shiploading system for transshipper *FTS Jeroboam* (1,500–2,500tph conveyor system capacity), in Gabon. The customer is Norden, and the work was carried out in 2022.
- ❖ petcoke handling, storage and port shiploading for the new DCU at INA's refinery in Rijeka, Croatia. The customer is Tecnimont KT, and the work was carried out in 2020.
- ❖ railcar unloading system and transfer to storage silo of aggregate, carbon coke and iron pellet for blast furnace

feeding, in Pont-A-Mousson, France. The customer is Saint Gobain PAM, and the work was carried out in 2017.

- ❖ asphaltene & coal handling system for Kilpilahti Power Plant in Porvoo, Finland. The work was carried out in 2016.
- ❖ petcoke handling, storage, reclaiming and truck loading system – Grupa Lotos refinery, in Gdansk, Poland. The customer is Tecnimont KT, and the work was carried out in 2015.
- ❖ Belt conveyors system for carbon coke at high temperature, in Florange, France. The customer is Arcelor Mittal, and the work was carried out in 2014.
- ❖ 250tph conveyor system for cement crushing mill feeding in Couvrot, France. The customer is Ciments Calcia Italcementi Group, and the work was carried out in 2011.
- ❖ 2,500tph (coal) offshore belt conveyor system for transshipper *Bulk Sumatra*

in Indonesia. The customer was Coeclerici and the work was carried out in 2011.

- ❖ 2,000tph (coal) offshore belt conveyor systems for transshipper *Bulk Borneo* in Nantong, China. The customer was Coeclerici, and the work was carried out in 2011.
- ❖ 750tph offshore conveyor belt system for transshipper *Bulk Kremi* with continuous shiploader (crushed & prilled sulphur handling) — the system is also able to handle coal and iron ore. ATEX 21/22 in Odessa, Ukraine. The customer was Coeclerici and the work was carried out in 2010.
- ❖ 2,000tph (coal) conveyor belt system for transshipper *Bulk Coal* in Nantong, China. The customer was Coeclerici and the work was carried out in 2010.
- ❖ plant engineering for 2,000tph transshipper *Bulk Coal* in Nantong, China. The customer was Coeclerici and the work was carried out in 2010.

INA project.



RHM's GENMA handling crane wins praise from Indonesian electric coal companies for stability, speed, and performance



In Indonesia's Balikpapan port, two sets of GENMA fixed grab handling cranes stand at the forefront of the customer's terminal, skillfully extending their 'arms' and opening their 'hands' to unload a large amount of coal from cargo ships.

With the help of a complete conveyor system, these cranes ensure a steady supply of electric coal to the customers' smelting plants.

The two sets of GENMA fixed grab handling cranes (handling cranes in short) used in the port are customized by Rainbow Heavy Machines (RHM) for the Indonesian customers. Having been in operation for a year, the cranes have received high praise from operator Fac Willi, who stated, "The GENMA handling crane is an excellent product with stable and efficient operation, and excellent comprehensive performance."

ANTI-SHAKE CONTROL TECHNOLOGY IS APPLIED TO ENSURE SAFETY AND STABILITY

GENMA handling cranes use the brand's self-developed crane design system. Through secondary development of the

calculation software, the system realizes the integration and application of such techniques as the mechanical analysis of steel structure, motion interference check of the boom system, and stability calculation of the whole machine, which allows the whole machine the advantages of light weight, reasonable force and high stability.

The stability of the equipment is not only closely related to the safety of personnel, but also to the efficiency of the operation. To ensure the operation stability under dynamic working conditions and make the operation more efficient and safer, GENMA handling crane adopts the segmented acceleration and deceleration anti-shaking system to achieve the purpose of anti-shaking by setting acceleration and deceleration points through the programme and simulating the operation of 'veterans'.

In the segmented acceleration and deceleration anti-shaking system, the acceleration and deceleration rate of the equipment is divided into a number of segments, with each controlled within a



certain range to avoid equipment shaking and loss of control being caused by the unstable acceleration and deceleration process. In the end, the lifting, luffing, and rotation mechanisms of the handling crane act more safely, coherently and smoothly. For this, Fac Willi has a deep feeling, "GENMA handling crane features sensitive action, smooth start and stop, and safe and reliable performance. Sitting in the cab, I couldn't feel the shaking of the equipment at all. GENMA handling crane is safe in use!"

THE SEMI-AUTOMATIC OPERATION MODE IS USED TO ASSIST AN EFFICIENT AND LABOUR-SAVING PERFORMANCE

GENMA handling crane adopts the variable-frequency control technology to realize linkage of all programmes via the programming controller. In the grabbing operation, by setting the moving trajectory of the grab, it pairs with the unloading auto-control system to realize automatic

unloading, efficiently improve the equipment's operation efficiency, and lower the labor intensity of the driver.

Like a plus-version assistant, the semi-auto mode enhances the safety and stability in operation, and the predictability of working process. Accurate, efficient, safe and environmental in use, it is a choice friendly to freshmen.

In the semi-auto mode, GENMA handling crane can complete the cycled loading/unloading operation at fixed spots of 24 grabs per hour, which can unload cargo at a minimum of 300 tonnes per hour. "GENMA handling crane, easy and efficient to operate, has enhanced the (coal) unloading efficiency of our terminal."

PROFESSIONAL AFTER-SALES SERVICES ENSURE A WORRY-FREE USE

Apart from the product itself, GENMA's all-cover and thoughtful supporting services have also profoundly impressed Fac Willi. "GENMA's professional after-sales services

can efficiently solve all the after-use problems. What impressed me is that, to help us develop good habits of equipment use and reduce the failure rate, GENMA's after-sales service engineers always patiently explain to us the precautions in equipment use, the analysis and treatment of common failures, and the importance of equipment maintenance in extending the service life of the equipment. GENMA is our friend!"

Customer recognition has strengthened GENMA's determination to create a good brand and present good services. For more than ten years, GENMA brand has always been customer-centric, creating value for customers with high-quality products and presenting attentive services to win their trust.

In the future, GENMA will promote the innovation and upgrading of products and services in a deeper and comprehensive manner to better meet customer needs and enhance customer satisfaction.



Designing state-of-the-art coal handling systems



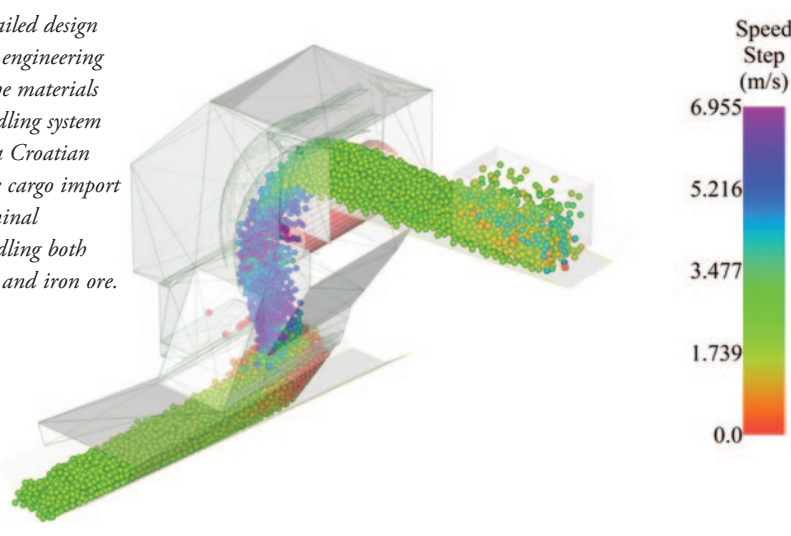
Detailed design of a new coal import conveying system for a power station in Malaysia included the upgrade of the existing grab-type ship-unloader (above, left) and adding a new conveying stream from the import jetty to the existing power station stockyard facility (above, right).

The handling of coal poses numerous challenges ranging from flow problems during rainy seasons with sticking and blockages of chutes and bunkers, to the abrasion of coal handling equipment and spillage, not to mention coal dust generation, particularly at transfer points.

The key to reliable coal handling system performance is therefore to incorporate fit-for-purpose technologies designed to take into account flow and other relevant material properties, notes DemcoTECH Engineering General Manager Paul van de Vyver.

In an important project, DemcoTECH undertook the detailed design of a new 5,000tph (tonnes per hour) coal import and conveying system for a coal fired power station in Malaysia. The project comprised upgrading an existing grab-type unloader's capacity and tailoring a new ship-unloader's interface with the existing

Detailed design and engineering of the materials handling system for a Croatian bulk cargo import terminal handling both coal and iron ore.



and new conveying streams. In addition, a completely new conveying stream was installed from the import jetty to the stockyard approximately 2km inland, comprising multiple conveyors and transfer chutes to reticulate the coal to the power station and its coal stockyard.

The brownfield project was part of the expansion programme to add generation capacity to the local grid and required significant interfacing between existing equipment and the new conveying system.

With conveying speeds of 4.6m/s on 1,800mm wide conveyor belts, the coal import and distribution system comprised eight conveyors and 11 transfer points, an inclined moving head, multiple fixed tripper transfer points and, in some cases, three-way actuated trouser-leg chutes.

"Complexities in this project included the need for seismic assessments as part of our structural designs and catering for a range in coal characteristics due to spot-purchases of coal from significantly varying environments. Particle size and material characteristics posed an interesting challenge as our designs had to cater for coal ranging from frozen to sized coal,

substantial fines in wet coal to high-clay content imports. Material flow simulation using discrete element modelling [DEM] was an essential tool," says van de Vyver. "Some chute geometry was particularly difficult to configure and interface with the existing facilities, exasperated by the envelope of varying coal behaviour, which super-imposed practical limitations to our designs. In addition, coal off-loaded from a vessel may be relatively dry at the top of the hold but, towards the bottom half of the ship's hold, the product is often fine and very wet.

"These factors posed significant challenges in the design of the chutework whereby degradation was to be minimized, material velocities optimized and chute blockages prevented."

For another client in South Africa, DemcoTECH reviewed and developed an upgrade to an existing rail tandem tippler and coal stockyard feed system. The upgrade increased the throughput, availability and reliability of the existing facility, which fed coal to the 6 x 700 MW coal-fired power station units. "By upgrading the wagon indexer, tippler,



DemcoTECH's recommendation for upgrading and enhancing of the coal off-loading and delivery system for a South African power utility included the tandem wagon tippler.

conveyors and transfer chutes, the system's capacity could achieve approximately 14mt (million tonnes) per annum coal deliveries to the power plant."

MULTI-PRODUCT TERMINALS

DemcoTECH also carried out the detailed design and engineering of the materials handling system for a new Croatian bulk cargo import terminal handling both coal and iron ore.

The terminal consists of a ship-unloading system, a stockpiling operation and a 2,400tph rapid rail loadout facility. The system is designed to import and stockpile up to 4,000tph iron ore or 2,000tph of coal.

As the 2,000mm-wide belt conveyor system is required to handle both coal and iron ore interchangeably, utilizing the same transfer chutes, the conveyor belt speeds and throughput of the two products varied considerably, namely 2m/s for iron ore and 4m/s for coal. The chutes were designed to allow the operator to configure the chutework for the two different products, i.e. the chutework designs for coal (free-flowing) versus iron ore (drop box) required a series of adjustable features that could be rotated into or out of the material flow path. Accordingly, the chute geometry and material flow path are automatically adjusted to suit the significantly different material trajectories and wear patterns, minimize particle degradation and load the receiving conveyor centrally.

Two stockpile reclaim systems were provided; one being a conventional bucket-wheel operation while the second system comprised two independent rail-mounted motorized reclaim hoppers, charged by large wheel loaders.

"The entire plant is subjected to severe seismic activity and thus the structural design had to incorporate the requisite features to dissipate and resist seismic-related forces and loads," says van de Vyver.

DemcoTECH was also commissioned to design and engineer a rapid rail loadout facility at this terminal, to export coal and iron ore at up to 2,400tph in three different wagon configurations. This gravity loadout follows a conventional configuration of surge hoppers, weigh flasks and loading apparel to suit the export requirements and wagon range presented to the terminal.

For one of its earlier projects, DemcoTECH was appointed the EPCM contractor to develop the materials handling system for a multi-product inland terminal to handle coal, sulphur, rock and phosphate, at the port of Richards Bay in



Materials handling portion of the expansion to a multi-product terminal at the port of Richards Bay in South Africa.

South Africa. In excess of 4mt per annum of product is delivered to and dispatched from this terminal by conveyor, rail, road and sea. The terminal comprises three distinct sites, separated geographically by either natural features or other users, but connected by the client's infrastructure. The sites are extremely congested owing to the available space, which posed a significant challenge to the design.

"As this was a brownfields site, the interfacing of new equipment into the existing equipment had to be carried out around planned shutdowns in order to minimize disruptions to operations," concludes van de Vyver.

"In addition, to achieve environmentally clean solutions, we designed and installed equipment that complies with stringent environmental and safety requirements," adds van de Vyver. "We provide a range of enclosed conveying systems including pipe, troughed and AeroConveyors™, as well ancillary dust control and suppression systems to contain, reduce and eliminate dust and environmental issues."

To support its suite of technologies and engineering expertise, DemcoTECH makes use of advanced testing, flow modelling and system simulation to design its systems based upon a thorough understanding of the properties of the material, particularly for the worst flow conditions that are expected to occur in practice with wet coal.

ABOUT DEMCOTECH ENGINEERING

DemcoTECH Engineering is a specialist bulk materials handling and niche process plant company, offering services from concept design through to project completion to the power generation, cement, mining, metallurgical, manufacturing and port handling industries. Services include conceptual design, feasibility studies, design, engineering, procurement, expediting, construction and commissioning. Plant supplied by DemcoTECH includes troughed conveyors, air-supported conveyors, pipe conveyors, rail-mounted slewing boom stackers, pivot boom conveyors and mobile conveyors.

Coal processing with screen media from MAJOR

SOLVING THE THREE BIGGEST COAL SCREENING CHALLENGES

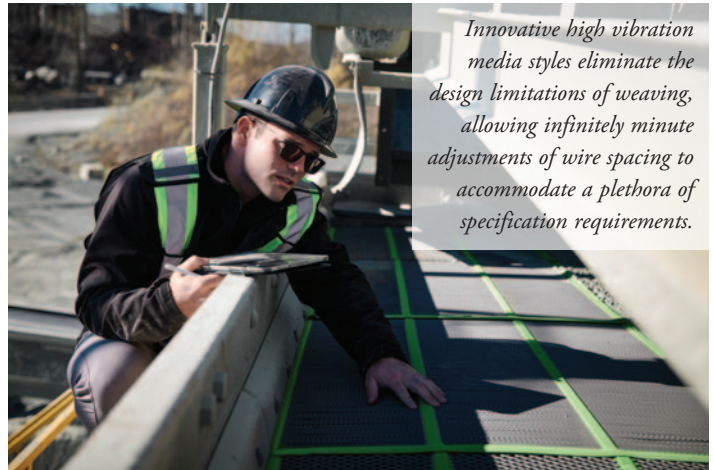
Energy is a hot topic in any country or socioeconomic circle these days, writes Serge Raymond, MAJOR product specialist. Though politicians will forever argue and debate the virtues and evils of one system of energy over another, the majority of the population no matter what part of the globe they live in, simply want to make sure that when they need heat, light or transportation, it's readily and economically available. In 2022, the demand for coal, especially in the power generation industry, hit a record high.

At the same time, the specs and requirements for coal production have gotten even tighter and the pressure on mines to find more sustainable processes have never been more rigid. Coal operations must examine many facets of their business to ensure efficiency and sustainability, and one significant consideration is screening and classifying. When it comes to screening coal, most operations will agree that tighter specs, issues with blinding and pegging and constant need to increase production are three of the most common challenges they face. While it's second nature to immediately look at the screen box for solutions, the key may lie in screen media.

1. TIGHTER SPECIFICATIONS = GREATER MARGINS

Throughout the past 20 years, the material specifications for all industries have tightened — including coal. While the once standard increments of woven wire cloth openings used to adequately meet all specifications, today's tighter specs demand infinitely more size options to produce the requirements for various applications and uses. Often the premium products offering the most margin require the most difficult specifications to attain.

Because coal is light and not abrasive, most coal screening operations use standard woven wire screens. These mass-produced screens are inexpensive and old school — seemingly an easy decision. But, when precision for a variety of materials is key, old-school media is often not the right path. Because of the design and weaving process of traditional woven wire, only specific opening sizes in 1/16-inch increments are available. Innovative high vibration media styles eliminate the design limitations of weaving, allowing infinitely minute adjustments of wire spacing to accommodate a plethora of specification requirements. This provides coal mines with the capacity to meet specifications and capitalize on the products or specifications that provide the highest profit margins.



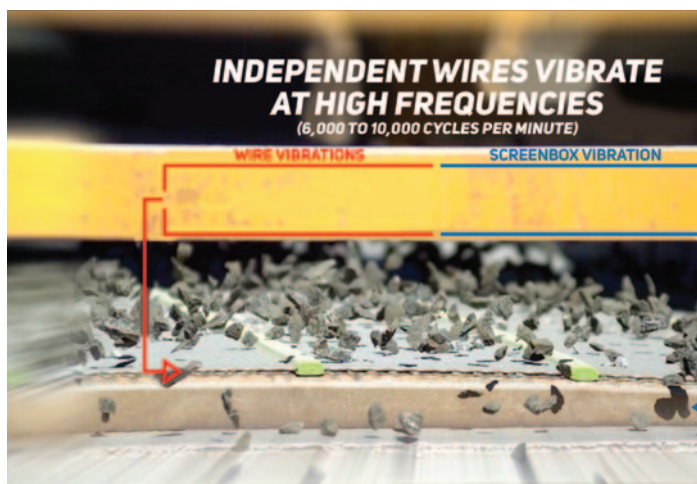
Innovative high vibration media styles eliminate the design limitations of weaving, allowing infinitely minute adjustments of wire spacing to accommodate a plethora of specification requirements.



Alternative screen media offers a more efficient solution to overcoming the blinding and pegging issue.



Predictive vibration analysis, which includes vibration analysis tests, detects miniscule changes in baseline operation before the effects are seen in screening performance and output.



High vibration screens are designed in a manner that allows each wire to vibrate independently enhancing the overall effectiveness and allowing the screen to self-clean.

2. BLINDING & PEGGING

The lightweight and relatively soft properties of coal lead to the production of many fines that stick to the surface of the screen causing issues with blinding. Though running the coal through a wash plant before screening may reduce the fines, the added moisture — even 5% — leads to equally troubling issues with blinding. Whether from the sticky fines or the moisture laden slime, blinding and pegging present a major problem to both quality and quantity of the final screened product. Left unchecked, blinding and pegging lead to incomplete screening and contaminated product or the need to stop the screen three

to four times a day for a thorough cleaning. Each cleaning stops production completely anywhere from 20 to 30 minutes. Depending on how severe the blinding or pegging issue, if a chain is needed to vibrate the material off, not only do producers need to figure in the cost of shut down, but also the cost of the added wear and potential damage to the screen media. If cleanings must occur four times a day, it results in upwards of two hours of lost production every week. With one tonne of coal priced at approximately \$30 and 250 tonnes processed per hour, that translates to \$15,000 of lost production each week or more than \$60,000 per month. Over the course of an average year, a coal mine is effectively leaving more than \$720,000 on the table.

Alternative screen media offers a more efficient solution to overcoming the blinding and pegging issue. While traditional woven wire cloth relies solely on the vibration of the screen box to create the frequency needed to stratify the material, high vibration screens are designed in a manner that allows each wire to vibrate independently enhancing the overall effectiveness and allowing the screen to self-clean. The high frequency vibration produced by the screen wires, virtually eliminates blinding and pegging erasing the need to prewash the coal or shutdown the machines for cleaning. In turn, eliminating that step can also reduce water use and costs leading to a more sustainable overall process.

To further reduce the chance of material buildup, the high-vibration screens offer customizations using stainless steel wire. While the porous nature of standard wire might attract the coal powder allowing it to build up and eventually close off the entire opening, the stainless-steel wire combined with high vibration effectively eliminates the chance of material buildup.

3. THE PROOF IS IN PRODUCTION

Often in screening applications, mines focus heavily on reducing the frequency of screen change outs. While both the cost of new media and the time to change out the screen panels can result in significant costs, the significance is often misplaced. Rather than focusing on cutting costs, coal mines would be better served focusing on making money. Ultimately, in achieving higher production, most costs can be offset or completely negated. While traditional woven wire might last more than a year between change outs in coal applications, that should actually be a flag to a coal mine, alerting them that they are significantly

Customized high vibration screen media continues to grow as the solution for the myriad of challenges in the coal industry.



under producing. By switching to a high-vibration screen, most coal mines will see an increase of upwards of 40% in production. Though pushing more material across the screens may result in slightly more frequent screen change outs, the revenue generated by increased production and a better-quality product more than offsets the additional screen media costs.

Performance is of course only one aspect of productivity. The other? Uptime. Any coal mine knows that the key to successful production is avoiding unscheduled downtime and instead employing tools to optimize performance and predict maintenance so it can be completed at scheduled times rather than unexpectedly. One tool some screen manufacturers offer to monitor the health of the screening system is predictive vibration analysis. Predictive vibration analysis, which includes vibration analysis tests, detects miniscule changes in baseline operation before the effects are seen in screening performance and output. Some vibration analysis systems even capture data while the machines are running material. This provides producers with up-to-date information on the machine and operational health without making sacrifices in production time. Issues such as improper tensioning or a broken wire can be identified and remedied through scheduled downtime. The system also gives an indication of how the screening machine is working allowing operations insight into adjustments or maintenance on the machine that could help improve productivity.

Building on those benefits of automation and data collection, some screen media manufacturers also embed tracking chips into each screen panel. These chips can be easily scanned to get data on the machine placement, the specs of the screen and other relevant data for both reorder and

flexibility in changing specs. Rather than worrying about putting screen panels in inventory to switch to a different specification, coal mines know that the data for the placement of the screen is housed in the chip which can easily be scanned for precise placement when the specifications change again. The data contained in the chip also makes it simple and seamless to reorder screen media.

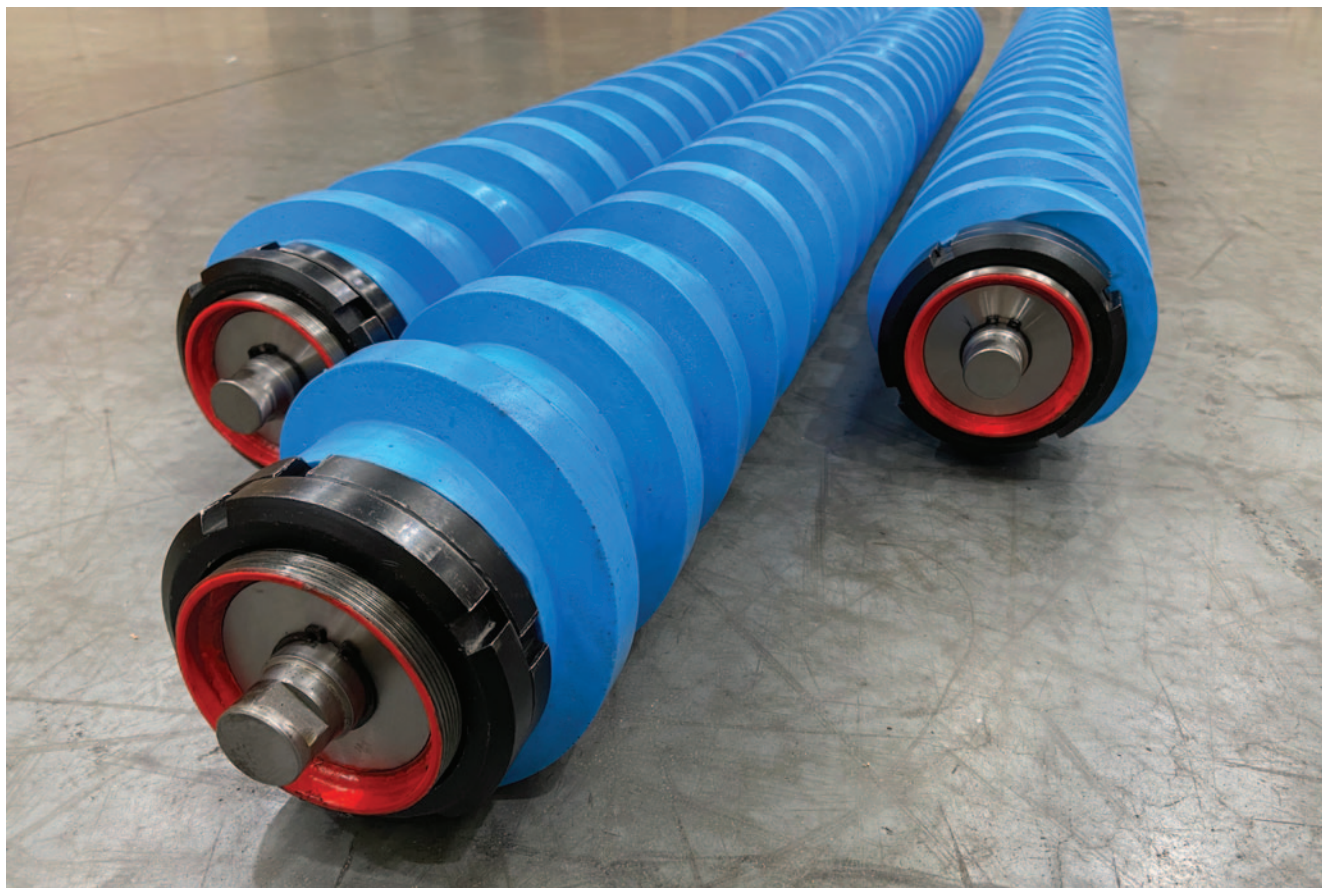
MAKING THE SWITCH

While the success of a coal mine's processing is often placed on the screening machine itself, the screen media likely plays a more important role. Progressive mines with a comprehensive and strong understanding of frequency and amplitude and the overall effects of vibration and movement, recognize that the static screen panels of the past simply fail to meet the challenges they face today. As a result, customized high vibration screen media continues to grow as the solution for the myriad of challenges in the coal industry.

ABOUT MAJOR

MAJOR is an innovative global manufacturer of wire screens for the aggregate, mining and recycling industries. FLEX-MAT®, the company's renowned line of distinctive lime-green high vibration screens made with OPTIMUMWIRE® — the longest-lasting wire — sets the standard in lowering the cost of production per tonne by dramatically increasing throughput and wear life while eliminating blinding and pegging. MAJOR masters wire quality, screen manufacturing and the screening process, and provides on-site screening performance assessment and training seminars on screen maintenance and screening efficiency to help producers increase their screening performance and profitability. MAJOR is a Haver & Boecker company.

Sparking safety – Fire Retardant Anti Static (FRAS) solutions for underground coal mines



Every precaution must be taken within underground coal mines to ensure a safe working environment. Yet, amidst the challenges posed by collapsing tunnels, heavy machinery, confined spaces, and limited ventilation, the presence of static electricity often goes unnoticed until disaster strikes.

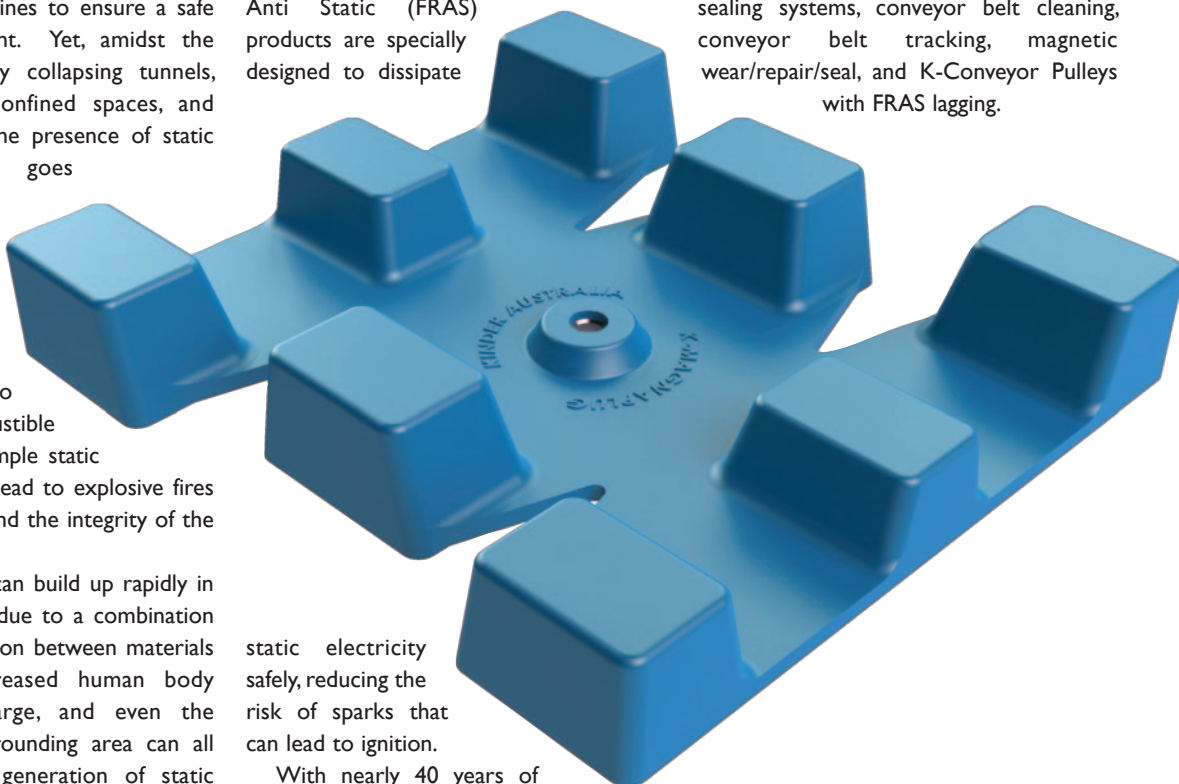
The danger posed by static electricity in underground mines is its potential to ignite highly combustible coal and dust. A simple static electrical spark can lead to explosive fires that put operators and the integrity of the mine itself at risk.

Static electricity can build up rapidly in underground mines due to a combination of factors. The friction between materials and the belt, increased human body electrostatic discharge, and even the geology of the surrounding area can all contribute to the generation of static charges.

The key to mitigating the dangers of static electricity in underground mines lies in the adoption of Fire Retardant Anti Static (FRAS) polyurethane. Kinder Australia's

high quality Fire Retardant Anti Static (FRAS) products are specially designed to dissipate

These include conveyor belt skirting and sealing systems, conveyor belt cleaning, conveyor belt tracking, magnetic wear/repair/seal, and K-Conveyor Pulleys with FRAS lagging.



static electricity safely, reducing the risk of sparks that can lead to ignition.

With nearly 40 years of engineering experience in delivering safety and productivity solutions for the global coal industry, Kinder Australia have developed a range featuring Fire Retardant Anti Static (FRAS) polyurethane.

By incorporating Kinder Australia's Fire Retardant Anti Static (FRAS) solutions into their operations, mining companies can significantly increase safety and reduce the potential for catastrophic incidents.

Arden Equipment clamshell buckets grab the attention of the coal market



Arden Equipment, which manufactures a range of attachments, offers clamshell buckets that are ideal for handling coal.

The models BA 303, BA 404, BA 453, BA 553, BA 604-B, and BA 704 are ideal for handling coal cargoes. Designed for optimum performance, these buckets are suitable for a wide range of jobs, from the lightest to the most demanding.

Thanks to their 360° rotation capability, the Arden Equipment bucket offers great manoeuvrability, making it easy to handle and move, regardless of the type of construction site. This complete rotation allows for precise positioning of the bucket,

improving efficiency and productivity in the field.

The change of shells on the BA 303, BA 404, BA 453, and BA 553 models has been simplified and accelerated thanks to the integration of a moulded rudder. This reduces the number of axes to three, making the process of changing shells not only faster but also easier. The system also ensures safe handling and transport of materials, minimizing the risk of accidents and loss of materials.

Special earthing shells are particularly appreciated for their strength and resistance to wear. Manufactured to last,

they are available in different sizes to meet the specific needs of customers. Whether working on large projects or smaller tasks, these shells offer a reliable and durable solution.

Finally, Arden Equipment pick-up buckets can be completely customized to the user's specific requirements. Whether it depends on the types of materials to be handled, the working environment or the characteristics of the carrier, these containers are designed to fit the user's needs perfectly. This flexibility optimizes performance and ensures maximum efficiency in all working conditions.



Empowering industries: Bateman Manufacturing's innovations in material handling



Based in Oro-Medonte, Ontario, Canada, Bateman Manufacturing is an industry expert in the creation and fabrication of material handling products designed to support the recycling, demolition, waste, industrial, port, railway, and forestry industries. Founded in 1989, Bateman has over 30 years of experience in attachment manufacturing and continues to rapidly expand. In 2019, Bateman was acquired by GRYB International, a material handling attachments manufacturer, based in Victoriaville, Quebec. GRYB International derives from GRYB Attachments, which was founded in 2007 and continues to expand with the additional acquisitions of Winkle Industries, Shearex, Serco Loaders, e-Trak, RadTech, and DalkoTech. GRYB International is a group of manufacturing companies that develop, design, and manufacture products for a wide range of industries. Today, GRYB International employs over 725 individuals.

Bateman is proud to manufacture both hydraulic and self-contained diesel clamshell buckets for coal handling. The best solution for re-handling and digging, Bateman clamshell buckets help streamline processes. Its hydraulic clamshell buckets are available in light, medium, and heavy-duty configurations with either open or

closed back designs. All hydraulic clamshell buckets come equipped with Bateman's severe-duty rotator with continuous 360° rotation and internal hydraulic relief. Bateman rotators also feature fully sealed moving parts for submersion in water. Customers looking for something specific can work with Bateman's team to design a custom bucket that is just right for their specific needs.

Bateman's major clients include those in the road salt, wood chip, and coal handling industries, as well as many more. In order to better serve its customers, Bateman also offers installation and support services, when needed, for all attachment purchases. The Bateman team additionally offers personalized and customized on-site installation services and training so that customers and their teams can safely and



properly operate their new handling equipment.

Bateman's team also provides repair and refurbishment services for existing handling equipment — Bateman brand or not — with remarkable efficiency. Bateman has an on-the-road service team that can repair customers' handling equipment, magnets, or generators. The company's service team specializes in solving complex problems for any type of installation.

If you have just ordered a new Bateman attachment, Bateman can handle every aspect of the delivery, including customs clearance anywhere in the world. The high volume of deliveries allows the company to offer competitive rates to its customers. Its delivery is flexible, provided the destination has capabilities to receive and offload heavy equipment.

In order to stay competitive in the market, Bateman is continually investing in research and development to improve its products and actively innovate new, high quality material handling attachments. After years in the grapple business, Bateman decided to bring over some of its grabs' strongest features to its clamshell buckets' design, such as rotations, pin design and retention, cylinder design, and frame design, in order to provide customers with the dexterity of an orange peel grapple.

Building on its legacy of innovation, Bateman Manufacturing introduces the skip pan, the latest addition to its lineup of cargo handling solutions. Versatility is at the core of the skip pan design. With a 360°



continuous rotation capability, the skip pan empowers operators with unprecedented manoeuvrability and is currently patent pending. Gone are the days of restricted movement and cumbersome handling. Whether it's navigating tight spaces or accessing hard-to-reach areas, the skip pan offers superb flexibility, ensuring optimal efficiency in every operation.

But versatility alone is not enough without reliability. That's why Bateman has equipped its skip pan with a dual motor rotator, ensuring smooth and seamless rotation under any conditions. This robust design not only enhances durability but also minimizes downtime, keeping operations running smoothly and efficiently. For more details on the skip pan, please see 'Revolutionizing cargo handling: Bateman manufacturing's cutting-edge solutions' on p118 of this issue.

What sets Bateman Manufacturing apart is not just its commitment to innovation, but also its dedication to customer

satisfaction. With a focus on quality craftsmanship and superior performance, its products are engineered to exceed industry standards and meet the evolving needs of material handling operations worldwide. From concept to execution, Bateman Manufacturing delivers solutions that empower its customers to achieve new levels of efficiency and productivity.

In conclusion, Bateman Manufacturing's hydraulic clamshell buckets and skip pan represent the pinnacle of innovation in the material handling industry. With their unmatched performance, reliability, and versatility, these cutting-edge solutions are poised to redefine the way materials are handled, setting new standards for efficiency and safety. As the industry continues to evolve, Bateman Manufacturing remains committed to pushing the boundaries of possibility, driving progress, and empowering its customers to succeed in an ever-changing world.

DCi



Moving forward...



...with high-tech
conveying
systems

Louise Dodds-Ely

Common problems - effective solutions

Rob van Oijen, Manager Application Engineering for Fenner Dunlop Conveyor Belting in The Netherlands, provides expert advice on some of the most common problems facing conveyor operators in the dry cargo industries.

Question: We spend a lot of money on our conveyors. What can I do to minimize conveyor belt lifecycle costs?

RvO: The best way to minimize conveyor lifecycle costs is to choose belts based on their durability, suitability and longevity (whole life cost) rather than for short-term 'economic' or budgetary motives. It really is as simple as that. Experience shows, without doubt, that the price of the belt

will invariably be reflected in both its quality of performance and the length of its working life. We regularly see cases where a good quality belt can produce a working life of more than five years compared to low-grade belts that have been bought on the basis of low price but need replacing annually.

The 'lower labour costs' argument that some use to explain extremely low prices offered for belts imported from Southeast Asia is a fallacy because the labour element accounts for as little as 5% of the production cost. The true reason is that raw materials make up some 70% of the cost of producing a conveyor belt so the only way to make a low-price belt is to use

low-price (low grade), unregulated raw materials. Cost-cutting practices include using cheap, low-grade carbon black made by burning old car tyres, minimizing or completely omitting vital additives (such as antiozonants to prevent ozone & UV damage) in the rubber and using low-grade inner synthetic plies. As I always say, price is what you pay but cost is what you spend.

Q: What steps can be taken to extend conveyor belt life?

RvO: In addition to buying good quality conveyor belts and good quality components such as idlers and rollers in the first place, regular, preventive maintenance and a clean working

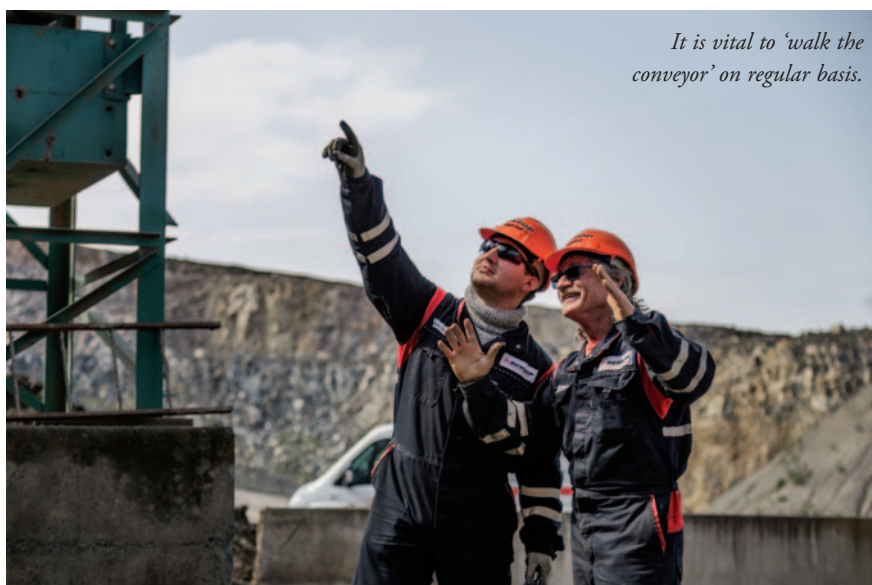
environment are essential factors that help to extend conveyor belt life. From an operational view, good quality belts can usually be left to do their job once installed. However, it is still vital to 'walk the conveyor' on regular basis, checking for broken parts or other irregularities. Very often, external influences like broken idlers or scrapers, material build-up on pulleys, or belt becoming lodged behind skirting cause premature belt failure, which could have been avoided with regular inspections. My doctrine is simple: "It is not what you expect, it is what you inspect".

Other factors include making sure that any scrapers that are fitted are correctly adjusted and drum linings (where applicable) are in good condition. Belt

Too soon on the scrapheap - the price of the belt will invariably be reflected in the length of its working life.



It is vital to 'walk the conveyor' on regular basis.



too thick for the design of the application can cause problems such as excessive rigidity (lack of troughability) and steering and handling difficulties. The same applies to increasing the tensile strength. It is important to remember that for every step increase in tensile strength, the pulley and drum diameters need to be increased by 25%. The belt carcass may fail due to dynamic stress if this action is not taken.

The only proven solution to rip, tear and impact damage is to fit a conveyor belt that has been specifically engineered to withstand ripping and tearing. In Fenner Dunlop, our 'rip and tear' belts are UsFlex and Ultra X. Although they might have a higher purchase price, they are unquestionably the most cost-effective

tracking is also important because a mis-tracked belt can limit belt life and contribute to uneven wear. The primary cause of mis-tracking is often found to be material build-up on the bottom side of the conveyor belt or drums and pulleys.

Another key element is to have the correct belt specification matching the conveyor design. Unsuitable belt types may behave badly and have a limited life span. Quality belt suppliers will have engineers to verify belt selection when provided with sufficient information on the conveyor design and material properties.

Q: What is the best way to deal with recurring rip and tear damage problems?

RvO: Because of the huge disparities between the types of cargo being conveyed, the design of the conveyor systems and their working environments, there is no 'silver bullet' answer to this question. What will almost certainly NOT solve the problem is to increase the cover thickness and/or the number of plies. Belts that are

Material build-up accelerates wear of the belt and other components.



solution by far. This is because they use uniquely designed fabric plies that allow the nylon strands to stretch. As the trapped object is being pulled through the belt, the strands gather into a bundle that eventually becomes strong enough to stop the belt in its tracks rather than propagate over a much longer distance. However, beware of cheap imitations.

As laboratory testing consistently reveals, they are cheap because they are made using cheap, low-grade materials with the result that their rip and tear resistance is 60% less than the real thing.

Q: What can be done to minimize dust emissions?

RvO: Most dust emissions occur at the loading point, at the discharge point or, most commonly of all, from cracks in the rubber covers of the conveyor belt caused by exposure to ozone pollution and ultraviolet light. This is because at low altitude, ozone becomes a pollutant that is created by the photolysis of nitrogen dioxide (NO_2). Exposure is unavoidable because even tiny traces of ozone in the air will attack the molecular structure of rubber, increasing the acidity of carbon black surfaces. Small transversal cracks begin to appear in the surface of unprotected rubber at a surprisingly early stage. Although the cracks may not seem to be a big problem, the rubber quickly becomes increasingly brittle and the cracks deepen under the repeated stress of passing over the pulleys and drums.



Belts that are too thick can cause problems such as excessive rigidity.



Pollution problems - fine particles of dust penetrate the cracks and are then discharged (shaken out) on the return (underside) run of the belt.



The cost of splice repairs and lost output is considerable.

Ultraviolet light is also accelerating the deterioration of the rubber. Fine dust penetrates the cracks caused by the effects of ozone and UV and is then shaken out on the return (underside) run. Ozone and ultraviolet damage is relatively easy to prevent by including antioxidants within the rubber compound mixing process. Unfortunately, laboratory testing has revealed that some 90% of 'economy' belts sold in Europe, Asia and Africa have virtually no in-built protection. My advice is to always make ozone & UV resistance an obligatory requirement when selecting any rubber conveyor belt.

Dust emissions at discharge occur from agitation of the material, which can



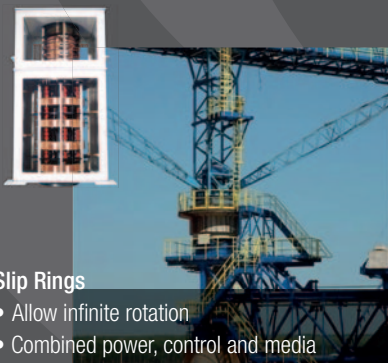
Motor Driven Reels

- Monospiral and Level-Wind configurations
- Rugged and dependable magnetic coupler for dusty environments



Cable Festoon

- Corrosion-resistant, long-life rollers; precision sealed bearings
- Systems customized for the application
- Preassembled option, for easy installation



Slip Rings

- Allow infinite rotation
- Combined power, control and media (water, air, oil, vacuum, other)
- Available with ATEX and SIL 3 certification

Rugged Energy & Data Transmission Systems

Conductix-Wampfler has one critical mission: To keep your bulk material handling operations running 24 / 7 / 365. You need proven, worry-free energy solutions - and Conductix-Wampfler has them. Our systems provide reliable electric power and water to stacker/reclaimers, barge and ship loaders/unloaders, bulk conveyors, tripper systems, and gantry cranes. Conductix-Wampfler systems are rugged, low maintenance, and time-tested in tough, dusty environments. All products are backed by the largest sales and service network worldwide!

www.conductix.com

CONDUCTIX
wampfler



Oil seriously distorts flat rubber belts.

usually be controlled with proper chute design with dedusting equipment, use of loading spouts and limiting 'free' movement of material. Dust emissions at the belt loading can be reduced by proper chute design, projecting material flow in the belt movement direction and limiting free-fall height and velocity differences. Enclosures around the loading zone with proper sealing to the belt and the use of dedusting devices allow materials to settle.

Q: We experience far too many splice joint failures. What is the best way to avoid them?

RvO: It is estimated that splice joint problems account for some 80% of unplanned stoppages to carry out repairs, which is a statistic that does not surprise me. The cost of repairing splice joints and the cost of lost output is considerable but should not be necessary at all. The biggest causes of splice problems are shortcomings in the quality of the conveyor belt itself, the materials used to join the belt and the quality of the workmanship.

Low-grade rubber and poor adhesion between the inner plies are both faults commonly found in the low-grade belts that I referred to in an earlier answer and make the job difficult even for the most skilled splicer. The cost of splice joint repairs and the associated lost output should both be included when calculating the whole life cost of a conveyor belt.

Q: We are handling increasingly large volumes of biomass. What are the most important properties for belts that carry biomass?

RvO: Conveyor belts that are transporting biomass should be made of a rubber that has good resistance to both fire and oil. Because it can self-ignite, all rubber belts used to convey biomass should be able to resist fire. The EN12882 standard is for safety requirements for conveyor belts for general-purpose, above ground applications and describes a range of classes from '1', '2A', '2B' up to '5C'. Given the highly flammable nature of biomass, 'S' grade (EN 12882 Class 2B including anti-static requirements) should be regarded as the minimum standard. A higher level of fire resistance (EN 12882 Class 4A) is recommended for conveyors that are used in enclosed areas.

Belts that are not adequately resistant to the oils and resins contained in biomass will provide a much shorter working life than should reasonably be expected. As oil and resins penetrate the rubber it softens and its ability to withstand wear decreases dramatically. It also loses its tensile strength while at the same time becoming much more prone to ripping and tearing. The next stage is that the rubber begins to swell and distort, causing steering and handling problems and a serious reduction in the elongation at break (the amount of stretch before the belt snaps).

Despite the fact that each has its own particular effects, most conveyor belt manufacturers only offer one oil resistant rubber cover quality compound. This is often referred to as 'MOR' (medium oil resistance). In my experience, to provide the best possible protection against the

differing effects of each category requires an oil resistant rubber that is as specific as possible to the type of oil or resin rather than a single 'one rubber compound suits all' approach. At Fenner Dunlop we have two types — ROM grade for vegetable-based oils and ROS grade for mineral based oils and products with a particularly high concentration of vegetable oils or resins. Because biomass can contain wood from a variety of sources, it is always safer to use conveyor belts that have a combined resistance to fire (EN 12882 Class 2B) and vegetable oil.

ROB VAN OIJEN

Rob van Oijen has specialized in conveyors for over 17 years, supporting businesses throughout Europe, Africa, the Middle East and South America and is widely regarded as being one of the best application engineers in the conveyor belt industry.



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Airborne dust, spillage or any material that escapes the conveyor is a risk — a risk to worker safety and a risk to operation profitability.



 ***martin***
engineering

Cambelt: serving the conveyor market since 1960

Cambelt has been making high-performing, long-lasting and highly durable conveyors since 1960. It makes all of its conveyor belts on site as well. The company specializes in high incline conveyors (up to 70° angle), portable transloaders and conveyor belts that are designed specifically to move the most difficult-to-handle materials.

SERVICES

Cambelt has a team of engineers that are available for consults, field service advisors that travel worldwide to evaluate the conveyors and schedule service.

WHAT MAKES CAMBELT UNIQUE

All of Cambelt's conveyors are custom designed for the specific application needs of the customer. The same applies with its belts.

All of the company's belts are specifically engineered to meet the specific requirements of the material to be moved. All of the belts are single moulded; no glued or screwed in cleats. The belts are guaranteed not to dilapidate. They are truly world renowned for quality, durability and performance.

CLIENTS

Cambelt's clients vary from Fortune 100 companies to smaller railcar unloading terminals all over the world.

STAYING COMPETITIVE

Cambelt is the only company in the USA that stocks transloaders and makes them available for rent. Transloaders are typically a 16–20-week lead time to build. All of Cambelt's transloaders are built on site in its factory located in Salt Lake City, Utah. The Scorpion 3015 Transloader is known for boasting the most powerful motor and belt that can move more material at a much faster rate than the competition, along with having the smallest footprint of all transloaders on the market. No other transloader can move the same amount of material at the same speed as the Scorpion 3015. It is best in class. The belt is 30" wide and 1.5" tall and can handle dry material like cement, coal, fly ash, soda ash, salt and countless other materials 1" minus.

NEW DEVELOPMENTS

In January of 2024, Cambelt leadership installed a fully operational production line for the Scorpion 3015 Transloader. This

means that a new Transloader comes off the production line about every three weeks. This eliminates the traditional 16–20 week waiting time between when the company wins a railcar unloading contract to when they have a unit on site and can begin to move the material. This ability has made Cambelt a Category of One company.

Cambelt has all new leadership and has turned the company into a dedicated 'customer centric' direction that specializes in the consumer experience. It is dedicated to ensuring that its clients have a truly productive and inviting experience from concept engineering, to fabrication, to delivery and go-live. It has a new team of customer service reps who also handle parts and service post-delivery. Cambelt has never had that prior to 2024.

The leadership is highly experienced and has set the company up for powerful growth and exceptional service, before and after the sale.

Cambelt publishes a blog weekly that can be found on the company website and is shared on platforms such as linkedIN. These blogs cover topics that are of interest to readers of *Dry Cargo International*.





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TAKRAF conveying systems – seamless link between mining and bulk material handling



A global specialist in bulk material handling, TAKRAF is synonymous with many of the mining industry's foremost conveyor projects, as well as with its milestone conveyor technology developments.

TAKRAF's conveying reference list includes not only the world's most powerful conveyor system, but also systems designed for some of the most extreme environments, both on surface and underground.

In a current project, TAKRAF is nearing completion of a conveyor system for a mine located in the Peruvian Andes at approximately 4,300m above sea level. The scope of work includes the provision of a 13,200tph (tonnes per hour) conveyor system that traverses extreme differences in height of approximately 145m and consists of a sacrificial and a downhill conveyor. In Mexico, TAKRAF has been contracted to design and supply a 6.6km underground conveyor and radial stacker for a gold mine. The conveyor is also required to accommodate significant changes in elevation, transporting 800tph of ore and waste material from underground to surface for stockpiling. Underground, the conveyor travels downhill before returning uphill, covering a height difference of approximately 66m.

A major project award from SNIM (Société Nationale Industrielle et Minière) for the F'Derick iron ore project in Mauritania includes the supply of a network of conveyor installations linking the primary and secondary crushing and train loading

stations, also being supplied by TAKRAF. Similarly, a complex conveyor system with transfer stations is part of a contract TAKRAF signed with Rio Tinto for the delivery of an In-Pit Crushing & Conveying (IPCC) and material handling system for the Simandou iron ore complex in Guinea. The conveyor system includes a technically sophisticated long downhill conveyor between the secondary In-Pit Secondary Crushing & Conveying (IPSCC) system and the stockyard.

TECHNOLOGY DEVELOPMENTS

A milestone award for the world's most powerful belt conveyor system for

Codelco's Chuquicamata underground mine in Chile was also notable for the number of technology firsts that TAKRAF introduced in the design of the system. This included the first complete installation of TAKRAF's advanced Gearless Conveyor Drive (GCD) technology, developed in collaboration with its drive partner ABB, a global technology leader in electrification and automation. This 12km 11,000tph system moves ore extracted and crushed underground to an above-ground processing plant using GCD technology (11 x 5MW motors) and boasts a total installed drive power of 58MW, overcoming 1km of vertical elevation underground.



GCDs eliminate the need for a gearbox, thereby significantly reducing the number of main wear parts. This results in increased efficiency and reliability, as well as reduced maintenance requirements. Further advantages include a considerable reduction in the drive system's footprint and emissions. For a large copper mine in Chile, studies showed that CO₂ emissions were reduced by 66% as compared to diesel truck engines for the same copper production volume.

TAKRAF has recently renewed its partnership with ABB regarding the deployment of GCD technology on its material handling solutions to enable a more sustainable and resource-efficient future.

FULL-SERVICE PROVIDER

TAKRAF's comprehensive suite of conveying technologies ranges from apron and belt feeders to complete conveying systems covering a wide range of applications, from mining or extraction to in-plant or overland. TAKRAF mobile conveyor bridges provide flexible links between mining machines and bench conveyors and increase the system's operating range, while the brand's mobile transfer conveyors are 'multi-use' equipment used to increase performance and flexibility of mining operations.

TAKRAF supports its equipment throughout the product lifecycle, with the emphasis on 'intelligent' maintenance — this means deploying innovative developments that increase safety and efficiency such as the TAKRAF Maintenance Cart.



This cart enables access to any location along a conveyor belt in the shortest possible time and in the safest manner and is especially suited to steep slope and/or underground tunnel applications. Idler replacement in the top and return strand of a belt conveyor is possible in less than 15 minutes. At a major copper project in North America, a TAKRAF maintenance cart services the steep 26% decline section of about 1,250m of a 4,350m overland conveyor, which boasts more than 3,700 rolls.

The TAKRAF-developed Automatic Belt Training System (ABTS) is a measurement, control and training device for ensuring the correct overlap position at the discharge area of a tube or pipe conveyor. Belt

rotation is a critical failure mode of tube conveyors and therefore the ABTS automatically determines the belt overlap position via ultrasonic sensors. If the overlap exceeds the tolerance limit, servomotors rotate the tube profile through individual idlers into the desired position.

The system has been fitted to a variety of global TAKRAF installations, including on a tube conveyor conveying ash and gypsum at a power plant in Bulgaria, a conveyor that is part of a residual material handling and disposal system in Eastern Europe and two conveyors conveying Direct Reduced Iron (DRI) at a steelworks in the USA.

Innovation out of tradition – It pays to talk to a specialist.



TMSA considers the environment in its conveying solutions



With special attention and constant concern for the environment, sustainability is a frequent topic in our debates and projects. In this way, TMSA has developed a set of measures, standards, and best practices aimed at promoting sustainable social awareness while minimizing the impact on operations.

TMSA actively monitors and participates in promoting actions that demonstrate its commitment to environmental preservation. It exclusively uses electrical energy from a clean, fully renewable source that does not harm the environment. Additionally, it offers ESG (Environmental, Social, and Governance) solutions. Its network of suppliers and

partners are extremely concerned with the positive result of the equipment in the market and community in which it is located, environmental issues of protecting the environment as well as good practices in asset management, through durable equipment, with low maintenance and high reliability. TMSA delivers socio-environmental value, avoiding as much as possible the generation of waste, contaminants or suspended dust.

Developing alternatives to optimize cost-benefit ratio in the construction of port terminals and warehouses for dry bulk is a great challenge. Millions of tonnes of products are handled and stored annually. And the conveyors shall be designed

according to the need for their use, obtaining diversified dimensions and capacities. It is necessary to obtain a robust system, combined with a standard of reliability and sustainability.

In this segment, TMSA Group is one of the leading suppliers of equipment for terminals and handling of solid bulk at high capacities and long distances.

Operating since 1966, currently about 70% of the grains exported thru Brazilian Ports pass through TMSA equipment, including high-capacity shiploaders.

TMSA also has extensive expertise in enclosed belt conveyors. The entire line was designed for the transport of solid bulk, with environmental and ecological concerns, with three variations of enclosed conveyors, such as: conventional enclosed belt conveyor; enclosed belt conveyor for multiple products and enclosed belt conveyor with air-supported return, each has different features, applicability and different advantages ensuring better organization of the environment and avoiding waste and bringing savings.

TMSA's enclosed conveyors are developed as needed and are easily adapted to each customer's production line and assembly process. The entire modular construction allows for assembly in a practical way. TMSA is proud of the ease of operation, maintenance, safety and easy installation of fire-fighting systems.





THE ENCLOSED BELT CONVEYOR WITH AIR-SUPPORTED RETURN IS A REFERENCE IN BRAZIL

The new concept is present in enclosed belt conveyors — the return is supported by air. This represents the future of solid bulk transportation systems. One of the most important port terminal complexes in Brazil in Santos is using this TMSA technology, with a capacity of 2,500 tonnes per hour for soybeans. The installation includes: shiploader, enclosed belt conveyors with air-supported return; as well as transfer towers, flow scale and integrating scale.

The enclosed belt conveyor with air return support has the important advantages of low energy consumption,

reduced installed power, increased belt and component lifespan and lower maintenance costs. And, due to the low return friction, it is possible to design and build equipment with a significantly longer length than conventional enclosed systems.

COMPLEMENTARY SOLUTIONS

Designed to operate in silos, belt transitions, chutes, scales and other dust emanating points, the complementary sustainable technologies and solutions by TMSA add value to the businesses of its clients.

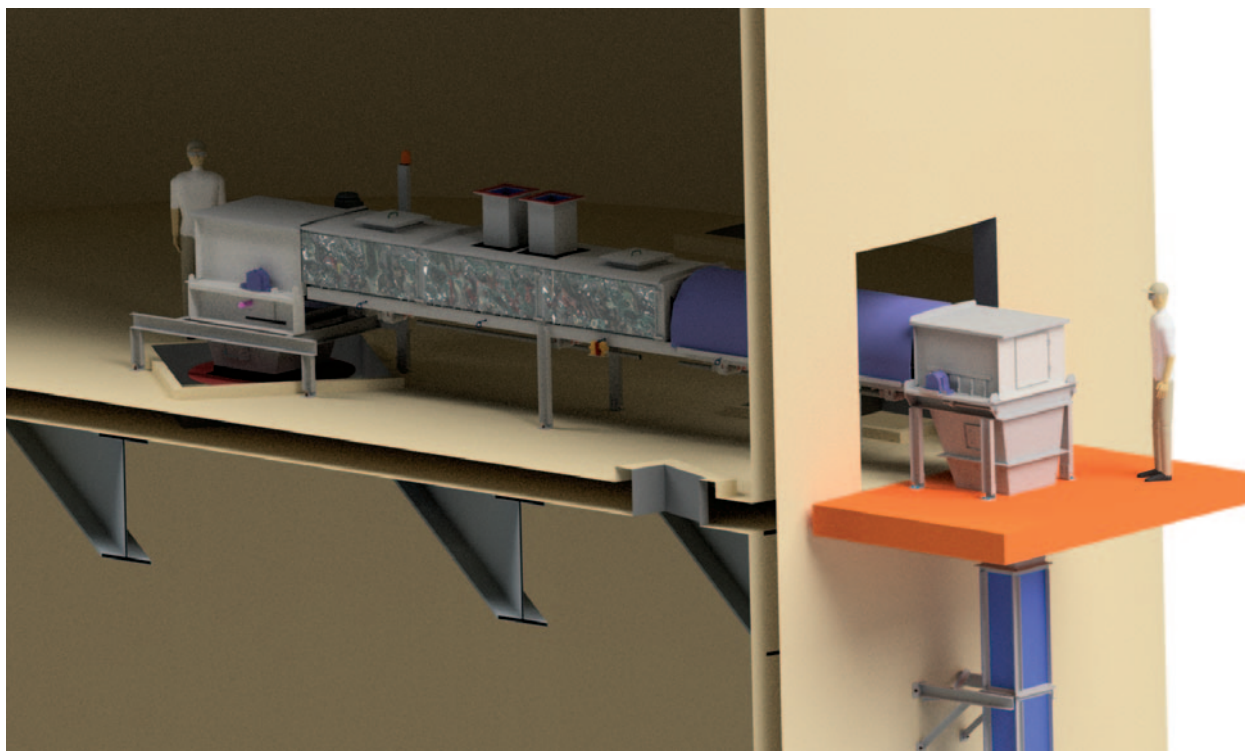
As an example, TMSA has the compact filter product line. The biggest advantage of this equipment is the suction of the pollutant and the discharge to be

performed directly at the point of dust generation; this makes it unnecessary to use other remote equipment such as central filters, fans and the pipes connecting long distances. The reduced dimensions of the compact filters are achieved due to the placement of high-performance pleated polyester cartridges, which replace several conventional bags.

All TMSA projects are designed and executed with the highest global standards of quality, safety and sustainability, and meet the most varied needs and requirements of each client. This is possible through a rigorous implementation of quality and performance indicators, offering highly specialized integrated and value-added solutions.



Loibl supplies conveying system for fossil-fuelled power plant in Poland



GYPSUM AND LIME TRANSPORT SOLUTIONS FROM LOIBL

Loibl Förderanlagen GmbH supplies mechanical and pneumatic conveyor systems for the transport of lime and gypsum, which are individually adapted to the requirements of its customers. The company's conveyors and systems also include components and equipment for intermediate storage, which can be used when transporting material to loading stations or ship loaders.

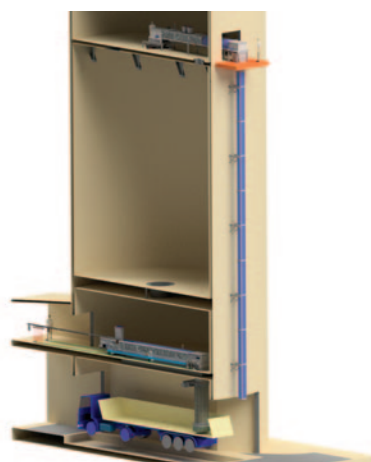
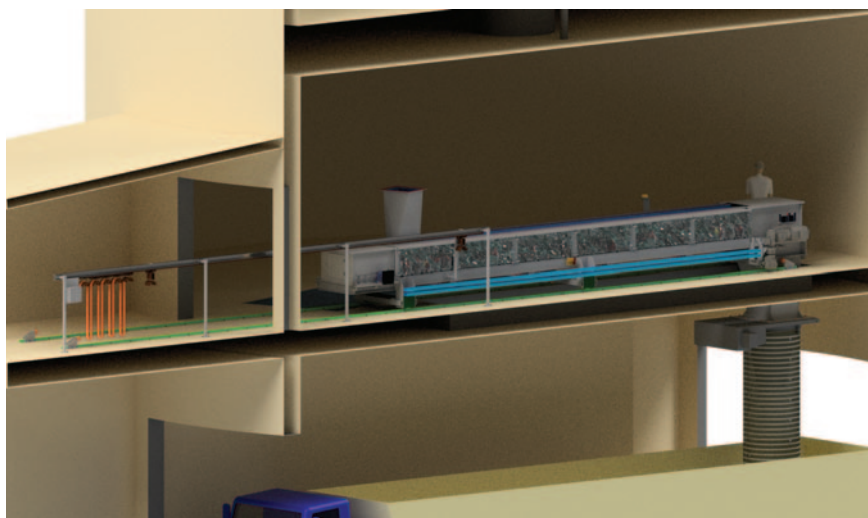
CASE STUDY

- ❖ **Installation location:** Poland
- ❖ **Year of construction:** 2021
- ❖ **Special features:** gypsum is a cohesive, non-free-flowing material

GYPSUM – AN IMPORTANT BY-PRODUCT

Gypsum is one of the non-free-flowing bulk materials. Among other things, it is produced during flue gas cleaning during energy generation in power plants. The by-product is used in the building materials, fertilizer and various other industries. ESI Eurosilos BV, known for its highly automated handling and storage systems, specializes in the storage of cohesive bulk materials such as gypsum. Loibl Förderanlagen GmbH supplied a conveyor belt system to Poland for the company.

Loibl Förderanlagen GmbH designed, manufactured and supplied two troughed belt conveyors that were installed in a gypsum storage silo. The product is first discharged onto a reversible



LASHBELTCON®, which can convey in two directions.

If the product is of insufficient quality or malfunction messages hinder the transport

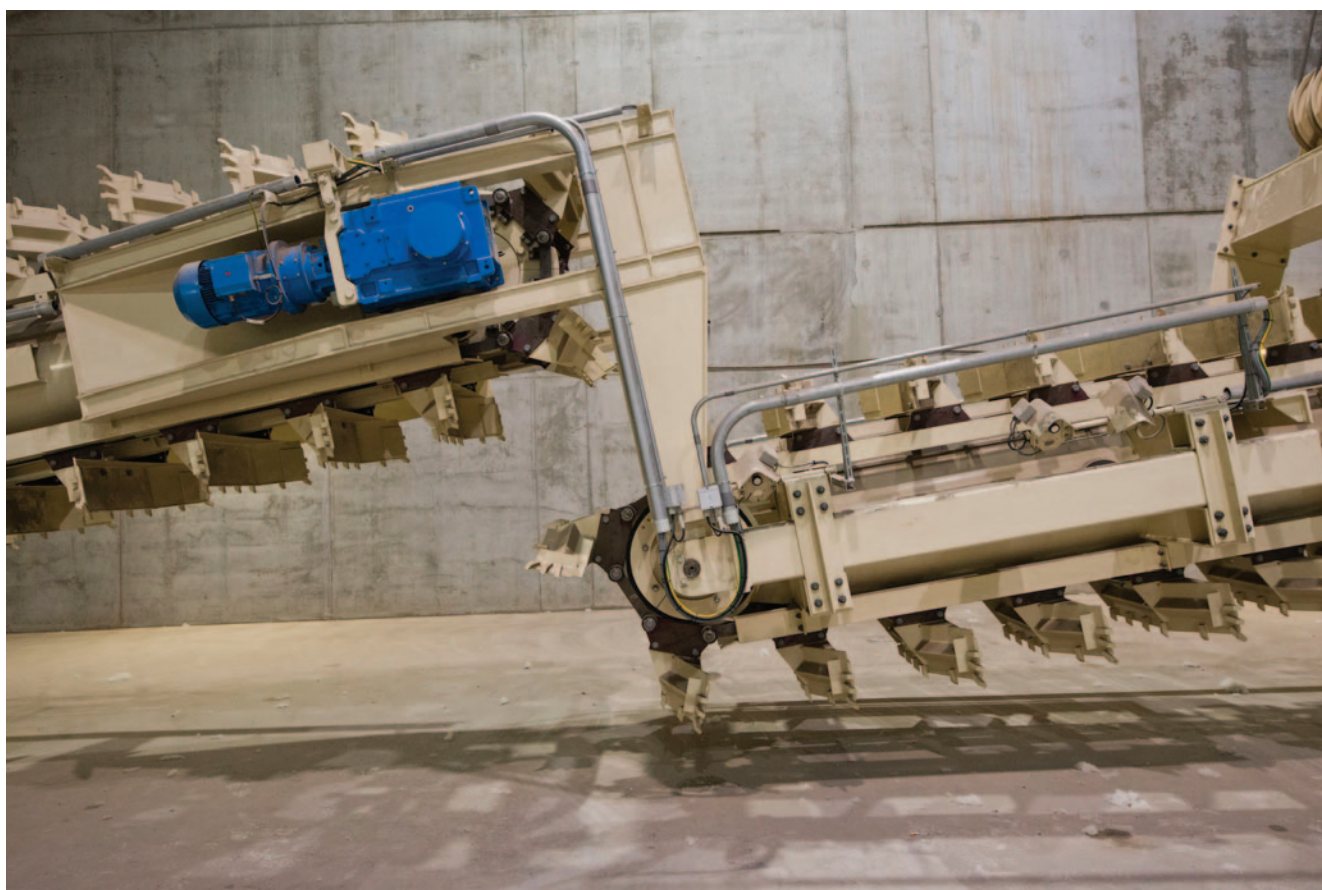
within the silo, the material is discharged into a container or truck via a bypass located at the outer wall of the silo.

When the gypsum is conveyed in the normal direction, it enters the silo. A movable conveyor belt was supplied for the silo discharge. This LASHBELTCON® can load a waiting truck via two main points. For increased loading precision and low dust generation, a truck loading unit was attached to the travelling conveyor.

LOIBL'S SCOPE OF SUPPLY AND SERVICES

- ❖ Consulting and planning.
- ❖ Detailed engineering.
- ❖ Manufacture in Straubing, Bavaria.
- ❖ Plant construction consisting of: LASHBELTCON® — reversible conveyor belt, LASHBELTCON® — moving belt with loading chute.

Loibl transport systems for wet ash, fly ash and FGD gypsum



CASE STUDY — NEW PLANT CONSTRUCTION IN A FOSSIL-FUELLED POWER PLANT

Transport systems for wet ash, fly ash and FGD gypsum.

- ❖ **Installation location:** Mannheim, Germany
- ❖ **Challenge:** new plant construction in Block 9 of the large Mannheim power plant
- ❖ **Conveyed material:** ash, gypsum
- ❖ **Construction phases:** 2009 to 2014
- ❖ **Modules:** dry ash loading system and ash moistening system
- ❖ **Special features:** planning, manufacturing and delivery of complete conveyor systems as well as assembly and commissioning on site

SPECIAL SYSTEMS FOR GYPSUM & ASH TRANSPORT

A superlative construction site was completed in 2014 in Mannheim's largest power plant. From 2009, over 60,000 tonnes of reinforcing steel were installed in Block 9 (911MW). A total of 14,000 construction site cards were issued during the entire project phase. At peak times, around 2,300 employees were simultaneously on site.

When Loibl received the order for the planning, delivery, assembly and commissioning of the transport systems for wet ash, fly ash and FGD gypsum for more





than €10 million at the end of 2009; this represented another milestone in the company's 60-year history.

The gypsum produced during desulphurization is loaded onto ships using special conveyor belts, an intermediate stockpile with a portal scraper and a ship

loader. Wet ash as well as dry or moistened fly ash are also shipped via the shiploader on the waterway.

LOIBL'S SCOPE OF SUPPLY AND SERVICES

- ❖ Complete wet ash conveying system starting after the wet ash machine

including fully automatic storage in the wet ash store.

- ❖ Outsourcing and transport to the shiploader.
- ❖ Shiploading with movable conveyor belt and telescopic loader.
- ❖ Complete dry ash loading system



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starting with the dry ash silo, silo discharge and pneumatic conveying as well as shiploading via telescopic loader.

- ❖ Ash moistening system for dust-free loading.
- ❖ Complete gypsum handling starting

after the belt filters via belt conveyor and automatic storage and retrieval via full portal scrapers.

- ❖ Transport to shiploading, which takes place on a movable conveyor belt with telescopic loader.
- ❖ Around 1,000 tonnes of steel

construction consisting of belt bridges, corner towers and shiploading buildings.

- ❖ Complete electrical and control technology for full portal scrapers and ship loading, with electrical rooms and control stations.



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**AGRICO
SALES**

Bucket elevators: game-changing bucket redesign delivers major efficiency, safety and sustainability benefits

Claus Weyhofen explains how BEUMER Group's determination to reduce backfall in lifting operations led the company to reassess and optimize the design of the elevator bucket, resulting in a far more efficient machine that delivers major benefits for the global cement industry.

Bucket elevators are the work-horses of the cement industry. They are used to vertically convey bulk materials ranging from powders like fly ash, alumina, raw meal, and cements with up to 5,000 Blaine fines, to coarse materials like gravel, cement clinker and re-circuit materials for roller press and vertical roller mill grinding. Using a belt or chain mechanism, these high capacity, heavy duty machines rely on a combination of centrifugal and gravimetric forces to eject the bulk material out of each bucket when it reaches the desired height.

The basic design of the bucket elevator has not changed for decades — but it is far from perfect. Efficiency is an ongoing challenge, with many operations experiencing backfall levels higher than 20%. BEUMER Group has undertaken a detailed study of the performance characteristics of bucket elevators to identify key areas for improvement. The outcomes have informed a total redesign of the bucket itself, as well as the fixing and tipping points (as seen in Figure 1). This article explains the research findings and how they affect bucket elevator design. It also spells out the significant benefits that are now available to the global cement industry by implementing the new-design bucket elevators.

BACKFALL CHALLENGES

Backfall of bulk material, though wasteful, has become an accepted part of lifting operations. Backfall is caused by an improper ratio between the centrifugal and gravimetric forces, or by bulk material (and/or mixtures of the same) whose flow behaviours make a proper discharge extremely difficult. Instead of ejecting cleanly from the bucket into the bucket elevator head outlet, material falls behind the adjustable sealing blade and accumulates in the boot of the elevator.

An average backfall of 8% to 10% is still considered to be normal for most kinds of applications. However, there are applications for bucket elevators in milling circuits behind a roller press or vertical roller mill where discharge behaviour is

even worse, often exceeding 20% backfall. In other words, bucket elevators are currently only around 70% to 90% efficient.

Backfall material needs to be recovered, which involves scooping it out of the bucket elevator boot and lifting it back to the top of the elevator: effectively performing the same task twice. This raises several issues.

Crucially, backfall recovery increases energy consumption because the same material is effectively being lifted twice. For example, if a bucket elevator lifts 100 tonnes and 25% of this quantity needs to be recovered as backfall, the energy bill is going to be 25% higher than it needs to be. Bearing in mind that approximately 95% of the power consumption of a bucket elevator is expended in lifting up bulk materials, there are clear efficiency, cost and sustainability benefits if that material is lifted and discharged cleanly the first time.

Working harder to lift the same amount of material can impact on operational safety and efficiency as well. Worn shaft casings and increased motor current are inevitable consequences of lifting heavy loads repeatedly, and ultimately lead to

problems with conveying capacity. Inefficient material discharge also creates a lot of wear and tear to the descending bucket elevator casing as well as to the buckets themselves, which means they need replacing more frequently. This not only affects production by increasing downtime while repairs are made, it also requires more resources: including steel, which has a high carbon footprint.

For an industry that is under increasing pressure to be more efficient and more sustainable, the current levels of backfall are no longer acceptable at either an operational or an environmental level. So, can bucket elevator design be improved to dramatically reduce backfall levels?

BUCKET TESTING

There are three key influencers on bucket elevator performance:

- ❖ bulk material (density and grain size);
- ❖ angle velocity of bucket (speed at circumference); and
- ❖ bucket shape (dimension and fixation).

Adapting an influencer changes the ratio between gravimetric and centrifugal forces

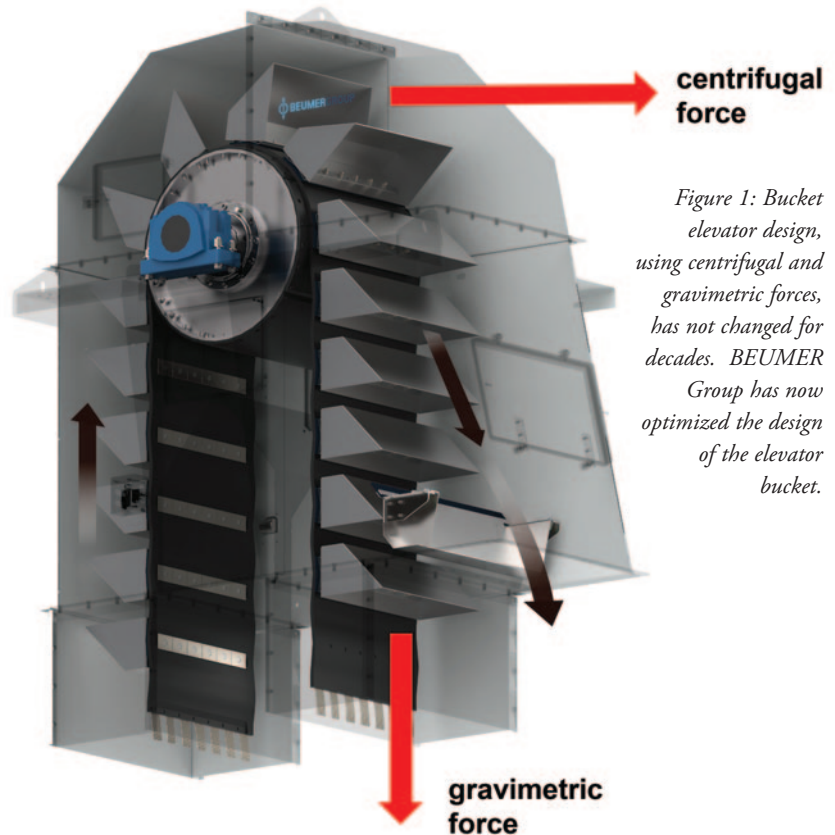


Figure 1: Bucket elevator design, using centrifugal and gravimetric forces, has not changed for decades. BEUMER Group has now optimized the design of the elevator bucket.



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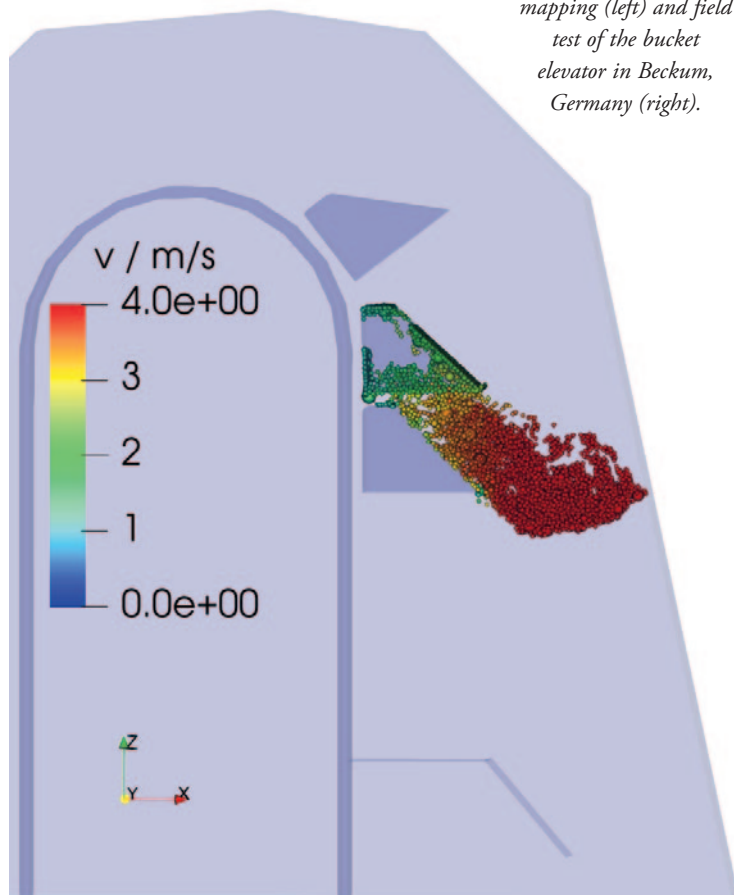


Figure 2: Digital DEM mapping (left) and field test of the bucket elevator in Beckum, Germany (right).



to affect the behaviour of the bucket elevator. It is therefore necessary to establish the optimum combination of forces that allow the material time to discharge effectively with minimal or no backfall at typical speeds of 1.5 to slightly more than 2m/sec. Equipment manufacturers have no control over the first of these parameters, as material specification is dictated by the application. However, the angle velocity and shape of the bucket can be investigated to determine how much these affect backfall.

BEUMER Group used digital DEM (Discrete Element Method) techniques to map and understand the behaviour of our existing bucket elevator design and its effect on the discharge for different materials, ranging from coarse clinker to finest cements. The theoretical results were subsequently verified by conducting discharge tests at their research and development facility in Beckum, Germany (see Figure 2). These tests comprised manual weighing and filling of the bucket, compacting to replicate the effects of vibration, and collection and weighing of the ejected material and backfill material.

The aim was to optimize the discharge parabola so material passes over the discharge lip and into the outlet without falling into the boot, and without hitting the casing, the bucket below or the head casing front wall.

The results have led to a significant alteration in the 30-year-old design of our established belt and chain bucket elevators.

DESIGN OPTIMIZATION

The new design uses the same drum diameter as before, but is able to run at slightly higher speeds. As a result, the new design can operate reliably at certain speed ranges, for example between 1.64 to 2.06m/sec. This higher velocity range allows the optimum speed for a particular bulk material to be applied and can be adjusted even after installation, improving discharge and minimizing backfall.

Further changes have been made to the

bucket profile and to where the bucket attaches to the belt or chain (see Figure 3). Testing showed that moving the fixing point for the new buckets further down allows earlier activation of the centrifugal forces, activating the ejecting process of bulk material at an earlier point, which again increases discharge efficiency.

Backfall of coarse materials such as clinker, gypsum and gravel under testing was so low as to be not measurable — even when the buckets were overloaded.

BENEFITS

The new bucket design and lower fixing point on belt and chain bucket elevators



Figure 3: The new bucket design with a lower fixing point.

delivers several benefits for cement producers.

- ❖ Up to 98% efficiency by optimizing discharge at the elevator head.
- ❖ Reduction in energy consumption due to reduction in backfall.
- ❖ Improved discharge efficiency, with various speed range options enabling centrifugal forces to be matched to bulk material properties.
- ❖ Reduced OPEX, through a combination of less wear and tear on equipment, less rework and therefore lower energy bills.
- ❖ Up to 25% weight saving on tall bucket elevators (e.g. kiln or silo feed), thanks to smaller buckets and housings.
- ❖ Lower carbon footprint, not only through lower energy consumption but also due to less steel being required for bucket elevator production.

Taken together, these benefits mean that the new design delivers the highest efficiency for bucket elevators in the market.

CUSTOMER APPLICATIONS

The new design bucket elevators are already delivering benefits in real cement industry applications involving both light and dense materials.

A European customer had been experiencing problems for more than a decade with a bucket elevator associated with a roller press at their cement mill. The company's BEUMER bucket elevator was originally installed in 2003 to lift clinker flakes at a rate of 750tph (tonnes per hour). It had been retrofitted by a market competitor in 2013 in an attempt to reduce backfall issues experienced since installation, but without success. Recirculation of backfall material continued to cause premature wearing of the shaft casings to such an extent that the plates needed replacing regularly.

The worn shaft casings were of particular concern because, in bucket elevators, they generally not only function as enclosures, but also as a load-bearing structure. There is a risk of static failure if they become too worn.

In order to help this customer, BEUMER obtained a material sample and tested the discharge behaviour in Beckum with the third-party bucket design. Reproducing the poor discharge behaviour enabled the solution. By redesigning the buckets,

BEUMER succeeded in reducing the backfall from 15% to 3%. These results were so compelling that the customer ordered a retrofit to the new bucket design immediately.

CONCLUSION

The cement industry faces many pressures in balancing global demand for its products with continuing calls for more sustainable ways of operating. Just because we have always done things a certain way does not mean there is no room for improvement. The bucket elevator is a prime example. BEUMER Group hopes that the results of the extensive study into the behaviour of materials during discharge and the subsequent improvements to bucket elevator design will support cement producers in finding new ways to be more

efficient and sustainable while remaining competitive.

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.



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Conveyor fires: causes and prevention

Global expert in conveyor accessories, Martin Engineering, is dedicated to conveyor safety by educating the bulk handling industry on the hazards of conveyor fires. With the Foundations™ Learning Center, the largest comprehensive free conveyor training archive on the web, Martin experts give detailed insight into the causes and prevention of deadly fires. This article, written in collaboration with the authors of *Foundations™ for Conveyor Safety*, gives an overview of how to improve workplace safety.

CAUSES OF BELT FIRES

To create a fire there must be three elements: oxygen, heat and fuel (aka, 'the fire triangle'). One factor that makes conveyor fires so hazardous is that the belt itself can be the fuel. According to a study of belt fires conducted by National Institute for Occupational Safety and Health (NIOSH),^[1] any of the standard neoprene, PVC, chloroprene and BELT-approved SBR belts can ignite. Although some belts were self-extinguishing, the conclusion is that there is no non-flammable belt, particularly when accompanied by a combustible material.^[2]

FRICTION

Inadequate belt cleaning in the discharge zone can lead to dust and carryback on the return side of the belt, causing a fouled tail pulley to run under a stalled belt, which creates tremendous heat.

Dust emissions of any kind (combustible or noncombustible) originating from the



Conveyor fires can happen anywhere, at any time, even outdoors in the cold.

loading or discharge zones have a tendency to foul rolling components, leading to failure of the seals and then contamination in the bearings and eventually causing the roller to seize. A rolling component can also stall if impact or cargo weight causes the bearings to collapse. Continuous frictional contact with a seized idler or the roller face can cause a loaded belt to exceed safe operational temperatures. It can also potentially result in extreme wear on the belt, degrading the main fire-retardant layer and exposing the heat-sensitive materials found in the belt's inner construction.

CONTROLLING FUGITIVE MATERIAL

Fugitive material control and regular cleaning of spillage are imperative. Without proper belt cleaning, chute sealing and belt tracking, spillage that collects around the loading/discharge areas and along the belt path can damage moving components, restrict access by fire crews and potentially act as fuel.

Dust control is extremely important when handling combustible substances, and it is recommended — instead of just taking into account the fire triangle — operators consider the 'Dust Explosion Pentagon'. Examples of highly combustible materials include:

- ❖ **Coal:** carbon-based, highly flammable material that burns at high heat, with dust that is easily ignited by a spark.
- ❖ **Petroleum coke (petcoke):** carbon-rich derivative of oil processing, used as a coal alternative for power generation, among other applications. In dense concentrations, the dust is combustible with a high-energy spark.
- ❖ **Cellulose:** a naturally occurring polymer found in wood, paper and grains; dust readily ignites.

Significant amounts of dust can collect on the walls of the loading zone chute. If a foreign metal object is accidentally introduced into the enclosed area, a spark can potentially create an explosion. Additionally, common maintenance within the chute such as removal of the wear liner using a cutting torch often requires confined space entry by workers. If the

POSSIBLE IGNITION SOURCES

Friction	Dust/material/chemical	Mechanical/maintenance
● Frictional heating of belts riding on non-rotating components ● Heat from brake friction ● Belt rubbing on structure ● Bearing seal failure leading to seized bearings	● Combustible dust ● Out of control high-temperature processes where bulk material temperature exceeds belt capability ● Spillage of combustible bulk materials ● Accumulations of bulk materials that can spontaneously ignite ● Flammable liquids	● Slip of a belt on a pulley ● Cutting and welding ● Mistracking ● Excessive temperature of the drive ● Excessive temperature of the drive ● Hot surfaces ● Sparks and electrical causes

inside of the chute is not adequately cleaned, this task could pose a serious hazard.

THINK LIKE AN INSPECTOR

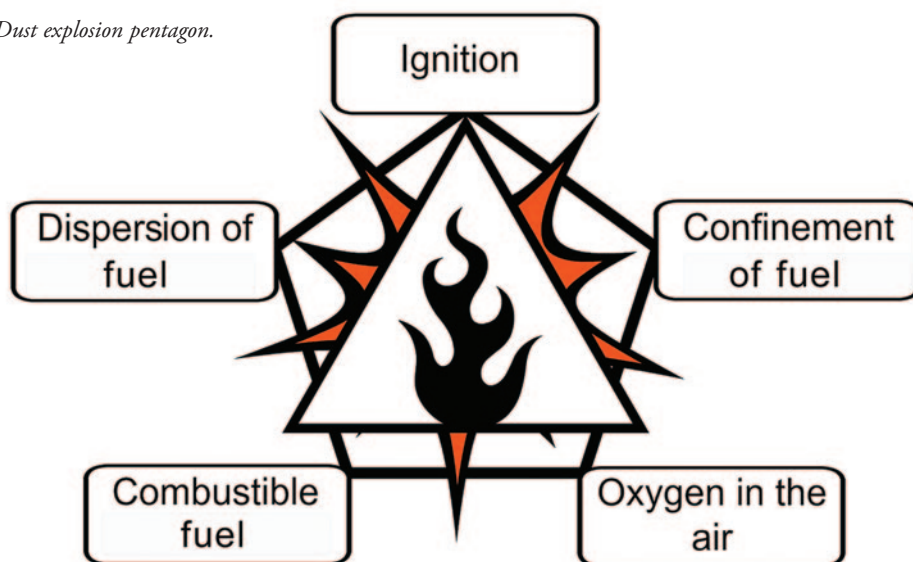
When examining conveyor equipment, one should approach the task with the same critical mindset as an inspector from OSHA, MSHA or the local fire department. Safety professionals recommend a holistic view of the system and the combustibility of the material. When making a conveyor fire risk assessment, also consider:

- ❖ Spillage levels and cleaning schedules.
- ❖ The conveyor's proximity to workstations.
- ❖ How the conveyor design (enclosures, narrow walkways, etc.) could create a hazard for employees.
- ❖ Safe storage of flammable liquids.
- ❖ Compliant signage.

CONSIDERATIONS FOR CONVEYOR FIRE PREVENTION

Often, the potential return on investment (ROI) for prevention equipment isn't

Dust explosion pentagon.



(source: OSHA <https://www.osha.gov/dts/shib/shib073105.html>)

recognized until managers are inspecting burnt rubble and negotiating with insurance adjusters. However, safety-minded operators understand that the same equipment they would implement for increased efficiency such as belt cleaners and impact cradles, can also help prevent fires.

- ❖ Impact cradles and support cradles

help reduce fugitive material by providing a flat, stable belt surface that facilitates effective sealing.

- ❖ Transfer chute design is a critical element of fugitive material control, with sufficient settling zones and confinement. New raised chute designs also allow for external wear liners that eliminate the need for

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confined space entry or torch removal. When paired with improved skirt seal designs, fugitive spillage and dust emissions are drastically reduced.

- ❖ Modern belt trackers detect mis-tracking and correct the belt path immediately using troughed idlers or gripping return idlers.
- ❖ A heavy-duty belt cleaner system featuring modern primary and secondary cleaners with an effective tensioner increases the volume of discharge and limits the amount of carryback and fugitive dust. Along with limiting spillage, tail pulley health is improved and there is less fouling of rolling components.

CONCLUSION

Operators should regularly contain airborne dust at transfer points and remove accumulation. Damaged rollers must be replaced promptly. Conveyor belt alignment is also an essential prerequisite to belt safety. Consider using flame-resistant grease and other lubricants. Fire detection and suppression systems must be tested in accordance to regulatory standards. Experience has shown that clean conveyor systems and ongoing maintenance form the best defence against fire.

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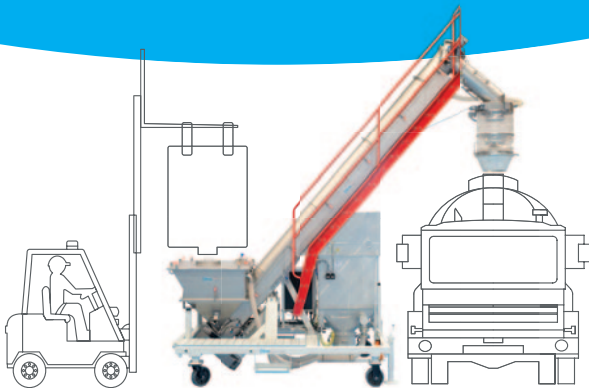
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ABOUT MARTIN ENGINEERING

Martin Engineering has been a global innovator in the bulk material handling industry for more than 80 years, developing new solutions to common problems and participating in industry organizations to improve safety and productivity. The company's series of *Foundations* books is an internationally recognized resource for safety, maintenance and operations training — with more than 22,000 print copies in circulation around the world. The 500+ page reference books are available in several languages and have been downloaded thousands of times as free PDFs from the Martin website. Martin Engineering products, sales, service and training are available from 17 factory-owned facilities worldwide, with wholly-owned business units in Australia, Brazil, China, Colombia, France, Germany, India, Indonesia, Italy, Malaysia, Mexico, Peru, Spain, South Africa, Turkey, the USA and UK. The firm employs more than 1,000 people, approximately 400 of whom hold advanced degrees.



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THE STANDARD IN SCREW CONVEYING



Friction heat between rolling components can be extreme enough to light both the material and belt.

Metso launches modular FIT and Foresight conveyors for fast set-up and increased productivity



At the end of April this year, Metso launched productized FIT™ in-plant and Foresight™ overland conveyors for reliable material transportation in the mining industry. The standardized conveyor modules and premium components offer high capacity and layout flexibility as well as substantial savings in time and resources, from feasibility and design to implementation, thereby enabling higher lifetime productivity.

The high-capacity Metso Foresight™ overland conveyors connect the primary crushing station with the coarse ore stockpile. The Metso FIT™ in-plant conveyors are compatible with Metso FIT™ crushing plants that are designed for the most demanding mining applications.

“The modular FIT™ and Foresight™ conveyors take project ease, speed and productivity to the next level. We have designed these conveyors for easier planning, configuration, installation and maintenance with a wide range of modules and components. This enables our mining customers to get their in-plant and overland conveying systems

up and running faster and brings a quicker return on investment,” says Guillaume Lambert, SVP, Crushing at Metso.

“Thanks to the standardized modular design of the conveyors, we have been able to shorten delivery time by up to 25% and set-up time by up to 15%. Metso premium components are used in the conveyors, and the use of ConveyInsights™ predictive maintenance and flow control technology can help our customers achieve their productivity targets. To improve the feasibility study process on Foresight™ overland conveyors, we developed the William Conveyor Explorer, an application software that is connected to our conveyor module range. It can be found in the new Metso Crush and Convey Resource Center. Our mining and EPC/M customers can enter their process and route data and then instantly assess

multiple options and download the modules they need for efficient planning in their software environment. This development also supports mine electrification programmes to reach fast decarbonization plans and targets,” notes Lambert.

To ensure continuous conveyor performance, Metso can provide a wide scope of services ranging from optimization and life-cycle services to premium wear and spare parts. Metso has installed over 1,000km of conveyors globally.



Telestack continues to lead the way on mobile conveyor innovation



Launching the NEW TSR 40 Radial Telescopic – the only ‘roll on – roll off’ (Ro-Ro) radial telescopic unit on the market. Following on from Telestack’s success with the range of radial telescopic stackers, Telestack has added the TSR 40 to its extensive range.

A common problem with standard radial telescopic conveyors is road transport, especially in areas with restricted road access in relation to permits and special loads. This is a major issue with radial telescopic units as these are typically transported in euro-liners or containers and then built-up on site with cranes/tools.

Therefore, succumbing to extra costs in labour, vulcanizing and the extra time needed for setup. This new TSR 40 eliminates this transport problem, as this unit can be transported the same as any normal Ro-Ro tracked mobile unit. This unit can be transported at a width of 3.0m (9ft 10”) x height of 3.5m (11ft 5”) x length of 23.2m (76ft 5”), so it is very easy to transport within many roads network, especially in strict areas of Europe, for example.

The TSR 40 offers a unique material handling solution for the quarrying, mining and rail industries, which can also be utilized in ports and inland terminals for ship/barge loading and unloading. The TSR 40 utilizes the radial, telescopic and luffing features to allow the

operator full control and flexibility when stockpiling a range of materials. The addition of the integrated PLC stockpiling system eliminates segregation, degradation, contamination, and compaction of material.

This is vital in maintaining the quality of your material during the stacking process. The TSR 40 allows for up to +30% larger stockpile capacity when compared to conventional fixed length conveyor systems with the added benefit of increased site mobility.

Its lattice frame design allows it to automatically stockpile from secondary crushers, screeners and fixed conveyors, while stockpiling materials such as aggregates, coal, grains, sand, gravel and mineral ores. A key feature of this unit is the ability to be driven electrically, diversifying away from the standard diesel hydraulic systems.

The TSR40 is all an ‘all electric’ driven unit complete with an integrated diesel electric generator built into the chassis to power all functions of the unit, both tracking and conveyor drives operation. This feature also allows the operator to plug in their own 3 x Phase Electric power if available on site, lowering their fuel consumption further and reducing their overall carbon footprint.

International Sales Manager, Carl Donnelly states, “We’re thrilled to

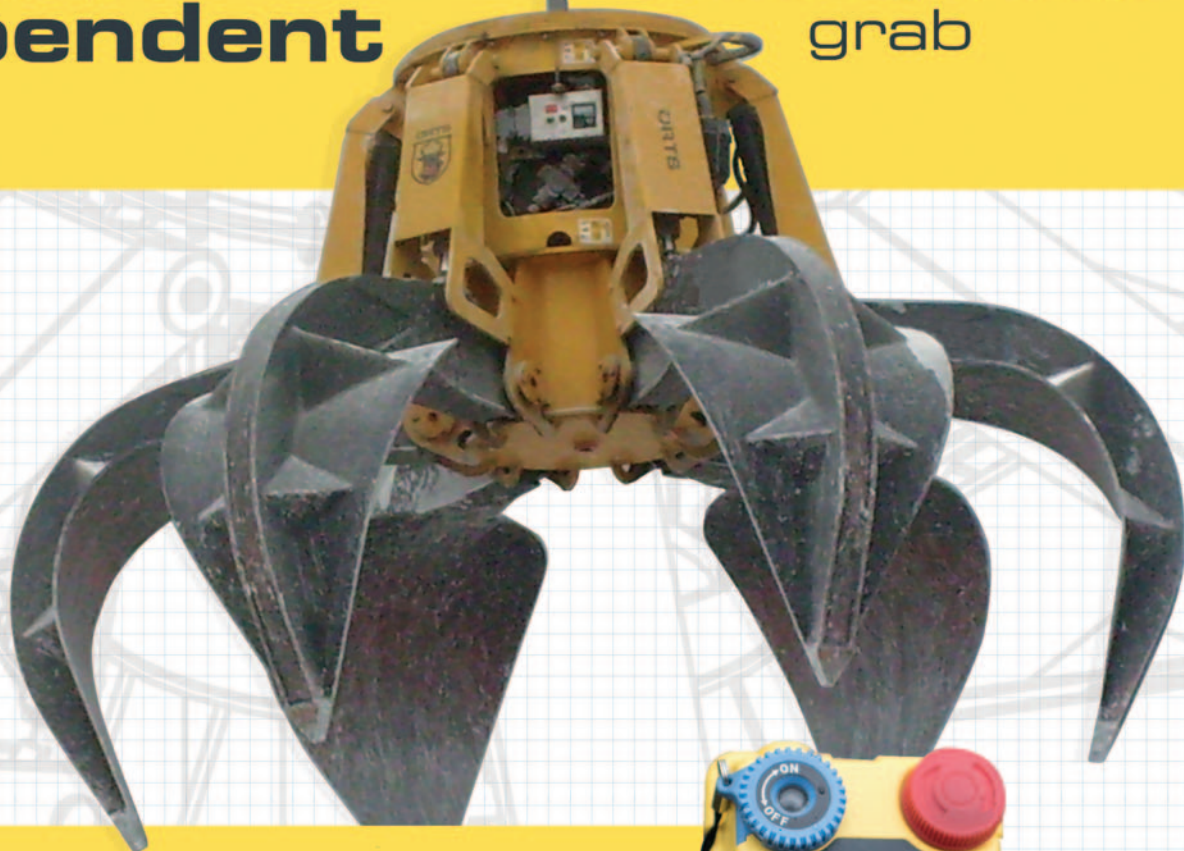
introduce our latest product to the market. As a leading OEM in the material handling sector, we take pride in our commitment to listening to our dealers and customers, designing and manufacturing solutions that address market needs. The TSR 40 is a prime example of this ethos. It also demonstrates our drive to innovate and devise solutions for our dealers and customers, which is paramount to our collective success”.

With their range of material handling solutions, Telestack’s radial telescopic units provide efficient stockpiling capacity, ease of movement and rapid set up. This is further enhanced with the launch of the TSR 40, which has an increased site and road mobility feature that makes it stand out from the rest. The proven lattice frame structure provides maximum strength with reduced overall mass along with an impressive radial potential of up to 270° for maximum stockpiling capacities.

By introducing the first Ro-Ro mobile radial telescopic stacker to the market, this highlights how Telestack is ahead of the curve and is constantly assessing the market demands. Its 39 years’ experience extends across many industries and commodities and the transferable experience has been successfully applied to its customized solutions for the various sectors.

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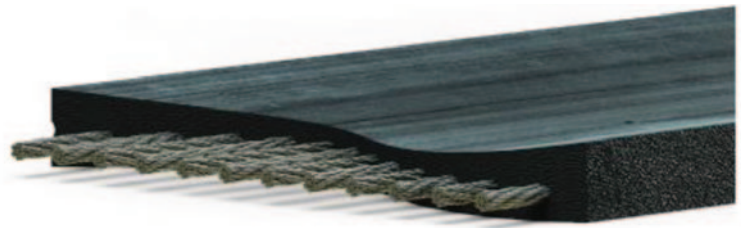
The BeltScanner MF: pioneering conveyor belt monitoring technology

In the realm of industrial conveyor belt monitoring, the BeltScanner MF stands out as a pioneering solution designed to revolutionize the way we understand and maintain steel cord conveyor belts. This innovative system, developed by Beltscan Pty Ltd, integrates state-of-the-art technology to deliver high-resolution data on belt conditions, ensuring both efficiency and safety in operations.

ADVANCED FEATURES AND CAPABILITIES

The BeltScanner MF is equipped with a suite of advanced features that set it apart from traditional belt monitoring systems. Here are some of the key features:

- ❖ **Patented Data Acquisition Protocol:** this feature ensures that the data files are small yet comprehensive, facilitating easy handling and analysis.
- ❖ **High-resolution detection:** the system offers exceptional splice and carcass damage detection capabilities, identifying issues down to better than one cord level.
- ❖ **Continuous monitoring:** the BeltScanner MF provides 24/7 monitoring with Disastrous Event Detection (DED), which automatically stops the belt in case of severe damage.
- ❖ **Programmed Parking:** this feature allows operators to stop the belt at pre-programmed points for maintenance, ensuring precise control and minimal downtime.
- ❖ **Non-contact operation:** the BeltScanner MF operates without physical contact with the belt, reducing wear and maintenance needs.



❖ **SCADA integration:** easy integration with Supervisory Control and Data Acquisition (SCADA) systems via TCP/IP network devices enhances operational control and data accessibility.

signatures of steel cord conveyor belts. The software provides a clear, easy-to-understand map of splice joints and damaged cords with tracked changes over time, aiding in proactive maintenance and preventing unexpected failures.

TECHNOLOGICAL DEVELOPMENTS

The BeltScanner MF represents a significant leap forward in conveyor belt monitoring technology. Developed to provide high-resolution data analysis, it employs advanced magnetic signature recognition to monitor the condition of steel cords in conveyor belts. This capability allows maintenance personnel to pinpoint damaged sections with remarkable accuracy, reducing downtime and operational costs.

One of the standout technological advancements is the BeltScanner's non-contact, slide-in/slide-out transducer. This design not only simplifies installation and maintenance but also ensures consistent data quality without the interference often associated with belt isolations to fit and remove equipment pre and post scan as is common with other systems.

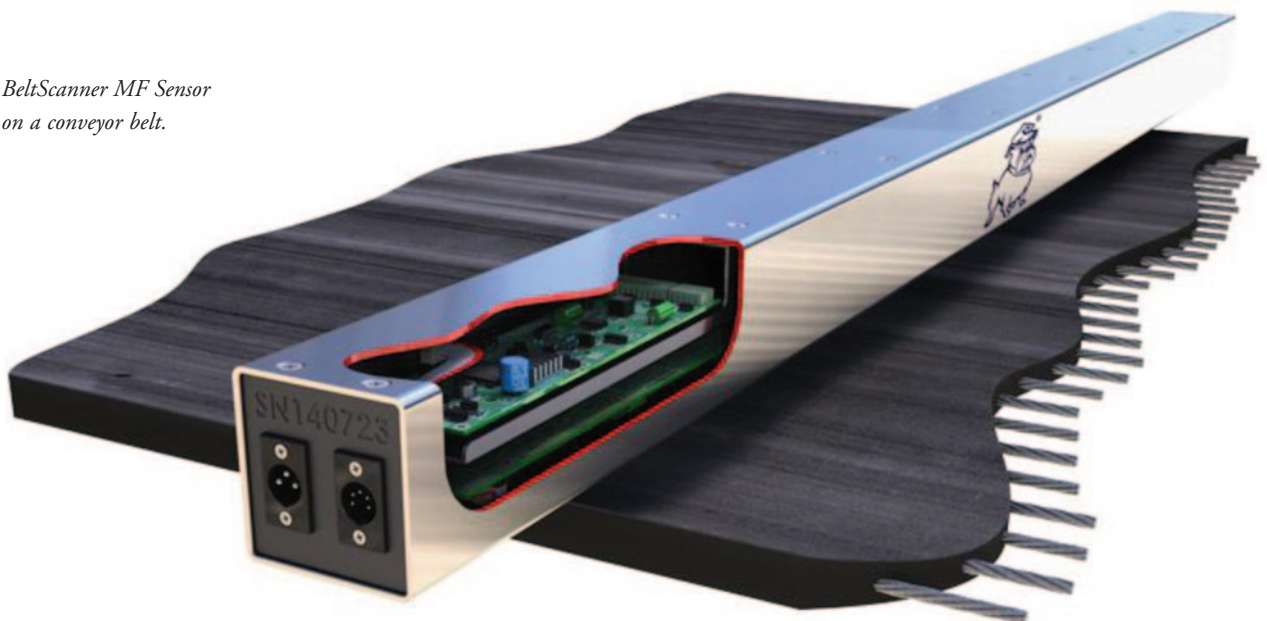
Additionally, the BeltScanner MF is supported by sophisticated data analysis software, which offers a user-friendly interface for interpreting the magnetic

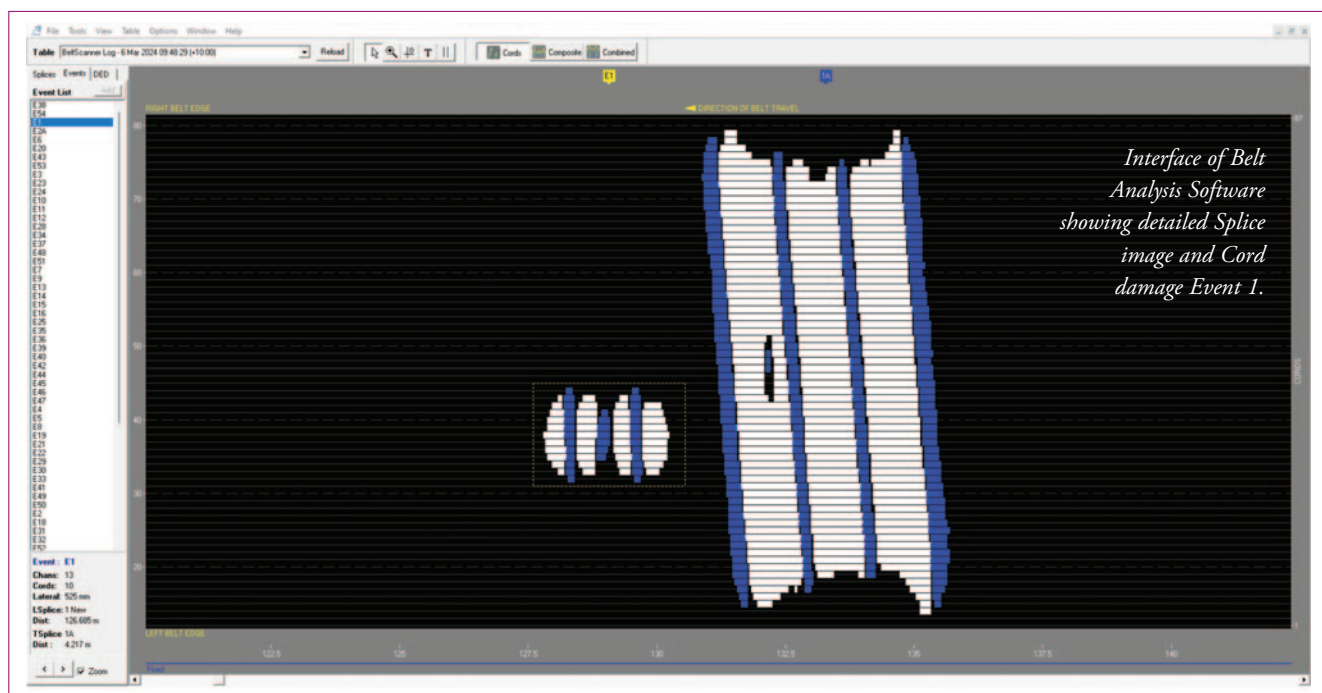
FIXED VS. PORTABLE SYSTEMS

Beltscan offers both fixed and portable versions of the BeltScanner MF, each tailored to specific operational needs:

- ❖ **Fixed BeltScanner MF:** ideal for continuous automated monitoring, the fixed system conducts scans without stopping the conveyor belt. It is available in a range of power supply options (24VDC, 110VAC, or 240VAC) and offers exquisite repeatability of scan data. Key features include belt synchronization, which facilitates programmed parking and disastrous event detection.
- ❖ **Portable BeltScanner MF:** designed for flexibility, the portable system can be used on multiple conveyors and is powered via a laptop USB. This version is particularly useful for operations requiring mobility and the ability to scan multiple belts at different times. It employs a non-contact positioning tachometer, which is highly sensitive to achieve precise belt metrics.

*BeltScanner MF Sensor
on a conveyor belt.*





INSTALLATION AND OPERATION

The installation process for the BeltScanner MF is straightforward, whether opting for the fixed or portable system. For fixed installations, the BeltScanner is typically attached to the conveyor structure at its optimal operating distance of 35mm from the conveyor belt surface at a stable location adjacent a roller. The system includes conditioning heads and a tachometer, all installed with precise measurements to ensure accurate data capture.

Portable installations involve the use of PVC or stainless-steel tubes, allowing the scanner to slide in and out easily. This method ensures that the conveyor can continue normal operation during the setup and scans, minimizing disruptions.

DATA ANALYSIS AND SOFTWARE

The BeltScanner MF's Data Analysis Software, is a powerful tool that provides detailed insights into belt conditions. Key benefits of the software include:

- ❖ **Accurate information:** provides reliable data on the integrity of splices and steel cords.
- ❖ **Easy interpretation:** displays data in an intuitive format, also highlighting all changes since the previous scan making it easy to understand and act upon.
- ❖ **Tracking changes:** monitors and tracks changes in splices and damaged sections.
- ❖ **Automated features:** includes Programmed Parking and DED for enhanced safety & maintenance efficiency.

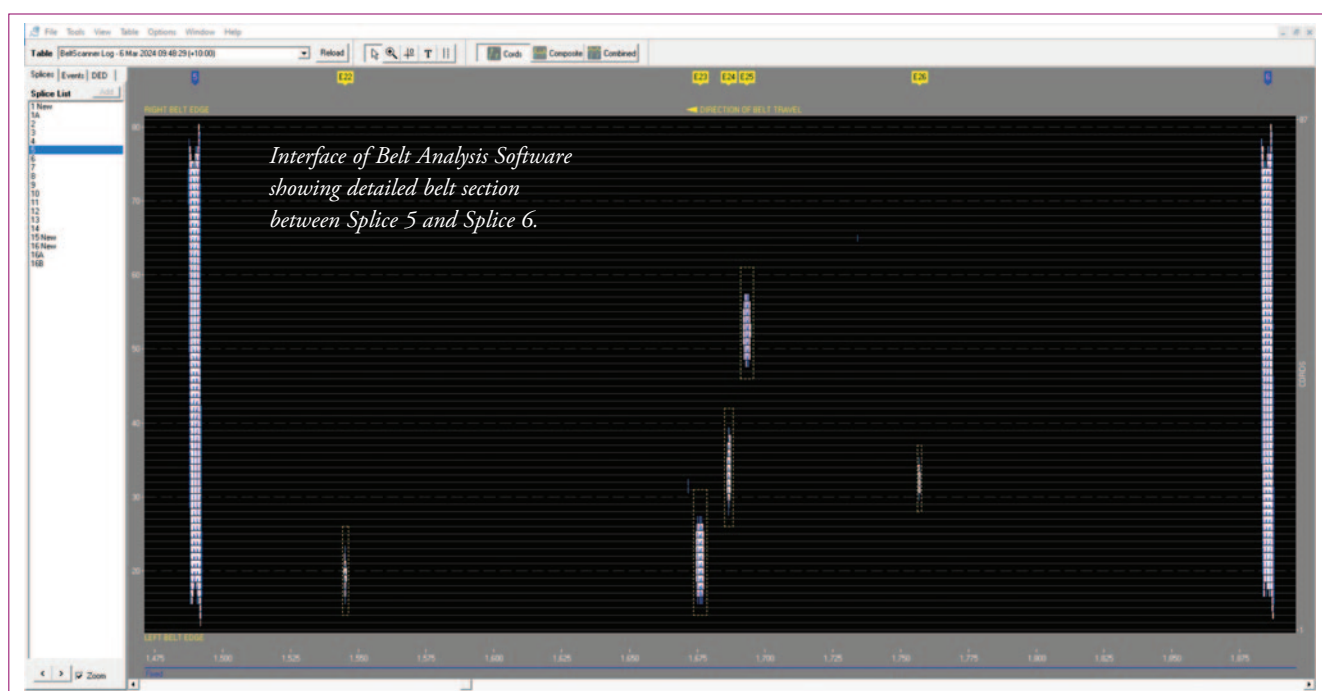
The BG Boss software supports most

common industrial communications protocols ensuring flexibility in connection for data access and management. It also allows for remote configuration and monitoring, making it a versatile tool for large-scale operations.

CONCLUSION

The BeltScanner MF is a game-changer in the field of conveyor belt monitoring. Its advanced technological features, combined with ease of installation and operation, make it an indispensable tool for industries reliant on conveyor systems.

By providing high-resolution, real-time data on belt conditions, the BeltScanner MF helps increase conveyor availability through prevention of costly downtimes, while enhancing overall operational efficiency.



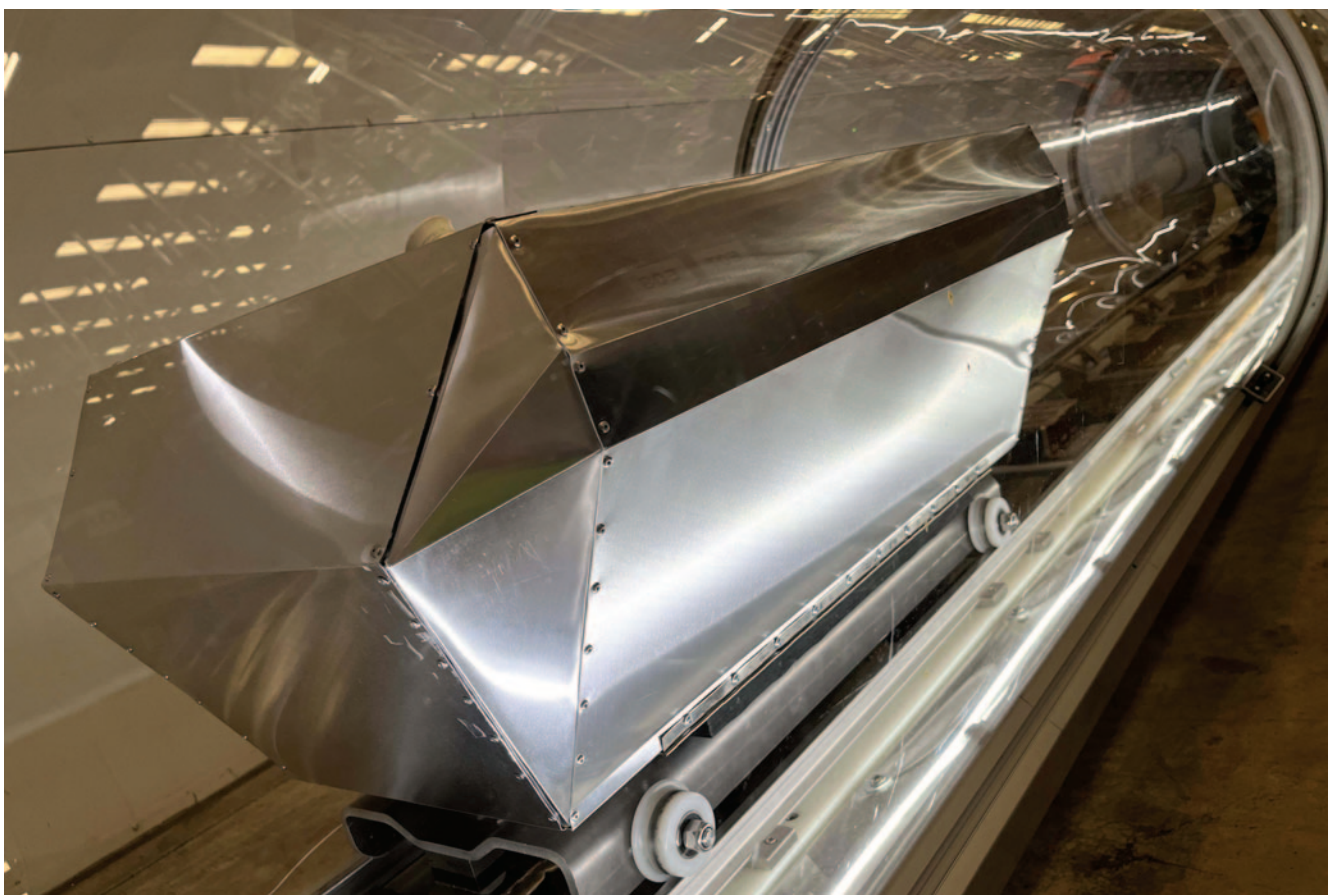
Wincanton Innovation Centre showcases Magway's magnetic propulsion technology

Magway Limited, a pioneering UK developer of zero-emission goods transport systems, is showcasing its innovative magnetic propulsion bulk material handling technology at Wincanton's W² Innovation Centre.

Magway's cutting-edge technology, designed to enhance the sustainability and efficiency of bulk material transport, is being showcased at logistics giant Wincanton's state-of-the-art Innovation Centre in Rockingham, Northamptonshire, UK. This centre, adjacent to The WEB — Wincanton's automated shared user facility for high volume fulfilment, is a hub for the latest in supply chain innovation which benefits Britain's businesses.

For six years, Magway has been at the forefront of magnetic propulsion, continuously pushing boundaries and refining its system. Magway's technology enables precise control over the horizontal and vertical movement of loads up to 250kg, with a throughput capacity of 1,000 tonnes per hour. Remarkably, the system operates at less than 20% of the energy and operating costs of traditional solutions, while producing zero emissions.

Phill Davies, CEO of Magway, stated: "Every year, over 100 billion tonnes of bulk materials — equivalent to two-thirds the mass of Mount Everest — are transported globally using traditional conveyors and trucks. In order to achieve net zero,



businesses need to innovate in their supply chain processes and embrace new technologies. Our system offers a compelling alternative, providing unparalleled efficiency and sustainability.

“This is the first Magway demonstrator outside of our own controlled test environment, and we’re extremely excited to showcase our technology and vision for sustainable, efficient bulk material movement. Working with these leading organizations, we can ‘Move Mountains Together’.”

Magway’s initiative is supported by industry leaders including construction materials supplier GRS Group, Warwick Manufacturing Group, Mackley Engineering, KPMG and NatWest.

Paul Durkin, Chief Customer and Innovation Officer, at Wincanton commented: “We are delighted to welcome Magway and its cutting-edge magnetic propulsion technology to our Innovation Centre. Innovation is at the heart of everything we do for our customers, and we are committed to collaborating with global innovators like Magway to drive emerging technology and sustainability in supply chain and logistics. Since its opening in 2021, our Innovation Centre has welcomed over 5,000 visitors, and we look forward to many more experiencing this new technology.”

Gary Coles, Integrated Solutions Director at GRS Group, said: “As a supplier of essential bulk materials for UK

construction, we’re always looking for innovations to improve efficiency and support our journey to net zero. As soon as we heard about Magway, we were keen to get involved. We’re excited to see how this remarkable technology could improve material movement at a GRS site that’s one of London’s busiest processing plants.”

NatWest’s Clean Transport Accelerator, in partnership with WMG, recently welcomed Magway into its fold. This fully funded programme provides specialized support to businesses developing clean transport solutions, facilitating the rapid deployment of innovative ideas into the market.

Richard Hill, Head of Mobility and Logistics at NatWest, remarked: “Magway’s transformation from concept to a sustainable business model has the potential to revolutionize the bulk goods movement. The accelerator is dedicated to nurturing ventures like Magway, ensuring swift market entry and maximizing the

benefits of groundbreaking innovations for the UK.”

ABOUT MAGWAY

Headquartered in Wembley, London, Magway is a pioneering zero-emissions magnetic propulsion material handling system, revolutionizing bulk material movement in the construction and mining sectors. Committed to a sustainable future, Magway’s innovative solutions aim to meet global net-zero targets by 2050.

ABOUT WINCANTON

Wincanton is a major British supply chain solutions company. The group provides business-critical services including storage, handling and distribution; high volume eFulfilment; retailer ‘dark stores’; two-person home delivery; fleet and transport management; and network optimization for many of the UK’s best-known companies. It is active across a range of markets including food and consumer goods; retail and manufacturing; eCommerce; the public sector; major infrastructure; building materials; fuel; and defence. With almost 100 years’ heritage, Wincanton’s 20,300-strong team operates from more than 160 sites across the country, responsible for 7,400 vehicles.

In February 2024, the Board of Wincanton reached agreement with GXO Logistics on an offer for GXO to acquire the entire issued and to be issued share capital of Wincanton for £764m. The offer was accepted by shareholders, and the acquisition was completed on 29 April 2024. Wincanton and GXO are currently still operating as separate entities, pending the approval of the UK Competition and Markets Authority.



Paul Hedfeld – spare parts expert supports conveying systems



Picture 1.



Picture 2.



Picture 3.

In 1949, Paul Hedfeld founded Paul Hedfeld KG, a company focused on the production of machines to convey grain and flour, as well as wear parts for mills and compound feed plants. Today, Paul Hedfeld GmbH is a medium-sized, third-generation family business based in Gevelsberg in Germany. The company's product range has been gradually expanded over the past 75 years. As the product range has grown, the number and diversity of customers has also increased. Over time, the company has developed a client base from all branches of industry beyond the borders of Germany and Europe.

The Paul Hedfeld GmbH supplies its international customer base with spare parts and new systems for bucket elevators, screw conveyors, slat conveyors, silo systems, trough chain conveyors and customized special constructions.

Paul Hedfeld GmbH defines itself as a very customer-focused company and thus manages to set itself apart from its

competitors. A smooth and fast flow of all business processes serves as a success factor for customer satisfaction. The stock of many important spare parts ensures fast delivery to customers and can minimize their unforeseeable downtimes of conveyor systems. If a customer wants to open up a new conveying route or replace an existing system with a new one, Paul Hedfeld GmbH is an ideal contact for projects of any status.

The company employs experienced and competent engineers in its sales department who can deal with technical problems and issues when planning new systems. The installation of new systems and spare parts can be carried out by skilled fitters. Paul Hedfeld GmbH provides customers with all services from a single source, if desired.

In addition to its customer-oriented focus, the company's competitiveness is ensured by constantly adapting to the market in order to enable customers to

transport their bulk goods without issues. This includes constantly adapting the products to the regulations to which the customers are subject. An example of this is the adaptation to the ATEX directive for the prevention and avoidance of explosions.

Paul Hedfeld GmbH considers it essential to adapt to trends and changes

SOME CURRENT AND PAST PROJECTS

Paul Hedfeld GmbH has already implemented many projects in the past. Below are some examples of past and current projects from various branches of industry to go with the pictures:

Shown in pictures 1, 2 and 3: the construction of a silo system is intended to provide the customer with an intermediate buffer between kilning and sterilization. In addition, the conveying capacity is increased through the use of various trough chain conveyors and a belt bucket elevator. The silo cells and parts of the conveyor



Picture 4.



Picture 5.



Picture 6.



Picture 7.



Picture 8.

technology were enclosed in a cladding.

Pictures 4, 5 and 6 illustrate when Paul Hedfeld GmbH renewed the sand/gravel intake of a concrete plant. Parts of the receiving hopper were renewed, a new belt bucket elevator and a oscillating conveyor were installed and a head platform was fitted. The new conveying capacity is 160tph (tonnes per hour) of sand or gravel.

Transporting bulk goods (see pictures 7 and 8) does not always have to be space-bound, as the mobile loading auger shown in the pictures demonstrates. It can be moved with a forklift and can be swivelled and adjusted in height and depth on the spot. The solution was built for a customer to load malt into a 40ft container. A conveying capacity of 40tph is possible with



Picture 9.



Picture 10.



Picture 11.



Picture 12.

a malt fraction of less than 0.7%.

In pictures 9, 10, 11 and 12, there is an example of an interesting current project — the development of a germination box for the vault-basement of a German specialty brewery. The dimensions of 19x2m enable the processing of two times five tonnes of green malt. The raisable cover ensures an optimal germination process and atmospheric condition. The entire system is made of V4A and operates in an energy and water-optimized way. Due to the modular system of the germination box, this solution is easily adaptable to other conditions and can therefore also be purchased by other prospective customers. Another special feature of the system is the pneumatic discharge using a patented screw conveyor.

Customer-specific problems (see picture 13) require individual solutions. In some cases, maximum effects can be achieved by making minimal changes to the overall system. This case is represented by the addition of brushes to the screw flights. In this particular case, a customer had problems with material residues in his screw conveyor. By fitting the brushes, this problem could be solved quickly and cost-effectively.

FUTURE PLANS

Paul Hedfeld GmbH will maintain its focus in the future and will continue to implement interesting projects with full commitment and will be available as a reliable partner for the supply of spare parts to customers.



Picture 13.

STARCLEAN® Smart Scraper: innovative conveyor belt monitoring with belt damage detection

Sustainability by Innovation – this motto drives the team at Schulte Strathaus every day. The company goes one decisive step further and develops products that provide sustainable solutions and add real value.

STARCLEAN® is known in the conveyor technology field, because ever more problem solvers and innovations are being developed. There's good reason why customers are enthusiastic and value the scraper and its tool-free maintenance.

Now there's a product innovation that takes spillage control to a whole new level:

STARCLEAN® Smart Scraper is a new intelligent scraper that combines with our proven electric drive and smart modules to detect conveyor belt damage early and allow preventative repair of segments. This saves material resources and ensures the belt system's performance.

DETECT — REACT — PROTECT

This modern technology is based on advanced, touch-based scanning that allows analysis of the movement and surface structure of the belt to detect possible damage. It allows reaction before the production process is seriously impaired.

The following damage is easily detected: cover plate damage; connection damage; punctures; repair damage; and belt slits (partial).

The scrapers can be folded in and out using an electric linear drive.

ADVANTAGES AT A GLANCE

- ❖ continuous inspection;
- ❖ damage limitation;
- ❖ efficient use of resources;
- ❖ improved operating reliability;
- ❖ prevention of unplanned conveyor downtime; and
- ❖ transparent data assessment.

This is made possible by the perfect interplay of Schulte Strathaus' existing and new modules. The advantage of the system is installation of conveyor belt monitoring on any conveyor in the bulk goods sector with relatively little cost and effort.

SCRAPING, PREDICTIVE MAINTENANCE AND BELT DETECTION WITH THE 3-IN-1 SMART SCRAPER

- ❖ Scraper Intelligence Module (SIM);
- ❖ motorization set with S³ sensor system;
- ❖ measuring roller with sensor system; and
- ❖ scrapers.



One highlight of the innovation is the newly developed STARCLEAN® Cloud, with a user-friendly dashboard. This is where all the assembled data appear, such as metres per operating hour, condition of the scrapers, and a wear display.

In addition to monitoring, the Cloud provides intervention in the system components.

The Scraper Intelligence Module (SIM) is the heart of the STARCLEAN® Smart Scraper, and automatically controls the components, and passes the captured data to the Cloud. This allows monitoring of the whole process.

The S³ sensor system recognizes belt properties thanks to scrapers lying directly on the conveyor belt and detects all damage events. It is possible at any time to see an update of the belt profile, observe the damage/profile, and individually set the damage level.

The measuring roller detects conveyor direction, position, belt length and speed. This also ensures precise localization of the damage.

Detection of movement direction is especially important with reversible belts, because the scrapers can be folded in or out automatically using Schulte Strathaus's motorization set.

All data become visible in the company's Cloud, in which the customer can monitor the system and step in as soon as an issue



occurs. This means that, depending on the damage level, STARCLEAN®S³ can take action independently or even initiate an emergency stop of the belt system. The customer can specify the function.

WHAT THE CLOUD CAN DO

- ❖ continuous conveyor belt monitoring;
- ❖ damage classification;
- ❖ definition of internal damage level;
- ❖ action if belt is damaged (swing away scraper, send messages, alarm – the customer determines the function);

- ❖ detection of belt damage position;
- ❖ graphic representation of belt properties;
- ❖ detailed technical evaluation; and
- ❖ condition of conveyor belt (operating hours, mileage, etc.).

So far, Schulte Strathaus can proudly claim that its new STARCLEAN® Smart Scraper has worked without a hitch. It was tested before market introduction in countless deployments under realistic conditions.



Fit it and forget it! ATEX safety technology for conveyor systems



One of the conveyor belts at E.ON: a vertical conveyor for feeding a silo for storing wood chips. All conveyor systems at E.ON in Bergkamen/Germany are equipped with pull-rope emergency stop switches or misalignment switches from Kiepe.

GREEN ELECTRICITY AND STEAM FOR THE NEIGHBOURHOOD

E.ON Energy Solutions operates a biomass cogeneration plant in Bergkamen, Germany with an output of up to 20 megawatts, which plays a central role in the regional energy supply and the future provision of steam for the nearby Bayer factory.

The raw materials used in the biomass cogeneration plant, such as wood chips from tree waste or waste wood, are transported to a steam power plant via horizontal and vertical conveyors. Here, a turbine is driven by the combustion of the

biomass and the resulting steam pressure in order to meet the necessary energy requirements.

SAFETY SWITCHES REDUCE THE RISK OF EXPLOSION

The shredded wood particles pose a particular potential hazard, which is why all systems, silos, pipes, conveyor lines and measuring devices are subject to rigorous fire and explosion protection regulations. Due to the increased amount of dust generated during the shredding and internal transportation of the biomass, the

formation of explosive atmospheres is an on-going hazard and always to be expected.

For this reason, E.ON Energy Solutions had already installed explosion proof pull-rope emergency stop and misalignment switches from the Kiepe Electric range of conveyor safety equipment.

From the very beginning, compliance with EX standards to prevent dust explosions had top priority. In addition, the emergency switches had to prevent the ingress of water, dust and dirt, which was covered by the IP67 protection classification.



Inspection of a switch housing at E.ON: behind an inspection flap is a 13-year-old misalignment switch from Kiepe Electric with a stainless steel roller under a layer of wood dust and dirt. Shortly after installation, Kiepe took care of reassembling the switch in 2010 to improve the mobility of the roller lever. This was replaced for the first time in 2023. Despite regular compressed air treatment, the installed roller levers are contaminated by the conveyed material and the paint has been corroded over the years. However, the functionality of all switches remained completely unaffected (detailed view on the right).



One of several pull-rope emergency stop switches from Kiepe Electric at E.ON. Regardless of how often the pull rope has had to be pulled during operation of the conveyor belt, the switches are still functional even after more than a decade.

Depending on its origin, the conveyed material is alternately wet or dry — in the case of high dust development, it may also be necessary to apply water to the material. Regardless of the moisture content of the biomass, or the airborne dust particles, the Kiepe Electric range of safety switches reliably fulfill their purpose.

The belt misalignment switches have been adjusted so they disconnect the conveyors immediately in the event of severe deflection in order to prevent consequential damage. In addition to direct shutdown, Kiepe Electric components also offer the option of a pre-warning alarm function — a relevant safety mechanism for the smooth operation of the system.

In the event of jamming and blockages, the strategically positioned Kiepe pull-rope emergency stop switches are used to stop the conveyor belt in good time and drastically minimize the risk of accidents and more importantly — personal injury — keeping operators safe at all times.

AS RELIABLE AS ON THE FIRST DAY

The Kiepe safety switches were installed prior to 2010 and there has been no need to replace them to date. They are cleaned with compressed air from time to time, but no external influences from the arduous working environment have been able to impair their functionality and complete reliability, commensurate with the reputation and reliability of the Kiepe Elektrik product range.

During an inspection in Bergkamen in 2023, Jan Puschmann, E.ON electrical engineer and waste management officer said, “We were surprised that the emergency pull rope and misalignment switches have performed so stubbornly to this day. We would have expected different results in such a harsh working environment”.

CONFIGURABLE SWITCHES FOR ALL CONVEYOR SYSTEMS

Due to the occasional high belt speeds, the

conveyor systems may experience unexpected wear and tear and thus unwanted production downtimes. Therefore, adjustments are required for efficient working of the conveyor system and the Kiepe products fulfill this important requirement.

As a precautionary measure, Kiepe Electric has created the necessary adjustments for pre-configuring suitable products according to individual criteria by using a modular assembly structure, thereby increasing the flexibility of their components for conveyor systems.

Literally thousands of emergency switches from the long-established and well-renowned Kiepe Elektrik are operating in world-wide installations that were put into operation in the last century. They are still in trouble-free operation today. In this way, they are upholding the Kiepe motto — when it comes to protecting people and equipment why use anything but the best?

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NETHERLANDS



SAMMI conveyors integral to safe handling of hazardous cargoes

Below, Italian bulk handling equipment expert talks about the seven common problems that plague the bulk handling industry — and how these issues can be solved. It is interesting to see how often conveyors play their part in the process — in points 1, 5 & 6, SAMMI is able to design and supply belt conveyors with scraper chains. Due to the transported materials (such as quicklime), the machines are completely enclosed in order to limit dust emissions into the atmosphere. The machines have been designed to be perfectly integrated into the already existing process, inserted to be powered by existing vibrating extractors.

1. DUST AND DISPERSION

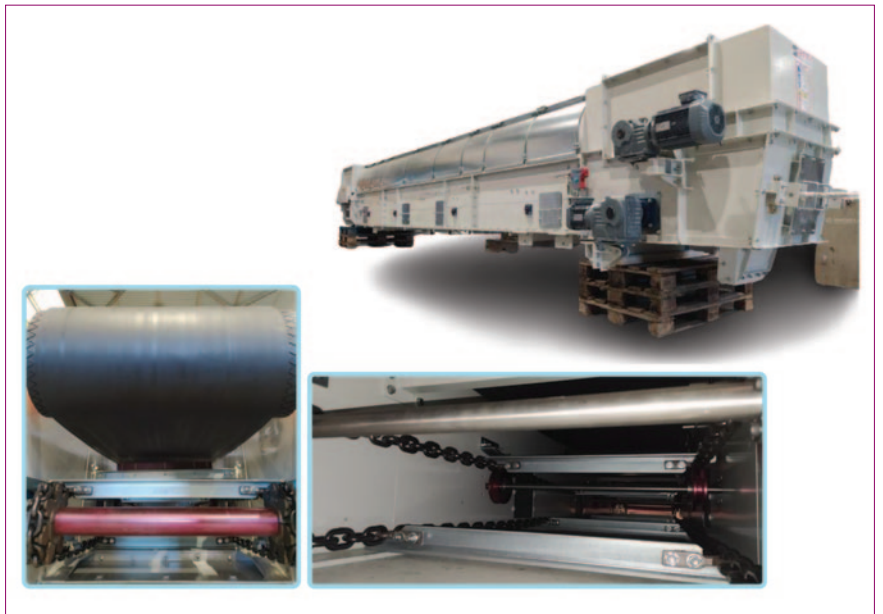
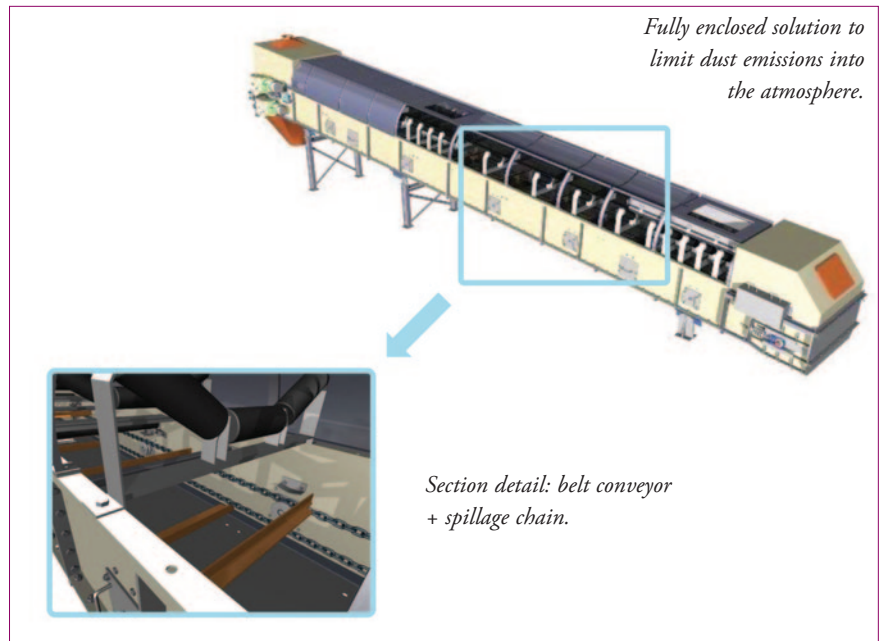
Problem: dust generated from bulk materials can create serious health and safety issues for workers, as well as contaminate products and machinery.

Solutions: implement dust suppression systems, such as water sprayers or aspiration systems. Use less dusty materials. Provide workers with appropriate personal protective equipment, such as dust masks.

2. WEAR AND TEAR OF COMPONENTS

Problem: components in bulk material handling systems are subject to wear and tear from abrasion and impact, causing frequent downtime and high maintenance costs.

Solutions: choose components made from wear-resistant materials. Perform regular maintenance on components. Install monitoring systems to identify and prevent failures.





3. BLOCKAGES AND JAMS

Problem: bulk materials can form blockages and jams in handling systems, causing flow interruptions and production losses.

Solutions: design handling systems for optimal material flow. Use flow aids and vibrators to prevent blockages. Monitor material levels in silos and conveyors.

4. FLOW CONTROL DIFFICULTIES

Problem: handling bulk materials with different flow characteristics can be difficult to control, causing spills and product waste.

Solutions: choose handling systems suitable for the material characteristics. Use valves and flow regulators to control material flow. Implement process monitoring and control systems.

5. SAFETY ISSUES

Problem: bulk material handling systems can pose safety hazards to workers, such as crushing, entanglement, and fall risks.

Solutions: install appropriate safety guards on machinery. Provide workers with proper training on safety hazards and procedures. Implement preventative maintenance

programs to ensure the proper functioning of systems.

6. ENVIRONMENTAL IMPACTS

Problem: bulk material handling can have a negative impact on the environment, causing air pollution and soil damage.

Solutions: implement dust emission control systems. Use material storage and handling methods that minimize the risk of dispersion. Adopt sustainable environmental management practices.

7. ENERGY INEFFICIENCY

Problem: bulk material handling systems can be energy inefficient, consuming large amounts of energy and increasing operating costs.

Solutions: upgrade components to more energy-efficient models. Implement smart control systems to optimize energy consumption.

SOLUTIONS IN PRACTICE — CASE STUDY

SAMMI's conveyor solutions can be seen clearly in a project to transport quicklime. SAMMI provided a 150tph (tonnes per hour) conveyor system for quicklime

transport in a cement factory. SAMMI designed and supplied conveyor belts with scraper chains for the transport of bulk lime.

Due to the transported materials, the machines are completely closed in order to limit dust emissions into the atmosphere. The machines have been designed to be perfectly integrated into the already existing process, inserted to be powered by existing vibrating extractors.

CEMENT-RELATED CONVEYOR PROJECTS CARRIED OUT BY SAMMI

- ❖ belt conveyors equipped with spillage chains, belt extractors for clinker handling, at Lomas de Chapultepec, Mexico. The end-user is Buzzi Unicem. Work began in 2014, and was completed in 2015.
- ❖ belt conveyor on bridge structure for clinker transportation at high temperature, in Egypt. The end-user is Cemex. Work began and was completed in 2013.
- ❖ clinker and additives transport line, at Fos Sur Mer (Marseille), France. The end-user is Lafarge. Work began, and was completed, in 2008.
- ❖ clinker transport line, Nord Broyage (Dunkerque), France. The end-user is Lafarge. Work began, and was completed, in 2008.
- ❖ bridge conveyor with spillage chain for cement transport to silo 'Claudius Peters' No.12, in Augusta (Syracuse), Italy. The end-user is Buzzi Unicem. Work began, and was completed, in 2007.
- ❖ 150tph belt with scraper chains for clinker and sulphur transport, Manfredonia (BA), Italy. The end-user is Colacem. Work began, and was completed, in 2006.

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Carrying a heavy load

bulk loading & unloading technologies



Louise Dodds-Ely

Cimbria port terminal projects in Poland increase customer efficiency and capacity

In a quite classic business as grain and seed storage and handling, two keywords are pivotal: efficiency and capacity. With

customized and flexible solutions, Cimbria supports its customers' needs for reliability and high pace while increasing conveying

and storage capacity including safe and gentle handling of crops to keep loss at a minimum. Cimbria is currently working on

Cimbria reaches significant milestone

Cimbria has delivered its 18,000th Moduflex chute. Cimbria is delighted, but not surprised, to see that customers are continuing to request its one-of-a-kind solution for dust-free dry bulk offloading. The capabilities of the Moduflex are impressive. The 18,000th sale was celebrated with Cimbria's trusted Spanish dealer Masanés Servindustria, which sold the milestone unit. Cimbria congratulates this great partner and its customer, which is now the lucky owner of a fantastic piece of equipment.

With 3,000m³/h maximum loading capacity, a drop of over 30 metres, and two standard modular lengths of 300mm (12in) and 600mm (24in), Moduflex handles 99% of all known dry bulk industry applications.

two large-capacity grain port terminal projects in Poland.

Time is essential in the port terminal business. So, the more efficient the transportation of raw material such as grain, wheat, and barley can be, the better. As one of the strongest players in this field, Cimbria is proactively approaching customers regarding complete port terminal solutions, where both transportation and storage of grain and other crops are central elements in the customer requests. This happens at the same time as transportation routes for grain and seed are being restructured due to changes in the world markets with increasing demands from places like the Black Sea region, Egypt, the Middle East, Kazakhstan, and Brazil.

"We experience a global market pull for full scope supply of port terminal solutions. The demand for safe handling of bigger volumes of crops such as grain, wheat, and barley and high speed in loading and unloading as well as high storage capacity is an overall trend. Today we experience a high level of interest in heavy duty handling equipment with capacities of 1,000–1,500tph [tonnes per hour], which is almost the double of the average capacity request just a few years ago," explains Thomas Mohr, Sales Director Grain EME and Africa in Cimbria, and continues:

"Customers come to us because they prefer to deal with a one-stop-shop solution provider who can deliver turnkey projects on time. And with the most efficient and reliable storage and transportation solutions, we can secure that the raw materials keep their value and quality throughout the value chain," he added.

One of the important and growing markets for Cimbria is Poland and currently Cimbria is working on two major port terminal projects there. One is for HES Gdynia Bulk Terminal in Port of Gdynia in the north-east of Poland. HES is expanding the current grain terminal intake capacity with 1,000tph and expanding with a new flat storage with a capacity of 64,000 tonnes.

"Cimbria delivered equipment for the bulk terminal in Gdynia in 2016 and we are

happy to have a satisfied customer returning for an expansion of the facility. A part of the new project is a customized intake system with weighing bridges significantly speeding up the unloading process, including also our Moduflex dust-free loading chutes and an underground discharging system and movable and reversible conveyors ensuring a very flexible and adaptable solution. This ensures a larger capacity and a more efficient receiving and shipping of grain via Panama ships. A flat storage facility is future-proofing the warehouse, so it can be used for both grain and soya meal storage," says Mateusz Olejniczak, Manager Cluster Sales Lead in Cimbria Poland.

"The solution from Cimbria has been designed in close collaboration with us, and our long-term relation helped to deliver the most effective solutions for our project. The new warehouse conveyors and handling equipment will contribute to a more efficient handling process. After completion, HES Gdynia will be able to offer higher level of quality, safety, and capabilities, providing much-needed space for such a supply constrained agricultural market, underpinning the terminal as the reliable logistic grain partner for our customers," says Sonia Florczuk, Commercial Director at HES Gdynia Bulk Terminal.

Another Polish project is for Szczecin Bulk Terminal in Stettin in the western part of Poland. Similar to the development in Gdynia, this project is also an extension of an existing plant, that Cimbria has delivered handling equipment to in 2017. For the new project, Cimbria is delivering four silos with a total capacity of almost 28,000 tonnes and a ship loading line with an intake capacity of 1,000tph.

"We are installing large amounts of extra storage capacity in a very narrow space, so we have put a lot of effort into the customization of the solution to match the specific needs and conditions. Furthermore, the silos are equipped with our intelligent temperature monitoring system that automatically manages and

monitors grain temperatures 24/7 and warns in case of any hot spots. The system is an important part of maintaining high quality of the grain and preventing product loss and downtime," says Olejniczak.

"We are glad to be collaborating with Cimbria on this plant extension. Our fully automated silos and transshipment system allow us to offer both import and export handling to our customers, and with even more storage capacity we continue supporting the global food market by meeting the increased demand for secure and efficient storage and transportation of grain," says Rafal Rozanski, Terminal Manager at Szczecin Bulk Terminal.

Both port terminal projects in Gdynia and Stettin are ATEX certified. The Gdynia project is expected to be completed by Q4, 2024, and the project in Stettin will be finalized by 2024-2025.

"The Polish projects both matches very well our overall aim to support global food security and food supply with a growing world population to feed," says Mohr.

ABOUT CIMBRIA A/S

Cimbria is a world expert in industrial processing, handling, and storage of cereals and seeds as well as animal feed, food, and other bulk products. Cimbria works closely with their customers to design, manufacture, install, and service customized solutions, individual machines, and complete turnkey systems. Cimbria is a global brand owned by AGCO Group.

ABOUT AGCO

AGCO is a global leader in the design, manufacture and distribution of agricultural machinery and precision ag technology. AGCO delivers value to farmers and OEM customers through its differentiated brand portfolio including core brands like Fendt®, GSI®, Massey Ferguson®, PTx and Valtra®. AGCO's full line of equipment, smart farming solutions and services helps farmers sustainably feed the world. Founded in 1990 and headquartered in Duluth, Georgia, USA, AGCO had net sales of approximately \$14.4 billion in 2023.

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Your challenge might be finding a grain-handling solution that ensures the profitable, sustainable growth of your business.

Our expertise can provide just that. A totally enclosed Bruks Siwertell solution that ensures operations are efficient, reliable, and free from dust and spillage.



**HANDLING
THE FUTURE**

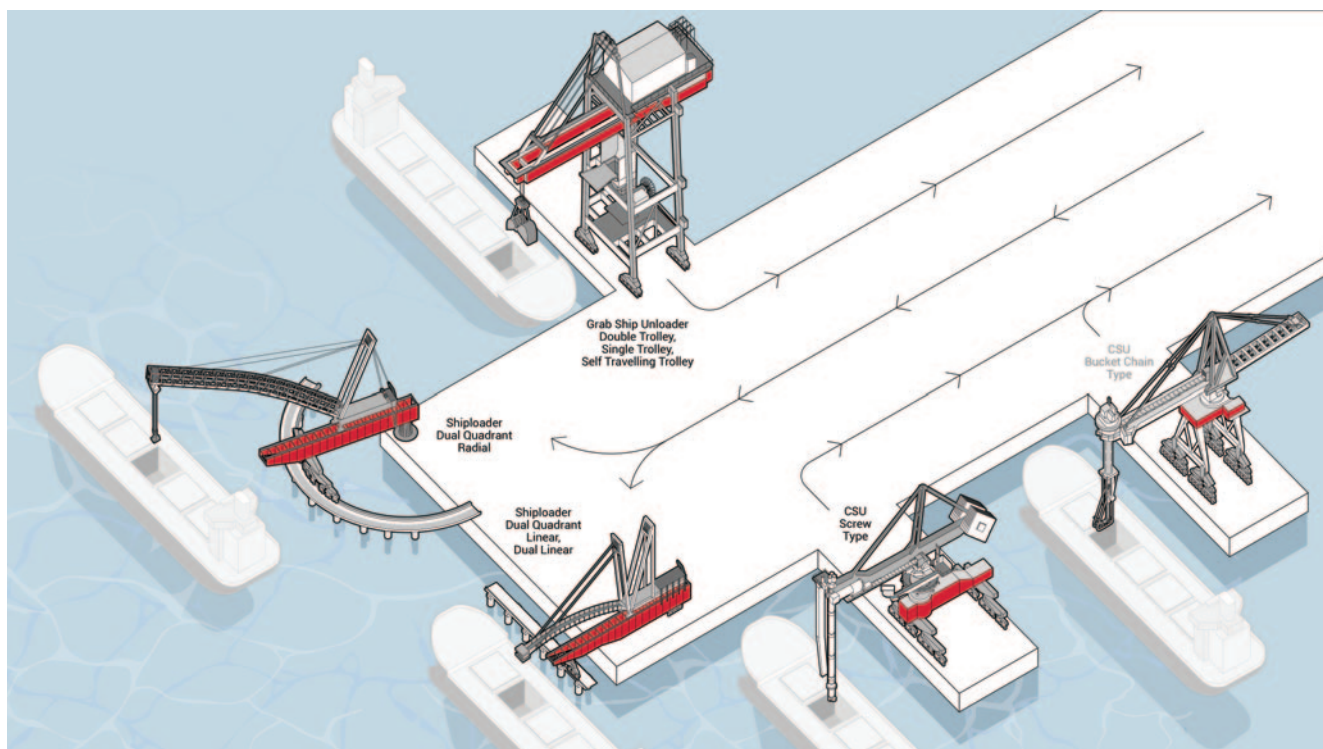
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BULK HANDLING & WOOD PROCESSING

Shiploading system forms major part of Tenova's bulk handling expertise



TENOVA MATERIAL HANDLING (TMH) STRATEGY TO ENHANCE SAFETY – FLEXIBILITY - PREDICTABILITY

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

Under the brand Tenova Material Handling (TMH), the company supplies standard and bespoke material handling equipment with a particular focus on to the loading and unloading of marine terminals.

TMH is engaged to promote innovative technological solutions and to back up its offerings with its long-term experience in the market and equipment in-house knowledge and expertise.

TMH has a long-standing heritage in the Material Handling sector and a strong track record of complex project delivery. The brand — well known for its engineering capability and reliability — leverages robust technical in-house expertise in high-capacity loading and unloading equipment for a wide range of commodities. TMH is committed to offering an equipment portfolio always more sustainable and innovative, with great emphasis in investing in digital technologies and in the design of well proven technical solutions.

As shown in the above image, TMH provides different kind of bulk material handling equipment for ports loading/unloading operations.

BUCKET CHAIN TYPE CSU

Bucket chain continuous unloaders (CSUs)

are the most advanced technology for highly efficient and environmentally friendly unloading. Tenova's CSU are suitable to operate on a wide range of vessel sizes, and can handle products ranging from very free flow bulk material to complex very abrasive or sticky products.

SCREW TYPE CSU

With the knowledge that it has gained from decades of experience with CSU technology, Tenova is now bringing out a screw-type version. Tenova has developed its own versatile design, which is suitable for handling a good range of products, and which also offers an optimum ratio between machine weight and performance.

GRAB SHIP-UNLOADERS (GSUs) — WITH SHUTTLE TROLLEY, SINGLE TROLLEY AND SELF-TRAVELLING TROLLEY

Tenova's GSUs are designed to handle bulk materials across a wide range of different particle sizes and properties. The GSU is specifically tailored-made according to the client's requirements incorporating various solutions that are suitable to its specific application.

QUADRANT SHIPLOADERS — RADIAL, LINEAR AND DUAL LINEAR

The Tenova quadrant shiploader is a very flexible solution to reach the best compromise between quayside civil works cost and the loading system.

Tenova quadrant shiploaders are suitable for operation on a wide range of

vessel sizes, and can handle from very-free-flowing bulk material to complex very abrasive or sticky products.

The shiploaders are specifically designed to the exact requirements of the client, and incorporate various solutions according to their specific application and existing site conditions. There is always a strong focus on minimizing environmental impact.

Tenova quadrant shiploaders can be supplied in three different configurations, depending on the client's specific needs: radial type (front circular rail and rear pivot), linear type (front linear rail and rear pivot with bogies) or dual linear (front linear rail and rear perpendicular and linear rail). All of them can perform multiple movements: front travelling (radial or linear) with luffing and shuttling booms. In addition, they can be equipped with a variety of different loading chutes such as cascade type, telescopic type or curved type, depending on specific applications, customer special needs and required environmental conditions.

Tenova specializes in fabricating and fully assembling off site and in shipping shiploaders and unloaders to the final destination in a single unit by heavy lift ship (Lo-Lo) or by flat deck ship or barge (Ro-Ro).

INNOVATION IN BULK HANDLING — UNMANNED OR AUTONOMOUS OPERATION

In addition to its standard portfolio, TMH is focusing its efforts on innovation toward the Unmanned or Autonomous operation



sustainable solutions for a green transition of metals and mining

Can you imagine a greener future for the metals and mining industries? We can. We design, develop and achieve it every day.

At Tenova, we partner with our stakeholders to design and develop solutions for metal processing and mining operations that cut costs, save energy, decarbonize production processes and reduce environmental impact.

Among other technologies, Tenova Material Handling (TMH) supplies standard and bespoke material handling equipment, with a particular focus on high-capacity port loading & unloading equipment for a wide range of commodities.

The brand – renowned for its engineering capability and reliability – leverages robust technical in-house expertise to offer an equipment portfolio that strives to speed the path to a net-zero economy through sustainable and innovative technologies, with great emphasis on investing in digital technologies and on the design of well-proven technical solutions.

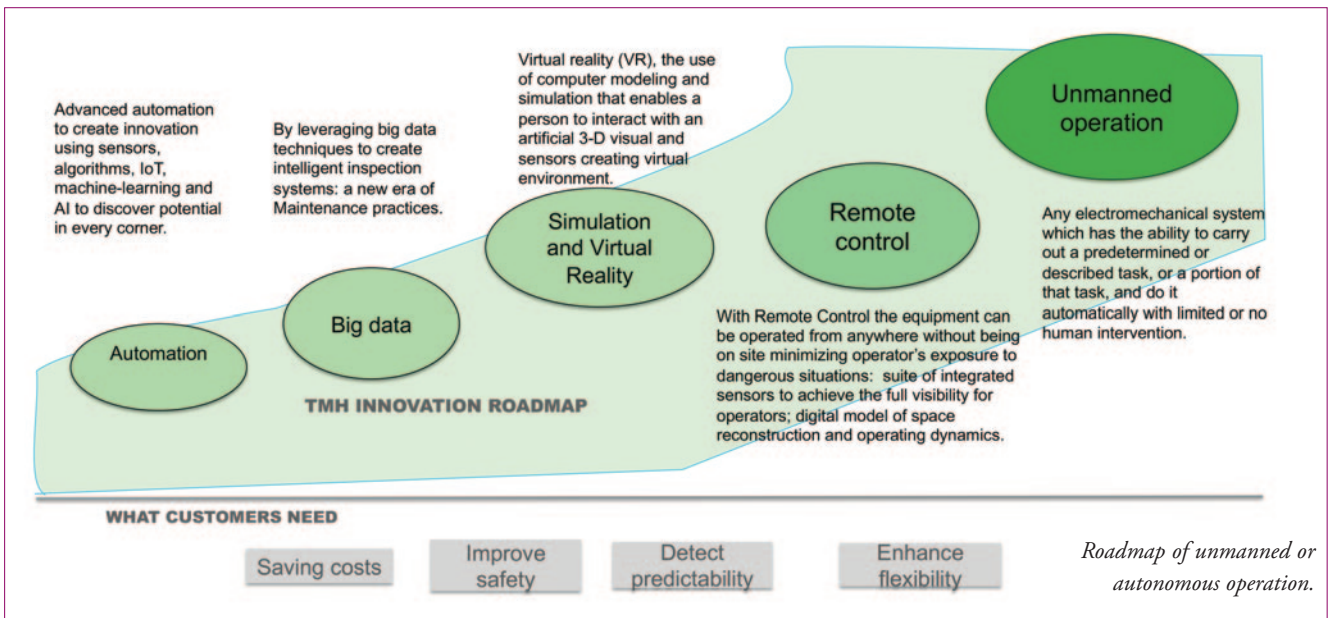


tenova.com

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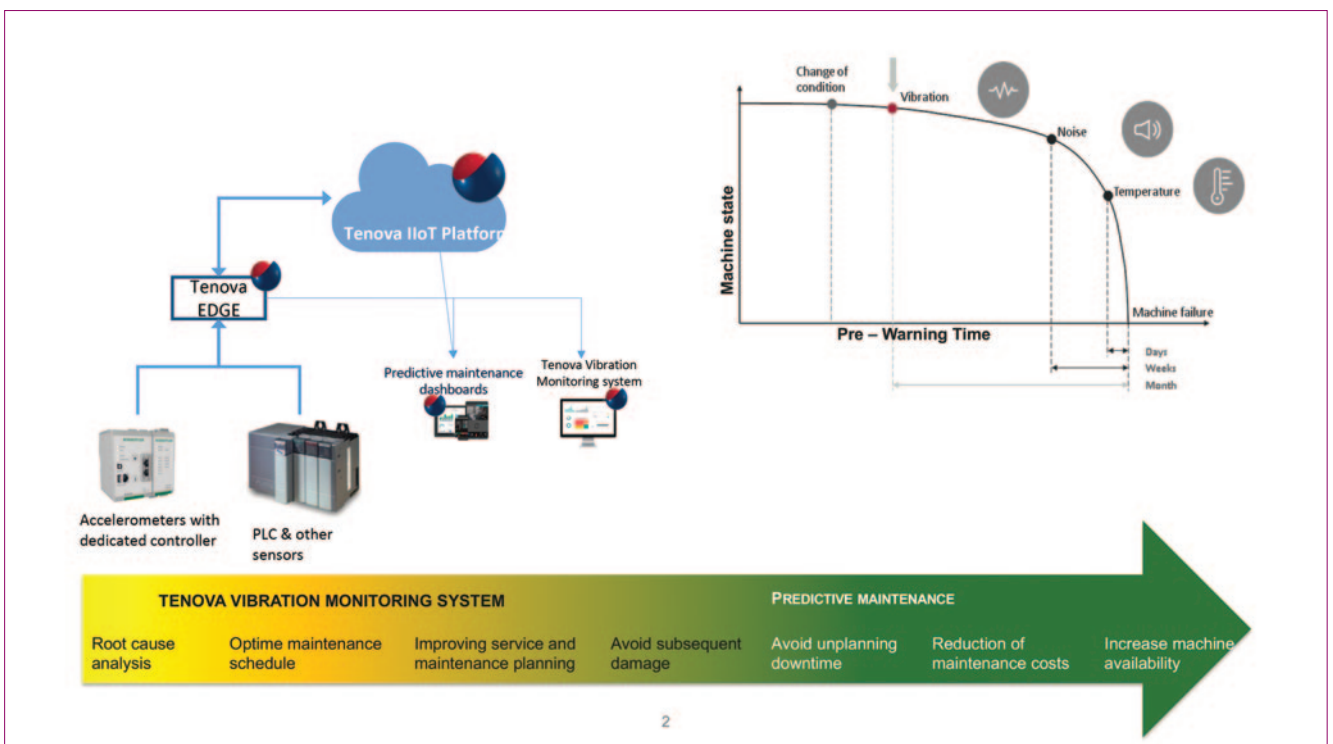
as per the above Roadmap.

Taking into account primarily customer needs, TMH developed and implemented innovative products such as virtual reality (VR) simulators for remote training, conditioning monitoring/predictive maintenance sensors, and remote control.

VR SIMULATOR FOR REMOTE TRAINING

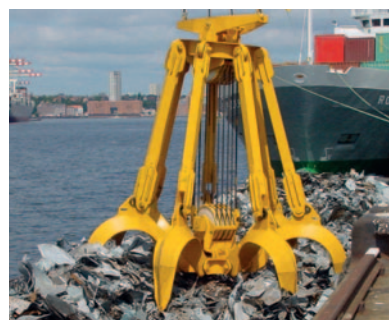
A VR simulator is a safe solution for the remote training of operators and on-field assistance for the operation and maintenance of ship-unloaders. The VR simulator will be accessible to operators via headsets, while remote assistance is enhanced through the processing of structured photographic material using IA and computer vision algorithms.

Designed and developed in Tenova's





PEINER Grabs for Marine Operation



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virtual laboratory in Genoa, Italy, the VR final system will advance the laboratory model by developing interactive elements and refining operational logic to achieve full virtual operational capability.

This integrated approach allows operators to execute maintenance workflows systematically, while supported by a hands-free head-mounted wearable device. These workflows involve capturing images of criticalities and providing inputs for processing IA algorithms that generate reports on system degradation. In addition, Tenova has foreseen the possibility of developing a Digital Twin for managing cargo hold procedures on the ship in unmanned operation mode.

CONDITIONING MONITORING/PREDICTIVE

MAINTENANCE SENSORS

The solution developed by Tenova is based on two kinds of different sensors:

- ❖ **wireless sensors** suited for monitoring specific component health status (for eg. rotating equipment like fun, pumps, ...)
- ❖ **cabled sensors** integrated with equipment automation suited to monitoring components and create



correlations with the full equipment health status.

The system will provide a dashboard where the following data/info will be displayed:

- ❖ A synthetic indicator that summarizes the health status of each component
- ❖ The list of active alarms related to vibration anomalies for all components

being monitored.

- ❖ History of the active alarms day by day in the last month.

Tenova Vibration Monitoring system, for each installed sensor, will show a set of KHI's that give synthetic information on the health status of the component where the sensors are installed.

For each KHI, during the commissioning phase warning and alarm thresholds will be set up. In this way, the system will generate alarms when an unexpected behaviour is detected.

REMOTE CONTROL

A suite of the most advanced integrated sensors, such as IP cameras, LiDAR, and microphones, able to provide the same visual perception to the operator (even better than the achievable usually on board thanks to the augmented reality) who is instead safely placed in a remote control cabin.

The standard remote-control solution can be housed either in an on-site office or in a specially supplied stand-alone booth.



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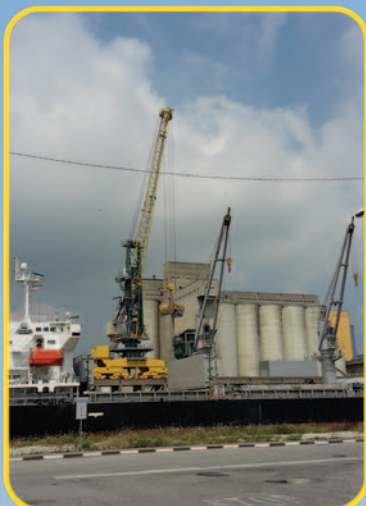
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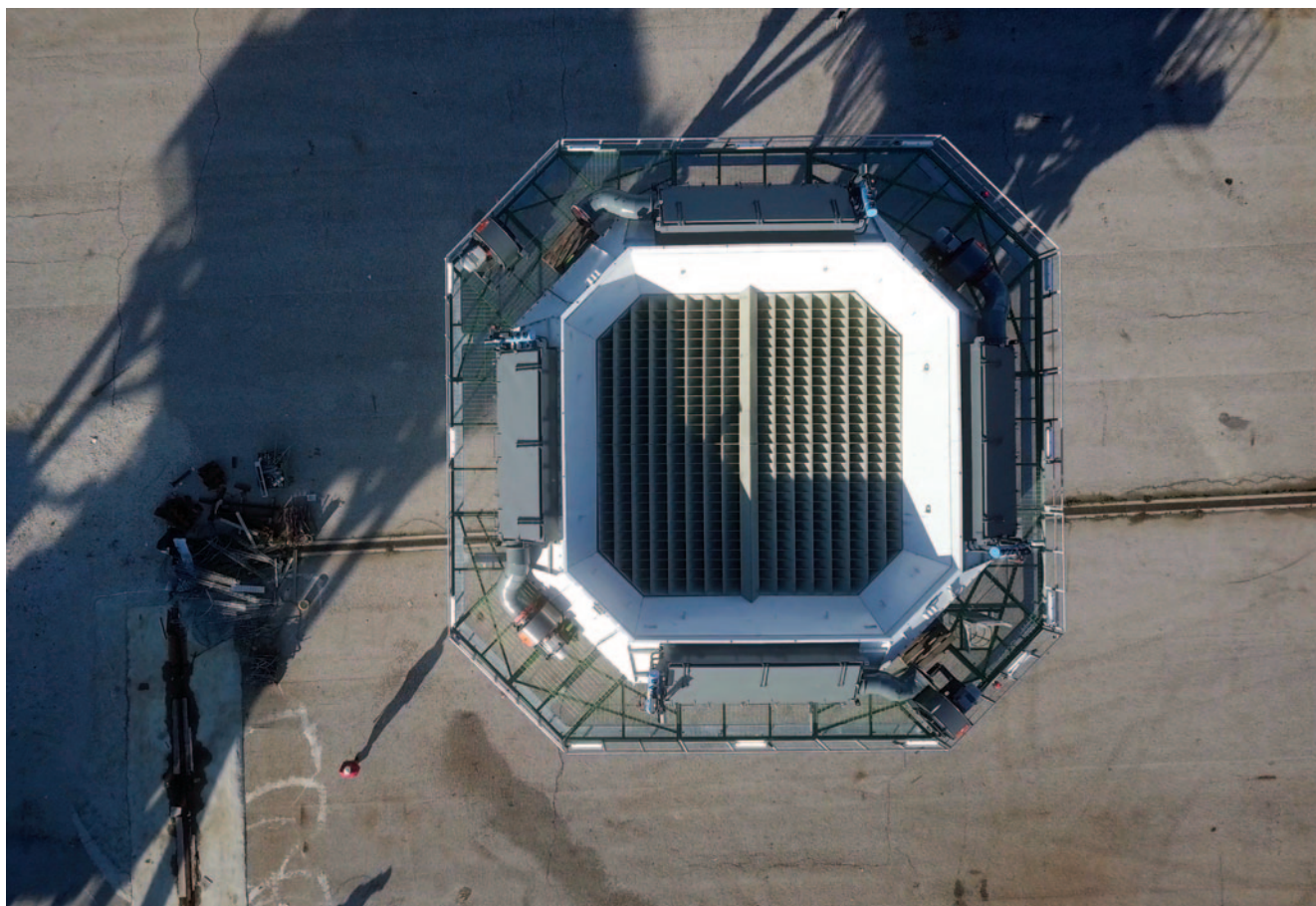
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Mobile Harbour Cranes ECO GREEN solution.

Eco Hopper: MDG Handling Solutions' latest product



The mission of MDG Handling is to offer customers its experience, knowledge and innovation in the exceptional products that it designs and produces for use all over the world. This creates value for all those who participate in the company and share its objectives," says Davide Gambarotta — CEO.

MDG Handling Solutions Srl was founded on the initiative of Davide Gambarotta, who is a member and sole director. The company operates in the field of bespoke design and production of bulk solids handling systems, in which he has gained considerable experience while working for ten years for the family

business — which has been operating in the same sector for around 60 years.

MDG Handling Solutions Srl was created with the precise aim of distinguishing itself in the international scene, adopting a highly innovative approach, both in the way it identifies the best technological solutions for the specific





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.

Choose TMSA for technologically advanced, environmentally conscious bulk handling solutions that don't compromise performance.



TMSA
Bulk Handling Technology

Brazil

Porto Alegre, RS
Belo Horizonte, MG
São Paulo, SP

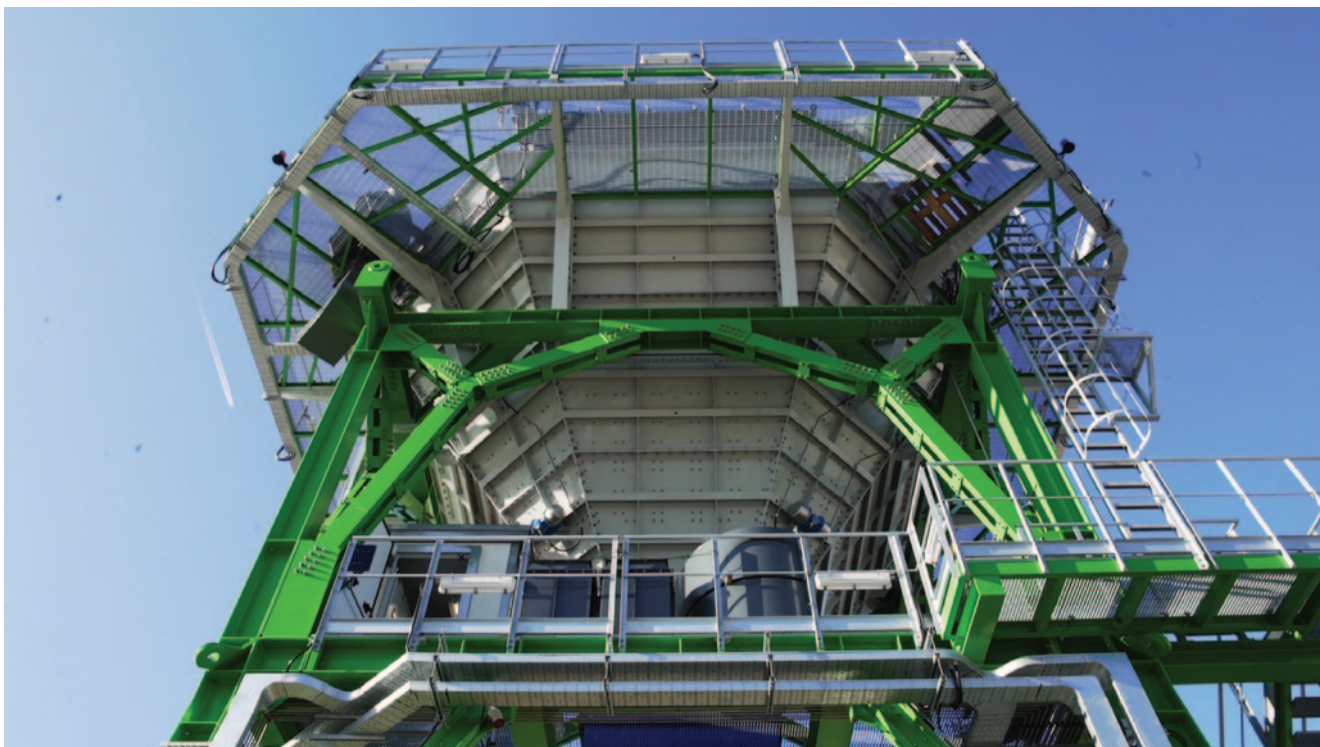
Argentina

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needs of the customer, and for the production and development of assistance systems.

MDG Handling Solutions Srl's fields of application are: cement & lime, mining & minerals, fertilizers, alternative fuels, power plants, ports and terminals, and many others.

The company's main services include: EPC projects, engineering, construction, commissioning and supervision, technical service, spare parts service and upgrades.

In 2020 Gambarotta Group was founded: made up of five leading companies in the sector and about 130 people

specialized in different fields. It includes: Gambarotta Gschwendt; MDG Handling Solutions; Gambarotta Australia; MDG America; and Ossitaglio.

One of MDG Handling Solutions's latest products is the Eco Hopper, which can be considered the latest ship-unloader system. Some of its features include:

- ❖ the Eco Hopper minimizes dust pollution during the unloading process, thus making it greener than ever.
- ❖ The maximum loading capacity can reach up to 1,500 tonnes per hour, thus meeting all clients' requirements. Moreover, the hopper storage capacity

is 150m³.

- ❖ Depending on its use, the MDG Handling Solutions' Eco Hopper can be designed with rubber tyres or rail bogies.

All MDG Handling Solutions equipment, including Eco Hoppers, is completely customized to the client's requirements and is designed, produced and installed by the company's technical staff, according to its high standards.

Commissioning and start-up on-site assistance as well as training for local staff can be provided by the company.



NEUERO installs SL1200 shiploader for BZ Group Beuzelin

At the time of writing, NEUERO Industrietechnik is completing of the installation of its SL1200 shiploader on rails at the site of its customer BZ Group Beuzelin.

The vertical boom is already in place,

and the elevator belt is being fitted last — which will then be followed by a test run. This unit is the eighth KIKO (kick-in kick-out) loader, with DLH (Dustless Loading Head), that NEUERO has installed in Rouen in less than ten years.

NEUERO's shiploaders are renowned for their efficiency, and dust-controlled properties. Unfortunately, not all suppliers have the same strong track record as NEUERO. This BZ Group Beuzelin unit replaces a modern (eight-year-old) unit





and relate to the bulk material being transported as gently as possible to avoid breakage and abrasion. The aim is to achieve the best environmental conditions

DLH makes the loading process nearly dust-free.

Shiploaders on rails can offer loading capacities of up to 3,000 tonnes per hour, with power supplied via low- or medium-voltage lines. They give a wide coverage within the ship's hold through telescopic loading tubes, swivelling boom, KIKOsystem and traceability of the relay. They also have low dust and noise emissions

from another company, as the client was dissatisfied with the level of dust emissions.

NEUERO SHIPLOADERS

NEUERO designs mechanical shiploaders for bulk goods. Its tailor-made mechanical shiploaders match the local conditions

with maximum performance.

NEUERO shiploaders are used to handle dry bulk goods, particularly from the food sector, fertilizer industry and power plant industry.

NEUERO shiploaders load all types of inland or deep-sea vessels. The NEUERO

ABOUT NEUERO

NEUERO has been a major manufacturer of mechanical and plant engineering since 1914. It stands for mechanical engineering,



innovation and maximum customer benefit.

The company's aim is to offer the best shiploading and unloading in the world to make it easier for its customers to work at ports and to ensure the supply of goods worldwide. With over 5,000 built references in over 140 countries, NEUERO is a respected manufacturer of shiploading and unloading equipment. Several tonnes of grain are handled every hour worldwide using NEUERO machines.

NEUERO's machines are characterized by advanced, efficient, reliable and user-friendly design. The systems have the lowest maintenance and operating costs and thus ensure a fast return on investment.

NEUERO's shiploaders and unloaders set standards worldwide. They protect the environment as well as the health and safety of employees (EH & S) through their innovative technologies.

NEUERO is ISO certified and has guidelines on work safety, health and the environment. More than 300 customers already rely on NEUERO's expertise. Continuous unloading performance, even during residual cleaning. Less dust during loading with our special engineered loading head and noise reduction through its insulated machine houses. NEUERO's lightweight designs make its machines very safe and environmentally friendly for handling.



ABOUT BZ GROUP BEUZELIN

BZ Group Beuzelin is a major French importer/exporter of grain cargoes.

As BZ Group Beuzelin's long-standing activity, grain procurement is focused on the large region of Normandy. It encompasses a network of 1,500 independent farms and represents an average yearly procurement volume of 575,000 tonnes.

Import-export activity is structured based on two major product groups: grains with Bz Grains and pulses with Bz

Pulses. Bz Grains exports 1.5mt (million tonnes) on average per crop. Bz Pulses commercializes 150,000 tonnes of pulses on average per crop. BZ Oléa commercializes 80,000 tonnes of oilseeds on average.

BZ Group Beuzelin's port logistics activity is ensured thanks to Maison Bleue, the group's multimodal port terminal, set up in Rouen's Grand Port Maritime. It represents an average of 1mt of maritime traffic per crop year, with total maritime traffic per year amounting to 1.5mt.

Automation and digitalization in offshore shiploading: paving the way for more efficient maritime operations

Offshore ship loading is a labour-intensive and time-consuming process, fraught with challenges in handling varying cargo types, managing loading sequence, and ensuring the safety and the integrity of the vessels. As global trade continues to expand, the maritime industry is undergoing a transformative shift, driven by the twin force of automation and digitalization. Such technological advancements are paving the way to enhance operational efficiency and significantly reduce the environmental footprint of maritime operations.

"Owing to our years of experience as operators and managers of several transshipment vessels, we believe that offshore loading operations can benefit from the adoption of the automation and digitalization technologies to the shiploading systems. The offshore shiploading of dry bulk materials requires transfer of cargo between large bulk carriers and smaller vessels, or directly to shore facilities. The vessels involved (floating cranes, floating transfer stations, self-unloaders) are installed with equipment such as: cranes, hoppers, conveyors, loading booms. The potential of each equipment collectively decides how fast and resourcefully the cargo can be transferred to its destination. Bearing this in mind, it's beneficial to use modern and advanced technologies on shiploading systems to have a beneficial impact on the shiploading process," says Luca Condini, Technical Director at Shield Services.

Automated and digitalized shiploading systems carry multiple advantages. Let's examine them more in detail.

AUTOMATION: PRECISION AND EFFICIENCY

Automation in shiploading uses advanced machinery and control systems to handle bulk materials with minimal human intervention. Automated shiploaders, for instance, are equipped with sensors, actuators, and control systems that ensure precise and consistent loading. These systems can adjust the loading rate, monitor the material flow, and even detect and correct potential issues in real-time.

Some key features of automated shiploaders include:

- ❖ **Collision detection and avoidance:** sensors detect obstacles and automatically adjust movements to prevent collisions.
- ❖ **Tilt monitoring:** checks the shiploader's working conditions



Luca Condini.

correct angle to prevent spillage and structural stress on the equipment.

- ❖ **Automated positioning:** sensors and actuators automatically position the shiploader over the hatch of the receiving vessel or over a hopper located on the jetty.
- ❖ **Variable Frequency Drives (VFDs):** adjust the motor speed and torque, optimizing energy consumption and reducing operational costs

ADVANTAGES

- ❖ **Efficiency and speed:** automated systems can operate continuously and with greater precision, significantly reducing shiploading times.
- ❖ **Enhanced safety:** as an additional support to human participation/input, automation minimizes human errors hence improving safety.
- ❖ **Consistent quality:** automation ensures that the loading process is more uniform throughout, therefore making it more reliable.
- ❖ **Cost reduction:** the relatively higher initial investment required for automated systems is repaid by the long-term savings due to the increased operational efficiency.

DIGITALIZATION: DATA-DRIVEN DECISION MAKING

Digital technologies are used to collect, process, and analyse data throughout the ship loading process. This includes the use of sensors, Internet of Things (IoT) devices,

and advanced software to collect and analyse data. Digital shiploading systems monitor various parameters such as loading rate, temperatures, power absorption, vibrations, speed and more in real-time. The insights gained from these data enable more informed decision-making and optimization of the loading process.

Some key features of digital shiploading systems are:

- ❖ **Virtual models of the shiploading system** and its operations allow operators to simulate and optimize the loading process in a risk-free environment.
- ❖ **Predictive maintenance:** analysis of collected data helps predict equipment failures before they occur, enabling proactive maintenance measures, reducing downtime and maintenance cost.
- ❖ **Wireless communication** allows operators to control and monitor the system remotely, increasing safety and flexibility.

ADVANTAGES

- ❖ **Live condition monitoring and control:** operators can monitor the loading process in real-time from remote locations, adjusting as needed to ensure optimal performance.
- ❖ **Transparency and traceability:** digital records provide a transparent and traceable log of the entire loading process, improving root-cause analysis in case of failure.
- ❖ **Improved decision-making:** real-time monitoring helps the operator to spontaneously act in the event of any mishap or failures during loading operation.
- ❖ **Adaptability and flexibility:** digital systems can be scaled and adapted to different project requirements and varying operational demands.

"Aside from the positive window to this transformation, it is not always easy to adapt to new technologies. Thanks to our experience, Shi.E.L.D. Services is a reliable partner who can support clients in this process. We help them maintain their competitive edge and reduce the time and cost associated with adaptation. Various companies in the market are now developing and implementing such advanced systems," continues Condini.

SUSTAINABILITY: PROTECTING THE ENVIRONMENT

Though the implementation of automation and digitalization in the shiploading process is driven by improving efficiency and reducing costs, an additional positive consequence is that shiploading becomes a more sustainable activity with a lower environmental impact. Infusing the above technologies into regular loading operations can contribute to the environmental goals in many ways:

- ❖ **Reduced emissions:** optimized loading processes reduce the operating time, leading to lower fuel consumption and emissions.
- ❖ **Energy efficiency:** advanced control systems ensure that equipment operates at peak efficiency, reducing energy usage.
- ❖ **Minimized waste:** precise loading reduces the likelihood of spillage and material waste, contributing to cleaner and safer environment.

CONCLUSION

Automation and digitalization represent an

important leap forward for the maritime industry. Implementing them on all the infrastructure on board can drive a positive change towards greater efficiency, safety, and sustainability. "Often seen in port or shore facilities, twin forces can also be implemented for offshore operations which would bring in a potential boost in the loading rate of the dry bulk commodities. As seasoned consultants in the industry, we support our clients in adapting to the nuances of the new technologies and enhance their success rates," concludes Condini.

ABOUT SHI.E.L.D. SERVICES SRL

Shi.E.L.D. Services is a logistics management consulting services company that helps commodity traders, bulk shipping companies, port owners/operators, and other stakeholders in the dry bulk logistics sector. It enables companies to streamline their supply chain workflows, reduce operating costs, and maximize profitability. The company specializes in designing innovative and bespoke dry bulk logistics solutions and comprehensive technical

consultancy that help unlock new opportunities.

Shi.E.L.D. Services' expertise in logistics consulting services is deeply rooted in the dry bulk shipping sector. Its team of dry bulk shipping leaders and professionals has served in the core leadership at Coeclerici, one of the world's leading industry players. It has, since then, built a reputation for excellence, reliability, and efficiency in the maritime logistics and shipping sectors.

As trusted partners in the operation of bulk carriers and transshippers, Shi.E.L.D. Services ensures the continuity of the logistics chain in challenging environments, providing critical first and last-mile connectivity with its fleet of custom-built transshipment vessels and feeder barges. It has worked on several groundbreaking projects in Asia, Africa, and the Middle East, including the world's first transshipment of granulated sulphur in the Black Sea.

Shi.E.L.D. Services is the consecutive winner in the 'Bulk Logistics Excellence' category at the IBJ awards 2019 and 2022, followed by the "Lifetime Achievement Award" won by the CEO in 2023.



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DCi

Revolutionizing cargo handling: Bateman Manufacturing's cutting-edge solutions



Ships' gear in operation.

In the dynamic world of cargo handling and bulk loading industries, efficiency, safety, and reliability are paramount. The seamless operation of equipment can make all the difference in meeting deadlines and maximizing productivity. Bateman Manufacturing has long been at the forefront of innovation in this arena, consistently delivering cutting-edge solutions that revolutionize cargo handling. With its state-of-the-art diesel-hydraulic grabs, clamshell buckets, electro-hydraulic grabs, and the latest addition of the skip pan, Bateman Manufacturing continues to set the standard for excellence in the industry.

The company's diesel-hydraulic grabs exemplify precision engineering and robust design, tailored specifically for the demands of cargo handling operations. Featuring a diesel-hydraulic mechanism for cable crane structures, this system ensures optimal performance even in the most challenging environments and is available in orange peel and clamshell configurations. Its ability to securely grasp and lift heavy loads with ease makes it an indispensable tool for vessel operators and port facilities alike.

Bateman's electro-hydraulic grabs offer an advanced alternative, utilizing an electric hydraulic mechanism that provides precise control and efficient operation. These

grabs are particularly well-suited for applications requiring high-speed cycles and reduced operational costs, making them a versatile and eco-friendly option for modern cargo handling. The electro-hydraulic grabs are also available in orange peel and clamshell configurations, catering to diverse operational needs.

One of the standout features of Bateman's ships' gear offering is its versatility. Whether it's handling bulk materials such as coal, ore, scrap, aggregates, or delicately manoeuvring sensitive cargo, this set-up delivers superb reliability and efficiency. Its intuitive controls enable operators to precisely



Bateman Manufacturing's clamshell.



Bateman Manufacturing's recently introduced skip pan.

position the attachment for efficient loading and unloading. The grabs additionally feature an on/off remote as well as the best hydraulic and engine components, which minimize downtime and maximize output.

In addition to the ships' gear grabs, Bateman Manufacturing offers hydraulic clamshell buckets, another essential tool for cargo handling operations. Built to withstand the rigours of heavy-duty use, the hydraulic clamshell bucket excels in applications where precise control and high-capacity handling are required. Its robust construction and innovative design ensure consistent performance, even in the most demanding conditions.

What sets the clamshell bucket apart is its ability to scoop and transport various types of bulk materials with ease. Whether it's gravel, sand, or coal commodities, this bucket delivers unmatched efficiency and versatility. Its hydraulic operation allows for seamless integration with a wide range of equipment, from cranes to excavators, offering flexibility and convenience to operators.

Building on its legacy of innovation,

Bateman Manufacturing introduces the skip pan, the latest addition to its line-up of cargo handling solutions. Versatility is at the core of the skip pan design. With a 360° continuous rotation capability, the skip pan empowers operators with excellent manoeuvrability and is currently patent pending. Gone are the days of restricted movement and cumbersome handling. Whether it's navigating tight spaces or accessing hard-to-reach areas, the skip pan offers exceptional flexibility, ensuring optimal efficiency in every operation.

But versatility alone is not enough without reliability. That's why Bateman has equipped its skip pan with a dual motor rotator, ensuring smooth and seamless rotation under any conditions. This robust design not only enhances durability but also minimizes downtime, keeping operations running smoothly and efficiently.

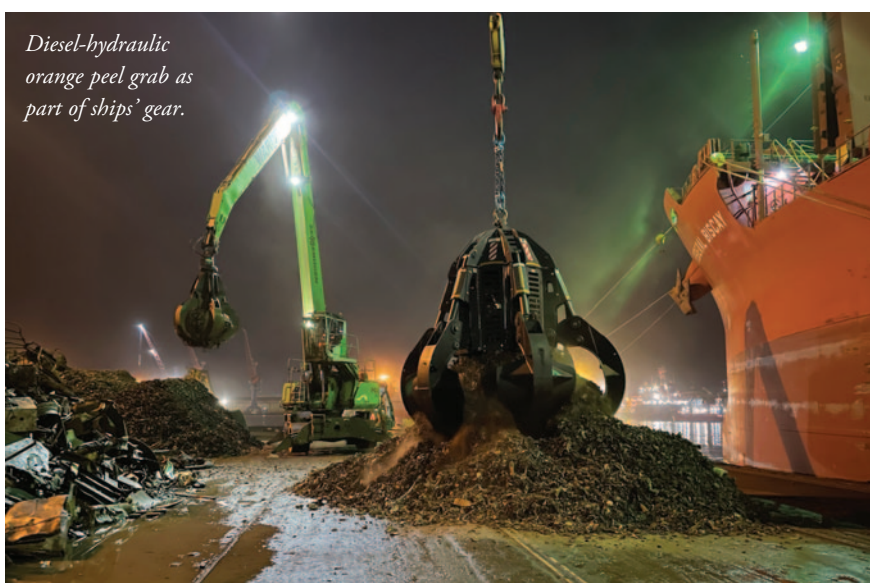
Furthermore, safety is a top priority in every aspect of our skip pan's design. With a 45° dumping angle, operators can unload materials with utmost precision and control, minimizing the risk of accidents or spillage. Additionally, the skip pan is equipped with a standard 4.5" cylinder,

providing the necessary power and stability to handle heavy loads with ease, but can also be designed and customized for unique needs and applications.

But perhaps one of the most innovative features of the skip pan is its unique ability to accommodate trucks for direct unloading. With the capability for trucks to drive inside the pan for material unloading, Bateman has eliminated the need for additional handling equipment, streamlining operations and maximizing efficiency like never before.

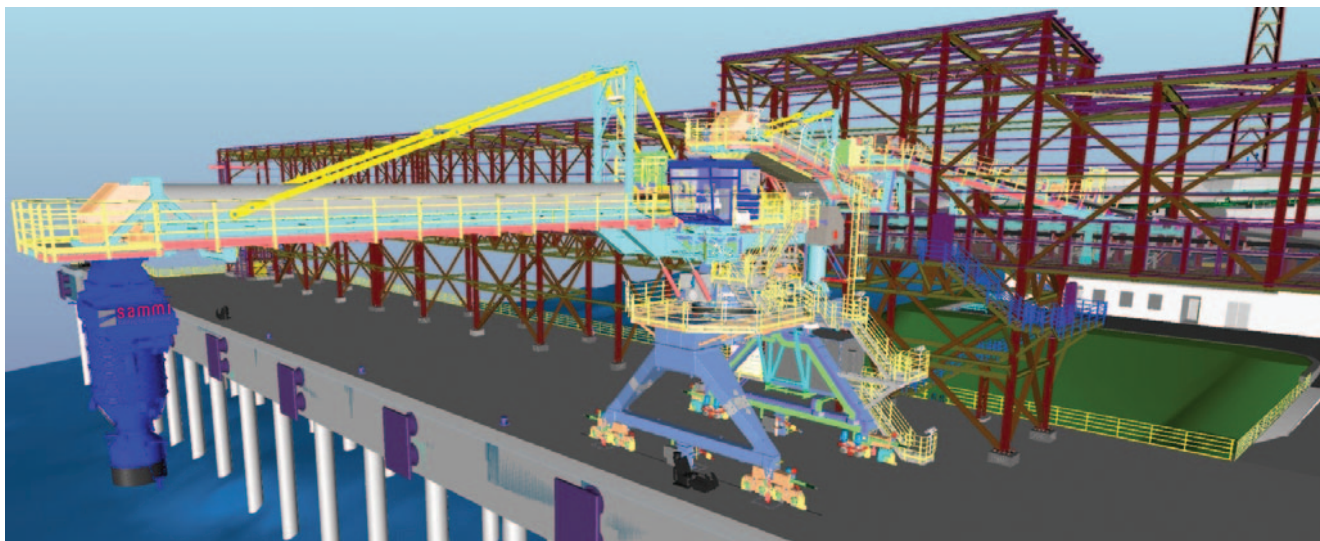
What sets Bateman Manufacturing apart is not just its commitment to innovation, but also its dedication to customer satisfaction. With a focus on quality craftsmanship and superior performance, their products are engineered to exceed industry standards and meet the evolving needs of cargo handling operations worldwide. From concept to execution, Bateman Manufacturing delivers solutions that empower their customers to achieve new levels of efficiency and productivity.

In conclusion, Bateman Manufacturing's diesel-hydraulic and electro-hydraulic grabs (both orange peel and clamshell configurations), hydraulic clamshell bucket, and skip pan represent the pinnacle of innovation in the cargo handling and bulk loading industries. With their unmatched performance, reliability, and versatility, these cutting-edge solutions are poised to redefine the way cargo is handled, setting new standards for efficiency and safety in maritime operations. As the industry continues to evolve, Bateman Manufacturing remains committed to pushing the boundaries of possibility, driving progress, and empowering its customers to succeed in an ever-changing world.



Diesel-hydraulic orange peel grab as part of ships' gear.

SAMMI S.r.l. reports notable shiploading projects



Shiploading forms a major part of the offering of SAMMI S.r.l. Below are a few notable projects in which SAMMI has been involved.

COMPLETE PETCOKE CRUSHING, HANDLING AND SHIPLOADING SYSTEM, WITH SHIPLOADER ON JETTY AREA

HANDLING SYSTEM

Petroleum (green) coke is cut from the coke drum by high-pressure cutting water. Coke and water fall into the pit and coke is moved to the pad for dewatering by using a bridge crane. Coke is transferred from the coke pad to the feed hopper by the bridge crane, which is able to move around the length and width of the coke pad area. The coke is generally moved in two steps: wet coke from the pit to a coke pile on the pad and from a coke pile, dewatered for approximately 24 hours, to the feed hopper.

From the feed hopper, the coke goes through the roll crusher reducing the coke particle size from inlet size 300mm to either 100 or 50mm (adjustable output size) and transferring the coke to the coke transportation system, which starts with the belt feeder, furnished with magnetic separator. The belt feeder is located within crusher tower near the DCU (delayed coker unit) and discharges the coke on the pipe conveyor, which delivers the material to the coke storage facility. Crushed petroleum coke will be stockpiled in a vertical silo (27,750m³) provided by the client. Near the discharge end of the pipe conveyor the belt scale is located, thus monitoring the incoming material flow.

The nominal crushing and stacking capacity is 450tph (tonnes per hour).

Coke is reclaimed from silo through of collecting conveyor and then conveyed on

transfer conveyor, which delivers the product to shiploading facility on jetty (about 110m from the silo).

The transfer conveyor is equipped with a belt scale and magnetic separator, and discharges the material on the jetty conveyor located in the gallery along the jetty. The jetty conveyor is equipped with a non-driven tripper car, towed by shiploader, for transferring coke on belt conveyor of the shiploader.

The nominal reclaiming and shiploading capacity is 550tph.

MATERIAL HANDLED

The handled material is green petroleum coke (shot coke/sponge coke), which is assumed to be lumpy, average flowing to sluggish, abrasive, and mildly corrosive product as per CEMA class D36T.

SHIPLOADER

Main characteristics

- ❖ **type of ships:** up to 25,000dwt
- ❖ **belt speed:** 3m/s
- ❖ **belt width:** 1,000mm
- ❖ **through angle:** 35°
- ❖ **shiploader type:** slewing and luffing
- ❖ **luffing system:** hydraulic
- ❖ **design capacity:** 550tph
- ❖ **machine travel distance:** approximately 90m (TBC, according to overall length for 25,000dwt)
- ❖ **distance between tracks:** about 10m
- ❖ **travel direction:** reversible
- ❖ **slewing angle upper structure:** about 150°
- ❖ **total slewing angle (parking):** about 175°

Travelling mechanism

- ❖ **travel speed:** 5–20 m/min, variable
- ❖ **nr. drive motors:** 3 (2 sea + 1 land

side)

- ❖ **total of wheels:** 8+4
- ❖ **wheel diameter:** 630mm

Upper structure slewing device

- ❖ **connecting element:** Crown gear with ball-bearings
- ❖ **number of motors:** 2
- ❖ **type of motors:** electric drive
- ❖ **location of drives:** 180°
- ❖ **automatic greasing system:** included
- ❖ **number of lubricating points:** 12
- ❖ **rotation speed:** 12m/min max with respect to centre of Crown
- ❖ **Crown manufacturer:** Rothe Erde or equivalent approved
- ❖ **Crown diameter type:** 3,400mm approximately

Boom luffing system

- ❖ **luffing range:** –10/+15°
- ❖ **number of cylinders:** 2 (double effect)

Belt conveyor on boom

- ❖ **belt width:** 1,000mm
- ❖ **type of belt:** EP 400/3 4+2
- ❖ **centre pulleys:** about 27m
- ❖ **conveyor speed:** about 3,0 m/s
- ❖ **impact idlers:** Ø108mm, spacing 300mm
- ❖ **carrying idlers:** Ø108mm, spacing 1200mm
- ❖ **return idlers:** Ø108mm, spacing 3,000mm
- ❖ **drive pulley:** Ø504mm, with rubber lagging, shaft housed in antifriction bearings
- ❖ **snub pulley:** Ø320mm, with rubber lagging, shaft housed in antifriction bearings
- ❖ **return pulley:** Ø420mm, without rubber lagging, shaft housed in

antifriction bearings

Intermediate conveyor

- ❖ **belt width:** 1,000mm
- ❖ **type of belt:** EP 400/3 4+2
- ❖ **centre pulleys:** about 14.5m
- ❖ **conveyor speed:** about 3m/s
- ❖ **impact idlers:** Ø108mm, spacing 300mm
- ❖ **carrying idlers:** Ø108mm, spacing 1200mm
- ❖ **return idlers:** Ø108mm, spacing 3,000mm
- ❖ **drive pulley:** Ø504mm, with rubber lagging, shaft housed in antifriction bearings
- ❖ **snub pulley:** Ø320mm, with rubber lagging, shaft housed in antifriction bearings
- ❖ **return pulley:** Ø420mm, without rubber lagging, shaft housed in antifriction bearings

Tripper car

- ❖ **type of transfer system:** for bulk
- ❖ **number of wheels:** 4
- ❖ **diameter of wheels:** 400mm
- ❖ **diameter of on-board drums:** 630mm
- ❖ **number of drives:** not necessary

Telescopic chute (cascade type)

- ❖ **type of application:** vessel loading
- ❖ **type:** with soft loading cones (length 17m approx.)
- ❖ **type of retracting device:** electrical winch
- ❖ **skirt assembly:** installed
- ❖ **overload system:** T90 load cell included
- ❖ **dedusting system:** not included

ENGINEERING AND SUPPLY OF A NEW CARGO/FLOATING TRANSFER STATION WITH SHIPLOADER ONBOARD

PROPERTIES OF MATERIAL HANDLED

Manganese is the main commodity that will be handled by conveyor system proposed in this offer. SAMMI's is also able to handle different solids in bulk according to the following data:

EQUIPMENT DESCRIPTION

Shiploader (SH-1)

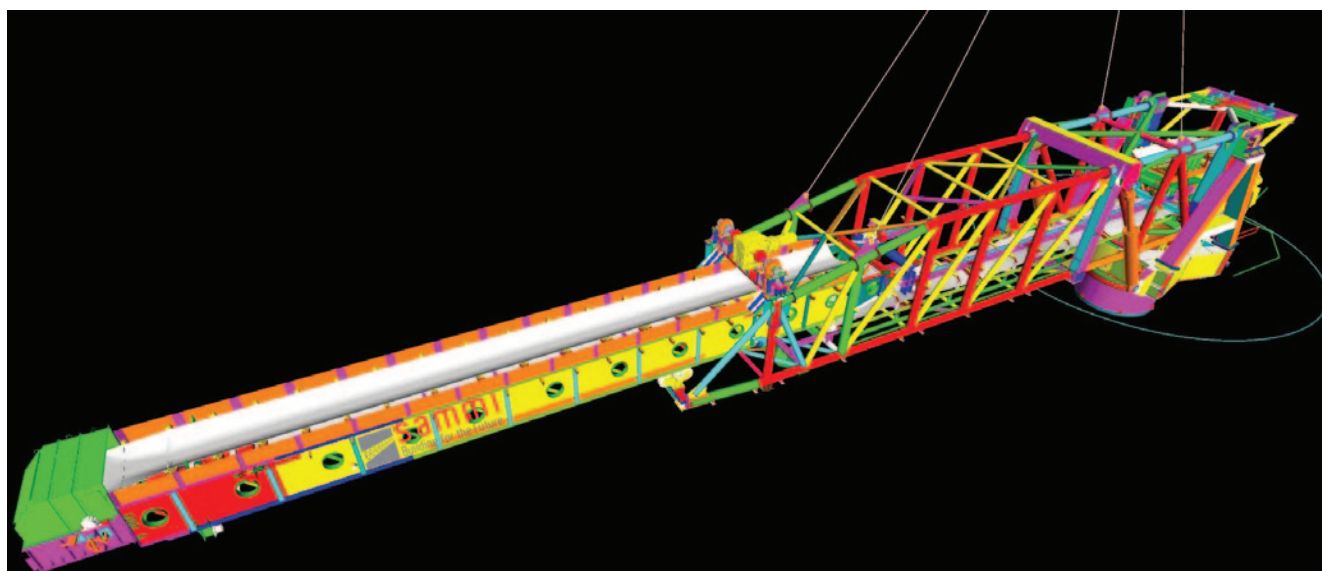
The supply includes one shiploader with luffing, slewing and extractable shuttle operating functions.

The machine has the following main characteristics:

- ❖ Shiploader installed on supporting column, installed on main deck. The battery limit of the supply is the pedestal adapter (included) located under the Crown gear (slewing ring)
- ❖ Engineering and supply of shiploader supporting column, as well as intermediate floors and stairs to access inner part of the Crown gear with drives, shall be made by the customer.
- ❖ Slewing movement made by planetary gearboxes with hydraulic drives and position brakes.*
- ❖ Luffing movement made by hydraulic cylinders acting from upper ring (above Crown gear) to the bottom part of the fixed boom ('push' arrangement)
- ❖ The shiploader is provided with a fixed boom, hinged to the overhead structure fixed to the upper ring, and a shuttle boom (telescopic design) which guarantees an outreach of 40m when fully extended (stroke 12m). The shuttle movement is made by double-strand roller chains and pinions (two set) and guided by suitable number of bogie wheels moving on rails installed on shuttle boom.
- ❖ The shiploader is provided with a

special chute, slewing/tilting and equipped with a curved discharge channel, for the optimization of trimming operation

- ❖ The shiploader is provided with an electric winch for dozer hoisting with 10-tonne lifting capacity, installed on a dedicated structure attachment fitted on the lower part of the fixed boom at about 20m from the transshipper starboard side (to be confirmed with final OGV dimensions).
- ❖ The following accessories included in the electrical winch will have RINA marine certification:
 - ☐ steel wire rope
 - ☐ wedge sockets clevis pin
 - ☐ block pulley
- ❖ RINA certification for the whole hoisting system (winch + boom) is not included and shall be carried on by the customer. SAMMI to provide the necessary engineering for the certification of shiploader as lifting appliance (i.e. reference standards, load calculations, constructive drawings of luffing cylinders and structures, etc.).
- ❖ One hydraulic power unit is included to feed oil in pressure to the different users, supplied together.
- ❖ With housing cabinet, block valves on board of users when required and interconnecting accessories.
- ❖ One automatic centralized greasing system is included only for main slewing ring, all other greasing points will be manual or with long-greasing cartridge, supplied together with housing cabinet, lubricant distributors and interconnecting accessories.
- ❖ Platforms and walkways will be provided, together with stairs or ladders, to all parts requiring service and maintenance including handrails.
- ❖ One set of special bolts for installation





of the Crown gear, lower and upper flanges, are included.

SHIPLOADER MAIN CHARACTERISTICS

- ❖ **vessel to be loaded:** up to 205,000dwt
- ❖ **loading capacity:** 2,500tph
- ❖ **belt speed:** about 3.2–3.4m/s
- ❖ **belt width:** 1,600mm
- ❖ **through angle:** 35°
- ❖ **shiploader type:** slewing, luffing and telescopic shuttle
- ❖ **boom outreach:** 28m with shuttle retracted, 40m with shuttle extracted
- ❖ **slewing working range:** –55° from transversal position
- ❖ **slewing angle at rest:** approximately 90° from transversal position (fore side)
- ❖ **slewing speed:** 10m/min on discharge head, with shuttle extracted
- ❖ **luffing working range:** +10°/–12° from horizontal

Machine features — slewing

- ❖ **type:** hydraulic
- ❖ **number of drive units:** 4
- ❖ **location of motors:** 90°
- ❖ **type of motors:** hydraulic
- ❖ **type of gearbox:** planetary
- ❖ **slewing device:** Crown gear with triple-row roller bearings (internal spur gearing)
- ❖ **Crown gear greasing system:** included
- ❖ **Crown gear diameter:** about 3,000mm (to be confirmed on later stage)

Machine features — luffing

- ❖ **type:** hydraulic
- ❖ **number of cylinders:** double effect

ISO type heavy duty

- ❖ **hydraulic power unit (HPU):** included
- ❖ **HPU main motor:** 2 x 45kW/each
- ❖ **HPU auxiliary motor:** 2 x 3kW/each

Machine features — telescopic shuttle

- ❖ **type:** electric motor with gearbox
- ❖ **motor power:** inst. 22kW by VFD
- ❖ **shuttle device:** with chain and gear pinions, two sets

Machine features — trimming chute

- ❖ **type:** (slewing) electric motor with gearbox
- ❖ **motor power:** inst. 2.2kW
- ❖ **slewing device:** Crown gear with single-row ball bearings (external spur gearing)
- ❖ **Crown gear greasing system:** manual
- ❖ **Crown gear diameter:** about 1,500mm (to be confirmed on later stage)
- ❖ **type (tilting):** electric motor with linear actuator
- ❖ **motor power:** inst. 2 x 2,2 kw

Machine features — boom conveyor

- ❖ **type:** electric motor with gearbox
- ❖ **motor power:** inst. 132kW by VFD
- ❖ **conveyor belt:** EP500/4 plies, covers 6+2mm, grade W to DIN 22102
- ❖ **belt take-up system:** hydraulic, by means of one tensioning cylinder
- ❖ **carrying idlers:** triple-roller idlers at 35°, rolls Ø133 shaft 25mm
- ❖ **impact idlers:** impact bars
- ❖ **return idlers:** rolls Ø133 shaft 20 with cleaning discs
- ❖ **belt cleaners:** one primary (tangential) one secondary on return belt
- ❖ **walkways:** included for all parts

requiring access for inspection and maintenance

- ❖ **safety/protections:** included
- ❖ **control devices/electrical:** included for all shiploader operating functions listed above

Machine features — dozer hoisting

- ❖ **type:** electric motor winch
- ❖ **motor power:** inst. 12kW
- ❖ **FEM class:** IAm

Machine features — accessories

- ❖ one TVCC camera on top of SH-I head, to monitor loading operation by one LCD monitor located in cargo control room
- ❖ two remote control systems to operate the shiploader from remote (transmitter + receiver in cargo control room)
- ❖ two 400W floodlights, on top of SH-I head for illumination of OGV hatch during loading.

750TPH OFFSHORE CONVEYOR BELT SYSTEM FOR TRANSSHIPPER 'BULK KREMI' WITH CONTINUOUS SHIPLOADER (CRUSHER & PRILLED SULPHUR HANDLING)

Solution for bulk materials, shiploaders, hoppers, belt conveyors, extractors

Complete material handling system for FTS BULK KREMI 1. Design, full supply (MEC-ELE-AUT), commissioning and service. The equipment is installed on a 14,000dwt flat top pontoon crane (the 'vessel').

The transshipper is equipped with two cranes, two hoppers, two extractor, one longitudinal belt, one transversal belt, one longitudinal belt and a loader, designed for a capacity of 750tph of sulphur, but also able to transport coal and iron ore in

Bulk Kreml.



different specific weights, using the inverters in the extractors, treating mainly 90% sulphur, 5% carbon and 5% iron ore. The system allows the loading of OGV up to Panamax, so an 18m air draught with a draught at full load of 6.5m is planned. The shiploader can be traversed up to 50° to step over cranes between holds of ships with cranes and allows the loading using a retractable chute.

FIXED BELTS FOR TRANSSHIPPER 'BULK PIONEER': SOLUTION FOR BULK MATERIAL, EXTRACTORS, HOPPERS, SHIP LOADERS, BELT CONVEYORS

System of conveyor belts for coal transport, with a capacity of 1,000tph, capable of loading Capesize from 180,000dwt to nine holds and Panamax from 80,000dwt to seven holds, through the two loading hoppers, extractors, fixed

belts conveyor up to the two mobile shiploaders.

FIXED BELTS FOR TRANSSHIPPER 'BULK PIONEER': SOLUTION FOR BULK MATERIAL, EXTRACTORS, HOPPERS, SHIPLOADERS, BELT CONVEYORS

System of conveyor belts for coal transport, capacity 1,000tph, capable of loading Capesize from 180,000dwt to nine

Bulk Pioneer.



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Bulk Java.

holds and Panamax from 80,000dwt to seven holds, through the two loading hoppers, extractors, fixed belts conveyor up to the two mobile shiploaders.

TRANSFER CONVEYOR SYSTEM OF RAW MATERIAL FOR TRANSSHIPPER 'BULK JAVA': SOLUTION FOR BULK MATERIAL, EXTRACTORS, HOPPERS, SHIPLOADERS, BELT CONVEYORS

The plant concerns a new transfer conveyor system of raw material installed on new geared pontoon *Bulk Java* (the transshipper) for coal transport, capacity 2,000tph, capable of loading Capesize vessels from 180,000dwt to nine holds and Panamax vessels from 80,000dwt to seven holds.

SELF-UNLOADING SYSTEM FOR TRANSSHIPPER 'BULK BORNEO': SOLUTION FOR BULK MATERIAL, EXTRACTORS, HOPPERS, SHIPLOADERS, BELT CONVEYORS

The plant concerns a transshipment system to be installed on new geared pontoon *Bulk Borneo* (the transshipper) for coal transport, capacity 2,000tph, capable of loading Capesize from 180,000dwt to nine holds and Panamax from 80,000dwt to seven holds, through the two grab cranes which feeds the receiving hoppers TR1/TR2 and from each hopper the handled material is extracted by means of two belt conveyors BC1/BC2 and conveyed into a single belt conveyor BC3 placed transversely extractors.

SELF-UNLOADING SYSTEM FOR TRANSSHIPPER 'BULK SUMATRA' SOLUTION FOR BULK MATERIAL, EXTRACTORS, HOPPERS, SHIPLOADERS, BELT CONVEYORS

Design, full supply and commissioning of belt conveyor system *Bulk Sumatra* for coal transport, capacity 2,400tph, capable of loading Capesize vessels from 180,000dwt to nine holds and Panamax from 80,000dwt to seven holds, through the two grab cranes which feeds the receiving hoppers TR1/TR2 and from each hopper the handled material is extracted by means of two belt conveyors BC1/BC2 and conveyed into a single belt conveyor BC3 placed transversely extractors.

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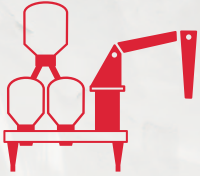


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Bulk handling cleans up its act

with effective dust control



Coal operations need versatile and mobile dust control options that allow them to adjust for changing conditions (all pictures ©BossTek 2024).

Louise Dodds-Ely

Coal dust control on port conveyors using mist technology

Carrying tonnes of coal per day and travelling at speeds measured in feet or metres per second, conveyors are present at all stages of the coal industry, including mining, transport and power generation, writes Mike Lewis, Vice President of Sales, BossTek. Greater demands for increased production and efficiency result in faster conveyors carrying more cargo. One of the consequences of increased speeds and volumes is fugitive dust emissions.

“Conveyor design plays a large role in

suppressing dust, as does where and when control mechanisms are placed,” said Michael Kelley, President of BossTek. “Although the size and mass of the conveyed material are significant indicators, some types of fugitive emissions, such as Respirable Crystalline Silica (RCS) found in high concentrations in coal, are more regulated than other particulates.”

In addition to the health risks, dust has a significant impact on the cost of operation. Low air quality can reduce

worker morale and productivity. Dust can clog rolling and mechanical components, increasing labour and downtime for cleanup and maintenance.

Ultimately, excessive particulate emissions will result in workplace safety violations and potential fines if they’re not addressed. This is why risk managers, compliance controllers, and environmental managers are turning to atomized mist as an affordable and versatile conveyor dust control solution.

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HOW IS CONVEYOR DUST GENERATED?

Dust is generated by a conveyor in four ways: wind, disruption, transition, and impact. Wind on outdoor conveyors can be mitigated with coverings, but not completely. Weather conditions are unpredictable, and for longer conveyors that are exposed to the elements, there are atomized mist solutions that treat the cargo prior to the long journey. Other conveyors that drop material from high places may require another, more mobile and versatile mist solution like a misting ring or cannon that adjusts to changing weather conditions.

Disruption happens along the conveyor path. Between idlers, the belt slumps slightly, then the trough angle realigns with every new roller. This action causes the cargo to shift and bounce along the belt path, producing dust emissions. Mist treated with surfactants administered at the loading zone can aid in reducing dust. Mistracking resulting in spillage can cause excessive dust and might require a cannon to control emissions until the mistracking issue is resolved.

Transition dust happens after the cargo is discharged from the conveyor. When the material encounters the head pulley, it either falls or clings to the belt. As it falls, material not contained by a drop chute separates, exposing the entire stream to ambient air currents allowing emissions. If not adequately cleaned by a scraper, leftover dust and fines in the belt's cracks and divots ('carryback') drop along the return belt path, creating emissions that fill the air and pile under the stringer. To restrict dust within the chute, misting heads can be strategically placed around the transfer chute. To control emissions from carryback, a small cannon pointed at the discharge area can suppress dust and improve workplace air quality.

Impact emits dust when the discharged material hits the side of the hopper or transfer chute, then happens again when it lands in a vessel, on a pile, or onto another moving conveyor. Depending on the drop height, weight, density, moisture content, and the conditions of the landing zone (the speed of the receiving conveyor, etc.), material impact causes turbulence and shifting that leads to airborne emissions. Mist technology can be added to the dust management plan in nearly every bulk handling operation.

DIFFERENT CONVEYORS, DIFFERENT DUST SOLUTIONS

Although there is a range of conveyor designs that can be used in any operation,

Upwind wide-area dust control can help operators reduce emissions by introducing millions of droplets.



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!



A dust ring suppresses dust from the discharge point to the top of the pile.

the most common in coal mining and handling are standard conveyors, stackers, and trippers.

Standard conveyors are stationary units that receive material, allow it to settle as it moves through an enclosure (settling zone), and then move at high speeds to another point where it is discharged. There are two good locations to address dust: at the point of discharge or in the settling zone. During discharge, misting heads can spray water or a water/surfactant formula onto the discharge stream. In the settling zone, misting heads offer surface

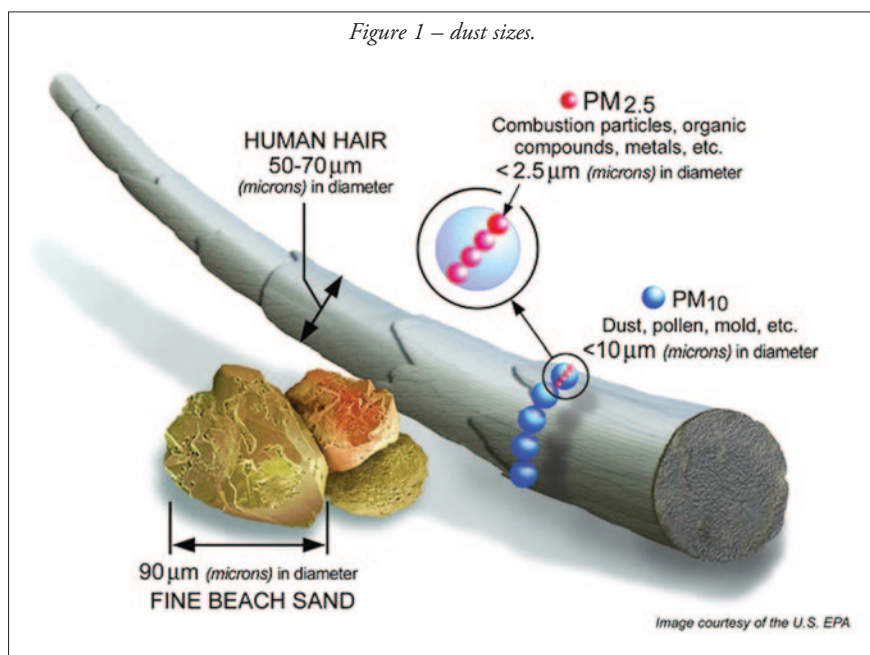
suppression on cargo before it leaves the enclosure. The damp layer on the top of the cargo mitigates emissions while travelling along the conveyor path.

Stacker conveyors are tall, inclined belts that can be mobile or static, which receive cargo, move it to a height, then drop it into a vessel or onto a pile. The discharge of material is generally long and uncontrolled, so sock chutes and misting rings are often used to direct the material to the endpoint with minimal emissions. Stacker conveyors are rarely equipped with elaborate belt cleaning systems, so fugitive dust from

carryback is common. Due to the height of the discharge, the emissions can travel long distances, so mobile cannons that can be adjusted for wind conditions are recommended for these conveyors.

Tripper conveyors are constantly moving horizontally on a track system, distributing material evenly across a designated area. Tripper conveyors are commonly found in massive enclosures where indoor air quality can become a potential violation. An elaborate return belting system using several pulleys can contribute to dust from carryback. Strategically placed mist cannons for wide-area suppression are recommended for these conveyors.

Figure 1 – dust sizes.



CONVEYOR AIR QUALITY REGULATIONS

Testing and experience have shown that atomized mist is one of the best controls of airborne RCS in bulk handling settings. RCS is highly regulated across industries because of its association with chronic and deadly diseases like silicosis, pneumoconiosis, and COPD. This is due in part to the small size and crystalline particle shape, which damages lungs. Silicon dioxide is formed into a crystalline structure over millions of years. Thirty per cent of all minerals are silicates (minerals containing silica), and geologists estimate that they could comprise up to 90% of the Earth's crust^[1].

Dust size is measured by diameter in

DOMES FOR COAL STORAGE



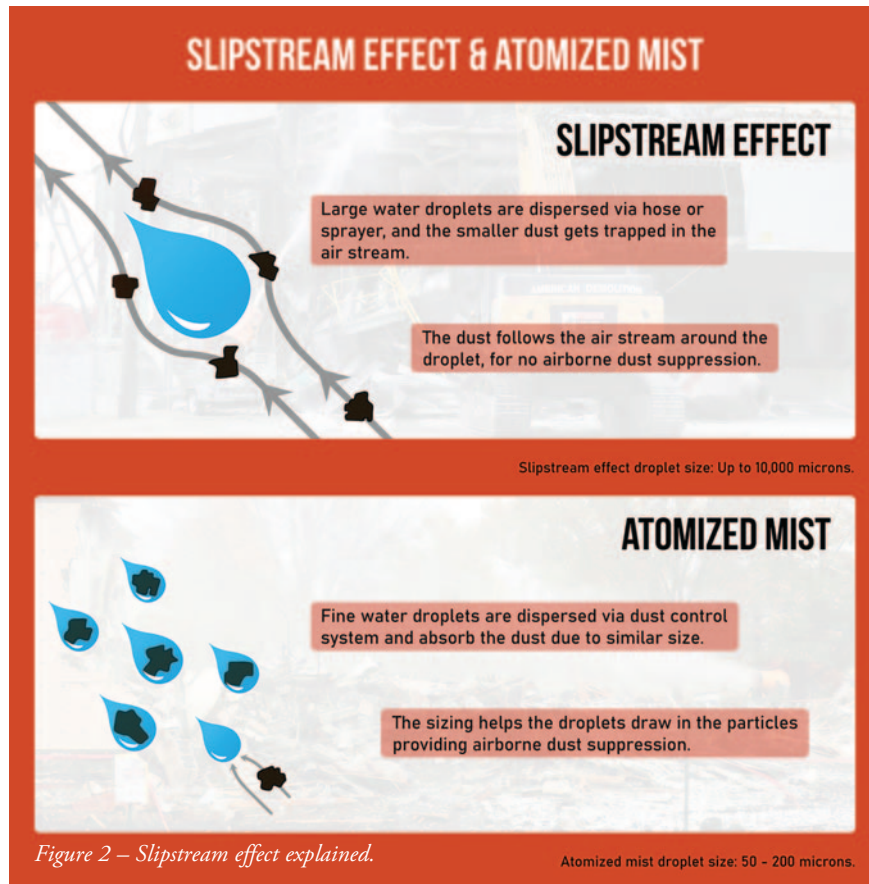
microns (μm) and volume in micrograms (μg) using personal detection devices. Lightweight Particulate Matter (PM) as large as 200 μm can remain airborne on ambient air currents, and it is no longer visible to the naked eye under 100 μm . RCS can be the microscopic size of <PM10, meaning the particles avoid the body's natural defenses and penetrate deep into the lungs. [Fig.1]

The Occupational Safety and Health Administration (OSHA) Final Rule for RCS dust emissions in the bulk handling industries sets a personal exposure limit (PEL) of 10 μg (stated as parts per million [ppm]) over a time weighted average (TWA) of eight hours^[2]. For perspective, a single grain of salt is ~58 μg . The TWA compensates for workers moving in and out of different concentrations of RCS throughout a shift, but exposure over that period should be limited.

"The OSHA Final Rule suggests that dust control methods are generic, mostly involving surface suppression, ventilation, and the use of chemical surfactants," said Kelley. "Regulators are testing for minuscule concentrations in the air, so 100% prevention is the goal, but in most high-volume industrial bulk handling environments that's just not possible."

WHY IS ATOMIZED MIST EFFECTIVE FOR CONVEYORS?

Research has shown that droplet sizes need to be roughly the same size as the airborne particulates to be effective. Water remains the most common medium for control of airborne outdoor emissions. Hoses and sprinklers create droplets between 200 μm and 1,000 μm compared to atomized mist, which is sized in the range of 15 μm to 200 μm . Droplet sizes greater than 200 μm are only adequate for wetting surfaces, but



don't offer airborne dust suppression. This is due to the slipstream effect. [Fig.2]

Atomized mist is effective because the fine engineered mist is distributed using a powerful fan-driven cannon design or strategically-placed misting bar or ring. Nucleating nozzles fracture pressurized water into millions of tiny droplets, preferably applied directly at the point of emission. As a large droplet moves through the air, the mass creates a strong current that moves around it called the slipstream effect. Particles get caught in the slipstream and remain uncontrolled. In some cases, the droplet can even lift the smallest

particles, making the issue worse. Atomized droplets, on the other hand, travel with the particles, collide with them, and drag them to the ground.

The tiny droplets also raise the humidity of the target area, floating on atmospheric air currents with dust and capturing particles. Settling droplets provide surface suppression evenly across the material using less water than hoses and sprinklers, drastically lowering the volume of runoff and reducing the chance of pooling.

DOSING SURFACTANTS FOR CONVEYOR DUST CONTROL

Surfactants are a category of chemical additive that can be distributed by atomized misting systems, particularly helpful for the suppression of dust emitted by naturally hydrophobic materials (shale, coal, etc.). Materials are hydrophobic when the interaction between the water molecule and the material is negative, causing the water molecules to bond to themselves rather than the material. This creates beaded droplets that roll off the surface rather than wetting it, similar to the effect of a water-resistant fabric. Surfactants promote ionic bonds that spread the droplet across the material, allowing hydrophobic materials to cling and cake.

This is particularly beneficial during transport and transfer of dusty cargo. When surfactants are dosed into water





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prior to applying it to the material, the chemical is evenly distributed so dust particles stay within the cargo stream rather than becoming airborne. Dosing pumps allow operators to control the concentration of additives.

MISTING EQUIPMENT FOR CONVEYORS

Mist cannons use a high-powered fan at the back of a cone-shaped barrel. Mounted on the front (exit side) of the barrel is a ring manifold with multiple nozzles that fracture pressurized water into atomized droplets. Air is forced through the barrel to propel millions of these minuscule droplets into the air. Misting heads use water pressure to fracture the water with similar nozzles and spray the fine mist with precision in a limited space.

- ❖ **Misting heads:** discharged material at conveyor transfer points will separate, offering an excellent opportunity to introduce moisture from strategically placed misting heads. This option can be accompanied by a dosing system to introduce dust suppressing surfactants to mitigate downstream dust emissions.
- ❖ **Misting rings:** material that is discharged from a conveyor and not contained in a transfer chute is exposed to ambient air currents. By using a stainless-steel ring, the material flow is surrounded by a curtain of light mist that falls with the material, preventing fugitive emissions from escaping.
- ❖ **Compact mist cannons:** these are mounted on two wheels with a tall handle, similar in size to a snow blower. They are light and easy to maneuver, while still offering industrial-sized dust control up to 30ft (10m) at



Smaller cannons can be mounted in loading and discharge zones to improve workplace air quality.

a 20° throw angle.

- ❖ **Mid-sized cannons:** often mounted in high points above material in coal barns, cement domes, and other large indoor facilities that utilize conveyors, these cannons have a reach of 100ft (30m) and a coverage area of up to 2,880m² (31,000ft²) when equipped with oscillation.
- ❖ **Large misting cannons:** popular with storage facilities that need a mobile solution to move with wind and pile rotation, these oscillating cannons have a 328ft (100m) throw distance and cover up to 280,000ft² (31,000ft²).

PREVENTING CONVEYOR DUST

When conveyor dust is emitted, it doesn't stay contained within the immediate area but can spread across the operation and past the site line into neighbouring

properties. Community complaints about dust emissions from normal conveyor operations can force inspections, violations, fines, and sometimes forced downtime until the problem is adequately addressed.

"There have been too many instances where we're contacted by frantic operators trying to get dust control solutions to their sites so they can quickly get production back up following a regulatory violation that has temporarily shut them down," said Kelley. "We do our best to fulfill those requests, but we recommend a proactive approach. We can schedule a visit and provide expert advice with economical solutions, before inspections affect operations."

RESOURCES

- [1] R. Nave, "Abundances of the Elements in the Earth's Crust." Hyperphysics. Georgia State University, Department of Physics and Astronomy. Atlanta, GA. Dec. 2023 <http://hyperphysics.phy-astr.gsu.edu/hbase/Tables/elabund.html>
- [2] U.S. Occupational Safety and Health Administration (OSHA) "1910.1000 - Air contaminants." U.S. Department of Labor. Washington, DC. Dec. 2023 <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1000>

ABOUT BossTEK

BossTek is a global leader in dust control solutions for the storage and handling of petcoke, coal, rock and aggregate, as well as controlling air quality during port unloading, recycling, mining, earth moving, and demolition activities. The company's DustBoss product line utilizes atomized mist technology to capture fugitive particles over a wide area.



Even covered conveyors can experience emissions from wind or belt mistracking.

Blue Water Misting: making bulk handling cleaner and safer



DUST-FREE BULK LOADING

Blue Water Misting (BWM) is a major, Australia-based, provider of dust-suppression systems for the bulk industry. The company now provides three main systems in over ten countries:

- ❖ hatch-based dry fog systems;
- ❖ hopper based dry fog systems; and
- ❖ shiploader-mounted systems.

The hatch-based system fits to the top of the vessel hatch and creates a barrier of dry fog that prevents the escape of fugitive dust.

The system consists of a power pack that sits on the quay connected to the power and water of the port. These deliver a high pressure spray to an array of purpose built spray bars that are temporally fitted to the hatch combing by the stevedores during loading.



In recent times, BWM has become more focused on shiploaders, with three projects with spouts mounted dust suppression.

How it works

The BWM system creates a complete mist screen. As particles rise after loading they collide with water joining together. By wetting airborne fines the weight of each particle is increased. These heavier combined particles of dust and water fall out of the air back to the pile.



BWM used the science and its experience to create moisture curtains to make contact with the dust fines increasing their mass and removing them from the air stream.

BWM uses a patented system of product specific nozzles to control the spray droplet size and distribution. This control allows the droplets to attach to commodity-specific particle sizes and drop them out of the airborne environment.

BWM has developed ore specific nozzles for coal, iron ore, mineral sands, copper concentrates and others. BWM provides dust specific suppression systems that work more efficiently than a normal dust suppression system.

DUST — MONEY BLOWING IN THE WIND

While it is important for companies to reduce pollution, arguably a greater motivator for mining companies is lost product = lost money. Concentrates of copper and zinc are valuable ranging from US\$1,000–3,500 per tonne. Even if you save 1% of material losses over 12 months this can add up to hundreds of thousands of dollars.

NOT ALL DUST IS THE SAME

There is a range of different materials and particle sizes. Before each new job BWM consults with the client and provides a bespoke designed system spray nozzles and bars that capture that dust. BWM can also

provide a dry fog for material that can't be wet like grain or cement.



Dry fog spray bar.

Hopper loading with BWM: fitting dry fog spray bars to the hopper solved the problem of dust emissions generated when using a front-end loader to fill the hopper.



Effective dust control in mining means substantial cost savings

BLT WORLD specialists work in conjunction with the global ScrapeTec team to offer dependable solutions for specific problems at the transfer points of conveyor systems in many industries where dust and material spillage are concerns, including in mining and quarrying.

"The risk of explosions caused by dust emissions on conveyor belts is an ongoing problem that engineers around the world are trying to prevent. ScrapeTec experts developed a new dust control system about six years ago, that is proving to be highly effective — not only for preventing dust formation and material spill, but also to minimize the risk of explosion at critical sections along the conveyor route and transfer points and for more efficient belt-cleaning," explains Korsten Koth, Sales and Distribution for ScrapeTec — specialists in the development of dust suppression systems for diverse industries. "ScrapeTec products — which are engineered in Germany to pristine quality and environmental standards — are proving to offer even greater operational cost savings in materials handling, than anticipated at the launch of the range.



"Apart from the benefit of cost savings, 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.

"Although conventional dust prevention

side-seals do reduce conveyor problems in the short-term, these components quickly deteriorate as a result of friction and can also damage the belt of the conveyor during extended periods of use.

"The success of the combination of the DustScrape and AirScrape contact-free

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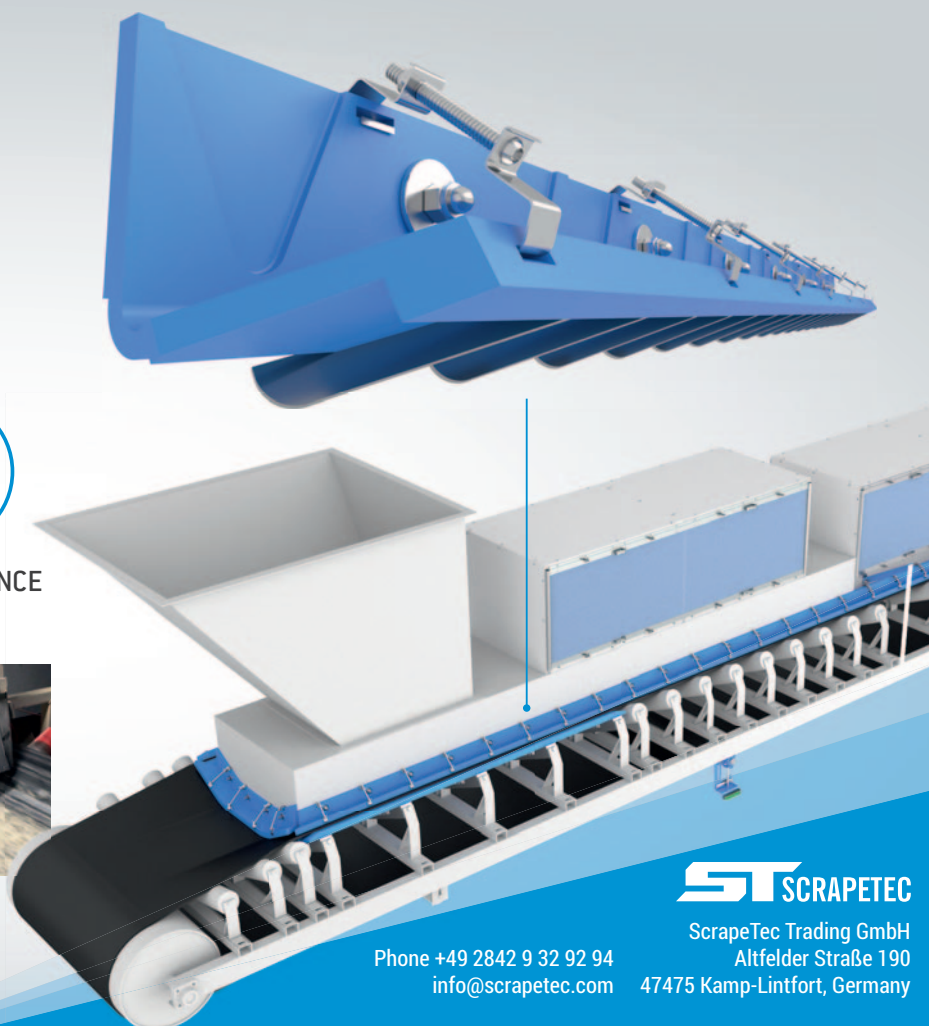
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AirScape conveyor belt skirting system, is in effective energy-efficient dust suppression. This compact and easy to install skirting adheres with most new dust prevention guides, to prevent health and safety issues on-site. This advanced system also minimizes product loss, by effectively preventing material from escaping into the surrounding environment. As a result, users benefit from substantial savings of energy, housekeeping and maintenance costs, without the need for collection of material spills.

"In a recent installation, we have solved many production problems for our customer, who was losing almost 5% of materials on conveyor belts, as a result of dust and material spill."

DustScape 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.

The DustScape dust emission prevention system comprises a filter cloth, support arches and skirts, arms to hold the system above the belt and a rubber curtain to eliminate further dust development — all sized to specific requirements. This system is easy to install and can be retrofitted to existing conveyors, for continuous operation and for extended periods.

The contact-free AirScape 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-



The DustScape dust filter system, which is used in conjunction with the contact-free AirScape conveyor belt skirting system, has been specially developed for the control of dust formation and material spill at critical sections along the conveyor route and transfer points.

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



AirScape.

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 escapes. Material spillage at transfer points needs to be removed and regular maintenance of belt skirting and transfer points is necessary.

Studies show that even five years after

installation and with continuous use in harsh conditions, the AirScape system shows hardly any signs of wear.

This durable 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 SureSupport system works in conjunction with DustScape and AirScape 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.

The PrimeTracker ensures the belt is constantly in the correctly aligned position during operation, thus eliminating problems with belt mistracking.

The TailScape system enhances performance of the AirScape, 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 SpeedScape secondary belt cleaner design is based on the inclined and staggered positioning of Tungsten blades, which increases the scraping surface to as much as 150% of the conveyor belt width. This high-performance system allows scraped material to be easily discharged.

Correct installation of suitable equipment ensures cost efficiency, optimum performance and safety, reduced risk of breakdown and extended service life of the conveyor system.



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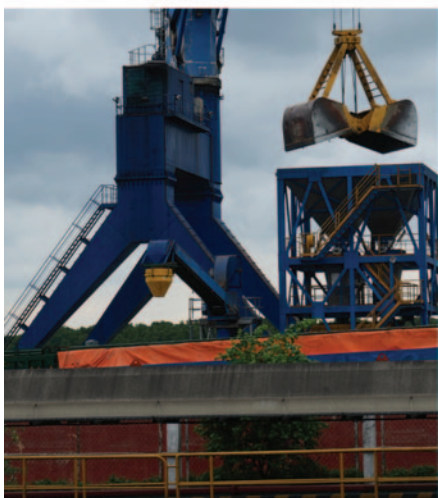
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The right equipment for the job from DSH Systems



The issue of fugitive dust has long been a significant challenge in the bulk handling industry, one which can impact both worker health and safety as well as having far reaching environmental impacts. Fugitive dust generated during bulk loading activities — whether it's loading ships, rail cars, trucks, or storage yards — poses serious risks. Dust not only reduces air quality and visibility in the workplace but also attracts regulatory scrutiny and potential complaints from the wider community. The airborne particles can be

harmful if inhaled, and can also potentially contaminate local ecosystems, as well as just being a general nuisance and causing mess both on and off site. Consequently, managing this pervasive problem has become a top priority for many companies involved in bulk handling. Choosing the right equipment for your bulk material handling needs is crucial, as it can significantly impact your efficiency, productivity, and safety. However, with a huge number of options available, the selection process can be daunting, so here

we seek to offer practical advice and essential considerations to help you choose the equipment that best fits your requirements.

UNDERSTANDING MATERIAL AND CAPACITY REQUIREMENTS

The first step in selecting the right equipment is to understand the characteristics of the material you need to handle. Factors such as size, abrasiveness, corrosiveness, and moisture content can all influence equipment options. Additionally,





assess how much material you need to move and how quickly. Choosing equipment that aligns with your volume and speed requirements ensures you avoid bottlenecks and maintain efficient operations.

CONSIDER YOUR AVAILABLE SPACE

Space constraints can play a significant role in determining your equipment choices. In areas with limited space, opting for custom-sized or shaped equipment might be the best solution to maximize efficiency without sacrificing performance. Consider the layout of your facility and how the new equipment will fit into the existing workflow. Efficient space utilization can lead to smoother operations and reduced handling times.

EVALUATE EQUIPMENT DURABILITY AND MAINTENANCE

Durability is a key factor in bulk material handling equipment. High-quality, durable equipment might come with a higher upfront cost but can save you money in the long run through reduced downtime and lower maintenance costs. It's also crucial to consider the maintenance requirements of the equipment. Low-maintenance equipment can further reduce downtime and operational costs, making it a more economical choice in the long term.

FOCUS ON ENERGY EFFICIENCY AND ENVIRONMENTAL IMPACT

Energy efficiency is another important consideration. Equipment that requires less power to operate not only minimizes your carbon footprint but also reduces energy bills. Additionally, selecting equipment that generates less noise and fewer emissions can help you meet stringent environmental regulations and foster a healthier workplace and community.

COMPARE COSTS

While cost shouldn't be the sole factor in your decision, it is undeniably important.

Compare the initial purchase price of different options, but also consider the total cost of ownership. This includes

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maintenance, operation, and potential downtime costs. A higher initial investment in quality equipment often pays off in the long run through improved efficiency and reduced operational expenses.

By carefully considering these factors, you can make an informed decision that not only meets your bulk material handling needs but also contributes to the overall success and sustainability of your operations

How DSH CAN HELP

A comprehensive dust control plan and choosing the correct equipment to handle it is crucial to addressing this issue, and one effective solution is DSH's Dust Suppression Hopper (DSH) system. Developed by Trevor Schwass in 2004 to rectify dust issues at the Ravensdown fertilizer plant in New Zealand, the DSH is the company's award-winning hopper that effectively reduces and controls dust during the loading of dry, granular materials. The company is proud that its DSH systems are a simple, low cost, low maintenance and long-term solution that promotes safer work environments all whilst requiring no electricity, hydraulics or pneumatics in order to function.

The DSH offers easy installation and minimal downtime with little maintenance once running.

How IT WORKS

The DSH hopper is installed under a loose bulk material infeed point, where it is suspended in a fixed location above a receiving vessel or loading area. As the hopper fills the product level rises and the springs extend, progressively opening the



flow control gap and balancing the product flowing in and out of the hopper. The unique design expels air and compresses the product into a solid column as it exits

the hopper, and this solid discharge column falls through the air virtually dust free for many metres, before driving into the pile formed on the floor or in a receiving vessel, resulting in minimal dust release and product loss.

DSH Systems believes that its DSH systems stand out for its primary focus on preventing dust generation rather than merely suppressing it after formation. By minimizing dust at the source and controlling any remaining particles into a condensed area, the system effectively curtails the escape of fugitive dust. This proactive approach not only enhances worker health and safety but also offers additional advantages such as reduced product waste due to the unique condensed product flow, the potential for increased loading capacity and speed, and compatibility with a wide range of loading scenarios. Requiring no electricity, hydraulics or pneumatics in order to function, the DSH offers easy installation and minimal downtime with little maintenance.

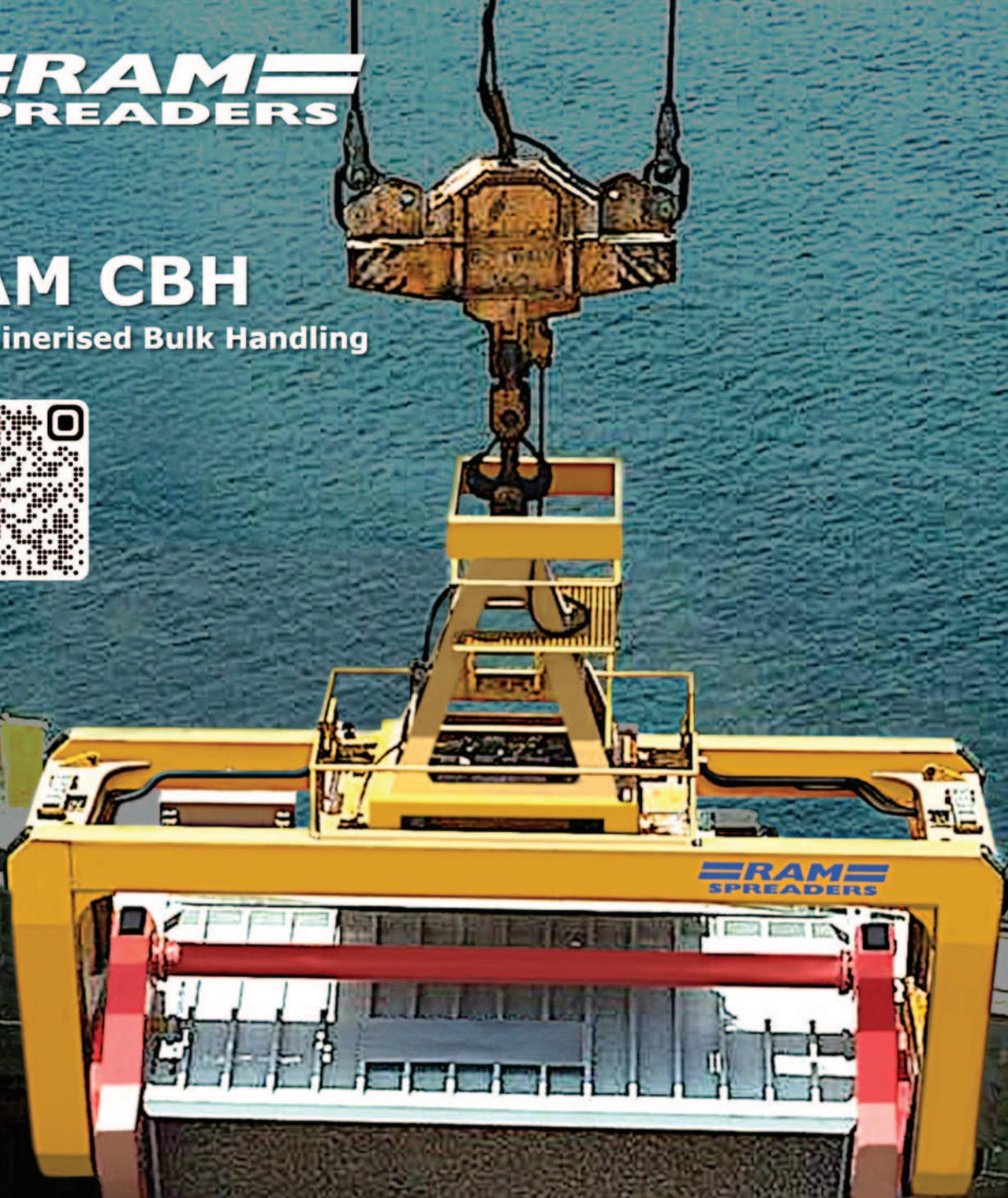




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**optional dust suppression system available*

www.ramspreaders.com

DP World Fraser Surrey: innovative revolving container technology supported by dust-control system from Blue Water Misting



Blue Water Misting (BWM) has delivered and commissioned a dust suppression system at Fraser Surrey docks, Canada, for DP World ports. The BWM system creates a barrier of fog over the hatch in bulk loading operation to stop any fugitive dust emissions.

WHAT IS THE BLUE WATER MISTING SYSTEM?

It is a series of spray bars fitted to the hatch of the vessel during bulk loading that provides a curtain of dry fog over the hatch. The dry fog particles collide with any fugitive dust particles, causing them to fall back into the hatch. The system protects the nearby environment and workers from pollution.

NEW GOLD COPPER PROJECT

The system was put in place to allow the loading of copper concentrates with traces of silver and gold. This system uses sealed containers and a special spreader allowing the miner to export with zero losses in the supply chain.

"Dust suppression stops pollution in loading but also protects the clients valuable material from losses"

James Davenport, BWM

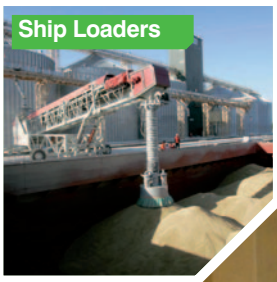


Cleveland Cascades Ltd

Global leader in bespoke dry bulk loading chutes



Ship Loaders



Silo Loaders



Truck Loaders



Tanker Loaders



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

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

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

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

Contact Cleveland Cascades Ltd

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

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



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NEUERO
Industrietechnik

Arden Jet – first factory-integrated water spray system



The Arden Jet is an innovation of Arden Equipment, and has applications in bulk material handling, demolition, recycling and earthmoving.

AWARDED SEVERAL TIMES WORLDWIDE

The Arden Jet is the first factory integrated water spray system in a demolition shear that reduces dust and odour emissions.

The technology, awarded six times by the demolition industry in France and internationally, is ideal to reduce dust in material handling applications.

The Arden Jet is available on demolition shear, sorting grab, concrete crusher, hydraulic breaker and clamshell.

HOSE SYSTEM FULLY INTEGRATED INSIDE THE TOOL

The spraying hoses are fully connected inside the body which renders them totally invisible and protected from external destructive elements. Spraying nozzles can be fitted at different angles or changed by the customer, allowing various nozzles diameters and shapes of the spraying pattern to best match job site requirements.

Changing is simple and very quick — the 360° spraying system is attached via a secured turning joint. The specific turning joint allows hydraulic oil and water management at the same time (no water/oil pollution), enabling the full use of the rotation head to operate the shear without worrying about the position of the hoses. Hydraulic elements are totally integrated inside the shear and



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thus are completely protected. High pressure spraying can operate up to 170 bar.

SPRAYING AS CLOSE AS POSSIBLE TO THE DUSTY AREA

High 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 savings on water usage are significant and this is not taking into account cost savings on fuel. The suppression of dust also means that other machines around will not be clogged by dust and will therefore run longer and need less maintenance.

The sprayed area is outstandingly accurate because of the four nozzles that are directly fitted on the body of the shear. As water is atomized with high pressure, creating a very fine mist, visibility on demolition area remains very clear.

ENVIRONMENTAL PROTECTION

It is proved that dust has a harmful impact on the health of workers and local residents. 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 a very fine mist which is very effective against airborne dust and even micro particles.





Dust Suppression

HATCH – SHIP LOADER – HOPPER – SHED



ZERO DUST

Web: www.bluewatermisting.com
E-mail: sales@bluewatermisting.com

The Raring Corp's dust control and theory of fog



Dust control is widely used with material handling and there is more than one technology to effectively and efficiently control dust problems when handling bulk materials, writes *Gonzalo Campos Canessa*, CEO, *The Raring Corporation*. These active dust control technologies use some sort of energy to operate, and they use different processes to achieve the same goal, controlling the dust generated from material handling by removing dust from the air. All these active dust control systems must work together with passive dust control systems to provide a successful solution for the dust problems.

They are anything that is permanently installed and that requires little or no power. In most cases, passive systems have no moving parts. These passive dust control strategies vary from one application to the other and must fit properly where it is applied.

ADS™ Dry Fog can operate in most of the applications where a passive dust control system can be built. ADS™ Dry Fog will project microscopic water droplets, generated by TRC sonic nozzles. TRC's FP nozzles break water particles and combine them with compressed air to create Agglomerative Dust Suppression (ADS™)

Dry Fog that agglomerates and settles down dust particles at the source. All this using low water, no chemicals, and without generating by-products, like other dust control technologies do.

FOG AND AGGLOMERATION

The principle of operation for TRC's ADS™ Dry Fog Systems is agglomeration of like-sized water and dust particles (size particles smaller than 30 microns). As the agglomerates become larger and heavier, they settle back onto the source material, and carry through the process without any special handling.

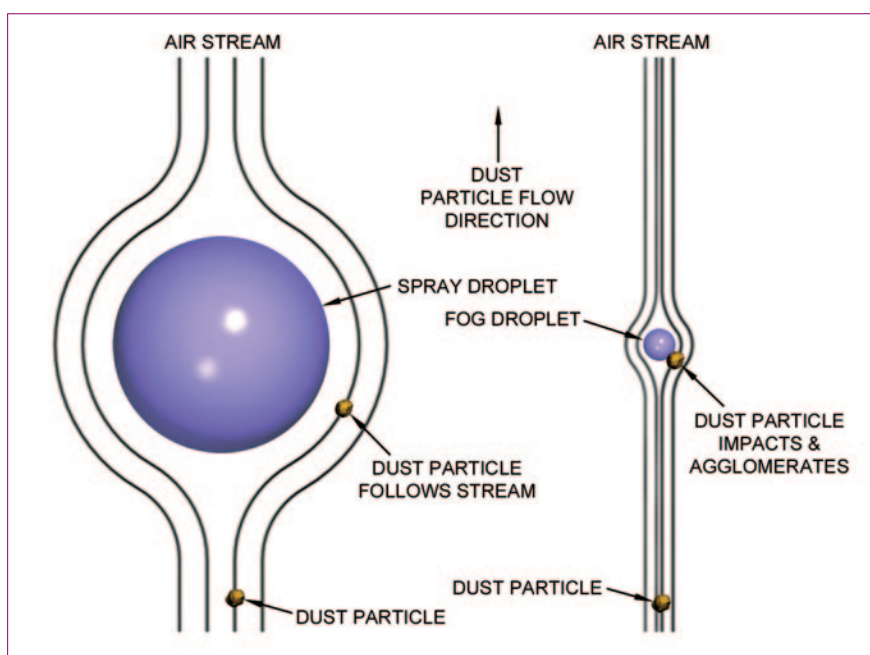
When water droplets are significantly larger (between 100 and 500 microns) than dust particles, which occurs on water spraying systems or plain water sprays, the air displaced by the moving big water droplet conveys the dust particle around the water droplet preventing collision.

APPLICATION OF FOG

ADS™ Dry Fog technology can easily work in hot, cold, humid, and arid climates. The tiny water droplets do not freeze under normal cold weather conditions due to their small size, as clouds do not freeze. In hot, dry climates, the systems produce their own humid environment limiting the amount of evaporation and allowing the system to function efficiently.

FOUR KEY ELEMENTS OF DUST SUPPRESSION SYSTEMS DESIGN

There are four key elements when

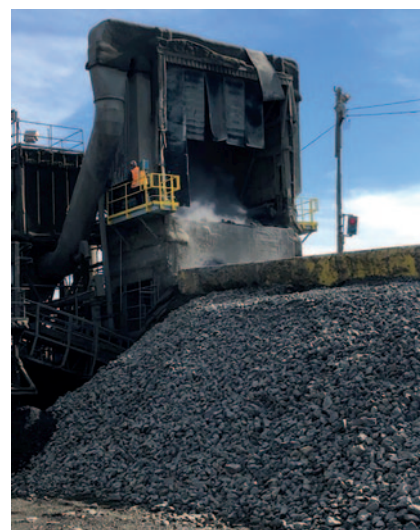


designing and implementing an ADS™ Dry Fog dust control system:

1. **Containment or passive dust control system:** the dust source must be contained or sealed to isolate the dust and fog from outside influences. This alone will reduce dust emissions significantly. This principal is responsible for the presence of enclosures at transfer points, the use of walls and fences around dump pockets, enclosures over screens and bins, etc. This key element must always work with the active dust control system if you are looking to implement an efficient dust control strategy.

2. **Application of Fog:** within a fog-based system, dust is collected in by the agglomeration (attraction between dust and fog particles) of airborne dust particles with airborne water droplets of like size. The sooner the fog attracts the dust, the faster will be the process. Fog must be projected so that it blankets the dust source and begins the agglomeration process before the dust distributes into the larger volume and becomes harder to capture.

3. **Retention time:** there is a time factor associated with the agglomeration process. Dust particles must collide with water droplets several times to grow large enough to settle or attach to a surface. Collisions are a matter of probability through time. Containment systems, then, must be of adequate size to provide the retention time required for adequate collection. The enclosures associated with fog systems are generally larger than conventional enclosures used with dust extraction or simply to contain the flow of ore on a



conveyor. Retention time is the principal that dictates the need for those larger enclosures.

4. **Other considerations:** a key element for a successful dust control system is the design of the transfer chutes and the quality and quantity of the hats located at the loading zone. A good design will reduce the potential energy, make the belts last longer and center the load on the conveyor, reducing monitoring problems. All these will also minimize the dust generation. Without an adequate support for the conveyor, tight skirts (we recommend using the double lip ones) and enough control volume there will be always dust leaks. An integral design will need to consider engineered chutes considering impact beds, skirts and a dust control system like dry fog.

In order to fulfill the four design key elements of a dust control system, stilling sheds, rubber curtains and deflectors must be considered on truck dumps and wind fences in stockpiles, key passive elements for successful dust control systems. 



RAM Pipe spreaders

go into operation



RAM Auto pipe spreader goes into operation for the Spliethoff Group

Spliethoff Shipping approached RAM to help with a major offshore project, handling pipes between Indonesia and Australia. Working together with Spliethoff, RAM produced a universal pipe handling spreader.

The RAM 'Octo' pipe-handling spreader is designed to allow the handling of a huge range of pipes from:

- ❖ one to three pipes;
- ❖ from 16 to 60 inches (40 to 152cm) in diameter; and
- ❖ between 11.8 and 12.7m in length.

HANDLING PIPES AT QUAY AND SHIP TO SHIP

RAM Octo will first be deployed at the

port in Batam, Indonesia, loading the offshore pipes from the quayside into the shipping vessel's hatch. Another RAM Octo on the shipping vessel crane then transfers the pipes into a transshipment vessel near the coast in North West Australia before being transferred again into the pipelaying vessel.

UNIQUE FEATURES

ROTATION CONTROL SYSTEM

Due to the nature of the load and harsh environment, an essential feature of the RAM Octo is its rotational control system that controls the rotation of the pipes being handled, making for fast and safe operations.

The ability to quickly control rotation

(up to 360° in less than one minute) allows accurate placement of pipes, saving time and allowing the operator to control the load at a safe distance without the need for ropes or slings.

SOFT TOUCH GRIPPERS

A crucial feature of RAM Octo is its soft touch grippers and pads on all contact points between 'Octo' and the pipes. Mechanical sensors on the soft touch end grippers send a signal to the operator's remote control when the pipes are securely clamped longitudinally.

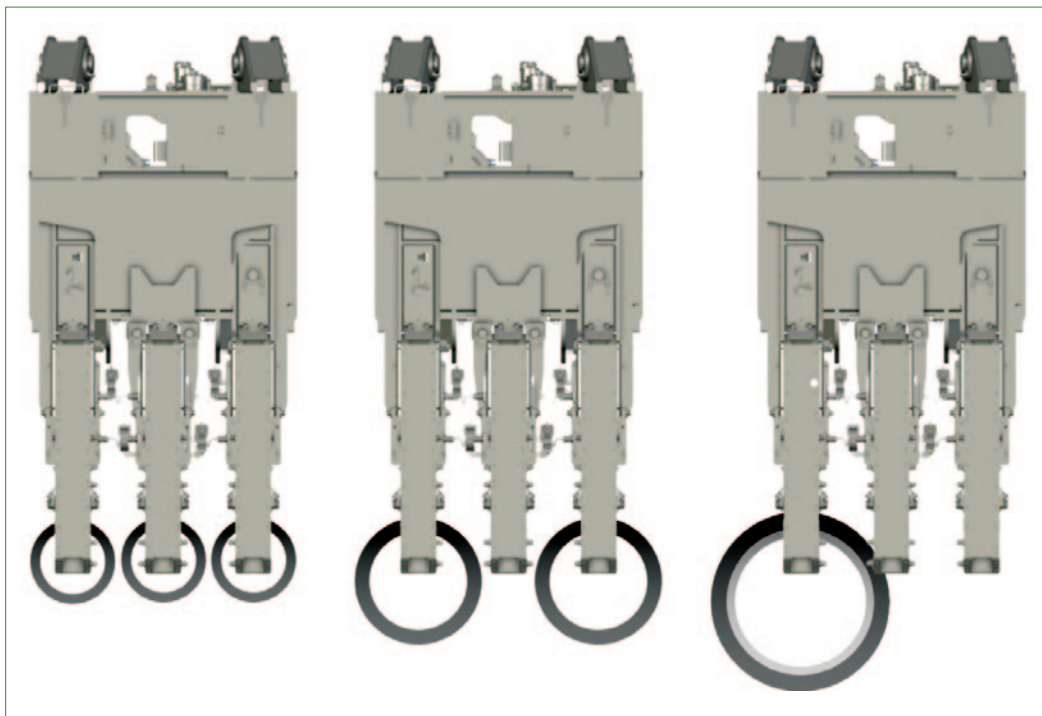
LOAD WEIGHING SYSTEM

Another safety feature is RAM Octo's

ability to detect load immediately before lifting. Load cells in the end gripper detect when the load is applied when the padded pipe fork engages with the underside of the pipe, sending a signal to the operator that it is safe to lift.

PIPE ADJUSTMENTS

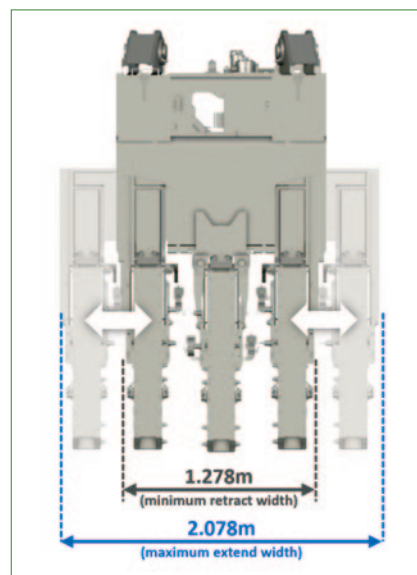
Independent longitudinal and lateral adjustments to each pair of telescopic arms allow the operator to make fine adjustments when encountering out-of-alignment pipes by lifting and correcting their alignment during the lifting process.



INNOVATIVE PROJECT FOR AN INNOVATIVE CUSTOMER

The pipe spreaders have been purchased by Spliethoff Shipping, which plays one small part in the innovations across this project regarding safety and productivity.

RAM commented during the project launch, "We have worked with Spliethoff to provide a safe and innovative solution to load pipes. This system is one of several innovations in this project to make it safe and reliable."



Australia

Bulk handling report

CBH Kwinana Grain Terminal, East Rockingham, Western Australia.

CBH welcomes promising shipping emissions reduction results following maiden Blue Visby trial

The CBH Group is part of an industry-first shipping trial that achieved significant carbon emissions reduction results.

The co-operative joined a consortium of companies participating in the BlueVisby project in June 2023 to support research into practical solutions that help reduce the international shipping industry's greenhouse gas emissions.

The Blue Visby Solution is an integrated system that notifies ships of the optimal date and time for arriving at their destination, eradicating the industry practice of "Sail Fast, Then Wait". This is achieved by analysing several factors, including the weather, vessel performance and congestion at the destination. Importantly, the Blue Visby Solution provides the required information systems to support measurement of the model and the contractual architecture to allow for cost and benefit sharing.

Blue Visby's first trials took place during March and April 2024 and involved two CBH-chartered bulk vessels travelling to the Kwinana Grain Terminal. These included the *Gerdt Oldendorff*, owned by Oldendorff Carriers, and the *Begonia*, owned by Dampskibsselskabet NORDEN A/S.

Several different benchmarks were tested throughout the trial, including speed, engine performance, arrival window dates, and intended voyage parameters. The emissions reduction was analysed by comparing the actual voyage with its digital twin in the Blue Visby system.

When analyzing the *Gerdt Oldendorff*, the CO₂ savings varied depending on the intended standard speed:

Speed	CO ₂ savings
12 knots	7.9%
14 knots	28.17%

The *Begonia* demonstrated a CO₂ savings of 12.9%, measured against the vessel's intended speed of 14 knots.

The trial results were consistent with earlier initiatives, including a 2023 Blue Visby pilot programme, which resulted in an average CO₂ saving of 18.9% across ten voyages.

Integral to the success of these trials was the comprehensive testing of all components of the Blue Visby Solution, including software, technical and operational systems. The trials demonstrated that the solution seamlessly integrates with existing voyage planning processes, ensuring minimal disruption

while delivering substantial carbon reduction benefits.

CBH Chief Marketing and Trading Officer Paul Smith said the trial demonstrated that management of shipping emissions would play an integral role in CBH's goal of reducing site to customer emissions over time.

"We're proud to have been involved in Blue Visby's first trials, which have demonstrated positive results," Smith said.

"Our involvement in the trial has provided valuable insights that will help us reduce emissions in future shipping programs.

"The benefits will flow on to our customers, who are also exploring how they can reduce emissions throughout the grain supply chain.

"This project was part of a huge collaboration between charterers, ship owners, and the CBH and Blue Visby teams, and we appreciate the efforts of all those who have helped make these results possible."

The trials are part of a wider program across many geographical areas involving other members of the Blue Visby consortium which will be conducted in the coming months.

Mobile bulk solutions by Mobile Conveying Services Pty Ltd

Mobile Conveying Services Pty Ltd (MCS) is a private Australian company established in 2007 based in Brisbane and is active in the bulk materials handling industry providing specialized equipment, skilled labour and management to a wide range of customers. MCS has built its business around the supply of mobile conveying equipment and Telebelts, owning and operating a substantial fleet both domestically in Australia and to regions in the Pacific and in recent years has developed an in-house solution for mobile grab hoppers.

MCS sources specialized world leading equipment from the North American market and complements the variability of services it supplies by establishing its own workshops, firstly to maintain MCS equipment and also manufacturing purpose-built equipment to support the broad range of services to the market.

The huge benefit of mobile conveying equipment is as per its description — 'MOBILE' and it can be used across a wide variety of industry applications, for example: infrastructure constructions sites, general purpose wharves to load and discharge bulk cargo, bulk storage facilities, remote mine sites, where it is not economical or complicated infrastructure restricts having permanent handling equipment.

MCS employs up to 60 people who embrace the variety and expert skills required and are very flexible to working across a wide variety of regions. MCS offers customized bulk material handling supply chain solutions that display innovation and agility to deliver what customers need, where they need it, when they need it.

Clients serviced include: Rio Tinto, Newcrest, North Connex, Centennial, BlueScope, Shell (QCG), South32, Riordan.

INDUSTRIES SERVED BY MCS

Mining: applications include backfilling tailings dams, loading train conveyors from stockpile, building and drawing down on temporary stockpiles, and more.

Construction: applications include placing unpumpable concrete, placing bulk materials in areas with no or limited direct access, and more.

Shipping: MCS has Australia-wide experience in loading a range of bulk materials from general purpose wharves using mobile

Quarrying: this equipment suits both fixed and short-term applications, and is as



TB200 Telebelt – concrete pouring Ohio.



Mobile grab hopper – discharging bulk cargo at a narrow berth in Australia.



Train unloading and stockpile management of coal with MCS specialized conveying equipment.

transportable as mobile crushers and screens.

Environmental: mobile conveyors are the ideal solution for backfilling over geotextiles without compromising their integrity, and are highly productive.

Building: commercial and domestic building sites regularly use mobile conveyors to place backfill and other materials in areas with restricted or no vehicle access.

Specialized equipment used in the aforementioned industries:

- ❖ mobile conveyors including — telestackers, transfer conveyors, overland conveyors;
- ❖ truck unloaders;
- ❖ telebelts;

- ❖ grab hoppers;
- ❖ dozer traps;
- ❖ reclaim units; and
- ❖ train unloaders.

INDUSTRY SERVICES SUPPLY EXAMPLE — BULK COAL HANDLING

Centennial is a coalmining and energy sector company and supplies thermal coal to the domestic and export markets. Centennial is a major fuel supplier to the New South Wales energy industry, fuelling approximately 30% of the State's coal-fired electricity and also exports to customers in Taiwan, Japan, Korea and China.

Issues were being encountered in the supply chain with truck deliveries not being able to maintain the appropriate

volume retention at the Lidsdale Siding to ensure there was always emergency supply back up to maintain electricity supply to the NSW region.

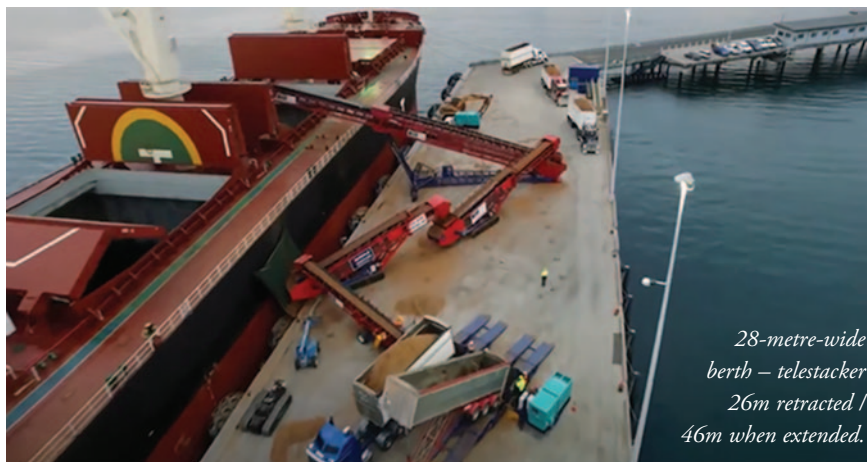
MCS provided an innovative solution allowing for high volume rail deliveries and were contracted to facilitate the delivery of coal 450 metres from a train unloading point, transfer to stockpile and automatic reclaim of material onto an overhead gantry conveyor 14m above ground supplying the coal directly to a local power station.

The solution had to:

- ❖ Unload 3,400 tonnes of coal from train cars at a rate of 2,000tph (tonnes per hour) and stockpile the material.
- ❖ Reclaim material at a rate of 900tph when required.

Critical time milestones were required to ensure the plant could continue to operate and negate the risk of power shortages to the huge population in NSW.

The revised operational platform was a great success and highlighted the adaptability and resourcefulness of the MCS equipment (as per bottom snapshot on the opposite page).



28-metre-wide
berth – telestacker
26m retracted /
46m when extended.

INDUSTRY SERVICES SUPPLY EXAMPLE — BULK VESSEL LOADING

Bulk vessel loading is another key operation where MCS mobile conveyors' adaptability is displayed. Bulk conveyor loading greatly increases productivity where bulk cargo can be loaded at up to 1,000tph so transport delivery never matches the loading capability. Bulk cargoes that MCS have handled for export vessel loading include silica sand, wood chip, wood pellets, fertilizer, grain, iron ore and various other minerals.

MCS were contracted to manage the

loading of bulk woodchip at a very narrow berth at the remote Port of Eden in NSW. The port was in close proximity to the customer's forestry operation and with the innovative vessel loading MCS provided allowed for a cost-efficient supply chain solution.

See snapshot above, of the operational platform provided with mobile dual lane truck unloader, transfer conveyors and radial Telestacker conveyor leading to a successful and very productive vessel loading.

Pilbara Ports: May 2024 shipping figures up 10% from last year

Pilbara Ports delivered a total monthly throughput of 68.8mt (million tonnes) for May 2024.

This throughput was a 10 per cent increase compared to May 2023.

The Port of Port Hedland achieved a monthly throughput of 52.7mt, of which 51.9mt was iron ore exports. This was an 7% increase to total throughput compared to May 2023.

Imports through the Port of Port Hedland totalled 192,000 tonnes, a decrease of two per cent compared to May 2023.

The Port of Dampier delivered a total throughput of 15.0mt, a 16% increase from May 2023.

Imports through the Port of Dampier totalled 123,000 tonnes, an increase of 25% from May 2023.

Several factors influence the fluctuation of throughput, including changes in market conditions, port maintenance operations and proponent needs.

Total throughput across all ports since 1 July 2023 is 687.1mt.



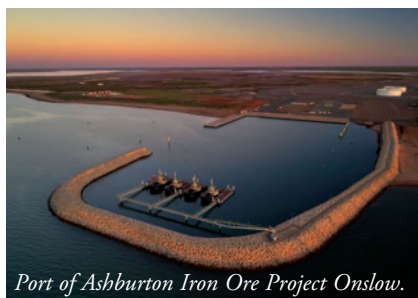
Port of Port Hedland inner harbour activity. Photo courtesy of Pilbara Ports.

Port of Port Hedland Urban Facility. Photo courtesy of Pilbara Ports.

Advancements in the handling of dry bulk in Australia



NextGen modular crushing plants that produce significantly lower dust and noise emissions than traditional crushers.



Port of Ashburton Iron Ore Project Onslow.



Port of Esperance.

Innovations in dry bulk storage technology are revolutionizing material handling across multiple industries. The use of advanced materials, IoT-enabled monitoring systems, sustainability-driven solutions, and automation enhances the efficiency, safety, and environmental responsibility of storage facilities. As the demand for efficient and sustainable material handling rises, these technological advancements will remain essential in shaping the future of dry bulk storage, writes *Captain Chris C. Gil, Consultant at WMS Marine*.

Australia is witnessing significant advancements in the handling, transportation, and storage of dry bulk commodities, driven by new technologies and digital solutions.

One notable innovation is ABB's launch of the ABB Ability™ Stockyard Management System. This system integrates all available data to optimize bulk material handling operations, offering features like real-time material tracking, 3D visualization of stockpiles, and predictive maintenance. This technology enhances the efficiency and productivity of stockyards in various industries, including coal-fired power plants, steel plants, and mines. It enables better planning, scheduling, and quality control, ultimately improving operational efficiency and reducing costs.

Bruks Siwertell is also at the forefront with its advanced dry bulk material handling solutions. The company provides equipment that ensures efficient, safe, and sustainable handling of a wide range of dry bulk materials, including biomass, coal, cement, grain, and fertilizers. Their systems are designed to minimize dust emissions and material spillage, promoting environmental protection while maintaining high throughput rates. Bruks Siwertell's innovative solutions include mechanical screw-type unloaders, shiploaders, and various conveying systems that can switch between different dry bulk materials, catering to the diverse needs of port terminals and other industrial operations: Newcastle Agri Terminal,

Fremantle Ports, Port Whyalla and Port Adelaide are some samples of the broad base of this company.

Furthermore, the adoption of IoT and automation technologies is transforming Australia's bulk handling sector. These technologies enable real-time monitoring and control of material flows, enhancing operational reliability and reducing downtime. By integrating these advanced systems, facilities can achieve higher efficiency, improved safety, and greater environmental sustainability in their operations.

These technological advancements are crucial as they help industries meet the increasing demand for efficient and sustainable material handling solutions, ensuring that Australia's dry bulk commodity sector remains competitive and environmentally responsible.

DRY BULK NEWS IN AUSTRALIA

- ❖ Australia's largest logistics event, MEGATRANS is set to take place on the 18–19 September 2024 at the Melbourne Convention and Exhibition Centre.
- ❖ An exciting addition to the 2024 event is its collaboration with the Australian Bulk Handling Expo (BULK2024).
- ❖ BULK2024 will shine a light on the storage solution market, giving an opportunity to the industry, including silos, to display the latest technology. Silos play a crucial role in various industries by providing secure and organized storage and help to preserve quality over time.
- ❖ The global market for silos is estimated to increase from 2023 through 2028, as confirmed in the latest report by 360 Research Reports. BULK2024 will serve as a platform to connect and reinforce the connection between companies that share the same purposes.
- ❖ Fertilizer Australia reports that 5.4mt (million tonnes) of fertilizer are sold annually in the country, with about half of this amount produced domestically.

- ❖ Additionally, Australia exports between 200,000–400,000 tonnes of fertilizer each year, primarily from Incitec Pivot Fertiliser's (IPF) ammonium phosphate plant in North Queensland.

IRON ORE

The Federal Government's 'Resources and Energy Quarterly' (REQ) for March 2024 reported an increase in iron ore prices at the beginning of 2024. This rise is attributed to China's stimulus policies, which have boosted its economy and increased demand for the steelmaking ingredient. Prices stabilized around US\$125 per tonne in January and February, a significant recovery from the mid-2023 slump when prices were at US\$98 per tonne.

China's iron ore imports increased by 6.6% to a record 1.18 billion tonnes in 2023, despite flat steel production during the year. Australian exports to China rose by 1.5%, contributing to an overall increase of 1.1% in Australia's iron ore export volumes, totalling 893mt in 2023. This growth is supported by the ongoing ramp-up of major operations such as BHP's South Flank, Rio Tinto's Gudai-Darri, and Fortescue's Eliwana.

Iron ore exports are tipped to rise to \$136 billion — US\$ 91 billion — in the 2023–24 financial year (FY24), before dropping to \$107 billion in FY25 and \$83 billion by FY29.

Mineral Resources' (MinRes) Onslow Iron project in Western Australia has delivered its first ore on ship ahead of schedule. The first five vessels will help Onslow Iron reach an annual capacity of 35mt per annum by June 2025.

Looking ahead, additional greenfield supply from both established and emerging producers, including Mineral Resources' Onslow project, is expected to further boost Australian export volumes. Forecasts indicate an annual increase of 1.6% in export volumes through to 2029.

The Port of Esperance in Western Australia will welcome a new iron ore exporter in a deal to boost iron ore trade by up to 1.5mt a year.

COAL

Pembroke Resources' \$1 billion Olive Downs steelmaking coal mine has officially opened in central Queensland, alongside a \$1 million community boost from the miner. Olive Downs is expected to produce up to 15mt of steelmaking coal each year over the next 80 years.

Coal production hit 14mt for Yancoal in the March quarter, with 8.3mt in attributable coal sales, a 47% boost on the same period of 2023.

The company also welcomed an \$180 per tonne (/t) average realized coal price and a \$260 million increase in cash holding.

Dyno Nobel, a Incitec Pivot (IPL) subsidiary, has locked in a long-term contract extension with BHP Mitsubishi Alliance (BMA) in the Bowen Basin region in Queensland. The five-year contract will see Dyno Nobel supply its explosives products, technology solutions and services to BMA's Goonyella, Saraji, Peak Downs and Caval Ridge coal mines.

Anglo American has reported "strong interest" in its five Australian coal mines, which are part of a major asset breakup. The mines up for sale include Moranbah North, Capcoal, Dawson, Aquila, and Grosvenor, all located in Queensland's prime coal regions.

The potential buyers have not been



officially named, but industry speculation suggests that major mining companies, private equity firms, and possibly international investors are in the mix.

Oxford Economics Australia has released data showing mine maintenance spending may be hitting its peak. According to the report, overall mining maintenance spend is expected to hit \$13.2 billion in the 2023–24 financial year (FY24) and grow to \$13.3 billion in FY25.

ABOUT WMS MARINE

WMS Marine is a leading marine service provider specializing in the supervision of loading commodities such as coal and iron ore at Australian terminals.

WMS Marine's key services impact on operational efficiency, safety, vessel assurance, and risk management for bulk

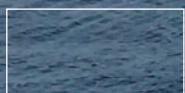
carriers:

- ❖ **Supervision and Superintendency:** Ensures efficient cargo operations with strict adherence to safety protocols and risk management.
- ❖ **Vessel and Cargo Inspection:** Pre-loading Inspections: Confirms vessel readiness and compliance with safety standards.
- ❖ **Cargo Quality Control:** Ensures commodities meet specified standards before loading.
- ❖ **Logistic Support and Coordination**
- ❖ **Real-time Tracking and Monitoring:** Ensures timely and efficient cargo delivery with advanced tracking technologies.
- ❖ **Advanced Software Solutions:** Streamlines cargo management and logistics planning



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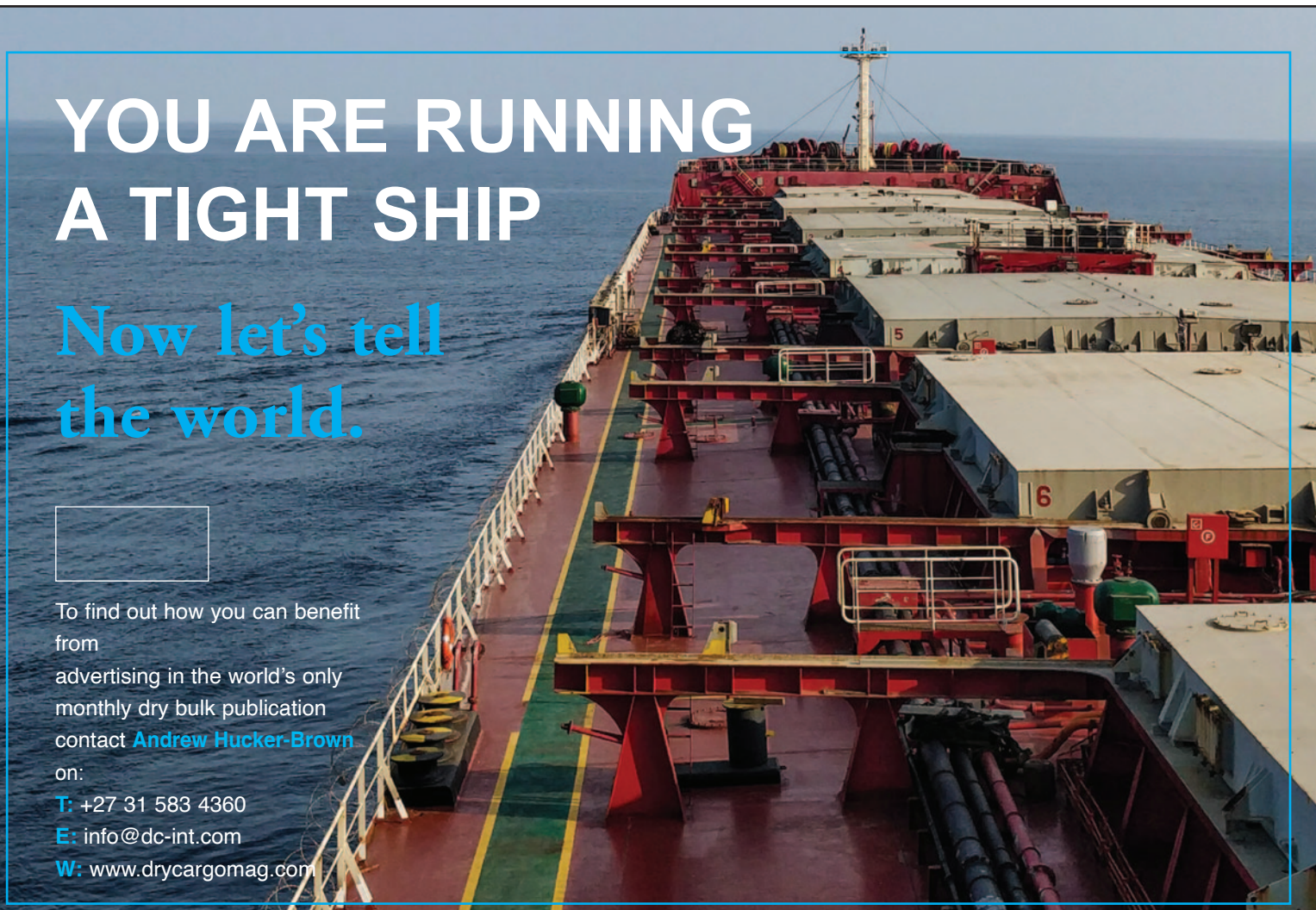


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ASPEC Engineering leads the way in value engineering for Australian ports and mines



ASPEC's Brisbane Team.

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 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.

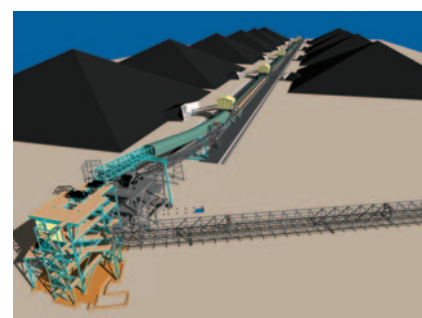
At the Hay Point SR1 and SR2 replacement project, ASPEC saved \$70 million by reusing existing rail beams for new stacker reclaimers. This project highlighted the firm's innovative approach to resource optimization and its commitment to delivering value-engineered solutions. Additionally, at the RG Tanna Coal Terminal in Gladstone, ASPEC implemented 'piggy-back' conveyors and re-used 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



Queensland Alumina Limited.



Gladstone Ports Corporation.

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– Henry Ford



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Roy Hill Stanley Point Berth Facility.

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 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, 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 a testament to ASPEC’s enduring commitment to delivering high-quality, cost-effective engineering solutions. Richard Morgan, Director at ASPEC, 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.

DCi

*SABR Project, Hay Point.*

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The Konecranes logo is displayed in a bold, orange, sans-serif font at the top left of the page. The background of the entire advertisement is a photograph of a port scene featuring several large blue mobile harbor cranes. One crane in the foreground is lifting a large, dark-colored grab bucket. The sky is blue with some light clouds. The side of a large cargo ship is visible on the right side of the image.

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