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ISSUE NO. 291 JUNE 2025

FEATURES

- Global Coal Trades
- Bulk Loading Technology
- Coal Handling Equipment
- Conveyor Components
- Marine Paints
- The Netherlands

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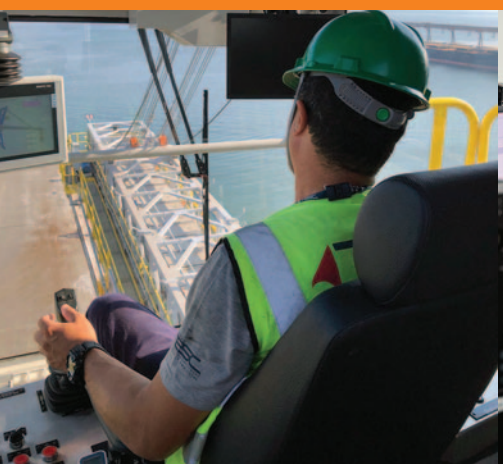

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ISSN 1466-3643
Insta: www.instagram.com/drycargointernational

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Steel raw materials trades fading?

Further signs of negative influences affecting commodity imports have been emerging recently. The outcome seems likely to be flat or slightly lower world seaborne dry bulk trade in 2025 as a whole, compared with last year. Nevertheless aspects of this outlook remain difficult to predict.

Amid continuing uncertainty about the extent of assumed adverse consequences from international trade policy changes, prospects for world economic activity in the near future and later have become more cautious. Forecasts of global growth in gross domestic product, the most widely used indicator, are now showing a downturn after last year's over 3% enlargement, to below 3% this year. Implied restraint in consumer or business investment spending patterns could affect some dry bulk movements.

Iron ore

A downturn in China's iron ore imports, the biggest individual dry bulk commodity trade, is becoming more likely during 2025. Despite buoyant exports of steel products, output of steel in China is being restrained by slack domestic demand, while high stocks of iron ore are also a restricting influence.

Elsewhere, among other importers of steel raw materials, there are only very limited signs of positive influences potentially sufficient to substantially offset lower volumes into China. For example a 30–40mt [million tonnes] (2–3%) reduction in China's iron ore total this year, from 1,241mt last year, may be only partly compensated. Several large buyers including the European Union, Japan and South Korea appear likely to see flat or possibly lower imports.

Coal

After a remarkably strong performance by global seaborne coal trade over the past two years, the trend's direction may be changing. Among the largest importers there is an absence of positive pointers. An exception may be Vietnam where imports have continued to rise, reaching 69mt in 2024 and could increase again.

Lower volumes into both India and China, together comprising almost half of the world coal trade total, are envisaged this year by some forecasters. Indications of impending weakness are perhaps most visible in China, where the market seems well supplied by domestic production and accumulated stocks. In many countries steps to deter coal usage are having an adverse impact on import demand, particularly in the steam coal segment.

Grain & soya

Prospects for grain and soya trade in the new 2025/26 year approaching are now a greater focus of attention. 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 and meal, the year starts on I October. Trade is expected to recover after the present year's large reduction.

In an initial forecast revealed a few weeks ago, the US Department of Agriculture calculated that world wheat and coarse grains trade (including land movements but mostly seaborne) may be about 5% higher. In the current 2024/25 year, a 10% decline to 418mt is estimated, mainly reflecting China's massive reduction. Figures for the year ahead are tentative, however, because of uncertainties about harvests in both importing and exporting countries.

Minor bulks

Among minor dry bulk commodities related to industrial processes, raw materials inputs and outputs of products, clear indications of additional volumes are not prominent except in the bauxite/alumina segment where trade may increase rapidly. Steel products and forest products trade may be flat or lower.

Bulk carrier fleet

The Handymax size group (including Supramax and Ultramax vessels) in the 45–69,999dwt range, comprises almost a quarter of the world bulk carrier fleet. During the past twelve months Handymax capacity grew by 4%, after several years of similar growth rates. In 2025 higher newbuilding deliveries than seen last year are expected and, assuming steady scrapping, growth could be slightly faster than previously.

TABLE 1: KEY IRON ORE IMPORTERS (MILLION TONNES)

	2019	2020	2021	2022	2023	2024
China (incl land)	1,068.7	1,170.1	1,125.6	1,107.7	1,180.6	1,241.0
Japan	119.6	99.4	113.1	104.2	102.2	96.5
EU+UK	96.7	82.8	97.0	87.5	81.6	76.5
South Korea	74.7	70.4	74.1	66.4	68.3	69.5
Taiwan	24.0	21.2	25.0	22.6	19.4	19.5
Total of above	**1,383.7**	**1,443.9**	**1,434.8**	**1,388.4**	**1,452.1**	**1,503.0**

source: China Customs, AGDISR, Bulk Shipping Analysis

TABLE 2: HANDYMAX (45–64,999DWT) BULK CARRIER FLEET (MILLION DEADWEIGHT TONNES)

	2019	2020	2021	2022	2023	2024
Newbuilding deliveries	8.2	9.2	7.0	7.3	9.4	10.5
Scrapping (sales)	0.8	1.7	0.6	0.4	1.6	0.8
Losses	0.1	0.0	0.1	0.0	0.0	0.0
Plus/minus adjustments	0.1	0.0	–0.1	0.0	–0.1	0.0
Fleet at end of year	**207.1**	**214.6**	**220.8**	**227.7**	**235.4**	**245.1**
% change from previous year-end	+3.7	+3.6	+2.9	+3.1	+3.4	+4.1

source: Clarksons Research (historical data) & BSA

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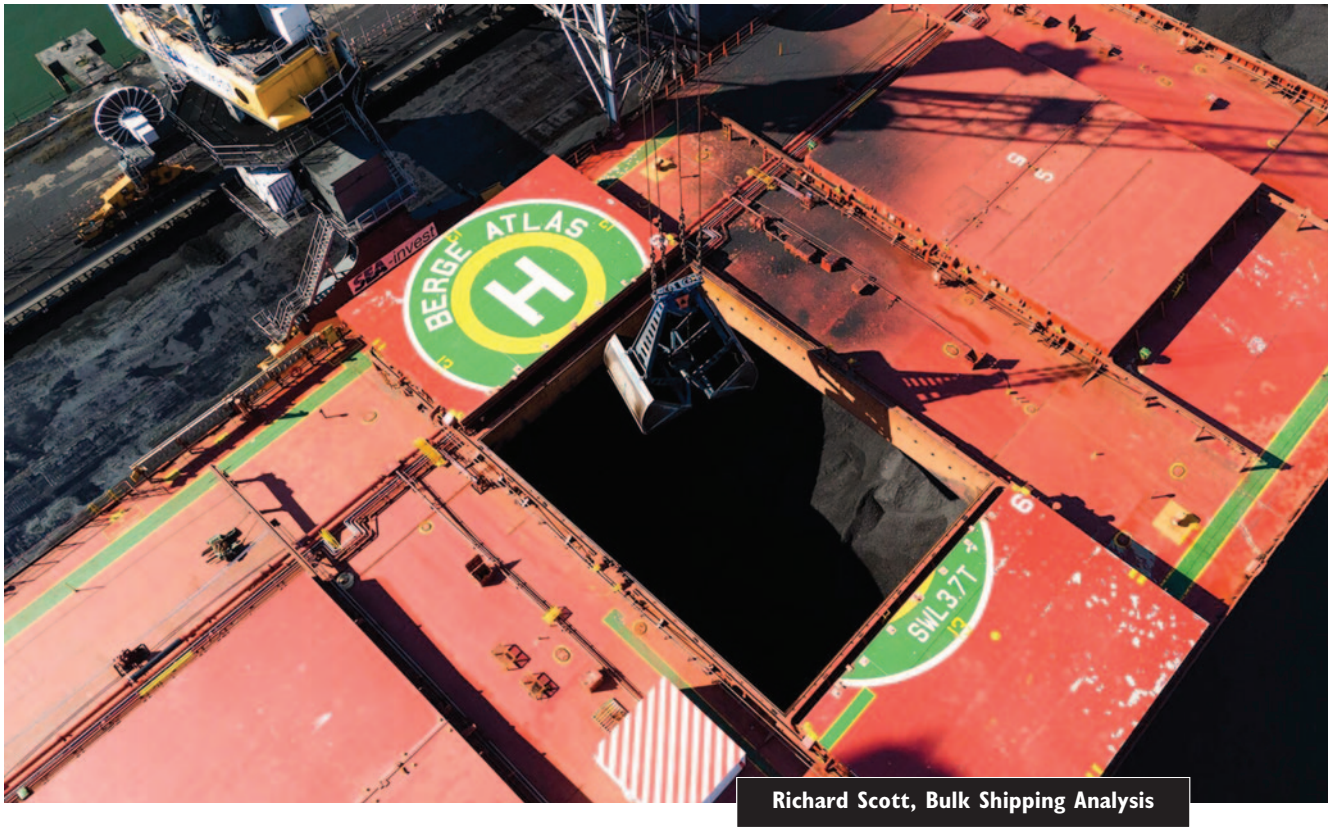
A tougher outlook...

... for coal exporters



Richard Scott, Bulk Shipping Analysis

Exporters around the world have benefited from continuous growth in world seaborne coal trade over the past four years, but the upwards trend seems poised to start reversing soon. Signs of a downturn in 2025 have been multiplying, amid indications of lower import demand in several countries and only limited positive changes elsewhere.

But this outlook is not altogether surprising. The strength of expansion in the past few years has been a greater surprise, given the magnitude of environmental pressures and related policy influences encouraging the movement towards cleaner energy sources. Despite this restraining background, however, coal is still a vital and sometimes the largest energy source in many countries and is expected to remain a valuable fuel for many years.

Although sustained dependence on imported coal supplies in a wide range of countries is likely to be a feature of the global market in the years ahead, downwards pressures are set to persist over the longer term. Within this trend, fluctuations, upwards or downwards from year to year, also are foreseeable for a variety of reasons, affecting coal consumption directly or indirectly through variations in supplies of other energy types. Energy security has also become a greater focus during the past few years, implying additional potential for annual changes in coal usage and imports, with implications for exporters' activity.

Among recent forecasts of world coal trade, optimism about further growth in 2025 as a whole is not prominent. A flat or more likely decreased volume is seen as being a more realistic outcome. Available global export supplies enabling volumes envisaged seem adequate. As usual, however, considerable uncertainty surrounds how activity by the main buyers and sellers will evolve.

The energy context

Underlying trends in energy consumption and coal usage during the past several years have been disrupted by events which disguised the effects of fundamental influences. The global economic recovery from the coronavirus pandemic was immediately followed by an energy crisis and an inflationary episode, amid rising geopolitical tensions with some impacts on the energy markets. Advantages for coal trade were evident.

The nature and pattern of world economic activity, and more relevantly in coal importing countries, has been of limited benefit. Economic growth rates, with implications for output in industries using coal directly or (via electricity consumption) indirectly, provided some support. World growth in gross domestic product (GDP) was stable at 3.3% last year but, according to the OECD organization's latest (early June) estimates, a lower 2.9%

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WORLD COAL TRADE — PRINCIPAL EXPORTERS (MILLION TONNES)

	2020	2021	2022	2023	2023	2024 % change**
Australia	371	366	339	354	362	+2
Canada (coking)	27	26	27	30	30	0
Colombia	58	54	52	48	53	+10
Indonesia	404	432	465	519	557	+7
Russia	153	166	161	169	156	–8
South Africa	73	65	71	73	71	–3
USA (exc to Canada)	58	73	73	86	93	+8

*** compared with previous year*
source: Australian Government Dept of Industry, Science & Resources and BSA calculations

growth rate is envisaged during 2025. Possible changes in international trade policies are a large unpredictable element, possibly with further negative consequences.

Potential for a more unfavourable outcome is clear. OECD economists suggested a few weeks ago that "global economic prospects are weakening, with substantial barriers to trade, tighter financial conditions, diminishing confidence and heightened policy uncertainty projected to have adverse impacts". The deterioration in prospects unfolding over recent months has been quite a dramatic change, not widely anticipated..

Looking at specific forecasts for countries which are major coal importers, one of the most positive contributions is India's GDP growth, expected to remain vigorous in 2025 at 6.3%, similar to last year's rate. By contrast China's growth is seen as experiencing a continued slowdown from 5.0% last year to 4.7%. In Japan the economy saw almost no increase in the past year and is likely to grow only minimally at 0.7% in 2025. Within the euro area, enlargement was slow at under 0.8% last year and may reach only 1.0% in the current year.

One interpretation of these expectations is that positive effects on energy consumption from economic activity trends this year are likely to prove limited. Nevertheless, consequences are not always obvious, because other influences will modify the impact of any change in the broad pattern of economic activity.

In some, probably most, countries coal import demand reflects other developments which are more visible influences on changes in the pace. 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 focus — both longer term and in the short term — 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.

Export markets overview

Prospects for coal exporters in 2025 as a whole suggest that for many it will be hard to maintain last year's volumes. During a period of predominantly downwards pressure on import demand, export decreases are likely. Changing trade patterns may provide advantages for a number of suppliers, especially when competitiveness is improved by other countries' exports falling.

Seaborne trade developments in the past few years underlined how political decisions in importing countries — often reflecting pressure 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 of impact 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.

An example of a cautious outlook for 2025 was published recently. Calculations by commodity analysts at the Australian Government Department of Industry, Science and Resources suggest that world coal trade — mostly seaborne but including land movements — could decline by 38mt (million tonnes) or 3%, from 1,515mt last year to 1,477mt this year.

This forecast envisages differing performances in the two parts. Steam or thermal coal trade, the largest part comprising over three-quarters of the total, is forecast to decline by 37mt (3%) to 1,129mt in 2025. In the metallurgical or coking coal sub-sector comprising the remainder, the current year's volume is estimated at 348mt, a small decline of one million tonnes.

Among forecasters, opinions do not always align, reflecting differing views about uncertainties surrounding the main influences and the magnitude of foreseeable changes. Since the above calculations were published a few weeks ago, further evidence has pointed towards a larger world coal trade annual reduction, although opinions vary, and conclusions are tentative. There is much uncertainty in particular about foreign purchases by China and India, together comprising almost half of world imports.

Broadly, potential for supplying countries either individually or together to raise exports during 2025 seems very limited. Greater competition among exporters probably will be a feature. 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 in a number of countries, also are likely to be instrumental in shaping trade movements.

Domestic influences in exporting countries are reflected in coal production, availability and quality of export supplies. These factors 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.

Outlook for individual exporters

The accompanying table includes major suppliers to the world coal market, showing export totals for 2024 and trends in preceding years. These seven large exporters' volumes represent over 95% of all world sea trade in coal. A feature is the large and often contrasting annual changes among individual countries. Another notable characteristic is how the market is dominated by two countries. Indonesia and Australia contribute over two-thirds of world export supplies.

Coal exports by number one supplier Indonesia (predominantly steam coal) increased in 2024 by 38mt (7%) from the previous year to reach 557mt, according to these calculations. The total included large quantities of low-grade lignite mainly carried to China for power station use. Recently signs have suggested that during 2025 the upwards trend may be hard to sustain, and a lower volume could be seen. A possibility that China's overall coal import demand will be much reduced implies unfavourable consequences for Indonesia.

Australia's exports in both main segments — steam coal and coking coal — are very large. In 2024, the 362mt total was 8mt (2%) higher, comprised of 210mt steam coal (58% of overall volume) and 152mt coking coal (42% of the total). In 2025 an overall increase of 4mt or 2% to 366mt is forecast by AGDISR, mainly due to an envisaged rise in coking coal quantities, but other forecasts suggest a smaller rise may occur.

The third-largest supplier to the world market for seaborne coal is Russia, mainly selling steam coal grades which comprised three-quarters of exports in the past twelve months. Last year's export total was156mt, a 13mt or 8% decline. During 2025 some further weakening may be seen but forecasts are largely speculative. In particular, uncertainty surrounds the impact of international sanctions that have reduced buying by several importers, while other importers not imposing sanctions have raised purchases. Despite the competitive advantages of having low-cost, high-quality coal available, the ability of Russian exporters to continue directing extra sales towards these non-sanctioned markets seems unclear.

Exports of coal from the United States (excluding shipments to Canada) were again higher last year when the total increased by 7mt (8%), to reach 93mt. Within this quantity steam coal and coking coal comprised similar proportions at 44mt and 49mt respectively. Indications suggest that in 2025 the total may be down, and AGDISR calculations point to a possible 10% reduction. 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.

Seaborne coal sales by South Africa, mainly consisting of steam coal, decreased last year. The total was about 3% below the previous year's level at 71mt and for 2025 estimates vary between a flat outcome and another limited decrease. Restrained throughput at the Richards Bay terminal, handling most of the country's shipment, has reflected various logistical problems encountered in transporting coal from mines to the port.

Exports from Colombia mainly comprise steam coal grades. In 2024 the total increased by 5mt (10%) to 53mt, but some forecasters envisage that this year's volume will not maintain the improved performance and could fall back. Several influences may restrict production and supplies, implying difficulty in supporting current export levels.

Canada is a significant supplier, mainly exporting coking coal. Seaborne exports (excluding shipments within North America to USA) were flat last year at

30mt. In 2025 the total may diminish slightly, according to some estimates. Another, relatively minor, supplier is Mozambique, which exported 4mt of coking coal last year, similar to volumes seen in previous years. Signs suggest that potential for increases in the years ahead is limited.

Exporters facing harder times

A more difficult global market for many coal exporting countries seems likely to unfold over the years ahead. Clear signs of diminishing import demand in numerous countries are visible, although a few positive elements also are features. The downwards trend may begin in 2025, based on tentative estimates and indications emerging in the past few months. Potential for a large reduction in the current year is apparent, especially if there is a sharp decline in purchases by one of the biggest importers.

Year-to-year changes in the volume of global seaborne coal trade may not always be negative because of changing circumstances in the energy markets of individual importing countries. But the general evolution expected to emerge is a fading pattern which is likely to affect most exporters, albeit unevenly. Environmental pressures and accompanying regulations have profoundly unfavourable implications for coal usage and trade.

Decarbonization strategies are being applied vigorously in many countries. Competition from alternative energy sources is growing, especially renewables, with some of these benefiting from falling costs. Government measures in numerous countries are designed to deter or prevent coal usage in the longer term.

Assessments of prospects for global coal import demand and the participation of exporters during 2025 and into next year reflect background assumptions. The outlook for economic activity around the world suggests that restraints have become more influential, with adverse implications for some energy- and coal-consuming industries. Geographical coal trading patterns remain disrupted by the war in Ukraine and its wider consequences for both importers and exporters in the world energy market.

Expectations of shrinking elements of the coal trade import demand forecast for 2025 focus especially on China and Europe, although India also is a potentially weaker buyer. In Europe the trend of reducing or eliminating coal use, especially in power stations, is ongoing but the rapid phase apparently has ended and further declines could be slower to emerge. The impact on imports in the next couple of years may be relatively small.

In China, the number one importing country with about 30% of the world seaborne coal imports total, potential for a downturn in 2025 is evident. Although massive, these imports form a small part, around 8%, of the Chinese coal market which is mainly supplied by domestic mines. Limited changes upwards or downwards in domestic coal production, consumption and stocks sometimes have a disproportionate impact on imports. Foreign purchases also partly reflect government policy changes. Domestic market changes supporting coal imports may weaken this year, with signs already visible, causing foreign purchases to fall.

Among other Asian countries, adverse pressures are evident, especially where changes weakening coal use are clear or are foreseeable. The outlook often reflects government energy and environmental policies, prioritizing increased use of alternative energy sources. However, the pattern is not uniformly negative, because in several smaller Asian importing countries consumption growth is still evolving, providing opportunities for some coal exporters.

Although a global coal trade weakening in 2025 has become more plausible, implying a tougher market for exporters, the longer term trend is still surrounded by uncertainties. The broad direction seems predictable. But 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. Assumed changes will require frequent modification amid changing circumstances. Estimates of coal sales by exporting countries will reflect the complicated patterns unfolding. DCi

New Seaber entry-level programme speeds up digital transformation in bulk shipping

The maritime industry has been promised 'transformation' for over a decade. Most of it was never delivered. Seaber, the European software company behind a smarter way to schedule bulk and tanker shipping, is done waiting.

Early this month, Seaber launched its new entry-level programme, a sharp, fast-moving initiative designed to cut through resistance and bring real, usable technology into the hands of chartering and operations teams that are tired of being sold vapourware.

Change is scary. New technology is risky. Digital transformation is inevitable. Seaber's new programme is designed to bring shipping companies and industrial charterers on this journey in a simple and easy way.

"We know what you're thinking: not another system, not another trial, not another 'innovation' pitch," said Jean-Guy Faubert, Chief Revenue Officer at Seaber. "But this is different. This is short. It's focused. It's simple, and it will actually make your daily work easier."

Seaber's brand promise is to be authentic and transparent. So no smoke, no mirrors, no snake oil. Here's what is on offer.

Seaber's entry-level programme, no filters

- Entry-level pricing. Not a lure to attract customers at the onset.
- Voyage scheduling platform, ready in four to six weeks due to a repeatable and proven go-live methodology.
- Scoped onboarding with clear KPIs, success criteria that the customer authors.
- There will be no contract mess, no long-term lock-in, and no scope creep.
- Customers can upgrade when they see the value.
- Early adopters get visibility, support, and a role in shaping what comes next.

The programme offers:

- Software with simplified UI and workflow based on feedback from shipowners and charterers.
- Standardized setup and implementation that improve time to value — customers can get up and running in weeks without the heavy lift.
- Integrated with the customer's specific existing software to ensure a fluid user experience with no double-entry of data.
- "This is not software-as-usual. It's results-oriented, human-assisted technology. The goal isn't to automate people out of the loop, it's to give commercial teams better visibility, faster answers, and a stronger hand in every decision," Jean-Guy continues.

Tangible benefits include

- 3–-5% improved fleet/asset utilization and reduction in spend/costs
  - Drive improvements across the business through integrated, next-gen tools.
  - Optimized for the customer's unique set of KPIs
- Eight hours saved per week
  - Business agility — customers can respond to market changes quicker.
  - Decision support at the fingertips makes planners more competitive and faster.

Built for commercial teams who are fed up with Excel

The programme is designed for maritime professionals who have had enough of Excel, bloated platforms, and lengthy implementation delays. It's already under way with a few smart users, and it's moving fast.

Shipping moves the world, but the systems behind it haven't moved in years. Most planning still happens on spreadsheets, stitched-together tools, or high-cost platforms that overpromise and underdeliver. Seaber is the practical, lightweight alternative.

The Seaber entry-level programme is available for a limited number of companies through the end of 2025.

About Seaber

Founded in 2017 with a mission to transform the shipping industry, Seaber is an independent Finnish maritime software-as-a-service (SaaS) company dedicated to addressing inefficiencies and reducing the environmental impact of global shipping. By combining advanced digitalization and data automation with purpose-built tools, Seaber empowers shipowners, charterers, and commodity traders to optimize operations, maximize fleet utilization, and streamline complex processes. Its innovative platform provides actionable insights and predictive capabilities that not only enhance operational efficiency but also contribute to a more sustainable, cost-effective, and environmentally responsible future for the maritime industry.

Two Damen Combi Freighters 3850

On Friday 30 May, the second of three Damen Combi Freighters (CF) 3850 was launched in China for Fast Lines Belgium. This follows the launch of the first vessel on 19 May. The two companies signed a contract for two vessels in October 2023. Last year, Fast took the option of a third vessel. The CF vessels will be the first newbuilds to enter into the Fast fleet.

The family-owned total logistics company is headquartered in Belgium, with locations in the UK, Republic of Ireland and Poland. Fast approached Damen to construct its new vessels based on a number of reasons.

Contract signing for the delivery of the third CF 3850.

Broad interpretation of sustainability

Like Damen, Fast Lines Belgium is focused on sustainability, applying a broad interpretation of the word, encompassing safety and crew welfare. Damen has designed the CF 3850 to be optimally fuel efficient with comfortable accommodation. What's more, the design can be easily adapted to meet client specific requirements.

For Fast, this includes the installation of a harbour generator and a larger-than-standard shore power connection. As is typical for the short sea sector, Fast's vessels spend significant amounts of time in port. With this, the CF 3850 vessels will be able to connect to electrical power in ports once infrastructure becomes more widely available, reducing noise and emissions in port.

Fast Anna Sofia
Combi Freighter 3850.

Crew, cranes and connectivity

The company has also opted to increase crane capacity to reduce the manual handling required of its crews. Fast has also amended the layout of the ships to ensure that more storage spaces are accessible by crane.

A further benefit for Fast was Damen Triton. With the IoT solution, thousands of sensors located around the vessel collect

Fast Olivia and Fast Anna Sofia *Combi Freighters 3850.*

launched for Fast Lines Belgium

data, informing decision making and leading to increased efficiency.


Fast Olivia *Combi Freighter 3850.*

A vessel for the future

Reflecting on the decision to commission Damen for the project, Fast Lines Belgium Chair Catrien Scheers said, "The Damen vessel stands out in the market. It is both fuel efficient and smart. With the Triton system on board, we will be able to demonstrate fuel efficiency to our clients in real time. On top of that, Damen is a company with a long track record. And, they are building standard ships, which offers considerable added value. As well as speeding up the construction process, building in series is a way to boost efficiency for the industry. Together, we are building vessels for the future."

The CF 3850 vessels are being constructed at the Damen Yichang Shipyard in China. Damen builds its cargo vessels at locations in both China and Vietnam, thereby ensuring the capacity to meet demand for the popular designs.

Family values

The CF 3850 vessels will be named for Fast family members. The four vessels currently sailing in the company's fleet are named *Fast Sim* and *Fast Herman*, for the company's founders, and *Fast Jef* and *Fast Sus*, for two of their grandchildren. Continuing this tradition, the new vessels will also be named for members of the third generation — *Fast Olivia*, *Fast Anna Sofia* and *Fast Gilles*.

Fast Lines Belgium Managing Director Yvan Vlaminckx said, "It has been a pleasure to work with Damen on the construction of our first newbuild vessels. As with any project of this scale, there have been challenges along the way. However, this is not a typical 'buyer-seller' relationship. This is a co-operation. Our two family companies share a long-term view and similar values with regards to safety, the welfare of people and the environment. With this, we are able to collaborate effectively, overcoming any hurdles we encounter along the way and achieving results that are mutually beneficial."

Collaborative evolution

Damen Commercial Director Cargo Vessels Remko Bouma said, "Fast Lines Belgium is a forward-thinking party, very invested in digitalization, sustainability and crew welfare. We are aware that they took the time to explore the market before ordering their vessels and we are very proud that they chose Damen — and that they rewarded our efforts with the order for a third vessel. We also appreciate the input they have provided. We have benefitted tremendously from Fast Lines Belgium's extensive experience, which will undoubtedly support the further evolution of our CF vessels in the future."

Damen Shipyards Group — oceans of possibilities

Damen Shipyards Group has been in operation for over 95 years and offers maritime solutions worldwide, through design, construction, conversion, maintenance and repair of ships and ship components. By integrating systems, Damen creates innovative, high quality platforms, which provide customers with maximum added value.

Damen's core values are fellowship, craftsmanship, entrepreneurship and stewardship. Its goal is to become the world's most sustainable shipbuilder, via digitalization, standardization and serial construction of its innovative vessels and through use of circular materials.

Damen operates 35 shipyards and 20 other companies in 20 countries, supported by a worldwide sales and service network. It delivers in the region of 100 vessels per year, with a total production value of over €3 billion. It offers direct employment to approximately 12,500 people. In all that it does, Damen aims to ensure a positive impact on the local environment and society.

Supporting sustainability goals in the dry bulk sector:

The decarbonization of the global shipping industry is no longer an aspiration, it's a mandate. With the International Maritime Organization (IMO) targeting a reduction in greenhouse gas emissions by at least 40% by 2030 and a net zero "by or around" 2050, every segment of the industry is being redefined. Nowhere is this more pressing than in the dry bulk sector, which moves nearly half of the world's seaborne cargo by tonnage.

Yet while much of the spotlight has focused on vessel performance, fuel types, and engine innovation, the transformation needed to meet sustainability goals runs deeper. It touches every link in the operational chain, including how vessels are supplied, what is procured, and who is trusted to deliver.

The dry bulk sector, known for its price-sensitive and time-pressured operating models, is facing a new challenge: balancing cost, compliance, and carbon accountability. And that means procurement, and the ship supply market that supports it, must evolve.

A new era: from statement to standard

Sustainability is no longer a value-add — it is becoming a baseline

Ship owners, charterers, and cargo interests are increasingly accountable to their investors, regulators, and customers for emissions data and sustainability progress. As environmental, social, and governance (EGS) frameworks become embedded in maritime operations, procurement decisions are under greater scrutiny.

That shift is already visible across major shipping companies who now demand transparent emissions reporting from suppliers, sustainability certifications, and low-carbon alternatives to traditional goods and services.

In this context, the traditional KPIs of marine procurement: cost-efficiency, speed, and availability, are being augmented, or even displaced, by climate-conscious decision-making.

Where suppliers were once judged on price and delivery times alone, the new questions are: what's the carbon cost of this delivery? Can the product be reused or recycled? Is the supplier aligned with our ESG goals?

From lowest price to lowest footprint

In the dry bulk sector, procurement has historically been viewed through a practical and cost-driven lens. Bulk carriers, often operating on tight margins and short turnaround times, prioritize fast, inexpensive sourcing solutions.

But today, being the cheapest no longer guarantees being the most attractive. Buyers increasingly seek vendors who can demonstrate environmental awareness and action. Certifications such as ISO 14001 for environmental management systems are becoming critical differentiators, not just formalities.

This shift from lowest price to lowest footprint doesn't mean abandoning efficiency. It means redefining it. A supplier who helps a vessel reduce waste, cut emissions, and simplify regulatory compliance may deliver far greater value than one who simply quotes the lowest price on a single line item.

Changing operational needs: fuels, formats, footprints

Decarbonization also demands operational adaptation, especially when it comes to fuel. The transition toward LNG, methanol, ammonia, and other alternative fuels presents new technical challenges. Ships using these fuels require different auxiliary equipment, safety gear, storage solutions, and monitoring systems.

Procurement officers must now source not just familiar consumables, but new types of equipment tailored to alternative energy systems. That requires ship suppliers to be more than just vendors; they must be knowledgeable advisors with insight into emerging technologies, fuel handling, and regulatory requirements.

Lifecycles are also under the microscope. Ship operators are seeking products with longer lifespans, reducing environmental impact, and better end-of-life recyclability. That puts pressure on suppliers to source and promote products that are not just compliant, but conscious.

Accountability through transparency

One of the defining trends in procurement is the demand for transparency. Buyers want to know: where products come from, how they are made, what their environmental cost is, and whether the supplier's own operations reflect sustainability best practices.

This is why AVS Global Supply has committed to the UN Global Compact, aligning with ten internationally recognized principles on human rights, labour, environment, and anti-corruption. It's not a badge; it's a framework for embedding responsible practice across every part of the business.

From ethical sourcing and emission-reducing logistics to sustainable catering and local procurement strategies, suppliers who take transparency seriously will be the ones invited to the table in the new era of maritime operations.

Practical innovation: one filter, 12,000 bottles saved

Sustainability in ship supply doesn't always require radical reinvention. Sometimes, it's about smart solutions to familiar problems.

Take plastic waste. A single vessel can consume thousands of plastic water bottles per year, many of which end up incinerated or improperly discarded. That's why AVS, in partnership with AQUAREX, has launched AVS Water, a compact, onboard filtration solution that replaces bottled water entirely.

The results are immediate: more than 12,000 fewer bottles per vessel per year, with the associated cost savings, storage efficiencies, and health benefits. It's a small change with a large impact, proving that decarbonization doesn't always mean complexity; sometimes it means simplicity done well.

Catering that cares

Another overlooked area in sustainable ship operations is crew catering. Onboard catering is often treated as an operational necessity, but it's also a significant touchpoint for crew welfare, food waste, and emissions.

Progressive suppliers like AVS are addressing this by offering tailored catering management systems that balance crew nutrition, cultural preferences, and budget constraints while reducing waste. Plant-based menu options, more efficient packaging, and strategic provisioning all contribute to lower environmental impact.

Under the banner of "Caring Beyond Catering," AVS promotes not just feeding crews, but supporting their overall health, mental wellbeing, and morale. In the long term, this drives both performance and retention, critical in an industry battling labour shortages and rising expectations around quality of life at sea.

A supplier is now a strategic partner

In the dry bulk world, operations are often complex, distributed, and under time pressure. It's easy to see procurement as a series of transactions. But that model is fast becoming outdated.

In today's environment, the supplier who

how procurement and ship supply must change

understands the strategic picture, who can anticipate the client's regulatory obligations, support their ESG reporting, offer value beyond price, and innovate for their crews, is the best supplier to have in your corner.

For AVS, that means becoming not just a supplier of goods, but a partner in performance, helping operators transition smoothly ethically, and competitively into a low-carbon future.

Looking ahead: a greener future is a competitive future

As regulatory pressures intensify and commercial expectations rise, sustainability is increasingly a gateway to opportunity. Dry bulk operators that can demonstrate clean operations will have better access to cargoes, financing, and partnerships. The same applies to the suppliers who support them.

In tomorrow's market, being green isn't a bonus, it's your boarding pass.

Sustainable procurement is no longer a compliance issue; it's a competitive one. Those who lead will differentiate. Those who innovate will thrive.

The dry bulk sector is already navigating headwinds, from economic volatility to fuel uncertainty, but it also has a unique opportunity: to use procurement not just to supply ships, but to shape a better future for shipping.

New research centre for sustainable shipping launched in Glasgow

A new Research Centre dedicated to advancing sustainable shipping has been launched by the University of Strathclyde in partnership with leading international shipping company Oldendorff Carriers.

Formally established during a signing ceremony at Strathclyde's city centre campus, the Oldendorff Research Centre for Sustainable Shipping will drive actionable research to advance the decarbonization of maritime operations, aligning global climate targets with operational realities at sea.

The Centre will address evidence gaps critical to an effective industry transition, focusing on technological, operational, and human factors, including the impacts of decarbonization measures on crew.

Key research areas will also encompass the design of next-generation, energy-efficient vessels, the integration of alternative fuel systems, and the application of AI-driven decision-support systems.

Professor Stephen McArthur, Executive Dean of Engineering and Associate Principal, who signed on behalf of the University, said:

"We are pleased to be working in partnership with Oldendorff, uniting Strathclyde's internationally recognized research capabilities with Oldendorff's deep operational expertise and knowledge.

By combining our strengths, we are creating new opportunities to drive forward the decarbonization of the global shipping industry — an urgent challenge that demands innovative, practical solutions. We look forward to delivering impact together through research, technology development and knowledge exchange."

Dr Torsten Barenthin, Director Research & Development, signed the research agreement on behalf of Oldendorff, and said: "Decarbonizing the maritime sector is the greatest operational challenge the industry faces and will continue to face in the years ahead.

Addressing it requires not only collaboration, but also a willingness to engage with the difficult issues that remain unexamined in much of the current discourse. The Centre is designed to generate insights that extend beyond Oldendorff and deliver measurable impact across the global fleet."

The collaboration also aims to advance the scientific evidence base that informs effective and practicable maritime policymaking. As part of the Centre activities, a scientific research paper on 'Round-trip Efficiency of Various E-fuels' is being prepared.

Electrostatic application of PPG hull coatings .

A fresh coat of paint

Marine paints & coatings

Jay Venter

PPG: Innovations in hull coatings

PPG Marine and Protective Coatings has developed a suite of advanced hull coatings engineered to reduce drag, enhance fuel efficiency and lower greenhouse gas (GHG) emissions. These coatings help its customers comply with environmental regulations, such as the European Commission's FuelEU Maritime Regulation and the International Maritime Organization's (IMO) Carbon Intensity Indicator (CII) and Energy Efficiency Existing Ship Index (EEXI) systems, while also reducing operational costs and maintenance downtime.

PPG SIGMAGLIDE® 2390 is a biocide-

free, low-VOC fouling release coating which employs PPG HydroReset Technology™ to create an ultra-smooth, low-friction surface. When immersed in water, this technology instantly reorganizes the surface profile of the coating at a nano scale to reduce drag and prevent marine organism adhesion. PPG Sigmaglide 2390 reduces power consumption by up to 20% and total GHG emissions by up to 35%, helping ship owners achieve IMO carbon intensity targets. With its stable silicone binder system, PPG Sigmaglide 2390 prevents surface deterioration so vessel owners can benefit from an extended lifetime of more than ten years with minimal maintenance.

Another breakthrough product, PPG NEXEON™ 810, is a copper-free hull coating that incorporates photodegradable biocides to minimize environmental impact without compromising performance. This coating offers exceptional smoothness, reducing GHG emissions by up to 25%. PPG Nexeon 810 also provides excellent colour retention, maintaining its vibrant appearance throughout the vessel's entire service life. While some conventional antifouling coatings contain ingredients that may discolor over time, PPG Nexeon 810 creates a long-lasting finish that preserves aesthetic performance.

Both PPG Sigmaglide 2390 and PPG Nexeon 810 are compatible with electrostatic application, which improves transfer efficiency, reducing coating overspray and waste compared to airless spraying. Applied with an electrostatic spray gun, the paint is electrically charged while the hull of the metal ship is grounded. The paint particles are attracted to the surface almost like a magnet, leading to an even distribution and a uniform, ultrasmooth film layer. Over the last two years, PPG has introduced this spraying technique to the marine market at global docking locations.

Staying ahead of the curve

Ship owners face increasing regulatory and operational pressures. At PPG, the company sees these strict measures prompting ship owners to adopt low-friction coatings as the technology of choice. These coatings can directly shift the speed-power curve, meaning that ships can sail at the same speed using less power while also improving operational efficiency. PPG has expanded its marine hull coatings portfolio to address the rising demand for solutions that reduce power consumption and lower GHG emissions. This product diversification is a key component of its strategy to provide coatings that not only enhance vessel performance, but also support compliance with environmental standards.

One of PPG's focus areas is electrostatic application of its hull coatings, which supports more efficient and sustainable coating processes. Electrostatic application is not a new process. It has been used in automotive coatings for many years. PPG is proud to be the first and only company introducing this technique to the shipping industry. This spraying technique reduces overspray and material waste, saves time with reduced hull masking and cleanup and also contributes to a safer and more controlled environment for applicators. PPG is expanding the electrostatic application equipment capabilities of shipyards all over the world.

PPG continues to invest heavily in R&D, ensuring that our coatings deliver long-term durability and superior protection in even the harshest marine conditions. By extending recoat cycles and minimizing maintenance needs, PPG's coatings offer significant lifecycle cost savings while reducing the carbon footprint of shipping operations.

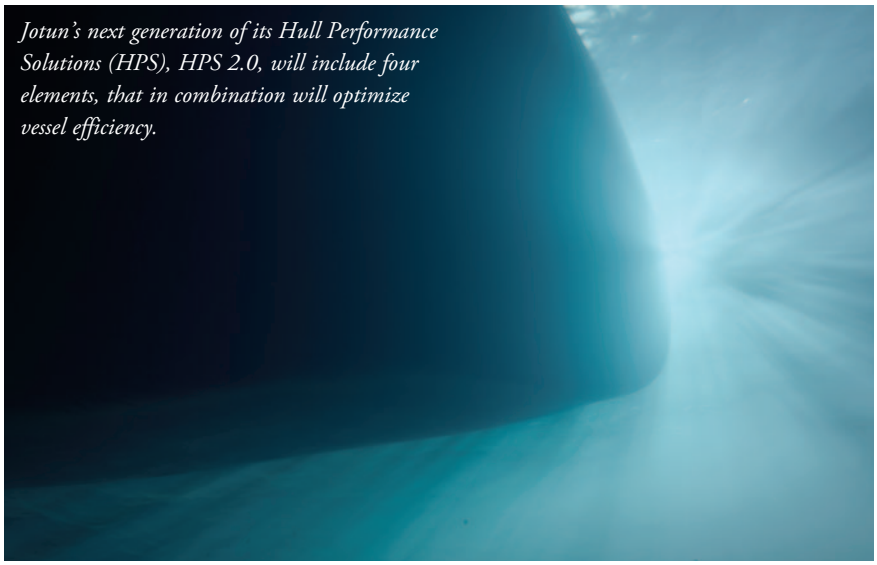
The company has also formed alliances that accelerate innovation and adoption of sustainable technologies. PPG is proud to partner with RightShip and its Zero Harm Innovation Partners Program with its PPG Sigmaglide 2390 fouling release coating. RightShip's programme aims to further reinforce the adoption of sustainable technologies to help the shipping industry reach its sustainability goals while encouraging collaboration between stakeholders.

About PPG

PPG's Protective and Marine Coatings business delivers specialized coatings that ensure optimal performance for vessels and structures in the world's most demanding marine environments. Its global presence and dedication to excellence enable the company to deliver high-performance solutions with a focus on sustainability and product innovation. PPG's suite of coatings provides operational advantages, helping to prevent marine fouling, reduce fuel consumption and emissions and minimize environmental impacts.

As the shipping sector continues to evolve, PPG remains committed to helping our customers navigate the changes ahead with coatings that deliver superior performance and ensure regulatory compliance.

Jotun introduces HPS 2.0 at Nor-Shipping



Jotun's next generation of its Hull Performance Solutions (HPS), HPS 2.0, will include four elements, that in combination will optimize vessel efficiency.

On 2 June 2025, global marine coatings supplier, Jotun, announced the launch of the next generation of its recognized Hull Performance Solutions (HPS). HPS 2.0 was presented for the first time to the shipping industry at Nor-Shipping in Norway and represents a significant enhancement to the HPS that was introduced in 2011. Included in HPS 2.0 are two new products for different trades and environments, alongside the established and newly speed-loss verified SeaQuantum X200, best-in-class technical service, hull condition management and performance guarantees to deliver a solution that is Tailored to trade™.

"We are thrilled to present HPS 2.0, a testament to our Clean shipping commitment and our focus on innovation that has been ongoing since 1926. This enhanced solution, consisting of products, services, data and our credible performance guarantees is designed to meet the evolving needs of our customers, ensuring optimal hull performance and supporting their ESG ambitions," said Morten Sten Johansen, Global Category Director for Hull Performance in Jotun.

HPS 2.0 will include four elements, that in combination will optimize vessel efficiency: Jotun's best antifouling technologies — tailored to trade, technical service from the industry's largest team of coatings advisors, intelligent hull condition management and credible performance guarantees.

Jotun's best antifouling technologies

Solutions tailored to specific needs are crucial as various trade patterns and operating environments each require specific coatings for optimal efficiency.

- **For predictable trades** — SeaQuantum X200 is Jotun's flagship SeaQuantum antifouling with 15 years track record of maximizing hull performance with close to 2,000 deep-seagoing vessel applications, delivering high performance for predictable trades. DNV has recently verified the average 1.0% speed loss of SeaQuantum X200 based on analysis done as per ISO 19030, which is also presented at Nor-Shipping for the first time to the industry.
- **For high fouling intensity trades** — SeaQuantum XT is Jotun's newest SeaQuantum antifouling, more robust for high fouling intensity trades. At the centre of this advancement is Jotun's ActiCore™ technology, building on the unique and patented in-house binder combination and an optimized high-performance biocide package. This technology is designed to deliver consistent, reliable protection against intensified fouling threats.
- **For unpredictable trades** - SeaQuest Endura II is a new high performing, tin-free biocidal FRC giving vessels flexibility in unpredictable trades. At the centre of this advancement is Jotun's Flexcure™ technology, which delivers exceptional levelling properties, optimized curing speed, and extended repairability.

A recent study, presented by Jotun during Nor-Shipping 2025, showcase the need for various antifouling technologies and that there is still an untapped opportunity for many ship owners and operators when it comes to optimizing the hull performance.

"Although various antifouling technologies are available, their effectiveness is dependent on the marine environment, trade patterns and the predictability of the trades. A tailored approach to antifouling, can help ship owners and operators achieve optimized effectiveness," said Morten Sten Johansen in Jotun.

"However, one in five ship owners and operators are aware that they are not using the most effective antifouling coating for each vessel in their fleet today. The impact of having optimized hull performance for the entire fleet is massive. DNV recently verified that Jotun coated vessels avoided 11.1 million tonnes CO_2 in 2024, or worth approximately US$2 billion in fuels, so there are definitely big gains to be made, both on an environmental and economical level, for each operator and for the industry as a whole."

Unmatchable technical service

With more than 1,200 coating advisors worldwide, Jotun provides unmatchable technical service to ensure optimal hull performance. Jotun's experts will as a part of HPS 2.0 provide on-site support and tailored recommendations to maximize efficiency and longevity and ensure application of coatings is to the highest standard.

Intelligent hull condition management

Through data-driven tools, Jotun helps optimize vessel efficiency by analysing key performance data according to ISO 19030. This helps identify improvement areas and minimize fouling, which in turn will reduce fuel consumption. Included for users of HPS 2.0 is the performance analysis service in Jotun's well-known HullKeeper platform, to synergize intelligence on hull condition with hull performance analysis, enabling operators to make better and faster decision through actionable insights.

Credible performance guarantees

Jotun's dock-to-dock guarantee ensures continuous performance from one dry docking to the next, maintaining consistent hull efficiency throughout. The guarantees protect against will ensure peace of mind for operators and is a testament to the proven and promised performance that HPS 2.0 is delivering.

With nearly 100 years of experience navigating unknown waters, Jotun remains committed to innovating and developing advanced products and solutions that cut carbon emissions, preserve fuel and protect biodiversity.

"In 2011, we revolutionized the industry with our groundbreaking HPS, moving from promised to proven performance. As the true home of hull performance, we are proud that the industry has jumped on board with this solution and consider hull performance as a core element of vessel efficiency. By introducing HPS 2.0, we will continue our legacy and build on our proven performance and move forward with an even more comprehensive solution tailored to our customers' specific trade requirements," said Morten Sten Johansen.

Morten Sten Johansen, Global Category Director for Hull Performance in Jotun.

Lloyd's Register grants industry first full antifouling approval to Jotun's Hull Skating Solutions

LR becomes first classification society to approve compatible cleaning and coating system, supporting maritime industry's proactive hull management strategies.

Lloyd's Register (LR) has awarded the world's first Recognised Enhanced Antifouling Type Approval to Jotun's SeaQuantum Skate antifouling coating, alongside type approval certification for the HullSkater hull cleaning equipment.

The approval, announced at Nor-Shipping 2025, covers both the HullSkater robotic cleaning device and the SeaQuantum Skate coating, making it the first fully integrated hull cleaning and coating solution to be certified by a classification society.

Jotun's HullSkater is a remotely operated robotic cleaner designed to remove early-stage biofouling without damaging antifouling coatings. It is always paired with the SeaQuantum Skate coating, and together it forms a fully compatible cleaning and coating regime.

The Recognised Enhanced Type Approval is the highest level of certification under LR's Antifouling Coatings programme. The Recognised approval status, now achieved by Jotun, is based on extensive in-service performance data from at least three vessels. This includes inspection reports before and after cleaning, time-to-refoul measurements, coating condition assessments, and third-party water quality testing conducted during the cleaning process. Recognized approvals are valid for five years and can be renewed with continued performance evidence.

Type approval of the HullSkater cleaning equipment is based on the cleaning performance, electrical and mechanical equipment fit-for purpose and data from water sample analysis in the vicinity of operation versus background samples.

The LR approval provides verified operational guidance to ship operators, specifying appropriate cleaning heads, optimal pressures, recommended cleaning cycles, and maximum allowable fouling levels before intervention becomes necessary. The certification identifies unsuitable cleaning methods, protecting both coating integrity and performance.

LR developed the Enhanced Antifouling Type Approval to bridge the regulatory and scientific gap in hull cleaning practices, ensuring that ship operators have access to objective, evidence-based guidance. It also enables vessels to qualify for LR's Clean Hull (CH) notation under the ECO class, which requires an Enhanced Antifouling Type Approval for any applied coating.

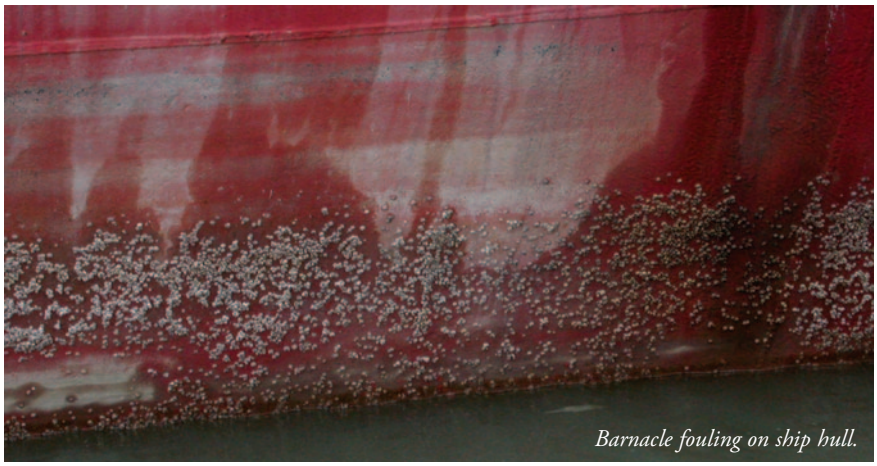
Heather Hughes, Principal Specialist at Lloyd's Register, said: "Ship operators are approaching LR seeking authoritative guidance on which coatings can be effectively used as part of their comprehensive hull management planning. We provide independent verification of antifouling coating performance both before and after cleaning, ensuring operators can make informed decisions with confidence."

Morten Fon, CEO of Jotun, said: "This approval validates the long-term performance of the HullSkater and SeaQuantum Skate. We're proud to set the standard for integrated solutions that protect both vessels and the oceans they operate in."

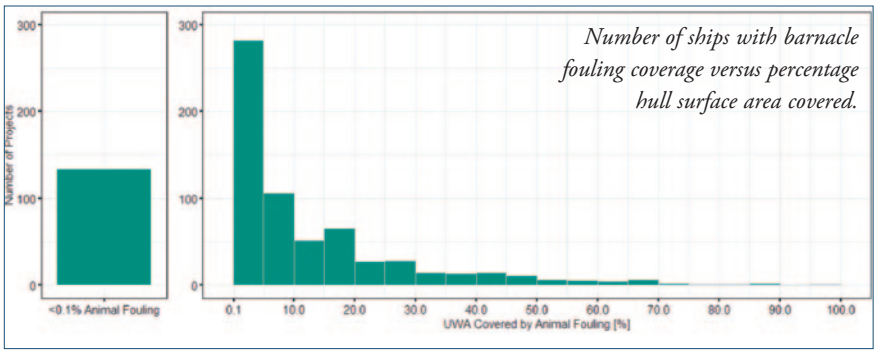
Heather Hughes, Principal Specialist at Lloyd's Register.

Morten Fon, CEO of Jotun.

New study confirms barnacle biofouling is a big burden for shipping



Barnacle fouling on ship hull.



Number of ships with barnacle fouling coverage versus percentage hull surface area covered.

Nearly one-fifth of a sample group comprising 685 vessels inspected in dry dock were found to have more than 20% of their underwater hull surface covered by barnacles, and as much as one-third of the sample had more than 10% coverage, a new study has found. High levels of barnacle biofouling on underwater hulls across the global shipping fleet can significantly drag down decarbonization efforts and increase fuel costs.

The reality of barnacle biofouling burden on the global shipping fleet has been determined with findings from extensive analysis of hull condition across a large group of ships, of varying type and age, confirming that the presence of barnacle biofouling is extremely common.

A new research study titled, '*How much could barnacles limit shipping's decarbonisation?*' published by I-Tech, developers of the barnacle repelling antifouling technology, Selektope, details how over one third of vessels in a 685-sample group sailed into dry dock with barnacles covering more than 10% of their hull surface.

More alarmingly, more than one fifth of vessels inspected in the sample group were found to have over 20% of their underwater hull surface covered with barnacle biofouling; whereas only 140 vessels inspected had the optimal condition of less than 0.1% barnacle biofouling coverage.

The extensive data analysis that sits at the core of the new research study was conducted by an independent marine coatings consultancy group based on data collected from 685 vessel hull condition inspections undertaken between 2015-2025 on the majority of vessel types, with a range of trading activity levels.

While this sample group is relatively small in comparison to the 55,000 merchant ships trading internationally, the high prevalence of barnacle biofouling found on this sample group of vessels gives indicative insight that should be of great concern to the industry considering the immense negative impact barnacle biofouling has on increasing vessel emissions.

Barnacle biofouling was found on all vessel types however; it was present on tankers more than other ship types. For example, almost 90% of tankers were found to have barnacle biofouling present on their underwater hull with varying intensity, compared to around 70% of pure car carriers and container ships inspected.

It was also clear that lower activity vessels are at greater risk and barnacle biofouling is more prevalent on the flat bottom area compared to vertical sides or boottop hull areas.

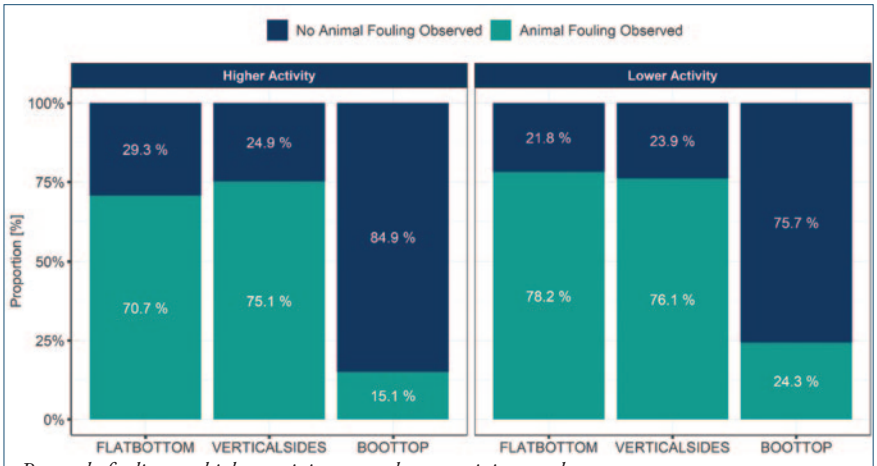
Variations in barnacle biofouling between vessel types can be attributable to a certain degree to different root causes; different paint systems, speed, activity and route. However, the presence of more than 10% barnacle biofouling coverage can result in significant added resistance, with 36% more shaft power required to maintain the same speed through water. This has a significant negative impact on a vessel's fuel use and subsequent emissions to air.

Extrapolating from published data taken from a 2011 study by Michael P. Schultz[1], this level of hard biofouling could be responsible for at least 110 million tonnes of excess carbon emissions per year, and an additional US $15 billion spend for the global commercial fleet. The true figure is likely to be higher, as this is a conservative calculation based on today's low sulphur fuel oil prices and only assumes a 10% coverage of hard biofouling.

Therefore, the significant extent of hard fouling found across this sample of group of 685 vessels in the research study demonstrates the magnitude of unnecessary demand being placed on engines because of barnacle biofouling, increasing fuel consumption and emissions, and exacerbating speed losses due to increased hydrodynamic drag.

Dr Markus Hoffmann, Technical Director at I-Tech says: "The findings that more than one fifth of vessels in this study had more than 20% barnacle biofouling is

1 Schultz et al, Biofouling, 2011



Barnacle fouling on higher activity versus lower activity vessels.

JOTUN

jotun.com

HPS™ 2.0

Tailored to trade™

When launched in 2011, Jotun's Hull Performance Solutions (HPS) disrupted the industry, and shifted the focus from promised to proven performance. Today, we continue to deliver premium products and services as part of the enhanced HPS 2.0 tailored to our customers' needs.

- Our best antifouling technologies
- Unmatchable technical service
- Intelligent hull condition management
- Credible performance guarantees

HULL PERFORMANCE SOLUTIONS

Avoiding barnacle fouling with Selektope - Tokyo Bay one year.

concerning. This reinforces the fact that antifouling coating systems with good static performance, boosted by the presence of biocides that target hard fouling, even under extended static conditions, are an absolute necessity if barnacle fouling is to be reduced to much lower levels on a global fleet scale."

"Data analysis on a sample group of vessels using coatings containing Selektope, conducted by the independent coatings consultants, showed that, in the majority, no barnacle biofouling was present. This confirms that good barnacle fouling protection is always worth the investment, not least because these organisms can really drag a vessel's Carbon Intensity indicator (CII) down and thrust greenhouse gas (GHG) emissions up," concludes Dr Hoffmann.

From the conclusions drawn in the '*How much could barnacles limit shipping´s decarbonisation?*' research study, I-Tech's advice for ship owners and/or operators includes using careful consideration of hard biofouling protection components during antifouling coating selection process. Ensuring adequate hard biofouling protection, for all vessels, but particularly those at risk of longer idling periods while in-service, is essential for the adequate protection of the global shipping fleet from barnacle biofouling.

About I-Tech AB

I-Tech is a biotechnology company that has developed the antifouling technology Selektope®, an active substance that prevents barnacle attachment on submerged surfaces such as ships and boat hulls. By increasing the anti-barnacle performance in marine paint systems (e.g. antifouling coatings), fuel and maintenance costs are reduced and vessel energy efficiency improved. I-Tech has obtained the necessary regulatory approvals for Selektope® and has several of the world's largest manufacturers of marine antifouling coatings as customers. The company's share is listed for trading on Nasdaq First North Growth Market in Stockholm. The Company's Certified Adviser is Carnegie Investment Bank AB (publ).

Fuel savings with Ecospeed

Fuel is one of the largest ongoing expenses for any shipowner or operator, accounting for up to 50% of a vessel's operating costs. A cruise ship, for example, typically spends from $80,000 to $200,000 a day on fuel. The world fleet spends from $120bn to over $200bn a year on bunker fuel. Anything which can significantly reduce that fuel bill is of great interest to the industry. This article is about Ecospeed, a coating system which can greatly increase fuel efficiency for individual ships and the world fleet.

Why so much fuel?

An analysis in the Second IMO GHG Study explains: "43% of the fuel energy is converted into shaft power while the remaining energy is lost in the exhaust or as heat losses. Due to further losses in the propeller and transmission, only 28% of the energy from the fuel that is fed to the main engine generates propulsion thrust in this example. The majority of these remaining 28% are spent overcoming hull friction."

Hull friction

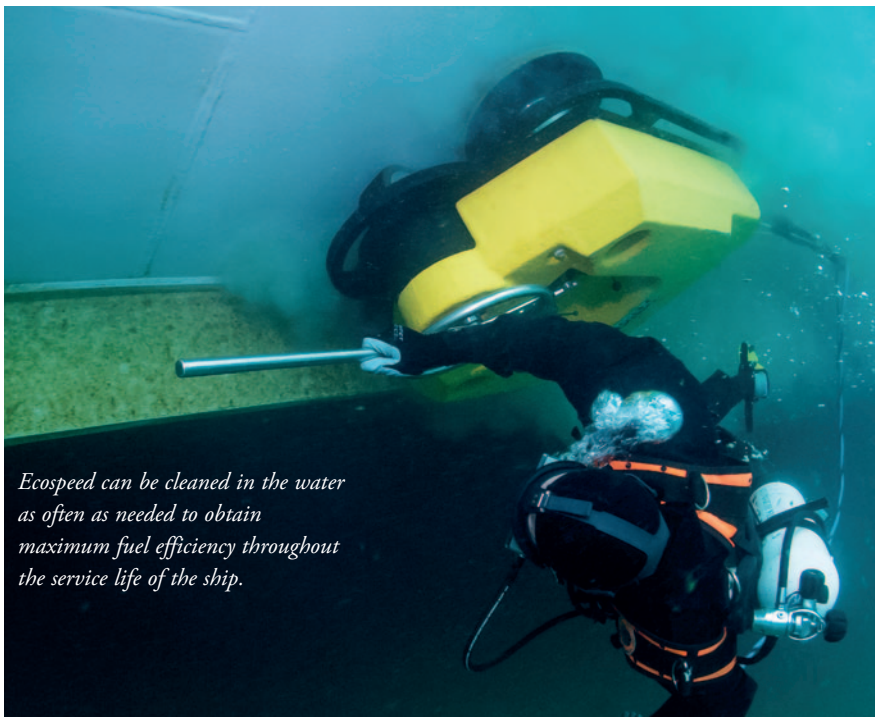
Hull friction is the enemy of fuel efficiency. A very high percentage of the energy generated by ship engines is expended in overcoming the resistance to the ship's hull as it moves through the water. This is hull friction.

Assuming that the ship's hull has been efficiently designed and built, there are two main factors that contribute to the fuel efficiency or inefficiency:

1. The roughness or smoothness of the hull itself which, assuming the ship has been well built, comes down to the paint, its application and its maintenance over time;
2. The degree of biofouling accumulated on the hull.

Ensuring the hull coating is smooth and remains so, and keeping it clean of biofouling — even a small degree of accumulated slime — can save as much as 20% of the ship's fuel consumption or more. With heavy fouling, the fuel penalty can be 80% or higher. This fact has been known since the days of sailing ships, where fouled ship hulls could cost a navy a whole battle due to loss of speed and manoeuvrability.

If the world fleet consisted of well-coated, smooth hulls that were kept clean



Ecospeed can be cleaned in the water as often as needed to obtain maximum fuel efficiency throughout the service life of the ship.

of slime, let alone weed and hard fouling, this would save between $20 billion and $40 billion a year or more, with a proportionate reduction in carbon emissions.

The hull coating system

There are three main types of underwater hull coatings in use today: antifouling coatings (AF) which leach poisonous substances into the water continuously to kill vegetable and animal fouling before it can attach; foul release coatings (FRC) which have a slick surface which biofouling cannot easily attach to and which is designed to release any fouling that does accumulate when the ship moves, particularly at speed; and hard, inert surface treated composites (STC) which provide a hard, smooth surface which does not degrade over time and which can be cleaned in the water to remove accumulated fouling without harm to the coating or the environment. They are listed above in order of prevalence in today's fleet. The biocidal antifouling coatings are by far the most common.

This article focuses on the third type of coating, specifically Ecospeed.

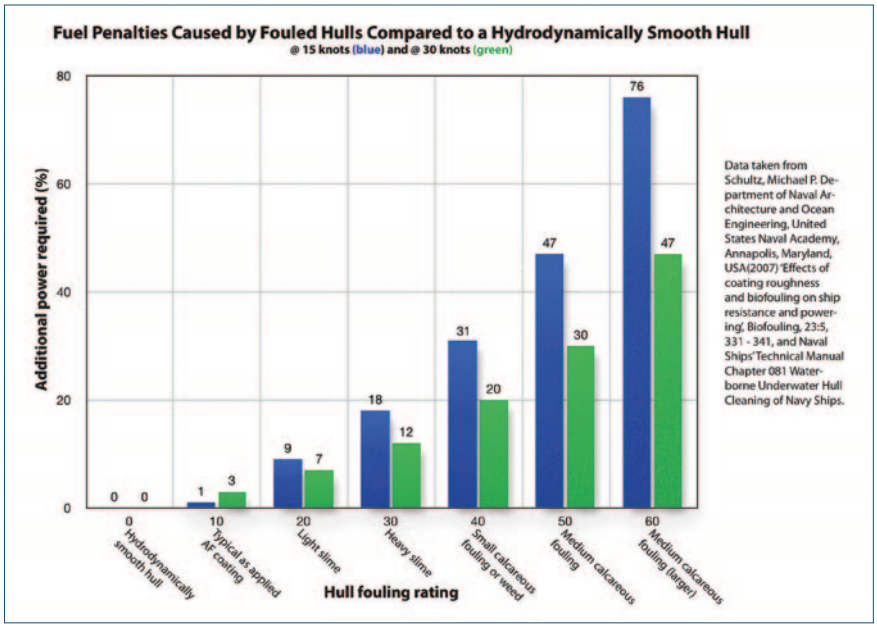
Description of Ecospeed

Ecospeed is a hull coating system designed to fully protect the hull for the life of the ship without need to repaint, while achieving maximum fuel efficiency throughout the ship's life. Because it is entirely non-toxic, it avoids any contamination or pollution of the marine environment.

Ecospeed is a system consisting of a hard, inert glass platelet reinforced vinyl ester resin combined with in-water cleaning as needed to keep it free of biofouling.

These are the main characteristics which distinguish it from conventional antifouling and foul release coating systems:

- designed to last the life of the ship without any need to repaint. Minor touch-ups to repair mechanical damage are very easy to carry out, and leave the repaired coating as smooth as the original.
- does not emit any contaminants into the water, such as copper, zinc or other heavy metals, biocides such as pesticides or herbicides, PFAS or microplastics. It has been tested and proven to have no harmful effect on the marine environment.
- can be cleaned as often as needed in the water without any damage to the coating or loss of thickness and without any harm to the environment. Any degree of fouling can be safely removed. The coating is restored to its original smoothness.
- cleaning the coating underwater using the correct tools also has a buffing effect which will make the hull smoother over time. Trying to clean a conventional antifouling or foul release coating damages the coating, particularly if macrofouling has to be removed. Barnacles and other fouling organisms can penetrate the softer AF and FR coatings, whereas with Ecospeed they cannot.



Ecospeed in action

A notable fuel savings success with Ecospeed is the case of a major cruise line which applied the coating to four ships in its fleet. First, two existing vessels were recoated during routine drydocking. The ships sailed mostly in the Caribbean where fouling is fairly rapid. They were cleaned every six to ten weeks on average in order to maintain maximum fuel efficiency. The president of the company stated publicly that these Ecospeed-coated ships were saving 10% fuel costs compared with their previous AF coating.

Based on this success, the cruise line applied Ecospeed to two newbuilds with even greater success. Because Ecospeed is so durable and designed to last, when the ships drydocked there was no need to repaint — at most some minor touch-ups of mechanical damage. This led to the officers and crew of the ships nicknaming Ecospeed the "wash and go" coating.

The cost of cleaning the ships 8–10 times per year was dwarfed by the fuel savings plus the additional savings of drydock fees, off-hire time, materials and labour required in maintaining the AF coating they had previously used.

There have been many other examples of fuel savings through correct application of the Ecospeed system.

Cautions

It must be noted that Ecospeed is not just another hull paint. It is a ship hull protection and performance system consisting of a special coating plus routine cleaning. When deciding to switch to Ecospeed or apply Ecospeed at newbuild, it is vital to take the cleaning requirement into consideration. As the coating does not leach any poison, it will accumulate biofouling. This will occur at different rates depending on the ship's sailing pattern and operating environment. Ships operating in the tropics will require cleaning much more often than those sailing in ice. The fouling will not damage the coating in any way and can always be cleaned off. Each individual ship's situation is discussed and Subsea Industries assists with working out how the cleaning requirements will be met.

Work is in progress on an industrial cleaning system that will not require divers and can clean a large container ship's vertical sides in an hour or two. Until now, the coating has been cleaned successfully with divers using powerful hydraulic in-water cleaning equipment or in drydock using high pressure washing.

Conclusion

Used correctly and cleaned often enough to keep the biofouling down to a light slime or microfouling, Ecospeed is capable of delivering the highest fuel efficiency of any ship hull coating system. To this is added the advantages of lasting the life of the vessel without the need for recoating, and the absence of any adverse effects on the marine environment. DCi

NORDEN inks iron ore logistics project in Australia

NORDEN has signed its first port logistics project in Australia with existing dry cargo freight customer, the Australian developer and operator of iron ore mining projects, Kimberley Metals Group (KMG), further expanding the partnership.

With the new project — situated in the port of Wyndham in Western Australia — NORDEN will provide additional assets for the existing transshipment operation, loading iron ore from the port onto barges and on to the ocean-going vessels.

"We are excited to continue the growth of NORDEN's logistics activities by entering into an agreement with KMG, taking our existing partnership to a new level by combining our freight services with our expertise within logistics to optimize KMG's entire port-to-port supply chain," says Anne Jensen, COO at NORDEN.

The contract also entails a fixed-term charter arrangement with an option to extend. The first barge is expected to launch in July this year.

Further expanding NORDEN's integrated customer solutions in a new region

With this entry point in the Australian logistics market, NORDEN continues to identify and evaluate opportunities to further grow its integrated logistics and freight solutions among new and existing customers in Australia.

"The new agreement is a natural next step on NORDEN's strategic journey within logistics, servicing customers on a deeper level and becoming even more relevant to them, continuously using the strong synergies across NORDEN's integrated freight solutions," Anne Jensen concludes.

NORDEN Logistics

In 2022, NORDEN entered into a new business area of port logistics with the signing of a 10-year agreement with manganese mining company Comilog – a subsidiary of French metallurgical group Eramet, where NORDEN is operating a large transshipment solution in Gabon. NORDEN's venturing into logistics was a natural extension of its customer service offering and NORDEN sees a large potential to grow the business globally by engaging in infrastructure developments in partnership with new and existing customers.

About NORDEN

NORDEN is a global provider of ocean-based freight services for bulk and project cargo of all sizes. The company integrates freight solutions with port logistics, helping its customers to optimize and decarbonize supply chains.

NORDEN provides tailored solutions based on flexibility, reliability and intelligence. Its agile business model ensures stability by continuously adapting its fleet to market developments and customer needs. Founded in 1871, NORDEN is one of Denmark's oldest internationally operating shipping companies. Incorporated in Denmark, it is listed on Nasdaq Copenhagen as a part of the OMX Nordic Large Cap index. With 19 offices across 6 continents, NORDEN is a truly integrated part of global trade.

About KMG

KMG is an active explorer, developer and operator of iron ore projects. KMG owns the Ridges and Matsu Iron Ore Projects in the Far North region of Western Australia.

Qube Ports & Bulk: 200 locations across Australia, New Zealand and South East Asia

Qube Bulk provides complete mine-to-market and mine resupply solutions, offering a range of mine, road, rail, storage, port and ship services.

Qube Bulk currently handled around 20mtpa (million tonnes per annum) of coal in Australia, predominantly from Central Queensland and the Hunter Valley.

The port's services focus on coal haulage, on and off road from the mine to the CHPP (wash plant) and TLO (train loading facility).

Qube works closely with local trailer manufacturers to ensure trailers are designed to optimize the payload to the highest constraint on any given route. This may be a maximum axle load limit for the road design (civil limit, colvet limit, bridge limit etc) or maximum length for the route. The port is also looking at ways to reduce the tare weights in order to increase payloads. It is also working with Prime Mover OEM's to maximize HP and Torque to ensure payloads >300t GVM can be safely and reliably managed.

In addition to the focus on hardware Qube continues to look at onboard data available to optimize driver performance, minimize fuel requirements and identify and correct any forecast asset reliability issues.

Qube is Australia's largest integrated provider of import and export logistics services and operates in over 200 locations across Australia, New Zealand and South East Asia with a workforce of more than 10,000 employees.

Qube Ports specializes in the development and management of an integrated bulk cargo service solutions incorporating stevedoring, transport and storage of bulk products.

LOGISTEC sets industry record with 30 Green Marine-certified terminals across North America

LOGISTEC, a major North American marine and logistics services provider, has proudly announced the certification of three additional terminals — Cleveland Bulk, Cleveland Breakbulk and MtlLINK in Montreal — under the Green Marine environmental programme. This milestone brings LOGISTEC's total to 30 certified terminals, setting a new industry benchmark for environmental leadership and sustainable operations.

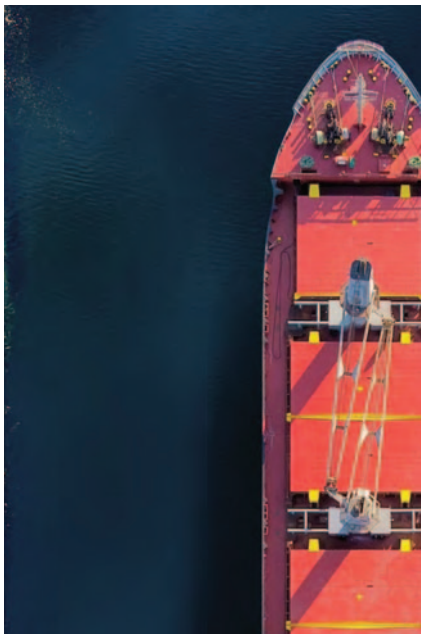
"Reaching 30 certified terminals, including our remote location in the Canadian Arctic, is a culmination of the hard work and shared vision of our entire organization," said Sean Pierce, CEO of LOGISTEC and Green Marine board member. "Together, in collaboration with our port partners, we will pursue our goal of certifying all our terminals across our North American network, reducing our carbon footprint and leading for a sustainable future in the marine industry."

Green Marine is an environmental certification programme requiring participants to continually improve their performance through rigorous, independently verified criteria. The organization is also creating a network of marine partners worldwide, driving innovation across borders. LOGISTEC's ongoing commitment to this program and international vision highlights its deep-rooted focus on continuous improvement.

LOGISTEC recently released its 2025 Sustainability Report, detailing its progress and future goals to drive positive change across its operations. The report highlights achievements in reducing greenhouse gas emissions, enhancing community engagement, and fostering a culture of safety and innovation.

About LOGISTEC

LOGISTEC is based in Montréal (QC) and provides specialized bulk, breakbulk and container cargo handling services, as well as logistics solutions, to marine and industrial companies across its North American network of 62 ports and 85 terminals.



LOGISTEC also offers marine transportation services in the Arctic and marine agency services for shipowners and operators.

Terminal Quequén: Argentina's reference grain exporting terminal

For the first five months of 2025, exports from Terminal Quequén S.A., the largest grain handling operator at the Argentinian Port of Quequén, have reached 851,138 tonnes, equivalent to 32.6% of total traffic at the port. For each grain harvesting season, the facility normally accounts for 2.5mt (million tonnes), which is why it has become Argentina's reference operator in the cereals export business.

It first came into operation in 1994 and nowadays operates two berths at the port: 4/5 and 6, which have alongside draught of up to 12.8 metres, allowing it to accommodate either Panamax or Handymax bulk carriers at the 486 metres of quay.

In terms of productivity, the main handling system operates at 3,000 tonnes per hour, allowing it to despatch peak loads of up to 60,000 tonnes per vessel. Inbound consignments are off-loaded at four truck dump platforms that can handle 2,000 tonnes per hour, with the total terminal storage capacity being 115,000 tonnes.

Terminal Quequén has also progressively automated its activities, nowadays allowing customers to track their cargo in real time, from reception to despatch. In addition, consignments are subjected to standard quality controls, which can also incorporate cleaning or drying elements as necessary. Also on offer is electronic weighing equipment, moisture sensors and a network of high-performance conveyor belts.

The company has led the way nationally in mitigating environmental pollution, first introducing measures in 2016 to minimize dust emissions. Air quality is nowadays constantly monitored.

The port as a whole handles between 6.5mt and 8mt annually, mostly composed of grains, by-products and fertilizer. Of this, Terminal Quequén S.A. is responsible for 33–40% of the total cereal traffic, being the largest private operator of the port complex. As for commodities, corn is by far the most important, followed by wheat, feed barley, malt barley, grain by-products, and soybeans. It also handles vegetable oils.

Its hinterland encompasses an area southwest of Buenos Aires, as well as regions to the south of Cordoba, La Pampa and San Luis. *Barry Cross*

Deeper draught attracts record size of fertilizer consignment at Paranaguá

The Port of Paranaguá has set a new record for the amount of fertilizer it has handled from a single vessel. The *Taj Knighthood*, inbound from China, offloaded 78,000 tonnes at berth 211 for onward despatch to various parts of Brazil.

The main company involved was Fortesolo, which belongs to the FTSpar group. Its COO, Jailson Luz, noted that there is a trend in the fertilizer market towards the greater use of Panamax bulk carriers. Last year, the company handled 13 vessels of this size, with nine already handled in 2025. A tenth was due to dock later in June.

Paranaguá is nowadays one of Brazil's main fertilizer importing facilities, which in part is due to a recent slight deepening of draught at several berths to accommodate bigger bulk vessels. The additional 30 centimetres involved has helped attract more business confirmed the company. *Barry Cross*

Port of Los Angeles completes construction of Berths 177-182 Wharf Restoration Project

Original timber wharf replaced with concrete wharf after significant fire damage

The Port of Los Angeles has completed construction of the $22.7 million Berths 177-182 Wharf Restoration project located along the East Basin Channel in Wilmington.

Approved by the Los Angeles Board of Harbor Commissioners in September 2023, the project began construction in November 2023, and included constructing approximately 382 linear feet of concrete wharf, 62-feet-wide. Work also includes slope erosion repair and bollard upgrades.

The new wharf, designed in compliance with the port's seismic code, partially replaced a timber wharf that was extensively damaged in a fire that occurred in 2014.

"The completion of this project on the heels of the catastrophic Eaton and Palisades fires is a stark reminder of the need to rebuild with long-term resiliency as a top priority," said Port of Los Angeles Executive Director Gene Seroka. "We're proud to deliver this key infrastructure project as steel-handling operations remain uninterrupted."

"Designing and building infrastructure with fire prevention in mind is critical to our operations," said Port of Los Angeles Deputy Executive Director of Development Dina Aryan-Zahlan. "This port is more than 100 years old; terminal modernization is essential to maintain our competitive edge."

The project allows terminal operator Pasha Stevedoring & Terminals to continue shipping and receiving of steel products, including coils of sheet metal and wire rods, tubing, piping, rebar and other bulk material. Pasha's terminal is a specialized 40-acre steel-handling facility with covered on-dock warehouses that comprise a 116,000ft^2 transit shed. The Port of Los Angeles is the largest steel-handling port on the West Coast.

Pasha operates two marine terminals at the Port of Los Angeles, including the site of the Green Omni Terminal Project, which demonstrates a full range of zero- and near-zero emissions equipment and vehicles.

Construction was completed by Reyes/Larison Joint Venture of Pomona, Calif.

Tradepoint Terminals announces $35m investment in state-of-the-art bulk conveyance system

Modernization of bulk logistics and port operations on the East Coast of the USA

Tradepoint Terminals, a multi-commodity terminal and subsidiary of Tradepoint Atlantic, announced a $35 million investment in a bulk cargo conveyance system, indoor and outdoor bulk storage expansion, supporting infrastructure, and rail connectivity, as part of its strategic plan to modernize its bulk logistics and port operations to one of the most efficient on the US East Coast. This bulk storage expansion project located on and immediately adjacent to an existing 1,100ft-long pier introduces a multi-commodity solution with ultra-efficient offloading and storage capabilities, increasing throughput and flexibility for a broad range of bulk products.

The project represents a pivotal advancement in material handling technology at Sparrows Point. The new system incorporates high-capacity conveyors and hoppers, equipped with variable speed control and washdown functionality, allowing for seamless handling of diverse materials — from cementitious products and road salt to fertilizer and more.

"This investment is about more than just new equipment — it's about building infrastructure that anticipates the needs of global supply chains," said Russell Williams, Vice President of Tradepoint Terminals.

Engineered to minimize the time it takes to discharge Panamax vessels, the system positions Tradepoint Atlantic as a competitive gateway for high-volume bulk materials. The infrastructure also leverages the existing 50 acres of adjacent paved storage, maximizing operational flexibility for customers.

"This innovative project is a critical next step in the realization of our vision to become one of the most diverse and efficient logistics hubs in the country," said Kerry Doyle, Managing Director of Tradepoint Atlantic. "Bulk material handling is at the core of our current operations, but our vision for Tradepoint Terminals includes a broad spectrum of commodities and cargo types. This investment allows us to expand capacity and optimize bulk material handling to meet the diverse needs of our growing customer base while also paving the way for continued growth of our breakbulk, automobile, and future container business. We're continuing to position Tradepoint and the Port of Baltimore for success on a global scale for decades to come."

The investment is expected to bolster the region's economic and industrial footprint, while modernizing core port infrastructure.

"Making our local economy, ports, and workforce more modern and efficient is always important, and we're excited to support this state-of-the-art investment," said Baltimore County Executive Kathy Klausmeier. "This $35 million transformation of Tradepoint Atlantic's cargo systems, storage yards, infrastructure, and more will energize our local workforce and continue to position the Port of Baltimore as an essential link in our global supply chain."

Construction on the bulk conveyance system is well under way, with commissioning slated for January 2026. Tradepoint Atlantic is currently engaging industry partners and shippers who are looking to leverage the capabilities of the new system.

About Tradepoint Terminals

A private marine terminal within the Port of Baltimore, Tradepoint Terminals specializes in the expert handling of bulk, breakbulk, and automobile roll on/roll off. Offering a suite of full services to include stevedoring and terminal operations including commissioning, maintenance, marketing, inventory management, and foreign trade zone operations. The marine terminal consists of four deep water multi-commodity berths and provides unparalleled access to rail and interstate highways.

About Tradepoint Atlantic

The 3,300-acre multimodal logistics and industrial centre in Baltimore, MD, offers a gateway to US domestic and global markets, featuring an unmatched combination of access to deep water berths, rail, and highways. At Tradepoint Atlantic, industry is set in motion with the financial backing of Redwood Holdings, as well as the robust support of local and state government which enables the redevelopment of the former Sparrows Point steel mill site. From here, world-class companies unleash their potential, jobs are created, communities prosper, and industry is set in motion.

Tarragona to have six additional grain warehouses

Tarragona Port Authority, in Spain, is to have six new concessions on its Aragón, Castilla y Navarra quays. These will involve the construction of six new warehouses for bulk agri-foodstuffs, and the adaptation and updating of two more. This will involve private investment of €38.49 million.

In four of the tenders, several companies have bid.

The new concessions will cover a combined area of 57,140 square metres, all of which will be given over to grain logistics. These should generate in the region of at least 1,613,300 tonnes of new dry bulk traffic, meaning that Tarragona will consolidate its existing position as the Mediterranean's leading agri-food port, as well as being Spain and Portugal's most important gateway port for grain.

All six new warehouses will be automated, thereby allowing greater productivity in bulk handling of grain. In addition, the roofs of these new facilities will incorporate photovoltaic installations, further boosting the port's green credentials and energy self-sufficiency.

Several of the warehouses will commit to handling the majority of their consignments by rail, thereby cutting out the number of HGVs involved, with a concomitant reduction in CO_2 emissions.

Barry Cross

Port of Vancouver breaks ground on soda ash facility

Port leaders, Solvay, Vancouver Bulk Terminal begin work to transform port facility into state-of-the-art gateway for key U.S.-sourced mineral.

On Tuesday 20 May 2025, at the Port of Vancouver USA, port leaders and partners broke ground on a project to construct a state-of-the-art terminal for soda ash.

The newly designed Terminal 2, Berth 7 port facility will have the capability to annually transload more than three million tonnes of soda ash. The project combines expertise and capabilities of Vancouver Bulk Terminal, a joint venture between Nautilus International Holding Corporation and Neltume Ports; the Port of Vancouver USA; and Solvay — a global leader in soda ash.

Soda ash is essential for a variety of purposes, including manufacturing glass and lithium-ion batteries critical to solar panels and electric vehicles. Natural soda ash coming to the port is also an essential ingredient for sodium bicarbonate, food, feed, pharmaceuticals, detergents and other products used every day.

The new facility is expected to begin operations in the second half of 2026.

"This port has been an economic engine for the region for 113 years, and a vital link in the global supply chain. Pursuing a diverse mix of commodities people need in their everyday lives is key to our continued stability," said Julianna Marler, CEO of the Port of Vancouver USA. "We are grateful to work with our project partners and put shovels in the ground to add soda ash to that mix, a building-block mineral critical for energy generation, construction, health care, food and more.

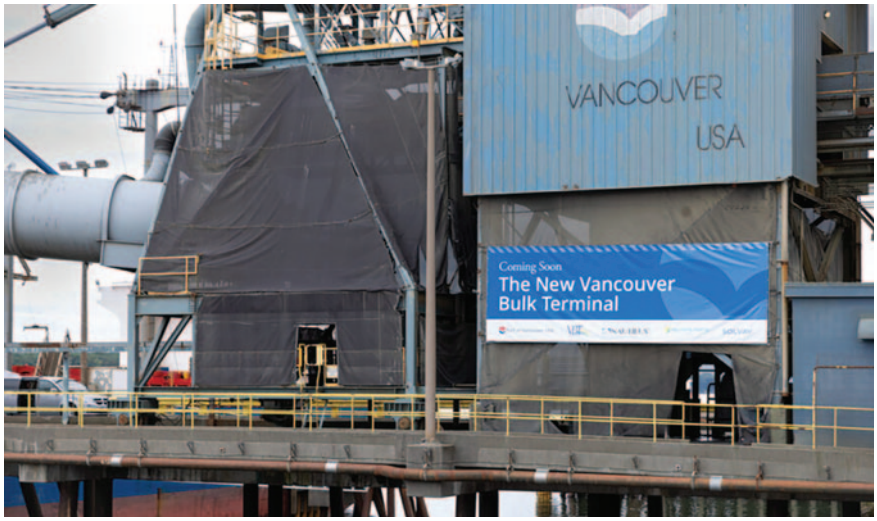
"We are incredibly excited to move full speed ahead on a project that will generate local jobs and economic benefits for years to come."

The expanded capacity will support an expansion of Solvay's Green River, Wyoming soda ash operations. The terminal will also add crucial export capacity to the North American soda ash industry, which is recognized as the world's fastest-growing natural soda ash producing region.

"Global demand for Soda Ash from Green River, the world's largest natural deposit, continues to grow," said Brian Kebart, Solvay EVP Global Supply Chain. "Solvay's Green River facility is a linchpin of our global supply network, and the Vancouver Terminal will secure Solvay's ability to meet the growing needs of the industry for years to come. We appreciate the collaboration with the Port of Vancouver USA and VBT, two partners who are well aligned with Solvay's desire to deliver sustainable, essential solutions globally."

The redeveloped facility plans to feature expanded storage space, upgraded rail unit train access, and state-of-the-art cargo handling systems that will work together to create a seamless flow from rail to vessel to global markets.

"This groundbreaking marks more than just a construction milestone — it's a commitment to building the future of sustainable trade in North America," said Brian Johnson, Chief Commercial Officer at Nautilus and Vancouver Bulk Terminal board member. "With advanced cargo handling systems, expanded storage, and enhanced rail connectivity, this terminal will set a new standard for bulk export efficiency. We're proud to invest in the long-term success of the Port of Vancouver USA and deliver economic opportunities that benefit the region and the global supply chain alike."



HES Gdynia reaches milestone with new grain warehouse

HES Gdynia recently announced the official opening of its new Warehouse No. 32, located at the Śląskie Quay in Port Gdynia. This strategic investment represents a significant step forward in enhancing the terminal's operational capabilities and supporting the long-term development of the agro sector in the Baltic region.

On Friday afternoon, 23 May 2025 , HES Gdynia officially opened and celebrated the first phase of its investment — a flat grain warehouse with a total capacity of 64,000 tonnes, featuring:

- an integrated transfer conveyor system to streamline operations and improve internal efficiency;
- four separate compartments, allowing for the simultaneous storage of different types of grain products; and
- new truck and railcar loading and discharge points, equipped with bottom-discharge technology — a much-anticipated innovation that supports sustainable growth by reducing road-based grain deliveries.

The second phase — comprising three new grain-handling silos with the total capacity of 21,000 tonnes — will follow shortly.

This expansion will increase HES Gdynia's grain export storage capacity by 150% and ramp up its annual handling potential by 1–1.5 million tonnes, enabling more efficient, scalable logistics for Poland's agricultural producers and exporters. It will also allow the terminal to service both Panamax and Capesize vessels with greater efficiency.

After three decades of partnership and trust with its long-term customers – and steadily built, sustainable growth – HES Gdynia is helping to shape a resilient, innovative, and future-ready logistics infrastructure with this expansion.

Regional Report on The Netherlands

Jay Venter

The future of conveyor belting has already arrived

Conveyor belts that suffer wear and tear are considered by many in bulk handling to be unavoidable. As a consequence, growing numbers have fallen into the trap of using low price imported 'sacrificial' belts. Ironically, low-grade belts have much less ability to resist damage, resulting in an even faster, more expensive cycle of fitting, repairing and replacing. However, one major conveyor belt manufacturer, Netherlands-based Fenner Dunlop Conveyor Belting, sees things differently and is successfully pioneering a radical change of thinking. Whereas single and dual-ply belts were used for only lighter applications in the past, Fenner Dunlop has since turned that convention on its head.

Huge advantage — Fenner has its own weaving facilities.

A single and dual-ply future

Since it first introduced its hugely successful single and dual-ply UsFlex belt more than two decades ago, Fenner Dunlop has continued to develop the concept. Known as the X Series, they not only replace thick, multi-layered belts, they also provide numerous advantages. Although thinner and lighter, Fenner Dunlop's single and dual-ply belts are actually much more robust and resistant to damage than the multiple ply counterparts.

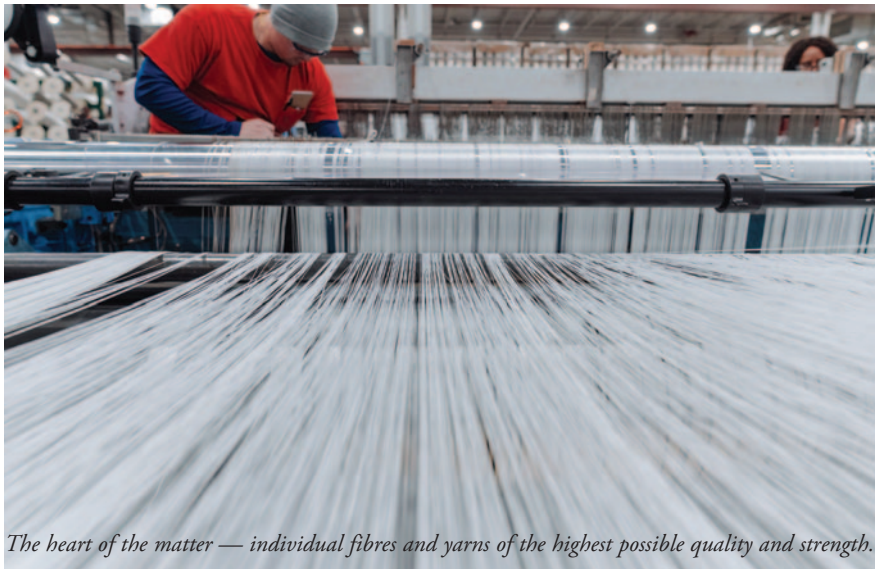
In theory, a higher number of inner plies should result in a stronger belt. However, the greatest influence on the strength and other essential physical properties of a conveyor belt is the design and quality of the ply material used to create the carcass. This is where Fenner Dunlop has a huge advantage over would-be competitors because it has its own fabric weaving facility in the USA.

As a result, Fenner Dunlop has been able to develop a range of unique super-strength fabrics for single-ply belts (Ultra X and Nova X) and its longer-established single- and dual-ply UsFlex constructions. The carcasses possess a longitudinal rip resistance that is more than 500% greater than multi-ply belts of equivalent rating and up to 300% greater impact resistance compared to conventional belting. So, how does it all work?

The heart of the matter

The whole working principle of being able to create advantages from using single and dual-ply belts centres on the fabric. Having already developed rubber cover compounds that are long recognized as being the hardest wearing and longest lasting, Fenner Dunlop's engineers focused on the design of the fabric. The priority was to ensure that the individual fibres and yarns were of the highest possible quality and strength. Next came the weave pattern, which is where fabric technology becomes difficult to explain.

The X Series has (so far at least) three versions of fabric. Ultra X features a



The heart of the matter — individual fibres and yarns of the highest possible quality and strength.

specially woven 'Crimped warp' carcass, combining crimped polyester warp yarns with strong binder and filler yarns, creating exceptional strength, stability, and impact resistance. The higher tensile strength Nova-X uses an even stronger crimped warp fabric with binder yarns to lock the carcass, providing excellent rip, tear, and impact resistance under load. For the toughest applications of all, there is the even heavier duty UsFlex, which employs a 'Straight warp' carcass made of high-tenacity polyester fibres protected by polyamide weft lines.

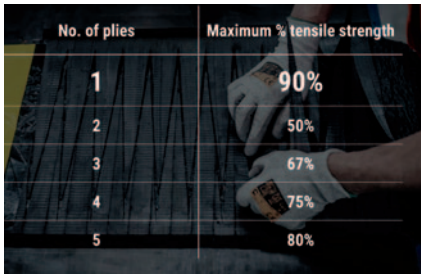
What all X Series fabrics have in common is that they consist of longitudinal strands lengthwise and heavy strands running crosswise, held in position by a strong yarn. The strands are completely straight in both directions and not interlocked as in conventional fabric, allowing the weft to float free from the warp. This creates a shock absorber effect by dissipating impact energy over a larger area, enabling the belt to withstand the kind of punishment that would destroy a normal multi-ply belt. Arguably even more important is the ability to resist rip and tear damage.

When penetrated and being pulled through a large, sharp, trapped object, the unique weave design allows the strands to gather in a bundle that can eventually become strong enough to stop the belt or even expel the object causing the damage.

Strange as it may seem, synthetic plies are usually more effective than steel when it comes to minimizing the length of a rip. In fact, the UsFlex fabric is so strong that Fenner Dunlop uses it as a breaker ply in its steel cord belts. As one operations manager was happy to testify, "We used to replace our belts every three to six months before we started fitting UsFlex belts. Now it can be four or five years before we need to fit a replacement."

Defying convention

Some find the idea that a single or dual-ply construction belt can possess the necessary tensile strength and also be considerably more resilient and durable difficult to comprehend. The answer lies in a combination of the amazing innate strength of the fabrics together with a higher level of splice efficiency. Although a step splice can be used to join a dual-ply UsFlex, single-ply constructions require a finger-splice joint*. The enormous advantage of finger splice joints is that they retain up to 90% of the belt's original tensile strength.



Much stronger – a finger splice retains up to 90% of the tensile strength.

By comparison, a 2-ply step splice only retains a maximum of 50% and a 3-ply step joint only achieves a maximum tensile strength of 67%. Single and dual-ply belts joined by a step splice create equivalent tensile strengths and belt safety factors that are more than comparable to three- or four-layer conventional belting. For example, an Ultra X3 single-ply belt can pull up to 56 tonnes. A significant additional benefit of this method is that finger splice joints are stronger and more durable so the need to repair and re-splice joints is much less frequent.

*(*Depending on the application, mechanical fasteners can also be used on X Series single-ply belts.)*

A single and dual-ply — the future has arrived

Fenner Dunlop freely admit that the Ultra X single-ply construction did raise a few eyebrows at first but as with all such ground-breaking innovations, it takes time for a new concept to be fully accepted. Judging by the growing sales, that acceptance seems to be spreading very rapidly. UsFlex is long-established while Ultra X has proved a great success since its launch some six years ago. Although still manufacturing a big range of conventional multi-ply and steel cord belting, Fenner Dunlop's management certainly regards the X Series single-ply and dual-ply belts as the future of industrial conveying belting. Given the evidence, the future seems to have arrived already!

Bob Nelson

Weft strands bundle together to stop belt or expel penetrating object. (Source: Graphically enhanced image supplied by Fenner Dunlop).

Tested to destruction – more than 500% superior longitudinal rip resistance and up to 300% greater impact resistance compared to conventional belting.

Exen Global B.V.: a reliable partner in dry bulk maritime logistics

Headquartered in Rotterdam and active in several European ports, Exen Global B.V. offers tailored logistics solutions in the dry bulk sector. As a group company with complementary subsidiaries, it uses its years of industry experience to meet the evolving needs of its clients in dry cargo logistics.

Exen Global provides logistics support for dry bulk commodities such as steel, fertilizers, grains, and minerals. The company's activities include chartering, agency services, crewing co-ordination, and on-site project support. With a flexible, client-oriented mindset, it works with both industrial companies and regional distributors in Europe, North Africa, and parts of the Middle East.

To support efficiency and transparency, Exen Global is gradually implementing digital solutions to improve scheduling and cargo monitoring. By working with selected technology partners, the company aims to provide clients with better visibility over their shipments, helping reduce delays and optimize planning.

Exen Global's clients include commodity traders, manufacturers, and logistics companies. The company serves them through a compact operational setup and a trusted network of local agents. Responsiveness, transparency, and adaptability form the core of its competitive approach.

Exen Global recognizes the importance of environmental and regulatory compliance. Exen Global aligns with current IMO environmental regulations and promotes responsible practices in collaboration with terminal and port partners. Digital workflows and efficient port calls are among the areas we continue to improve.

As the company moves forward, it aims to expand its range of services and deepen integration across its logistics network. Its focus remains on creating practical, customer-oriented solutions that align with industry expectations and future challenges.

About Exen Global

Exen Global is a Netherlands-based shipping and logistics company offering chartering and ship management services. The company also provides port agency support in Turkey, crewing coordination, and project logistics services. It operated vessels, primarily in the coaster and handysize segments, transport dry bulk and breakbulk cargo across European shortsea routes, the Mediterranean, and the Black Sea. With over three decades of industry background, Exen Global maintains offices in Rotterdam, Istanbul, and Düsseldorf.

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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HES International unifies brand as part of the ONE HES Program

HES International, one of Europe's largest independent bulk handling companies for liquid, dry, and breakbulk products, announced that as of 2 April 2025, the rebranding of Europees Massagoed-Overslagbedrijf (EMO) B.V. and European Bulk Services (E.B.S) B.V. Moving forward, EMO will be known as HES Bulk Terminal Rotterdam (HBTR), while E.B.S will be known as HES Bulk Terminal Maasdelta (HBTM).

This rebranding marks the final step in the company's comprehensive strategy to align all its terminals under the HES International brand, ensuring consistency, efficiency, and even better recognition in the market, as part of the ONE HES Program. The name change reflects HES International's vision of creating an integrated network of bulk terminals, offering customers enhanced service and streamlined operations under a single, trusted name.

Paul van Gelder, CEO of HES International, commented on the rebranding, "With this rebranding, we complete the transition of all terminals under the HES International name, solidifying our position as a unified and future-focused bulk terminal operator. This move underscores our commitment to delivering operational excellence across all our locations while fostering a strong and recognizable brand presence."

The VAT and trade register numbers for both terminals will remain the same, ensuring a smooth transition with no administrative impact on business relationships.

About HES International

HES International is one of Europe's largest independent bulk handling companies for liquid, dry, and breakbulk products. Its companies hold a unique independent position in the supply chain of bulk goods for a wide range of products providing first class access to Europe's deep draught terminals and excellent hinterland connectivity by barge, rail and truck. With 13 terminals in four countries at strategic located ports in Europe, HES International is an important switch in the continuous delivery of essential building blocks for everyday life needed to develop, sustain and improve the world around us. The company's professional staff ensure that bulk commodities are safely stored, handled and processed 24/7 for customers from all corners of the globe. HES International has a strong ambition to further broaden its product portfolio and also wants to respond optimally to the opportunities that the energy transition offers us.

HES International is headquartered in Rotterdam and has already been carefully handling bulk raw materials since 1908. Macquarie Asset Management, via Macquarie European Infrastructure Fund 5, and West Street Infrastructure Partners III, managed by the Goldman Sachs Asset Management Infrastructure business, each indirectly control 50% of the shares of HES International B.V.

HES International and Binding Solutions sign an MOU to assess potential for iron ore cold pelletizing plant at HES Bulk Terminal Rotterdam (HBTR)


HES International B.V.

HES International B.V. (HES) and Binding Solutions Limited (BSL) announced, on 19 May 2025, the signing of a Memorandum of Understanding (MOU) to assess the potential for a state-of-the-art iron ore cold pelletizing plant at HES's HBTR terminal in Rotterdam, the Netherlands. HES is a major European provider of bulk handling services for industrial customers across the continent. BSL is a technology company that has developed a patented and proprietary process for producing cold agglomerated pellets (CAPs) that can enable Green Steel production at scale.

The parties' aim is that the project at HBTR will produce high value iron ore CAPs. Compared to traditional high-temperature processes, BSL's cold agglomeration technology reduces energy requirements by up to 80% and cuts up to 70% of CO_2 emissions, making it a key enabler for industries transitioning to greener production processes.

The envisaged first phase of the project involves the construction of a 400k tonnes per year capacity plant, with future expansions envisioned to increase capacity to between one and three million metric tonnes per year.

The HBTR terminal is the largest dry bulk terminal in Europe. The pelletizing plant aligns with HES's long-term vision to solidify HBTR's position as an important hub in the European steel supply chain, enhancing its capacity to support sustainable steel production and logistics.

HES's Chief Commercial Officer, Joop de Rooij, said: "As we further develop HBTR into the steel terminal of Europe, this project represents a significant step in reinforcing our role as a catalyst for Europe's transition to Green Steel."

Russell Kaschula, Chief Operating Officer of Binding Solutions, stated: "We're excited to work with HES International to enable Green Steel production by supplying high quality iron ore pellets to meet growing demand. HBTR is the largest dry bulk terminal in Europe, providing us with the ideal location to serve European steel producers and, in partnership with HES International, deliver commercial, environmental and operational benefits along the steel production chain."


Binding Solutions Limited .

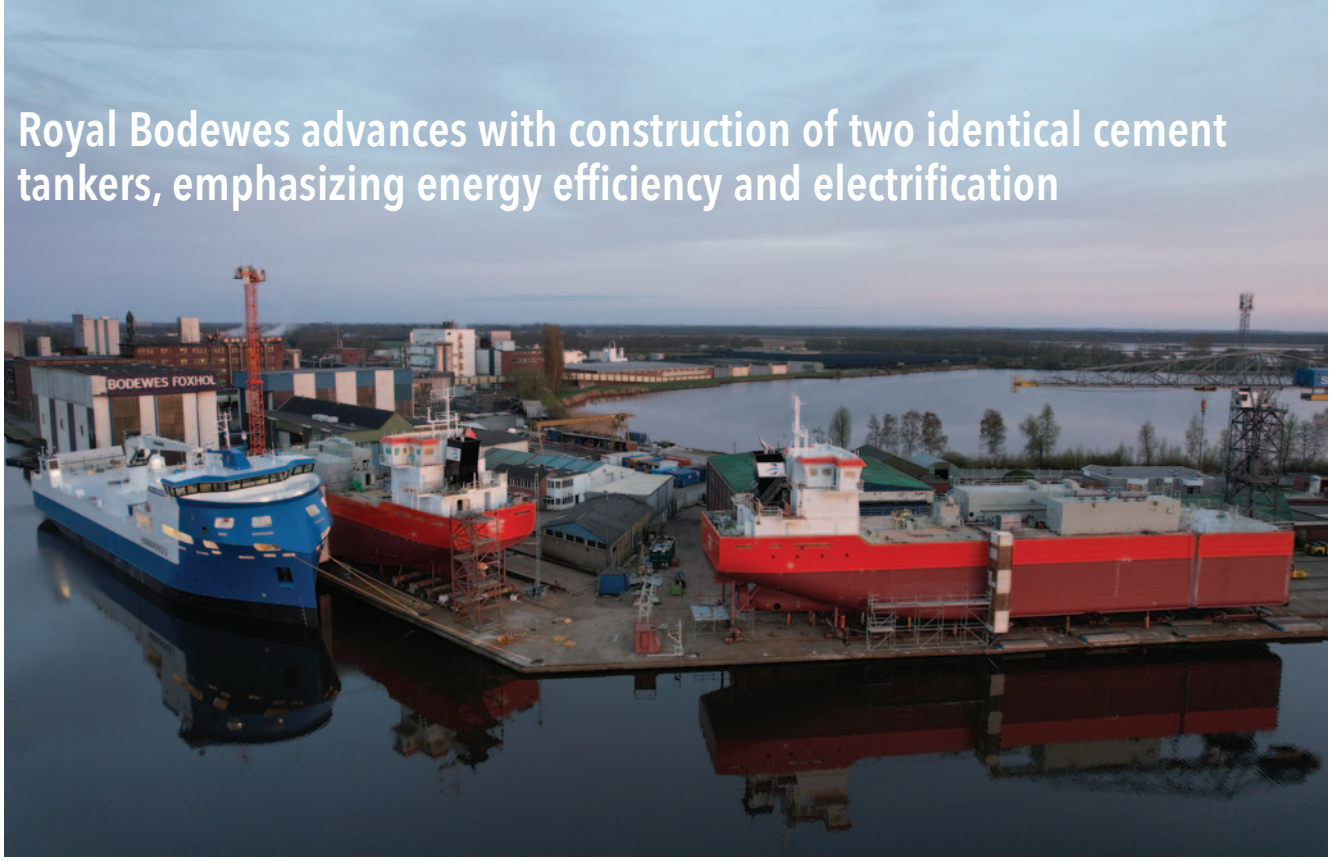
About Binding Solutions

Binding Solutions is a fast-growing technology company that has developed a patented process for significantly reducing carbon emissions from steel production. Its CAPs enable reductions of up to 80% in energy usage and 70% in CO_2 emissions by replacing sinter and induration process that account for approximately 15% of the sector's emissions. Using the cold agglomeration technology can also cut capital requirements by 86% vs indurated pellets and reduce process complexity, delivering commercial benefits to iron ore miners, pellet producers and steel makers.

BSL's technology can also be deployed to monetise waste fines from metals production by converting them into cold agglomerated pellets that can be added back to the furnace.

BSL's advanced Technology Centre provides full life cycle testing for clients from lab scale to furnace trial. It is able to work with a wide variety of ores and to simulate conditions in all types of production furnaces.

Royal Bodewes advances with construction of two identical cement tankers, emphasizing energy efficiency and electrification



Dutch shipbuilder, Royal Bodewes, is currently constructing two identical cement tankers that are being built almost simultaneously at its shipyards. These vessels are the latest additions to a successful series of sister ships, following the earlier deliveries of the *Aalborg White, Florvik,* and *Ulvik* and three others in this series.

Each of the new vessels boasts a deadweight tonnage (dwt) of 4,200 and is designed with a strong emphasis on fuel efficiency. Thanks to advanced engineering and optimized hull design, these tankers are expected to operate with remarkably low fuel consumption, making them highly efficient and environmentally friendly additions to the global cement transport fleet.

A key feature of these vessels is the integration of a Lovik cement discharge system, which ensures fast and reliable unloading of cement cargo. This system is electrically powered by the ship's main engine, which normally provides the propulsion. By utilizing the main engine's power for cargo operations, the vessels further enhance their energy efficiency and reduce the need for auxiliary power sources.

Energy efficiency plays an increasingly vital role in reducing CO_2 emissions. As such, both the optimal generation and efficient use of energy are central to the design philosophy behind these new vessels. This focus has led Royal Bodewes to invest heavily in the electrification of ships. The shipyard already has several diesel-electric vessels under construction, including both cement carriers and dry cargo ships.

The two new cement tankers are being launched approximately two weeks apart, showcasing the shipyard's streamlined production capabilities and precise project coordination. Delivery of both vessels is scheduled for shortly after the summer, marking another milestone in Royal Bodewes' commitment to innovation, sustainability, and future-ready shipbuilding.

With these new builds, Royal Bodewes continues to strengthen its position in the specialized segment of cement carriers, offering reliable and efficient solutions for maritime logistics.

New shareholders for Maja Stuwadoors

Maja Stuwadoors recently announced that the current shareholders of Maja Stuwadoors Group have reached an agreement on the sale of their entire interest in Maja Stuwadoors Group, including its subsidiaries Maja Stuwadoors, Maja Storage and Maja Equipment to Aug. Bolten, Nova Marine Carriers and Ership.

With this transaction, the Holleman family is distancing itself from the company after more than 52 years. They look back on a wonderfully dynamic time. With the new shareholders, Maja has found strategic partners who want to continue to grow together with Maja and its customers in the dry bulk sector. The continuity of the business operations is guaranteed for both customers and employees of Maja. The daily execution remains in the hands of the same employees that customers are familiar with now.

Aug. Bolten is a German shipping company with over 200 years of history in dry bulk shipping. The company has a long history as a shipping company and wants to grow further in dry bulk activities together with its Swiss shareholder Nova Marine Carriers. The acquisition of Maja together with Ership fits perfectly in this ambition.

Nova also owns and operates, through its subsidiary Nova Marine Carriers SA, headquartered in Lugano, Switzerland, a diversified fleet of modern bulk carriers and self-unloaders ranging from 5,000dwt to 57,000dwt. With approximately one hundred vessels under control, Nova specialises in bulk transport in the Mediterranean, Atlantic, Middle East and Italian/European coastal trades.

Ership group is a Spanish family-owned company with a maritime tradition that was founded more than 135 years ago. The group of companies specializes in bulk port operations, shipping companies, ship operators, freight brokers, consignments, freight forwarding and customs brokers. Ership operates in more than 40 ports in the Iberian Peninsula, America, Africa and Asia and continues its international expansion with the acquisition of Maja in the Netherlands. Maja is pleased with these two new shareholders and looks forward to further growth and collaborations in the Port of Amsterdam.

IDEAL FOR BULK, BREAKBULK & PROJECT CARGO

Combi freighters

Damen's proven Combi freighters can be delivered fast and offer reliable performance and full compliance with the latest regulations including loading aground. The new series within the 2500 – 6500 dwt tons range are designed to take a wide range of different cargoes and have been optimized for an economic fuel consumption and low emission.

The vessels feature low operational and maintenance costs and have high capacity on deadweight and volume, excellent stability, comfortable accommodation and are built fully according to well-known Damen quality standards.

Pictured here:
CF 3850

Find out more on **Damen.com**

DAMEN
OCEANS OF POSSIBILITIES

Mobile stacker conveyor for HES Bulk TerminaL Amsterdam

De Regt Conveyor systems B.V. has recently delivered a tailor-made bulk handling solution at HES Bulk Terminal Amsterdam: a powerful mobile stacker conveyor. The conveyor is the last step in a logistics chain and will be used for agri bulk such as grain, soybeans and corn.

The conveyor is designed to fill the warehouse efficiently and semi-automatically.

Prior to the delivery the complete machine was assembled and tested at De Regt's workshop in Biervliet. It was then transported in parts and reassembled at the costumer's location in Amsterdam.

Key specifications:

- **Capacity:** 800 tonnes per hour;
- **Total length:** 30 metres;
- Feed angle up to 24.5°;
- **Belt speed:** 3m/s;
- **Belt drive:** 2 x 30kW gearmotor;
- Both front wheel hydraulically driven (with manual freewheel option);
- **Weight:** 30t.

Equipped with various options for optimum performance and multifunctional use:

- adjustable belt speed;
- swivel module for automatic repetitive movement;
- height and length retract module for atomatic filling;
- rf remote control;
- dust proof transition point;
- stairs and walkway for easy access;
- obstacle detection;
- ready to connect with other conveyors for in-line use.

The result: a robust and technically advanced stacker conveyor with user friendly features for both production and maintenance.

New eco-hopper in use at Marcor Stevedoring B.V.

For Marcor Stevedoring B.V. De Regt Conveyor Systems recently delivered an innovative eco-hopper specially designed for unloading ships with agri bulk, biomass, petcokes, minerals, fertilizers and phosphates.

- **Capacity:** 750 tonnes per hour;
- **Mobile:** hydraulic drive, max speed 0.5kmph;
- **Efficient:** can be operated on a generator or shore power connection with an automatic cable reel.
- **Flexible:** the conveyor under the hopper van rotate and swith in drive direction.
- **Operator comfort:** installation can be operated from an ergonomic and comfortable cab on the machine.

The hopper is equipped with several unique features like a flip/flap system, air filters and air cannons.

Products like phosphate are difficult to process and have a tendency to stick and harden — to prevent this, De Regt has chosen a strategic solution.

The bunker is coated with an anti-stick layer and De Regt installed four powerful air cannons, specifically designed to prevent blockage.

When activated these cannons blow a large amount of compressed air into the bunker. This breaks up the blockage and keeps the product flow going.

For the required compressed air, De Regt uses two 11kW frequency controlled screw compressors.

This advanced and tailormade bulk handling installation ensures an efficient, dust-free and safe working environment.

OVET: serving the Netherlands bulk market since 1957

OVET dry bulk terminal is a stevedore company which specializes in storing, transshipping and processing dry bulk. With over 100 employees, the company has been offering very high quality and flexibility in services, since 1957. It can achieve a total unloading capacity of as much as 80,000 tonnes dry bulk per day, using its four floating cranes.

It is not surprising that, since OVET was founded in 1957, a lot has changed. At first, the company operated ex-Marshall Plan six-tonne floating cranes to discharge coal from seagoing vessels on Terneuzen roads and at the Zevenaarhaven terminal in Terneuzen. This gradually evolved to the 25- and 36-tonne units which nowadays handle all kinds of bulk and breakbulk cargoes at its Massagoed and Kaloothaven terminals in Terneuzen and Vlissingen. However, what hasn't changed is the nature and spirit of OVET. As ever, each project benefits from an all-out effort on behalf of OVET, where all floating cranes are combined to ensure the customer receives swift and quality service.

About OVET

From an annual 500,000 tonnes of transshipment during the beginning, OVET has grown and today handles as much as 11 million tonnes of transshipment cargoes each year.

The company now has dry bulk terminals in Vlissingen and Terneuzen and over 100 employees ensure services of high quality for the customers.

OVET can achieve a total unloading capacity of as much as 80,000 tonnes dry bulk per day, using its four lemniscate floating cranes.

In addition to creating more capacity, OVET also makes use of mobile SENNEBOGEN material handlers.

OVET high-quality offering comes from its strong focus on the questions and requirements of customers. Every OVET employee knows their daily duty of providing good service and quality; they deliver high quality personal service. This personal touch distinguishes OVET dry bulk terminal as a specialist and leader when it comes to the flexible handling of dry bulk.

Terminal Terneuzen (Massagoedharbour) and Terminal Vlissingen (Kaloothарbour)

With its floating cranes, OVET is active throughout the entire area of the Western Scheldt, in Vlissingen, Terneuzen and Ghent, but also at anchorage berths on the Western Scheldt itself.

Tri-modal platform

Water transport (inland navigation/ maritime shipping)

The OVET dry bulk terminals are connected to the most important waterways in Europe. Access to the Rhine is gained through modern channel connections. The proximity of the North Sea ensures the OVET dry bulk terminals are very suitable for sea traffic. OVET is able to load and unload all inland navigation (lighters and tug-pushed barges) and maritime shipping (coasters, Handysize, Panamax and Capesize). All possibilities are therefore open for its customers.

Road transport

OVET uses loaders to fill up trucks, which then pass a weighing platform to determine the exact weight.

Rail transport

Since July 2013, OVET has had a completely renovated track and a new train loading system at the Vlissingen terminal. This ensures OVET is able to provide an even better hinterland connection for its customers. OVET has successfully proven that a train can travel to and from the German Ruhr area within 24 hours. On top of that, both dry bulk terminals have a good connection to the European railway network with good access to the Betuwelijn and the Corridor C.

Flexibility

With its four floating cranes, OVET is capable of working in the entire ARA (Antwerp–Rotterdam–Amsterdam) range. The floating cranes can be moved between the terminals in the ports of Vlissingen (Flushing) and Terneuzen, in a mere three to four. On top of that, lightering can take place at Terneuzen Rede and Everingen (on the Scheldt). Also, almost all equipment at the terminals is mobile. Flexibility and OVET belong together.

Wide range of cargoes

OVET is able to handle many different cargoes, including:

- coal/(pet)cokes/anthracite;
- minerals;
- agricultural products (seeds/grains);
- biomass/GMP;
- offshore/density stones; and
- scrap.

Warehousing

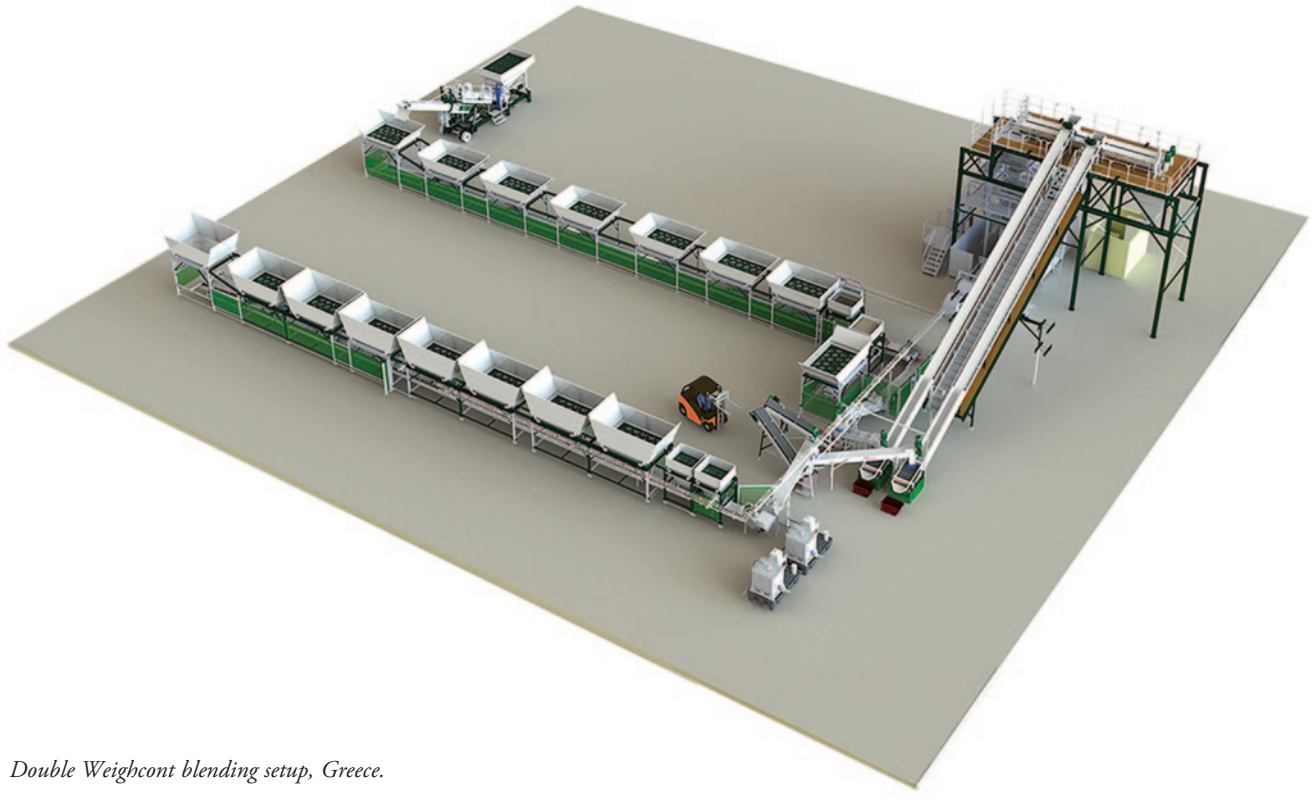
In order to meet the needs of its customers, OVET has a large covered storage facility with six compartments, in which products can be stored while staying dry. The large warehouse is mainly used for biomass, but other products can also be stored.

Precision in motion: how EMT is redefining dry bulk handling for the fertilizer industry

Airial photo of the EMT's new hall.

EMT's story began nearly a century ago, with the purchase of a Dutch windmill to grind grain. Over the generations, the company transformed step by step: first into a feed mixing business, then into a fertilizer blending and distribution company — and eventually into the specialized manufacturer of fertilizer handling machinery that EMT is today.

For over 35 years, EMT has focused on the development and production of equipment for the handling, blending,



Double Weighcont blending setup, Greece.

Venezuela Inline coating project.

coating and bagging of fertilizers.

Now led by Gustaaf, Janco and the fifth generation of the founding family; Zico Zeeman, EMT continues to build on its legacy with an eye to the future. The recent completion of a fourth production hall marks a new chapter — one that reinforces the company's commitment to long-term, sustainable business relationships across the globe. From its base in 't Zand, the Netherlands, EMT serves customers in more than 80 countries with equipment designed to perform under real-world conditions — and engineered for growth.

Investing in technology — from inline coating to full automation

One of EMT's recent key areas of innovation is inline liquid coating. Instead of requiring pre-treatment or batch-based spraying, EMT's coating systems apply liquids such as inhibitors, anti-dust agents or micro-nutrients directly in the product flow. Recent projects in the UK illustrate this approach: granular urea is treated via a stainless steel inline system equipped with a continuous weighing scale, worm cavity pump, and open spray plate, allowing real-time and precise dosing.

In parallel, EMT is investing heavily in software integration and automation. With the development of its in-house control system and Optiblend software, producers can now generate formulations based on nutrient requirements or product cost, and push them directly to the blending system. Process data, dosing trends, alarms, and performance statistics are accessible via remote connection, giving operators both control and insight.

Supporting global blenders — recent expansion projects

EMT's systems are increasingly used as the backbone of fertilizer blending and bagging operations worldwide. In Greece, EMT recently installed a large-scale dual-line Weighcont blending installation for Agrohellas S.A., featuring two eight-hopper blenders, inline liquid coating, screening, full transport and centralized control — all tailored for high throughput and operational flexibility.

In the United Kingdom, a compact but high-capacity system was commissioned for Thomas Bell, consisting of an inline urea coating unit and a Twin Big Bag High Speed filling station, offering fast and precise large-format packaging of treated fertilizer.

Elsewhere, in regions like West Africa, EMT's portable and containerized solutions — such as mobile coating unit are used to minimize civil works and speed up commissioning, ideal for remote sites or seasonal operations.

Staying competitive in a demanding market

With tight margins and strong seasonal dynamics, the fertilizer industry demands both efficiency and adaptability. EMT stays competitive by offering the best of both worlds: standardized machine concepts that are fully tailored to the specific needs of each customer.

All design and production — from mechanical to electrical and software — is handled in-house at EMT's factory in 't Zand, the Netherlands. This vertical integration ensures full control over quality, short lead times for custom builds, and the flexibility to adapt quickly when project requirements change.

Additionally, EMT has invested in a large inventory of spare parts and components, enabling short delivery times even for custom systems. For larger installations, EMT offers on-site commissioning and remote diagnostics, reducing downtime and ensuring production stability.

Looking ahead— blending for the future

As sustainability and efficiency become more important across the agricultural value chain, EMT's role is to support producers with equipment that makes their processes cleaner, more precise, and easier to scale.

Whether it's through coating units that reduce nutrient losses, or blending systems that adapt to local raw materials, EMT is focused on delivering real-world solutions that add value from the first tonne to the last. DCi

Bigging up bulk on the Scandinavian peninsula

Mussalo harbour (all pictures: ©Port of HaminaKotka Ltd).

HaminaKotka: major Finnish multi-purpose port

The Port of HaminaKotka is a versatile Finnish seaport providing an excellent operating environment for international trade and industry. It serves as an important hub in Europe and in the Baltic Sea region.

HaminaKotka is a port for dry bulk, containers, liquid bulk, gas, RoRo cargo and project shipments. HaminaKotka provides an excellent service to the Finnish exporting industries, transit traffic and major international projects.

Regular liner services to seaports in Continental Europe, well-functioning road transport connections, the E18 motorway, complete infrastructure and a comprehensive range of logistics services have turned the Port of HaminaKotka into a significant logistics hub.

HaminaKotka also specializes in handling of demanding project shipments, and it has created conditions for the establishment of industrial companies in the service area of the port. The port area is designed to meet the needs of long-term growth, which is why the area has an abundance of space for investments and extensions by industrial operators.

The location of HaminaKotka at the logistics hub makes the port truly unique — it opens up connections to all parts of the world.

The logistics and stevedoring services at the Port of HaminaKotka, together with the industrial operations encompassing in total 1,200 hectares within the port render it a unique unit on the Baltic Sea. In addition, its fairway with a draught of 15 metres enables excellent connections between the Port of HaminaKotka and the rest of the world.

PORT AREA IN NUMBERS

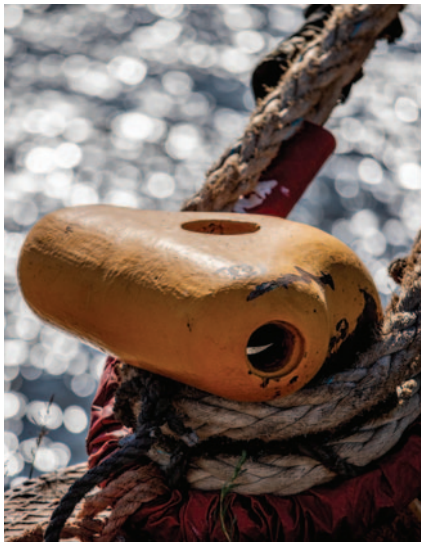
- 1,200 ha of land areas
- 1,600 ha of sea areas
- max. safe clearance depth 17.5m
- 9km of quays
- 70 berths
- 90km of railways

Dry bulk and breakbulk

The fairway to the Port of HaminaKotka has a depth of more than 15 metres. This enables service to all vessels that can access the Baltic Sea. Warehouses suited to various product categories, large field areas and experienced port operators are key factors in handling large volumes and cargoes requiring special expertise.

Bulk is primarily brought into the port by rail. The Port of HaminaKotka has a rail network spanning over 90 kilometres. The transport of raw materials for manufacturing industries passes through HaminaKotka smoothly and quickly.

Dry bulk is handled at the Mussalo Bulk Terminal, at Hietanen South and in Hamina.



Port of HaminaKotka 2024 cargo volumes — including bulk

PORT TRAFFIC 8.1.2025	December TONS 2024	January-December TONS 2024	January-December TONS 2023	CHANGE %
EXPORT*				
Dry Bulk	245 545	2 137 411	2 613 628	-18,2 %
Liquid Bulk	31 872	188 441	317 318	-40,6 %
Sawn Goods	129 281	1 577 904	1 713 416	-7,9 %
Wood Pulp	149 278	1 474 007	1 637 400	-10,0 %
Paper	155 404	2 114 671	1 982 165	6,7 %
Other Goods	51 267	811 992	901 068	-9,9 %
General Cargo	19 626	302 813	246 221	23,0 %
Total	782 273	8 607 239	9 411 216	-8,5 %
IMPORT**				
Dry Bulk	36 454	429 959	388 197	10,8 %
Liquid Bulk	65 582	1 035 857	1 024 529	1,1 %
Ran Wood	119 050	2 211 068	2 193 724	0,8 %
General Cargo	30 169	453 253	700 426	-35,3 %
Other Goods	21 801	407 317	399 716	1,9 %
Total	273 056	4 537 454	4 706 592	-3,6 %
PORT TRAFFIC	1 055 329	13 144 693	14 117 808	-6,9 %
ON PORT TRAFFIC				
Transit Traffic***	250 960	2 360 571	3 144 788	-24,9 %
Coastal Traffic	0	131 239	196 451	-33,2 %
Containers in TEU units	48 808	571 097	617 181	-7,5 %
Vessel traffic	163	2 181	2 267	-3,8 %

Breakbulk cargoes include products of wood-processing industry and various types of project shipments.

Flexible co-operation between the port, port operators and logistics operators guarantees high quality transportation.

Mussalo harbour

The Mussalo Container Terminal with its annual capacity of 1.5 million TEUs is the

MUSSALO HARBOUR FACILITIES

- ❏ Containers, dry bulk, liquid bulk, RoRo, StoRo, project shipments
- ❏ Safe clearance depth 11.5–17.5m
- ❏ Draught 8–9m in Jänskä
- ❏ 3,700m of quays
- ❏ 20 berths
- ❏ 500ha of land areas
- ❏ 170ha of logistics & industrial areas
- ❏ various types of warehouses
- ❏ 40km of railways
- ❏ Rail weighbridge
- ❏ Truck weighbridges
- ❏ 8 container cranes

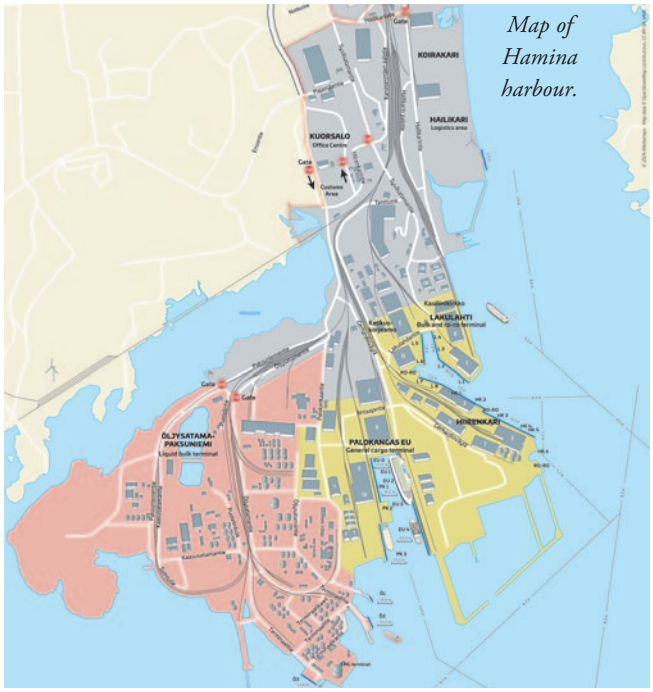
Heitenen South harbour.

HIETANEN AND HIETANEN SOUTH HARBOUR FACILITIES

- ❏ RoRo and car terminal
- ❏ Draught 7.9–10m
- ❏ 1,430m of quays
- ❏ 10 berths
- ❏ Car terminal 110ha
- ❏ RoRo terminal 100ha
- ❏ 10km of railways
- ❏ Mobile cranes

HAMINA HARBOUR FACILITIES

- ❏ Dry bulk, liquid bulk, gas, RoRo, StoRo, LoLo, project shipments
- ❏ Draught 5.9-12.0 m / HL, L, HK, FG, Ö3
- ❏ Safe clearance depth 10–13.2m/ EU, PK, MCV, Ö1, Ö2
- ❏ 3,000m of quays
- ❏ 500ha of land areas
- ❏ 40km of railways
- ❏ Truck weighbridges



Map of Hamina harbour.

biggest container terminal in Finland and one of the busiest of its kind on the Baltic Sea. Mussalo handles a majority of the Finnish export and transit containers. The products of the wood-processing industry also play a key role at Mussalo: it is the biggest hub for sawn timber, pulp and paper containerized at a port in Finland.

In addition to the Container Terminal, Mussalo has terminals for the handling of dry bulk and liquid bulk. The bulk products are mostly Finnish imports or in transit. Large warehousing and industrial areas make the operations at Mussalo highly diversified.

Hietanen and Hietanen South

The Hietanen Harbour specializes in RoRo cargoes. Daily liner services to the primary seaports in Europe enable a quick transport of goods.

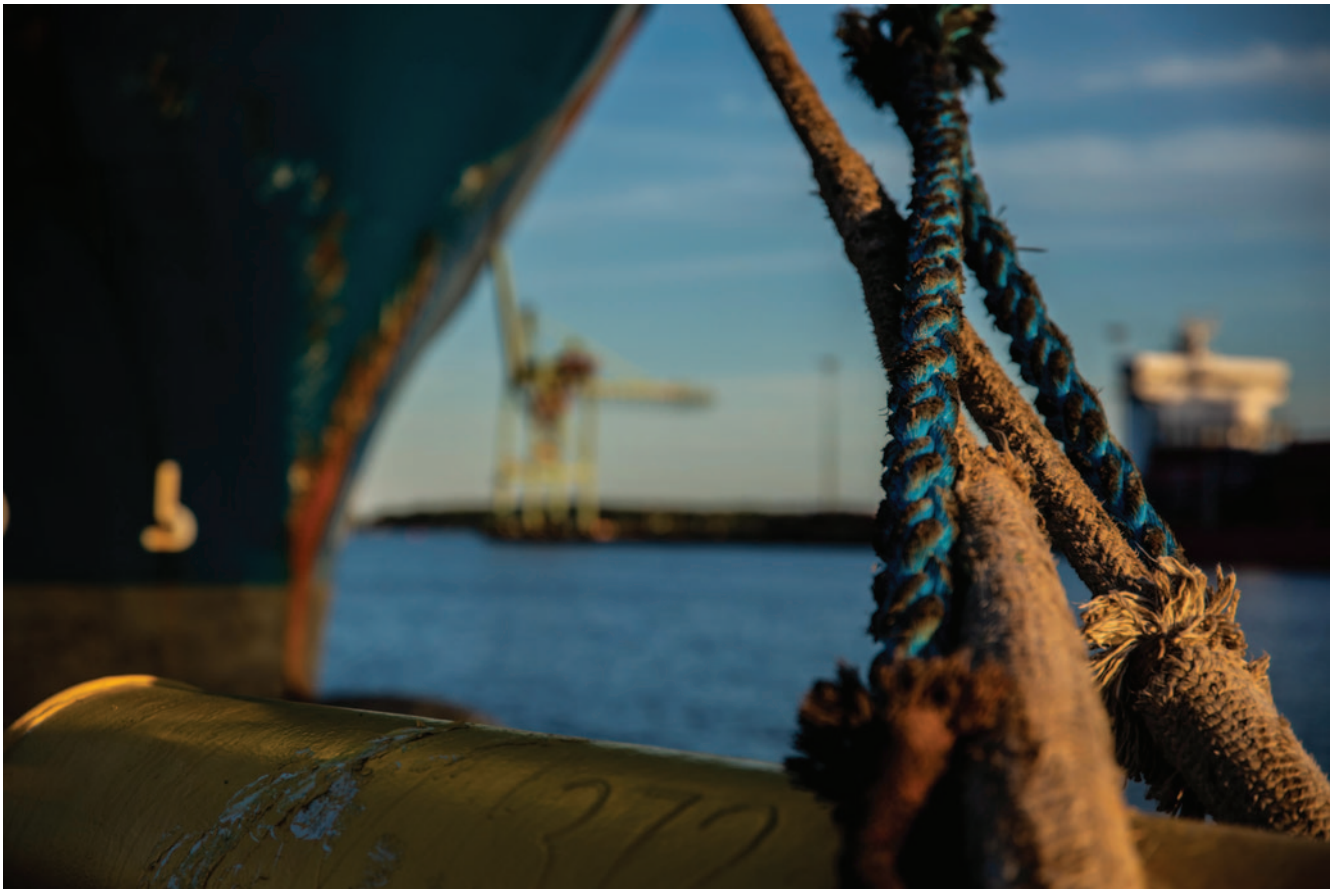
The 100-hectare car terminal at Hietanen provides facilities for the handling and storage of large quantities of import and transit vehicles.

Hietanen South specializes in the handling of dry bulk cargos.

Hamina

Hamina is the leading port for the wood-processing industry in Finland. The port operators in Hamina represent state-of-the-art in terms of their efficiency and range of services. The Hamina Harbour specializes in general cargo, liquid bulk, dry bulk and demanding project shipments. The Liquid and Gas Terminal at the Hamina Harbour is the foremost hub in Finland for the handling of chemicals.

The Hamina Harbour also has large areas available for logistics enterprises and port-related industries.



Wide range of cargoes handled at the Port of Ystad

❑ one Sennebogen crane with a five-fingered grab and a grab bucket of 2.5m³ and a reach of 23 metres.

The Port of Ystad in Sweden has considerable experience in handling bulk cargoes. Located in Southern Sweden, the ISPS-compliant terminal serves Bornholm, Zealand, and nearby areas.

The port, which is also known for its ferry services, is able to deal with a wide variety of cargoes, including wood pellets, wood chips, limestone, stone, grain, big bags, timber, gravel and sand. The port prides itself on the fact that no cargo is too large, unwieldy or complicated.

Loading and unloading operations take place at the Revhuskajen jetty. Quay length is 173 metres, and chart depth at the port of port 7.20 metres. Around 100,000 tonnes of bulk products are handled (loaded/unloaded at the port).

Equipment at the bulk terminal includes:

- four forklifts;
- 5.5-tonne terminal trolleys;
- two 20-tonne and one 40-tonne loaders;
- five-tonne loaders (Ljungby L15, Volvo L120 and Kramer Allrad), all with various attachments;
- port cranes:
  - ❑ one 40-tonne Fantuzzi, with a lifting capacity (hook) of 40 tonnes and a reach of 18 metres, and 25m³ and 12m³ bucket with a reach of 25 metres.
  - ❑ new Liebherr LH 150 Port Litronic folding jib, with a 30m centre. The crane has a lifting capacity with hook: 26m/9 tonnes; 8m/20 tonnes. The timber grab has a safe working load of 10 tonnes. The chip bucket has a capacity of 12m³ with removable teeth. The lime bucket has a 6m³ capacity. Density is 1.5 tonnes/m³.
- JLG Skylift (telescopic boom lift) has a reach of 20 metres.

Companies with their own operations at the Port of Ystad

- Over the past 15 years, **Dansk Natursten A/S** has imported, sold and supplied granite chippings for the concrete and asphalt industry, railway chippings for railways, water building stones for coastal protection and chippings for gardens.
- Since 1985, **Copenhagen Merchants Group** has set the benchmark for efficient, high-capacity bulk storage and handling. What began with a modest grain terminal in Kalundborg, Denmark, has evolved into a network of 11 state-of-the-art terminals — including at the Port of Ystad — across Denmark, Sweden, Poland, and Latvia, offering over 700,000 metric tonnes of storage capacity.

Ship agents

The Port of Ystad is currently served by the following ship agents:

- L.SVENSSON SHIPPING AB - 2025;
- TSA Agency Sweden; and
- GAC Sweden.

Heidelberg Materials opens environmentally friendly concrete factory on Sjursøya island in Oslo, Norway

Ribbon ceremony: Heidelberg Materials' new environmentally friendly concrete factory was officially opened by City Councillor Eirik Lae Solberg and City Councillor for Culture and Industry, Anita Leirvik North, together with Otto Poulson, CEO of Heidelberg Materials Betong Norge.

All photos: Hans Kristian Riise/Port of Oslo.

Heidelberg Materials opened a new environmentally friendly concrete factory on the northern Sjursøya quay at Port of Oslo in mid-October last year.

Capitalizing on height

In order to utilize the limited space in the industrial port, the concrete factory consists of 30m-high silos, which have a comparatively small footprint. "It has been very exciting and inspiring to be here today and see how production takes place at a new concrete factory, especially how they use the height to be more efficient and use less space," says Oslo City Councillor Eirik Lae Solberg.

The Sjursøya concrete factory was officially opened by Lae Solberg and City Councillor for Culture and Industry, Anita Leirvik North. They carried out the opening with Otto Poulson, CEO of Heidelberg Materials Betong Norge.

"I am proud to show off our new concrete plant on Sjursøya to the Governing Mayor and Vice Mayor," said Poulson. "It is a state-of-the-art facility with the latest environmentally friendly technology. All raw materials come to us by ship. There is direct pneumatic transfer from the cement silos to our production silos, and industrial production takes place indoors. This is a factory that has zero dust, noise and water emissions, and represents the standard of the future," concluded Poulson.

Heidelberg Materials has installed a

Heidelberg Materials' new concrete factory on Sjursøya.

heating system that runs on biogas to keep the concrete and production plant warm. Lae Solberg was impressed by what he saw.

"It has been very exciting and inspiring to be here today and see how production takes place at a new concrete factory, especially how they use the height to be more efficient and use less space. If we are to succeed with the green shift, there is no doubt that it is these types of solutions that we must put in place. This is a good example of industry and climate policy in practice together," says Lae Solberg.

The Sjursøya concrete factory is Norway's largest concrete production unit. Its environmentally friendly technology and connection to oceangoing transport make the plant a leading player in sustainable concrete production in Norway. On an area of around two acres, the factory receives 250,000 tonnes of aggregate materials.

SJURSØYA CONCRETE FACTORY STATISTICS

- ❏ Capacity to produce over 200m³/hour.
- ❏ Aggregate storage capacity, 8,700m³/12,000 tonnes.
- ❏ Shiploads of sand, stone and cement reduce 10,000 truckloads annually.
- ❏ The silos are 30m high and hold 2,000 tonnes each with aggregates that come in by sea.
- ❏ Dosing storage capacity 46,000 litres.
- ❏ Several of the ships that arrive at the factory are hybrids and they can be unloaded using shore power.
- ❏ Exhaust from the heating plant is used for heating aggregates.
- ❏ Possibility of connecting power for unloading powder and additives.
- ❏ Two mixing lines of 4m³.
- ❏ eight dosing tanks on each mixing line.
- ❏ Three silos for powder on each mixing line and one split silo for silica.

Heidelberg Materials' new concrete factory on Sjursøya. In the foreground, Schwenk's silos at Kongshavn. Heidelberg Materials' 30m-high silos have a comparatively small footprint, which is efficient and uses less space — one of many measures being implemented to shift towards Net Zero at Port of Oslo.

The aggregate materials used in concrete production arrive at the factory with energy-efficient bulk ships in large volumes. These aggregate materials for the concrete production are unloaded on the quay into a fairly large hopper. The bulk cargo continues on a belt all the way up the top of the silo. Sand and stone are unloaded from the silo at the bottom. It is then further transported on belts up into the mixer and down into the cars.

Cement — an important ingredient in concrete production — is pneumatically blown directly from Heidelberg Materials' blue-painted cement silo, which is located opposite the concrete factory.

A cement bulk carrier transports between two and four thousand tonnes. Each bulker that arrives with raw materials for concrete production replaces 150 trucks on the road network in to Oslo. In this way, energy use in bulk transport is made more efficient and the climate is saved from large emissions.

"I see great advantages in that the factory is located by the lake and that the raw materials are transported here by ship. This takes many trucks off the road, meaning far less pollution in Oslo," says Solberg.

The new E18 motorway, Fornebu rail system and the contractor Skanska are all currently receiving concrete from the factory. From the concrete factory on Sjursøya, it is a short distance to the town's many construction projects. The average mileage for the concrete cars is just 11km.

Bulk ships such as *Shetland* and *Fjordkalk* connect to the hinterland when they call at the northern Sjursøya quay. During a 36-hour unloading period, it is estimated that there was a saving of 7,000 litres of fuel compared to previous operations. Heidelberg Materials states that it cuts diesel consumption by 400,000 litres a year by connecting the bulk ships to shore power at the northern Sjursøya quay.

Enclosed plant

The new Sjursøya concrete factory is an enclosed and isolated plant, so there is no

SHORE POWER: The bulk carriers that deliver aggregates for concrete production are connected to shore power at the northern Sjursøya quay. The shore power plant for bulk carriers at Nordre Sjursøykai was established by the Port of Oslo in 2022 and has a capacity of 1.8 megawatts.

need for wheel loaders to drive on the quay and internally at the plant. This means that noise and pollution are greatly reduced. This is a significant step forward from the old factory, where diesel-powered bulk trucks transported cement from the cement silo to the concrete mixing plant.

Double capacity — fewer emissions

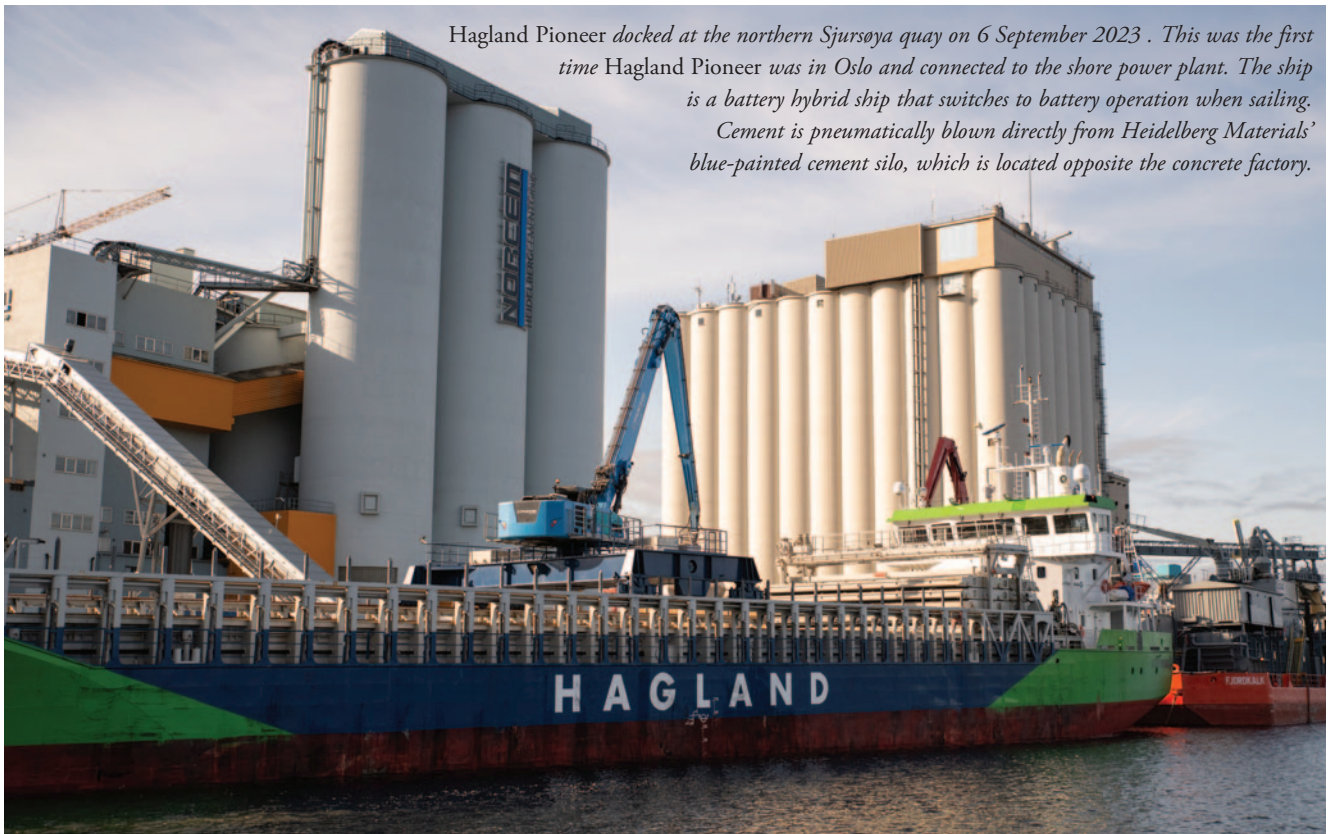
The concrete factory has more than double the production capacity compared to the old plant.

"We are completely dependent on innovative players like Heidelberg and I am pleased that such a large proportion of the basis for concrete comes by sea, is processed locally and has a short distance to our construction projects. This is an important step for the zero emission work in Oslo Harbor and in Oslo, says Leirvik North.

"We have a major focus on reducing our footprint. The factory we have built now answers that. Here we have zero emissions to air and water, and we have worked well with our sister company Heidelberg Materials Cement, so that we have no car transport between the plants. In addition, we take in our inputs via the sea, which further reduces our emissions and environmental impact," says Poulsen, who gives an example; "If we had brought in our deliveries to the factory via the road network, it would have resulted in nearly 10,000 truck trips in Oslo traffic each year."

Investing in a clean future

"I would like to congratulate Heidelberg Materials on a new, stylish and area-efficient concrete factory. We are pleased that private actors are betting on, and investing in, Sydhavna [South Harbour], just as Oslo Harbour is doing. Heidelberg



Hagland Pioneer *docked at the northern Sjursøya quay on 6 September 2023 . This was the first time* Hagland Pioneer *was in Oslo and connected to the shore power plant. The ship is a battery hybrid ship that switches to battery operation when sailing. Cement is pneumatically blown directly from Heidelberg Materials' blue-painted cement silo, which is located opposite the concrete factory.*

Shore power plant for Heidelberg Materials' cement ships.

Materials' investments in this factory have made an important contribution to both the municipality of Oslo and Port of Oslo reaching our ambitious climate goals," says Einar Marthinussen, commercial director at Port of Oslo.

In order to reduce emissions from mass transport in the construction industry, road transport must be limited as much as possible, and non-renewable resources such as sand, stone and gravel must be used effectively.

Port of Oslo therefore wants to establish a recycling terminal and bulk terminal for cargoes such as sand, stone and gravel at Kongshavn, in connection with, among other things, the concrete producers at the northern Sjursøya quay.

"A mass recycling terminal will contribute to better resource utilization and strengthen the circular economy in Oslo. By recovering and recycling non-renewable natural resources, socio-economic and environmental costs are reduced. A bulk recycling terminal at Kongshavn can be co-located with already existing concrete production in Sydhavna. Co-location will help ensure that boats and trucks are filled both ways, and that resources are utilized almost optimally, says Einar Marthinussen in Port of Oslo.

For Heidelberg Materials, the concrete factory is an important part of developing a value chain that has the lowest possible emissions and efficiently enables deliveries of construction materials to the construction site.

"The completion of the concrete plant is part of a larger whole that we are focusing on. In parallel, we are in the final phase of the carbon capture project in Brevik, and together with more use of recycling of the materials in our products, and increased use of renewable energy in our processes, this will help to reduce emissions. We also collaborate with, among others, Volvo to develop innovative electric transport solutions," says Poulsen.

Port of Oslo encourages shift to shore power — wants container vessels to join Heidelberg Materials in green initiative

Port of Oslo is urging shipping companies to take advantage of shore power facilities in the Oslofjord and join the green shift.

The port is trying to persuade operators of container ships to convert their fleets and help reduce greenhouse gas emissions from maritime transport.

Port of Oslo wants to advance the green shift by helping shipping companies convert their vessels to shore power. There are already around two hundred shore power facilities in Norway, and ports in Norway are adding more with financial support from Enova. Unfortunately, container ships are not using them, says Heidi Neilson, Head of Planning and Environment at Port of Oslo.

"Without innovation and investment by shipping companies in the bulk and container segments, we risk losing the advantage of shore power facilities for the foreseeable future," says Nielson.

Heidelberg Materials is the only company using shore power facilities for bulk carriers in Oslo's cargo port today.

"None of the container ships that regularly call at ports in the Oslo Fjord use shore power. Despite a relatively low cost to retrofit, shipping companies are reluctant to invest and convert their aging fleets," adds Neilson.

Port of Oslo has received an approximate price quote from a supplier to convert container ships to shore power.

"The offer estimates that conversion of a single vessel will cost half a million Norwegian kroner. This is an investment that shipping companies will recover quickly through the lowest port fees when using shore power," says Neilson.

In the future those who choose not to connect to shore power will have higher port fees, when the infrastructure in the Oslo Fjord is in place in all ports by 2025.

Port of Oslo can help container shipping companies convert their vessels to shore power.

"We can assist using our expertise with shore power and applications to Enova for financial support. We only need one or two container ships to convert to shore power to move forward. Then the barrier is broken, and others are likely to follow. Don't hesitate to contact me if you want to convert your container ship," says Neilson.

Collaboration among ports and port directors in Oslo, Drammen, Moss, Borg, Larvik, Grenland, Kristiansand, and Arendal through Emissions-Free Oslo Fjord aims to cut 85% of greenhouse gas emissions by 2030. "We are collaborating to reduce barriers converting to shore power by establishing common connection routines in all ports. By 2025, all the major ports in

the Oslo Fjord will offer shore power for container ships and dry bulk carriers. In four of the eight ports, the infrastructure is already in place. This collaboration provides predictability and security for shipping companies investing in the green shift. We need container ships to test our facilities and show the world it works. The result will be a reduction in emissions from shipping," says Neilson.

Norwegian authorities also have ambitious climate goals, including a 50% reduction in greenhouse gas emissions from domestic shipping and fishing by 2030. Meeting this target requires deploying 700 low-emission and 400 zero-emission ships distributed across all ship categories.

Green corridors

Shore power, renewable fuels, and electrification through batteries as range extenders, support the development of green corridors: emission-free logistics routes from origin to destination.

A green corridor contributes to the shift from fossil to renewable fuels on sea and land. Although switching will not eliminate all emissions, shifting transport mode from road to sea can cut emissions by 50%. ASKO Maritime's electric sea drones, *Therese* and *Marit*, are a feature of the first green corridor in the Oslo Fjord. Drones shuttle between the ports of Moss and Horten. Electric tractors move cargo to and from the docks.

"ASKO's solution to sail emissions-free across the fjord, instead of driving all the way around, is a good example of how maritime transport can contribute to the green shift. The seaway is the green way. Establishing and developing urban ports will help Norwegian cities meet their climate targets faster," says Neilson.

Port of Oslo contributes to green corridors by building charging stations and infrastructure for emissions-free cargo transport, including terminal equipment, cargo vehicles, and cement trucks.

"Ports have a fantastic opportunity to contribute to green corridors. We need ambitious customers and politicians who support clear environmental requirements," adds Neilson.

Green corridors are a hot topic worldwide. C40 is a network of mayors representing almost a hundred leading cities working together to address the climate crisis.

About Port of Oslo

Port of Oslo is Norway's largest public cargo and passenger port. From Oslo, half of Norway's population can be reached within three hours.

Oslo Port is a natural hub for logistics in Norway, with modern and efficient terminals. More than six million tonnes of cargo are shipped by sea to and from Oslo.

Being one of the leading maritime centres in the world, Port of Oslo is looking to expand further, meeting at the same time its ambitious targets to reduce greenhouse gas (GHG) emissions. Clear targets are set for 2030, with an 85% reduction in current GHG emissions. Efforts will continue after that so that Oslo can become a zero-emissions port in the long term. In order to reach its goal of a future zero-emission port, increased sea transport is an important contribution to this green shift.

As the port is growing very rapidly, it needs to make sure it doesn't become a bottleneck in this development. With more lines and more vessels calling in Oslo, the port is going to the south, moving out of the city to expand further. The overall aim is to make the South Port a large energy ecosystem — to use the energy in a smarter way but also to get smoother logistics between sea and land transport.

Port of Oslo is a municipal enterprise with a separate board of directors, operating under the aegis of the municipality of Oslo. The port facilitates efficient and environmentally friendly operations to support maritime transport, monitor traffic in the municipality's waters, and manage the port's properties and facilities in an economical and environmentally sound manner.

The port has approximately 100 employees with a head office at Vippetangen, and other offices located on Sjursøya. Port of Oslo has earned ISO 14001 environmental certification for its management and operations.

- Port of Oslo is responsible for facilitating efficient and environmentally friendly sea transport to and from Oslo, at the lowest possible social cost, through modernization and construction of state of the art port facilities.
- Port of Oslo's vision is to be the world's most area-efficient and environmentally friendly municipal port.
- Port of Oslo aims to become one of the world's first emissions-free ports.

The Hagland Pioneer *is a battery hybrid ship that switches to battery operation when sailing.*

ALPINE secures major lifecycle services contract with DTA

On 10 June this year, ALPINE announced that it has been awarded a major contract with Dominion Terminal Associates (DTA) in Virginia, USA.

This significant partnership underscores ALPINE's commitment to delivering comprehensive lifecycle services that go beyond equipment supply, ensuring long-term reliability and performance for bulk materials handling operations.

Following extensive collaboration with DTA to assess and optimize its bulk handling systems, ALPINE is now entering the implementation phase of this five-year lifecycle extension project.

The scope of work includes engineering solutions and critical equipment upgrades for DTA's stacker/reclaimers, conveyors, and shiploader. The project is designed to minimize investment while maximizing operational efficiency and reducing downtime.

"This contract is a testament to ALPINE's unique approach to lifecycle asset management," said Trevor Keogh, ALPINE General Manager – Canada. "Rather than just supplying equipment, we partner with our customers to develop long-term, tailored solutions that enhance performance and reliability. We are excited to work alongside DTA in ensuring the continued success of their terminal operations."

As ALPINE moves forward with project implementation, the company remains dedicated to providing innovative engineering services that drive efficiency and extend the lifespan of critical infrastructure.

Vale automates stacker-reclaimers at Guaíba Island Terminal

In Brazil, Vale has completed the automation of the three stacker-reclaimers it operates at its Guaíba Island Terminal (TIG), which is located at Mangaratibo, in Rio de Janeiro state. Upgrades, which cost $10 million, allow the equipment to operate completely autonomously, without the requirement of on-board personnel.

The company claims that this enables it to remove operatives from potentially dangerous working areas, and has already resulted in a 12.3% improvement in ore recovery rates compared to the previous manual operation.

At TIG, stacker-reclaimers handle iron ore in the stockpile area, loading it onto a conveyor-based system to make up shipments for export by maritime vessel.

To date, Vale has trained 70 personnel to work in the new automated environment, essentially overseeing operations undertaken by the upgraded stacker-reclaimers.

FUCHS LAUNCHES NEXT-GENERATION G-SERIES

FUCHS®, German manufacturer of specialist material handling equipment proudly unveiled the MHL340 and MHL350, debut models of its new G-series at Bauma 2025 trade fair in Munich. As global leaders in their class, these models bring operator-focused innovation to market, combining greater efficiency with advanced digital integration.

"The MHL340 is among our top international models for recycling and scrap handling, while the MHL350 is one of the fastest and most precise loading machines in its performance class," explains Dominik Vierkotten, Vice President, Lifting and Handling, Terex. "With the G-Series generation of these models, FUCHS is redefining standards in operator comfort and efficiency."

The G-Series introduces a new state-of-the-art display interface to FUCHS material handling equipment, offering a live view of the work area and intuitive workflows. It enables operators to control sensitivity, speed, and joystick configurations to suit personal preferences, providing a smooth, controlled, and intuitive handling experience.

The optional 'Virtual Wall' enables operators to set height and reach limits directly via a display monitor — enhancing precision and safety in sensitive environments. Safety is further supported by a high-definition camera system with optional AI-based person detection, providing all-around visibility and real-time awareness on the job site. Additional support is easily accessed by scannable QR codes on the machine, which deliver mobile-accessible operating instructions and troubleshooting tips, accessible from any smartphone.

Both models offer increased load capacities, allowing for faster, more productive work cycles in demanding applications. The MHL350 G has been further enhanced with an extended reach of up to 17 metres (55'9"), providing operators more coverage with less repositioning.

To assist return on investment, FUCHS has an upgraded digital platform that includes an enhanced web and smartphone app, enabling real-time telemetry, maintenance tracking, and performance analytics. New service packages, based on actual machine hours, offer full transparency and predictable maintenance costs through early detection of anomalies to help reduce downtime and extend machine lifespan.

"With the launch of the G-Series, FUCHS is once again at the forefront of innovation in material handling," added Vierkotten. "The strong interest at Bauma confirms that the industry is ready for the next step in intelligent machine design — and FUCHS is leading that charge."

About Terex

Terex Corporation is a global industrial equipment manufacturer of materials processing machinery, waste and recycling solutions, mobile elevating work platforms (MEWPs), and equipment for the electric utility industry. It designs, builds and supports products used in maintenance, manufacturing, energy, minerals and materials management, construction, waste and recycling, and the entertainment industry. The company provides best-in-class lifecycle support to its customers through its global parts and services organization, and offers complementary digital solutions, designed to help customers maximize their return on their

investment. Certain Terex products and solutions enable customers to reduce their impact on the environment including electric and hybrid offerings that deliver quiet and emission-free performance, products that support renewable energy, and products that aid in the recovery of useful materials from various types of waste. Its products are manufactured in North America, Europe, and Asia Pacific and sold worldwide.

About FUCHS

Founded in 1888 by Johannes Fuchs, then as a manufacturer of agricultural implements and barn equipment, FUCHS® has evolved over the decades into the specialist for professional material handling.

Unique design features make its loading machines true all-rounders in material handling. Whether in the scrap yard, in recycling operations, in the timber industry or in port handling — FUCHS machines, manufactured at its centre of excellence in Bad Schönborn, Germany, stand for maximum productivity and cost-effectiveness. DCi

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Above: KMK O-type wagon tippler unloading 150te wagons handling iron ore.

Right: KMK train mover (indexer) — 12 drives pulling 150te arm load handling coal.

Louise Dodds-Ely

DemcoTECH enhances its full service offering to the coal sector

DemcoTECH has augmented its holistic offering to the coal mining sector through the signing of a co-operation agreement with KMK Consulting Engineers (KMK) in the United Kingdom.

KMK specializes in providing services and machines for a wide range of sectors including bulk material handling, mining and port terminals.

"KMK's range of bulk materials handling machines integrates well with our services to the coal sector, which cover the design and supply of systems and technologies right from offloading trains, through to coal storage, and in-plant and overland conveyor systems," says DemcoTECH General Manager, Paul van de Vyver. "In particular, the versatility of KMK's machine ranges enhances our ability to provide our clients with custom-designed solutions tailored to their needs and site requirements.

"For example, KMK's wagon unloading systems include wagon tipplers (car dumpers), train movers (indexer/positioners), traversers and train holders (wheel grippers), which combine different wagon or railcar unloading machines to unload different types of train wagons. The wagons can be open on top, known as gondola wagons, or have hatches underneath that can be opened for bottom dumping."

Through the agreement, DemcoTECH has access to KMK's range of stacking and reclaiming machines, which are widely used in coal operations. These machines include stacker, scraper and bucketwheel reclaimers.

"KMK also supplies bucket- and barrel-wheel bridge reclaimers, which offer the option for a reversible bucketwheel for dual reclaiming," adds van de Vyver. "This is a major benefit for blending, homogenization and enrichment.

"For port handling, KMK's machines are mobile or rail mounted. The range includes ship unloaders/loaders designed to specific customer requirements and crane grabbers to unload from ships or open containers, with a scoop to load into a chute or onto ships and containers. Its wagon unloaders are bespoke machines designed for lower capacities to unload material from an open wagon."

In addition to KMK's train unloading systems and stockyard machines, they also

offer a wide range of feeder systems including fully customized belt and apron feeders for handling different sizes of material.

DemcoTECH services

In designing and suppling materials handling equipment for the coal sector, DemcoTECH utilizes advanced testing, flow modelling and system simulation tools for a thorough understanding of the properties of the coal.

"For example, we use Discreet Element Modelling (DEM) to simulate the flow of bulk materials through, for example, transfer chutes, hoppers, rail and road loadout facilities, to optimize equipment design, minimize degradation and prolong the life of the platework. In one application, we used DEM to design transfer chutes where both coal and iron ore were conveyed."

Given the inherently polluting nature of coal handling and the increasing pressure on mine operators to reduce their impact on the environment, DemcoTECH equips its systems with effective dust suppression and dust extraction systems. In addition, it supplies environmentally friendly technologies such as pipe conveyors, which, by providing enclosed conveying, contain, reduce and eliminate dust and other issues, such as material spillage.

Projects

DemcoTECH's suite of completed projects for the coal sector reflect the range of services it offers from conceptual design and feasibility studies to engineering, procurement, expediting, construction and commissioning.

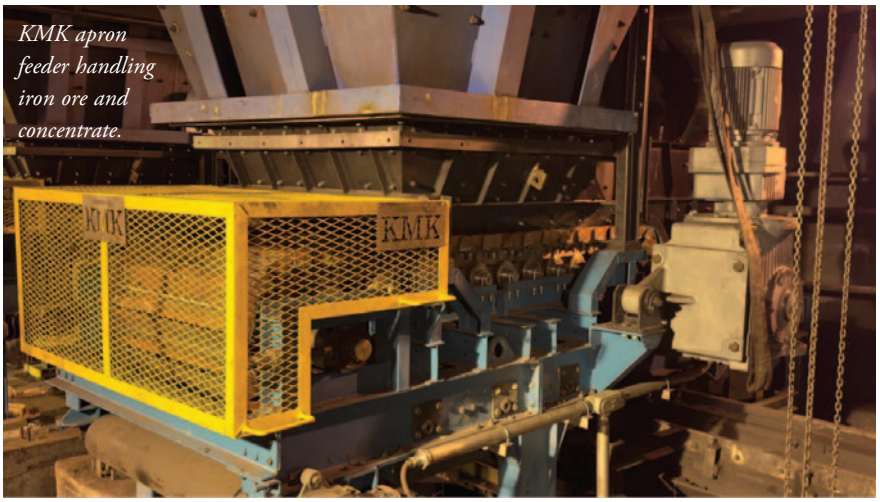
"For example, we were appointed to carry out concept feasibility studies for major power stations in South Africa covering upgrading a coal delivery facility and the fly ash, coarse ash and ash water return systems," says van de Vyver. "On the other hand, we were appointed by Grindrod for the design, engineering, procurement and construction management for the materials handling portion (excluding the civils and earthworks) of the expansion to its multi-product terminal at the port of Richards Bay in South Africa."

The scope of the contract covered providing the materials handling to convey various materials, but mainly rock phosphate and coal, from the three Richards Bay terminal sites: Navitrade, Kusasa and Valley.

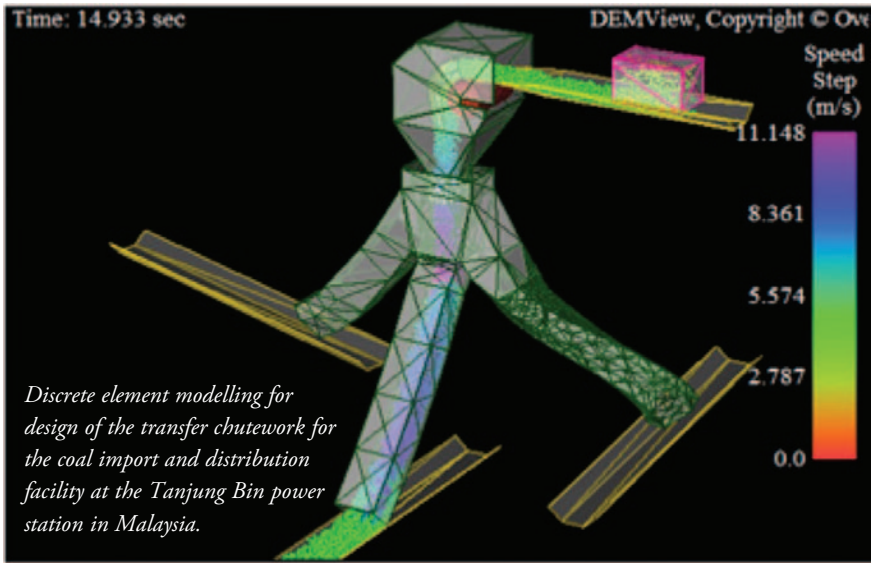
In recent years, DemcoTECH has seen strong and growing demand internationally, particularly from the Asian market. Recent projects include the detailed engineering of the bulk materials handling on the stockyard at an import terminal project at the Port of Ploce in Croatia. The multi-product terminal offloads and handles mainly coal, but also iron ore.

The materials handling system included five belt conveyors with associated transfer stations, two hydraulically-operated dewatering lifting tables, two rail-mounted loading hoppers for mobile plant reclaim operations and a train loading system.

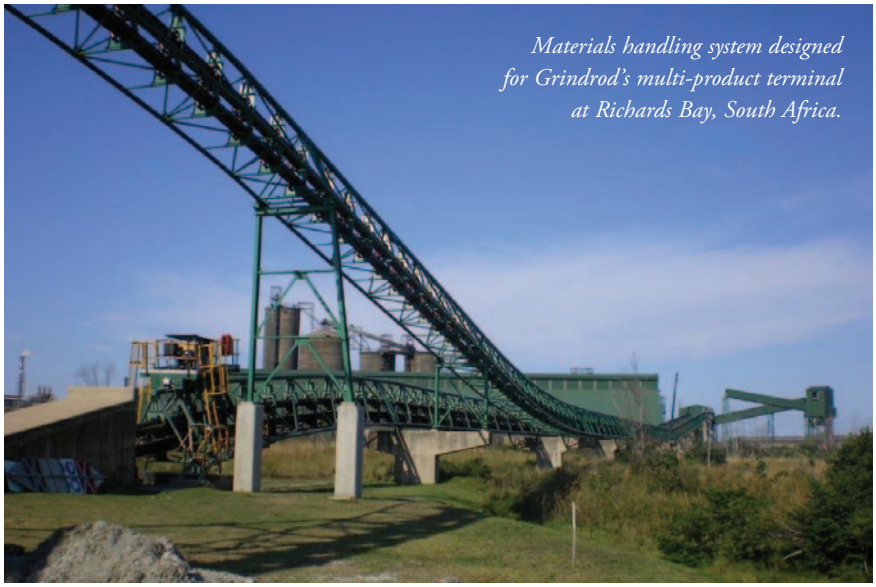
KMK surface-mounted train wheel gripper – shallow foundation.



KMK apron feeder handling iron ore and concentrate.



Discrete element modelling for design of the transfer chutework for the coal import and distribution facility at the Tanjung Bin power station in Malaysia.



Materials handling system designed for Grindrod's multi-product terminal at Richards Bay, South Africa.

"The vastly different material properties of coal and iron ore presented challenging design implications for the system," says van de Vyver. "This was particularly so for the chutes and train rapid rail load-out system, as well as the fact that the main stockpile was served by only one rail-mounted bucketwheel stacker reclaimer."

To enable the conveyor system to handle both coal and iron ore interchangeably, through the same chutes, the conveyor belt speeds and throughput of the two products varied considerably. Also, the chutes were required to be set up for the two products with the chutework designs for coal (free-flowing) versus iron ore (drop box) achieved through a series of adjustable features rotated into or out of the material path.

"Another design challenge was the fact that 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."

In another port handling project, DemcoTECH provided the design for the 5,000tph (tonnes per hour) conveyor system for the coal import and distribution facility at the Tanjung Bin coal-fired power station located in Johor, Malaysia. The power station was being expanded to include an additional 1,000MW units, requiring additional coal supply capacity, imported from a variety of locations worldwide.

DemcoTECH's scope of work comprised the detailed mechanical and structural design including conveyor equipment, take-ups, structures, fabrication drawings, design of the transfer chutework using DEM, seismic assessments and managing the engineering design phase of the project.

"The range in coal characteristics was particularly difficult to cater for and simulate in the DEM process due to the fact that the coal is sourced from environments varying from frozen Russian mines to monsoon-affected Indonesian suppliers to drier South African mining operations. "Also, when the coal is off-loaded at the power station it commences as dry, middlings product but, towards the bottom half of the ships' holds, the product is often fine and wet and even frozen. This posed significant challenges in the chutework design, which were overcome by making use of Tivar and VRN liners, and curved and adjustable deflector plates. Load centralizing was achieved by beveled chute edges at the loading boots onto the receiving conveyors."

About DemcoTECH

DemcoTECH 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.

Pipe conveyor installed for Grindrod's multi product terminal at Richards Bay, South Africa.

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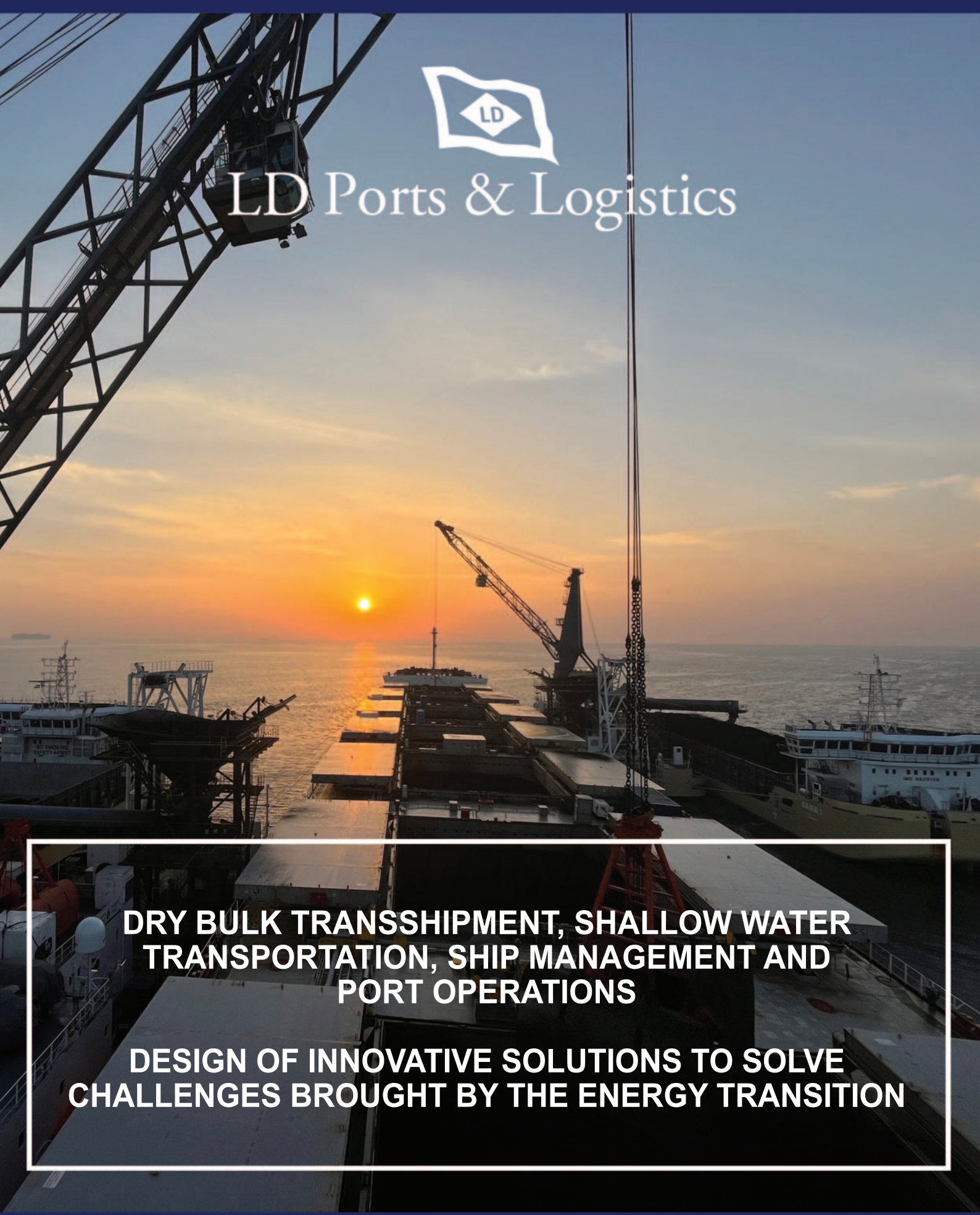

DRY BULK TRANSSHIPMENT, SHALLOW WATER TRANSPORTATION, SHIP MANAGEMENT AND PORT OPERATIONS

DESIGN OF INNOVATIVE SOLUTIONS TO SOLVE CHALLENGES BROUGHT BY THE ENERGY TRANSITION

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in the ship's hold.

This, in turn, dramatically reduces the need to long travel the cranes and reduces final trimming and ballast requirements.

The 360°, longitudinal rotation of the rotation head frame is controlled by pulse inputs by the operator's joy stick. The operator pushes the button once for 90° rotation, twice for 180° rotation and so on. Once the load is discharged and the Rotainer® is on the return leg of the cycle, the spreader is programmed to automatically return to zero.

To maintain an efficient feed to the crane, generally six to eight containers per crane will be required if a tandem, Mafi-style tug and trailer combination is used.

Some of the differences between a generic style 2,900mm high cube container and CRS's Coaltainer high cycle rotatable container are:

- 38,400kg as standard gross weight with a 42,000kg gross weight as an option. A 42-tonne gross container weight works with CRS's newly developed 2025 Rotainer® Eurospec MH42, the Rolls-Royce of container rotators.
- CRS's unique, patented industry-proven 'whale bone' rib design provides for full 360° rotation without the need for side supports. The rib system allows for a strong, highly flexible, heavy-duty container with the lowest cost-per-tonne of payload.
- CRS specially engineered, high strength twist lock pockets. Standard, cast twist corner pockets, on high cycle, shed-to-ship application, wear quickly and therefore rapidly lose design integrity — after all, they were originally designed for general container usage, not 360° operation, with load rates >32,000kg/hour up to six to ten times per hour.

CRS has one of the most versatile ranges of 2,900mm-high cube rotatable containers such as:

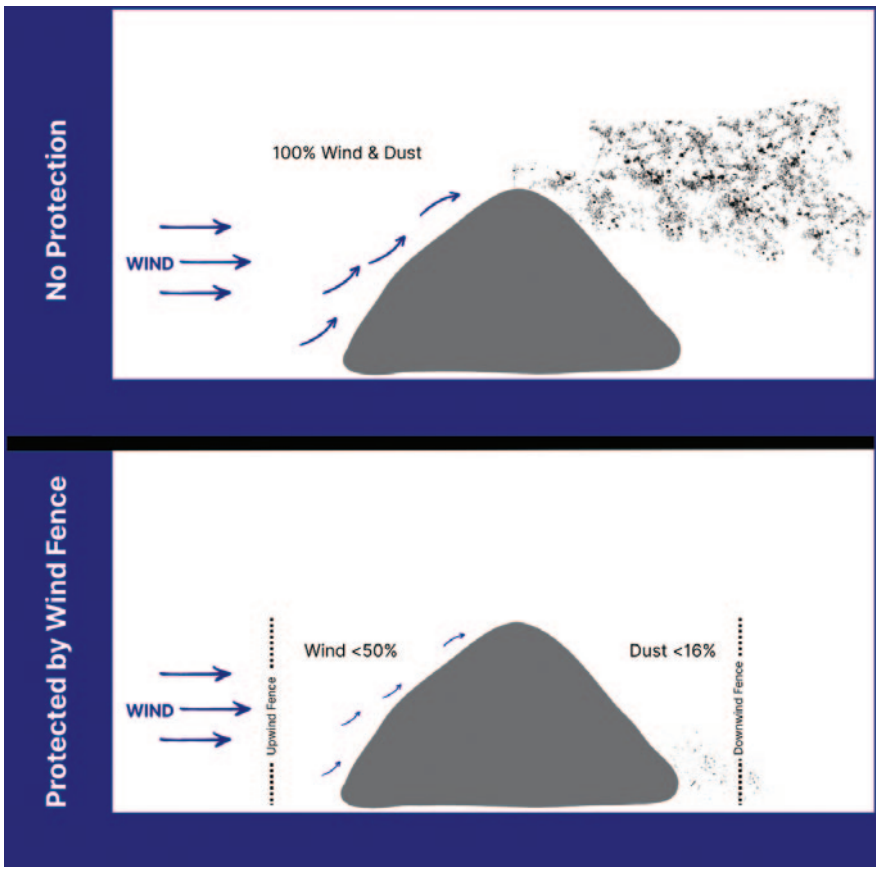
- Coaltainer® 2,900mm for approximately 35 tonnes.
- Scraptainer® 2,900mm extra heavy duty for arduous scrap metal applications.
- Graintainer® for food and grain products for 35m³.
- Multibulker® 2,900mm, rotatable container with large rear door and lid hatches.
- Wastetainer® 2,900mm in 20ft and 40ft versions for waste and refuse
- Chiptainer® 40ft for woodchips, the world's largest rotatable container
- Maxitainer® wide bodied 45m³ and 55m³ for wood chips and wood pellets.

Wind fences: traffic control for coal handling

Imagine a busy intersection during rush hour traffic. Cars are weaving in and out jostling for position, horns are honking, and a stalled vehicle is blocking the turning lane. It's an environment of chaos and frustration until traffic control steps in to direct the cars and restore order. Coal handling operations are no different than the intersection, just replace the cars with wind and dust and the outcome is the same — utter mayhem. Enter the wind fence, the traffic control for coal handling. Like a traffic controller managing cars in a busy intersection to keep things moving, wind fences 'manage' wind and dust in coal handling to support smooth operations.

At coal transfer points and stockyards, wind and dust threaten operations, health and safety, and limit visibility. Dust generation from equipment such as conveyors, stacker/reclaimers, and haulers only make matters worse.

Considering that coal remains one of the world's largest sources of energy with the global coal mining industry valued at US$2.5 trillion in 2024[1] and many mines having throughputs in the millions of tonnes per year[2], effectively managing wind and dust isn't just important, it's a critical necessity.



The wind fence traffic controller

So how exactly does a wind fence control wind and dust? A wind fence is a porous barrier erected to function much like a traffic controller directing traffic. A traffic controller allows some cars to pass through while directing others in a different direction. WeatherSolve's wind fence traffic controller operates in the same manner and re-directs wind up and over the fence while still allowing some wind to pass through. The result is a calm protected zone, also known as a sheltered zone, on the opposite (leeward) side of the fence where wind speeds are drastically reduced. The small amount of air that passes through the fence equalizes pressure on both sides which minimizes disruptive

References & Reading Material

1. Statista "Global coal mining industry – statistics & facts" https://www.statista.com/topics/1051/coal/#topicOverview

2. US Energy Information Administration "Annual Coal Report 2023" October 2024

Dust control for coal handling

Standing **23m high, and spanning 1.5km**, this fence to control coal dust can **withstand ice storms** and has **multiple access points** for an extensive railway system.

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

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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!

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turbulence and eddies that are typically seen with a solid barrier. In the sheltered zone, there is significantly less wind present to generate dust, and any airborne dust quickly settles. In fact, a well-designed wind fence can reduce fugitive dust to 1/8th that of an unprotected situation.

Wind fences function through two modalities: upwind and downwind. An upwind fence dramatically lowers incoming wind speeds and prevents dust from being kicked up and transported, while a downwind fence acts like a 'catch' fence for dust still in motion. A small amount of dust may still pass through the fence, but doesn't get far as it quickly settles in the sheltered zone of the downwind fence. As wind patterns change, an upwind fence may function as a downwind fence and vice versa.

Traffic calming measures ahead — managing dust & wind for coal handling operations at a European port

To evidence the efficacy of wind fences in coal handling let's consider a large port in the Baltic Sea corridor in need of control measures for dust generated from its coal handling operations. Cargo turnover of coal at the port is in the tens of millions of metric tonnes per year and accounts for approximately 50% of overall turnover. Coastal winds were directing dust toward a high-density urban population risking public health and safety.

The port required a solution that would accommodate the unique challenges presented by the site. The coal stockyard itself had an area exceeding 120,000m^2 with stockpiles reaching heights of 18m. A railway transport system was integrated into the port linking the stockyard to inland areas and was responsible for the transport of millions of tonnes of cargo yearly.

Cranes were positioned for loading and unloading and any implemented dust control strategy could not hinder operations. In addition, compliance with strict regulatory requirements regarding air pollution was essential.

To make things even more interesting, port infrastructure was prone to ice accumulation during colder months requiring the dust control solution to be able to handle freezing temperatures and a harsh winter environment without impacting its effectiveness.

WeatherSolve Structures was tasked with designing an innovative wind fence solution to meet the needs of this large-scale project. A 1.5km long, 23m high fence integrating two porosities of proprietary flexible woven polypropylene fabric, designed to match the scale of the stockpile, was installed around three sides of the yard (open on the water-facing side) with construction completed in 2019.

The lower fence panels feature 24% aerodynamic porosity fabric to control fine dust while the upper panels are constructed with 47% porosity fabric.

WeatherSolve's proprietary fabric has been tested and proven to withstand environmental extremes and is designed to flex with the wind to prevent ice accumulation. To ensure peak performance in the harsh winter climate, all wind fence components were engineered to withstand maximum ice loads as specified by local building codes and multiple access points were integrated into the fence design to accommodate the extensive railway system, allowing for unimpeded cargo transport.

Following installation, air quality measured at monitoring stations downwind showed that concentrations of PM10 and PM2.5 more than satisfied regulatory requirements. The fence proficiently manages wind and dust and the ice storms of the region do not impact fence effectiveness. A WeatherSolve wind fence is a great traffic controller!

All lanes open: a smooth route forward

Just as a traffic controller transforms an intersection from a gridlocked, chaotic mess to a smooth thoroughfare, wind fences bring order to the wind and dust that impact coal handling operations. The success of the Baltic Sea port project clearly demonstrates the power of a well-designed wind fence to meet the demands of operational efficiency and environmental responsibility — even under extreme conditions. As coal continues to play a significant role in the global energy landscape, wind fences are an essential tool for coal handling operations to minimize the impact of dust and wind on operations, public safety and the environment. In the ongoing effort to balance industrial productivity with public and environmental health, the wind fence stands as a powerful traffic controller at the frontlines of dust and wind management.

MCI: trusted partner in high-stakes industrial environments

Founded in 1962 in Graz, Austria, MCI Mining Construction International GmbH (MCI) began as the in-house maintenance and operations partner for the country's largest open-pit coal mine. Over time, it became a trusted specialist in the relocation and refurbishment of continuous mining equipment — acquiring entire systems, overhauling them to OEM standards, and recommissioning them at new mine sites around the world.

This legacy of hands-on technical service forms the foundation of what MCI is today: an independent, family-owned company with full engineering and project execution capabilities across mining and bulk material handling. Its teams combine decades of practical field expertise with in-house engineering for mechanical, structural, electrical, and instrumentation disciplines.

As the industry reshaped in recent years and two major players stepped out of the market, MCI expanded its offering beyond service and refurbishment — bringing in a large team of senior OEM experts and building large scale new systems from pit to port. Today, its portfolio spans feasibility studies, custom equipment development, hybrid solutions combining new and used assets, and turnkey installations.

MCI still works with the same operator mindset that defined its origins: long-lasting, maintenance-friendly designs, delivered with accountability and technical depth.

Equipment and service portfolio

A. New-build equipment

MCI offers end-to-end delivery of continuous mining and bulk material handling systems — from concept to commissioning. Its capabilities span:

- **Full-scope engineering:** conceptual, basic, and detail design, including mechanical, structural, electrical and instrumentation (E&I), as well as flow and load analysis
- **Execution & delivery:** fabrication, procurement, quality assurance, and logistics — realized through certified partner workshops, with MCI engineers supervising quality on site
- **Customized system design:** all equipment is tailored to project-specific requirements, not based on pre-defined catalogues
- **Turnkey readiness:** MCI manages every phase up to on-site commissioning, ensuring full integration across disciplines and interfaces

MCI's engineering expertise is rooted in over 60 years of field experience — initially in servicing and refurbishing large-scale continuous mining equipment. This foundation continues to shape its technical approach today: every system it designs is informed by deep operational understanding.

MCI's offering includes:

- **Continuous mining equipment:** for overburden and coal extraction, including excavators, conveyors, and spreader systems
- **Large-scale conveying systems:** such as in-pit crushing & conveying (IPCC) stations and modular belt conveyors linking pit, plant, and port
- **Bulk-handling machines:** stackers and reclaimers (drum, boom, or bridge type), as well as shiploading and unloading systems

B. Integrated services

MCI provides a full suite of services across the equipment lifecycle:

- **Feasibility, mine planning and equipment strategy studies:** integrating geological, logistical and operational parameters into system concepts
- **On-site execution:** supervision of erection, commissioning, and operator training
- **Aftermarket support:** supply of spare and wear parts, inspections, audits, system upgrades, and fully staffed O&M services
- **Refurbishment & relocation:** complete overhaul and recommissioning of used equipment, enabling redeployment under OEM-level engineering control

MCI's engineering and execution teams work hand-in-hand from day one, ensuring consistency across design, production, and site implementation. By maintaining direct control over technical interfaces and quality standards, it delivers reliable results without dependency on rigid corporate structures.

3. Customer base and current projects

Client confidentiality precludes naming individual owners, yet MCI's systems are active in coal and overburden lines across Central Asia, Indonesia, and several African jurisdictions.

As the engineering and technology partner, MCI is currently leading the life-extension of two high-capacity coal reclaimers in close collaboration with the operator.

Its scope includes a targeted mechanical and structural revamp designed to restore the machine to full operational performance. This involves the engineering, manufacturing, and installation of key components, following a complete reassessment of the structural integrity using Finite Element Analysis (FEA) analysis. Based on these calculations, MCI is reinforcing critical areas to meet today's operational and safety standards. Additionally, it is overhauling essential functional groups of the machine — carrying out repairs, adjustments, and performance optimization.

Final commissioning, including fine-tuning of the machine performance, will be executed by MCI's on-site team. With its engineering expertise and proven execution capabilities, MCI is ensuring a reliable, long-term solution that maximizes asset performance and lifecycle value.

Also, MCI is currently engineering and executing a complex project for stacker system at a major coal handling facility — designed to integrate seamlessly into the client's existing operational infrastructure.

With a deep understanding of the system environment and operational dynamics on site, MCI assumes full responsibility for both design and implementation. Its solution is tailored not only to technical specifications, but to the practical realities of day-to-day operation — ensuring long-term performance, reliability, and maintainability.

This project reflects MCI's continued role as a trusted partner in high-stakes industrial environments — where precision, adaptability, and system-level thinking make the difference.

MCI provides ongoing support for bucket wheel excavators in overburden removal at coal mining operation in Thailand.

With its own specialists on site, MCI ensures continuous technical support. Its team works closely with local operations to proactively address wear, system stress, and performance optimization.

4. Staying Competitive

MCI's cost and quality advantage is built on three key pillars. First, lean ownership: as a family-controlled company, it makes fast, unbureaucratic decisions — without the inertia of a large corporate structure. Second, strict project costing: customers are only charged for milestone-linked work directly related to their project. There are no cross-subsidized overheads or bundled corporate fees. Third, flexible manufacturing: MCI outsources fabrication to certified partners, while its engineers are present on site to supervise and ensure quality. The result is a combination rarely found in the industry — OEM engineering depth with the speed and focus of a mid-sized operation.

5. Technological developments

LEOPOLD® compact bucket-wheel excavator — engineered in response to growing demand for continuous, non-blasting overburden removal in harder geological formations. Fully electric, with a capacity of up to 6,500m³/h and equipped with proprietary Dual-Teeth™ technology.

LEOPOLD® marks a step change in compact bucket-wheel mining:

Dual-Teeth™ allows tool configuration to match specific material types — from soft soils to competent overburden— ensuring optimal cutting performance.

The all-electric design minimizes CO_2 emissions, dust, and noise, addressing modern environmental and regulatory standards.

Built with a 25–35 year life cycle in mind, the machine's modular structure supports redeployment across different sites, enabling long-term operational flexibility and lower total cost of ownership.

The same modular and serviceable design principles now guide MCI's IPCC system developments and reclaimer revamps, offering customers a way to upgrade existing assets without full system replacement.

6. Outlook

Global coal and overburden handling faces two parallel demands: tight cost control and tangible environmental improvement. MCI addresses both with electric heavy machinery, hybrid 'used-plus-new'" concepts, and a service package proven to cut downtime.

Beyond expectations: state-of-the art bulk material conveyor from TSUBAKI handles coal smoothly and efficiently

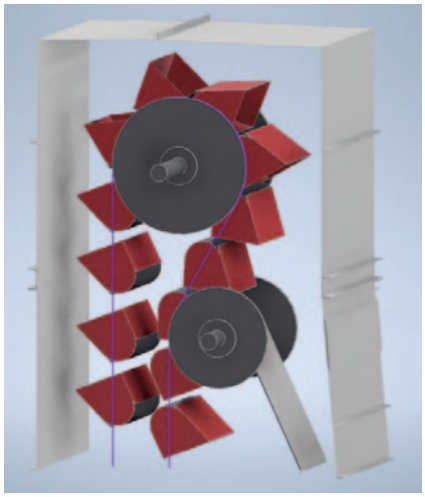
TSUBAKI was founded in 1917 in Osaka, Japan, and its first commissioning of a bulk material handling conveyor took place in 1936, *writes Koh Tsumura of TSUBAKIMOTO BULK SYSTEMS CORP., Japan*. Its first commissioning of bucket elevator was accomplished in 1944. Accordingly, TSUBAKI successfully completed its first export project in 1956. Since then, TSUBAKI's state-of-the-art conveyor technology has been advanced, improved, and enhanced through extensive experience, resulting in a great number of conveyor installations both in Japan and abroad.

Today, the members of TSUBAKIMOTO BULK SYSTEMS CORP. are expanding the bulk handling conveyor business worldwide. The company is an internationally renowned player in cement, steel, thermal power, fertilizer, chemical, mining, food, incineration and water treatment plants, and also aboard ocean bulk carriers. It develops and provides highly refined technical solutions for all factories around the world under the slogan of 'Beyond Expectations'.

Wherever coal handling facilities are constructed, conveyors for storage and receiving are required. For this, Tsubaki offers significant mechanical conveyor equipment, with its unshakeable confidence based on the abundant experience and latest technology which have been established for approximately 90 years of experience.

The TSUBAKI NBC-K Bucket Elevator/Positive Discharge Type was developed to achieve excellent vertical transport of sticky/adhesive coal or petroleum coke, which cannot be discharged with a normal design. This special-purpose bucket elevator is offered for a coal storage facility, such as a silo. The conveying capacity exceeds 750m³/h and the vertical height is up to 65m, even for high moisture coal. Raw coal in particular has characteristics such as high adhesiveness and stickiness, and it generates corrosive gas inside of the elevator's enclosed casings due to high moisture and chemical reactions. The bucket elevator has managed to solve these troublesome matters with long-running coal handling experience.

Other conveyor suppliers are likely to offer either a normal centrifugal or gravity discharge mechanism. However, the high adhesiveness of coal often prevents material itself from being well transported, which is sure to cause a capacity shortage, since such sticky coal often remains in the buckets, without being discharged from the casings. As a countermeasure, TSUBAKIMOTO BULK SYSTEMS CORP. developed the excellent head casing mechanism with the snub sprockets that allow buckets to pivot, in addition to normal head sprockets. Furthermore, the flexible mesh bottom of the bucket is prepared for promoting material discharge. Thanks to the design of this positive discharge mechanism, the special vertical transport of coal is fully established.



Head Casing with Snub Sprocket (above, left).

TSUBAKI NBC-K Bucket Elevator/Positive Discharge Type (right).

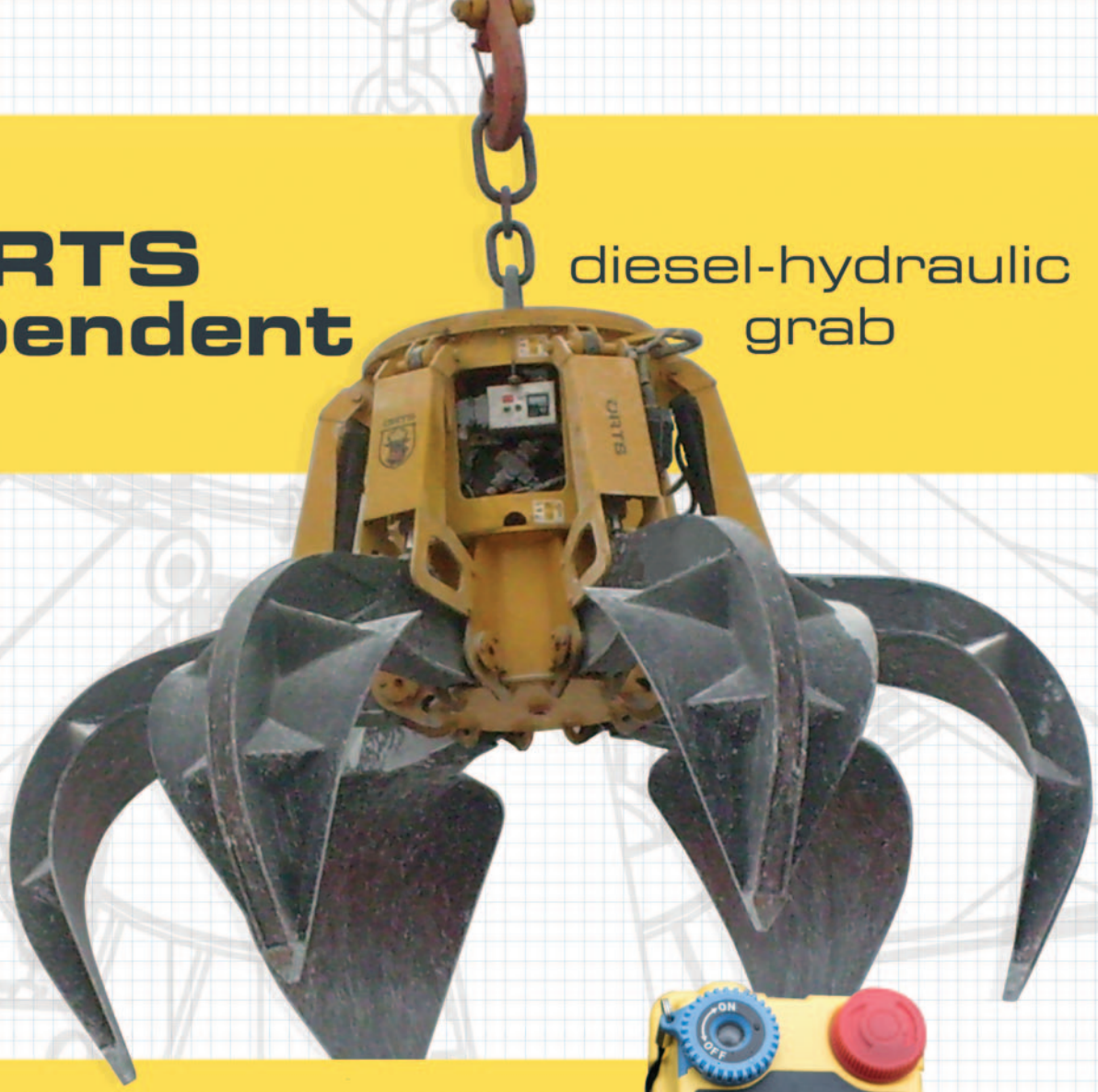
Buckets with Mesh Bottom (below)

As for the troublesome corrosive atmosphere into the casings, TSUBAKIMOTO BULK SYSTEMS CORP. has established a good solution centred on high-quality conveyor chains and sprockets, which are constructed using custom-made stainless steel with special heat treatment, such as through hardening, case hardening, and induction hardening. Even when stainless steel chains are installed, high tensile strength and sufficient hardness are assured by virtue of the chain manufacturing technology.

Wherever coal silos exist, a coal receiving feeder is necessary for constant and continuous material flow control. The TSUBAKI Coal Feeder is a great choice,

ORTS independent

diesel-hydraulic grab



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not only for conveying equipment in the downstream, such as transportation or process machines, but also for all industries which have kiln, boiler, or any calcination facilities along with the energy generation or consumption.

The TSUBAKI Coal Feeder is a forged drag chain type conveyor where the material remains, or insufficient material discharge issues are solved. That is because it is the forged drag chain conveyor in the totally enclosed casings where the conveyor chain is running on the surface of the conveying path. Thanks to the enclosed, rugged, dust-tight construction design, there is no chance of coal leaking outside from the casings, which helps keep the conveyor's surroundings uncontaminated. The clean condition around the equipment is preserved and maintained, compared with a totally opened belt conveyor, and so forth.

The forged chain is the appropriate specification for highly abrasive coal transportation with help of the special case hardening treatment. Besides, the simple components of the forged chain are suitable for conveying adhesive, lumpy, and coarse coal, since the chain is composed of only pins and links, without bushings or rollers.

TSUBAKI's Coal Feeder is directly installed underneath the hopper, bin, tank, or silo. In addition, both the material flow adjusting gate and VFD application motor are provided for the conveying capacity control based on the precise and accurate volumetric calculation. This feature is sure to contribute to the stable and steady performance of the downstream equipment with constant and continuous coal feeding.

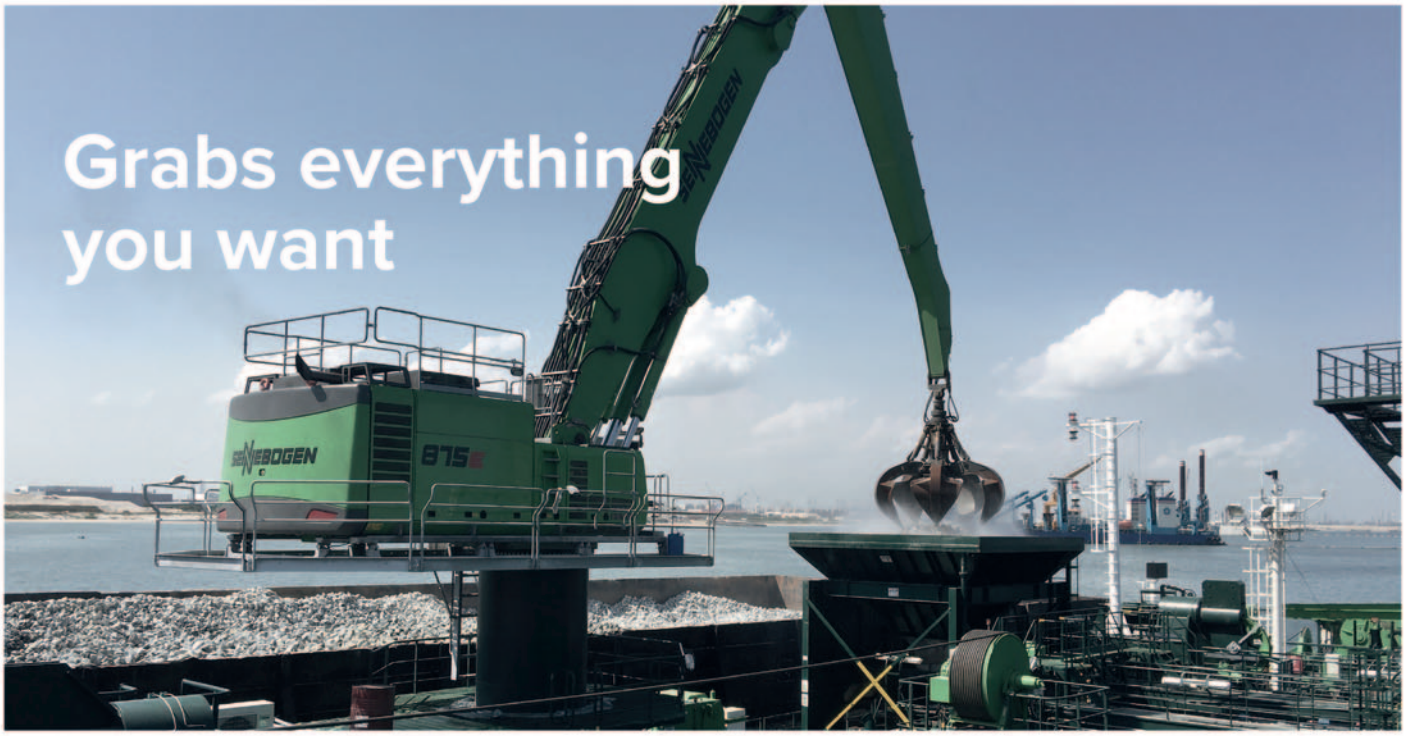
TSUBAKI Coal Feeder.

Forged Drag Chain.

Casing and Sprocket.

J&B Grabs

More than 75 years experience



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Coal handling reinvented: a strategic alliance for intelligent bulk operations

In the evolving landscape of global bulk logistics, coal remains a cornerstone of dry cargo, representing a substantial share of maritime freight volumes. As the industry pivots towards more efficient, reliable, and data-driven operations, the convergence of mechanical excellence and digital intelligence is redefining traditional paradigms. It is within this context that GBS Colombia SAS, in strategic alliance with Emotron and powered by its proprietary IKKI system (for more details, please see 'IKKI: the intelligent revolution in conveyor belt monitoring for ports and other large-scale operations' on p151 of this issue), presents a new standard for coal handling operations — one that is smarter, more adaptive, and fundamentally aligned with the complexities of 21st-century industrial logistics.

Engineering a collaborative advantage

GBS Colombia SAS, part of the GBS International Group, brings to the market a robust portfolio of engineered conveyor belt solutions for the port, mining, and heavy industry sectors. With a strong foothold in Latin America and operational extensions through CI Global Traders SAS and Global Belting Solutions LLC, GBS has positioned itself not merely as a supplier of components, but as a strategic process partner.

The partnership with Emotron — renowned for its variable frequency drives (VFDs) tailored to critical applications in the marine and process industries — enhances this offering by integrating world-class motor control with real-time process optimization. Emotron's drives are designed not just for speed variation, but for active process protection, energy optimization, and predictive analytics — crucial parameters in environments like coal terminals where uptime, safety, and energy efficiency are non-negotiable.

In practical terms, Emotron's marine-grade drives have proven their value in harsh coastal environments, as seen in their deployment in marine scrubber systems and major milling operations across Europe. By combining this resilience with GBS's structural expertise and field-based innovation, clients gain access to a hybridized ecosystem of durable hardware, adaptive control, and intelligent diagnostics.

IKKI: the cognitive core of the operation

What sets this alliance apart is the inclusion of IKKI — an artificial intelligence-based monitoring and decision support system developed by GBS. More than a dashboard or alert system, IKKI functions as a neural network capable of learning from the conveyor system's real-time behaviour. It continuously analyses vibration patterns, thermal gradients, belt misalignments, material accumulation, and load dynamics to anticipate faults, extend component life, and adapt system performance in response to operational stressors.

For example, in a high-output coal terminal processing over 70,000 tonnes per day, IKKI was able to detect incipient mechanical oscillations in a transfer station 48 hours before a potential failure. The insight, combined with Emotron's dynamic torque response capabilities, enabled the system to adjust motor parameters autonomously, stabilize load flow, and avert downtime — without human intervention.

This kind of intelligence goes beyond predictive maintenance. IKKI serves as a cognitive agent within the conveyor system, capable of interfacing with Emotron drives and GBS mechanical infrastructure to create a synchronized, self-aware handling environment. In essence, it empowers the conveyor system to think, react, and optimize — turning static infrastructure into adaptive ecosystems.

Architecture for resilience and performance

The joint solution architecture prioritizes

modularity and field adaptability. Emotron's VFDs come with built-in process monitoring, quick-stop functions, and drive-based protection algorithms that minimize wear and energy waste.

When layered with IKKI's real-time diagnostics and GBS's rugged conveyor designs, the result is a layered protection and optimization model.

This architecture has already demonstrated results in environments with aggressive thermal fluctuations, high humidity, and abrasive dust conditions — typical of coal yards and port terminals. One success case in northern South America saw a 17% increase in belt lifespan and a 21% reduction in unplanned maintenance events within six months of integration.

Furthermore, GBS has implemented this system in modular expansions, allowing clients to scale their infrastructure progressively while maintaining unified control. This is particularly advantageous in operations where fluctuating commodity cycles demand flexible, yet robust, asset deployment.

Data-driven decision-making for executives

For executive teams and operations directors, the true value lies in the system's capacity to deliver strategic insight. IKKI collects operational data across multiple nodes — belt loading cycles, torque loads, ambient conditions, anomaly frequency — and presents them through intelligent visualization dashboards accessible remotely. These dashboards allow for key performance indicator tracking, efficiency benchmarking, and return on investment modelling in near real-time.

When combined with Emotron's load curve analytics and GBS's performance history, the alliance provides a level of transparency and control previously available only in high-end SCADA environments. Now, decision-makers can act on data, not assumptions, and evolve maintenance from a cost centre into a strategic pillar of productivity.

A vision beyond components

What differentiates this approach is not just the quality of each partner, but the integrative philosophy behind the collaboration. Emotron, IKKI, and GBS are not simply interoperable — they are co-engineered for synergy. This extends to joint field support, shared diagnostic protocols, and synchronized commissioning workflows that reduce integration friction and ensure system integrity from day one.

Moreover, the alliance is continuously innovating. Pilot programmes are underway to integrate cloud-based analytics and edge computing into the IKKI architecture, opening the door to decentralized intelligence and deeper process automation.

Conclusion: future-ready coal handling

Coal will remain a key energy and industrial commodity for years to come. However, the methods of handling, storing, and transporting it must evolve. The strategic partnership between GBS Colombia SAS, Emotron, and the IKKI platform represents that evolution — a move away from fragmented solutions towards intelligent, harmonized systems designed for resilience, insight, and long-term value creation.

In an industry where every tonne, minute, and kilowatt matters, this alliance delivers not just machinery, but intelligence — transforming conveyor belts from passive transport tools into smart operational assets.

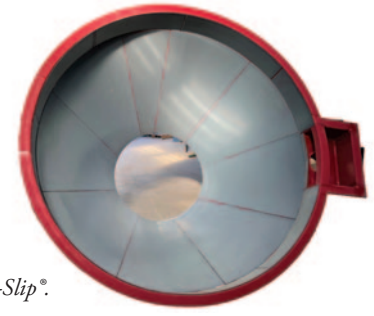
Because the future of coal logistics isn't just about moving bulk — it's about moving forward.

Smarter flow in coal handling: K-Slip®, K-Slide® & K-Floshield®

Efficient coal handling isn't just about moving material from point A to point B, it's about keeping it moving safely, consistently, and with minimal maintenance or unplanned downtime. Whether managing sticky fines, highly abrasive raw material, or changing moisture content, the pressure on plant reliability and throughput is real. Kinder has long supported the coal sector with practical engineering solutions. Its range of liners, K-Slip®, K-Slide®, and K-Floshield®, are helping site operators address material flow and wear issues and improve safety and operational performance.

K-Slip®: flexible lining that adapts

K-Slip® is a rubber-backed UHMWPE (ultra high molecular weight polyethylene) flow liner designed to improve material movement in chutes, bins, hoppers, and transfer points. What makes K-Slip® unique is its flexibility and ease of application. It conforms to irregular shapes, helping to create a uniform, slick surface that eliminates areas where material tends to catch, stick, or build up.



K-Slip®.

This is especially valuable in coal handling, where fine, wet or sticky product can severely impact flow consistency, particularly during seasonal shifts or periods of high humidity. The rubber backing enables simple cold bonding to metal surfaces, avoiding the need for complicated mechanical fixing. It's also cost-effective to install and maintain, making it a popular choice for operators looking for low-friction lining with reliable performance over time.

K-Slide®: built for tougher wear

In coal environments where wear is as much of a concern as flow, K-Slide® provides a high-performance solution. Manufactured from premium-grade UHMWPE, K-Slide® is known for its superior abrasion resistance, low friction and resistance to a wide range of chemical and environmental factors. Available in a variety of thicknesses, grades and sizes, it is often used in applications such as lining material for chutes, hoppers, bins and dump truck beds.

K-Slide®'s molecular structure gives it extremely low surface energy, helping coal and other bulk materials move cleanly and without interruption, even in systems dealing with high moisture content or changing feed conditions. For maintenance teams, the ability to fabricate K-Slide® to precise dimensions means less time spent on fitting and retrofitting. Its toughness and versatility also help reduce the frequency of changeouts, which can be a major cost and safety consideration in underground and remote operations.

K-Floshield®: when flow and impact both matter

Some coal operations with high throughputs require solutions that go well beyond standard liners, particularly in areas prone to extreme wear, impact, or violent material flow. K-Floshield® is engineered for just that. It features a high-polished chromium carbide-rich alloy surface over a mild steel backing plate, providing

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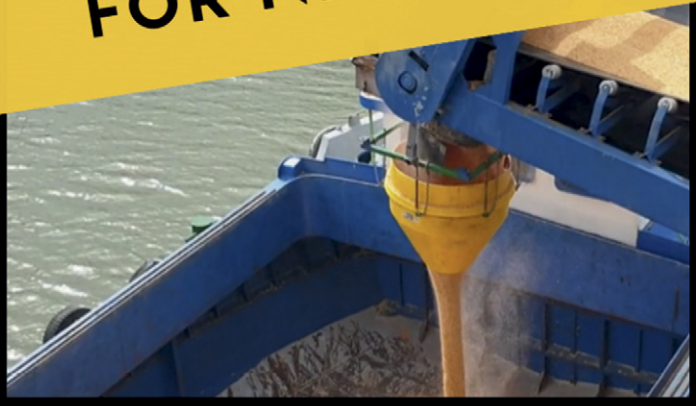

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Kinder K-Slide®.

exceptional wear resistance and a friction-reducing finish.

Designed for use in chutes, transfer points and impact zones, K-Floshield® is particularly effective where materials are wet, sticky or cohesive, or where hang-up is leading to regular blockages. Its ultra-smooth surface helps coal flow freely and reduces the risk of material build-up, which can otherwise lead to unplanned downtime or require manual clean ups.

Its strength lies in the chromium carbide fused coating, which not only extends the liner's lifespan under harsh conditions but also makes it easier to maintain. For operators seeking a long-lasting solution in high-impact zones where product is hammering through the system, the K-Floshield® provides peace of mind.

Real solutions for real problems

Across the coal industry, common challenges include bridging, ratholing, hang-up and rapid wear on contact surfaces. These issues don't just impact output, they increase operational risk and maintenance overhead. Material hang-up can compromise product flow rates, while uneven wear on equipment shortens service life and leads to higher capital expenditure.

Kinder's product development is grounded in these real-world concerns. The company has worked closely with coal producers, helping them resolve specific flow and wear issues with tailored, application-specific solutions. Its in-house engineering team take the time to understand each site's requirements, considering everything from the type of coal to throughput demands and environmental factors.

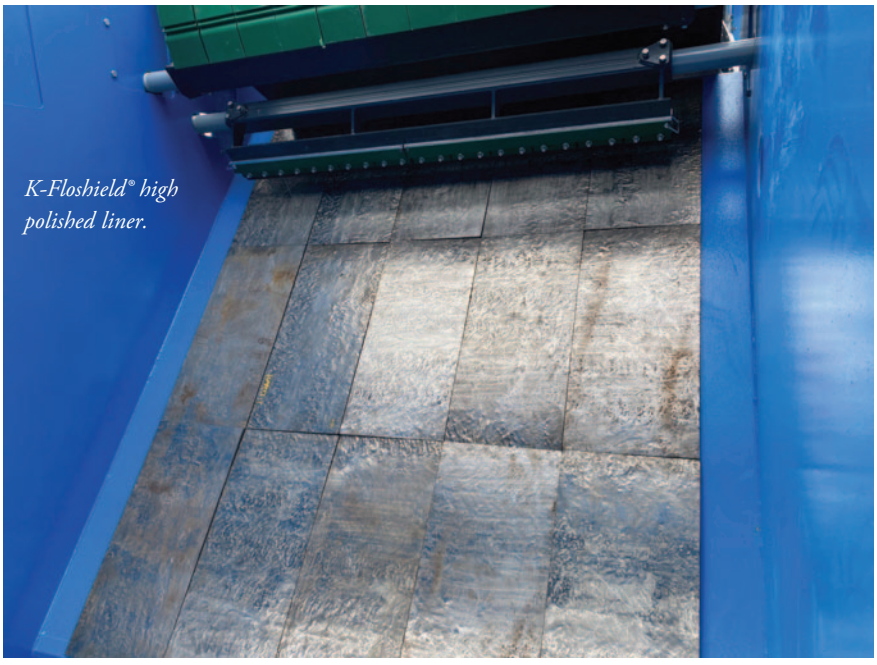
Tailored support from mine to port

Whether it's streamlining loadout facilities, improving flow through underground transfer chutes or reducing blockages in stockpile reclaim tunnels, Kinder's flow liners are delivering measurable improvements in performance.

Operators also benefit from having access to a wide range of product types and thicknesses, allowing for flexibility in design without compromising durability or efficiency.

For sites seeking to meet production targets while improving plant availability and safety outcomes, the right liner system isn't a luxury, it's a necessity. The combination of K-Slip®'s versatility, K-Slide®'s resilience, and K-Floshield®'s premium wear resistance provides a toolkit that coal operations can rely on.

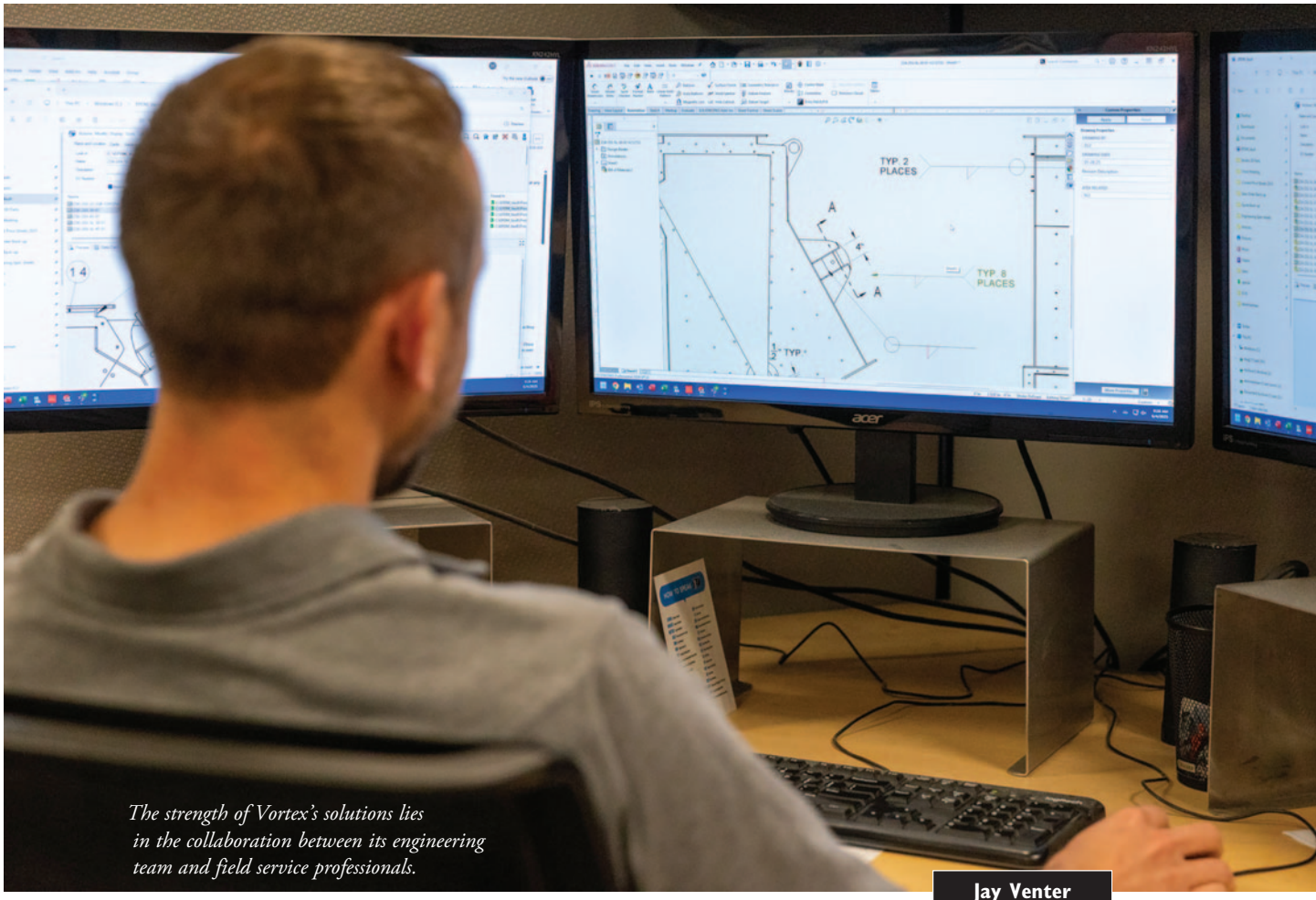
With a reputation built on practical engineering, responsive service and a deep understanding of materials handling, Kinder continues to support the coal sector and bulk handling industry with solutions that make a tangible difference. For site managers and maintenance teams under pressure to perform, Kinder's liners represent a smart investment in reliability and long-term efficiency. DCi



K-Floshield® high polished liner.

Steering the ship of State(s)

US engineering under scrutiny



The strength of Vortex's solutions lies in the collaboration between its engineering team and field service professionals.

Jay Venter

Engineering solutions for dry bulk handling

When it comes to handling dry bulk solids, few companies have demonstrated the level of innovation and expertise achieved by Vortex Global. Founded in 1977 on the inventive spirit of Neil Peterson and Lee Young, Vortex has revolutionized the design and functionality of slide gates and diverters, setting a new standard in dry bulk handling components.

From its earliest developments to its current, cutting-edge products, the company's focus has consistently been on the development of innovative technologies designed to improve solids process efficiency, ensure dust-free environments, and establish long-term reliability.

Transformative beginnings

Vortex's story begins with Neil Peterson's groundbreaking work in pneumatically conveying flour and other bulk powders at Salina Manufacturing Company. Recognizing inefficiencies in existing equipment, Peterson, along with the help of Lee Young, pursued new designs that would have a lasting impact on the industry. Their development of the Orifice Gate in the 1970s marked a major turning point, offering a reliable, purpose-built solution for handling dry solids. This innovation led to the patenting of the Orifice Gate, which earned the prestigious Vaaler Award for its immediate and significant impact, particularly in the chemical industry.

Since then, Vortex has continued to innovate, holding a multitude of patents for its cutting-edge designs including the original Orifice Gate and Wye Line Diverter designs.

The duo's inventive approach wasn't just about equipment functionality; it was about crafting solutions that addressed the real-world challenges faced by maintaining the components within dry bulk handling systems. This blend of technical ingenuity and user-centric design became the foundation on which Vortex was built.

Engineering for Practical Innovation

At Vortex, engineering extends beyond meeting performance specifications. The company prioritizes designing equipment that aligns with the realities of day-to-day operations in challenging environments, such as frequent cycling, abrasive materials, and the demand for minimal downtime. This commitment is reflected in its products, such as slide gates, diverters, and loading solutions, all designed with a focus on reliability and performance in the field.

One of Vortex's key engineering philosophies is ease of maintenance. With features like reliable hoist systems, removable access panels, replaceable wear liners, and externally adjustable seals, their equipment facilitates faster, safer, and less labour-intensive inspections and repairs. The result? Equipment downtime is minimized, and productivity is maximized for its customers.

Collaboration between engineering and real-world insight

The strength of Vortex's solutions lies in the collaboration between their engineering team and field service professionals. Supported by more than 20 engineers, five product designers, four drafting specialists, and a hands-on service team, the company brings over 300+ years of combined experience to each product they design.

Field experience plays a key role in the innovation process at Vortex. The service team, with critical insights from troubleshooting and customer installations, contributes to a feedback loop that refines product performance. This integration ensures that every solution is backed by real-world functionality and durability.

A history of custom solutions

Vortex's legacy includes the delivery of over 35,000 custom-engineered pieces of equipment designed to tackle the unique challenges of dry bulk handling across industries like agriculture, food processing, cement, and mining. These projects highlight Vortex's ability to deliver purpose-built equipment tailored to specific process demands. Whether addressing complex material flow requirements or designing for extreme conditions, Vortex's commitment to customer-centric innovation is unwavering.

Continuous innovation

Improving their standard product offerings is an ongoing effort at Vortex. By evaluating new materials, refining manufacturing techniques, and integrating lean design principles, they're able to reduce lead times and elevate product performance. These improvements are a testament to the company's dedication to efficiency and value, helping customers meet their operational goals with greater confidence.

Designed for industry challenges

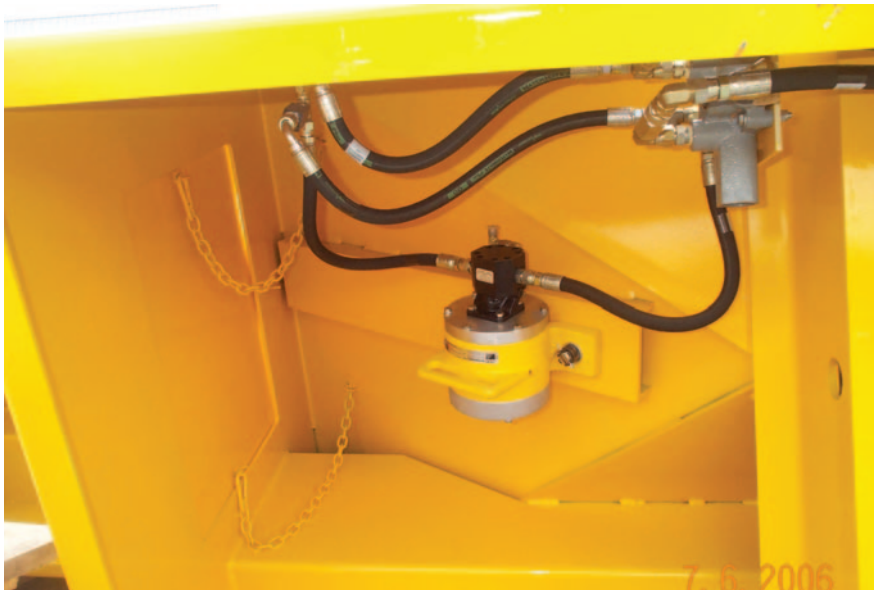
Vortex's approach to innovation serves practicality above all else. Whether it's a heavy-duty slide gate for handling industrial abrasives or a diverter for managing food-grade materials, their designs are built for long-term reliability.

Beyond providing equipment, Vortex embraces the broader challenges of the dry bulk handling industry, positioning itself as a pioneer in offering sustainable and efficient solutions.

Shaping the future of bulk handling together

Vortex's history and engineering expertise establish the brand as a trusted leader in the dry bulk handling industry. The company continues to advance the field with a clear commitment to innovation, customer satisfaction, and practical application. By addressing complex challenges with tailored, field-proven designs, Vortex empowers businesses worldwide to operate with greater reliability and efficiency.

USA engineering expertise in dry bulk handling: the Global Manufacturing, Inc. advantage



As a major US manufacturer of industrial vibrators and air blasters, Global Manufacturing, Inc. has built a reputation for solving some of the most stubborn material flow problems with durable, intelligently engineered solutions – developed, tested, and refined right in the United States. Its mission is simple: keep material moving. Whether it's in hoppers, bins, silos, railcars, or ship holds, flow blockages and hang-ups can grind operations to a halt. The company engineers and manufactures the tools that keep operations running smoothly across industries — from aggregates to agriculture, cement to shipping.

Built in the USA for industry leaders

Global Manufacturing partners directly with OEMs, distributors, and industrial clients across North America and internationally. Its products are integrated into standard and custom hopper systems, conveyor unloading designs, and mobile transport equipment — used by clients ranging from major shipbuilders to bulk material processors. Global Manufacturing's air cannons and vibrators are frequently featured on self-unloading vessels, fertilizer trailers, and concrete volumetric mobile mixers.

The company's products are available through a robust distributor network or directly through OEM partners.

Whether retrofitting old equipment or building from scratch, Global Manufacturing's engineering team and educational resources are available to help guide the process.

Solving flow problems with smarter engineering

Blockages and inconsistent flow rates can be a design issue, but the real-world complexity of changing material types, storage conditions, and space constraints often demands post-installation solutions. Global Manufacturing's answer is simple yet effective: apply vibration or high-energy air bursts to loosen material and restore flow.

Global Manufacturing's USA-engineered vibrators are effective across a wide range of materials — from powders, minerals, and aggregates to pellets and wood chips. For tough applications where vibration alone won't do the job, the company's air blasters deliver high-impact bursts that clean walls, remove stuck material from seams, and maintain optimal discharge rates.

These tools help minimize downtime, prevent product loss, and extend equipment lifespan.

American innovation at its core

Global Manufacturing's commitment to engineering excellence means it doesn't just manufacture equipment — it improves it constantly. Every product the company releases undergoes rigorous in-house design, testing, and performance benchmarking. Here's how Global Manufacturing raised the bar:

- **Yellow Jacket™ (YJ) Piston Vibrators:** this line exemplifies American innovation. Compared to legacy designs, Global Manufacturing's YJ vibrators produce equal or greater force with up to 68% less weight, and

require just a single mounting bolt — simplifying installation and reducing structural stress.

- **Design Series Rotary Vibrators:** with adjustable weight and variable force output, Global Manufacturing's pneumatic and hydraulic units are engineered for precision. Operators can dial-in the frequency and amplitude needed for their material — right at the job site.
- **Customer-driven R&D:** Global Manufacturing's engineering team listens to feedback from end users, OEMs, and distributors to drive improvements. Whether it's redesigning a mount or developing new force configurations, the customer's experience fuels its next innovation.

Engineering Education: A Cornerstone of Global Manufacturing Service

Global Manufacturing doesn't just sell equipment — it educates its partners on how to use it effectively. The company's engineering support and training tools help prevent common issues like poor mounting, vibration isolation, or product misapplication.

Proper installation isn't just best practice — it's essential to avoiding equipment damage and maximizing ROI.

It is for this reason that the company launched a suite of free educational resources:

- **Rotary Vibrator Calculator:** available on Global Manufacturing's website, this tool helps engineers and buyers evaluate the ideal vibrator for their application.
- **How-To Guides:** Global Manufacturing provides detailed manuals on mounting, maintenance, and vibration theory to help customers get it right the first time.
- **Complementary Application Assistance:** Global Manufacturing's team of sales, customer service, and engineers are standing by to help OEMs and distributors identify the correct solution — often the most cost-effective one, too. The company is prepared to be a partner in customers' solutions and will continue to provide assistance throughout the life of its products. It has worked with engineers in the shipping industry to redesign material flow systems, resulting in expedient and efficient full cargo discharge with fewer material losses — as well as leading to a large-scale adoption of using its air blasters in vessels where conventional vibrators fall short.

Quality Backed by Confidence: Lifetime Warranty

Everything Global Manufacturing builds reflects the precision and durability of American manufacturing. That's why it backs its products with the best warranty in the industry: a Lifetime Warranty. The company stands by the longevity and performance of its equipment — because it knows what it takes to work in the toughest industrial environments.

Why Global Manufacturing?

- Made in the USA with a focus on performance, innovation, and reliability.
- The company is trusted by OEMs, shipbuilders, bulk material processors, and distributors.
- Engineering-driven product development focused on real-world application success.
- Comprehensive support and educational resources for every customer.
- Lifetime warranty that reflects the company's commitment to quality

Whether a customer is designing a new system or upgrading existing equipment, Global Manufacturing, Inc. offers the technical expertise, American craftsmanship, and customer-first philosophy to keep their materials — and operation — flowing smoothly.

ASGCO®: engineering safer, smarter bulk material handling systems

A legacy of innovation and reliability

Since its founding in 1971, ASGCO® Manufacturing has been a pioneer in the design and delivery of bulk material handling solutions. With over five decades of engineering excellence, the company has built a trusted reputation for enhancing the safety, performance, and efficiency of conveyor systems across some of the world's most demanding industrial environments.

At its core, ASGCO offers end-to-end solutions from precision-engineered conveyor components to expert belt services and safety training. The company's commitment to workplace safety and operational reliability drives the development of technologies that address key challenges in material transport systems.

Dry bulk handling technologies making an impact

ASGCO manufactures a strong portfolio of conveyor equipment specifically designed to reduce downtime, minimize spillage, and improve operational safety:

Load Zone Support Systems: products like Impact Cradle Beds and Slide-N-Roll Beds absorb shock and stabilize belts during loading, reducing sag and improving sealing.

Skalper® Belt Cleaners: featuring patented torsion spring technology, these cleaners maintain effective blade-to-belt contact, eliminating carryback and reducing clean-up.

Pulley Lagging and Tru-Trainer® Belt Tracking: with ceramic and rubber lagging options and self-aligning idlers, ASGCO ensures superior belt tracking, reducing wear and unplanned stoppages.

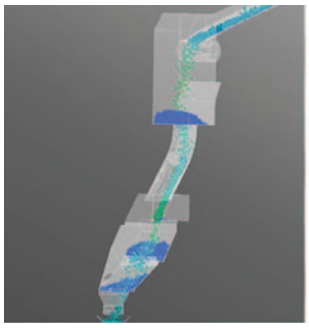
Safe-Guard® Safety Products: from return idler guards to inspection doors, ASGCO prioritizes worker safety with systems that meet OSHA standards and streamline maintenance.

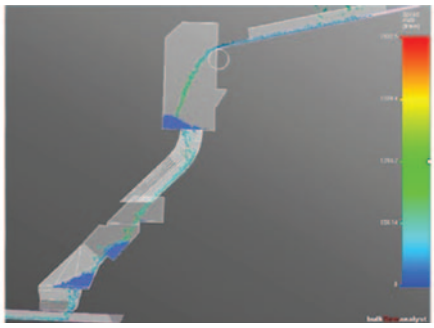
Engineered Chute and Load Zone Systems: these advanced systems integrate dust curtains, stilling boxes, and skirtboard liners to control silica dust, prevent material escape, and maintain safer work environments.

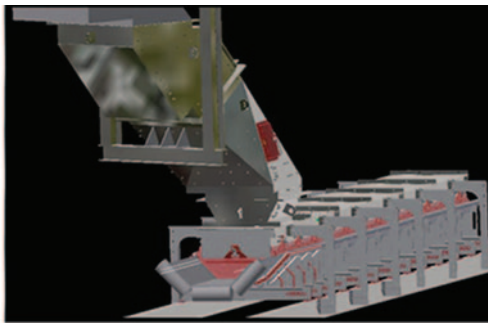
Real-world results: load zone chute redesign

A recent project showcases ASGCO's ability to tackle tough material flow challenges. A misaligned step chute at a cement facility was leading to off-center loading, spillage, and maintenance nightmares. ASGCO used point cloud scanning and 3DEM simulation to identify

The problem: *A misaligned step chute at a cement facility was leading to off-centre loading and spillage.*







The solution: *ASGCO used point cloud scanning and 3DEM simulation to identify the issue and engineered a custom center-loading chute w/ modern skirting.*

The result: *Clean, centred loading, no spillage.*

the issue and engineered a custom center-loading chute with modern skirting. The result? Clean, centred loading, no spillage, and drastically reduced downtime restoring efficiency and safety to a critical load zone.

Clients and industries served

ASGCO serves a wide range of industries where bulk material handling is mission-critical, including:

- aggregate and construction materials
- cement manufacturing
- power generation (coal, gas, and renewables)
- mining (coal, copper, iron ore, gold)
- general manufacturing (steel, food, chemical, pharmaceutical)

By aligning its systems with the unique needs of each industry, ASGCO helps companies like mining operators, energy providers, and manufacturing giants improve uptime, reduce material loss, and meet environmental and safety compliance.

Staying competitive with technology-driven engineering

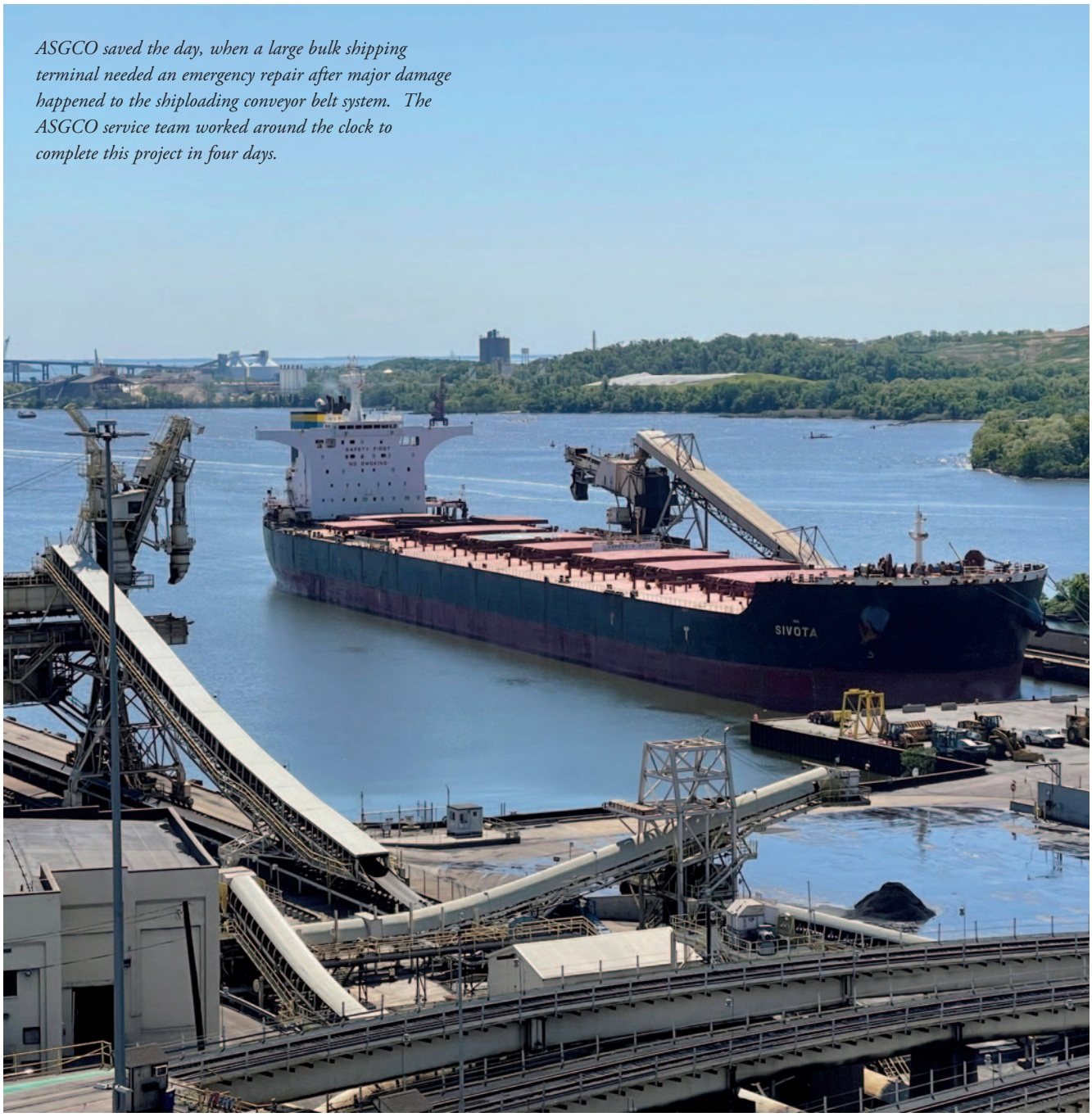
ASGCO continues to lead the bulk handling sector by integrating cutting-edge technology into its engineering processes. The use of 3D Point Cloud Scanning allows engineers to digitally map existing conveyor systems and create highly tailored solutions. This data-rich approach enables precise retrofits, optimal component fit, and smarter designs especially in challenging load zone environments.

What sets ASGCO apart is its system-wide philosophy. Every product is engineered not just for individual performance, but as a critical piece in a larger, integrated solution. Whether it's improving material flow, controlling dust, or enhancing safety, ASGCO delivers on every front.

Conclusion: more than components – a complete conveyor solution

ASGCO isn't just a supplier, it's a partner in performance. With a product lineup designed to meet modern industry standards, a customer-first engineering process, and a relentless focus on safety and innovation, ASGCO is redefining what it means to handle bulk materials efficiently and responsibly.

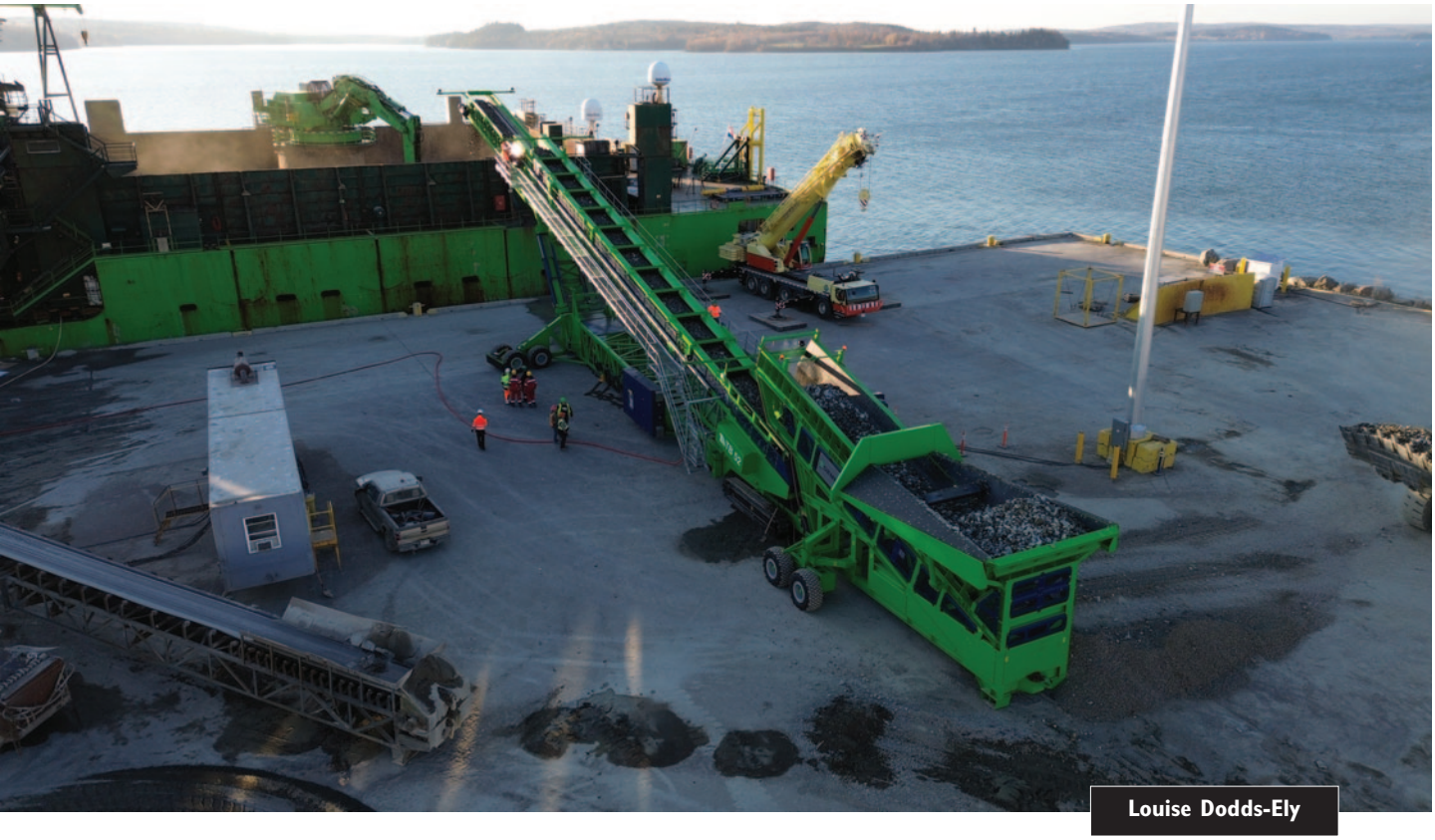
For industries that demand reliability, safety, and scalability, ASGCO remains a name synonymous with quality and forward-thinking solutions. DCi



ASGCO saved the day, when a large bulk shipping terminal needed an emergency repair after major damage happened to the shiploading conveyor belt system. The ASGCO service team worked around the clock to complete this project in four days.

Lightening the load...

... with bulk materials loading systems



Louise Dodds-Ely

Telestack system loading rocks to Flexible Fall Pipe Vessel for DEME

Telestack loading system for DEME forms part of the groundbreaking CVOW project

Telestack played an instrumental role in the supply of two mobile shiploading systems to one of the world's leading marine engineering and offshore energy companies, DEME, as part of the Coastal Virginia Offshore Wind (CVOW) project, a landmark initiative in the United States' renewable energy sector.

As the largest offshore wind project in the US, CVOW represents a pivotal step toward clean energy and reducing carbon emissions, with Telestack's innovative shiploading equipment playing a vital part in its success. CVOW, developed by Dominion Energy, is designed to deliver 2.6GW of renewable energy — enough to power 660,000 homes at peak output. The project involves the construction of 176 wind turbines, three offshore substations, and undersea cables, with onshore infrastructure to channel renewable energy to the grid.

Telestack's two mobile shiploading systems have seamlessly integrated into the material handling element of the project, ensuring the efficient loading of large grade armour rock to Flexible Fall Pipe Vessels (FFPV).

Telestack's innovative shiploading equipment is operating in Bayside Canada where the company has supplied two AP 1500 D3 wheel-mounted apron steel feeders and two TB 52 (170ft) radial telescopic shiploaders for loading rock material to DEME specialized rock installation vessels at high loading rate.

The Telestack system — 'rock to vessel'

The Telestack system included a range of technical features and benefits which were vitally important for the long-term handling of these grades of rocks. The AP 1500 feeders included a heavy-duty steel apron chain coupled with high grade cast steel flights and bearings for the large rock application. The feeder allows the wheel loaders to be fed over three sides for the ultimate flexibility and increased tonnages. Also, the integrated variable-speed drive on the feeder ensures a 'controlled' flow of material to the TB 52 shiploader, especially important for the large rock. The feeder is a wheel-mounted design to allow the operator to move the unit via tow hitch around the quayside as required, ensuring the mobility of the system.

The feeder then discharges to the TB 52 Radial Telescopic conveyor, which is equally impressive in its innovative features to meet the challenges of handling this material grade effectively. The 52m (170ft) long telescopic boom conveyor can load the largest FFPVs in the world including the current DEME *Yellowstone* vessel, which is currently the largest FFPV in the world with a 37,000-tonne capacity and over 14m free-board/draught height.

The design of the radial and telescopic

features allows the operator to place the material easily within the rock hold while the material flows, minimizing the work of the vessel excavator to move the material within the hold, ultimately increasing the tonnage rate of the entire operation.

The TB 52 shiploaders are both track-mounted units, which allows them to easily move off the site when not required, ensuring their use on multi-cargo berths and jetties. The shiploaders include heavy duty rollers, belting and skirting complete with anti-roll back to handle the large rock along with 600mm spacing of the rollers to minimize 'bounce' of the material when the

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units stop in operation. This material is further controlled with the variable speed drive on the shiploaders, which work along with the feeder to ensure full operational control in all scenarios.

The Telestack advantage and experience

This contract has once again demonstrated Telestack as an expert in mobile bulk material handling largely due to its experience and ability to design and manufacture innovative products that meet the high specific demands of this instrumental project.

Telestack's shiploading solutions are engineered for high throughput, operational efficiency and flexibility achieved through mobility. Telestack's International Sales Manager Carl Donnelly explains, "Telestack has a huge portfolio of international projects that demonstrate our expertise. Our team is experienced in high profile projects and value the pre-engineering stage that allows the solution to develop as a result of true collaboration, listening to the needs of the operation, using decades of experience. This process isn't just one meeting — it takes time, patience and partnerships which we pride ourselves on."

Heavy-duty design for heavy-duty product

Designed for the toughest applications, Telestack's heavy-duty equipment is engineered to handle the most demanding materials with unmatched durability and efficiency. Built with reinforced structures and mine-spec componentry, Telestack's shiploading solutions ensure performance regardless of the application. The high-capacity loading ability of the Telestack solutions enables the rapid transfer of rock materials, minimizing turnaround times for the FFPV. In addition, they ensure material is delivered to vessels accurately and in compliance with environmental regulations.

Mobility = productivity and operational efficiency

Mobile shiploading can significantly enhance the operational performance and productivity of a port by offering greater flexibility, efficiency, and cost savings compared to fixed loading systems. These mobile units allow ports to quickly adapt to different vessel sizes and cargo types, reducing vessel turnaround times and increasing throughput. By eliminating the need for extensive infrastructure modifications, mobile shiploaders minimize capital expenditures while still providing high-capacity loading rates.

Rapid deployment ensures that revenue streams start flowing almost immediately. Unlike traditional systems that experience downtime due to empty return cycles, mobile solutions enable continuous loading, maximizing throughput while reducing operating costs. Designed for simplicity, these machines require minimal training, are easy to maintain, and eliminate complex electrical systems, ensuring smooth, uninterrupted operations.

By embracing mobile solutions, companies like DEME and others within the offshore industry can unlock unprecedented efficiency, safety, and environmental benefits in handling their offshore rock.

Shaping the future of offshore projects

The CVOW project underscores the critical importance of partnerships and innovative solutions in advancing renewable energy. Telestack is honoured to have collaborated and work closely with DEME to devise this shiploading system for groundbreaking endeavour, which will not only bolster the nation's renewable energy capacity but also inspire confidence in offshore wind as a reliable, sustainable energy source.

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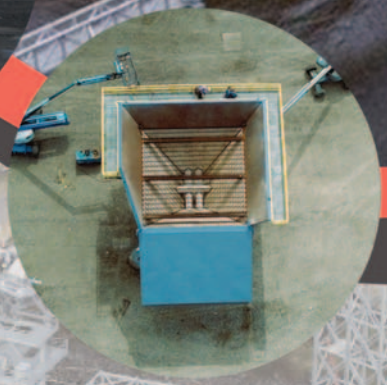

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AGRICO SALES

Telestack tracked hopper feeder for giant iron ore producer's shiploaders

Telestack has been awarded a contract for the supply of a modified HF 24T (tracked hopper feeder) with on-board genset to one of the world's largest iron ore producers.

The unit will consist of a modified HF 24T with on-board genset to feed existing shiploaders, and will work along with a previously supplied HF 24T unit.

The unit will be fed by high-capacity wheel loaders such as CAT 988s and Volvo 350s and will form a key part of the shiploading process in loading of the iron ore.

This contract, with a repeat customer, has once again highlighted Telestack as a major force in the mobile bulk material handling in its ability to design and manufacture these innovative products to meet specific requirements.

The HF 24T has proved popular in mines and ports for its ability to work at high production rates with large wheel loaders in applications such as reclaiming to a stacker reclaimer conveyor line or feeding rail wagons/barges/ships.

Advanced digital technology included in Siwertell shiploader order for major cement and clinker facility

Bruks Siwertell has secured a new Siwertell shiploader order from Akcansa, one of Turkey's principal cement producers. The shiploader will reliably and efficiently handle both cement and clinker at Akcansa's largest facility in Çanakkale, northwest Turkey.

"This is not simply a new order," says Per Hansson, Operations Director, Bruks Siwertell. "It is a prestigious project and our involvement in it, is testament to our ability to offer value in dry bulk handling, compete successfully in international markets, and create and strengthen long-term partnerships with customers. The contract also demonstrates that hard work, and a focus on export markets, delivers results.

"We are delighted to bring our innovation and quality engineering to this exciting development," he continues. "The order is a market breakthrough for the Siwertell type-2 shiploader; a true piece of value engineering. The installation will showcase its remarkable capabilities, demonstrate its commercial advantages, and open doors to new opportunities."

Akcansa's port terminal facility in Çanakkale has an annual total production capacity of 10mt (million metric tonnes), and the shiploader will play a crucial role in doubling production capacity at the plant, ensuring smooth and efficient operations for years to come.

Designed specifically for handling cement and clinker, the Siwertell type-2 shiploader delivers a rated capacity of 1,000tph (tonnes per hour), accommodating vessels up to 60,000dwt. The loader is equipped with a belt-type conveyor system, selected for its high capacity, flexibility, durability and low maintenance requirements. The scope of delivery also includes a tripper arrangement, seamlessly integrating with Akcansa's planned jetty conveyor.

This latest contract strengthens Bruks Siwertell's existing relationship with Akcansa, where the company

already operates one other Siwertell shiploader in Çanakkale, which was delivered in 1992 and a 490 F-type Siwertell ship-unloader and terminal in Ambarli, delivered a year later in 1993.

"Akcansa has been operating our dry bulk handling systems for over thirty years and trusts our technology," says Hansson. "The selection of our Siwertell type-2 loader underscores this confidence and our ability to deliver reliable, market-leading solutions that set the benchmark for quality, and drive efficiency, performance and sustainability in cement and clinker handling."

Akcansa chose Bruks Siwertell's solution following an extensive evaluation of four different Siwertell shiploader concepts. The deciding factors included the loader's low-power consumption, fully enclosed and dust-free operation, and ability to handle two very different commodities, cement and clinker, efficiently. The system's telescoping and dust-mitigating loading bellow, suitable for both cement and clinker, further enhances environmental benefits, while its minimal maintenance requirements ensure long-term cost-effectiveness.

The contract includes a comprehensive two-year service agreement, which covers all the machines in both the Çanakkale and Ambarli facilities, and the new shiploader features Bruks Siwertell's advanced digital technology, the industrial Internet of things (IIoT) system, Siwertell SmartView.

"This service agreement provides substantial added value for Akcansa, strengthening our partnership and Bruks Siwertell's commitment to long-term customer support," notes Hansson.

The integration of Siwertell SmartView into Siwertell technology represents a significant step toward digitalized bulk handling. This cloud-based IIoT system enables real-time monitoring of operational parameters such as material throughput, equipment performance, and maintenance needs. It allows Akcansa to optimize productivity, minimize downtime, and enhance overall profitability through data-driven insights.

"The introduction of Siwertell SmartView brings our expertise even closer to customers," explains Hansson. "By providing historical data analysis and real-time operational monitoring, we empower customers to identify areas for improvement, ensure efficient terminal operations, and enhance training programmes. This level of connectivity is transforming the industry."

The new shiploader is planned for delivery in the first quarter of 2026, and will be accompanied with a five-day training programme during commissioning to ensure a smooth start-up and optimal ongoing performance.

Revolution in shiploading: the evolution in modern day containerized bulk handling

In 2010, CRS — Container Rotations Systems Australia (formerly AMMESA) — initiated the revolution in Containerized Bulk Handling (CBH) with the introduction of its Rotainer HD to the market.

This machine — a heavy duty, 360°, multidirectional container rotator — first entered service at the D.P. World Terminal in Adelaide, South Australia.

In total, 3,500 containers were supplied to IMX resources by Cronos for iron ore bulk loading operations. These containers were not specifically designed for the arduous conditions of 360° rotation; therefore, CRS undertook a detailed FEA (Finite Engineering Analysis) on the integrity of these containers, and ultimately, advised the manufacturer of several modifications required to meet Rotainer operational requirements. These modifications included, thicker top rails, internal cross braces, and beefed-up twist lock pockets.

The South Australia region is now one of Australia biggest users of CBH.

2011

As the need for sealed container technology progressed, it became obvious that purpose-built, fully certified, rotatable containers would be required to meet the environmental requirements necessary to progress the industry moving forward.

Using the detailed engineering knowledge that CRS formulated during the initial design of the Rotainer HDs, CRS enhanced this knowledge and went on to develop the very first, 360° rotatable container for >35 tonnes, with hard flat lids suitable for use with CRS's lid lifting apparatus.

Inquisitive Australian miners highlighted a need for such a container. They required a fully certified rotatable, BK2-compliant*, open top, heavy-duty container with hard lids including a lid locking mechanism for payloads of 35 tonnes plus.

Rotatable containers have a tare weight of around 3.5 tonnes; combined with payloads of 35 tonnes gross weights, so with a total weight upwards of 38 tonnes, boundaries therefore had to be pushed. The result was CRS's Heavy-Duty Rotorcon® container.

The first prototype Rotorcon® container was fabricated and tested at CRS's fledgling manufacturing factory in Sydney, Australia, and the containers were later mass-manufactured in China.

The CRS Rotorcon® container remains at the forefront of the rotatable container industry, with the best tare to payload ratio on the market. To make it all work, CRS utilized a 'one design' philosophy, and developed models that range from 1,800mm to 2,900mm in height.

CRS's first production run of these Rotorcons went into service at Bisha Mining, Eritrea. They are still in full service 13 years later, and will be fit for use for many years to come.

2012

This year saw a rapid uptake with global interest. CRS therefore continued to develop its offering for the CBH industry. This was a necessity to meet clients' needs, particularly at unsophisticated ports where ships' cranes provided the solution for shiploading.

** BK2-compliant refers to a type of closed bulk container that meets specific design and construction requirements for the safe transport of goods, particularly hazardous materials.*

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CRS moved forward with the introduction of a low-costs, light tare weight machine, the Rotainer® MD, specifically designed for ships' gear. These units have a gross capacity of 28 tonnes, and are not fitted with lid lifting, but are stand alone, self-powered machines with hand-held remote control.

Furthermore, in 2012, CRS introduced to the market the very first automated lid lifting system for container rotators. This was an innovative technology evolved over 12 months to perfect. Subsequently, it became an environmental game changer for the CBH industry and is now industry standard — a proud technological advancement for the CBH industry.

This innovative lid lifting technology was developed by CRS with input from OZ Minerals and Flinders Ports, both astute Australian businesses at that time.

Mid-tier mining companies also embraced this ground breaking technology, and it was keenly sought after to meet the latest environmental requirements for concentrate loading. Subsequently CRS's engineering details of the system were issued to third-party container suppliers for inclusion on various container lid designs and shapes. These would eventually go into service in CRS Rotainers at Port Adelaide, South Australia — eventually this technology made its way to overseas concentrate handlers, predominantly in Latin America.

2013 — NEED IS THE MOTHER OF ALL INVENTIONS.

CRS's European clients, some who were handling many types of commodities — ranging from lightweight grains to heavy ore concentrates — needed one model of container rotator that fits all sizes of container sizes from small to large. For CRS, the obvious solution was a variable arm.

CRS went on to design and ultimately patent this innovative, adjustable arm technology and is as an option on all Rotainers®. It caters for containers ranging from 1,450mm half heights to 2,900mm high cubes, the perfect answer to a complex requirement.

The best part of CRS's variable arm system is that, within a matter of minutes, the user can easily change from one container height to another to meet the various centres of gravity required during container rotation.

FAST FORWARD TO 2014–2017

In this period, it became quite clear that innovation in the CBH industry was lacking;

container rotators were somewhat cumbersome, outdated in design and lazy in operation.

Many players embraced older, existing technologies, some added basic engineering tweaks, others claimed modifications it as their own. For example, Western NSW, Australia miners have been using open top containers with lids, locks including slanted side sides since the early 1980s. These containers were rotated — and still are in 2025 — via ground-based tipplers.

These units are based at Newcastle and Port Kemble, Australia. These early versions, which did have an early version of a lid lifting system are still considered mainline machines today.

European market opens up to CBH

Gross truck trailer combinations differ from region to region, and from country to country. For example, in Europe, a container may move though many countries by road or rail by the time it gets to the shiploading port. As an Australian exporter, CRS knew that, in order to remain competitive, simplification of its systems was the answer.

For the CRS engineering team, the 'Eureka moment' came after a visit to European crane manufacturers, which were introducing rectangular booms to large mobile hydraulic cranes. CRS's engineering department thought, why not introduce this design philosophy the CBH industry?

CRS decided to embrace this technology and, to change the industry's way of thinking, it decided to utilize this crane boom design methodology with the introduction of single beam container rotators. This approach would take innovation, it would be challenging and — most of all — it would take a different approach for CBH. After all, container rotators are not container spreaders, they are specialized, dedicated pieces of machinery.

CRS come up with its new daring new, innovative solution, the Rotainer Eurospec range of container rotators for 32 and 38 tonnes — and this solution turned heads

throughout the industry. These Rotainers are a unique single-beam construction, are soft looking and have a smart design. The use of fewer complicated mechanicals provides a low-cost rotator, offering longevity with excellent return on investment.

This compact container rotation was easier and less complex to build and, above all, can be shipped globally in a single 40ft open top container. It is fully sealed and can work in climates ranging from –20°C to +60°C ambient temperature with CRS's optional 'Arctic Pack'.

CRS's very first Rotainer Eurospec 32 container rotators went into service for QSL, Beau Comeau, Quebec. It was equipped with the Arctic Pack for –20°C operation, and went onto service in 2018. This unit handles aluminium fines and is used with ships' gear, proudly the single beam. The Rotainer Eurospec is now CRS's most successful design to date.

CRS's innovative 'E' Link for single, centre point connections to rams hooks — another CRS industry first

Connecting rotating spreaders to mobile harbour cranes has always been problematic — it can be dangerous and cumbersome.

Using heavy duty slings or chains to connect to the crane hook is not an easy task; lifting gear needs constant maintenance with soft slings requiring regular replacement. These costs all add up over time.

CRS solution to eliminate these issues was solved with the introduction in 2018 of CRS's unique 'E' Link to the CBH industry.

In the face of negative industry feedback, CRS persisted with this innovative problem solver. The link has proven its worth time and time again and is now a standard fitment on all Rotainers moving forwards. All Rotainers, incidentally, offer a superb advantage in that the container operator has total control for the perfect placement of the payload and, most of all, this dramatically reduces damage,

2022 — innovation never stops at CRS

A potential client purchased a newly developed, extremely large 'E Crane'. They required a high-performance container rotator with gross capacity of 42 tonnes. Reviews of the CBH market again highlighted the lack of innovation for large material handlers.

CRS's engineers reviewed the application, found a pen, one sheet of paper, and scribbled a design. This included a single, centre, lift point directly connected to the crane's ram head hook; jokingly, the CRS designers named it the 'Harbour Bridge', a name that has now stuck to this design, the real nomenclature is Rotainer MH42.

This unit was presented to all involved; the client liked what they saw, E-Crane Europe liked what they saw, and three months later the Rotainer Eurospec MH42 was in production. It is currently CRS's

most popular container rotator. This year, 2025, will see a new version of the MH42 which been upgraded to 360° multi-directional rotation.

2023: Rare Earth — the current buzz word

Lynas Rare Earths Australia, was developing ground-breaking technology for the processing of Rare Earths, a milestone for Australian mining. To meet very strict environmental approvals, a fully sealed processing plant was required. Lynas Australia approached CRS for a solution, as it wanted a 'one-stop-shop'.

CRSs answered the call with the complete CBH solution that included: a specialized 360° multidirectional container rotator with a canopy that fully sealed the dumping chamber; Rotainer® RS for reachstackers; Rotorcon® containers for 38 tonnes; and lid lifting at the load and dump stations.

The lid lifter for the loading station with a weigh system (supplied by others) was fully manufactured, assembled and tested at CRS's Sydney facility. Once completed, it was trucked by road and train 4,000km to site. There, it was installed by local contractors. More details on this technically super loading station will be released later this year once it has been fully commissioned.

For this project, CRS designed a completely new machine, now known as the Rotainer® Eurospec 38-360PC. This unit saw the introduction to CRS's mechanical portfolio of a new, specially designed, 'slew ring' drive mechanism. Again, this is a fully automated unit for a closed shed application; this consolidates the versatility of the CRS's engineering team to take on difficult technical challenges in ever evolving CBH industry.

2024 — it never stops. Bigger is better

CRS again takes on the call of developing a 40ft container rotator for STS (ship-to-shore) cranes. The requirement was to develop a 360° multidirectional container rotator that could be exported globally in a single, 40ft open top container. Furthermore, it needed to be assembled simply on site with minimum of fuss. Again, CRS undertook the challenge.

CRS utilized all its 16 years of learning to come up with a practical solution for such a large machine. It developed new design and assembly techniques that are now Patent Pending. Considering that fact that all CRS Rotainers do not use 'Floating Twist locks', manufacturing accuracy was paramount. At the of the day, the unit was perfect; it easily passed all CRS's stringent FAT (Factory Approved Testing) prior to export.

The year 2025 sees another significant CRS milestone in the CBH industry, with the release of CRS's new, wide-bodied 'Maxitainer®' range of high-volume containers favouring shed-to-ship operations.

Predominantly designed for products under <.8 SG, these Maxitainer® containers are fully certified for 360° rotation, and CRS's unique inner frame structure negates the need for cumbersome side systems.

These wide-bodied containers offer >25% increase in productivity as compared to normal high cube containers. Two variants are available — 45 and 55 cubic metres. The Maxitainer® 45 is available with CRS's heavy duty hard flat lid and locks for fully sealed applications, whereas the latter, Maxitainer® 55 is an open top with side extensions.

Both variants of these wide-bodied containers work with any of CRS's Rotainers but to gain best return on investment, they are best suited to the company's new 2025 model, Rotainer Eurospec MH42-360, which is fitted with CRS's innovative second generation electronics.

In 2025, CRS will continue to attract attention to the CBH industry with the release of its new version of the Multilid® container lid handing mechanism. Again, this is an innovative show stopper that will turn heads and further enhance CRS's lid lifting technology to cater for 'Any Lid-Anytime,. Also hitting service in Q3 2025 is a much anticipated, very exciting, newly upgraded Rotainer Eurospec MH42-360 for Liebherr LMH 550 with Series 6 Electronics.

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Modern SENNEBOGEN material handler on the Mittelland Canal

The new SENNEBOGEN material handling machine increases handling performance while reducing operating costs.

The long-established logistics company Albert Bergschneider, specialized in building materials, is investing in state-of-the-art handling technology: at the port location in Ibbenbüren-Uffeln, a new electrically powered SENNEBOGEN 870 E on rail gantry has recently been commissioned. The powerful material handler replaces two older installations — a rope gantry crane and an additional crane system — and now handles the bulk material transfer between inland vessel and freight train.

Over 125 years of experience

With over 125 years of experience in logistics and building materials trade, the family-run company is now a regional expert in trimodal logistics between ship, rail, and truck. From its five inland port locations along the Mittelland Canal and Dortmund-Ems Canal, Bergschneider supplies building material dealers and manufacturers across northwestern Germany. Two of these locations have direct rail access, ensuring efficient transport by train.

New SENNEBOGEN replaces two crane systems

At the Ibbenbüren-Uffeln site, located directly on the Mittelland Canal — Germany's longest artificial waterway — the new machine was installed along a 340m-long quay with an adjacent storage hall and rail connection. The SENNEBOGEN 870 E on rail gantry is now responsible for bulk material loading and unloading between inland vessels and freight wagons, gradually replacing two older crane systems.

The procurement and commissioning process was supported by SENNEBOGEN sales and service partner Schlüter Baumaschinen.

Thanks to the Mastercab cabin with flexible height adjustment and additional camera support, the operator has an optimum view of his working environment.

Shorter turnaround times and reduced operating costs

In Ibbenbüren-Uffeln, the SENNEBOGEN 870 E combines a 25m reach, a lifting capacity of up to 25 tonnes, and faster slewing movements — significantly speeding up vessel handling. "We were able to reduce the unloading time of a ship from five-and-a-half to just two-and-a-half hours," emphasizes Managing Director Silva Haselon. The powerful 250kW electric motor operates locally emission-free and with minimal noise. An integrated cable reel supplies the machine with power, ensuring flexible movement along the full 340m quay length. In addition, the SENNEBOGEN Green Hybrid energy recovery system reduces operating costs by up to 30% compared to a conventional material handling machine. By using this innovative technology, Bergschneider avoids around 6.5 tonnes of CO_2 emissions per year at the site.

Optimal view of the working environment

The spacious Mastercab, equipped with hydraulic height adjustment, offers a variable working height between 8 and 12m. Thanks to the elevated cab position and additional camera systems, the operator benefits from excellent visibility of the entire working area.

With the new SENNEBOGEN 870 E, Bergschneider is investing in a powerful and environmentally friendly material handling solution: two outdated systems were replaced, handling times and operating costs significantly reduced, and CO_2 emissions lowered — an important step toward efficient and sustainable port logistics. DCi

A clean slate – environmentally

dust control technologies in the bulk arena

Louise Dodds-Ely

Fugitive dust: a critical challenge

Fugitive dust presents a persistent and complex challenge in dry bulk handling; *explaining how fully enclosed screw-type conveying technology is at the forefront of dust mitigation is Daniel Frostberg, Sales Director, Bruks Siwertell.*

As environmental regulations tighten and awareness grows about the health and safety implications of dust emissions in dry bulk handling operations, the need for effective dust control becomes ever more urgent.

From respiratory hazards and contamination of local ecosystems to the very real risk of explosion and fire, fugitive dust is far more than a simple, localized concern. It is a matter of operational integrity, regulatory compliance, and public safety.

Dust poses multiple risks

Fugitive dust refers to particulate matter that becomes airborne during, for example, bulk material handling processes, including loading, unloading, and conveying. Additionally, material degradation, caused by some handling practices, increases dust generation, while also reducing cargo quality and usability, leading to unnecessary waste and higher operational costs.

For materials such as coal, fly ash, biomass, sulphur, and fertilizers, dust emissions can have serious implications. Inhalation of fine dust particles, particularly those generated from sulphur or fly ash, is linked to respiratory diseases and environmental pollution.

Whereas combustible materials like grain and biomass, dust clouds not only pose a health and environmental hazard but also carry a substantial risk of ignition and explosion. The fine particles can ignite under the right conditions, with devastating consequences for port personnel and infrastructure.

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The easiest way to avoid spreading and creating dust, especially that which is potentially harmful to human health and the environment, is not to create it in the first place.

Containment is key

Fully enclosed Siwertell screw-type ship-unloaders, with continuously smooth conveying velocities, are engineered to address fugitive dust from the outset. Key to the Siwertell ship-unloader is its counter-rotating inlet feeder, which is submerged below the material's surface during unloading, and follows a continuous, pre-set travelling pattern across the hold. This not only enhances discharge efficiency but also avoids creating hold avalanches that typically generate dust plumes in conventional mechanical unloading systems.

In addition, low-impact, steady-speed conveying minimizes material degradation and collisions between material in the conveyors, significantly reducing the production of fines, which are highly combustible dust particles, and keeping them at negligible levels.

Dust filters at transfer points and dust suppression systems add to these capabilities, along with specialized transfer trolleys that ensure the same level of containment is maintained across the entire conveying chain, including jetty and shore-side systems.

Siwertell ship unloaders lead the market for the safe and efficient handling of some of the world's most challenging dusty dry bulk materials, such as sulphur and biomass. Critical to all sulphur handling Siwertell ship-unloaders, is the Siwertell Sulfur Safety System (4S). The 4S system minimizes the risk of explosions during sulphfur unloading, and if an explosion does occur, it ensures the safety of operating personnel and the integrity of the machine by mitigating any potential damage.

Farewell to hazy yellow

The power of any technology is best illustrated in real-world applications. One of the most compelling examples of dust transformations is found in Paradeep, India, where enclosed Siwertell ship-unloading technology has yielded a marked transformation for the environment and for workers at the terminal; consigning the clouds of yellow dust to the past.

Paradeep Phosphates Limited (PPL), a key supplier of fertilizers in India, operates two rail-mounted Siwertell ST 640-D unloaders, replacing traditional, open-grab systems. The first was delivered in 2005 and the second was commissioned in 2023.

The screw-type ship-unloaders are able to seamlessly switch between PPL's three essential dry bulk cargoes, handling sulphur, rock phosphates, and MOP at continuously high rated capacities without requiring any additional measures to be taken between shipments.

Not long after PPL's initial order, neighbouring terminal, the Indian Farmers Fertilizer Co-operative Limited (IFFCO) ordered an ST 790-D Siwertell ship-unloader. Commissioned in 2011, it also replaced a grab crane previously used at the terminal. This larger model handles bulk sulphur at a rate of 1,800tph (tonnes per hour), and rock phosphate at a rate of up to 2,100tph. Dust collectors at the unloader's transfer points further prevents the emission of dust to the surrounding environment.

Safe biomass handling: a growing necessity

Biomass is rapidly becoming a primary fuel source in the global push toward cleaner energy. But it also comes with a unique set of handling challenges.

Biomass materials, including wood pellets and palm kernel shells, are highly prone to dust generation, self-heating, and, under certain conditions, spontaneous combustion.

To handle the risks associated with biomass, Bruks Siwertell has drawn on its decades of experience managing volatile materials like sulphur. Like sulphur unloaders, Siwertell units designed for biomass are equipped with an in-house-developed safety system that suppress dust explosions and protect operators and equipment.

Numerous biomass handling Siwertell ship-unloaders showcase these capabilities. For example, at the UK's Immingham Renewable Fuels Terminal (IRFT), two Siwertell ST 790-D unloaders are responsible for discharging massive volumes of US-imported wood pellets destined for Drax Power Station. These systems have proven capable of maintaining the integrity of fragile biomass pellets while preventing the creation of combustible dust. Their performance has been mirrored at Peel Ports' Ligna Biomass Terminal in Liverpool, UK, and at the Teesside Renewable Energy Plant in Middlesbrough, UK, where a dedicated Siwertell unloader supports a 299MW biomass facility.

Today, Siwertell unloaders have clocked-up 100,000 hours of biomass unloading, proving their value not just in performance, but also in environmental and operational safety.

Driving a sustainable future

Beyond dust suppression, Siwertell technology drives broader sustainability benefits. Low-energy demands, continuously efficient operating profiles, mechanical quality and longevity, and high through-ship capacities deliver long-lasting environmental gains. Furthermore, faster unloading means reduced time at berth, translating into lower ship emissions. Siwertell technology is also lower in weight than equivalent capacity systems, this minimizes the structural demands on jetties, reducing steel use and associated carbon footprints.

The environmental and safety challenges associated with dry bulk handling are only intensifying. Fugitive dust, once seen as an unavoidable by-product of bulk cargo handling, is no longer acceptable. Regulatory frameworks, industry standards, and public expectations are driving change, and Siwertell ship-unloaders are already delivering the industry benchmark.

Weba Chute Systems leads shift from reactive to proactive chute maintenance – significantly reducing dust emissions

Technological advancements in the digital space are paving the way for a key trend in the management of transfer points: a transition from reactive to proactive maintenance.

Mark Baller, Managing Director of Weba Chute Systems, notes that chutes were traditionally replaced or repaired only after failure, resulting in unplanned downtime and higher costs. However, today's leading mines are leveraging digital technologies to monitor equipment and processes in real time, enabling them to identify and resolve potential issues before they escalate.

"This is certainly the direction in which transfer point technology is evolving," says Baller. "Mining operations are increasingly leveraging data to prevent unplanned downtime and optimize equipment performance."

He explains that the value of data begins

Manufacturing of standardized chute components by Weba Chute Systems, streamlining maintenance and reducing lead times.

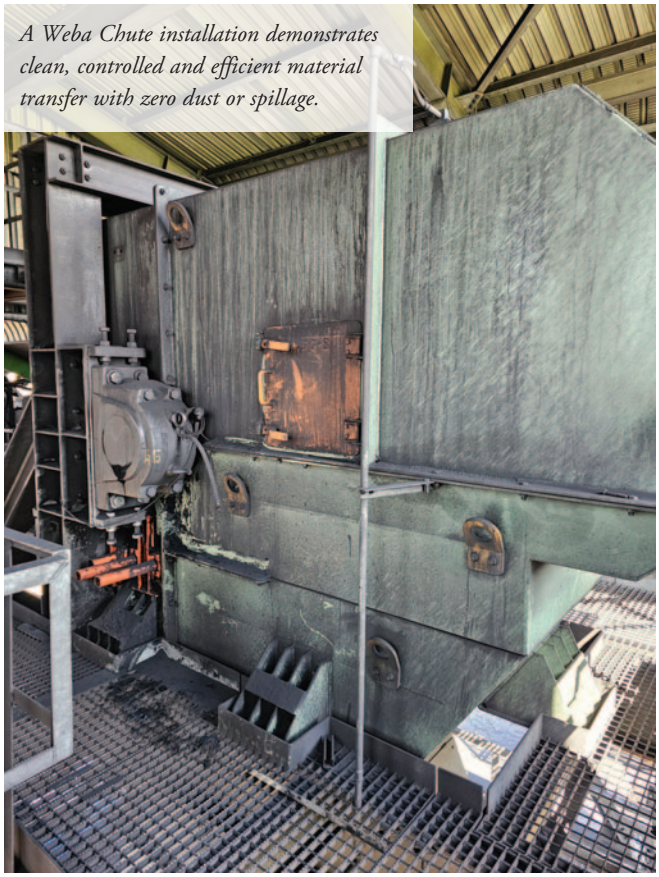
with building a historical record of equipment condition and performance, enabling more accurate maintenance predictions.

To support this, Weba Chute Systems has developed an inspection app that allows clients to monitor chute performance remotely. The app simplifies data collection and storage, enabling Weba to analyse trends and provide customers with informed maintenance recommendations.

"With remote monitoring, we can identify trends and build a predictive maintenance model, allowing customers to schedule maintenance more efficiently," Baller explains. "This level of transparency strengthens our partnership with clients and enhances the overall efficiency of their operations."

He emphasizes that an improved maintenance strategy not only increases

A Weba Chute installation at a coal mine in South Africa demonstrating minimal dust and spillage, highlighting the effectiveness of the advanced design.



A Weba Chute installation demonstrates clean, controlled and efficient material transfer with zero dust or spillage.

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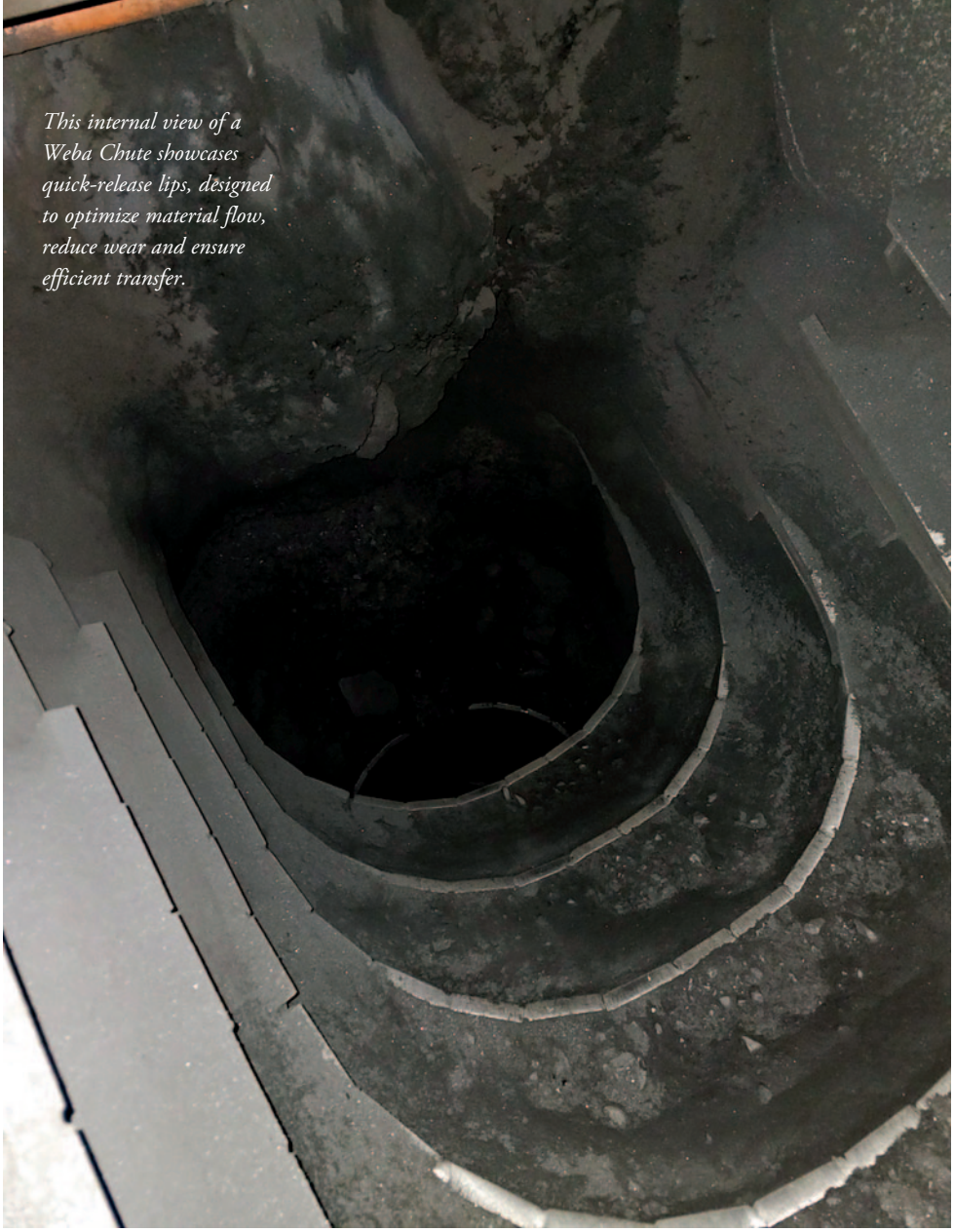
operational uptime but also extends equipment lifespan. This reduces capital expenditure and minimizes steel wastage while maximizing the customer's return on investment in the chute. Enhanced predictability also streamlines the supply chain, allowing both the OEM and the customer to anticipate spare parts requirements in advance.

Another key advancement for Weba Chute Systems is the move towards standardizing chute components. While the company is renowned for its custom-built transfer chute solutions, it has been developing standardized components that can be used across multiple chute installations.

This approach enhances efficiency, reduces lead times and streamlines maintenance.

"Previously, every chute required custom components, forcing clients to keep a variety of different parts in stock," Baller explains. "Now, we are shifting towards more standardized components, enabling clients to streamline their stockholding while still maintaining the flexibility to meet their maintenance requirements efficiently."

This transition is especially



This internal view of a Weba Chute showcases quick-release lips, designed to optimize material flow, reduce wear and ensure efficient transfer.

Superflow chutes installed at a power plant in the USA, showcasing Weba Chute Systems' advanced technology and engineering for optimal material flow.

The Weba Chute Systems Superflow chute design, expertly engineered for high-performance and efficient material transfer.

advantageous for large mining operations with multiple chutes. By introducing component interchangeability, Weba Chute Systems is helping clients reduce operational costs while enhancing equipment longevity and overall efficiency.

Health and safety continue to be key considerations in chute selection, and Weba Chute Systems' advanced designs optimize material flow while minimizing turbulence, significantly reducing dust generation. Baller emphasizes that a well-designed chute is often a more effective solution for dust control than relying on dust extraction systems.

The cost of installing and maintaining a dust extraction system can be significant and if the chute design itself generates excessive dust, the system may not be very effective," says Baller. "Our chutes have demonstrated that a well-engineered design can eliminate the need for a separate dust extraction system, helping customers avoid unnecessary expenditure."

A prime example is a coal mine in the United States that was at risk of being shut down due to environmental concerns over excessive dust. After switching to Weba Chute Systems' innovative technology, the results were remarkable.

"The customer was able to remove their dust extraction systems entirely because our chutes alone produced even less dust than their previous system did with extraction in place," Baller explains.

The proven success of Weba Chute Systems' designs has driven strong growth across sub-Saharan Africa, with an expanding footprint in the Middle East, Australia, Canada and the United States.

"We are particularly excited about opportunities in the Middle East and North Africa," Baller says. "In markets like Australia and North America, our strategy focuses on engineering and design, while local partners manage fabrication. This approach allows us to leverage our expertise while ensuring efficient service to local industries."

Dust dominance: containing emissions at conveyor transfer points

All pictures: ©Martin Engineering.

The transfer point of a belt conveyor comprises the loading zone, the settling zone, and the stilling zone, all enclosed by a skirtboard, *writes Todd Swinderman, President Emeritus, Martin Engineering*. The term skirtboard originates from the early practice of using wooden boards to confine the load on conveyors. Discussions among port operators about the best practices of 'skirtboards as a system' should encompass elements of the entire loading zone, as each element impacts the effectiveness of the skirtboards to function well as a system.

Due to the punishing environment of underground operations and modern production demands, a skirtboard sealing system today consists of equipment — some permanent, some wear parts — that work in tandem to seal the conveyor loading area from dust emissions and fugitive fines. These innovative designs are engineered to improve workplace safety, reduce labor for cleanup and ensure efficient production.

Design approach

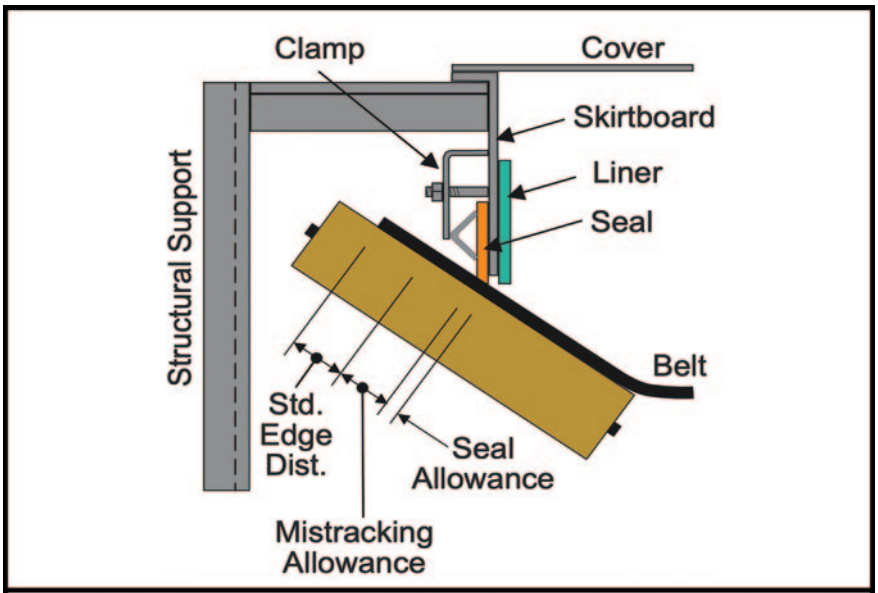
Conveyor design is an iterative process where initial selections are made for the belt width and speed based on the desired capacity and the path of the conveyor. The design approach depends upon the purchasing philosophy, lowest purchase price vs. lowest cost of operation.

It is unusual to find a conveyor purchased on price alone meeting the specified throughput. Almost every conveyor is 'upgraded' at some point, so provisions for the eventual increase in throughput and to address potential operating issues such as dust and spillage should be built into the design. Note that, one of the most common design shortcomings is lack of access for cleaning and maintenance.

Skirtboard system

The system includes the belt, tail pulley, loading chute, skirtboards, skirtboard covers, dust curtains belt support, sealing system and wear liners. It is recommended for the belt to be in reasonably good condition without existing skirtboard grooves, otherwise, the system may not seal the belt effectively. If dust is an issue, replacing enclosure covers after maintenance is an absolute must.

The material should be center loaded and the skirtboards aligned parallel to the centreline of the conveyor. Idlers that are not closely spaced under the skirtboard



Skirtboard Sealing System Components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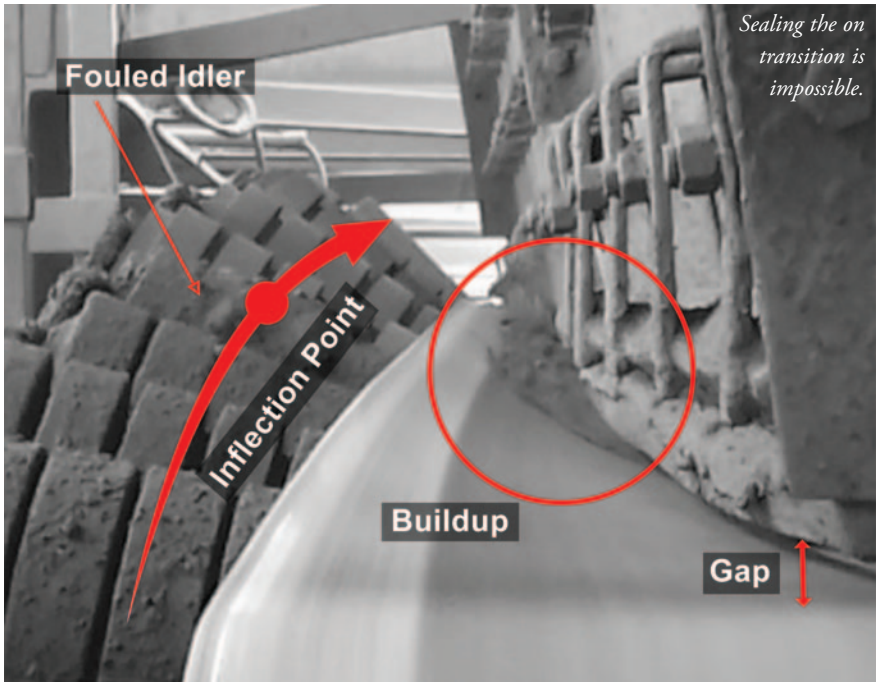


enclosure will make a bumpy belt path which leaves gaps between the skirt and the belt for dust and fines to escape. To produce a fully sealed environment, the belt should be supported with closely spaced idlers or cradles under the sealing system. If there are large lumps, an impact cradle should be used to support the belt and prevent damage.

'Loading on the transition' is when the material is loaded as the belt is transitioning to a full trough angle. It is one of the main causes of grooving under the sealing system as it is impossible to seal the three-dimensional belt surface in the transition even with adjustable wing idlers. The inflection point created at the first fully troughed idler creates an entrapment point for abrasive particles. Therefore, loading must only start after the belt is fully troughed to control fugitive material release and belt damage.

Skirtboard Width

There are various historical ratios for the spacing of skirtboards. They are usually based on belt width such as the Conveyor Equipment Manufacturers Association (CEMA) standard is 2/3 times or ½ times belt width for very free flowing material or multiple loading points. Another approach states three times the size of the largest average lump.

The standard edge distance is an allowance to prevent material from falling from the belt as the edges sag between carrying idlers after the load zone. A mistracking allowance is the expected deviation of the belt path from the central axis of the conveyor. CEMA Misalignment Guide is based on the dimensions of standard CEMA idlers and pulleys and considers three categories of mistracking: Allowable, Actionable and Critical[1]. The International Organization for Standardization (ISO) misalignment allowance is ±40mm for belts up to and including 800 mm or ±5% (±75mm max.) of the belt width for widths over 800mm.[2]

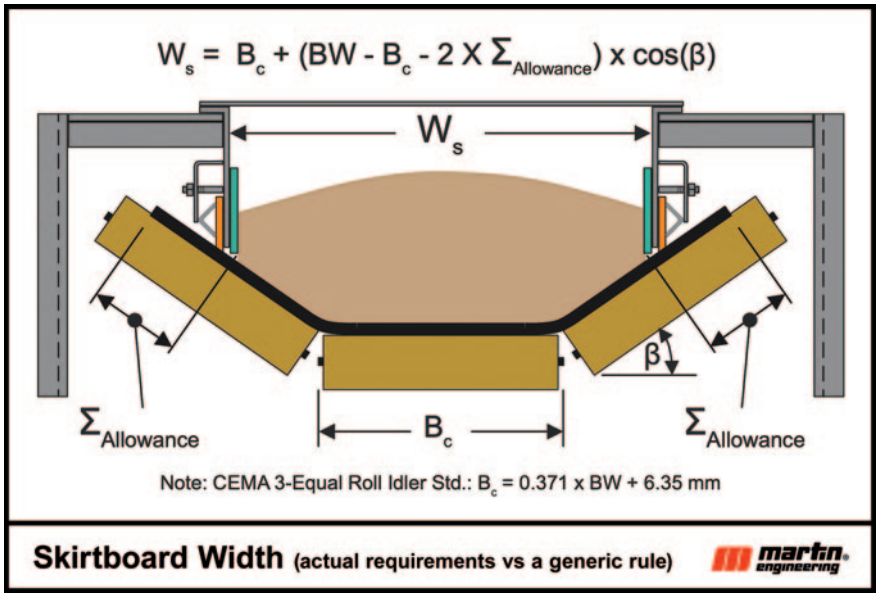
The free belt edge should be based on the thickness of the sealing system, skirtboards, wear liners and standard edge distance added together and measured along the troughed belt surface. This distance will determine the maximum skirtboard spacing. With a BW of 1,200mm, centre roll width, B_C, of 452mm, trough angle of 35°, standard edge distance of 60mm, a mistracking allowance of 100mm and a sealing system 50mm thickness, the skirtboard width inside the wear liners would be 757mm. Note that this is the distance between skirtboards, not the distance between the wear liners, but wearliner thickness should be included.

Skirtboard Height

The minimum skirtboard height is based on the maximum expected cross-sectional area contained between the skirtboards, so the belt's full edge-to-edge area should be used to determine the height of material rubbing on wearliners and to make sure the skirtboards are tall enough for a completely full belt. Use the loose bulk density — material before it settles on the conveyor — to represent the bulk density. The reason for this is the loose bulk density can be up to 40% less than the settled (vibrated) bulk density of the cargo on the carrying run, requiring the material cross-sectional area to be 40% greater at the point of impact until the load settles into a stable profile.

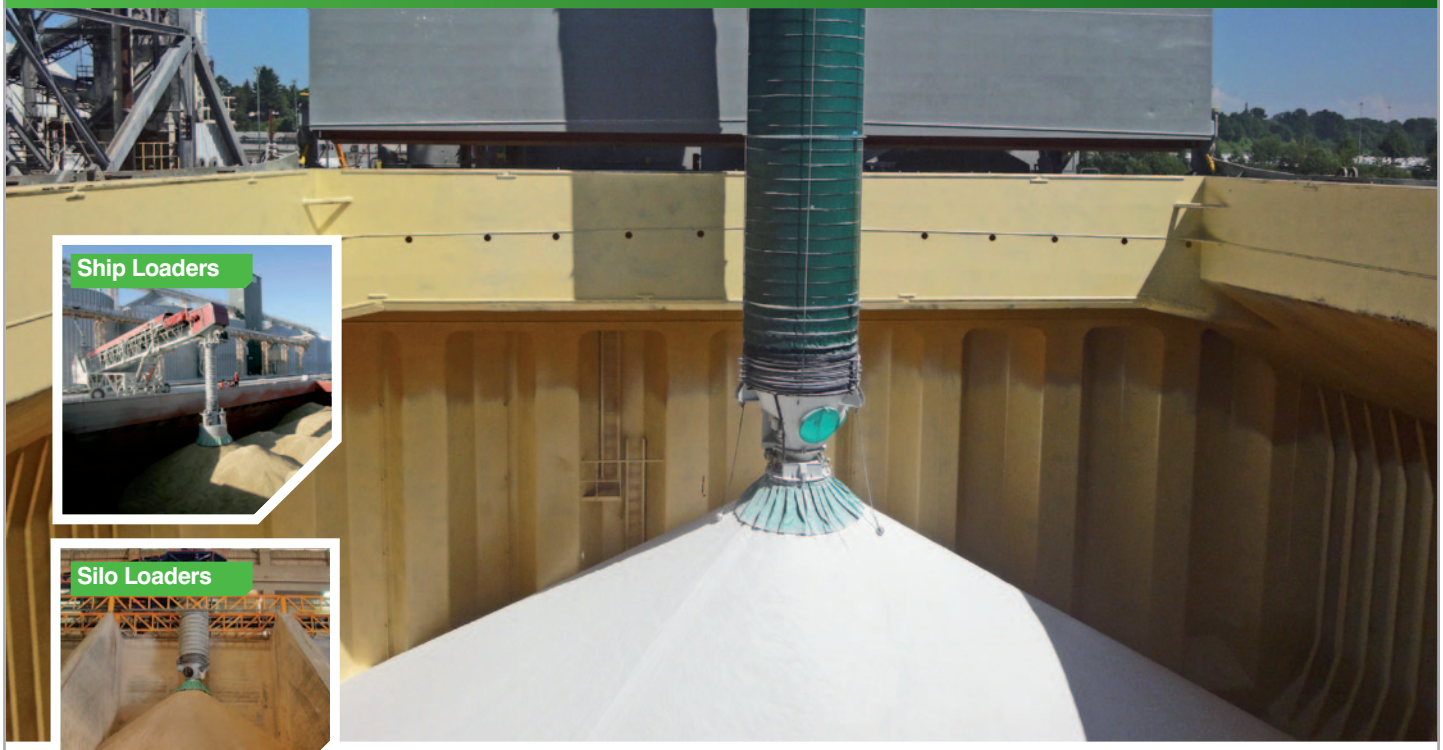
When a conveyor is purchased on price the skirtboards will typically be 300mm tall to accommodate a basic vertical slab seal and clamping arrangement. With an engineered approach the height of the skirtboards is based on the above allowances and keeping the airspeed in the

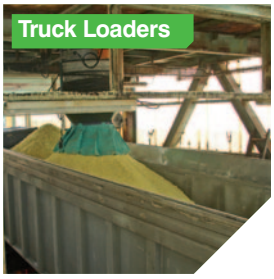
$W_S = B_C + (BW - B_C - 2 \times Allowance) \times \cos(ß)$
$B_C = 0.371 \times BW + 6.35mm$ [CEMA method or use actual] = 451.55mm
Allowance = 5% x BW + Mistracking Allowance = Sealing System Thickness measured along belt surface = 210mm
cos (35) = 0.9037
$W_S = 451.55 \div (1{,}200 - 451.5 - 2 \times 210) \times 0.9037 = 757.4mm$



Cleveland Cascades Ltd

Global leader in bespoke dry bulk loading chutes





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

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

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

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

Contact Cleveland Cascades Ltd

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

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

enclosure below 1.0 m/s. At this air speed, most nuisance dust will settle in the enclosure. When taking this approach, the quantity of air flowing through the enclosure is estimated by considering the displaced air from the initial loading, the induced air created by the separation of the material discharge stream drawing or inducing airflow into the transfer point and any generated air from prevailing winds or process equipment like crushers or screens.[3]

For existing enclosures simply measure the average air speed at the exit. If the average speed is 3.0m/s then the cross-sectional area of the enclosure needs to be three times the existing area (i.e. three times the height) to reduce the exit air speed to 1.0m/s.

Skirtboard structure can be unique to the operation and the application and should be determined by an experienced engineer.

Length of skirtboards

As with the width of the skirtboards there are various generic rules for the extended length of the skirtboards. The extension serves two purposes, first, it prevents spillage as the load settles into a stable profile after loading. Generic rules for containing turbulent flow range from 1.8m extension past the dump point or, 1.5m plus 1.2m for every 1.0m/s of belt speed. Secondly, the extension helps settle nuisance dust without extraction, so, 1.2m per 1.0m/s length for minor airflow and 1.8m per 1.0m/s length for major airflow is one recommendation for dust control.

The ACGIH Industrial Ventilation manual

The longer the enclosure, the more time dust has to settle, making to a cleaner work environment.

provides guidance when collection is needed for respirable or hazardous dust. In general, it is good practice to make the extension generous in length and height, keeping in mind there is added friction from seals and material rubbing on the liners. This can be a significant additional load on the drive for long lengths of skirting. Material rubbing on the wear liners also creates drag so the capacity belt width and skirtboard spacing should consider minimizing material contact with the wearliners.

Conclusion

Designing an effective underground conveyor skirtboard system requires an iterative approach. Starting with basic capacity calculations ensures the belt is wide enough to accommodate the free belt edge, the sealing system, wear liners and expected mistracking allowance. Old design rules and fabricated solutions only work for the short term and often result in more maintenance. Installing a well-designed skirtboard sealing system for safety, ease of maintenance and less downtime is part of a cost-effective production plan with the greatest return on investment.

References

[1] CEMA Guide 01-2023, CEMA System Mistracking Allowance Guide, Conveyor Equipment Manufacturers Association

[2] ISO standards ISO 22721, ISO 14890, and ISO 15236-1.

[3] FOUNDATIONS for Cleaner, Safer and more productive Dust and Material Control, fourth ed., Chapter 11, Martin Engineering

About the author

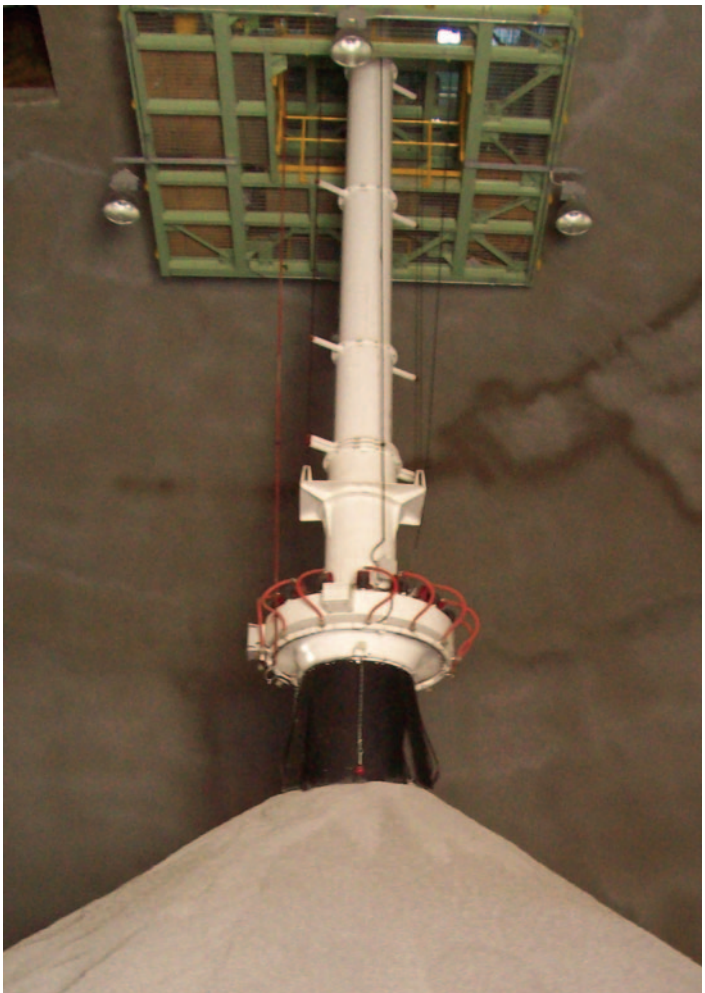
R. Todd Swinderman earned his B.S. from the University of Illinois, joining Martin Engineering's Conveyor Products division in 1979 and subsequently serving as V.P. and General Manager, President, CEO and Chief Technology Officer. Swinderman has authored dozens of articles and papers, presenting at conferences and customer facilities around the world and holding more than 140 active patents. He has served as President of the Conveyor Equipment Manufacturers' Association and is a member of the ASME B20 committee on conveyor safety. Swinderman retired from Martin Engineering to establish his own engineering firm, currently serving the company as an independent consultant.

About Martin Engineering

Martin Engineering has been a global expert in bulk material handling for more than 80 years, continuously developing new solutions to make high-volume conveyors cleaner, safer and more productive. The company's series of *Foundations*™ books is an internationally recognized resource for safety, maintenance and operations training — with over 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 18 factory-owned facilities worldwide, with wholly-owned business units in Australia, Brazil, China, Colombia, France, Germany, India, Indonesia, Italy, Kazakhstan, 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.

Built for the port: engineering dust control systems that maximize safety and throughput

When dust escapes control, so does profit, safety, and compliance. In dry bulk shipping, effective dust control is key to maintaining performance and compliance. Uncontrolled dust emissions can result in non-compliance with port regulations, pose health risks to personnel, and increase equipment wear. However, when properly managed, dust can be captured directly at the source and reintegrated into the material stream — minimizing product loss, reducing clean-up and maintenance requirements, and ultimately enhancing throughput and profitability within the supply chain.



High-efficiency dust control for bulk loading operations

In dry cargo operations, particularly at ports and transloading facilities, dust collection systems play a vital role in minimizing airborne particulates and maintaining a safe, compliant work environment. Integrated dust control technologies — such as loading spouts equipped with reverse pulse filter cleaning systems and dust-tight seals — are designed to capture emissions at the point of discharge. The effectiveness of these systems can vary significantly depending on design, placement, and filtration media. The following sections outline key considerations and technologies that differentiate high-performance solutions from less efficient approaches.

Maximizing dust control during bulk loading operations starts with selecting equipment engineered for performance, reliability, and ease of maintenance. Compact dust collection

systems with integrated cartridge filters are highly effective at capturing airborne particles at the source, virtually eliminating material loss and reducing environmental impact. For optimal efficiency, choose systems designed with operator-friendly features — such as tool-free access panels or thumbscrews — that allow for quick filter changes and routine inspections without disrupting operations. Prioritizing low-maintenance, high-efficiency systems not only improves dust capture but also supports safer, more streamlined ship loading.

Selecting the appropriate filter media is critical to maintaining consistent, high-efficiency dust control in bulk material loading operations. In systems such as inline or compact filtration units, airborne particles accumulate on the filter surface, forming a dust cake that must be efficiently released to maintain airflow and performance. Advanced filter designs — using pleated, smooth, spun-bound media — are engineered to shed these dust cakes effectively. During operation, short bursts of compressed air cause the filter to flex slightly, dislodging the accumulated material and returning it to the material stream. This self-cleaning action supports continuous filtration virtually eliminates material loss and ensures reliable system performance over time.

Custom spout solutions for dusty materials and complex boom configurations

Variable boom configurations can present challenges when it comes to precise and efficient loading. At DCL, the experienced Design Engineering team specializes in developing custom solutions that adapt to these constraints. By incorporating double pivot joints, DCL enables full utilization of luffing and slewing booms, allowing the spout to reach across the entire cargo hold. Additionally, loading spouts equipped with swivel trajectory discharges give operators the flexibility to distribute material evenly — filling corners and topping off loads to maximize vessel or container capacity with greater control and accuracy.

The loading spout discharge is equipped with level-sensing probes that monitor the rising material pile and automatically adjust the spout height to maintain optimal loading conditions. The spout can be integrated with a dust collection system to capture airborne particles generated during loading. Most granular or lumpy materials are effectively handled using a standard rubber-skirted discharge. For materials

with exceptionally high dust content, the addition of a 'Deadfall' discharge accessory provides enhanced dust suppression by minimizing the velocity and dispersion of falling material.

The Deadfall advantage: precision loading and dust control for open-vehicle and vessel applications

The H-Style Deadfall discharge was specifically engineered to enable loading of highly dust-prone materials — that are otherwise difficult to manage without full enclosure. This innovative design features a dual-skirt configuration: an inner slitted rubber skirt combined with an outer weighted barrier skirt, both located below a hood assembly sized according to the loading spout diameter. As material enters the hood, it expands and slows, reducing its discharge velocity. This allows airborne dust to settle or be captured efficiently by an integrated dust collection system.

Mounted directly to the discharge of a standard loading spout, the Deadfall system includes a housing with counterweighted bleed air dampers and product plug relief doors for added safety and airflow control. This discharge accessory is virtually maintenance-free, highly durable, and well-suited for abrasive or fine materials. Field-proven across a range of demanding bulk materials — including alumina, bentonite, calcined coke, phosphate rock, sodium sulfite, soda ash, potash, and magnesium oxide — the Deadfall enables high-rate ship loading with minimal dust emissions. Many operators report full return on investment within the first year, thanks to improved product recovery and significantly reduced maintenance costs.

Built to withstand the elements:

Material selection is a key factor in the

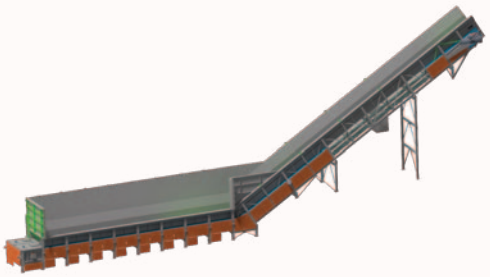
performance and longevity of shiploading spouts, particularly in demanding marine environments. At DCL, spouts are engineered to accommodate a wide range of application-specific requirements, including corrosive, abrasive, food-grade, and hazardous environments requiring explosion-proof design. Common construction materials include hardened steel, chromium carbide, and stainless steel — each selected based on its resistance to wear, corrosion, or contamination. In weight-sensitive applications, such as mobile shiploaders or long-reach systems, aluminum components are strategically incorporated to reduce overall system weight without compromising structural integrity. This tailored approach ensures reliable, long-term performance across diverse loading conditions.

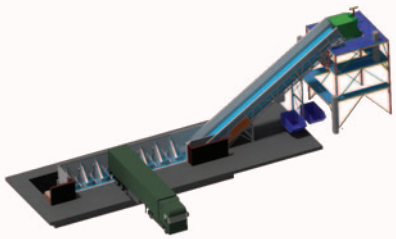
Conclusion

As dry bulk terminals face increasing pressure to improve safety, environmental compliance, and operational efficiency, effective dust control has become a strategic priority. From compact, inline filtration units to advanced spout designs and material-specific discharge accessories like the Deadfall, DCL's dust control systems are engineered not just to contain particles — but to recover product, reduce downtime, and enhance throughput. By investing in smart, low-maintenance technologies tailored to port environments, operators can future-proof their operations, improve worker safety, and ensure cleaner, more profitable bulk loading.

Loibl adds new dust-controlled conveyor line to recycling wood plant

Location: Luxembourg
Project period: November 2022 to September 2023
Conveyed material: waste wood





Recycled wood-based materials are fed back into the production process at the processing plant in Luxembourg. A new hall was built in 2023 to expand the existing plant. The pan conveyor is connected to the new hall and is used to receive and transport recycled wood. As the waste wood is delivered by truck and unloaded directly onto the pan conveyor, the design had to be particularly sturdy and durable.

Pan conveyor with character: the delivered pan conveyor has a length of 41 metres. The generous apron width of two metres makes it easier to pick up the unloaded waste wood. The pan conveyor is equipped with an automatic lubrication unit to reduce wear and extend the service life of the conveyor chain. The conveying capacity per hour is 110 tonnes.

Unloading recycled wood can generate dust, which can have a negative impact on the environment and employees. The pan conveyor is therefore equipped with a water spraying system to minimize dust formation during the unloading and transport process. The side access guard is divided into two parts and can be easily opened when the apron feeder is at a standstill. This allows easy access for cleaning and maintenance work.

The scope of supply included: consulting and planning; basic and detail engineering; production in Straubing, Bavaria; plant construction consisting of pan conveyor; and delivery.

Quarry Mining offers environmental solutions for production plants

Quarry Mining LLC designs and manufactures screening and crushing plants in compliance with European standards, while adhering to the same safety standards and features that are expected of equipment produced in Europe. Quarry Mining LLC (QM) is certified for quality management with ISO Certificate 9001:2008 and for environmental management with ISO Certificate 14001:2004 from the German Technical Inspection Association TÜV Rhineland/ Germany. These certifications also apply to the continuous integration of all upgrades. Located in the United Arab Emirates, QM can supply high quality plants with very competitive prices.

Screening and crushing always creates dust — this is the nature of the production process. It's impossible to crush material without dust, but it is important that operators know how to reduce this dust, and how they can even benefit from it.

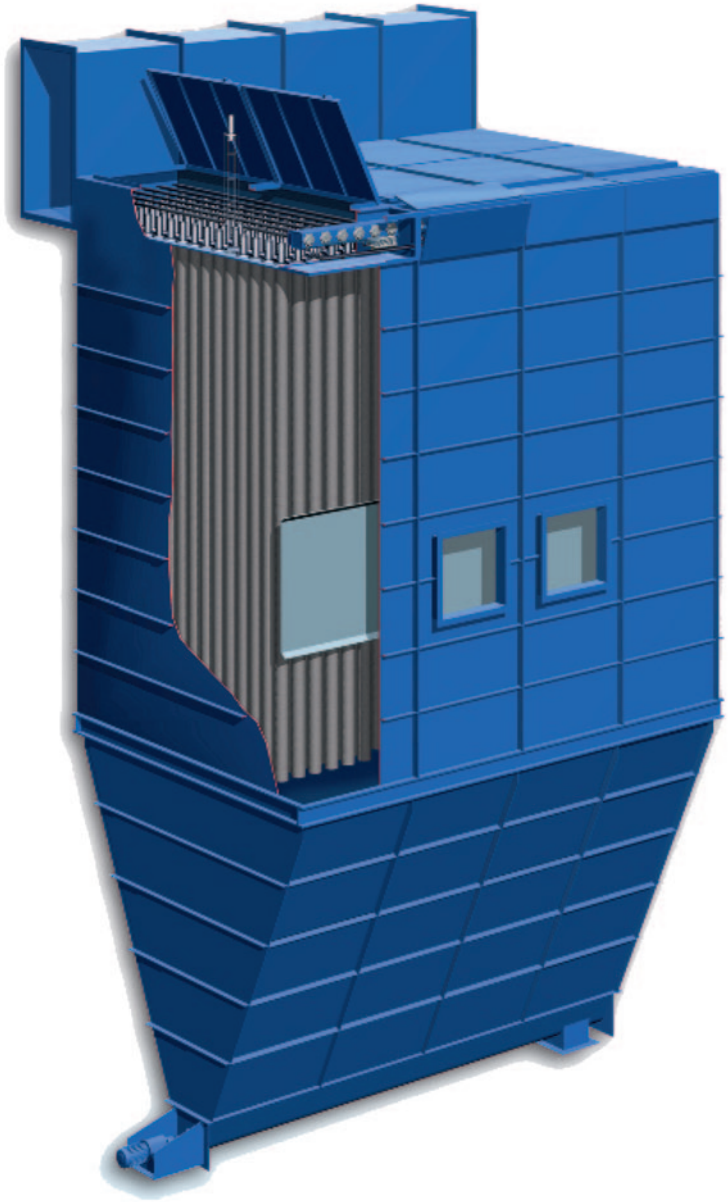
QM provides a wide range of environmental solutions. Dust emission and spillage from conveyors is a major concern for many screening and crushing plants.

The environmental production requirements are getting more stringent each year. Controlling dust is important not only to safeguard the environment, but also to protect operational personnel. Dedusting plants from QM ensure that dust emissions are kept to a minimum. Furthermore the final product is cleaner in regards to fines.

Using highly efficient, state-of-the-art filter systems from ELMA Favorit Filter (Germany), is key to ensuring that QM's systems offer the highest availability and well-proven systems to its clients. With many years of experiences, QM can provide a solution for every application. Using self-cleaning bag filter systems, the maintenance costs are at a very low level, and the same applies for operational costs. With over 45 plants in operation QM is able to source from a huge range of experiences and can provide the right solution for each application.

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

Quarry Mining is an ideal partner whenever customers need support for environmental solutions, filter systems, and sifter systems. All systems are compatible with QM's standard plants as well, and can be integrated to every individual plant.



WAMGROUP advances in dust control: compact units, committed to a cleaner and safer industry

As the dry bulk handling industry continues to evolve in response to increasingly stringent environmental regulations and heightened awareness of workplace safety, effective dust control is no longer optional — it is essential. In this context, WAMGROUP S.p.A., a global expert in bulk solids handling, mixing and dust filtration technology, is setting the benchmark for innovation with a portfolio of stand-alone and spot dust filters designed to meet the most pressing challenges of the industrial landscape.

WAMAIR stand-alone.

Reimagining dust filtration for market needs

In traditional setups, centralized dust collection systems have been widely adopted. However, WAMGROUP has seen a growing shift toward spot and stand-alone filter units, which offer several clear advantages in terms of efficiency, safety, and environmental sustainability.

In these systems, dust is filtered directly at the source — where it is generated — and is then immediately reintroduced into the process. This minimizes waste and ensures a clean working environment around the equipment. Such equipment also eliminates the need for extensive ducting, which reduces energy losses due to pressure drop and simplifies system design.

From a practical standpoint, these compact units are easier to maintain, often without requiring highly specialized personnel. They are ideal for facilities with space constraints or those seeking to reduce their environmental footprint while maintaining operational flexibility.

A proactive approach to environmental stewardship

Dust emissions in dry bulk handling are a serious environmental concern. Fine particles released into the atmosphere contribute not only to visual pollution but also to air quality degradation, affecting local ecosystems and communities. Certain types of dust, depending on their composition, can even be classified as hazardous and subject to regulatory limits on emissions.

WAMGROUP's spot filtration units, by capturing dust at the source, significantly reduce fugitive emissions, helping


WAMFLO silo venting filter.

Handle bulk with efficiency and reliability

Pneumatic and mechanical ship (un)loaders
Up to 2500 tph for loaders and up to 1200 tph for unloaders.

Low noise & no dust emission
Turnkey solutions for cereals, soy flour, fertilizer, pellets and more...

SCAN ME

VIGAN

Comparison of a plant with spot filters (left) versus one without.

customers comply with air quality standards such as ISO 14001, ATEX, and various national clean air regulations. The recycling of filtered dust back into the process also reduces landfill waste and material loss, supporting a circular economy model in production environments.

Moreover, the company's ongoing research into nano-fibre filter media has led to dramatic improvements in filtration efficiency. These advanced materials are capable of capturing submicron particles with high reliability, reducing the environmental impact of even the most demanding processes.

Prioritizing employee health and workplace safety

Airborne dust isn't just an environmental issue — it's a critical occupational hazard. Prolonged exposure to fine dust can lead to serious health conditions such as silicosis, respiratory allergies, and even certain forms of cancer, depending on the materials handled. It can also create slippery or explosive atmospheres, posing serious safety risks to employees and equipment.

By enabling localized filtration, WAMGROUP's equipment solutions greatly reduce the concentration of airborne dust near operating personnel. This leads to cleaner, safer work environments with improved visibility, better air quality, and lower risk of respiratory exposure.

The company also places strong emphasis on ease of maintenance and operational safety. Many of the stand-alone units are designed for tool-free access, equipped with features like automatic cleaning systems (pulse jet), and offer easy filter element replacement. This reduces downtime, prevents unnecessary exposure to dust during maintenance, and supports a culture of safety in the workplace.

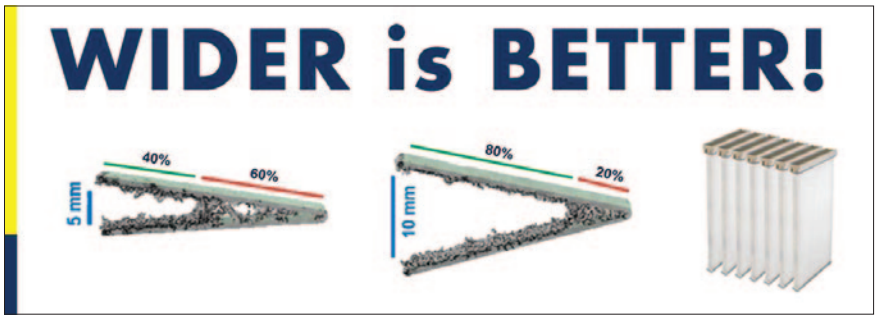
Built to last: filters for the harshest environments

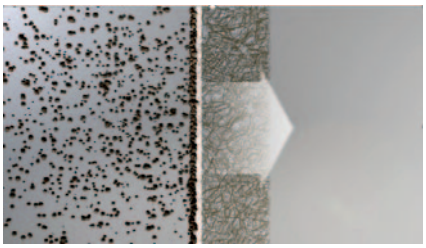
Industrial environments can be harsh — exposure to moisture, corrosion, abrasion, or high temperatures is common. To meet these challenges, WAMGROUP offers dust filtration units with stainless steel casings, ensuring exceptional durability and long service life even in the most extreme conditions.

These robust materials not only extend equipment lifespan but also reduce the risk of leaks or failures that could lead to uncontrolled emissions or hazardous dust accumulation. This reinforces the system's reliability and further aligns with environmental compliance goals.

Innovative filter design for lasting performance

Dust filtration efficiency is not only about the quality of the media but also the geometry and structure of the filter elements. WAMGROUP has invested in advanced R&D to develop semi-open and open-profile geometries that ensure a useful filtering surface area extremely close to the theoretical maximum. This design innovation delivers consistently high filtration performance over time and reduces the frequency of filter media replacement.





Applying nano-fibre to standard filter media improves overall filtration performance.

Combined with the nano-fibre filter technology, this results in a powerful system capable of addressing a wide range of industrial dust challenges — from fine powders to abrasive or sticky materials — with minimum maintenance and exceptional operational continuity.

Specialized solutions for every application

WAMGROUP recognizes that every facility has unique requirements. That's why its filtration solutions are available in multiple configurations — round or polygonal, vertical or horizontal installation, with various discharge systems (e.g., bin, rotary valve, screw conveyor). The company also offers an extensive range of filter media types, each selected based on the properties of the dust and the demands of the process.

Whether in cement, food, chemical, plastics, or mining industries, WAMGROUP provides specialized, high-efficiency filter units that offer peace of mind in terms of compliance, performance, and sustainability.

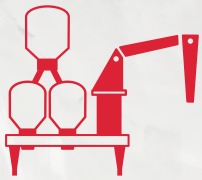
Conclusion

As environmental regulations tighten and expectations for worker safety grow, companies must act decisively to manage dust emissions. WAMGROUP's stand-alone and spot filters — compact, customizable, and technologically advanced — are not only a smart investment in efficiency, but a meaningful step toward a cleaner planet and a safer workplace.

The open-profile geometry of WAM filter media maximizes the filtering surface area.

The answer to your bulk handling questions

Ship unloaders



Road mobile ship unloaders

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Convey units

Truck loading

Ship loaders

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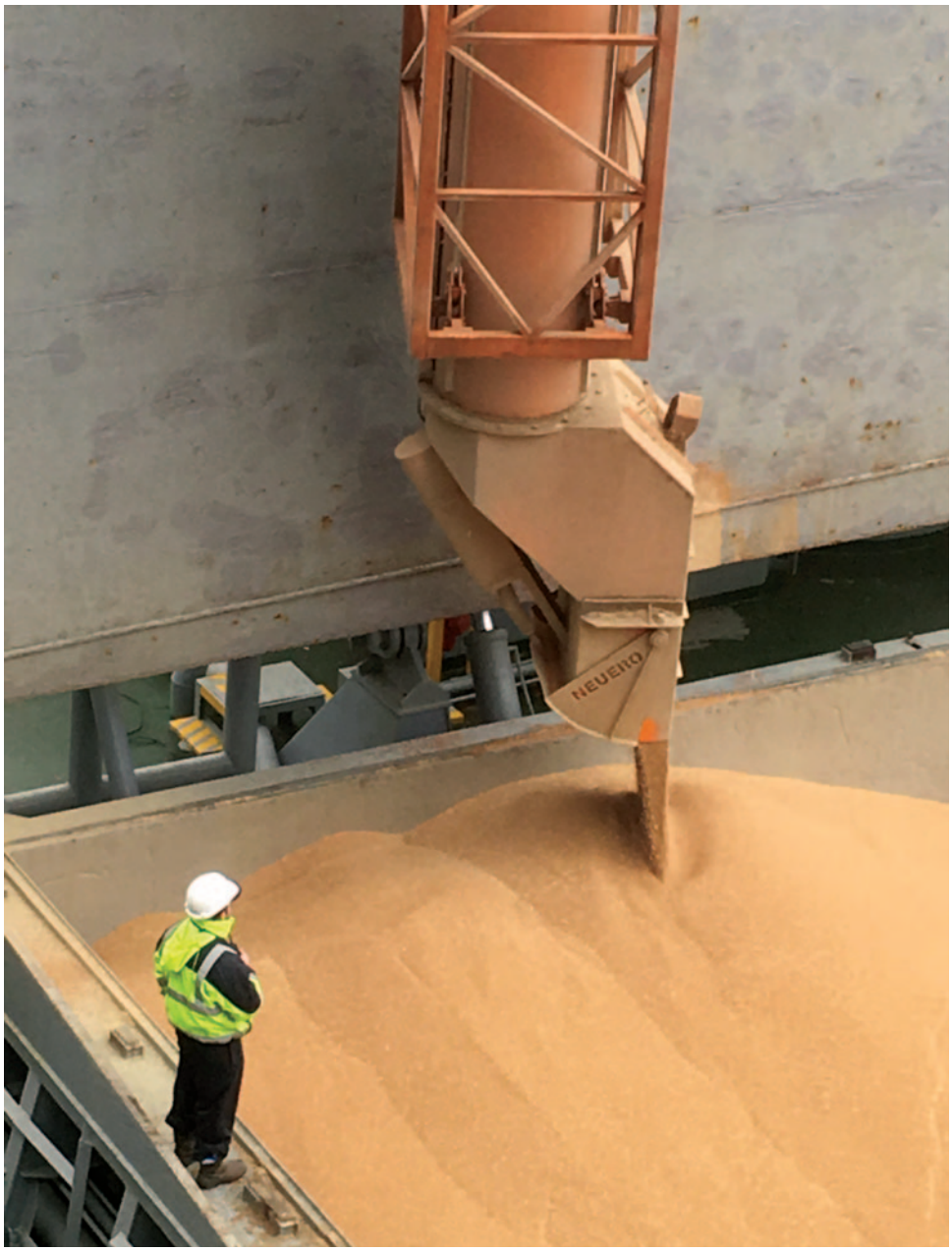
VAN AALST
BULK HANDLING

NEUERO DLH Dustless Loading Head – a global solution for efficient dust suppression

Simplicity meets technology in dust control

As industries face increasing environmental responsibility and stricter air quality regulations, NEUERO has responded with a forward-thinking solution that is transforming loading operations around the globe: the DLH Dustless Loading Head. Designed for versatility and efficiency, the DLH system minimizes dust emissions in both mobile and stationary applications — proving itself to be a valuable tool in the ongoing effort to improve air quality in ports, terminals, and bulk handling facilities.



A modular system with broad application

The DLH system is engineered for adaptability. While the core functionality is optimized when combined with NEUERO's KIKO (kick-in/kick-out) pendular movement in mobile installations, it is a necessary key component in stationary systems, where dust suppression should not reduce efficiency and flexibility. In traditional set-ups, vertical positioning may be a secondary mode of operation. However, the DLH proves its value even here, offering mass flow performance in systems mounted on silo walls or towers. The system's hanging configuration combined with pendular movement ensures coverage of the hatch area without requiring additional horizontal travel — offering operational safety, simplicity, and efficiency.

Technology behind dust reduction

Dust elimination may be physically impossible due to wind displacement or product surface dust. However, NEUERO's DLH significantly reduces emissions in all loading scenarios, particularly during the critical final trimming stage. To tackle hard-to-reach corners, the rotating DLH option enables fine adjustment of the material flow angle — keeping the discharge aligned with the hatch.

At the heart of its dust-suppressing efficiency is a controlled mass flow approach. The slow, regulated material flow prevents segregation and limits dust dispersion. Unlike systems relying solely on fast discharge and high-volume suction, the DLH prioritizes flow control, minimizing dust at the source.

Design highlights

The DLH system stands out due to its intelligent, minimalistic design:

- Loading head with built-in flow-regulation valve.
- Telescopic pipe, typically two sections (three-section variants also available).
- Vertical boom equipped with hydraulic cylinders for KIKO pendular movement.
- Own winches powering all functions with robust construction and standardized components.
- Smart control system, fully developed and continuously optimized in-house.

This low-maintenance and highly efficient design ensures not only reduced dust emissions but also increased uptime, easier handling, and long-term reliability.

Proven worldwide

Already implemented in multiple installations worldwide, the DLH has contributed significantly to global air quality improvements in grain terminals and bulk handling operations. With each new project, the system is refined, proving that simple solutions, when engineered with insight and care, can lead to extraordinary environmental outcomes. DCi

Going through the right channels

to find efficient, high-tech conveyor systems

Louise Dodds-Ely

De Regt Conveyor Systems develops full tailor-made conveying installations

Since 1988, De Regt Conveyor Systems B.V. has been a respected specialist in the design, production, installation, and maintenance of internal conveyor systems and storage solutions for both bulk handling and general cargo transportation. With over 35 years of experience, the company has built a strong reputation both nationally and internationally. What started with the production of the first conveyor belt has evolved into the delivery of complex, tailor-made installations fully customized to the specific needs of its clients.

The team at De Regt is available 24/7 to support customers and delivers fully integrated turn-key projects, bringing together all the necessary knowledge and experience to ensure smooth and efficient execution of all projects.

The company's mission is to offer the most effective and efficient solutions, perfectly tailor-made to the customers' requirements, thereby ensuring continuity

and reliability in their operations.

Tailor-made solutions for bulk handling and processing

De Regt Conveyor Systems designs and manufactures both mobile and stationary installations for a wide range of applications in the bulk handling and recycling industries. The product range includes stacker conveyors, mobile conveyors, mobile crushers for fertilizers, weighing hoppers, hoppers, eco hoppers, and ship-unloading systems for dredgers. The company also supplies conveyor systems in various lengths — from just a few metres up to several hundred — suitable for ground-level or elevated installation.

Applications and target industries

The installations by De Regt Conveyor Systems are used for processing fertilizers, agricultural products, minerals, and salt, among other materials. The main client groups include bulk handling companies, raw material and fertilizer producers, and recycling firms. Thanks to its broad product range, the company can provide solutions for both large-scale bulk handling and precision separation processes.

Innovative custom-built solutions

De Regt Conveyor Systems can distinguish itself through continuous innovation and customer-focused engineering. By working closely with clients and actively monitoring

technological developments, the company delivers systems that are perfectly aligned with changing market demands. A recent example is the further development of the DRH hydraulic hopper, now optimized for fluctuating capacities during shiploading and unloading — a common challenge in port operations.

In addition, De Regt Conveyor Systems develops separation systems for recovering metals from incinerator bottom ash or mining residues, concrete separation. It also designs a range of dust reduction systems. All installations are custom-built and tailor made to the client's situation and demands.

Recent projects

De Regt Conveyor Systems recently designed and delivered two advanced installations for Marcor Stevedoring BV: a high-performance ECO hopper and a precision-engineered weighing bunker.

Both systems were fully tailor made to the customer's operational and technical requirements. These are clear examples of De Regt Conveyor Systems' custom engineering capabilities.

ECO hopper: efficient unloading system with dust control — and bi-directional conveyor system

The ECO hopper is designed for the

efficient unloading of ships carrying bulk materials such as agribulk, biomass, petcokes, minerals, fertilizers, and phosphate rock. With a capacity of 750tph (tonnes per hour) and a hydraulically powered mobility of 0.5km/h, the installation combines power and flexibility.

It is equipped with a shore power connection featuring an automatic cable reel, a bi-directional conveyor belt, and a control cabin with joystick operation. To control dust emissions, a flip/flap system is installed in the hopper along with a dust-reduction hopper at the conveyor belt.

For challenging materials such as phosphate rock, four powerful air cannons have been installed, operated by two 11kW screw compressors, effectively preventing clogging. This advanced installation ensures a clean, safe, and highly efficient working environment.

Weigh bunker: precise dosing with intelligent control

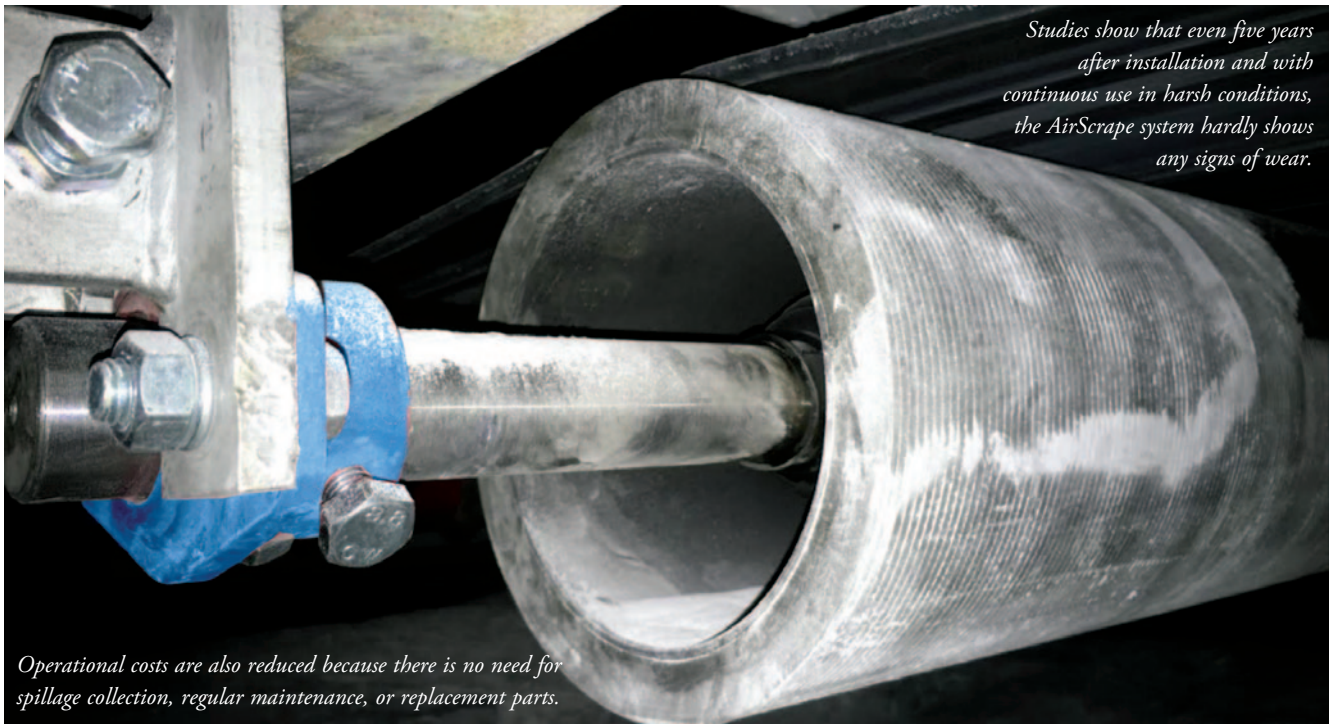
The delivered weigh bunker also has a capacity of 750tph and is suitable for various bulk goods. It is constructed from S235 structural steel with stainless steel components and mounted on a mobile frame that can be leveled using four hydraulic cylinders.

The system includes a certified weighing system featuring the IT8000E indicator and four C3 load cells, providing exceptional accuracy (maximum deviation of 0.19%). Underneath the bunker is a 15-metre-long conveyor belt equipped with a weather cover, a 22kW drum motor, and pneumatically controlled double discharge gates for precise material flow.

A filter system with compressed air cleaning and integrated tracing is included to prevent moisture accumulation during standstill. The installation meets all VCA (Safety Checklist Contractors) safety requirements and is fully enclosed for safe operation.

With these projects, De Regt Conveyor Systems demonstrates its ability to translate complex customer requirements into robust, efficient, and safe custom-built solutions. Both the ECO hopper and the weigh bunker are strong examples of innovative installations that are ready for the future.

Innovative solutions for conveyor systems from ScrapeTec



Studies show that even five years after installation and with continuous use in harsh conditions, the AirScrape system hardly shows any signs of wear.

Operational costs are also reduced because there is no need for spillage collection, regular maintenance, or replacement parts.

Companies around the world are continually looking for more efficient, dependable systems to alleviate problems associated with dust generation and belt misalignment in bulk handling. Common difficulties include dust, spills and contamination at the transfer points of conveyor systems. Misalignment, abrasion and subsequent belt damage are other problems that the industry faces.

The ScrapeTec team — with more than 30 years in the global bulk handling sector — has developed advanced solutions for conveyor systems used in diverse sectors, including the handling of difficult bulk materials, like cement, fertilizer, coal and minerals.

Scrapetec's Airscrape system prevents dust formation, reduces material spill, enables thorough belt-cleaning and minimizes the risk of explosion at critical sections along the conveyor route and at transfer points.

Also in the range of ScrapeTec conveyor components, is the PrimeTracker belt tracker, which eliminates other problems associated with conveyor belt systems, including misalignment, abrasion and belt damage.

Conventional dust control measures — which include side seals, covers, shrouds or enclosures around a dust source — do help to suppress dust generation and dispersal in the short-term, but many of these measures quickly wear-out as a result of friction and can damage the belt of the conveyor during extended periods of use.

"ScrapeTec specialists have discovered substantial benefits when combining the ScrapeTec Airscrape and PrimeTracker belt tracker on a conveyor system," explains Thorsten Koch, Sales and Distribution for ScrapeTec. "The PrimeTracker ensures the belt is constantly in the correct position during operation, thus eliminating problems with belt mistracking, while the Airscrape efficiently controls dust, prevents material spill and minimizes explosion risks.

"Correct installation of this highly-efficient equipment ensures optimum performance, reduced risk of explosion, low maintenance and extended service life of the conveyor system."

Efficient dust control

The contact-free AirScrape conveyor belt skirting system is a highly-effective side seal that lies over the conveyor belt, without contact and creates negative pressure on the belt, due to its specially designed lamella 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.

The AirScrape system encompasses inward facing, hardened-steel diagonal blades and operates according to an advanced principle where it hovers 1–2mm, on the left and right side above the conveyor belt.

These blades deflect larger particles inwards, while using the air-flow of the conveyor belt and conveyed material to create an inward suction, forcing any dust and fine particles back into the product flow. Through these diagonally fitted plates and the speed of the running belt, air is drawn from the outside inwards. As a

Airscrape: the contact-free Airscrape® conveyor belt skirting system, which significantly reduces material spill, dust formation and explosion hazards at transfer points and other critical sections in the conveyor chain.

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result, neither the dust nor material can escape.

Conventional skirting is pressed against a conveyor belt to keep dust and material in the middle of the belt, but after a period, wear of the skirting and belt can be so severe, that material and dust escapes. Material spillage at transfer points needs to be removed and regular maintenance of belt skirting and transfer points is necessary.

With the AirScrape dust-free and contact-free, side-sealing system for belt conveyors, there is no skirt contact and therefore no belt wear or damage. Motor power requirements are reduced as there is no belt-skirt friction and because there is continuous skirting with no gaps, product loss is minimal.

This system is fitted using spacers, floating the blades just above the belt and is attached to the outside of the chute by utilizing existing skirt clamps or a simple bolt and nut system. It is longitudinally adjustable to follow the contours of conveyor belt rollers and the belt trough angle.

Benefits of installing belt tracker

For optimum performance of a conveyor system, it is critical that the belt always runs straight on the conveyor, without sideways movement.

ScrapeTec's PrimeTracker belt tracker has been designed to automatically guide a conveyor belt back into the correct straight-line position, to prevent costly downtime and component replacement.

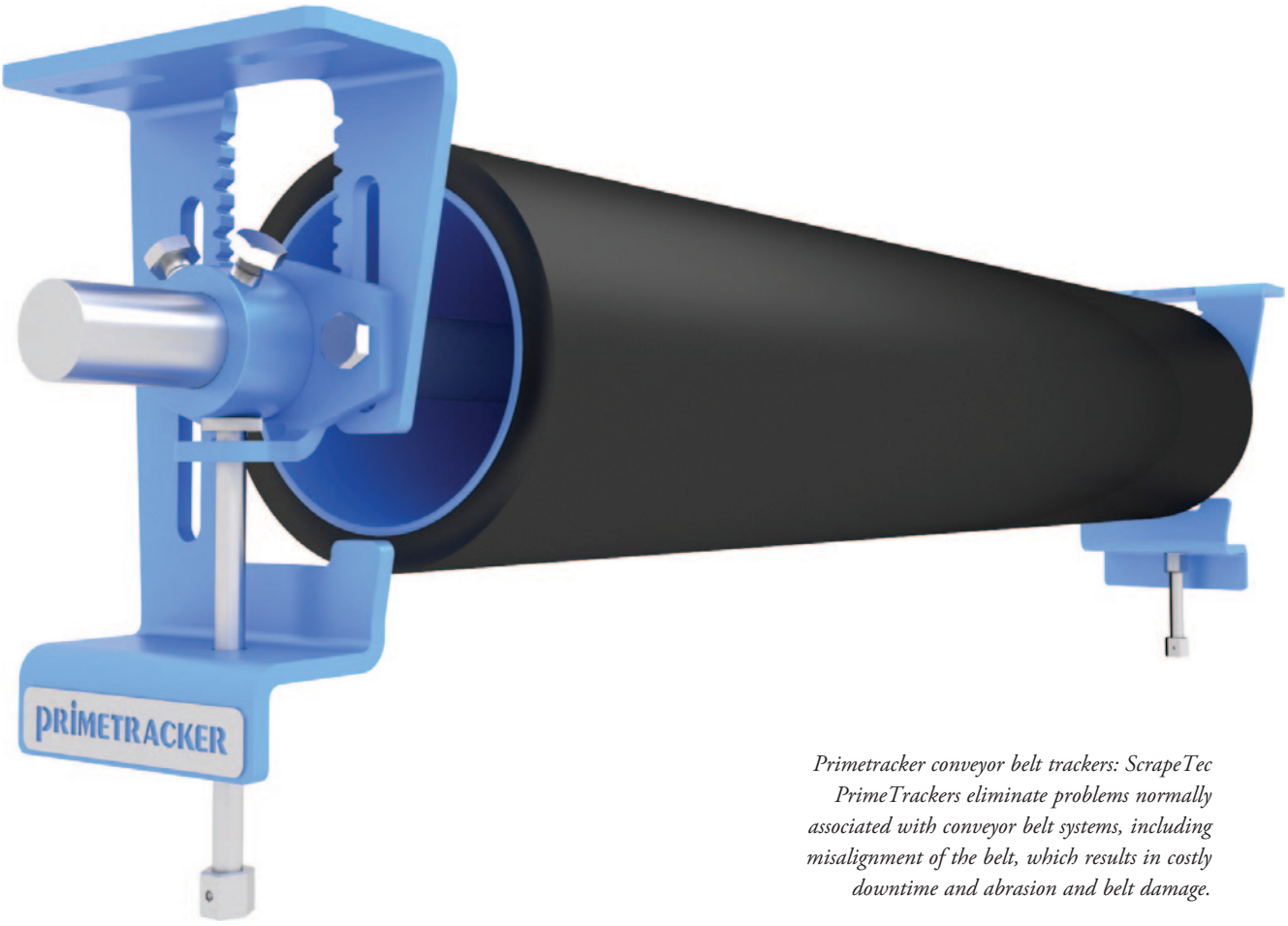
An advantage of this device is that it is operates in the idling position at all times, unless there is sideways movement of the belt. This system corrects misalignment immediately, by guiding the belt back into the correct position, with no damage or abrasion to the belt or tracker. This is unlike conventional belt trackers that slide over the belt surface causing possible abrasion and belt damage — rather than adopting free rotation. Conventional belt trackers, with tapered edges, never idle and are always in a braking mode.

What's also notable, is the cylindrical shape and pivot bush that allow this belt tracker to swing and tilt during operation and to always be in full contact with the belt. Added to this, the ScrapeTec PrimeTracker has the same peripheral speed over the entire surface of the belt, where traditional crowned rollers have different speeds at the centre and edges of the system.

Other advantages include easy installation, low maintenance requirements and protection of belt edges and structure of the conveyor belt. A strong corrugated EPDM rubber hose protects this system from dust and sand, while the rubber pivot offers soft suspension of the tracker shaft, ensuring extended service life of the system. This system can be installed in front of every return pulley, above and below the belt.

In close co-operation with ScrapeTec experts, global distributors provide an assessment and solutions service to customers in diverse sectors, for planning and implementing projects. A technical advisory and support service enhances performance of every ScrapeTec system.

These advanced conveyor systems — which meet stringent quality, safety and environmental standards — are available directly from ScrapeTec and from carefully selected distributors around the world.



Primetracker conveyor belt trackers: ScrapeTec PrimeTrackers eliminate problems normally associated with conveyor belt systems, including misalignment of the belt, which results in costly downtime and abrasion and belt damage.

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martin® engineering

ProStack launches new conveyor range to serve smaller operations

ProStack®, a major provider of bulk material handling solutions, has unveiled a new range of tracked conveyors designed specifically for small to medium-sized operations. These new models offer a shorter conveyor length than the existing ProStack range, delivering greater choice without compromising on performance.

The latest additions include the TC 50, TC 60, and TR 60 — tracked conveyors measuring 50ft (15m) and 60ft (18m), including a radial option. These models are engineered for efficient stockpiling and are ideal for operations where space, mobility, or budget constraints are key considerations.

"This new range allows us to fill a gap in our portfolio with conveyors that are better suited to smaller-scale operations," said Neil Robinson, Business Line Director at ProStack. "They're compact, competitively priced, and tailored to meet the needs of a wider customer base."

The new conveyors complement the broader ProStack line-up, which includes tracked feeders, bulk reception feeders, port hoppers, and telescopic conveyors. With this launch, ProStack continues to expand its offering to meet evolving customer demands.

The new range is available globally through ProStack's distribution network.

About Terex

Terex Corporation is a global industrial equipment manufacturer of materials processing machinery, waste and recycling solutions, mobile elevating work platforms (MEWPs), and equipment for the electric utility industry. It designs, builds and supports products used in maintenance, manufacturing, energy, minerals and materials management, construction, waste and recycling, and the entertainment industry. The company provides best-in-class lifecycle support to customers through its global parts and services organization, and offers complementary digital solutions, designed to help customers maximize their return on their investment. Certain Terex products and solutions enable customers to reduce their impact on the environment including electric and hybrid offerings that deliver quiet and emission-free performance, products that support renewable energy, and products that aid in the recovery of useful materials from various types of waste. Terex products are manufactured in North America, Europe, and Asia Pacific and sold worldwide.

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Innovative Spillage Control solutions from Schulte Strathaus make conveying cleaner and safer – and more environmentally friendly

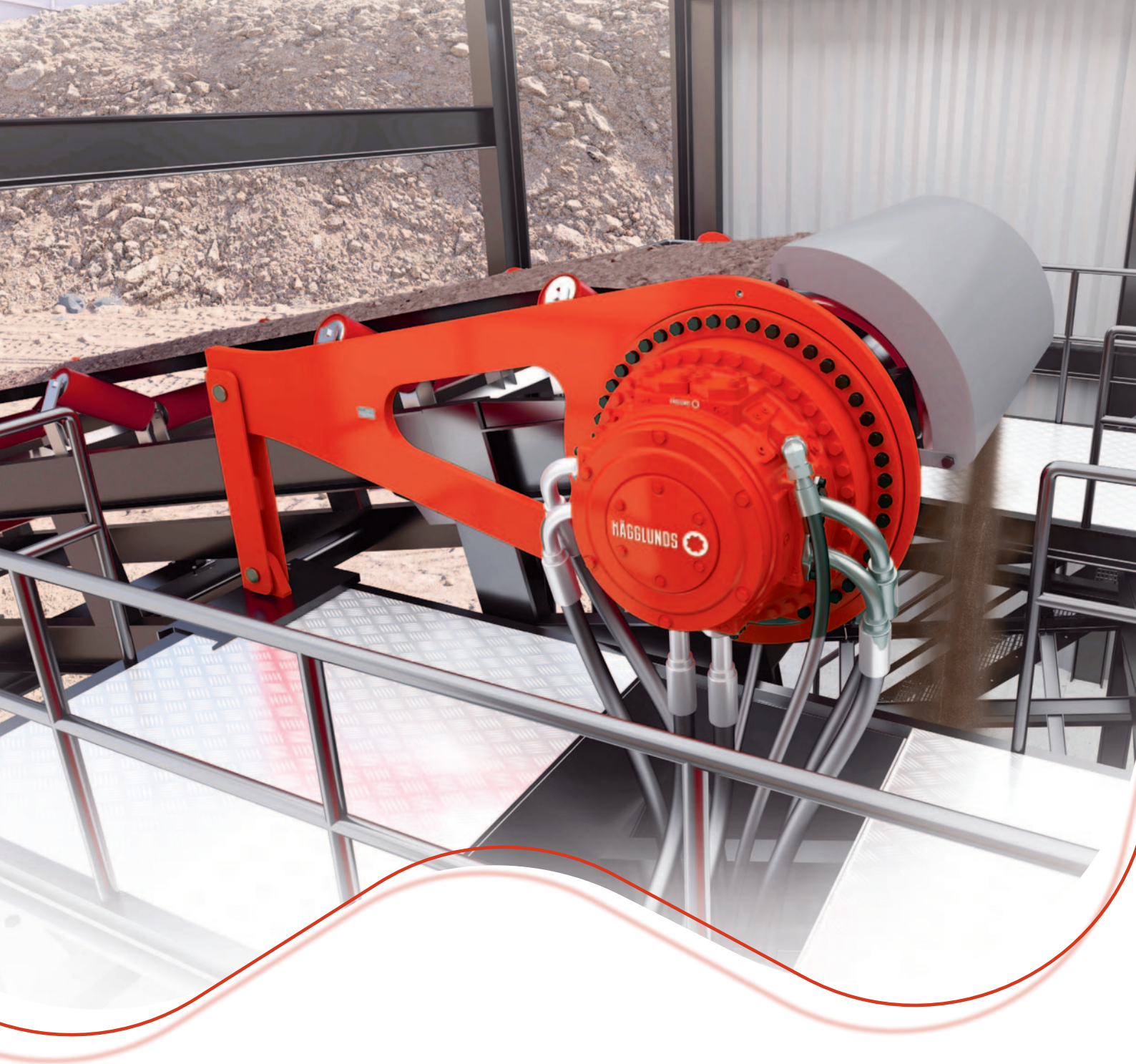
STARCLEAN® products by Schulte Strathaus help users to transport bulk material in a safe, clean and reliable way. The company's innovative 'Spillage Control' solutions ensure that conveyor belts enjoy a long, trouble-free life. The path to efficient bulk material conveying and optimization of the cost-effectiveness of belt conveyors includes proper conveyor belt cleaning, reliable conveyor belt centreing, and sealing of the system.

The STARCLEAN® system provides a comprehensive solution that offers numerous advantages. Optimization of the entire plant system and intelligent, efficient material flow control enable economical bulk material conveying. At the same time, dust generation, which is harmful to the environment and health, is reduced and the service life of the conveyor system is significantly increased.

Key elements of the STARCLEAN® Spillage Control System are the conveyor belt scrapers. The scrapers ensure proper and gentle cleaning of the conveyor belt. Thanks to the innovative TWIST-SWING® mechanism, the scrapers adapt optimally to the belt during operation and protect it from damage. Due to the low wear of the scrapers and the efficient cleaning of the conveyor belt, the service life of both components is significantly extended. This leads to a reduction in replacement and maintenance costs. In addition, the scrapers blades can be replaced without tools when it is necessary to change the wear parts.

To support the spillage control process, STARCLEAN® additionally offers impact systems that absorb the drop energy of the bulk material, protecting the belt from damage when the material is dropped onto the conveyor. In addition, STARCLEAN®'s tracking systems provide reliable centreing of the conveyor belt in the event of mistracking to avoid material loss.

Particularly important in terms of sustainability is the reduction of dust. STARCLEAN® offers flexible transfer point seals that minimize dust leakage and prevent contamination at transfer points. These seals not only allow for a cleaner working environment, but also contribute to the efficient guidance of



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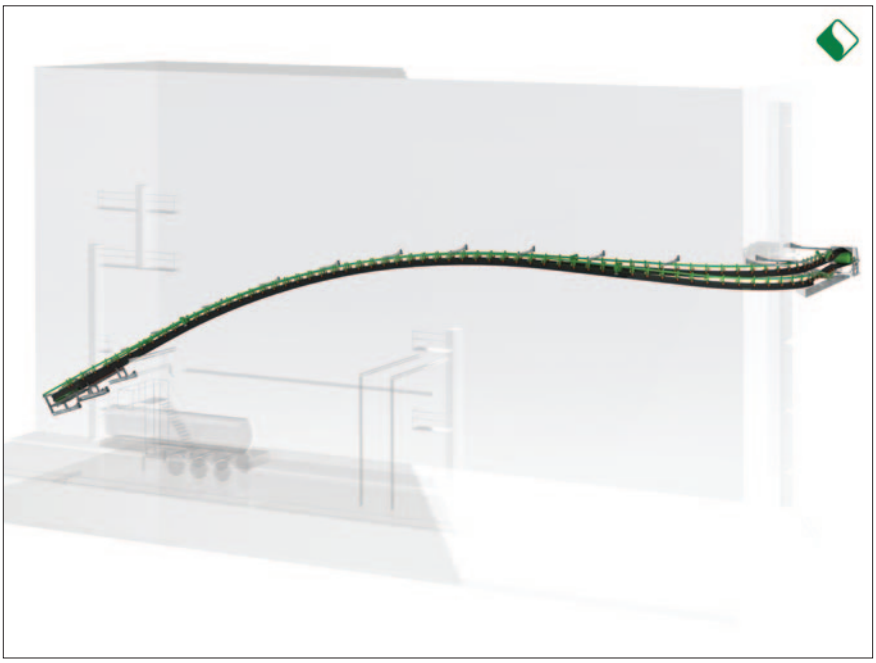
the bulk material.

An innovative product in the STARCLEAN® Spillage Control portfolio is the new STARCLEAN® Smart Scraper. This unique automatic scraper with intelligent cloud dashboard provides early damage detection on the conveyor belt as well as a predictive scraper belt maintenance system through automatic wear detection. Thanks to this digital innovation, the scraper can automatically self-regulate the pre-tensioning load. This leads to improved performance and a longer service life of the conveyor belt. Detection of belt damage prevents unscheduled conveyor downtime and thus avoids costly production stops. Information is received in good time by email or SMS. Further actions like stopping the conveyor can be implemented.

In addition to the individual conveyor belt components, STARCLEAN® also offers a complete belt conveyor system — the SAFEBELT® — a closed conveyor belt that protects the bulk material from weather conditions and external influences. The SAFEBELT® can cope with tight curve radii and steep inclination with minimal space requirements. At the same time, the escape of dust and liquids is almost completely prevented, and odours remain enclosed in the conveyor belt. This results in an environmentally friendly and efficient transport of the bulk material, thus protecting the environment and people.

STARCLEAN® gives companies the opportunity to take their bulk material conveying to a new level. The innovative Spillage Control solutions not only ensure safe and reliable conveying, but also optimize the economic efficiency of the belt conveyor. Efficient material flow control, perfect conveyor belt cleaning and reliable centreing of the conveyor belt increase productivity and minimize downtime. At the same time, STARCLEAN® contributes to environmental protection by preventing dust generation that is harmful to the environment and health.



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TMSA: driving innovation and sustainability in bulk handling

TMSA's enclosed belt conveyors and the 4.0 digital revolution

Developing efficient and sustainable solutions for transporting solid bulk materials in ports, terminals, and industrial facilities is one of modern engineering's foremost challenges. Millions of tonnes of bulk products are handled every year, requiring robust, safe systems with minimal environmental impact. In this context, TMSA – Tecnologia em Movimentação S/A stands out as an expert in high-capacity equipment, combining innovation with practices aligned with ESG (Environmental, Social, and Governance) principles.

Since 1966, TMSA has delivered reliable solutions for the port, mining, and agribusiness sectors, maintaining a strong presence throughout Brazil and the Mercosur region. The company is headquartered in Rio Grande do Sul, with branches in São Paulo and Minas Gerais, and an advanced operations unit in Argentina.

One of its highlights is its portfolio of enclosed belt conveyors, designed to ensure environmental responsibility, emission control, and energy efficiency. Engineered for dust-tight operation and minimal spillage, these systems reduce waste, improve industrial organization, and foster sustainable practices.

The product portfolio includes four different models:

- Conventional Enclosed Belt Conveyors;
- Multi-Product Conveyors;
- Air-Supported Return Conveyors; and
- the newly introduced spool belt Conveyor.

The **Conventional Enclosed Belt Conveyor** is optimized for transporting grains and derivatives, featuring belt return over UHMW and an automatic self-cleaning system. The Multi-Product Conveyor is designed for hygroscopic products like sugar, incorporating side access doors for cleaning and a roller supported belt return path.

The **Air-Supported Return Conveyor** introduces an innovative technology that uses a thin air film under the return belt. This system drastically reduces belt friction, extends component lifespan, lowers power consumption, and significantly improves operational efficiency. Ambient air is directed into the system plenums and released through micro-perforations, creating an air cushion that supports the belt and minimizes mechanical friction.

The **Spool Belt Conveyor** is engineered for medium-duty operations and offers an excellent cost-benefit ratio. Its robust design makes it ideal for many applications where reliability, operational safety and dust emission control are necessary.

Regardless of the model, all bearings are mounted externally, preventing internal overheating and ignition points — solutions that minimize explosion risks and simplify preventive maintenance. All equipment complies with safety standards such as Brazil's NR-12.

TMSA 4.0: THE DIGITAL TRANSFORMATION OF THE BULK HANDLING SECTOR

Beyond mechanical engineering, TMSA is a pioneer in bringing Industry 4.0 technologies to the bulk handling sector. Through the TMSA 4.0 programme, the company promotes tangible gains in safety, energy efficiency, and cost reduction — pillars that directly support ESG commitments.

Among the main innovations is remote service via connection to the equipment's PLC. This allows immediate access to control logic, real-time diagnostics, and remote technical guidance, reducing travel, extending asset lifespan, and improving operator training through real-time, on-the-job learning.

The TMSA Noctua IoT platform is a cloud-based industrial Internet of Things (IoT) system that continuously monitors key parameters such as temperature, vibration, and system performance. This technology enables practical application of predictive maintenance, reduces environmental impact and minimizes the total cost of ownership.

ADVANCED SOLUTIONS FOR SHIPLOADING

In the shiploader segment, TMSA incorporates cutting-edge technologies such as collision prevention systems, remote control via HMI, and operational training using augmented reality (AR). AR allows operators to train in simulated environments without interrupting real equipment operation, ensuring safety and efficiency from day one.

ESG AND A COMMITMENT TO THE FUTURE

TMSA's operations embody a firm commitment to ESG principles. Projects are designed to minimize emissions, reduce waste, and operate with low environmental impact. The use of energy-efficient technologies, remote services that eliminate unnecessary travel, and equipment with longer service life are practical examples of these principles in action.

Moreover, the company uses 100% renewable electricity and collaborates with partners committed to ethical governance and environmental stewardship.

In a sector where reliability, sustainability, and innovation converge, TMSA delivers high-performance integrated solutions for the transportation of solid bulk materials. Its enclosed systems and digital tools show that productivity, safety, environmental responsibility, and industrial intelligence can coexist on the same platform.

Whether in engineering, digital transformation, or sustainable operations, TMSA is equipped to address today's demands and proactively respond to the challenges of the future.

Continental's SICON enclosed conveyor system is ideal for environments conventional belts cannot navigate

Continental's SICON conveyor belt system offers a unique combination of flexibility, cleanliness and efficiency. Designed for industries where space is limited and routing is complex, SICON excels in environments that conventional conveyors cannot navigate — thanks to its ability to handle tight 180° curves with a radius of less than one metre.

This capability is made possible by the system's innovative belt design. The SICON belt folds into a closed, pear-shaped tube, enclosing the conveyed material completely. Steel rope reinforcements are vulcanized into the belt's profiles, absorbing all tensile forces and guiding the belt through curves and elevation changes. When the belt is folded, the steel ropes are positioned one above the other, ensuring that both follow the same radius in curves. This structural symmetry allows the belt to maintain stability and alignment even in the sharpest turns, enabling the system to maneuver through confined spaces, around obstacles, and along highly customized paths.

This extreme routing flexibility is a defining advantage of SICON, particularly in retrofit projects or urban and underground installations where space constraints and existing infrastructure limit the use of traditional conveyors. The ability to execute 180° turns without transfer points not only reduces the system's footprint but also eliminates spillage, minimizes dust emissions, and lowers maintenance requirements.

SICON is available in two main configurations: the S100 and the S1000. The S100 features a profile size of approximately 25 x 25 millimetres, belt widths from 650 to 1,200mm, and a belt thickness of 5mm, supporting capacities from 10 to 100 cubic metres per hour. The S1000, with a larger profile of approximately 50 x 50mm, offers belt widths up to 1,400mm and capacities from 100 to 500 cubic metres per hour. Both systems operate at belt speeds between 0.5 and four metres per second, with the potential to reach speed values above four metres per second depending on the application.

The system supports inclinations up to 35° and allows for material transport even on multiple loading and discharge stations, enabling complex logistics without the need for additional transfer points. Belt qualities are available for a wide range of materials, including chemically neutral or oil- and grease-containing.

SICON belts maintain stability and alignment even in sharp turns..

Each SICON installation is engineered to meet the specific needs of the site. Continental provides full technical support, including layout design, belt tension and power calculations, and detailed documentation. The system includes all mechanical components — rollers, pulleys, motors, sensors, and take-up arrangements — ready for integration. The company also has the resources to enable on-site experienced engineers who ensure proper setup and provide training for operational staff.

Best of three worlds: cleanliness of pneumatic systems, flexibility of pipe conveyors, efficiency of traditional belt conveyors

SICON has proven its value in industries such as cement, tunneling, wood and paper, glass, power generation, and food processing. In each case, its ability to navigate tight curves and complex paths has enabled operators to overcome spatial limitations, reduce environmental impact, and improve operational efficiency. Whether transporting clinker in a cement plant, pulp in a paper mill, or fish pellets in a port facility, SICON delivers clean, reliable, and space-saving performance.

With its compact footprint, routing agility, and low operational costs, SICON is a future-ready solution for modern material handling. It combines the cleanliness of pneumatic systems, the flexibility of pipe conveyors, and the efficiency of traditional belt conveyors into one integrated system. For operations facing spatial constraints and complex routing challenges, SICON offers a level of manoeuvrability and performance that sets the standard in the industry.

Superior gets patent for recirculating conveyor on Sentry® HSI plant

CENTRALIZED FEED DESIGN MAXIMIZES BLOW BAR LIFE, REDUCES COST PER TONNE FOR PRODUCERS.

Superior Industries, Inc., a US-based manufacturer and global supplier of bulk material processing and handling systems, has been awarded patent protection for a key feature on its Portable Sentry Horizontal Shaft Impactor (HSI) Closed Circuit Plant

The newly patented recirculating conveyor delivers returning material back to the HSI with a centred, uniform feed. This centralized approach ensures full utilization of the crusher's blow bars, significantly improving wear life and reducing cost per tonne in recycled concrete, reclaimed asphalt, and other crushing and screening applications.

"Uneven wear is one of the hidden killers of cost efficiency," says Devon McKinney, Superior's product manager for portable plants. "With this design, our engineers found a way to take care of the crusher and a producer's bottom line at the same time."

By contrast, other HSI closed-circuit plants commonly introduce recirculated material from one side of the crusher, causing blow bars to wear unevenly and increasing replacement frequency.

In addition to the hydraulically positioned recirculating conveyor, the Portable Sentry HSI Plant also includes these features:

- **Intrepid® Vibrating Grizzly Feeder** equipped with interchangeable grizzly cassettes (bars, fingers or punch plates) to accommodate multiple applications.
- **Two-deck Anthem® Inclined Screen** for sorting up to three sizes of material and includes extra clearance between decks, which eases human access for maintenance.
- **Universally designed cross conveyors** are fully interchangeable, allowing producers to rotate them as needed and minimize inventory requirements.

The new recirculating conveyor patent reinforces Superior's commitment to practical innovation focused on uptime, safety, and long-term cost savings.

About Superior Industries, Inc.

Superior Industries is a deeply-rooted, privately-owned American manufacturing company whose products play a pivotal role in production and transportation of ingredients used to build the world's infrastructure. Specialties include crushing, screening, washing, and conveying systems, alongside comprehensive parts and services that support robust construction aggregates production from Rock Face to Load Out®. Equipped with one million square feet of manufacturing space and more than 100 engineers, Superior is headquartered in Morris, Minnesota, with four additional production facilities in the United States, plus international manufacturing locations in Canada, Brazil, and Asia.

TAKRAF solutions: designed for unique conveying demands

Tail drive station of new extendable conveyor supplied for a backfill project in South Africa

TAKRAF Group's systems overcome the challenges of demanding operating conditions.

As demand for minerals continues to surge, the conveyor market is expected to experience sustained growth. Mine operators are turning to leading suppliers, such as TAKRAF Group (TAKRAF), for innovative conveying solutions that can withstand increasingly challenging mining conditions.

Technological advancements, such as the gearless drive concept introduced by TAKRAF Group in conjunction with ABB in recent years, not only offer improved reliability and efficiency, but also have a considerable benefit in terms of reducing a mine's environmental impact. While a notable development last year saw the Group and ABB enhance their partnership to broaden the use of Gearless Conveyor Drive (GCD) technology in TAKRAF's handling solutions, the Group has been, and still is, continually working on other developments to ensure the safety and sustainability of future mining operations. For example, the TAKRAF Maintenance Cart enables access to any location along a conveyor belt in the shortest time and safest manner possible.

Bespoke conveyor solutions

This rich history of innovation, combined with the Group's extensive materials handling expertise in complex and high-capacity materials handling, means that its services are in demand worldwide. Mining operators seek the most suitable, low environmental impact conveyor solutions for their individual requirements. With mining environments varying considerably and placing different demands on the design of a conveyor system, TAKRAF Group tailors each solution to the specific application and site conditions.

For example, the Group was awarded two projects located at high altitudes exceeding 4,000m above sea level. These projects required robust conveying solutions that could accommodate, amongst other challenges, significant temperature swings, harsh weather conditions, uneven terrain and steep inclines.

In Chile, TAKRAF Group supplied a conveying system for Minera Collahuasi's Ujina growth project, comprising three advanced conveyors engineered to operate at an elevation of 4,535m above sea level. The system connects a relocated crushing station to the mine's existing conveyor network.

Also in South America, the Group supplied a 13,200tph (tonnes per hour) conveyor system for a mine located at approximately 4,300m above sea level in the Peruvian Andes. The conveyor system, consisting of a sacrificial and a downhill conveyor, traverses extreme differences in height.

Changes in elevation also posed design challenges in a contract to supply a 6.6km underground conveyor and radial stacker for a gold mine in Mexico. The conveyor transports 800tph of ore and waste material from underground to surface for stockpiling and, while underground, travels downhill before returning uphill, covering a height difference of approximately 66m.

In Africa, the conveying solution for the extension of a backfilling system for a major South African mine backfill project required the structural design to cater for unstable ground conditions as the system would be located on previously backfilled

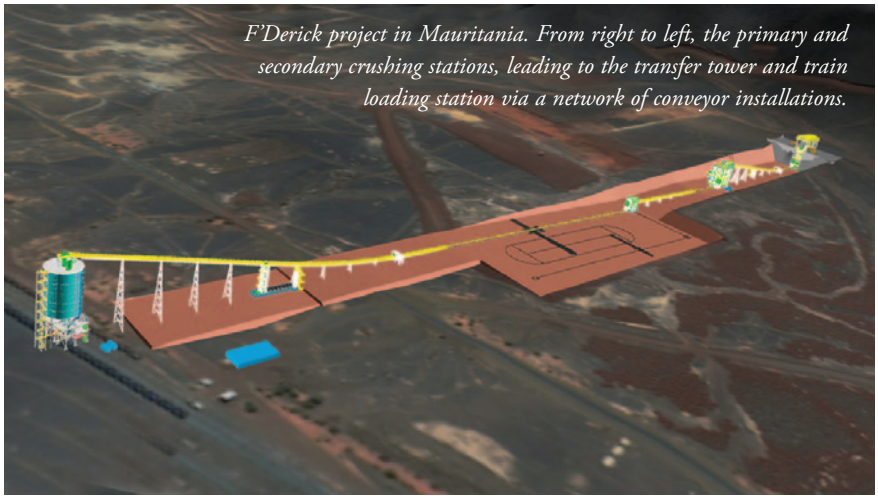
Primary crushing station and discharge conveyor previously supplied by TAKRAF for a brownfield copper project in Chile.

Head drive station of a TAKRAF Gearless Overland Conveyor in Chile.

land. As a result, the tail drive station was designed with a unique jacking mechanism that allows the height and level to be adjusted in the event of ground settlement. The system comprises a new extendable conveyor complete with auxiliary infrastructure, with the design catering for the full final length of 2,082m, although only 615m of conveyor length was installed during the project.

In Mauritania, TAKRAF Group is supplying a complex network of conveyors to link the primary and secondary crushing and train loading stations at the F'Derick iron ore project. The conveyors are part of a contract for a complete iron ore in-pit crushing, screening and material handling system, together with a train loading station, which was awarded by SNIM (Société Nationale Industrielle et Minière).

In Guinea, a complex conveyor system for the Simandou iron ore complex includes a technically sophisticated long downhill conveyor linking the secondary In-Pit Crushing & Screening (IPCC) system and the stockyard. The system forms part of a major project awarded to TAKRAF Group for an IPCC and material handling system. It follows successful completion of an earlier project in Guinea for Phase 1 of the Compagnie des Bauxites de Guinée (CBG) bauxite expansion project, which included a greenfield wagon unloading and primary crushing station, a secondary crushing station and a complex brownfield conveyor system. With the completion of Phase 1, a further two conveyors were ordered in a fast track contract to be commissioned within 10 months of the date of the award.



F'Derick project in Mauritania. From right to left, the primary and secondary crushing stations, leading to the transfer tower and train loading station via a network of conveyor installations.

The Group also recently completed a bauxite handling plant in Greece, which covered the design of a complete crushing station comprising a receiving hopper, a TAKRAF Apron Feeder, a TAKRAF Sizer and two belt conveyors. Due to the bauxite material being very cohesive with unique agglomeration characteristics, TAKRAF Group engineered a solution suited for this application, which included special features on the conveyor transfers to handle wet and dry bauxite.

Complete systems provider

As a provider of complete material handling systems, TAKRAF Group can design and install conveyors that can easily be integrated into complex systems within and downstream of mining operations. Its global reputation as a foremost specialist in conveyor solutions is reinforced by the number of milestones it has contributed to the mining industry. This includes being one of a limited number of global conveyor manufacturers boasting an operating reference in the use of advanced gearless drive technology in conveyor systems. In addition, the Group was responsible for the world's most powerful conveyer system, having delivered equipment for the principal ore transport system for Chuquicamata, one of the world's largest copper ore mines. This system, which moves ore extracted underground to an above-ground processing plant, has a total installed drive power of 58MW.

Innovation out of tradition — it pays to talk to a specialist.

Belt conveying system supplied as part of a bauxite handling project in Greece.

Keeping conveyors online with cleaning systems from HOSCH

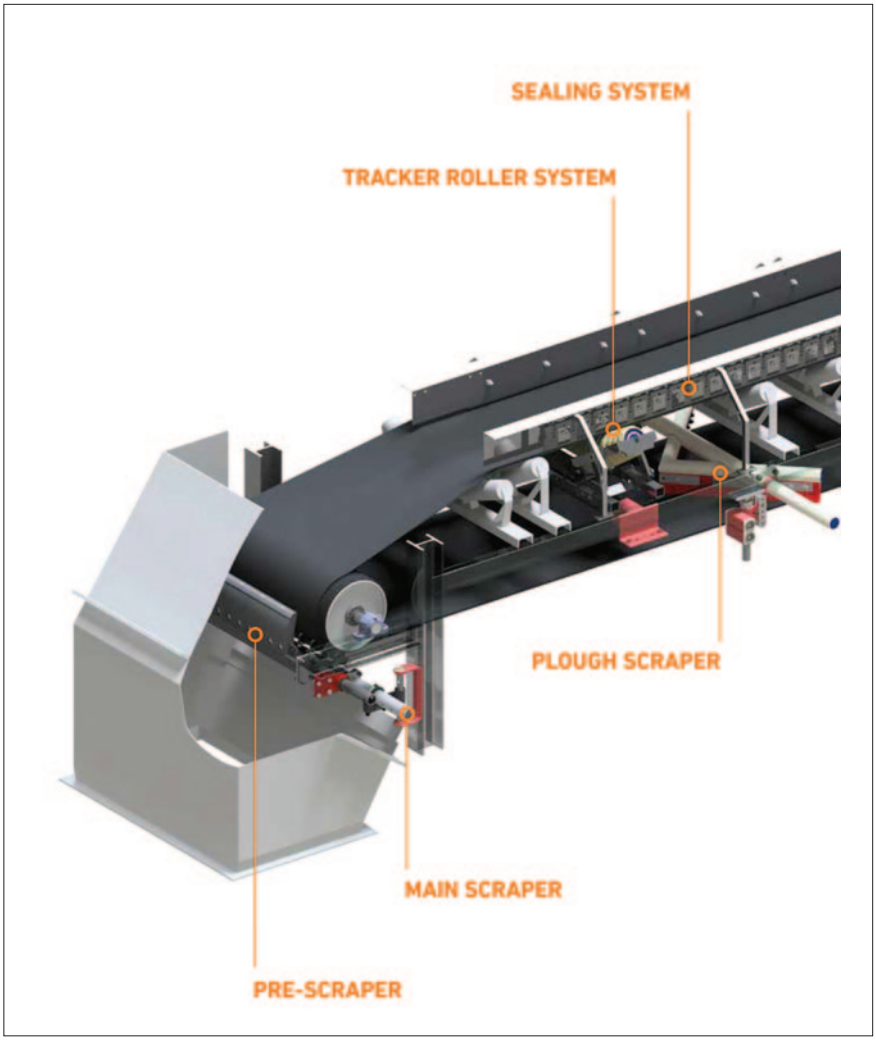
German manufacturer of conveyor belt cleaning equipment, HOSCH, was founded by Hans-Otto Schwarze in 1975. He recognized the serious consequences of carryback on conveyor belts, and understood the challenges. This insight led him to develop conveyor belt scrapers based on an innovative concept — the 'paint-scraper principle,' and it is for this principle that the company is known today.

With this technology, HOSCH created a product that was significantly more efficient than conventional solutions. This innovation laid the foundation for the company's growth into the globally operating company that it is today.

This year, HOSCH Fördertechnik Recklinghausen GmbH proudly celebrates its 50th anniversary. Since its founding in 1975, the company has specialized in high-performance conveyor belt cleaning systems, helping customers around the world maintain maximum productivity by ensuring optimal belt cleaning efficiency.

What makes HOSCH unique is not only its innovative product technology, but also its approach to customer support. It places great value on understanding the specific conditions of each conveyor system, and designing tailor-made solutions that ensure long-term performance and reliability. Its commitment also includes training its customers' staff and supporting the implementation of predictive maintenance strategies as part of sustainable and cost-effective plant operation.

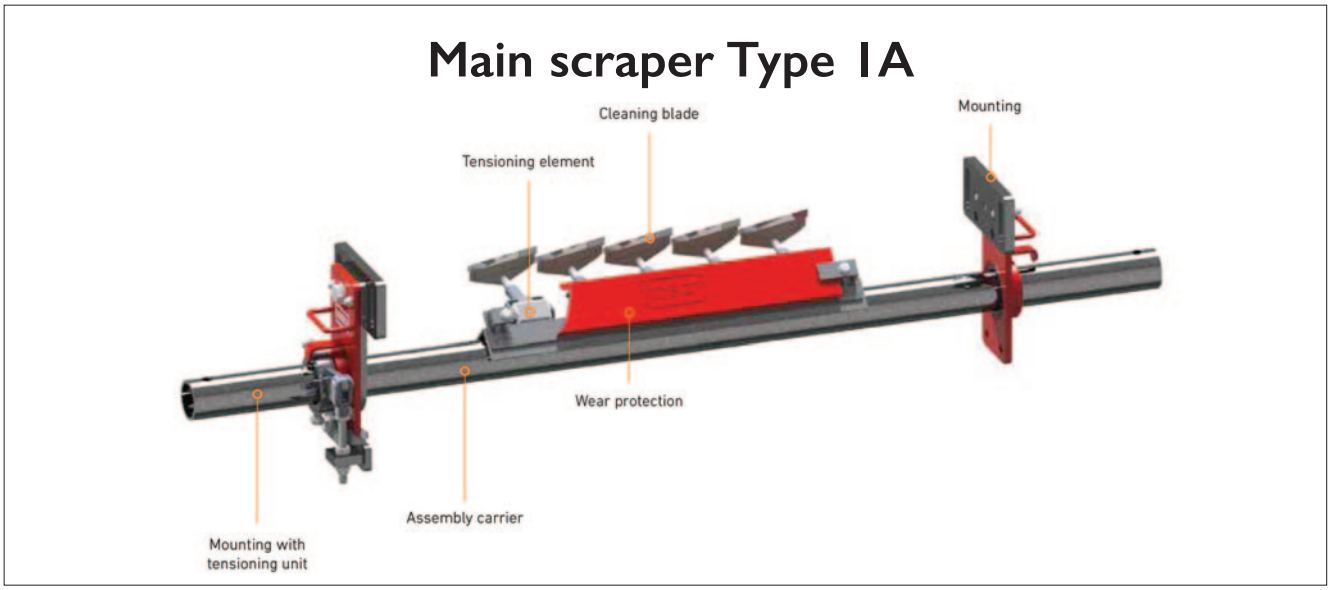
HOSCH products are developed and designed in-house by its dedicated Research & Development department in Recklinghausen, Germany. Through close collaboration with its customers, HOSCH continuously enhances its product portfolio to address evolving industry needs and site-specific challenges.



Today, HOSCH operates through 19 subsidiaries and a strong network of nine official distributors worldwide, all of whom receive regular training and technical support from its headquarters.

HOSCH's current product portfolio includes:

- main scrapers;
- pre-scrapers;
- tracker rollers, -systems;
- sealing systems;
- impact bars;
- a growing range of digital solutions, such as:
  - **HOSCHiris DATA:** a digital platform for service documentation and



planning. Keeping an overview of all assets and track of critical spare parts and service missions is a daily challenge. HOSCHiris DATA provides all critical information anytime, anywhere. Whether on-site or in the office, users get an overview of service history and service planning. The HOSCHiris DATA app keeps track of spare parts and service missions around scrapers — even without a mobile network.

The benefits of the platform include:

1. Transparent service and inventory: the user receives digital service reports and accesses asset data remotely.

2. Increased work safety: all necessary data and emergency contacts are available remotely and on-site.

3. Reduced management efforts: automated inspection scheduling, reporting and invoicing, spare part demand forecast.

The system features include:

1. Straightforward device inventory.
2. Digital capture via NFC and QR code.
3. Usable with mobile, tablet and PC.
4. Device data always at hand.
— device configuration
— service history
— belt information
— spare part tracking
— workplace emergency info.

The HOSCHiris DATA has been collecting in-field data since 2019. It is applied in over 1,000 operations, and information on 7,550 conveyor belts has been digitized. The system is available worldwide.

❒ **HOSCHiris DETECT:** a compact belt monitoring system. Nobody likes unscheduled downtime. The HOSCHiris DETECT notifies the user when an issue at their belt occurs, even before an emergency shutdown is necessary. Using the system means that belt inspections can be performed on demand instead of when scheduled.


HOSCH main scraper in position.

The benefits of the platform include:

1. Reduced manual inspection efforts: the user is notified about potential incidents rather than inspect remote installations frequently.

2. Increased work safety: on-site inspections can be performed on demand, instead of matching schedules.

3. Increased uptime: the user is informed about potential issues before they cause breakdowns.

The system features include:

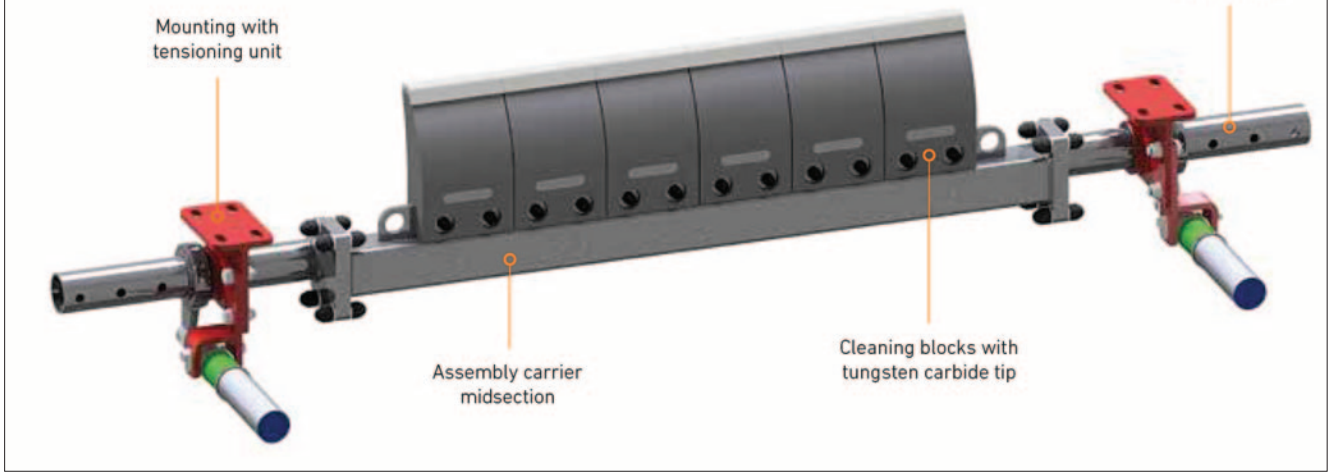
1. Event-based warning system right at the conveyor belt.
2. Easy installation & maintenance.
3. Automatic calibration and data - transmission (NB-IoT).
4. Battery powered (lifetime 6-12 months).
5. Energy-saving stand-by mode.
6. Regular norm measurement and threshold setting.
7. Usable with mobile, tablet and PC.
8. When individual limit values are exceeded:
— direct notification via e-mail
— detail measurement and data transmission for analysis of the incident.

The HOSCHiris DETECT is online in the top five world iron ore operations. It has been securing continuous belt operations since April 2022, and operates in the toughest climates and environments. The system is available worldwide.

❒ **HOSCHiris DISCOVER:** an advanced belt monitoring system offering comprehensive data analysis. Patented technology for more control, which enables the user to

The 'iris' platforms. 'iris' stands for 'intelligent responsive information system'.

Pre-scraper HD-PU-S-SERIES



take advantage of the privileged position of HOSCH scrapers right at the belt. HOSCHiris DISCOVER expands the HD-PU scraper line by adding sensors, cameras and data transmission for a continuous belt monitoring. This tailor-made remote monitoring tool leverages asset-specific and automatically processed data, and improve work safety and asset availability.

The benefits of the platform include:

1. Reduced down-time and continuous production assured: the user is informed about potential issues before they cause breakdowns or damages.

2. Reduced risk for costly belt damages: changes in belt surface and scraper behaviour are continuously monitored.

3. Increased work safety: on-site inspections can be performed on demand instead of following schedules.

4. Reduced labour input: users benefit from digital monitoring to reduce manual inspection efforts of the conveyor.

The system features include:

1. Continuous belt monitoring and data visualization.
2. Vibration resistant HD data.
3. Recording and transmission.
4. Video stream of belt operation.
5. Data storage on-site and in the cloud.
5. Online visualization with live data in individual dashboards.
6. Signal history.
7. Individual configuration options.
8. Remote access from any device via web-browser.
9. Event notification and alerts via e-mail.
10. Support of the HOSCH expert team.
11. Reliable data can be used for further applications and analyses.

The HOSCHiris DISCOVER is online in Europe's largest tunnelling project. In its first year, it prevented €10.2 million in belt damages in its first year. A total of 181 million metres of belt have been scanned. Data transmission is continuous and high resolution. The system is available worldwide.

These digital tools help HOSCH clients monitor their systems more efficiently, detect potential issues early, and optimize their maintenance strategies.

The company's scrapers are different to some of its competitors, in that: there is permanent contact of the scraper edge to the conveyor belt, long service life due to the selection of the best materials, and research and development work at the highest level. The functionality of HOSCH products has many faces. The flexible HOSCH modular system allows a variety of individual solutions tailored to each plant.

Main scrapers

It is customary in the market to install several scrapers, but one optimally matched main scraper from HOSCH is usually sufficient to achieve maximum cleaning results. This not only saves investment costs, but also minimizes the installation and maintenance effort. The use of only one highly efficient main scraper, which replaces two or three conventional scrapers, also minimizes the necessary modifications to the transfer.

The highest productivity with low manpower is an absolute must for conveyor operators worldwide in today's world.

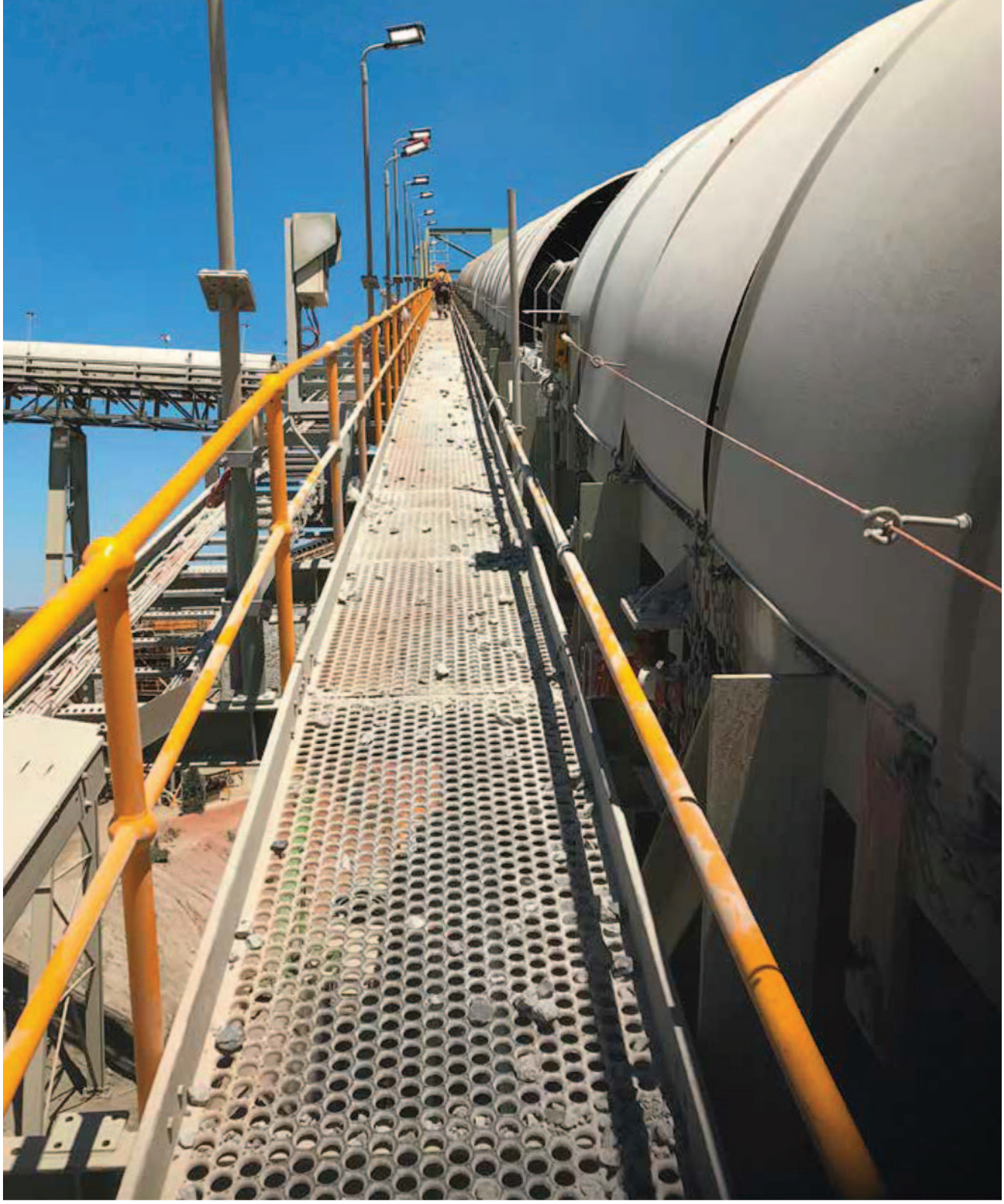
In extreme applications, an additional pre-scraper can be used to relieve the load. However, this is usually not required due to the unique performance of HOSCH main scrapers. HOSCH's primary goal is to provide customers with a perfect result with the minimum amount of equipment.

Advantages include:

- significantly reduced cleaning and operating costs which increase plant availability by:
  - shortened installation and maintenance times due to extremely simple and innovative handling; and
  - extended maintenance intervals due to exceptionally long component service life.
- maximum flexibility with a product that meets the most challenging requirements;
- use of a wide range of optional accessories to compensate for any special features caused by the analogue system; and
- use of a wide range of individualized special components to solve problems, such as: extreme abrasion, chemical influences or special extreme dynamic effects.

Pre-scrapers

Innovative HOSCH scraper technology, also on the discharge drum. Belt conveyors that transport sticky, highly adhesive bulk materials pose special challenges for belt cleaning. Many bulk materials have the property of adhering to the conveyor belt in considerable layer thicknesses. Under such conditions, an additional pre-scraper



should be used for the best possible cleaning result of the main scraper. It is also recommended to use a HOSCH pre-scraper in case of extreme belt speeds and the resulting high carryback volume.

The HOSCH pre-scrapers have been developed with the usual technical expertise and cover every possible application with an extensive product range.

In contrast to other suppliers of pre-scrapers, the HOSCH HDOX-Series offers a unique, complete evasive mechanism and a range of different wear parts depending on the bulk material.

Advantages include:

- the user is assured of continuous, long-lasting and high cleaning performance;
- plant availability is increased through reduced installation times and almost maintenance-free operation;
- the user benefits from the precise co-ordination of the pre-scraper to the overall HOSCH concept; and
- the user can take advantage of various pre-scrapers that can be customized to fit their equipment.

HOSCH is not afraid of any comparison. For this reason, it has developed its own comparative measurement, with which it can measure the performance of different cleaning systems together with the customer. The so-called carryback measurement has become the industry standard. The customer can not only see which savings opportunities are available to them on paper but directly on the system at the relevant conveyor belt.

Main clients

HOSCH equipment is used across a wide range of industries including mining, cement, power generation, steel production, port handling, and bulk terminals, etc. It serves numerous major international clients in these sectors.

GURTEC's components form the backbone of the conveyor

In a world where efficiency, safety, and sustainability drive progress, GURTEC continues to set the benchmark in conveyor component technology. With over five decades of experience, the German manufacturer is shaping the future of bulk material handling — one high-performance component at a time.

German engineering — global reach

Founded in 1969, GURTEC has built a strong reputation for high-quality rollers, idlers, and related components — all engineered and manufactured in Germany. Each product reflects the company's focus on precision, reliability, and long-lasting performance in even the toughest operating conditions.

An early milestone in GURTEC's history came in the 1980s, when the company pioneered the use of plastic-coated steel rollers and frames. This innovation dramatically increased resistance to wear and corrosion, setting a new standard in durability and service life. That same innovative spirit continues to define GURTEC's approach today.

Custom solutions for demanding industries

GURTEC's components power critical operations across industries — from mining and cement to ports, power plants, and steel production. Built to withstand abrasion, high loads, extreme heat, and harsh environments, GURTEC delivers reliable, low-maintenance performance where failure isn't an option.

Smart improvements where it counts

At the core of GURTEC's success lies its ability to innovate precisely where it matters most — in the performance and durability of each component. Several standout technologies underline this strength:

- **Visual Condition Monitoring (VCM):** launched during BAUMA 2025, this patented innovation brings a new level of simplicity to maintenance. The roller surface changes colour when the component reaches the end of its lifespan — allowing for visual, tool-free condition checks even in hard-to-access areas. It's a breakthrough for operational safety, planning, and efficiency.
- **Plastic-Coated Rollers and Frames:** these provide enhanced resistance to wear and environmental exposure,

extending service life while reducing required maintenance.

- **Multi-Channel Labyrinth Seal:** developed in-house, this advanced seal protects bearings from dust, water, and other contaminants — increasing reliability in aggressive environments.
- **Flow Forming Technology (GPR Series):** this manufacturing process ensures perfect roller concentricity, enabling higher belt speeds, smoother operation, and reduced vibration — all without dynamic balancing.
- **End Forming Technology:** a precise forming process integrates the bearing housing directly into the roller shell, enhancing mechanical strength and reducing failure risks.
- **Cold-Forged Hollow Shafts:** these lightweight, high-precision shafts reduce component weight and improve load handling — ideal for heavy-duty installations and energy-sensitive applications.

Sustainability and efficiency

GURTEC places strong emphasis on helping customers reduce energy consumption and operational costs through friction-optimized designs and long-life components.

The Visual Condition Monitoring rollers are a clear example: by eliminating premature or late roller replacement, they reduce waste and avoid unnecessary downtimes — a smart step toward more sustainable maintenance strategies.

GURTEC also supports digital transformation in the bulk material handling space. With smart tools like the HX Belt Monitoring System, operators can track wear, detect misalignment, and plan interventions based on real-time data. These systems bring predictive maintenance to life, increasing overall equipment efficiency and long-term system reliability.

Customer-centric by design

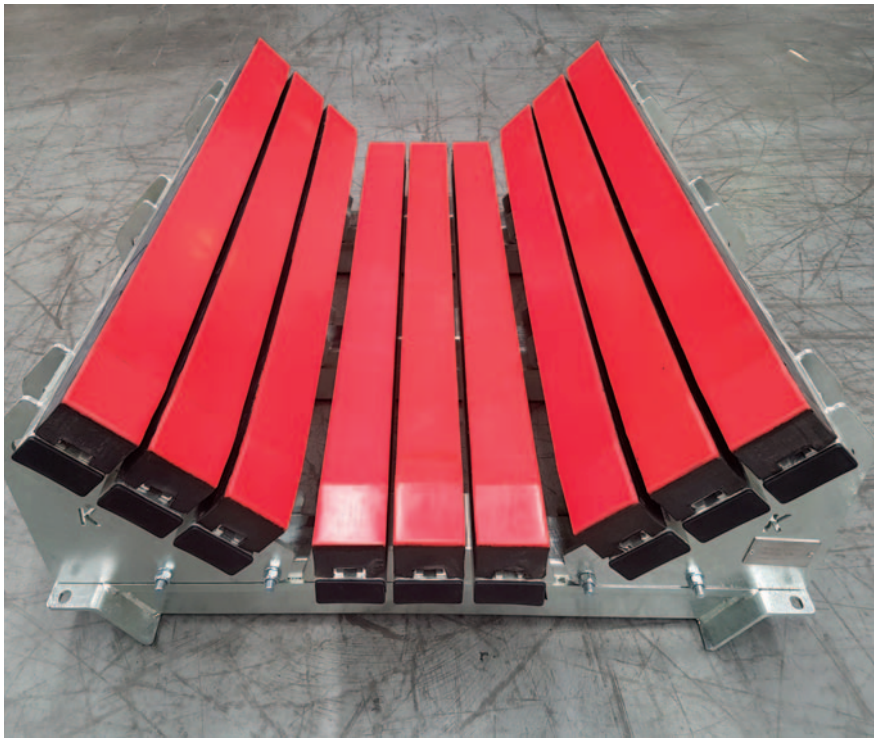
What makes GURTEC a trusted partner in the industry is more than just product quality — it's the company's deep understanding of customer needs. Whether supporting OEMs or end users, GURTEC works closely with its partners to tailor solutions to real-world challenges, from special climate conditions to installation constraints and system integration.

With over 35 million rollers and components supplied to the market, GURTEC is a trusted partner for keeping essential industries running — reliably, efficiently, and at scale.

Looking ahead

As material handling systems become more demanding and digitalization reshapes industrial operations, GURTEC is evolving right alongside. With a continued focus on smarter, more sustainable components, and a legacy of German engineering at its core, the company is well-positioned to support the next generation of bulk handling operations around the world.

Protecting conveyors and the environment with Kinder's K-Shield Impact Belt Support System



Kinder - K-Shield Belt Support System.

In the world of bulk material handling, efficiency, reliability, and environmental responsibility have never been more important. With industries increasing pressure to boost productivity while minimizing their environmental footprint, solutions that offer both operational and sustainability benefits are in high demand. Kinder's K-Shield Impact Belt Support System is one such innovation, designed to meet the tough demands of heavy-duty industries while also contributing to better material containment and reduced waste.

The K-Shield Impact Belt Support System is engineered to improve material containment at high-impact conveyor transfer points, a critical area where material spillage and belt damage often occur. Traditional conveyor systems can struggle to manage the heavy loads, and dynamic forces present at these transfer points, leading to costly maintenance, downtime, and environmental challenges such as dust and material loss.

Recognizing these industry challenges, Kinder has developed the K-Shield Impact Belt Support System as a robust, long-lasting solution. Every cradle is custom engineered to suit a wide range of heavy material applications, offering the rigidity needed to stabilize the belt and load at the point of transfer.

Unlike traditional idler rollers that can lead to uneven load distribution, the K-Shield supports the belt continuously across the entire surface area.

A standout feature of the system is its 12mm thick UHMW polyethylene wear surface, allowing the conveyor belt to slide freely over the cradle. The smooth, curved trough design helps support the belt uniformly, resulting in more effective sealing by the skirting and less chance of material escape. In turn, this not only protects the conveyor belt from edge damage but also reduces spillage — an important environmental consideration.

The environmental advantages of effective material containment are significant. Preventing spillage means less dust generation, fewer clean-up requirements, and lower risk of materials contaminating surrounding land and waterways. For industries conscious of their environmental impact, investing in systems like the K-Shield Impact Belt Support System is a practical step towards achieving more sustainable operations.

Durability and simplicity are at the heart of the K-Shield's design. With no moving parts, there's a reduced risk of mechanical failure, leading to longer service life and lower maintenance demands. This modular system can be tailored to suit virtually any conveyor build and is designed to be easily interchangeable with existing idlers, helping to maintain consistent belt height without costly reconfiguration.

If extra stability is required for demanding mining and high-speed applications, K-Shield can also be manufactured with proprietary K-Glideshield® high speed impact bars. These proprietary composite bars enhance the system's performance with features like a very low coefficient of friction (less than 0.1), and excellent compressive strength. The K-Glideshield® bars also boast anti-static properties to prevent spark generation — a crucial safety consideration in explosive or flammable environments — and are fire resistant and anti-static (FRAS) certified.

Service temperature is another area where K-Glideshield® excels, capable of handling continuous temperatures up to 250°C and short-term peaks of 300°C, making it suitable for the most extreme operational conditions. This added resilience ensures conveyor systems can maintain peak performance even under tough conditions, ultimately extending the lifespan of equipment and reducing the need for frequent replacements.

The benefits of installing the K-Shield Impact Belt Support System extend well beyond equipment protection. By stabilizing the load and reducing material spillage, operations can achieve a more consistent throughput, less downtime for clean-up, and better working conditions for onsite personnel. Less dust and spillage also contribute to a safer, cleaner workplace, aligning with modern expectations for occupational health and safety.

In an era where operational excellence must go hand-in-hand with environmental stewardship, Kinder's K-Shield solution offers a compelling answer. It not only improves the efficiency and reliability of conveyor systems but also helps organizations reduce their environmental impact through better material containment and reduced waste.

Kinder's 40 years of experience in designing bulk materials handling solutions are evident in every detail of the K-Shield Impact Belt Support System. It's a smart investment for companies looking to optimize their operations while contributing to a more sustainable future for the bulk handling industry.

If a company is seeking a proven, engineered solution to contain material more effectively and protect its conveyor systems for the long term, Kinder's K-Shield Impact Belt Support System is ready to deliver.

IKKI: the intelligent revolution in conveyor belt monitoring for ports and other large-scale operations

In a world where operational efficiency marks the divide between industrial leadership and obsolescence, GBS International Group (CI Global Traders SAS, GBS Colombia SAS and Global Belting Solutions LLC) presents its most disruptive breakthrough to date: IKKI, an intelligent monitoring system designed to radically transform the control, analysis, and maintenance of high-performance conveyor belts.

GBS International Group has identified that the world of conveyor belts has predominantly focused on their mechanics, performance, durability, and efficiency. While some automation processes have proven effective — especially in light-duty conveyor systems — it has observed that in the realm of heavy-duty belts, automation remains minimal and limited to basic functionalities, despite operating in far more robust environments. With IKKI, GBS International Group aims to create both a brain and a heart capable of operating conveyor systems, acting as the eyes and hands of operations managers — not only monitoring performance, but also delivering metrics and strategic insights for decision-making. More than that, the system itself can take autonomous decisions and self-adjust in moments of operational stress or urgency. This is where the true value of a system that learns, processes, and delivers lies — optimizing performance and delivering reliably consistent results.

IKKI: more than monitoring — a living intelligence

IKKI is not just another sensor platform. It is a neural network specifically trained to interpret conveyor belt behaviour in real-time, identifying wear patterns, thermal anomalies, dynamic imbalances, progressive misalignments, material build-up, or suboptimal load conditions. Through an adaptive artificial intelligence architecture, IKKI learns from each industrial environment to deliver anticipatory — not merely reactive — solutions.

What sets IKKI apart is not only its technical precision but its ability to evolve over time, drawing from historical data, weather conditions, load cycles, and overall system performance. It is a cognitive assistant that doesn't just issue alerts — it reasons, compares, and proposes decisions.

IKKI has the ability to integrate into diverse operational systems, offering intelligent solutions. When properly paired with compatible software and hardware, it can execute decisions such as emergency stops, alignment adjustments, and material flow regulation. It operates autonomously and, thanks to its neural network, learns, corrects, understands, and adapts to the most demanding industrial conditions.

From theory to action: how IKKI transforms operations

In a port handling more than 60,000 tonnes of coal per day, the implementation of IKKI made it possible to detect an anomalous microvibration in one of the intermediate loading stations. Imperceptible to the naked eye, IKKI recognized the pattern as an early sign of drum imbalance.

In a mining operation located at 4,100 metres above sea level, IKKI learned to detect aggressive thermal fluctuations impacting the elasticity of certain transported materials. Leveraging this insight, it dynamically adjusted predictive maintenance alerts based on the type of material and the operational shift, optimizing component lifespan without human intervention.

Intelligence embedded in the process

IKKI does not require expansive control centres. Its interface is accessible from mobile devices, tablets, or local stations. Its dynamic dashboard offers real-time visualization, intelligent reports, and alerts classified by criticality. However, its true power lies in its core: a system that understands the language of industrial operations and transforms it into smart decisions.

With IKKI, maintenance shifts from a reactive routine to a continuous optimization strategy. Conveyor belts cease to be mere mechanical elements and become sensored systems with a voice of their own. The result: full traceability, reduced contingencies, extended service life, and operational control that previously existed only in highly robotic environments.

This is the new paradigm — systems that think, learn, communicate, and evolve. IKKI does not replace the operator — it empowers them. It doesn't substitute the engineer — it expands their vision. And it doesn't replace management — it equips them with real-time, data-driven decision-making tools.

Developed in Colombia, IKKI sends a bold message to the global industry: breakthrough innovation is not exclusive to Silicon Valley or tech giants. It also emerges in industrial corridors where labour, ingenuity, and vision intersect — where conveyor belts are not just mechanical lines, but vital arteries that keep entire economies moving.

GBS International Group: technology with purpose

Since 2016, CI Global Traders SAS, together with the integration of Global Belting Solutions LLC and GBS Colombia SAS, has supported the port, mining, food, and logistics industries with customized conveyor belt solutions. Today, with IKKI, the group reaffirms its role not merely as a product supplier, but as a designer of the future of industrial operations — one that combines intelligence, human insight, and strategic vision.

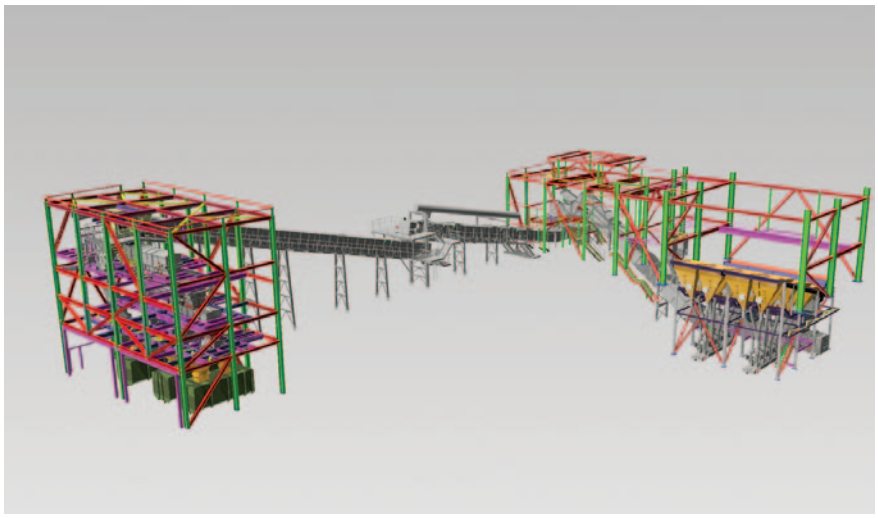
The group's mission is to create tailor-made solutions for each client, aiming to optimize processes while offering support, development, and innovation at every stage. It is a reliable strategic ally in developing the innovations that operations demand.

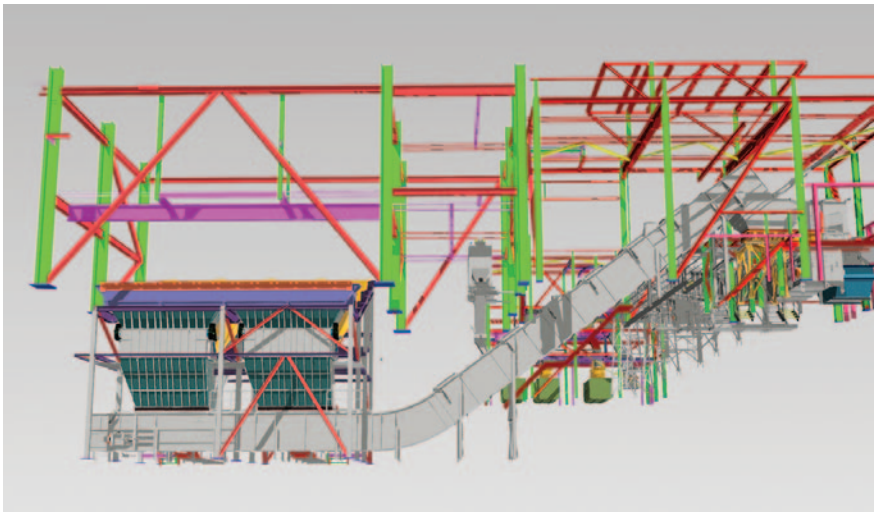
Because the future is not something to await. It must be monitored, predicted — and built.

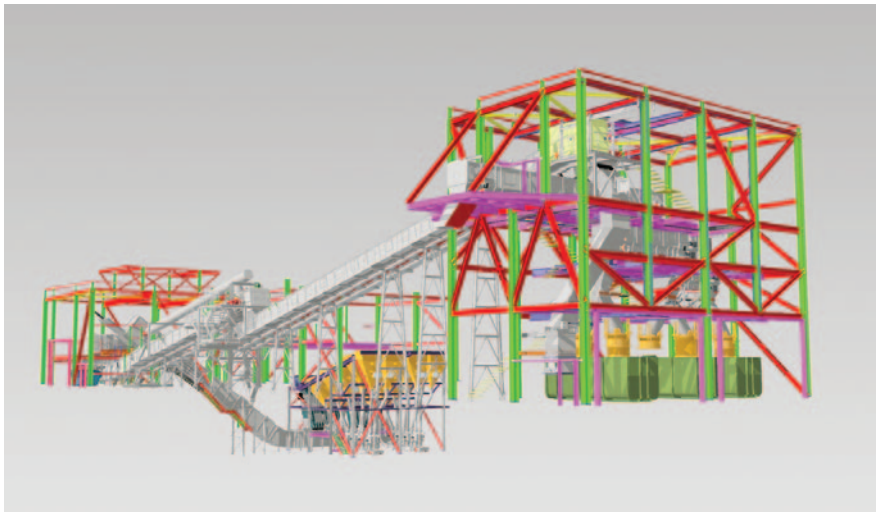
Sustainable waste management at Sweden's largest waste incineration plant

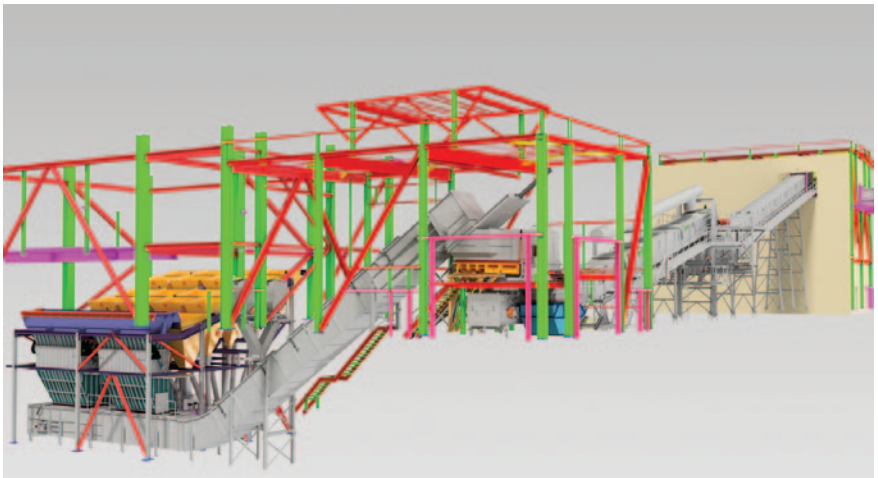
Location: Högbytorp, Sweden
Completion and commissioning: 2020
Bulk material: ash, slag

The circular economy process is successfully used in Sweden's largest waste-to-energy (WTE) plant since several years. The WtE facility generates electricity, heating power and biogas for the metropolis of Stockholm from incinerated municipal and industrial waste. Instead of a wet deslagging process, a dry deslagging system from Loibl was installed, which was convincing due to its customized, technically sophisticated design and robust construction.









Dry slag conveying system

Loibl's LASHDRYPRON® ensures the discharge of bottom ash and cools slag by means of cooling air flowing into the conveyor through control dampers and openings with non-return valves. In the event of a malfunction of the slag conveyor, the hydraulically driven flaps in the slag chute are closed. This way, the conveyor system is separated from the furnace. If unburned residues ignite in the deslagger, the dry extinguishing device is triggered by temperature measurements. Boiler ash from a feed tank is preferably used for extinguishing. As a final fire-fighting measure, the extinguishing nozzles with which the deslagger is equipped are activated.

An enclosed particle separator at the outlet of the dry deslagger ensures that coarse fragments fall into a container. The remaining slag is picked up by an apron conveyor and cooled down further. This is followed by a belt conveyor that transports combustion residues to the slag hall, where FE metal separation takes place using an overband magnet. Furthermore, the slag is discharged onto a belt conveyor leading to the slag processing plant. In addition, the slag can be diverted to three separate containers via reversible belt conveyors.

Loibl's engineering team designed the entire conveying path to the transfer point to the belt conveyor for slag processing to be dust-tight. All conveying units are kept under negative pressure by a fan. The extracted air is cleaned by means of a filter and fed to the secondary air of the grate firing system

Scope of supply

- LASHDRYPRON®: dry slag conveyor;

- LASHCHAINCON®: trough chain conveyor;
- LASHBELTCON®: belt conveyor (reversible) with belt weigher and cleaning scraper in dust-tight design;
- overband magnetic separator;
- double flap valve;
- chutes;
- (pneumatic) gate valves;
- loader;
- coarse part separator; and
- two-way diverter.

Ash handling

The boiler ash is discharged with discharge screws. It enters a trough chain conveyor via a crushing rotary valve. Trough chain conveyors combine the boiler ash from the various boiler passes. Fly ash discharged from the fuel bed is separated in the boiler area and transported to the boiler ash silo by a mechanical boiler ash conveyor. There it can be discharged from the silo via a crushing rotary valve. For unloading the silo, a loading bellows was installed, which ensures dust-free unloading by means of a dust extraction system.

Scope of supply

- LASHSCREWCON®: screw conveyor;
- LASHCHAINCON®: trough chain conveyor;
- manual and pneumatic slide gate valves;
- various chutes;
- rotary feeders with crushing function;
- docking device;
- container with accessories;
- loading device for silo vehicles; and
- ash silo

Scope of services

- consulting and planning;
- basic and detail engineering;
- plant construction;
- production in Straubing, Bavaria; and
- delivery.

Wet or dry slag conveying - Where are the advantages?

With both processes, the majority of the slag residues produced are recycled to recover valuable metallic residues.

With wet slag conveying, hot slag and remaining embers from the boiler are fed to a water bath in which they cool down rapidly. Depending on the application, Loibl uses patented product solutions for this process, including highly efficient pan conveyors, chain conveyors, wet slag conveyors as well as slag pushers. While

wet slag conveying is proven, the recovery rate of metallic residues is lower than with dry slag conveying.

With dry slag conveying, cooling is done with air instead of water. Loibl's LASHDRYPRON® efficiently separates fine and coarse ash, which increases the recovery rate of FE and NF metals. DCi

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